Appendix A

Stormwater Ordinance

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ORDINANCE NO. 2015-

AN ORDINANCE OF THE CITY COUNCIL OF THE CHARTERED CITY OF VISTA, CALIFORNIA, AMENDING CHAPTER 13.18 OF THE VISTA MUNICIPAL CODE REGARDING THE STORMWATER MANAGEMENT AND DISCHARGE CONTROL PROGRAM

The City Council of the City of Vista does ordain as follows:

1. Findings. The City Council hereby finds and declares that:

A. The Regional Water Quality Control Board for the San Diego region (RWQCB) has approved Order No. R9-2013-0001 and later amended as R9-2015-0001, National Pollutant Discharge Elimination System (NPDES) Permit No. CAS0109266 (Permit); and

B. The Permit requires certain changes be made to the Stormwater Management and Discharge Control Ordinance (Chapter 13.18 of the Vista Municipal Code).

C. The purpose of this Ordinance is to update the Stormwater Management and Discharge Control Ordinance to comply with the Permit; and

D. Adoption of this ordinance and the associated Stormwater Standards Manual are exempt from review under the California Environmental Quality Act pursuant to section 21080.5 of the Public Resources Code and 14 CCR sections 15060(3)(1), 15060(c)(3), 15251(g), 15307 and 15308.

2. Code Amendment.

Chapter 13.18 is hereby amended to read as follows:

Chapter 13.18

Stormwater Management and Discharge Control Program

Sections:

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Section 13.18.010 Title

This chapter shall be known as the "Stormwater Management and Discharge Control Ordinance."
(Ord. No. 93-18, Enacted, 7/6/93; Ord. No. 2002-10, Amended, 3/29/02; Ord. No. 2002-24, Amended, 11/12/02; Ord. No. 2008-14, Repealed and Replaced, 4/8/08)

Section 13.18.020 Purpose

The purposes of this chapter are as follows:

A. To establish requirements for discharges into the Municipal Separate Storm Sewer System (MS4), receiving waters, and the environment;

B. To protect, to the maximum extent practicable (MEP), life, property, receiving waters, aquatic life, and the environment from loss, injury, degradation, or damage by discharges from within the City's jurisdiction;

C. To protect the MS4 from damage; and

D. To meet the requirements of state and federal law and the City of Vista's (City's) MS4 Permit.

(Ord. No. 93-18, Enacted, 7/6/93; Ord. No. 2002-10, Amended, 3/29/02; Ord. No. 2002-24, Amended, 11/12/02; Ord. No. 2008-14, Repealed and Replaced, 4/8/08)

Section 13.18.030 Definitions

When used in this chapter and reference documents (including the Stormwater Standards Manual), the following definitions shall have the meanings given by this section, whether or not these words or phrases are capitalized:

"Advanced Treatment" means using mechanical or chemical means to flocculate and remove suspended sediment from runoff from construction sites prior to discharge.

"Authorized Enforcement Staff" means any City employee or contractor hired by the City who is assigned to duties involving permits and other City approvals, inspections, or enforcement related to this chapter.

"Authorized Enforcement Official" means the City Manager or his/her designee who is responsible for enforcing the provisions of this chapter.

"Best Management Practices" or "BMPs" are the schedules of activities, pollution treatment practices or devices, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices or devices to prevent or reduce the discharge of pollutants directly or indirectly to stormwater, receiving waters, or the **"MS4"**. Best Management Practices also include, but are not limited to, treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage. Best Management Practices may include any type of pollution prevention and pollution control measure that can help to achieve compliance with this Chapter.

"Channel" means natural or improved watercourse with a definite bed and banks that conveys continuously or intermittently flowing water.

"City" means the City of Vista

"Contamination" as defined in the Porter-Cologne Water Quality Control Act, is "an impairment of the quality of waters of the State by waste to a degree which creates a hazard to the public health through poisoning or through the spread of disease. Contamination includes any equivalent effect resulting from the disposal of waste whether or not waters of the State are affected."

"County" means the County of San Diego.

"Developer" is a person who seeks or receives permits for or who undertakes land development activities.

"Development Project Proponent" refers to Developer.

"Direct Discharge" means stormwater or non-stormwater that enters receiving waters from a facility or activity, without mixing with any stormwater or non-stormwater from another facility or activity prior to entering such receiving waters.

"Discharge" when used as a verb, means to allow pollutants to directly or indirectly enter stormwater, or to allow stormwater or non-stormwater to directly or indirectly enter the **"MS4"** or receiving waters, from an activity or operations, which one owns or operates. When used as a noun, discharge means the pollutants, stormwater and/or non-stormwater that is discharged.

"Discharger" is any person or entity engaged in activities or operations or owning facilities, which will or may result in pollutants entering stormwater, the **"MS4"**, or receiving waters; and the owners of real property on which such activities, operations or facilities are located; provided, however, that a local government or public authority is not a discharger as to activities conducted by others in public rights-of-way.

"Erosion" refers to any process in which land is diminished or worn away due to wind, water, or glacial ice. Often the eroded debris (silt or sediment) becomes a pollutant via storm water runoff. Erosion occurs naturally but can be intensified by land-clearing activities such as farming, development, road building, and timber harvesting.

"Groundwater" means subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated.

"Illegal Connection" means a pipe, facility, or other device connected to the **"MS4"** or receiving waters, which has not been authorized by the City; or a permitted/authorized pipe, facility, or other device, which conveys illegal discharges.

"Illegal Discharge" is any discharge into the MS4 or receiving waters that is prohibited by this Chapter. This includes, but is not limited to, discharges of non-stormwater that are not exempt discharges listed in Section 13.18.060, discharges of irrigation runoff to the **"MS4"**, any discharge from an illegal connection, and any discharge that contains additional pollutants due to the absence of a required BMP or the failure of a BMP. Discharges that require a City permit or an RWQCB permit that has not been issued or has not been acknowledged by the discharger to be applicable are illegal discharges. Discharges regulated under an applicable NPDES Permit are illegal discharges for purposes of this Chapter, unless compliance with all applicable permit and SWPPP conditions are maintained.

"Impaired Water Body" is a water body that is listed by the **"RWQCB"** and **"SWRCB"** as impaired by a particular pollutant or pollutants, pursuant to Section 303(d) of the Federal Clean Water Act. **"303(d)-Listed Water Body"** has the same meaning.

"Impervious Cover or Impervious Surface" refers to constructed or modified surfaces that cannot effectively infiltrate rainfall. The term includes, but is not limited to, building rooftops, pavement, sidewalks, and driveways.

"Impervious Surface Area" means the ground area covered or sheltered by an impervious surface, measured in plan view (i.e., as if from directly above). For example, the

impervious surface area for a pitched roof is equal to the ground area it shelters, rather than the surface area of the roof itself.

"Industrial Stormwater Permit" is the State General Industrial Stormwater Permit.

"Land Development Activity" is any activity or proposed activity that requires any of the permits or approvals listed in Section 13.18.040.C of this Chapter.

"Land Disturbance Activity" is any activity that moves soils or substantially alters the pre-existing vegetated or man-made cover of any land. This includes, but is not limited to, grading, digging, cutting, scraping, stockpiling or excavating of soil; placement of fill materials; paving, pavement removal, exterior construction; substantial removal of vegetation where soils are disturbed, including, but not limited to, removal by clearing or grubbing; or any activity which bares soil or rock or involves streambed alterations or the diversion or piping of any watercourse. Land disturbance activity does not include routine maintenance to maintain original line and grade, hydraulic capacity, or the original purpose of the facility, nor does it include emergency construction activities (i.e., land disturbances) required to protect public health and safety.

"Land Owner" is the holder of legal title to the land, and other persons or entities who exercise control over a land development project pursuant to rights granted in a purchase agreement, joint venture agreement, development agreement, or long term lease.

"Maintenance of a BMP" refers to the regular action taken to maintain the as-designed performance of a BMP, and includes, but is not limited to, repairs to the BMP as necessary, and replacement of the BMP by an equally effective or more effective BMP at the end of its useful life.

"Maximum Extent Practicable" "MEP" is an acceptability standard for Best Management Practices (BMPs). When BMPs are required to meet this standard, the BMPs must be the most effective set of BMPs that are still practicable. A BMP is effective if it prevents, reduces or removes the pollutants that would otherwise be present in runoff due to human activity. A BMP is practicable if: it complies with other regulations as well as stormwater regulations; is compatible with the area's land use, character, facilities, and activities; is technically feasible (considering area soil, geography, water resources, and other resources available); is economically feasible; and provides benefits that are reasonable in relation to costs.

"MS4 Permit" refers to RWQCB Order No. R9-2013-0001, NPDES Permit No. CAS0109266, as may be amended.

"Municipal Separate Storm Sewer System" or "MS4" means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to state law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under state law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or designated and approved management agency under section 208 of the CWA that discharges to waters of the United States; (ii) Designated or used for collecting or conveying storm water; (iii) Which is not a combined sewer; (iv) Which is not part of the Publicly Owned Treatment Works **"POTW"** as defined at 40 CFR 122.26.

"Non-Storm Water Discharge" is any discharge to the Storm Water Conveyance System or **"Receiving Waters"** that is not composed entirely of stormwater.

"NPDES Permit" is a National Pollutant Discharge Elimination System permit issued by the U.S. Environmental Protection Agency, the "**SWRCB"**, or the **"RWQCB".**

"Person" means any individual, corporation, partnership, organization, enterprise, or similar entity whether for profit or nonprofit.

"Pollutant" means any agent that may cause or contribute to the degradation of water quality such that a condition of pollution or contamination is created or aggravated.

"Pollution," as defined in the Porter-Cologne Water Quality Control Act, is "the alteration of the quality of the waters of the State by waste, to a degree that unreasonably affects either of the following: 1) The waters for beneficial uses; or 2) Facilities that serve these beneficial uses." Pollution may include contamination.

"Premises" means any building, lot parcel, land or portion of land whether improved or unimproved.

"Priority Development Project" "PDP" refers to new development and redevelopment project categories as more fully set forth in Section E.3.b of the MS4 Permit and in the "**Stormwater Standards Manual"**.

"Public Nuisance" has the same meaning as in Vista Municipal Code section 8.36.030.

"Receiving Waters" refers to all waters that are "waters of the state" within the scope of the State Water Code, including, but not limited to, natural streams, creeks, rivers, reservoirs, lakes, ponds, water in vernal pools, lagoons, estuaries, bays, the Pacific Ocean, and ground water.

"Redevelopment" is the creation, addition, and or replacement of impervious surface on an already developed site. Examples include the expansion of a building footprint, road-widening, the addition to or replacement of a structure, and creation or addition of impervious surfaces. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include trenching and resurfacing associated with utility work; resurfacing and reconfiguring surface parking lots and existing roadways, new sidewalk construction, pedestrian ramps, or bike lane on existing roads; or routine replacement of damaged pavement, such as pothole repair.

"Runoff" means all flows in an MS4, including stormwater (wet weather flows) and non-stormwater (dry weather flows).

"RWQCB" means the California Regional Water Quality Control Board for the San Diego Region.

"State" means the State of California.

"State General Construction Stormwater Permit" refers to **"NPDES"** Permit No. CAS000002, as may be amended.

"State General Industrial Stormwater Permit" refers to NPDES Permit No. CAS000001, as may be amended.

"Stop Work Order" is an order issued which requires that specifically identified activity or all activity on a site be stopped.

"Storm Water Quality Management Plan" or "SWQMP" is a report that documents how a Priority Development Project complies with applicable BMP requirements for land development and redevelopment activities listed in the **"Stormwater Standards Manual"**.

"Stormwater" refers to the surface runoff and drainage associated with storm events.

"Stormwater Management" is the use of structural or non-structural BMPs that are designed to reduce urban runoff pollutant loads, discharge volumes, and/or peak discharge flow rates or velocities. When applied to the City, the County or another municipality, stormwater management also includes planning and programmatic measures.

"Stormwater Pollution Prevention Plan" "SWPPP" is a document that meets the requirements for a **"SWPPP"** set out in the State General Construction Stormwater Permit or State General Industrial Stormwater Permit.

"Stormwater Standards Manual" refers to the manual described in Section 13.18.040.B.

"Structural BMP" A subset of BMPs that detains, retains, filters, removes, or prevents the release of pollutants to surface waters from development projects in perpetuity, after

construction of a project is completed. This subset of BMPs requires regular maintenance to function as designed.

"Structural Post-Construction BMP" is a structural BMP (other than a temporary construction-related BMP) put in place in connection with a land development activity or redevelopment project to prevent or reduce contamination in stormwater or receiving waters, or to prevent or reduce erosion downstream from the project.

"SWRCB" means the State Water Resources Control Board.

"Watercourse" is a permanent or intermittent stream, creek, or other body of water, either natural or improved, which gathers or carries surface water.

"Water Pollution Control Plan" (WPCP) is a document that describes the BMPs to be implemented by the Land Owner or Discharger to eliminate or reduce to the MEP discharges of pollutants to the MS4. A WPCP must include all measures necessary to comply with this Chapter and the Stormwater Standards Manual to the satisfaction of Authorized Enforcement Staff. A WPCP is typically shorter than a SWPPP. A SWPPP may be accepted in lieu of a WPCP at the discretion of Authorized Enforcement Staff.

"Water Quality Standards" are defined as the beneficial uses (e.g., swimming, fishing, municipal drinking water supply, etc.) of water and the water quality objectives adopted by the State or the United States Environmental Protection Agency to protect those uses.

"Waters of the United States" are waters subject to the regulatory jurisdiction of the United States under the Federal Clean Water Act and applicable case law. (In general, this includes navigable waters, waters tributary to navigable waters, and adjacent wetlands.)

(Ord. No. 93-18, Enacted, 7/6/93; Ord. No. 2002-10, Amended, 3/29/02; Ord. No. 2002-24, Amended, 11/12/02; Ord. No. 2008-14, Repealed and Replaced, 4/8/08)

Section 13.18.040 General Provisions

A. Construction and Application. Interpretation of the meanings of parts of this Chapter shall assure consistency with the purpose and intent of this chapter. This includes, but is not limited to, consistency with the requirements of the MS4 Permit. This Chapter is not intended to interfere with, abrogate or annul any other ordinance, rule or regulation, statute, or other provision of law. The requirements of this Chapter should be considered minimum requirements, and where any provision of this Chapter imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, whichever provisions are more restrictive or impose higher protective standards for human health or the environment shall take precedence.

B. Stormwater Standards Manual. The Authorized Enforcement Official may establish a written description of the runoff management measures and programs, including minimum BMPs that the City will implement, or require to be implemented, to ensure compliance with this Chapter. These documents shall be known collectively as the Stormwater Standards Manual. Amendments to the Stormwater Standards Manual shall be approved by the Authorized Enforcement Official. The Stormwater Standards Manual shall have the same force and effect as the provisions of this Chapter, and a violation of the Stormwater Standards Manual shall constitute a violation of this Chapter and be subject to all remedies and penalties as exist for a violations of the provisions of this Chapter. A copy of the Stormwater Standards Manual, and all amendments thereto, shall be posted to the City's website.

(Ord. No. 93-18, Enacted, 7/6/93; Ord. No. 2002-10, Amended, 3/29/02; Ord. No. 2002-24, Amended, 11/12/02; Ord. No. 2008-14, Repealed and Replaced, 4/8/08)

Section 13.18.045 Watercourse Protection

Every person owning or occupying property through which a natural watercourse of a stormwater conveyance system passes shall:

A. Keep and maintain that part of the watercourse within the property free of trash, debris and other materials that would pollute, contaminate, retard, or divert the flow of water through the watercourse or the MS4;

B. Maintain existing structures within or adjacent to such a watercourse so that those structures will not become a hazard to the use, function, or physical integrity of the watercourse or the MS4; and

C. Not remove healthy bank vegetation beyond that necessary for maintenance, nor remove vegetation in such a manner as to increase the vulnerability of the watercourse to erosion;

D. Deposit in, plant in, or remove any material from a watercourse, including its banks, except as required for necessary maintenance;

E. Construct, alter, enlarge, connect to, change, or remove any structure in a watercourse; or

F. Carry out developments within 50 feet of the centerline of any watercourse or 20 feet from the top of a bank of a watercourse, whichever is the greater distance from the centerline of the watercourse;

G. The above requirements do not supersede any requirements set forth by the California Department of Fish and Game, the SWRCB, the RWQCB, or the United States Army Corps of Engineers regulating waters of the United States and/or storm water discharges.

(Ord. No. 2002-24, Added, 11/12/02; Ord. No. 2008-14, Repealed and Replaced, 4/8/08)

Section 13.18.050 Discharge Prohibitions

A. Illegal Discharges. Illegal discharges are prohibited except where exempted in Section 13.18.060 of this Chapter. As defined in Section 13.18.030 of this Chapter, illegal discharges include, but are not limited to, discharges of non-stormwater that are not exempt, discharges listed in Section 13.18.060, discharges of irrigation runoff to the MS4, any discharge from an illegal connection, and any discharge that contains additional pollutants due to the absence of a required BMP or the failure of a BMP. Discharges that require a City permit or an RWQCB permit that has not been issued or has not been acknowledged by the discharger to be applicable are illegal discharges. Discharges regulated under an applicable NPDES Permit are illegal discharges for purposes of this Chapter unless compliance with all applicable permit and SWPPP conditions are maintained.

B. Illegal Connection. The establishment of illegal connections is prohibited. As defined in Section 13.18.030 of this Chapter, illegal connection means a pipe, facility, or other device connected to the MS4 or receiving waters, which has not been authorized by the City; or a permitted/authorized pipe, facility, or other device, which conveys illegal discharges. The use of illegal connections is prohibited, even if the connection was established pursuant to a valid City or County permit and was legal at the time it was constructed.

C. Prevention of Illegal Discharges. Throwing, depositing, leaving, abandoning, maintaining or keeping materials or wastes on public or private lands in a manner and place where they may result in an illegal discharge is prohibited.

D. Violations of the MS4 Permit. It is unlawful for any person to, jointly or individually, cause by action or omission a condition, occurrence, event, or situation which causes or threatens to cause any discharge into or from the MS4 that results in or contributes to a violation of the MS4 Permit.

(Ord. No. 93-18, Enacted, 7/6/93; Ord. No. 2002-10, Amended, 3/29/02; Ord. No. 2002-24, Amended, 11/12/02; Ord. No. 2008-14, Repealed and Replaced, 4/8/08)

Section 13.18.060 Exemptions to Discharge Prohibitions

A. Permitted Discharges. Any discharge to the MS4 that is regulated under a NPDES permit issued to the discharger and administered by the State of California pursuant to Division 7 of the California Water Code is allowed, provided that the discharger is in compliance with all requirements of the NPDES permit and other applicable laws and regulations.

B. Groundwater Discharges Typically Requiring Permits. Non-storm water discharges to the MS4 from the following categories are allowed if: (i) the discharger obtains coverage under NPDES Permit No. CAG919002 (RWQCB Order No. R9-2008-0002, or subsequent order) for discharges to surface waters other than San Diego Bay, and the discharger is in compliance with all requirements of the applicable NPDES permit and all other applicable laws and regulations; or (ii) the RWQCB determines in writing that coverage under NPDES Permit No. CAG919002 (or subsequent permit) is not required. Otherwise, non-storm water discharges from the following categories are illicit discharges:

1. Discharges from uncontaminated pumped groundwater;
2. Discharges from foundation drains when the system is designed to be located at or below the groundwater table to actively or passively extract groundwater during any part of the year;
3. Discharges from water from crawl space pumps;
4. Discharges from water from footing drains when the system is designed to be located at or below the groundwater table to actively or passively extract groundwater during any part of the year.

C. Discharges from Water Lines. Non-storm water discharges to the MS4 from water line flushing and water main breaks are allowed if the discharges have coverage under NPDES Permit No. CAG679001 (Regional Water Quality Control Board Order No. R9-2010-0003, or subsequent order), and the discharger is in compliance with all requirements of that NPDES permit and other applicable laws and regulations. This category includes water line flushing and water main break discharges from water purveyors issued a water supply permit by the California Department of Public Health or federal military installations. Discharges from recycled or reclaimed water lines to the MS4 are allowed if the discharges have coverage under an NPDES permit, and the discharger is in compliance with the applicable NPDES permit and other applicable laws and regulations. Otherwise, discharges from water lines are illicit discharges.

D. Allowable Discharges. Non-storm water discharges to the MS4 from the following categories are allowed, unless the enforcement official or the Regional Water Quality Control Board identifies the discharge as a source of pollutants to receiving waters, in which case the discharge is considered an illicit discharge:

1. Discharges from diverted stream flows;
2. Discharges from rising groundwater;
3. Discharges from uncontaminated groundwater infiltration to the MS4;
4. Discharges from springs;
5. Discharges from flows from riparian habitats and wetlands;
6. Discharges from potable water sources, except as set forth in Vista Municipal Code section 13.18.060.C;

7. Discharges from foundation drains when the system is designed to be located above the groundwater table at all times of the year, and the system is only expected to produce non-storm water discharges under unusual circumstances; and

8. Discharges from footing drains when the system is designed to be located above the groundwater table at all times of the year, and the system is only expected to produce non-storm water discharges under unusual circumstances.

E. Conditionally Allowed Discharges. Non-storm water discharges from the following categories are allowed if they are addressed as follows. Otherwise, non-storm water discharges from the following categories are illicit discharges:

1. Air conditioning condensation. Air conditioning condensation discharges shall comply with applicable BMPs identified in the Stormwater Standards Manual.

2. Individual residential vehicle washing. Wash water from individual residential vehicle washing must be directed to landscaped areas or other pervious surfaces, where feasible. Where discharges cannot be feasibly prevented, BMPs must be implemented in accordance with the Stormwater Standards Manual. Non-commercial car washes, such as fundraisers and other similar activities, are not considered individual residential vehicle washing. Discharges from such activities are therefore considered Illegal Discharges.

3. Water from swimming pools.

a. Chlorinated swimming pool water. Chlorine, algaecide, filter backwash, and other pollutants shall be eliminated prior to discharging swimming pool water to the MS4.

b. Saline swimming pool water. Saline swimming pool water must be directed to the sanitary sewer, landscaped areas, or other pervious surfaces that can accommodate the volume of water, unless the saline swimming pool water can be discharged directly to a naturally saline water body.

F. Firefighting Activities. Non-storm water discharges to the MS4 from firefighting activities are allowed if they are addressed as follows:

1. Non-emergency firefighting discharges. Non-emergency firefighting discharges, including building fire suppression system maintenance discharges (e.g. sprinkler line flushing), controlled or practice blazes, training, and maintenance activities shall be addressed by BMPs to prevent the discharge of pollutants to the MS4.

2. Emergency firefighting discharges. BMPs are encouraged to prevent pollutants from entering the MS4. During emergencies, priority of efforts should be directed toward life, property, and the environment (in descending order). BMPs shall not interfere with emergency response operations or impact public health and safety.

G. Exemptions not Absolute. Notwithstanding the categories of non-storm water discharges conditionally allowed by Vista Municipal Code sections 13.18.060.A through F, if the RWQCB or the Authorized Enforcement Official determines that any of these categories of otherwise conditionally allowed non-storm water discharges are a source of pollutants to receiving waters, are a danger to public health or safety, or are causing a public nuisance, such discharges shall be prohibited from entering the MS4.

(Ord. No. 93-18, Enacted, 7/6/93; Ord. No. 2002-10, Amended, 3/29/02; Ord. No. 2002-24, Amended, 11/12/02; Ord. No. 2008-14, Repealed and Replaced, 4/8/08)

Section 13.18.070 BMP Requirements for All Dischargers

A. Best Management Practices. Any person engaged in activities which may result in discharges to the MS4 shall, to the MEP, undertake all measures to reduce the risk of non–storm water discharges and pollutant discharges. The following requirements shall apply:

1. Every person and/or entity undertaking any activity or use of a premises that may cause or contribute to storm water pollution or contamination, illicit discharges, or non-storm water discharges to the MS4 shall comply with BMP guidelines or pollution control requirements, as may be established by the Authorized Enforcement Official. . Such BMPs include the minimum BMPs set forth in the Stormwater Standards Manual.

2. An Authorized Enforcement Official may require any business or operations that is engaged in activities which may result in pollutant discharges to the MS4 to develop and implement a Water Pollution Control Plan, which must include an employee training program and the applicable minimum BMPs from the Stormwater Standards Manual.

3. Each discharger that is subject to any NPDES Permit shall comply with all requirements of all such permits. The discharger must also make reports submitted to the RWQCB or other permitting agency, including monitoring data, available to the City upon request.

4. Parties undertaking land disturbance activities shall comply with all applicable requirements of Section 13.18.080.

5. Parties undertaking land development and redevelopment activities shall comply with all applicable requirements of Section 13.18.090.

B. Guidance Documents. Any Authorized Enforcement Official under the supervision of the City Engineer may prepare, disseminate and maintain guidance documents addressing the use of BMPs for specific activities or facilities, illegal connections, and illegal discharges. These guidance documents may set out additional compliance alternatives that, in specified circumstances, can provide the same environmental protection that is afforded by the BMPs required by this chapter or specified in the Stormwater Standards Manual.

C. Significant Sources of Pollutants. Where Authorized Enforcement Staff identify a discharge that is in violation, or is likely to result in a violation, of Vista Municipal Code Section 13.18.050.D or 13.18.060.G, Authorized Enforcement Staff may order the discharger to install, implement and maintain additional BMPs. Any such order shall specify a reasonable date by which those BMPs must be put in place. A failure to install, implement, or maintain additional BMPs as required by any such order is a violation of this Chapter.

D. Collection and Use of Stormwater. An Authorized Enforcement Official may modify any requirement imposed by this chapter to allow the on-site collection and use of stormwater, or the collection of stormwater for delivery to and use at City-designated sites, provided the modified requirements are enforceable and provide equivalent environmental protection.

Section 13.18.080 BMP Requirements for Land Disturbance Activity

A. Permit Issuance. No discharger and/or development project proponent shall receive any City grading, clearing, building or other land development permit without first meeting the requirements of this Chapter, Chapter 17.56, and the Stormwater Standards Manual.

B. Owners and Operators both Responsible and Liable. Persons or entities performing land disturbance activities (including, but not limited to, construction activities) in the City, and the owners of land on which land disturbance activities are performed, are dischargers for purposes of this Chapter, provided, however, that a local government or public authority is not a discharger as to activities conducted by others in public rights-of-way.

C. Plan Submittal Requirements. Any Authorized Official under supervision of the City Engineer may prepare plan submittal requirements for permit applications, consistent with the Stormwater Standards Manual.

D. Agricultural Grading and Clearing. The BMP requirements imposed by this Section for land disturbance activities apply to agricultural grading and clearing, whether a city-issued grading and clearing permit is required for that activity. Tilling or cultivating land exclusively for

the purpose of growing plants or animals is not considered to be grading or clearing, provided all disturbed material remains on the same site, the tilling or cultivating will not block or divert any natural drainage way, and the land to be tilled or cultivated has been in agricultural production within the preceding five years.
(Ord. No. 93-18, Enacted, 7/6/93; Ord. No. 2002-10, Amended, 3/29/02; Ord. No. 2002-24, Amended, 11/12/02; Ord. No. 2008-14, Repealed and Replaced, 4/8/08)

Section 13.18.090 BMP Requirements for Development and Redevelopment Projects

A. Application to Development and Redevelopment Projects. No land owner or development project proponent in the City shall receive any City grading, clearing, building or other land development permit required for land development activity or redevelopment activity unless the project meets or will meet the requirements of this chapter and the applicable requirements defined in the City's Stormwater Standards Manual. For Priority Development Projects, the project's SWQMP must be approved prior to the issuance of such permits.

B. Owners and Developers Responsible and Liable. Developers, development project proponents, and land owners for land on which development activities are performed are dischargers for purposes of this chapter, provided, however, that a local government or public authority is not a discharger as to activities conducted by others in public rights-of-way.

C. Post-Construction Best Management Practices Required. Land development and redevelopment activities with the potential to add pollutants to stormwater or to affect the flow rate or velocity of stormwater runoff after construction is completed, shall be designed to include and shall implement post-construction BMPs to ensure that pollutants and runoff from the development will be reduced to the MEP, will not significantly degrade receiving water quality, and will not cause or contribute to an exceedance of Water Quality Standards in accordance with the requirements defined in the City's Stormwater Standards Manual.

D. Land Development Associated with Agricultural Operations. The requirements imposed by this Section for land development activities apply to such activities when they are associated with agricultural operations.
(Ord. No. 93-18, Enacted, 7/6/93; Ord. No. 2002-10, Amended, 3/29/02; Ord. No. 2002-24, Amended, 11/12/02; Ord. No. 2008-14, Repealed and Replaced, 4/8/08)

Section 13.18.100 Maintenance Requirements

A. Existing Development. Dischargers shall maintain the designed functionality of the storm drain system and BMPs they rely upon to achieve and maintain compliance with this chapter.

B. Responsibility to Maintain. The owners and occupants of lands on which a storm drain system and BMPs have been installed to meet the requirements of this chapter shall ensure the maintained functionality of those structures, regardless if other persons or entities identified in 13.18.100.C fail to do so. .

C. Maintenance Obligations Assumed by Contract or Other Agreement. Primary responsibility to maintain a BMP may be transferred through a contract or other agreement. If that contract provides that it will be submitted to the City pursuant to this Chapter as part of a development permit application, and if that contract is so submitted, the person or entity accepting a maintenance obligation in such a contract or agreement will also be legally obliged to maintain that BMP pursuant to this Chapter.

D. Obligation to Maintain BMPs not Avoided by Contracts or Other Agreements. For purposes of City enforcement, no contract or other agreement imposing an obligation to maintain

a BMP can relieve a person or entity of any obligation to maintain a BMP imposed by this chapter.

E. Disclosure of Maintenance Obligations. Any developer who transfers ownership of land on which a BMP is located or will be located, or who otherwise transfers ownership of a BMP or responsibility for the maintenance of a BMP to another person or entity, shall provide clear written notice of the maintenance obligations associated with that BMP to the new or additional responsible party prior to that transfer.

F. Maintenance Plans for Land Development Activities. The proponents of any land development activity or redevelopment activity that requires installation of structural post-construction BMPs shall provide to the City for review and approval prior to issuance of permits for the project a plan for maintenance of all structural post-construction BMPs associated with the project. The plan shall specify the persons or entities responsible for maintenance activity, the persons or entities responsible for funding, schedules and procedures for inspection and maintenance of the BMPs, worker training requirements, and any other activities necessary to ensure BMP maintenance. The plan shall provide for servicing of all structural post-construction BMPs at least annually, and for the retention of inspection and maintenance records for at least three years.

G. Access Requirements. Storm drain system structures shall be provided adequate access for long-term inspection and maintenance purposes.

H. Assurance of Maintenance for Land Development Projects. The proponents of any land development activity or redevelopment activity that requires a City permit shall provide to the City, prior to issuance of permits for the project, proof of a mechanism acceptable to the City which will ensure ongoing long-term maintenance of all structural post-construction BMPs associated with the proposed project. The proponents shall be responsible for maintenance of BMPs unless, and until, an alternative mechanism for ensuring maintenance is accepted by the City and becomes effective.

(Ord. No. 93-18, Enacted, 7/6/93; Ord. No. 2002-10, Amended, 3/29/02; Ord. No. 2002-24, Amended, 11/12/02; Ord. No. 2008-14, Repealed and Replaced, 4/8/08)

Section 13.18.110 Inspection and Sampling

A. Regulatory Inspections and Certification Programs. The Authorized Enforcement Official may establish inspection or certification programs to evaluate and enforce compliance with the requirements of this Chapter. Authorized enforcement officials and authorized enforcement staff may inspect facilities, activities, and properties subject to this chapter at reasonable times and in a reasonable manner to carry out the purposes of this Chapter. If entry for a regulatory inspection is refused by the facility owner or operator, or by the occupant of a residence, an inspection warrant shall be obtained prior to inspection.

B. Inspections of New Construction. When any new storm drain system or BMP is installed on private property as part of a project that requires a City permit, in order to comply with this Chapter, the property owner shall grant to the City access permission to enter the property at reasonable times and in a reasonable manner to ensure compliance with this Chapter. This includes the right to enter the property without prior notice for routine inspections, to enter as needed for additional inspections during construction, to enter for any needed follow-up inspections, and to enter when necessary for abatement of a nuisance or correction of a violation of this chapter.

C. Scope of Inspections. Inspections may include all actions necessary to determine whether any illegal discharges or illegal connections exist, whether the BMPs installed and implemented are adequate to comply with this Chapter, whether those BMPs are being properly

maintained, and whether the facility or activity complies with the other requirements of this Chapter.
(Ord. No. 93-18, Enacted, 7/6/93; Ord. No. 2002-10, Amended, 3/29/02; Ord. No. 2002-24, Amended, 11/12/02; Ord. No. 2008-14, Repealed and Replaced, 4/8/08)

Section 13.18.120 Violations of Chapter.

A. This Chapter is violated any time a person violates any provision of this Chapter or fails to act, as required by this Chapter. For purposes of assessing and determining administrative penalties, civil penalties, or criminal penalties, a person shall be responsible or guilty of a separate offense for each and every day on which such a violation occurs and continues.

B. Failure by a person to take the actions required by an order or directive of an authorized enforcement official or authorized enforcement staff in the manner and by the time required by such order or directive shall constitute a separate violation of this Chapter apart from any other violations that may have occurred. Each day (or part thereof) in excess of the allowed period for correction shall constitute a separate violation of this Chapter.

C. A violation of this Chapter occurs any time a person makes a misrepresentation or omission of fact in a voluntary disclosure, a submission, a report, or a filing provided to the City to avoid, delay, or curtail a possible enforcement action or remedial action by the City.

D. Causing, permitting, aiding, abetting or concealing a violation of any provision of this Chapter shall constitute a violation of such provision.

Section 13.18.130 Administrative Enforcement Powers.

A. In addition to the other enforcement powers and remedies established by this Chapter, any authorized enforcement official has the authority to utilize the following administrative remedies or to issue the following orders to any person responsible, in whole or part, for any violation of this Chapter:

B. Notice of Violation. When an authorized enforcement official finds that a discharge has taken place or is likely to take place in violation of this Chapter, the official may issue a notice of violation and direct that those persons not complying shall take the following actions within the time periods specified by the authorized enforcement officials:

1. Cease and desist all activities that may cause or contribute to any discharge or condition violating any provision of this Chapter;
2. Comply with a time schedule for compliance;
3. Take appropriate remedial or preventative action to prevent the violation from recurring;
4. Submit and implement a plan approved by the enforcement official for the correction and prevention of the discharge or condition violating any provision of this Chapter;
5. Clean up any release of pollutants causing or resulting from the violation of any provision of this Chapter;
6. Mitigate any circumstances that may cause or contribute to any discharge or condition violating any provision of this Chapter; and
7. Adopt and implement best management practices and/or a stormwater pollution prevention plan approved by the enforcement official.
8. Require a business or organization to establish the elements of an employee training program as may be necessary to fulfill the purposes of this Chapter where

such a program has been required as part of a stormwater prevention plan or represents a BMP.

9. Assess and charge a person, business, or organization responsible for a violation the cost of any cleaning or repair of the MS4 system which resulted from an obstruction, damage or impairment caused by the violation.

10. Assess and charge a person, business, or organization responsible for a violation any and all costs which the City incurred, including any direct and indirect costs resulting from the violation.

11. Issue stop work notices or orders for any work under a city permit which is occurring in a manner to cause or threaten to cause a discharge in violation of this Chapter.

12. Suspend or revoke any permit, license, certificate, or approval issued by the City for any development, operations, use, or activity if the activities undertaken pursuant to that permit, license, certificate or approval are occurring in a manner to cause or threaten to cause a discharge in violation of this Chapter.

C. When, in the opinion of the enforcement official, any discharge from any source to the stormwater conveyance system causes or threatens to cause a condition that presents an imminent hazard to the public health, safety, or welfare, or the environment, or a violation of a NPDES permit, the Authorized Enforcement Official may issue a notice requiring the owner or occupant of the premises where the discharge is occurring to immediately abate the discharge. In any case where the discharge is not immediately abated, or for any reason the owner or occupant of the subject premises does not receive the notice, or the Authorized Enforcement Official determines that time constraints are such that abatement must occur without providing the notice, the Authorized Enforcement Official may summarily abate the condition in accordance with the provisions of Chapter 8.36 of the Vista Municipal Code or other applicable law.

D. If any violation of this Chapter constitutes a seasonal and recurrent nuisance, the Authorized Enforcement Official shall so declare in the notice and order issued pursuant to subsection B, above. Thereafter, the owner or occupant of the subject premises shall abate such seasonal and recurrent nuisance every year without the necessity of any further notice and order. If at any time the nuisance is not abated as required herein, the enforcement official may summarily abate the condition in accordance with the provisions of Chapter 8.36 of the Vista Municipal Code or other applicable law.

E. The owner of any premises in the city from which is made a discharge in violation of this Chapter, and any person making or causing to be made the discharge, if different from the owner, shall be jointly and severally liable for the costs incurred by the City for any abatement, clean-up or restoration, including any related inspection and testing costs, arising from the discharge, and the cost therefor shall be invoiced to the owner of the premises. If the invoice is not paid within sixty (60) days, the Authorized Enforcement Official may commence proceedings for recovery of in accordance with the provisions of Chapter 8.36 of the Vista Municipal Code or other applicable law.

F. Administrative Penalties. In addition to any other remedy or penalty set forth in this Chapter or this code, administrative penalties may be imposed pursuant to applicable provisions of Chapter 1.13 of the Vista Municipal Code against any responsible party, whether owner, lessee, sublessor, sublessee or occupant of any premises in violation of any of the provisions of this Chapter. Imposition, enforcement, collection and administrative review of administrative penalties imposed shall be conducted pursuant to Chapter 1.13 of the Vista Municipal Code.

Section 13.18.140 Civil Actions.

A. In addition to any other remedies provided in this Chapter, any violation of this section may be enforced by civil action brought by the City. In any such action, the City may seek, without limitation, and the court shall grant, as appropriate, any or all of the following remedies:

1. Injunctive relief;

2. Assessment of the violator for the costs of any investigation, inspection, or monitoring survey which led to the establishment of the violation, and for the reasonable costs of preparing and bringing legal action under this subsection;

3. Costs incurred in removing, correcting, or terminating the adverse effects resulting from the violation;

4. Compensatory damages for loss or destruction to water quality, wildlife, fish and aquatic life.

5. Payment or reimbursement of any governmental fines or penalties imposed on the City as a result of the violation.

6. Civil penalties imposed either on a daily basis or a per-gallon basis, but not both, for any discharge of nonstormwater to the stormwater conveyance system violating any provision of this Chapter. Civil penalties imposed on a daily basis shall not exceed five thousand dollars ($5,000.00) for each day or portion of a day that the discharge occurs, and civil penalties imposed on a per-gallon basis shall not exceed ten dollars ($10.00) for each gallon of the discharge. The amount of civil penalties imposed shall be determined by taking into consideration some or all of the following factors: the nature, circumstances, extent, and gravity of the discharge, whether the discharge is susceptible to cleanup or abatement, the degree of toxicity of the discharge, and, with respect to the violator, the ability to pay, the effect on its ability to continue in business, any voluntary cleanup efforts undertaken, any prior history of violations, the degree of culpability, the economic benefit or savings, if any, resulting from the violation, and such other matters as justice may require.

Section 13.18.150 Criminal Penalties.

A. Any person who knowingly or intentionally violates any provision of this Chapter shall be guilty of a misdemeanor punishable by imprisonment in the county jail for a period not to exceed one year, or a fine not to exceed ten thousand dollars for each day such a violation exists, or both. There is no requirement that administrative enforcement authorities be used before such actions are filed. A citation and notice to appear as prescribed by Chapter 1.12 may be issued.

B. Notwithstanding paragraph A, any such violation constituting a misdemeanor under this Chapter may, in the discretion of the City Attorney or City Prosecutor, be charged and prosecuted as an infraction.

C. The immunities prescribed in Section 836.5 of the California Penal Code shall be applicable to public officers or employees acting in the course and scope of employment pursuant to this Chapter.

Section 13.18.160 Violations Deemed a Public Nuisance.

A. Any condition caused or permitted to exist in violation of any of the provisions of this Chapter is a threat to the public health, safety and welfare and is declared and deemed to be a public nuisance subject to abatement.

B. A nuisance resulting from violation of any provisions of this Chapter may be summarily abated by any authorized enforcement official, and/or through a civil action to abate,

enjoin or otherwise compel the cessation of such nuisance. Such actions may be undertaken by or on behalf of the City pursuant to Chapter 8.36 of the Vista Municipal Code or any other provision of law.

B. The cost of such abatement and restoration shall be borne by the owner of the property and the cost thereof shall be a lien upon and against the property and such lien shall continue in existence until the same shall be paid.

Section 13.18.170 Remedies Not Exclusive.

Remedies under this Chapter are in addition to and do not supersede or limit any and all other remedies, civil or criminal. The remedies provided for herein shall be cumulative and not exclusive.

Section 13.18.180 Use of Penalties or Assessments.

Any monetary penalties or assessments collected by the city pursuant to violations of this Chapter, shall be used for storm water pollution prevention and program management.

Section 13.18.190 Appeal.

If a decision or action of the Authorized Enforcement Official is not subject to an appeal procedure under any other provision of this Chapter or code, any person who is affected by the Authorized Enforcement Official's decision or action may appeal the decision or action to the City Manager or designee within ten (10) days following the effective date of the decision or action, by filing a written appeal with the City Manager or designee. Upon receipt of such appeal, the City Manager may request a report and recommendation from the authorized enforcement official and shall set the matter for an informal hearing at the earliest practical date. Not less than seven days prior to the date of hearing, the City Manager or designee shall provide written notice of the hearing to the person appealing the decision or action of the enforcement official. At the hearing, the appellant may be represented by any person of appellant's choice. The City Manager or designee shall hear any additional evidence presented by the appellant or the Authorized Enforcement Official, and may reject, affirm or modify the Authorized Enforcement Official's decision. The decision of the City Manager or designee shall be the City's final administrative determination of the matter.

Section 13.18.200 Severability

If any section, subsection, sentence, clause or phrase of this chapter is for any reason held to be invalid or unconstitutional, such decision shall not affect the validity of the remaining portions of this chapter. The City Council hereby declares that it would have passed this chapter, and each section, subsection, sentence, clause and phrase thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses or phrases had been declared invalid or unconstitutional, and if for any reason this chapter should be declared invalid or unconstitutional, then the original ordinance or ordinances shall be in full force and effect.
(Ord. No. 93-18, Enacted, 7/6/93; Ord. No. 2002-10, Amended, 3/29/02; Ord. No. 2002-24, Amended, 11/12/02; Ord. No. 2008-14, Repealed and Replaced, 4/8/08)

3. Effective Date. This ordinance shall be effective on the 31st day following the date of its adoption.

4. Adoption. INTRODUCED AND ADOPTED at a meeting of the City Council held on_____, 2015, by the following vote:

AYES:

NOES:

ABSTAIN:

_____
JUDY RITTER, MAYOR

APPROVED AS TO FORM:
DAROLD PIEPER, CITY ATTORNEY

By:_____

ATTEST:
MARCI KILIAN, CITY CLERK

By:_____

APPROVED
Jonathan B. Stone
1132 052015

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Appendix B

Enforcement Response Plan

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Appendix B. City of Vista Enforcement Response Plan

The City of Vista (City) ensures that pollution prevention methods, also known as best management practices (BMPs), are implemented by enforcing Vista Municipal Code (VMC) Chapter 13.18, the Stormwater Management and Discharge Control Program Ordinance (Stormwater Ordinance). In accordance with Section E.6 of the Regional Water Quality Control Board, San Diego Region (RWQCB) Order No. R9-2013-0001, as amended by Order No. R9-2015-0001 (MS4 Permit or Permit), compliance with the City's ordinances will be assessed through a variety of means, including inspections, responses to hotline calls, and the routine municipal separate storm sewer system (MS4) outfall monitoring. Where violations of the Stormwater Ordinance are observed, the enforcement actions and procedures described in this Enforcement Response Plan will be employed to enforce stormwater requirements.

The City typically employs a tiered, escalating enforcement system. However, the City reserves the right to use whatever tools the Authorized Enforcement Official deems most appropriate for a given situation, as dictated by the specifics of each case. The Stormwater Ordinance defines Authorized Enforcement Official as the party who is responsible for enforcing the requirements of Chapter 13.18. This is the City Manager or his or her designee. The Authorized Enforcement Official also may assign other staff enforcement responsibilities. These staff are referred to as Authorized Enforcement Staff in the Stormwater Ordinance. Throughout this Enforcement Response Plan enforcement actions are described as being taken by the Authorized Enforcement Staff. However, the Authorized Enforcement Official has the final authority to determine which enforcement actions are appropriate for particular cases or as overall matters of enforcement policy.

Examples of enforcement and escalated enforcement actions can be found in the following sections. It should be noted that experience and professional judgment of City staff are important in guiding the appropriate response to a violation. Escalated enforcement actions will continue to increase in severity, as necessary, to compel compliance as soon as possible.

1 Administrative Enforcement Actions (VMC § 13.18.130)

Several different types of administrative enforcement actions can be used to enforce compliance with the Stormwater Ordinance, as discussed below.

1.1 Documented Warnings

When a violation of the Stormwater Ordinance is observed, a written warning is typically the City's first level of enforcement action. Written warnings can be issued using a variety of

methods, including documented warnings, Notices of Violation, cease and desist orders, and notice and order to clean, test, or abate.

Notices and orders to clean, test, or abate may be issued to perform any act required by the Vista Municipal Code. When written warnings are issued, the violation is noted, a time frame to correct the violation is given, and a follow-up date is scheduled. Authorized Enforcement Staff follow up as necessary to determine whether compliance has been achieved.

1.2 Public Nuisance Abatement

Violations that are deemed to be a threat to public health, safety, and welfare may be identified as a public nuisance. Costs for pollution detection and abatement may be recovered from the discharger in addition to any other penalties. If cost recovery is initiated by the City and not paid in full by the discharger, any unrecovered costs may be made a lien against the discharger's property. This provision is in accordance with the City's abatement procedure (VMC Chapter 8.36, Property Maintenance and Nuisance Abatement).

1.3 Enforcement of Contracts

If a contractor is performing work for the City, then the City may use provisions within the contract for enforcement of non-compliance. Such contract provisions may allow the City to refuse payment, stop work (without time penalties), and/or revoke contracts, if contractors performing activities do not comply with all appropriate permits, laws, regulations, and ordinances.

1.4 Stop Work Order

Authorized Enforcement Staff may order work to be stopped if such work is in violation of the Vista Municipal Code. Stop work orders are issued in writing. Any person receiving a stop work order is required to immediately stop such work until approved by the Authorized Enforcement Staff to proceed with the work.

As discussed in Enforcement Response Plan Section 8 (Program Enforcement – Construction Management), a stop work order is generally used as an elevated enforcement tool for all phases of active land development projects—both public and private. In some cases a stop work order may be used for an Industrial/Commercial operations issue, but this is rare. Because stop work orders prohibit further regular site activity until compliance has been achieved, they are effective compliance mechanisms. Moreover, stop work orders are typically issued if requirements designated in written warnings have not been adequately addressed, or if an observed violation poses a significant threat to water quality.

To restart work once a stop work order has been issued, the responsible party must request that Authorized Enforcement Staff re-inspect the site to verify that the deficiencies have been

satisfactorily corrected. When Authorized Enforcement Staff verifies in writing that the appropriate corrections have been implemented, activities may resume.

1.5 Permit Suspension or Revocation

City permits, licenses, or other approvals may be suspended or revoked if a notice of violation (NOV) is issued and compliance is not achieved within the specified timeframe. If the responsible party pursues an appeals/hearing process that determines he/she is still in violation, the suspensions will remain in effect until the designated requirements are met. For example, in persistent cases of non-compliance, or significant discharges relating to development and/or construction activities, the City may revoke a responsible party's existing building or grading permits or deny future permits. Prior to resuming work, the responsible party will need to re-apply for permits and meet the City-specified requirements.

1.6 Administrative Citations and Penalties

Authorized Enforcement Staff may issue administrative citations for violations of the Vista Municipal Code pursuant to VMC § 1.13.060. Maximum citation amounts for each violation of the same code section or permit condition depend on the number of previous violations, with the current penalty schedule as follows:

- Initial violation: $100
- Second violation within one year of the first violation: $200
- Additional violations within one year of the first violation: $500

When administrative citations are issued, a violator may request a hearing to contest the determination that a violation of the City's stormwater requirements has occurred. Details on the City's hearing and appeals process can be found in VMC Chapter 1.13.

2 Judicial Enforcement Actions (VMC §§ 13.18.140-150)

In addition to administrative enforcement procedures, the City also may use the judicial enforcement actions described below. Judicial enforcement actions involve both Authorized Enforcement Staff and the City Attorney. Although there is no requirement that administrative enforcement procedures be pursued before judicial enforcement actions are filed, most violations are resolved through the administrative enforcement process.

2.1 Civil Penalties and Remedies

The City Attorney is authorized to file criminal and civil actions and to seek civil penalties and/or other remedies to enforce the Stormwater Ordinance.

2.2 Injunctive Relief

The City may pursue enforcement by judicial action for preliminary or permanent injunctive relief for any violation of the Stormwater Ordinance.

2.3 Arrest or Issue Citations

Violators may be arrested, with the assistance of a peace officer, pursuant to the provisions of the California Penal Code. Violators may also be issued a citation and notice to appear as prescribed in the California Penal Code.

2.4 Criminal Penalties and Remedies

It is unlawful for any person, firm, corporation, or other responsible entity to violate any provision for failure to comply with any of the restrictions or requirements of the Vista Municipal Code, including the Stormwater Ordinance. A violation of the Stormwater Ordinance constitutes a misdemeanor and may be enforced and punished per the California Penal Code and Government Code.

3 Documentation

During investigations of activities in violation of the Vista Municipal Code, a wide variety of information may be collected and documented. The information listed below is recorded for use in administrative and judicial enforcement actions, where applicable. Cityworks, a database system with GIS capabilities, is the primary system used to store enforcement-related documentation:

- Chronology of events
- Case summary
- Time and expense log
- Inspection reports
- Complaints
- Phone conversation records
- Correspondence
- Maps and diagrams
- Photographs
- Witness list
- Explanation of the violations
- Request-to-file form
- Field notes
- Emergency incident reports
- Lab results
- Chain-of-custody for samples
- Permit applications
- Sampling plans
- Other supporting documents
- Reports from regulatory agencies

4 Program Enforcement - Municipal

During routine municipal facility inspections, City or contract staff will assess facility areas and activities to ensure all are maintained in accordance with City regulations, ordinances, and BMP requirements. If BMPs are found to be deficient or otherwise ineffective, the responsible party or department will be provided with required corrective actions. If the Authorized Enforcement Staff notes that specific areas of a leased facility require additional BMPs, the City may require the implementation of BMPs in addition to the required minimum for the specific area/activity. If a leased facility continues to be out of compliance, the City may choose to discontinue the lease, which would remove the tenant from that particular site.

If the responsible City staff member or department/division does not perform the necessary corrective actions in response to the direction of their immediate superior, escalated enforcement action will be taken by involving higher ranking representatives within the responsible department or division, who may enact internal disciplinary procedures, until the deficiencies are resolved.

As required by the MS4 Permit, City staff will seek to resolve incidents of observed non-compliance within 30 calendar days, or prior to the next rain event, whichever is sooner. In cases where the violation cannot be resolved within 30 days, the reason additional time was needed for case resolution will be documented and kept on file.

5 Program Enforcement - Industrial and Commercial

During industrial and commercial facility inspections, Authorized Enforcement Staff document each observed violation of stormwater ordinance requirements. Enforcement action is taken where necessary to achieve compliance. If the Authorized Enforcement Staff observes a significant and/or immediate threat to water quality, action will be taken to require the facility owner and/or operator to cease and correct the discharge or activity.

Conditions that could warrant such action may include runoff from a business that is not reasonably controlled by existing protective measures or a BMP failure resulting or potentially resulting in a release of pollutants that may substantially degrade water quality. Violations deemed to pose a threat to health or the environment will be reported to the RWQCB verbally within 24 hours and in writing within 5 days, as required by Attachment B of the MS4 Permit (see also Enforcement Response Plan Section 9).

Events of non-compliance are evaluated according to the following criteria to determine whether they pose a threat to human or environmental health:

- The event of non-compliance resulted in a spill or discharge of hazardous materials, pollutants, or runoff containing pollutants that had an effect on a receiving water body.

- The quantity and/or concentration of the pollutants in the spill or discharge affecting the receiving water was such that it may cause or contribute to an exceedance in water quality objectives as specified in the San Diego Basin Plan.

Depending on the nature and severity of the violation, enforcement may consist of any of the actions listed in Sections 3.1 or 3.2. Typical enforcement actions are listed below; escalated enforcement actions are marked with an asterisk (*):

- Verbal warnings
- Written warnings, including notices of violation
- Administrative citations*
- Public nuisance abatement*

Escalated enforcement is used as needed to ensure compliance, providing flexibility for Authorized Enforcement Staff to establish appropriate compliance time frames on a case-by-case basis. Through the Stormwater Ordinance, the City maintains the authority to require facilities to implement additional actions to address violations, such as preparation of a Storm Water Pollution Prevention Plan, conducting sampling and analysis, or revising training activities.

As required by the MS4 Permit, Authorized Enforcement Staff will seek to resolve incidents of observed non-compliance within 30 calendar days, or prior to the next rain event, whichever is sooner. In cases where the violation cannot be resolved within 30 days, the reason additional time was needed for case resolution will be documented and kept on file.

When a site is subject to the Industrial General Permit (IGP), City staff may also collaborate with RWQCB staff on enforcement actions. The City will notify the RWQCB of any industrial facilities required to obtain coverage under the IGP that, to the City's knowledge, have not filed for coverage, within five calendar days from the time the City became aware of the circumstances. At minimum, the business name, business type, and address will be provided to the RWQCB. Written notification may be provided electronically by email to Nonfilers_R9@waterboards.ca.gov.

5.1 Mobile Business Enforcement

Violations associated with mobile businesses are typically related to illegal discharges. The City's enforcement approach to such discharges often requires the discharge to be abated and the area cleaned. Education will be provided to operators who are not aware of the City's stormwater requirements, and a Mobile Water Use license may be required for their business activities. Businesses that do not possess the materials necessary to implement the required BMPs will be required to demonstrate to the City that they have obtained such materials and can properly use them before the City allows them to resume operations within its jurisdiction.

Discharges related to non-compliance deemed to pose a threat to health or the environment will be reported using the same process described above in Section 5.

As required by the MS4 Permit, Authorized Enforcement Staff will seek to resolve incidents of observed non-compliance within 30 calendar days, or prior to the next rain event, whichever is sooner. In cases where the violation cannot be resolved within 30 days, the reason additional time was needed for case resolution will be documented and kept on file.

6 Program Enforcement - Residential

The following mechanisms will be used by the City to determine residential areas where enforcement actions may be necessary, where appropriate:

- Public reporting hotline
- Analysis of field screening and analytical monitoring results
- Observations from City personnel

Residential-based stormwater 'complaints' are typically received through calls or emails to the City's Water Quality Hotline. Residents occasionally contact City staff directly while in the field. Activities by City staff also assist in identifying residential-based violations, including residential area inspections/observations, scheduled MS4 outfall monitoring, and routine maintenance activities such as storm drain system inspection/cleaning. Targeted investigations of areas upstream of outfalls with obvious pollutants present during the Dry Weather MS4 Outfall Monitoring Program and complaint response investigations provide additional information sources. The combination of public reporting, direct observations, targeted investigations, and in-field monitoring provide effective oversight of residential areas and activities.

During investigations of incidents discovered through the mechanisms described above, the City will continue to use the opportunity to address any other issues of concern and provide educational materials where appropriate. Enforcement mechanisms are implemented to eliminate each IC/ID once its source has been identified. Further details of enforcement mechanisms pertaining to IC/IDs can be found in Section 9 of this document.

Follow-up inspections are conducted for BMP deficiencies and violations in residential areas as needed. Depending on the nature and severity of the violation, enforcement may consist of any of the actions listed in Sections 1 or 2. Typical enforcement actions are listed below; escalated enforcement actions are marked with an asterisk (*):

- Verbal warnings
- Written warnings
- Administrative citations*

- Public nuisance abatement*

Violations deemed to pose a threat to health or the environment will be reported to the RWQCB verbally within 24 hours and in writing within 5 days, as required by Attachment B of the MS4 Permit (see also Enforcement Response Plan Section 9).

As required by the MS4 Permit, Authorized Enforcement Staff will seek to resolve incidents of observed noncompliance within 30 calendar days, or prior to the next rain event, whichever is sooner. In cases where the violation cannot be resolved within 30 days, the reason additional time was needed for case resolution will be documented and kept on file.

7 Program Enforcement - Development Planning

The City may use a variety of enforcement methods to ensure stormwater requirements are appropriately implemented for all development projects within the City's jurisdiction. This section discusses enforcement for project planning and post-construction structural BMP components, whereas Section 8 discusses active construction enforcement activities.

7.1 Development Review and Approval

The City implements a development review and plan check process that verifies post-construction BMPs are included in project designs in accordance with the City's requirements. Projects are not allowed to begin construction before plans have been approved. Section 4 of the JRMP provides more information about the review process.

7.2 Pre-Occupancy Installation Verification

Since all structural BMPs included in the Water Quality Technical Report are required to be shown on the project's grading plans, Engineering inspectors confirm that structural BMPs are being constructed per plan during routine inspections. If structural BMP construction or installation varies from approved plans, the City requires that in-field corrections be made, or for the project engineer to confirm that revisions continue to comply with project requirements. Engineering inspectors and Stormwater staff jointly complete a 'final' inspection to verify structural BMPs have been installed in accordance with the grading plans prior to release of project occupancy. Occupancy is not granted until all BMPs have been installed.

7.3 Ongoing Operation and Maintenance for Completed Projects

Following occupancy, ongoing operation and maintenance is verified through inspections or through review of submitted maintenance verification certifications. Stormwater staff are responsible for this part of the program. If a project is found not to be maintaining BMPs as required, depending on the nature and severity of the violation, enforcement may consist of any of the actions listed in Sections 1 or 2. Typical enforcement actions are listed below; escalated enforcement actions are marked with an asterisk (*):

- Verbal warnings
- Written warnings
- Administrative citations*
- Public nuisance abatement, which may include placing a lien against the property*

If Authorized Enforcement Staff finds maintenance deficiencies with any structural BMPs at a site, he or she documents deficiencies and necessary corrective actions and provides these to the responsible party. Minor deficiencies and corrective actions may warrant resolution through a verbal warning. If the responsible party performs all necessary corrective actions promptly, the case is closed, and the resolution is documented. Where appropriate, the Authorized Enforcement Staff may decide to formally document non-compliance by issuing a written warning with required corrective actions. Responsible parties are required to perform the corrective actions and demonstrate that all necessary maintenance activities were completed through a re-inspection with the Authorized Enforcement Staff or through providing photographs of corrections. The Authorized Enforcement Staff may also request additional documentation (e.g., maintenance records or invoices) or perform a re-inspection at their discretion.

Annual self-certification is also a requirement of the City's annual inspection program. Priority Development Project sites with structural BMPs are required to submit certification that documents the BMPs' on-going maintenance and functionality. If a responsible party fails to provide a certification to the City, a written warning is issued. The warning documents non-compliance per failure to timely to submit a certification form and the BMP maintenance responsibilities related to the annual certification process. The warning also designates the required certification to be submitted. If a responsible party fails to sufficiently respond to a notice from the City by the response deadline, the Authorized Enforcement Staff may issue a NOV or pursue escalated enforcement actions. .

To document compliance status, follow-up inspections may be performed at sites where structural BMP deficiencies have been identified. Escalated enforcement action may be used, where appropriate, to facilitate compliance with structural BMP maintenance requirements. If a development site continues to demonstrate non-compliance and is not responsive to administrative enforcement actions, judicial enforcement actions may be initiated.

Violations deemed to pose a threat to health or the environment will be reported to the RWQCB verbally within 24 hours and in writing within 5 days, as required by Attachment B of the MS4 Permit (see also Enforcement Response Plan Section 9).

As required by the MS4 Permit, Authorized Enforcement Staff will seek to resolve incidents of observed non-compliance within 30 calendar days, or prior to the next rain event, whichever is

sooner. In cases where the violation cannot be resolved within 30 days, the reason additional time was needed for case resolution will be documented and kept in the project's file.

8 Program Enforcement - Construction Management

The City is responsible for enforcement of applicable local ordinances and permits at all construction sites in its jurisdiction. The Stormwater Ordinance, VMC Chapter 13.18, and the Grading and Erosion Control Ordinance, VMC Chapter 17.56, provide legal authority for enforcement at construction sites. When violations are observed during a site inspection, the City will implement appropriate enforcement measures based on the severity of the violation. Verbal warnings are not used as means of enforcement at active construction sites. Enforcement can range from correction notices to more severe enforcement such as NOVs and Stop Work Orders. Stronger enforcement measures will be used as necessary if proper corrective actions are not implemented during the allotted time frame or if the severity of the violation warrants stricter enforcement.

The typical progressive enforcement steps that the City will implement include the following; actions considered escalated enforcement are marked with an asterisk (*):

- Correction notices
- NOVs
- Enforcement of contracts (CIP projects)
- Administrative citations
- Stop work orders*
- Public nuisance abatement, which may include BMP implementation by City-hired contractor, with cost reimbursement to the City*
- Revocation of permits*

Escalated enforcement actions will be reported to the RWQCB within five (5) days, as required by the Municipal Permit.

The City works closely with all development projects prior to the commencement of construction activities. All construction sites are expected to be aware of the City's construction BMP requirements. Accordingly, a written correction notice will be the first enforcement step. Written corrections, NOVs, and administrative citations are the most common measures used to bring about compliance. However, if a construction site demonstrates continued non-compliance with Vista Municipal Code, more severe actions, such as a stop work order or judicial enforcement action may be imposed. Construction site inspections are performed by the City inspection staff to evaluate compliance with minimum BMP requirements (Appendix C) and applicable ordinances and permits (building, grading, stormwater etc.). Follow-up inspections conducted as a result of construction BMP deficiencies will be performed. Site inspections are discussed in greater detail in Chapter 5.

Authorized Enforcement Staff seek to resolve incidents of observed noncompliance at construction sites within 72 hours, or prior to the next rain event, whichever is sooner. When a violation has not been resolved within 72 hours, additional enforcement actions will be taken as necessary to achieve compliance. If a violation has not been resolved within 30 days, the reason additional time was needed for case resolution will be documented and kept in the project's file, as required by the MS4 Permit.

The City implements a robust process to ensure construction sites obtain CGP coverage before they begin work, as described in JRMP Section 5 (Construction Management). When a site is subject to the Construction General Permit (CGP), City staff may also collaborate with RWQCB staff on enforcement actions. The City will notify the RWQCB in writing within five calendar days of issuing escalated enforcement to a construction site that poses a significant threat to water quality as a result of violations of other non-compliance. Written notification may be provided to the appropriate RWQCB staff member by email. If any construction site that is subject to the CGP but has not obtained coverage (e.g., a project that had been operating without permits) is discovered in the field, the City will notify the RWQCB promptly. Written notification may be provided electronically by email to Nonfilers_R9@waterboards.ca.gov.

Violations deemed to pose a threat to health or the environment will be reported to the RWQCB verbally within 24 hours and in writing within 5 days, as required by Attachment B of the MS4 Permit. Criteria listed below may be used in addition to the criteria listed in Enforcement Response Plan Section 9 to determine the human or environmental health threats of non-compliance, whether from stormwater or non-stormwater discharges, where applicable:

- Estimated area of erosion caused by discharge
- Total suspended solids concentration and turbidity of discharge
- Other materials discharged that pose a threat (concrete washout, sanitary washes, etc.)

9 Program Enforcement – Illicit Discharges

The City implements and enforces its ordinances, orders, or other legal authority to prevent illicit discharges and connections to its storm drain system. If the City identifies the source as a controllable source of non-stormwater or as an IC/ID, the administrative and judicial enforcement measures previously listed will be used, as necessary, to eliminate IC/IDs.

If a complaint is received that indicates a potential IC/ID, Authorized Enforcement Staff will conduct a field investigation for complaints with details suggesting an actual or potential discharge to the storm drain system or receiving water body. If investigators find evidence of a violation with the potential to release pollutants or an actual IC/ID, every effort is made to find the responsible party to resolve the situation. Parties found to be responsible for a violation or IC/ID are required to clean up or remove pollutants to the maximum extent practicable.

The appropriate level of enforcement for IC/IDs is determined on a case-by-case basis and is based on factors such as the severity of the violation, the threat to human or environmental health, site-specific circumstances, and past compliance history. If the situation is determined to pose an immediate risk to public health or the environment, an NOV or administrative citation may be issued immediately. When public health is at risk, the City may coordinate with other agencies or teams that are specially trained to assess and mitigate the discharge (e.g., those involving hazardous wastes/materials, etc.). Violations deemed to pose a threat to health or the environment will be reported to the RWQCB verbally within 24 hours and in writing within 5 days, as required by Attachment B of the MS4 Permit. Section 3.3 of the JRMP (Preventing, Detecting, and Responding to Illegal Connections and Illegal Discharges) provides additional detail on IC/ID investigation, response, and reporting.

Criteria listed below may be used to determine the human or environmental health threats of a non-compliance event, whether from stormwater or non-stormwater discharges, where applicable:

- Estimated pollutant load discharged from site
- Estimated volume of discharge
- Types of pollutants discharged, including if toxic materials were discharged
- Sensitivity of the receiving water body, including if it is 303(d) listed for any of the pollutants in the discharge
- Proximity of site to sensitive habitat/endangered species
- Proximity of site to public water supply (well head, monitoring wells)
- Quantity, if any of the discharge reached the receiving water body
- Beneficial uses for affected water bodies

Upstream investigations of suspected illicit discharges are conducted, and appropriate enforcement action is taken and documented when/if the discharge source is determined. As necessary, follow-up inspections will be conducted to confirm compliance with enforcement actions.

As required by the MS4 Permit, Authorized Enforcement Staff will seek to resolve incidents of observed non-compliance within 30 calendar days, or prior to the next rain event, whichever is sooner. In cases where the violation cannot be resolved within 30 days, the reason additional time was needed for case resolution will be documented and kept on file.

Appendix C

Stormwater Standards Manual

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City of Vista

Stormwater Standards Manual

June 2015

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1 Introduction

1.1 Stormwater Standards Manual

This Stormwater Standards Manual (hereafter, "Manual") supports the City of Vista's (City) Stormwater Management and Discharge Control Program Ordinance (Stormwater Ordinance), codified as Vista Municipal Code (VMC) Chapter 13.18. The Manual also supports the water quality protection provisions of the Grading and Erosion Control Ordinance, codified as VMC Chapter 17.56. Moreover, the Manual is not a stand-alone document but must be read with applicable parts of the Stormwater Ordinance and the Grading and Erosion Control Ordinance (collectively, "Ordinances"). In general, this Manual categorically and explicitly establishes what Dischargers must do to comply with the Ordinances and to receive permits for projects and activities that are subject to them. The Manual and the Ordinances have been prepared to provide the City with the respective legal authority and administrative actions necessary to comply with the requirements of California Regional Water Quality Control Board, San Diego Region (RWQCB) Order No. R9-2013-0001, as amended by Order No. R9-2015-0001 (MS4 Permit).

1.2 Purposes and Use

The Manual establishes minimum stormwater management requirements and controls to address the highest priority water quality conditions in the Water Quality Improvement Plans (WQIPs) for the San Luis Rey and Carlsbad Watershed Management Areas (WMAs). Further, the Manual supports the following objectives stated in Section 13.18.020 of the Stormwater Ordinance:

- To establish requirements for discharges into the Municipal Separate Storm Sewer System (MS4), receiving waters, and the environment;
- To protect, to the maximum extent practicable (MEP), life, property, receiving waters, aquatic life, and the environment from loss, injury, degradation, or damage by discharges from within the City's jurisdiction;
- To protect the MS4 from damage; and
- To meet the requirements of state and federal law.

In both the San Luis Rey and Carlsbad WMAs, bacteria has been identified as the highest priority water quality condition. During dry weather conditions, non-stormwater flows transport bacteria and other pollutants. For this reason, the City has minimum requirements to effectively prohibit non-stormwater discharges and will implement activities to reduce them. Because sediment transports bacteria, the City has also designed program activities to reduce discharges of sediment, primarily during wet weather conditions. Efforts to reduce sediment discharges are intended to reduce bacteria levels in stormwater discharges. These efforts are anticipated to reduce sediment loading in nearby receiving waters.

The Manual describes best management practices (BMPs), which are required activities to be implemented to reduce the amount of pollutants discharged to the City's MS4 (hereafter, "storm drain system"[1]). The Manual informs residents, businesses, contractors, developers, and City staff about what is necessary to meet the City's stormwater requirements. All terms used in the Manual have the same meaning as defined in VMC Chapter 13.18, unless otherwise noted.

[1] Throughout the Manual, the term "storm drain system" is typically used in place of "MS4.".

2 Other Potentially Applicable Regulations

The Manual describes stormwater BMPs required by the City of Vista. Some actions and activities associated with stormwater BMP requirements may be subject to additional requirements or approvals, such as other City departments or non-municipal agencies. The legally responsible person must identify all other applicable requirements and obtain the necessary permits or approvals. Some of the more common regulations to consider are discussed in this section; however, this discussion is not meant to be exhaustive.

2.1 Other City of Vista Requirements

Discharges to the sanitary sewer system may require approval from the City's Engineering Department. Call (760) 639-6111 for more information.

Structural improvements to properties, such as building an overhead canopy, may require City permits. Contact Development Services at (760) 639-6108 for more information.

2.2 Requirements of Other Agencies

Work in and around natural drainages, wetlands, and other water resources may require permits from multiple agencies, including the following:

- US Army Corps of Engineers (USACE)
- California Department of Fish and Wildlife
- US Fish and Wildlife Service
- RWQCB

The RWQCB and State Water Resources Control Board (SWRCB) issue permits and conditional waivers for a number of activities that have potential to impact stormwater discharges. Consideration may be given to the following permits and waivers:

- State of California Industrial General Permit, SWRCB Order No. 2014-0057-DWQ
- State of California Construction General Permit, SWRCB Order No. 2009-0009-DWQ
- Groundwater Dewatering Permit, RWQCB Order No. R9-2010-003[2]
- Permit for Discharges of Hydrostatic Test Water or Potable Water, RWQCB Order No. R9-2010-003
- Utility Vault Dewatering Permit, SWRCB Order No. 2014-0174-DWQ
- Conditional Waiver No. 1, Discharges from On-site Disposal Systems
- Conditional Waiver No. 2, "Low Threat" Discharges to Land

[2] This order is expected to be replaced by a new order in 2015. The most recent version is Tentative Order No. R9-2015-0013. The RWQCB's proposed schedule would result in the new order going into effect on October 1, 2015.

- Conditional Waiver No. 3, Discharges from Animal Operations
- Conditional Waiver No. 4, Discharges from Agricultural and Nursery Operations
- Conditional Waiver No. 5, Discharges from Silvicultural Operations
- Conditional Waiver No. 6, Discharges of Dredged or Fill Materials Nearby or Within Surface Waters
- Conditional Waiver No. 7, Discharges of Solid Wastes to Land
- Conditional Waiver No. 8, Discharges of Solid Wastes to Land
- Conditional Waiver No. 9, Discharges of Slurries to Land
- Conditional Waiver No. 10, Discharges of Emergency/Disaster Related Wastes
- Conditional Waiver No. 11, Aerially Discharged Wastes Over Land

Information on the most current requirements for RWQCB and SWRCB permitting and waivers can be obtained from the following website: http://www.waterboards.ca.gov/sandiego/

3 Minimum BMP Requirements

This section presents minimum BMP requirements for the following land uses, activities, and projects within the City:

- Industrial, commercial and municipal facilities or areas
- Residential properties
- Construction sites
- Development projects (post-construction BMPs)

These are the minimum BMP requirements that must be implemented for applicable activities. However, additional consideration should be given to the following:

- Due to site-specific conditions, some BMP requirements reference terms such as "where applicable" or "where feasible." These terms require that BMPs be implemented at the discretion and with the final determination made by Authorized Enforcement Staff. Vista Municipal Code Chapter 13.18 defines "Authorized Enforcement Staff" as follows: "any City employee or contractor hired by the City who is assigned to duties involving permits and other City approvals, inspections, or enforcement related to this chapter."
- Authorized Enforcement Staff also have the authority to require additional BMPs, if necessary, to comply with the Stormwater Ordinance and/or the MS4 Permit.
- References to "CASQA Factsheets" refer to factsheets in manuals prepared by the California Stormwater Quality Association (CASQA). CASQA materials can be accessed at www.casqa.org. Some materials may not be viewable without a paid subscription.

3.1 Industrial, Commercial, and Municipal

Minimum BMP requirements for industrial, commercial and municipal sites and activities are provided in Table 1. These BMPs have been developed, and are supported by, factsheets adopted by the California Stormwater Quality Association (CASQA)[3]. City exceptions to the procedures described in the CASQA factsheets are identified in footnotes. Where any conflict may exist between CASQA factsheets and requirements in the Manual or the Municipal Code, the requirements of the Manual and the Municipal Code shall prevail. Complying with the BMPs described in the Manual does not ensure compliance with all other regulatory requirements, including requirements of other agencies. See Section 2 for more information about other potentially applicable requirements.

[3] CASQA (2015). *Stormwater Best Management Practice Portal: Industrial and Commercial*. www.casqa.org.

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Table 1. Minimum BMPs for Industrial, Commercial and Municipal Sites/Sources

BMP No.	Requirement	Description	Applicable CASQA BMP Factsheet(s)	Pollutants or Conditions Targeted							
				Bacteria	Sediment	Dry Weather Flow	Nutrients	Trash	Metals	Oil & Grease	Organics
Discharge Control											
1	Eliminate illicit discharges to the storm drain system.	Do not allow any material (solid or liquid) or pollutant, except uncontaminated stormwater, to enter the City's storm drain system. Conditional exceptions apply, as described in Vista Municipal Code Chapter 13.18. Additional activity-specific BMPs related to illicit discharges are described in BMP No.'s 3 through 10 (below). Report any suspected or active illicit discharges to the City's Stormwater Hotline at (760) 643-2804.	SC-10, SC-11, SC-44	x	x	x	x		x	x	x
2	Eliminate illicit connections to the storm drain system.	Illicit connections are any drain or connection that allows for an illegal discharge to enter the storm drain system. Find and abate all illicit connections to the storm drain system through properly approved procedures, permits, and protocols. Report any suspected or active illicit connections to the City's Stormwater Hotline at (760) 643-2804.	SC-10, SC-44	x	x	x	x		x	x	x
3	Properly dispose of water used to clean outdoor areas.	All water used to clean outdoor areas (e.g., power washing) shall be contained, captured, and reused, or properly disposed of to the sanitary sewer, an appropriate waste hauler, or to landscaping or other pervious surfaces.	SC-10, SC-41[4], BG-62	x	x	x	x	x	x	x	x

[4] Exception to guidance in factsheet: Factsheet SC-41, Building & Grounds Maintenance, states (in regards to pressure washing), "If soaps or detergents are not used, and the surrounding area is paved, wash runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in the catch basin to trap the particles in wash water runoff." However, non-stormwater discharges of this nature, even if filtered, are not allowed to enter the City's storm drain system. Wash water must be contained, collected, and disposed of properly.

Table 1. Minimum BMPs for Industrial, Commercial and Municipal Sites/Sources (Continued)

				Pollutants or Conditions Targeted							
BMP No.	**Requirement**	**Description**	**Applicable CASQA BMP Factsheet(s)**	**Bacteria**	**Sediment**	**Dry Weather Flow**	**Nutrients**	**Trash**	**Metals**	**Oil & Grease**	**Organics**
4	Eliminate the discharge of vehicle and equipment wash water.	Water associated with vehicle or equipment-washing activities shall not be allowed to enter the storm drain system. Uncovered designated wash areas must either drain to the sanitary sewer, or all wash water must be contained, captured, and disposed of appropriately. Wash water containing pollutants such as oil, grease, paint, or other hazardous waste must be disposed in accordance with applicable regulations. If approved by the City, drains located in vehicle or equipment washing areas may be connected to the sanitary sewer system. Contact the Engineering Department at (760) 639-6111 for approval.	SC-10, SC-21, BG-64[5]		x	x			x	x	x
5	Properly dispose of water from fire sprinkler maintenance activities.	Fire sprinkler system discharges shall be discharged to the sanitary sewer system when permitted by the City. For approval, contact the Engineering Department at (760) 639-6111. When not practicable or allowed to discharge to the sanitary sewer system due to the presence of prohibited contaminants, the water shall be collected and disposed of by an appropriately certified party. Fire sprinkler system discharges without corrosion inhibitors, fire suppressants, or antifreeze may be discharged to landscaping or other pervious surfaces. Fire sprinkler system discharges may be directed to the storm drain system if the following are implemented: (1) prior to entering the storm drain system, the discharge must be clear, odorless, and pH neutral, and (2) the flow path must be cleaned to ensure that pollutants such as trash and debris are not conveyed to the storm drain system. Discharges shall not result in erosion or in runoff to any adjacent property.	SC-10, SC-41		x	x			x		x

[5] Exception to guidance in factsheet: Factsheet BG-64, Mobile Cleaning – Vehicle and Equipment Washing, states that water used to rinse new cars "May discharge to storm drain." However, water used to rinse new cars is not allowed to be discharged to the City's storm drain system.

Table 1. Minimum BMPs for Industrial, Commercial and Municipal Sites/Sources (Continued)

				Pollutants or Conditions Targeted							
BMP No.	**Requirement**	**Description**	**Applicable CASQA BMP Factsheet(s)**	**Bacteria**	**Sediment**	**Dry Weather Flow**	**Nutrients**	**Trash**	**Metals**	**Oil & Grease**	**Organics**
6	Eliminate irrigation runoff.	Irrigation runoff to the storm drain system shall be eliminated. For example, irrigation water and associated pollutants (e.g., sediment, fertilizer, pesticides) from businesses and facilities such as landscape areas, nurseries, and garden centers, shall be prevented from reaching the storm drain system.	SC-10[6], SC-41	x		x	x				
7	Properly dispose of discharges from swimming pools, spas, or water features.	Water from swimming pools, spas, and water features shall be properly disposed of to prevent pollutants from entering the storm drain system. Such discharges to the storm drain system are allowed only if the water is: 1) dechlorinated, 2) has a pH level in the 7-8 range, 3) is near or at ambient temperature, 4) does not have algae or suspended solids, and 5) is not saline. Other related discharges, such as from filter backwash or saline pools, are prohibited from entering the storm drain system. At the discretion of the City, discharges of saline water to the sanitary sewer system may be allowed. Contact the Engineering Department at (760) 639-6111 for approval.	SC-10, BG-63[7]			x					
8	Control air conditioning condensation discharges.	Air conditioning condensation shall be directed to landscaped areas or other pervious surfaces where feasible.	SC-10, SC-42			x			x		

[6] Exception to guidance in factsheet: Factsheet SC-10, Non-Stormwater Discharges, states that "landscape irrigation drainage and landscape watering" may be discharged to the storm drain with conditions; however, in accordance with the MS4 Permit and the City's Stormwater Ordinance, no irrigation runoff may be discharged to the City's storm drain system.

[7] Exception to guidance in factsheet: Factsheet BG-63, Mobile Cleaning – Swimming Pools & Spas, states that discharges from swimming pools and spas to the storm drain system are not permitted; however, discharges of this nature are permitted if the conditions described in BMP 7 are met.

Table 1. Minimum BMPs for Industrial, Commercial and Municipal Sites/Sources (Continued)

				Pollutants or Conditions Targeted							
BMP No.	**Requirement**	**Description**	**Applicable CASQA BMP Factsheet(s)**	**Bacteria**	**Sediment**	**Dry Weather Flow**	**Nutrients**	**Trash**	**Metals**	**Oil & Grease**	**Organics**
9	Eliminate discharges from cleaning indoor areas.	Water used to clean indoor areas, such as during floor mopping or mat washing, shall not be discharged to the storm drain system. Indoor wash areas, mop sinks, or indoor floor drains may be utilized if they drain to the sanitary sewer system. Alternatively, such waste water may be suitable for collection, recovery, and discharge to landscape.	SC-10, SC-21, BG-30	x		x				x	x
10	Eliminate pumped groundwater, foundation, and footing drain discharges.	Unless approved by a National Pollutant Discharge Elimination System (NPDES) permit, or the RWQCB has determined in writing that no permit is needed, the following discharges are not allowed: 1) pumped groundwater, such as water from crawl space or sump pumps, 2) discharges from foundation and footing drains that are at or below groundwater elevation.	SC-10			x					
BMP and Storm Drain Conveyance and Structure Maintenance											
11	Regularly inspect and maintain storm drain structures to retain designed functionality.	Storm drain conveyances and structures for which the property owner is responsible for maintenance shall be inspected, maintained, and cleaned to maintain design functionality. All structural BMPs (e.g., treatment and flow control facilities) shall be maintained in accordance with recorded maintenance agreements, and where applicable, structural BMPs shall demonstrate compliance with the City's certification program.	SC-44	x	x		x	x	x	x	x
Erosion and Sediment Control											
12	Protect unpaved and landscaped areas from erosion.	Exposed soils that are eroding or are likely to erode shall be stabilized to prevent sediment from mobilizing in stormwater and entering the storm drain system. Mulch, vegetation, and other stabilization techniques for erosion and sediment control may be implemented. Significant accumulations of eroded soil shall be removed or contained to prevent discharge to the storm drain system.	SC-40, SC-42	x	x		x				

Table 1. Minimum BMPs for Industrial, Commercial and Municipal Sites/Sources (Continued)

				Pollutants or Conditions Targeted							
BMP No.	**Requirement**	**Description**	**Applicable CASQA BMP Factsheet(s)**	**Bacteria**	**Sediment**	**Dry Weather Flow**	**Nutrients**	**Trash**	**Metals**	**Oil & Grease**	**Organics**
Good Housekeeping											
13	Regularly clean parking areas, driveways, and hardscape.	Paved parking lots, private roads, and other hardscape, shall be inspected and cleaned as necessary to remove trash, debris, and pollutants that may enter the storm drain system. Sweeping is the preferred method of cleaning. Wet-cleaning methods, such as mopping or power washing, may be conducted if all wash water is contained, captured, and disposed of appropriately.	SC-41, SC-43, BG-62[8]		x			x	x	x	x
14	Implement good housekeeping in outdoor areas.	Outdoor areas shall be inspected and cleaned as necessary to keep them free of trash, sediment, litter, and other debris. Additional attention shall be given to areas such as trash enclosures, loading docks, compactors, and material storage locations.	SC-41	x	x			x	x		

[8] Exception to guidance in factsheet: Factsheet BG-62, Mobile Cleaning – Surface Cleaning, states (in regards to pressure washing) that screened, or filtered, wash water can be discharged to a gutter, street, or storm drain. Non-stormwater discharges of this nature, even if filtered, are not allowed to enter the storm drain system, which includes the streets and gutters. Wash water must be contained, collected, and disposed of properly.

Table 1. Minimum BMPs for Industrial, Commercial and Municipal Sites/Sources (Continued)

BMP No.	Requirement	Description	Applicable CASQA BMP Factsheet(s)	Pollutants or Conditions Targeted							
				Bacteria	Sediment	Dry Weather Flow	Nutrients	Trash	Metals	Oil & Grease	Organics
Material Storage and Handling											
15	Provide and maintain secondary containment to catch spills if storing potential stormwater pollutants.	To prevent leaks and spills from discharging to the storm drain system, effective secondary containment shall be provided and maintained for all containers of material (liquid or solid) with the potential to discharge onto outdoor areas. Drums and other containers shall be kept in good condition and securely closed when not in use. Secondary containment shall also be provided for all liquids during transport to prevent spills due to leaks or punctures. Spills, liquids, and precipitation that accumulates within secondary containment devices shall be regularly removed and disposed of appropriately. Other applicable regulations will apply to the use of secondary containment, as appropriate, especially for hazardous materials, which are regulated by the County of San Diego Department of Environmental Health.	SC-20, SC-31						x	x	x
16	Cover, contain, and/or elevate materials stored outside that may become a source of pollutants in stormwater or non-stormwater.	Materials stored outdoors shall be covered, contained, and/or elevated to prevent stormwater and non-stormwater from contacting and/or transporting materials to the storm drain system. Cover types may include roofs, awnings, and the use of tarps. Where coverage is not feasible or is cost-prohibitive, alternative approaches to pollution prevention may be allowed, such as installing berms around the stored materials, directing runoff to pervious areas, or installing treatment devices. The installation of structural overhead cover may require obtaining City-issued permits. Contact Development Services at (760) 639-6108 for information.	SC-20, SC-33		x		x	x	x	x	x

Table 1. Minimum BMPs for Industrial, Commercial and Municipal Sites/Sources (Continued)

				Pollutants or Conditions Targeted							
BMP No.	**Requirement**	**Description**	**Applicable CASQA BMP Factsheet(s)**	**Bacteria**	**Sediment**	**Dry Weather Flow**	**Nutrients**	**Trash**	**Metals**	**Oil & Grease**	**Organics**
17	Properly store and dispose of hazardous materials.	Hazardous materials and wastes shall be stored, managed, and disposed in accordance with federal, state, and local laws and regulations—notably, but not limited to, County of San Diego Department of Environmental Health regulations. Hazardous materials and their primary storage containers shall be stored such that they will not come into contact with stormwater, even if leaks or spills occur (e.g., secondary containment and appropriately covered). Disposal of hazardous wastes requires the use of authorized hazardous waste collection services. See BMPs 16 and 17 for additional details regarding storage.	SC-20, SC-31, SC-33						x		x
Pesticide and Fertilizer Management											
18	Properly manage pesticides and fertilizers.	Pesticides and fertilizers shall be used in strict accordance with manufacturer's labels, as authorized by the U.S. Environmental Protection Agency. See BMPs No.'s 15 and 16 for secondary containment and cover requirements. Waste products shall be disposed in accordance with the manufacturer's label and applicable hazardous waste regulations. The use of integrated pest management (IPM) principles is encouraged to reduce or eliminate use of chemicals. For more information about integrated pest management, see the University of California Statewide IPM Program at: http://www.ipm.ucdavis.edu	SC-35, SC-41, BG-40				x				x

Table 1. Minimum BMPs for Industrial, Commercial and Municipal Sites/Sources (Continued)

BMP No.	Requirement	Description	Applicable CASQA BMP Factsheet(s)	Pollutants or Conditions Targeted							
				Bacteria	Sediment	Dry Weather Flow	Nutrients	Trash	Metals	Oil & Grease	Organics
Outdoor Work Areas											
19	Implement controls to minimize pollution from exposed outdoor work areas.	Activities that may generate pollutants shall be conducted in covered, contained areas; alternatively, adequate measures shall be implemented to prevent the discharge of activity-sourced pollutants. Outdoor work areas shall consider and implement the following, as appropriate: (1) conduct activities indoors; (2) when it is raining, do not conduct outdoor activities that may generate pollutants; (3) prevent runoff from upstream areas from flowing through the work area ; (4) contain the work area to prevent spills or by-products from escaping; (5) install cover or use canopies in areas where outdoor activities are performed; (6) protect storm drain inlets and ensure adequate spill response materials are readily available; and, (7) regularly clean outdoor work areas to remove accumulated debris, materials, and pollutants. Structural BMPs (stormwater treatment devices) may be prescribed if these measures are determined to be ineffective at preventing stormwater pollution from outdoor work activities.	SC-20, SC-30, SC-32, SC-34, SC-42		x		x	x	x	x	x
Spill Prevention and Response											
20	Prevent or capture liquid leaks from vehicles or equipment.	Leaking vehicles or equipment shall be repaired promptly. Drip pans or other equivalent means shall be used to capture spills or leaks from vehicles and equipment. Captured fluids shall be disposed of in accordance with applicable hazardous materials regulations.	SC-11, SC-22						x	x	x
21	Immediately clean up spills.	Spills shall be cleaned up immediately and prevented from entering the storm drain system. Dry-cleaning methods of cleanup are recommended, such as the use of a broom, absorbent, or shop-vac. Consistent with BMP No. 1, uncontained spills must be reported to the City's Stormwater Hotline at (760) 643-2804.	SC-11						x	x	x

Table 1. Minimum BMPs for Industrial, Commercial and Municipal Sites/Sources (Continued)

				Pollutants or Conditions Targeted							
BMP No.	**Requirement**	**Description**	**Applicable CASQA BMP Factsheet(s)**	**Bacteria**	**Sediment**	**Dry Weather Flow**	**Nutrients**	**Trash**	**Metals**	**Oil & Grease**	**Organics**
22	Maintain readily accessible and appropriately supplied spill cleanup materials (or kit).	Spill cleanup materials and equipment shall be kept on-site and, appropriately supplied for the type and quantity of spills that may occur. One or more designated 'spill cleanup kits' are recommended. Spill cleanup materials shall be stored in close proximity to where a spill may occur.	SC-11, SC-22						x	x	x
Waste Management											
23	Keep waste storage and dumpster areas free of exposed trash, sediment, and debris.	Waste storage and dumpster areas shall be cleaned to keep them free of uncontained trash, debris, or other potential pollutants. Liquid waste, hazardous waste, medical waste, universal waste, and other items prohibited by current regulations shall not be placed in solid waste dumpsters. Dry-cleaning methods such as sweeping are preferred. If wet cleaning methods are used, all wash water must be contained, captured, and disposed of appropriately. See BMP 3 for information on appropriate wet cleaning practices.	SC-34, SC-41, BG-30	x	x			x			
24	Protect waste storage and dumpster areas from contact with stormwater and non-stormwater flows onto the property.	Waste storage and dumpster areas shall be protected from contact with stormwater and non-stormwater flows. Waste storage lids shall be closed at all times. Dumpsters, compactors, or storage containers that leak shall be promptly repaired or replaced. Overhead structural cover of waste storage areas is recommended.	SC-34	x				x			

Table 1. Minimum BMPs for Industrial, Commercial and Municipal Sites/Sources (Continued)

				Pollutants or Conditions Targeted							
BMP No.	**Requirement**	**Description**	**Applicable CASQA BMP Factsheet(s)**	**Bacteria**	**Sediment**	**Dry Weather Flow**	**Nutrients**	**Trash**	**Metals**	**Oil & Grease**	**Organics**
25	Cooking oil waste shall be managed to prevent illicit discharges.	Waste containers for fats, oils, and grease (FOG) shall be kept indoors where feasible. Where not feasible, the waste containers shall be kept in an area with secondary containment. FOG waste containers shall be maintained to prevent spills and discharges to the storm drain system. Documentation of this maintenance shall be available to City inspectors upon request.	SC-34, BG-30	x						x	
26	Manage animal waste and animal washing in a manner that prevents transport of pollutants.	Animals and animal waste shall be managed and stored in a manner that prevents waste and wash water from entering the storm drain system. Collect animal waste and dispose of it to the trash or sanitary sewer, as approved and appropriate.	SC-34, BG-10	x	x		x				

3.2 Residential

Table 2 below presents the minimum required BMPs for residential sites and sources. The City's BMP standards are based on the California Stormwater Quality Association (CASQA) BMP factsheets. City exceptions to the procedures described in the factsheets are identified in footnotes. Where any conflict may exist between CASQA factsheets and requirements in the Manual or the Municipal Code, the requirements of the Manual and the Municipal Code shall prevail. Complying with the BMPs described in the Manual does not ensure compliance with all other regulatory requirements, including requirements of other agencies. See Section 2 for more information about other potentially applicable requirements.

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Table 2. Minimum BMPs for Residential Sites/Sources[9]

No.	BMP Title	BMP Description	CASQA BMP Factsheet Reference[10]	Pollutants or Conditions Targeted							
				Bacteria	Sediment	Dry Weather Flow	Nutrients	Trash	Metals	Oil & Grease	Organics
Discharge Control											
1	Eliminate illicit discharges to the storm drain system.	Do not allow any material (solid or liquid) or pollutant, except uncontaminated stormwater, to enter the City's storm drain system. Conditional exceptions apply, as described in Vista Municipal Code Chapter 13.18. Additional activity-specific BMPs related to illicit discharges are described in BMP No.'s 3 through 10 (below). Report any suspected or active illicit discharges to the City's Stormwater Hotline at (760) 643-2804.	SC-10, SC-11, SC-44	x	x	x	x		x	x	x
2	Eliminate illicit connections to the storm drain system.	Illicit connections are any drain or connection that allows for an illegal discharge to enter the storm drain system. Find and abate all illicit connections to the storm drain system through properly approved procedures, permits, and protocols. Report any suspected or active illicit connections to the City's Stormwater Hotline at (760) 643-2804.	SC-10, SC-11, SC-44	x	x	x	x		x	x	x

[9] To the extent practicable, the City's established minimum BMPs for industrial, commercial, municipal sites/sources shall also be implemented for any industrial/commercial type of activities conducted at a residence where appropriate.

[10] CASQA BMP factsheet references refer to factsheets included in the *Stormwater Best Management Practice Portal: Industrial and Commercial* (2015) since CASQA has not produced a residential BMP manual. BMPs for businesses are generally applicable to residential activities as well.

Table 2. Minimum BMPs for Residential Sites/Sources (Continued)

No.	BMP Title	BMP Description	CASQA BMP Factsheet Reference[10]	Pollutants or Conditions Targeted							
				Bacteria	Sediment	Dry Weather Flow	Nutrients	Trash	Metals	Oil & Grease	Organics
3	Properly dispose of water used to clean outdoor areas.	All water used to clean outdoor areas (e.g., power washing) shall be contained, captured, and reused, or properly disposed of to the sanitary sewer, an appropriate waste hauler, or to landscaping or other pervious surfaces.	SC-10, SC-41[11], BG-62	x	x	x	x	x	x	x	x
4	Properly dispose of vehicle and equipment wash water.	Wash water from individual residential vehicle washing shall be prevented from discharging to the City's storm drain system, e.g., by directing wash water to landscaped areas or other pervious surfaces, where feasible. Where it is not feasible to prevent discharges to the City's storm drain system, use of water and detergents and other vehicle wash products must be minimized. Discharges to the City's storm drain system from non-commercial car washes, such as fundraisers and other similar activities, are prohibited. For questions, contact the Stormwater Division at (760) 643-2804.	SC-10, SC-21		x	x			x	x	x

[11] Factsheet SC-41 - Building & Grounds Maintenance, states (in regards to pressure washing), "If soaps or detergents are not used, and the surrounding area is paved, wash runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in the catch basin to trap the particles in wash water runoff." Non-stormwater discharges of this nature, even if filtered, are not allowed to enter the storm drain system. Wash water must be contained, collected, and disposed of properly.

Table 2. Minimum BMPs for Residential Sites/Sources (Continued)

No.	BMP Title	BMP Description	CASQA BMP Factsheet Reference[10]	Pollutants or Conditions Targeted							
				Bacteria	Sediment	Dry Weather Flow	Nutrients	Trash	Metals	Oil & Grease	Organics
5	Properly dispose of water from fire sprinkler maintenance activities.	Fire sprinkler system discharges shall be discharged to the sanitary sewer system when permitted by the City. For approval, contact the Engineering Department at (760) 639-6111. When not practicable or allowed to discharge to the sanitary sewer system due to the presence of prohibited contaminants, the water shall be collected and disposed of by an appropriately certified party. Fire sprinkler system discharges without corrosion inhibitors, fire suppressants, or antifreeze may be discharged to landscaping or other pervious surfaces. Fire sprinkler system discharges may be directed to the storm drain system if the following are implemented: (1) prior to entering the storm drain system, the discharge must be clear, odorless, and pH neutral, and (2) the flow path must be cleaned to ensure that pollutants such as trash and debris are not conveyed to the storm drain system. Discharges shall not result in erosion or in runoff to any adjacent property.	SC-10, SC-41		x	x			x		x
6	Eliminate irrigation runoff.	Irrigation runoff to the storm drain system shall be eliminated. For example, irrigation water and associated pollutants (e.g., sediment, fertilizer, pesticides) from landscape areas and gardens shall be prevented from reaching the storm drain system.	SC-10[12], SC-41	x		x	x				

[12] Factsheet SC-10 – Non-Stormwater Discharges states that "landscape irrigation drainage and landscape watering" may be discharged to the storm drain with conditions; however, in accordance with the MS4 Permit and the City's Stormwater Ordinance, no irrigation runoff may be discharged to the City's storm drain system.

Table 2. Minimum BMPs for Residential Sites/Sources (Continued)

No.	BMP Title	BMP Description	CASQA BMP Factsheet Reference[10]	Pollutants or Conditions Targeted							
				Bacteria	Sediment	Dry Weather Flow	Nutrients	Trash	Metals	Oil & Grease	Organics
7	Properly dispose of discharges from swimming pools, spas, or water features.	Water from swimming pools, spas, and water features shall be properly disposed of to prevent pollutants from entering the storm drain system. Such discharges to the storm drain system are allowed only if the water is: 1) dechlorinated, 2) has a pH level in the 7-8 range, 3) is near or at ambient temperature, 4) does not have algae or suspended solids, and 5) is not saline. Other related discharges, such as from filter backwash or saline pools, are prohibited from entering the storm drain system. At the discretion of the City, discharges of saline water to the sanitary sewer system may be allowed. Contact the Engineering Department at (760) 639-6111 for approval.	SC-10, BG-63[13]			x					
8	Control air conditioning condensation discharges.	Air conditioning condensation shall be directed to landscaped areas or other pervious surfaces where feasible.	SC-10, SC-42			x			x		
9	Eliminate discharges from cleaning indoor areas.	Water used to clean indoor areas, such as during floor mopping or mat washing, shall not be discharged to the storm drain system. Indoor sinks or indoor floor drains may be utilized if they drain to the sanitary sewer system. Alternatively, such waste water may be suitable for collection, recovery, and discharge to landscape.	SC-10, SC-21, BG-30	x		x				x	x

[13] Exception to guidance in factsheet: Factsheet BG-63, Mobile Cleaning – Swimming Pools & Spas, states that discharges from swimming pools and spas to the storm drain system are not permitted; however, discharges of this nature are permitted if the conditions described in BMP 7 are met.

Table 2. Minimum BMPs for Residential Sites/Sources (Continued)

No.	BMP Title	BMP Description	CASQA BMP Factsheet Reference[10]	Pollutants or Conditions Targeted							
				Bacteria	Sediment	Dry Weather Flow	Nutrients	Trash	Metals	Oil & Grease	Organics
10	Eliminate pumped groundwater, foundation, and footing drain discharges.	Unless approved by a National Pollutant Discharge Elimination System (NPDES) permit, or the RWQCB has determined in writing that no permit is needed, the following discharges are not allowed: 1) pumped groundwater, such as water from crawl space or sump pumps, 2) discharges from foundation and footing drains that are at or below groundwater elevation.	SC-10			x					
BMP and Storm Drain Conveyance and Structure Maintenance											
11	Regularly inspect and maintain storm drain structures to retain designed functionality.	Storm drain conveyances and structures for which the property owner is responsible for maintenance shall be inspected, maintained, and cleaned to maintain design functionality. All structural BMPs (e.g., treatment and flow control facilities) shall be maintained in accordance with recorded maintenance agreements, and where applicable, structural BMPs shall demonstrate compliance with the City's certification program.	SC-44	x	x		x	x	x	x	x
Erosion and Sediment Control											
12	Protect unpaved and landscaped areas from erosion.	Exposed soils that are eroding or are likely to erode shall be stabilized to prevent sediment from mobilizing in stormwater and entering the storm drain system. Mulch, vegetation, and other stabilization techniques for erosion and sediment control may be implemented. Significant accumulations of eroded soil shall be removed or contained to prevent discharge to the storm drain system.	SC-40, SC-42	x	x		x				
Good Housekeeping											
13	Implement good housekeeping in outdoor areas.	Outdoor areas shall be inspected and cleaned as necessary to keep them free of trash, sediment, litter, and other debris. Additional attention shall be given to outdoor trash storage areas and and material storage locations.	SC-41	x	x			x			

Table 2. Minimum BMPs for Residential Sites/Sources (Continued)

No.	BMP Title	BMP Description	CASQA BMP Factsheet Reference[10]	Pollutants or Conditions Targeted							
				Bacteria	Sediment	Dry Weather Flow	Nutrients	Trash	Metals	Oil & Grease	Organics
Pesticide and Fertilizer Management											
14	Properly manage pesticides and fertilizers.	Pesticides and fertilizers shall be used in strict accordance with manufacturer's labels, as authorized by the U.S. Environmental Protection Agency. See BMPs No.'s 16 and 17 for secondary containment and cover requirements. Waste products shall be disposed in accordance with the manufacturer's label and applicable hazardous waste regulations. The use of integrated pest management (IPM) principles is encouraged to reduce or eliminate use of chemicals. For more information about integrated pest management, see the University of California Statewide IPM Program at: http://www.ipm.ucdavis.edu	SC-35, SC-41, BG-40				x				x
Spill Prevention and Response											
15	Prevent or capture liquid leaks from vehicles or equipment.	Leaking vehicles or equipment shall be repaired promptly. Drip pans or other equivalent means shall be used to capture spills or leaks from vehicles and equipment. Captured fluids shall be disposed of in accordance with applicable hazardous materials regulations.	SC-11, SC-22						x	x	x
16	Immediately clean up spills.	Spills shall be cleaned up immediately and prevented from entering the storm drain system. Dry-cleaning methods of cleanup are recommended, such as the use of a broom, absorbent, or shop-vac. Consistent with BMP No. 1, uncontained spills must be reported to the City's Stormwater Hotline at (760) 643-2804.	SC-11						x	x	x

Table 2. Minimum BMPs for Residential Sites/Sources (Continued)

No.	BMP Title	BMP Description	CASQA BMP Factsheet Reference[10]	Pollutants or Conditions Targeted							
				Bacteria	Sediment	Dry Weather Flow	Nutrients	Trash	Metals	Oil & Grease	Organics
17	Maintain readily accessible and appropriately supplied spill cleanup materials (or kit).	Spill cleanup materials and equipment shall be kept on-site and, appropriately supplied for the type and quantity of spills that may occur. One or more designated 'spill cleanup kits' are recommended. Spill cleanup materials shall be stored in close proximity to where a spill may occur.	SC-11, SC-22						x	x	x
Waste Management											
18	Keep waste storage and dumpster areas free of exposed trash, sediment, and debris.	Waste storage and dumpster areas shall be cleaned to keep them free of uncontained trash, debris, or other potential pollutants. Liquid waste, hazardous waste, medical waste, universal waste, and other items prohibited by current regulations shall not be placed in solid waste dumpsters. Dry-cleaning methods such as sweeping are preferred. If wet cleaning methods are used, all wash water must be contained, captured, and disposed of appropriately. See BMP 3 for information on appropriate wet cleaning practices.	SC-34, SC-41, BG-30	x	x			x			
19	Protect waste storage and dumpster areas from contact with stormwater and non-stormwater flows onto the property.	Waste storage and dumpster areas shall be protected from contact with stormwater and non-stormwater flows. Waste storage lids shall be closed at all times. Dumpsters, compactors, or storage containers that leak shall be promptly repaired or replaced. Overhead structural cover of waste storage areas is recommended.	SC-34	x				x			

Table 2. Minimum BMPs for Residential Sites/Sources (Continued)

				Pollutants or Conditions Targeted							
No.	**BMP Title**	**BMP Description**	**CASQA BMP Factsheet Reference[10]**	**Bacteria**	**Sediment**	**Dry Weather Flow**	**Nutrients**	**Trash**	**Metals**	**Oil & Grease**	**Organics**
20	Manage animal waste and animal washing in a manner that prevents transport of pollutants.	Animals and animal waste shall be managed and stored in a manner that prevents waste and wash water from entering the storm drain system. Collect animal waste and dispose of it to the trash or sanitary sewer, as approved and appropriate.	SC-34, BG-10	x	x		x				

3.3 Construction

Table 3 below presents the minimum BMPs required for construction sites within the City's jurisdiction. The City's BMP standards are based on the California Stormwater Quality Association (CASQA) BMP factsheets. Where any conflict may exist between CASQA factsheets and requirements in the Manual or the Municipal Code, the requirements of the Manual and the Municipal Code shall prevail. Complying with the BMPs described in the Manual does not ensure compliance with all other regulatory requirements, including requirements of other agencies. See Section 2 for more information about other potentially applicable requirements. Note that Table 3 must be used as directed in Section 3.3.1, which provides direction on the interpretation and use of Table 3.

Construction site BMPs are required to be implemented in an effective combination of BMPs that are site specific, construction phase appropriate, and seasonally appropriate. Dry Season (May 1 through September 30) BMP implementation must plan for and address rain events that may occur in the Dry Season. Non-stormwater discharges from construction sites into the City's storm drain system are prohibited year-round. City inspectors have the authority to require additional BMPs to prevent discharges of pollutants and to prevent non-stormwater discharges to the City's storm drain system from construction sites year round. Construction sites also must adhere to the requirements of all applicable additional SWRCB or RWQCB general or site specific NPDES permits for construction activities (see Section 2) at the time of construction.

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Table 3. Minimum BMPs for Construction Sites

THIS MATRIX IS A GENERAL GUIDANCE DOCUMENT AND IS NOT A SUBSTITUTION FOR SITE SPECIFIC BMP REQUIREMENTS.
Construction sites that are subject to other SWRCB or RWQCB permits must also adhere to the BMP Requirements of the additional permits
Refer to the notes at the end of this table for acronyms, reference documents, footnotes, and permit definitions

A	B	C	D	E	F	G	H					
Required BMPs	**Other Permits Potentially Required**	**CASQA BMP Factsheet No.**	**CASQA BMP Factsheet Name**	**MS4 Permit Compliance Category**	**CASQA BMP Factsheet No. Targeted Pollutants**	**On-Site or Off-site Work: Construction Phase**	**CASQA BMP Factsheet No. Categories & Objectives (P = Primary S= Secondary)[1]**					
							Effective Combination Required		**TC**	**WE**	**NS**	**WM**
							EC	**SE**				
X	n/a	n/a	Training	PP,SMWM EC,SE	n/a	G, V, F						
X	✓	EC-1	Scheduling	PP, EC,SE,SMWM	Sediment, Trash	G, V, F	P	S	S	S		
X[a]	✓	EC-2	Preservation of Existing Vegetation	PP,EC	Sediment	G, V, F	P					
X[a]	n/a	EC-3	Hydraulic Mulch	PP,EC, SMWM	Sediment	G, V	P			S		
X[a]	✓	EC-4	Hydroseeding	PP,EC	Sediment	G, V	P			S		
X[a]	n/a	EC-5	Soil Binders	PP,EC	Sediment	G, V	P			S		
X[a]	n/a	EC-6	Straw Mulch	PP,EC	Sediment	G, V	P			S		
X[a]	n/a	EC-7	Geotextiles and Mats	PP,EC	Sediment	G, V, F	P			S		
X[a]	n/a	EC-8	Wood Mulching	PP,EC	Sediment	G, V, F	P			S		
X[a]	✓	EC-9	Earth Dikes and Drainage Swales	PP,EC,RUROC	Sediment	G, V	P					
X[a]	✓	EC-10	Velocity Dissipation Devices	PP,EC,RUROC	Sediment	G, V, F	P					
X[a]	✓	EC-11	Slope Drains	PP,EC,RUROC	Sediment	G, V, F	P					
X[a]	✓	EC-12	Stream Bank Stabilization	PP,EC,SE,NS	Sediment	G, V, F	P	S			S	
X[a]	n/a	EC-14	Compost Blankets	PP,EC	Sediment	G, V, F	P					
X[a]	n/a	EC-15	Soil Preparation Roughening	PP, EC, SE	Sediment	G	P	S				

Table 3. Minimum BMPs for Construction Sites (Continued)

THIS MATRIX IS A GENERAL GUIDANCE DOCUMENT AND IS NOT A SUBSTITUTION FOR SITE SPECIFIC BMP REQUIREMENTS.
Construction sites that are subject to other SWRCB or RWQCB permits must also adhere to the BMP Requirements of the additional permits
Refer to the notes at the end of this table for acronyms, reference documents, footnotes, and permit definitions

A	B	C	D	E	F	G	H					
Required BMPs	**Other Permits Potentially Required**	**CASQA BMP Factsheet No.**	**CASQA BMP Factsheet Name**	**MS4 Permit Compliance Category**	**CASQA BMP Factsheet No. Targeted Pollutants**	**On-Site or Off-site Work: Construction Phase**	**CASQA BMP Factsheet No. Categories & Objectives (P = Primary S= Secondary)[1]**					
							Effective Combination Required		**TC**	**WE**	**NS**	**WM**
							EC	**SE**				
X[a]	n/a	EC-16	Non-Vegetative Stabilization	PP, EC, SE, RUROC	Sediment	G, V, F	P	S			S	
X[b]	n/a	SE-1	Silt Fence	PP, SE, RUROC	Sediment (coarse)	G, V, F		P				
X[b, c]	✓	SE-2	Sediment Basin	PP, SE, RUROC, APS	Sediment, Trash	G, V		P				
X[b, c]	✓	SE-3	Sediment Traps	PP, EC, RUROC, APS	Sediment, Trash	G, V		P				
X[b]	n/a	SE-4	Check Dam	PP, EC, RUROC	Sediment	G, V	S	P				
X[b]	n/a	SE-5	Fiber Rolls	PP, EC, SE, RUROC	Sediment	G, V	S	P				
X[b]	n/a	SE-6	Gravel Bag Berm	PP, EC, SE, RUROC	Sediment	G, V, F	S	P				
X[b]	n/a	SE-7	Street Sweeping and Vacuuming	PP, SE	Sediment, Trash, Oil & Grease, Bacteria	G, V		S	P			
X[b]	n/a	SE-8	Sandbag Barrier (note: gravel to be used)	PP, EC, RUROC	Sediment	G, V, F	S	P				
X[b]	n/a	SE-10	Storm Drain Inlet Protection	PP, SE, RUROC	Sediment, Trash, Oil And Grease, Bacteria	G, V, F		P				
d	✓	SE-11	Active Treatment Systems	PP, APS	Sediment	G	P					

Table 3. Minimum BMPs for Construction Sites (Continued)

THIS MATRIX IS A GENERAL GUIDANCE DOCUMENT AND IS NOT A SUBSTITUTION FOR SITE SPECIFIC BMP REQUIREMENTS.
Construction sites that are subject to other SWRCB or RWQCB permits must also adhere to the BMP Requirements of the additional permits
Refer to the notes at the end of this table for acronyms, reference documents, footnotes, and permit definitions

A	B	C	D	E	F	G	H					
Required BMPs	**Other Permits Potentially Required**	**CASQA BMP Factsheet No.**	**CASQA BMP Factsheet Name**	**MS4 Permit Compliance Category**	**CASQA BMP Factsheet No. Targeted Pollutants**	**On-Site or Off-site Work: Construction Phase**	**CASQA BMP Factsheet No. Categories & Objectives (P = Primary S= Secondary)[1]**					
							Effective Combination Required		**TC**	**WE**	**NS**	**WM**
							EC	**SE**				
e	n/a	SE-12	Manufactured Linear Sediment Controls	PP, SE, RUROC	Sediment, Trash	G, V	S	P				P
e	n/a	SE-13	Compost Socks and Berms	PP, EC, SE, RUROC	Sediment, Metals, Bacteria, Oil & Grease	G, V	S	P				
e	n/a	SE-14	Bio Filter Bags	PP, SE, RUROC	Sediment	G, V, F		P				
X	n/a	WE-1	Wind Erosion Control	PP, SMWM, SE	Sediment	G, V		S		P		
X	n/a	TC-1	Stabilized Construction Entrance/Exit	PP, SMWM, EC, SE, RUROC	Sediment	G, V	S	S	P			
X	n/a	TC-2	Stabilized Construction Roadway	PP, SMWM, EC, SE, RUROC	Sediment	G, V	S	S	P			
X	n/a	TC-3	Tire Wash	PP, SMWM, SE	Sediment	G, V		S	P			
X	✓	NS-1	Water Conservation Practices	PP, SMWM, SE, NS	Sediment, Nutrients, Bacteria	G, V, F	S	S			P	
f	✓	NS-2	Dewatering Operations	PP, SMWM, SE, NS	Sediment, Oil & Grease	G		S			P	
X	n/a	NS-3	Paving and Grinding Operations	PP, SMWM, NS	Sediment, Oil & Grease	G, V, F					P	S

Table 3. Minimum BMPs for Construction Sites (Continued)

THIS MATRIX IS A GENERAL GUIDANCE DOCUMENT AND IS NOT A SUBSTITUTION FOR SITE SPECIFIC BMP REQUIREMENTS.
Construction sites that are subject to other SWRCB or RWQCB permits must also adhere to the BMP Requirements of the additional permits
Refer to the notes at the end of this table for acronyms, reference documents, footnotes, and permit definitions

A	B	C	D	E	F	G	H					
Required BMPs	**Other Permits Potentially Required**	**CASQA BMP Factsheet No.**	**CASQA BMP Factsheet Name**	**MS4 Permit Compliance Category**	**CASQA BMP Factsheet No. Targeted Pollutants**	**On-Site or Off-site Work: Construction Phase**	**CASQA BMP Factsheet No. Categories & Objectives (P = Primary S= Secondary)[1]**					
							Effective Combination Required		**TC**	**WE**	**NS**	**WM**
							EC	**SE**				
f	✓	NS-4	Temporary Stream Crossing	PP, EC, SE NS	Sediment	G, V	S	S	S		P	
f	✓	NS-5	Clear Water Diversion	PP, NS	Sediment	G					P	
X	✓	NS-6	Illicit Connection/ Discharge	SMWM, NS	Sediment, Nutrients, Trash, Metals, Bacteria, Oil & Grease, Organics	G, V, F					P	
X	✓	NS-7	Potable Water/Irrigation	SMWM, NS	Sediment, Nutrients, Metals, Organics,Bacteria	G, V, F					P	
X	n/a	NS-8	Vehicle and Equipment Cleaning	PP, SMWM, NS	Sediment, Nutrients, Oil & Grease, Organics	G, V, F					P	
X	n/a	NS-9	Vehicle and Equipment Fueling	PP, SMWM, NS	Oil & Grease	G, V, F					P	
X	n/a	NS-10	Vehicle and Equipment Maintenance	PP, SMWM, NS	Nutrients, Trash Oil & Grease, Organics	G, V, F					P	
f	n/a	NS-11	Pile Driving Operations	PP, SMWM, NS	Sediment, Oil & Grease	G, V					P	

Table 3. Minimum BMPs for Construction Sites (Continued)

THIS MATRIX IS A GENERAL GUIDANCE DOCUMENT AND IS NOT A SUBSTITUTION FOR SITE SPECIFIC BMP REQUIREMENTS.
Construction sites that are subject to other SWRCB or RWQCB permits must also adhere to the BMP Requirements of the additional permits
Refer to the notes at the end of this table for acronyms, reference documents, footnotes, and permit definitions

A	B	C	D	E	F	G	H					
Required BMPs	**Other Permits Potentially Required**	**CASQA BMP Factsheet No.**	**CASQA BMP Factsheet Name**	**MS4 Permit Compliance Category**	**CASQA BMP Factsheet No. Targeted Pollutants**	**On-Site or Off-site Work: Construction Phase**	**CASQA BMP Factsheet No. Categories & Objectives (P = Primary S= Secondary)[1]**					
							Effective Combination Required		**TC**	**WE**	**NS**	**WM**
							EC	**SE**				
X	n/a	NS-12	Concrete Curing	PP, SMWM, NS	Sediment, Metals, Oil & Grease	G, V, F					P	P
X	n/a	NS-13	Concrete Finishing	PP, SMWM, NS	Sediment, Metals, Oil & Grease	G, V, F					P	P
f	✓	NS-14	Material Over Water	PP, SMWM, NS	Sediment, Nutrients, Trash, Metals, Bacteria, Oil & Grease, Organics	G, V, F					P	P
f	✓	NS-15	Demolition Adjacent to Water	PP, SMWM, NS	Sediment, Nutrients, Trash, Metals, Bacteria, Oil & Grease, Organics	G, V						P
f	✓	NS-16	Temporary Batch Plants	PP, SMWM, NS	Sediment, Trash, Metals	G						P
X	n/a	WM-1	Material Delivery & Storage	PP, SMWM, NS	Sediment, Nutrients, Trash, Metals, Oil & Grease, Organics	G, V, F						P
X	n/a	WM-2	Material Use	PP, SMWM, NS	Sediment, Nutrients, Trash, Metals, Oil & Grease, Organics	G, V, F						P

Table 3. Minimum BMPs for Construction Sites (Continued)

THIS MATRIX IS A GENERAL GUIDANCE DOCUMENT AND IS NOT A SUBSTITUTION FOR SITE SPECIFIC BMP REQUIREMENTS.
Construction sites that are subject to other SWRCB or RWQCB permits must also adhere to the BMP Requirements of the additional permits
Refer to the notes at the end of this table for acronyms, reference documents, footnotes, and permit definitions

A	B	C	D	E	F	G	H					
Required BMPs	**Other Permits Potentially Required**	**CASQA BMP Factsheet No.**	**CASQA BMP Factsheet Name**	**MS4 Permit Compliance Category**	**CASQA BMP Factsheet No. Targeted Pollutants**	**On-Site or Off-site Work: Construction Phase**	**CASQA BMP Factsheet No. Categories & Objectives (P = Primary S= Secondary)[1]**					
							Effective Combination Required		**TC**	**WE**	**NS**	**WM**
							EC	**SE**				
X	n/a	WM-3	Stockpile Management	PP, SMWM, NS	Sediment, Nutrients, Trash, Metals, Oil & Grease, Organics	G, V, F	S	S				P
X	n/a	WM-4	Spill Prevention & Control	PP, SMWM, NS	Sediment, Nutrients, Trash, Metals, Oil & Grease, Organics	G, V, F						P
X	n/a	WM-5	Solid Waste Management	PP, SMWM, NS	Sediment, Nutrients, Trash, Metals, Oil & Grease, Organics	G, V, F						P
X	✓	WM-6	Hazardous Waste Management	PP, SMWM, NS	Nutrients, Trash, Metals, Bacteria, Oil & Grease, Organics	G, V, F						P
f	✓	WM-7	Contaminated Soil Management	PP, SMWM, NS	Nutrients, Trash, Metals, Oil & Grease, Organics	G						P
X	n/a	WM-8	Concrete Waste Management	PP, SMWM, NS	Sediment, Metals, Trash	G, V, F					S	P

Table 3. Minimum BMPs for Construction Sites (Continued)

THIS MATRIX IS A GENERAL GUIDANCE DOCUMENT AND IS NOT A SUBSTITUTION FOR SITE SPECIFIC BMP REQUIREMENTS.
Construction sites that are subject to other SWRCB or RWQCB permits must also adhere to the BMP Requirements of the additional permits
Refer to the notes at the end of this table for acronyms, reference documents, footnotes, and permit definitions

A	B	C	D	E	F	G	H					
Required BMPs	**Other Permits Potentially Required**	**CASQA BMP Factsheet No.**	**CASQA BMP Factsheet Name**	**MS4 Permit Compliance Category**	**CASQA BMP Factsheet No. Targeted Pollutants**	**On-Site or Off-site Work: Construction Phase**	**CASQA BMP Factsheet No. Categories & Objectives (P = Primary S= Secondary)[1]**					
							Effective Combination Required		**TC**	**WE**	**NS**	**WM**
							EC	**SE**				
X	✓	WM-9	Sanitary/ Septic Waste Management	PP, SMWM, NS	Nutrients, Trash, Bacteria, Organics	G, V, F						P
X	✓	WM-10	Liquid Waste Management	PP, SMWM, NS	Sediment, Metals, Nutrients, Trash, Metals, Oil & Grease	G, V						P

Note: Table 3 must be used as directed in Section 3.3.1, Use and Guidance for Table 3.

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3.3.1 Use and Guidance for Table 3

The following discussion provides additional guidance on the application of Table 3 to construction projects, including definitions of acronyms and abbreviations used. The guidance below is organized by table column, beginning with Column A.

Column A:

This column identifies required BMPs. BMPs with an "X" are required when applicable. BMPs are required for each phase of construction on site or offsite regardless of size. Projects are required to schedule in advance which BMPs may be applicable to each phase of construction (construction phases are defined in the notes on Column G below). Footnotes "a" and "b", which are included for some required BMPs, are defined below.

a. An appropriate BMP, or combination of BMPs, by construction phase for erosion control must be selected. Typically not every erosion control BMP listed in Table 3 will be required to meet this standard. The appropriate and effective BMP selection is based on site specific characteristics, construction phase, and as listed factsheet constraints such as slope, site size or drainage area, and soils. All applicable design requirements must be met. Project owners/operators are required to adjust the BMP selection by scheduling necessary BMPs onsite for each construction phase and season to prevent pollutant discharge to the Storm Drain System. The City may require additional submittals of BMP plans prior to releasing permits for additional construction phases.
b. An appropriate BMP, or combination of BMPs, by construction phase for sediment control must be selected. Typically not every sediment control BMP listed in Table 3 will be required to meet this standard. The appropriate and effective BMP selection is based on site specific characteristics, construction phase, and as listed factsheet constraints such as slope, site size or drainage area, and soils. All applicable design requirements must be met. Project owners/operators are required to adjust the BMP selection by scheduling necessary BMPs onsite for each construction phase and season to prevent pollutant discharge to the Storm Drain System. The City may require additional submittals of BMP plans prior to releasing permits for additional construction phases.
c. Sediment Basins and Sediment Traps must be designed in accordance with the most current CASQA and City design requirements. Design must be conducted by a licensed CA professional engineer (PE). Maintenance, stabilization of slopes during construction, safety requirements, and Vector Control must be addressed in the design. Planned or future discharge or outlets must be approved by the City prior to installation.

Other BMPs that may also be required in some cases are identified using the following identifiers in column A.

d. Active Treatment Systems (ATS) may be required for Risk Level 3 Construction General Permit projects, as necessary to meet Construction General Permit requirements. The City at its discretion and based on project location, violation history, or other criteria may require ATS for projects of any Risk Level or for projects under 1 acre.
e. These BMPs may be used as part of the project's system of sediment control BMPs (described in note "b" above) if approved by City staff.
f. This BMP may require securing additional regulatory permits prior to implementing. Permits must be on site prior to implementing these BMPs, including work in drainage channels.

Column B:

This column identifies BMPs that address situations that may also require permits or approvals from other agencies or other departments or divisions within the City (see Section 2). The project owner is responsible for determining which, if any, additional permit are necessary and securing the required permits prior to starting work. Acquisition of these permits may require additional time and engineering reports or submittals. The project owner is also responsible for maintaining compliance with the permits over the duration of the project, including completing any required monitoring and reporting.

A check mark (✓) in column B indicates that a permit or approval from another agency or another department or division within the City may be required. An "n/a" means that additional permits or approvals are typically not required. However, it is possible that in specific circumstances additional permits could also be required even for the BMPs marked as "n/a." An "n/a" does not guarantee that no other permit or approval is required.

Columns C and D:

These columns present the California Stormwater Quality Association (CASQA) identification code and title for each factsheet. Unless specified differently in the Manual or the Municipal Code, the City of Vista standard for BMP installation, use, location, and maintenance schedule is CASQA. BMP codes incorporate two letter abbreviations by BMP type, as follows: EC = Erosion Control; SE = Sediment Control; TC = Tracking Control; WE= Wind Erosion; NS = Non Stormwater Controls; WM = Waste Management. For more information see the CASQA website, www.casqa.org. Note that a subscription is required to view the CASQA factsheets, and the City of Vista does not provide subscription access.

Column E:

This column identifies which of the construction BMP categories listed in MS4 Permit Section E.4 are addressed by each CASQA factsheet. The MS4 Permit BMP categories are abbreviated as follows: PP = Project Planning; SMWM = Site Management, Housekeeping, Waste Management; NS = Non-Stormwater Management; EC= Erosion Control; SE = Sediment Control; RUROC: Run-on and Runoff Control; APS = Active/Passive Sediment Treatment Systems.

Column F:

This column identifies the pollutant(s) likely to be reduced by implementing each BMP. Pollutants addressed are a combination of designations by the CASQA factsheets and other studies identifying the effect of BMPs.

Column G:

This column identifies the construction phases during which a BMP is most likely to be applicable. Construction phases are defined as follows:

- **Grading ("G")**: Demolition, ROW Work, Site Preparation and Earthmoving, Earthwork, Construction or Relocation of Above Ground and Below Ground Structures and Utilities, channels, dewatering, hydrostatic testing of utilities and fire systems
- **Vertical ("V"):** Construction of Above Ground Structures to area 5 feet from Structures, Stucco, Framing, Mechanical, Roof, Painting, drain flushing, fire system testing (hydrants, sprinklers)
- **Finish ("F"):** Roadways, Slurry Seal, Asphalt, Concrete, Walkways, Parking Lots, Landscaping, Painting, Striping, Traffic/Lighting Facilities, Architectural

Column H:

This column identifies the objectives CASQA has defined for each BMP. While the primary objective is typically identified by the two digit letter code at the beginning of the BMP factsheet number (see notes on Column E above), many BMPs also provide additional secondary benefits. A "P" indicates a primary objective, and an "S" indicates a secondary objective. The CASQA objective abbreviations and their definitions are as follows: EC = Erosion Control; SE = Sediment Control; TC = Tracking Control; WE= Wind Erosion; NS = Non Stormwater Controls; WM = Waste Management.

3.4 BMP Requirements for Development Projects

The City's BMP requirements for new and re-development projects are presented in the Standard Urban Stormwater Mitigation Plan (SUSMP), which is included as Attachment A. These BMPs include, but are not limited to, site design, source control, and post-construction structural BMPs (e.g., flow control or treatment control devices).

3.4.1 Notice of Upcoming Changes to Requirements

By 2016, the City anticipates adopting updated BMP requirements for new and re-development projects that will be consistent with the MS4 Permit adopted in 2013. The updated requirements and associated guidance document (referred to as the "BMP Design Manual" in the MS4 Permit) are being prepared cooperatively with staff from multiple San Diego County municipalities and other interested parties. The City will be publishing notices and informing the development community of these new requirements as they near coming into effect. Project proponents that anticipate acquiring City approvals for construction toward the end of 2015, or initiating construction near then, are advised to contact the City Engineering Department to evaluate applicability of the new requirements.

Attachment A

Standard Urban Stormwater Mitigation Plan

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The San Diego Region has varied topography consisting of coastal plain, central mountain-valley, and eastern mountain valley areas. Elevations range from sea level at the Pacific Ocean to approximately 6,000 feet at the summit of Palomar Mountain. Temperature averages about 65 degrees Fahrenheit and average annual precipitation is between 10 and 13 inches.

San Diego County comprises 10 major stream systems: San Onofre Creek, Santa Margarita River, San Luis Rey River, San Marcos Creek, Escondido Creek, San Dieguito River, San Diego River, Sweetwater River, Otay River, and the Tijuana River. Almost all stream systems in the San Diego region have both perennial and ephemeral reaches. In addition, most of these streams have been impacted by impoundments and/or channelization. There are few undisturbed stream reaches left in San Diego County.

San Diego County is approximately 2.7 million acres and roughly 1.8 million acres (66 percent) is developed or in use. Much of the remaining land is preserved from future development.

Impervious surfaces now cover much of the land, and storm drains pipe runoff from urban areas directly into streams. As in many of California's urban areas, growth and development have caused changes in the timing and intensity of stream flows. These changes can then lead to more frequent flooding, destabilized stream banks, armoring of streambanks with riprap and concrete, loss of streamside trees and vegetation, and the destruction of stream habitat.

The remaining habitat in the region is composed of sensitive coastal sage scrub, chaparral, woodlands, and grasslands. Human encroachment and habitat loss threaten close to 300 species of plants and animals in California. Many of those reside in southern California and range from native grasslands to the Fairy Shrimp.

Once altered, natural streams and their ecosystems cannot be fully restored. However, it is possible to stop, and partially reverse, the trend of declining habitat and preserve some ecosystem values for the benefit of future generations.

This is an enormous, long-term effort. Managing runoff from a single development site may seem inconsequential, but by changing the way most sites are developed (and redeveloped), we may be able to preserve and enhance existing stream ecosystems in urban and urbanizing areas.

In January 2007, the California Regional Water Quality Control Board for the San Diego Region (Regional Board) reissued a municipal stormwater NPDES permit to San Diego area municipal Copermittees, including the City of Vista. The reissued permit updates and

expands stormwater requirements for new developments and redevelopments. Stormwater treatment requirements have been made more widely applicable and more stringent; minimum standards for Low Impact Development (LID) have been added, and the Copermittees are required to develop and implement criteria for the control of runoff peaks and durations from development sites.

Low Impact Development is an integrated site design methodology that uses small-scale detention and retention to minimize pollutants conveyed by runoff and to mimic pre-project site hydrological conditions.

As required by the reissued permit, the Copermittees prepared an updated Countywide Model SUSMP to replace the current countywide model SUSMP, which has been in effect since 2002. Each municipality, including the City of Vista, is required to update its local SUSMP to implement the requirements. To assist the land development community, to streamline project reviews, and to maximize cost-effective environmental benefits, the updated Countywide Model SUSMP incorporates a unified LID design procedure. This design procedure integrates site planning and design measures with engineered, small-scale Integrated Management Practices (IMPs) such as bioretention. By following the procedure, applicants can develop a single integrated design which complies with the complex and overlapping NPDES permit LID requirements, stormwater treatment requirements, and runoff peak-and-duration-control (hydromodification management) requirements.

Along with the detailed design procedure, the updated SUSMP includes design information and criteria for dispersal of runoff to landscaped areas and for pervious pavements, bioretention facilities, flow-through planters, dry wells, infiltration basins, and cisterns. Where feasible and where allowed, water in cisterns may be directed to nonpotable uses, augmenting water supplies. Bioretention facilities and planter boxes can be designed with an impermeable barrier so that runoff does not saturate native soils; instead, runoff is filtered through an engineered soil mix before being captured in an underdrain and conveyed to off-site storm drains. This configuration may be needed where groundwater is high, is contaminated, or where increasing soil moisture may present a hazard to foundations or slope stability.

Applicants for development project approvals may choose not to use the unified LID design procedure; however, they will still need to demonstrate compliance with the applicable LID criteria, stormwater treatment criteria, and hydromodification management criteria. The City requires that runoff be infiltrated or else treated by bioretention facilities, planter boxes, filters, settling ponds, or constructed wetlands. In some special circumstances—retrofit of existing drainage systems, some pedestrian-oriented developments, and roadway widening projects—where it can also be demonstrated it is not be feasible to construct any of these facilities, higher-rate surface biofilters or higher-rate vault based filtration units may be used.

Applicants for approval of Priority Development Projects must demonstrate compliance with the hydromodification management criteria in the NPDES permit. This document includes guidance for demonstrating compliance. Submittals for projects smaller than 50 acres may demonstrate compliance by using the integrated LID design procedure. For larger projects, the applicant may use a continuous simulation hydrologic computer model to simulate pre-project and post-project runoff, including the effect of LID facilities, detention basins, or other stormwater management facilities, or may identify an exemption applicable to the site.

Applicants must also incorporate into their project design features to control pollutants from specified on-site sources, such as refuse areas, outdoor storage areas, and vehicle washing and repair facilities. The Copermittees have developed a table listing the types of sources to be controlled and for each, the corresponding source control measures required.

The updated SUSMP provides the applicant with step-by-step instructions for preparing a Project Submittal for review by City Land Development and Water Quality Protection Program staff. The recommended steps are:

1. Assemble needed information.
2. Identify site opportunities and constraints.
3. Follow the LID Design Guidance to analyze the project for LID and to develop and document the drainage design.
4. Specify source controls using the sources/source control checklist in the appendix.
5. Plan for ongoing maintenance of treatment and flow-control facilities.
6. Complete the Project Submittal.

The step-by-step instructions are augmented by the City's process for reviewing the Project Submittal. These instructions are detailed in Chapter 3 of this document and are further supplemented by the documents in Appendix B. As required by the City's NPDES permit, each Copermittee implements a program to verify that approved stormwater treatment facilities are operating effectively. To facilitate implementation of these programs, the updated Countywide Model SUSMP includes instructions for applicants to prepare detailed maintenance plans.

For development projects in the City of Vista, project proponents should utilize this SUSMP document for reference in preparing project designs and submittals. For reference or comparison, the updated Countywide Model SUSMP is available for download in .PDF format at www.projectcleanwater.org. The 126-page model document is formatted for 2-sided printing, and may also be navigated online. Hyperlinks throughout the document provide ready access to references and additional information resources.

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Glossary

Best Management Practice (BMP)	Any procedure or device designed to minimize the quantity of pollutants that enter the storm drain system.
California Association of Stormwater Quality Agencies (CASQA)	Publisher of the California Stormwater Best Management Practices Handbooks, available at www.cabmphandbooks.com. Successor to the Storm Water Quality Task Force (SWQTF).
California BMP Method	A method for determining the required volume of stormwater treatment facilities. Described in Section 5.5.1 of the California Stormwater Best Management Practice Manual (New Development) (CASQA, 2003).
City	City of Vista
Conditions of Approval (COAs)	Requirements a municipality may adopt for a project in connection with a discretionary action (e.g., adoption of an EIR or negative declaration or issuance of a use permit). COAs may include features to be incorporated into the final plans for the project and may also specify uses, activities, and operational measures that must be observed over the life of the project.
Continuous Simulation Modeling	A method of hydrological analysis in which a set of rainfall data (typically hourly for 30 years or more) is used as input, and runoff rates are calculated on the same time step. The output is then analyzed statistically for the purposes of comparing runoff patterns under different conditions (for example, pre- and post-development-project).
Copermittees	See **Dischargers**.
Detention	The practice of holding stormwater runoff in ponds, vaults, within berms, or in depressed areas and letting it discharge slowly to the storm drain system. See definitions of **infiltration** and **retention**.
Development Projects	New development or redevelopment with land disturbing activities; structural development, including construction or installation of a building or structure, the creation of impervious surfaces, public agency projects, and land subdivision.
Directly Connected Impervious Area	Any impervious surface which drains into a catch basin, area drain, or other conveyance structure without first allowing flow across pervious areas (e.g. lawns).
Direct Infiltration	Infiltration via methods or devices, such as dry wells or infiltration trenches, designed to bypass unsaturated surface soils and transmit runoff directly to groundwater.

Dischargers The agencies named in the **stormwater NPDES permit** (see definition): the County of San Diego; the Cities of Carlsbad, El Cajon, La Mesa, Poway, Solana Beach, Chula Vista, Encinitas, Lemon Grove, San Diego, Vista, Coronado, Escondido, National City, San Marcos, Del Mar, Imperial Beach, Oceanside, and Santee; the San Diego Unified Port District, and the San Diego County Regional Airport Authority.

Drainage Management Areas Areas delineated on a map of the development site showing how drainage is detained, dispersed, or directed to **Integrated Management Practices**. There are four types of Drainage Management Areas, and specific criteria apply to each type of area. See Chapter 4.

Drawdown time The time required for a stormwater detention or infiltration facility to drain and return to the dry-weather condition. For detention facilities, drawdown time is a function of basin volume and outlet orifice size. For infiltration facilities, drawdown time is a function of basin volume and infiltration rate.

Environmentally Sensitive Areas Areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Resources Control Board (Water Quality Control Plan for the San Diego Basin (1994) and amendments); water bodies designated with the RARE beneficial use by the State Water Resources Control Board (Water Quality Control Plan for the San Diego Basin (1994) and amendments); areas designated as preserves or their equivalent under the Multi Species Conservation Program within the Cities and County of San Diego; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees.

Flow Control Control of runoff rates and durations as required by the Hydromodification Management Plan.

Head In hydraulics, energy represented as a difference in elevation. In slow-flowing open systems, the difference in water surface elevation, e.g., between an inlet and outlet.

Higher-Rate Biofilter A biofilter with a design surface loading rate higher than the 5 inches per hour rate specified in this document for bioretention facilities and planter boxes.

Hydrograph Runoff flow rate plotted as a function of time.

Hydromodification Management Plan (HMP) A Plan implemented by the **dischargers** so that post-project runoff shall not exceed estimated pre-project rates and/or durations, where increased runoff would result in increased potential for erosion or other adverse impacts to beneficial uses. Also see definition for **flow control.**

Hydrologic Soil Group Classification of soils by the Natural Resources Conservation Service (NRCS) into A, B, C, and D groups according to infiltration capacity.

Impervious surface Any material that prevents or substantially reduces infiltration of water into the soil. See discussion of imperviousness in Chapter Two.

Infeasible As applied to best management practices, impossible to implement because of technical constraints specific to the site.

Infiltration Seepage of runoff into soils underlying the site. See definition of **retention.**

Infiltration Device Any structure, such as a dry well, that is designed to infiltrate stormwater into the subsurface and, as designed, bypasses the natural groundwater protection afforded by surface or near-surface soil. See definition for **direct infiltration**.

Integrated Management Practice (IMP) A facility **(BMP)** that provides small-scale treatment, retention, and/or detention and is integrated into site layout, landscaping and drainage design. See **Low Impact Development.**

Integrated Pest Management (IPM) An approach to pest management that relies on information about the life cycles of pests and their interaction with the environment. Pest control methods are applied with the most economical means and with the least possible hazard to people, property, and the environment.

Interim Hydromodification Criteria Pursuant to NPDES permit Provision D.1.d.g.(6), the Copermittees prepared Interim Hydromodification Management criteria, which apply to projects disturbing 50 acres or more. The criteria are described in Chapter 2 and in memoranda on the Project Clean Water website.

Jurisdictional Urban Runoff Management Plan (JURMP) A written description of the specific jurisdictional urban runoff management measures and programs that each Copermittee implements to comply with the **stormwater NPDES permit** and ensure pollutant discharges are reduced to the MEP and do not cause or contribute to a violation of water quality standards. See **Stormwater Pollution Prevention Program.**

Lead Agency The public agency that has the principal responsibility for carrying out or approving a project. (CEQA Guidelines §15367).

Low Impact Development An integrated site design methodology that uses small-scale detention and retention (Integrated Management Practices, or **IMPs**) to mimic pre-existing site hydrological conditions.

Maintenance Projects Maintenance projects are those projects where impervious surfaces may be removed, however the underlying soils are not exposed and/or routine replacement of damaged pavement, such as pothole repair or street overlay projects.

Maximum Extent Practicable (MEP) Standard, established by the 1987 amendments to the Clean Water Act, for the implementation of municipal **stormwater pollution prevention programs** (see definition). According to the Act, municipal stormwater NPDES permits "shall require controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques and system, design and engineering methods, and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants."

National Pollutant Discharge Elimination System (NPDES) As part of the 1972 Clean Water Act, Congress established the NPDES permitting system to regulate the discharge of pollutants from municipal sanitary sewers and industries. The NPDES was expanded in 1987 to incorporate permits for stormwater discharges as well.

Numeric Criteria Sizing requirements for stormwater treatment facilities established in Provision D.1.d.(6)(c) of the San Diego RWQCB's stormwater NPDES permit.

Operation and Maintenance (O&M) Refers to requirements in the **Stormwater NPDES Permit** to inspect treatment BMPs and implement preventative and corrective maintenance in perpetuity. See Chapter Five.

Parking Lot A land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce.

Permeable Pavements Pavements for roadways, sidewalks, or plazas that are designed to infiltrate a portion of rainfall, including pervious concrete, pervious asphalt, unit-pavers-on-sand, and crushed gravel.

Priority Development Project A project subject to SUSMP requirements. Defined in **Stormwater NPDES Permit** Provision D.1.d.(1). See Chapter One.

Project Area The entire project area comprises all areas to be altered or developed by the project, plus any additional areas that drain on to areas to be altered or developed.

Project Submittal Documents submitted to a municipality in connection with an application for development approval and demonstrating compliance with Stormwater NPDES Permit requirements for the project. Specific requirements vary from municipality to municipality.

Proprietary A proprietary device is one marketed under legal right of the manufacturer.

Reconfiguration Activities Those activities that affect the surfaces of roads and parking lots that do not impact or expose the underlying soils. Examples of this could include changing the number or configuration of parking spaces, number of traffic lanes, lane widths, bicycle lanes, intersection configuration, or turning lanes.

The creation, addition, and or replacement of impervious surface on an already developed site. Examples include the expansion of a building footprint, road widening, the addition to or replacement of a structure, and creation or addition of impervious surfaces.

Redevelopment Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include trenching and resurfacing associated with utility work; resurfacing and reconfiguring surface parking lots and existing roadways; new sidewalk construction, pedestrian ramps, or bike lanes on existing roads; and routine replacement of damaged pavement, such as pothole repair.

Rational Method A method of calculating runoff flows based on rainfall intensity, tributary area, and a factor representing the proportion of rainfall that runs off.

Regional (or Watershed) Stormwater Treatment Facility A facility that treats runoff from more than one project or parcel.

Regional Water Quality Control Board (Regional Water Board or RWQCB) California RWQCBs are responsible for implementing pollution control provisions of the Clean Water Act and California Water Code within their jurisdiction. There are nine California RWQCBs. In this document, RWQCB refers to the San Diego Regional Water Quality Control Board, Region 9.

Retention The practice of holding stormwater in ponds or basins, or within berms or depressed areas, and allowing it to slowly infiltrate into underlying soils. Some portion will evaporate. See definitions for **infiltration** and **detention**.

Self-retaining area An area designed to retain runoff. Self-retaining areas may include graded depressions with landscaping or pervious pavements and may also include tributary impervious areas up to a 2:1 impervious-to-pervious ratio.

Self-treating area A natural, landscaped, or turf area drains directly off site or to the public storm drain system.

Source Control Land use or site planning practices, or structural or nonstructural measures that aim to prevent urban runoff pollution by reducing the potential for contamination at the source of pollution. Source control BMPs minimize the contact between pollutants and urban runoff.

Standard Industrial Classification (SIC) A Federal government system for classifying industries by 4-digit code. It is being supplanted by the North American Industrial Classification System but SIC codes are still referenced by the Regional Water Board in identifying development sites subject to regulation under the NPDES permit. Information and an SIC search function are available at http://www.bls.gov/bls/NAICS.htm

Stormwater NPDES Permit A permit issued by a **Regional Water Quality Control Board** (see definition) to local government agencies (**Dischargers**) placing provisions on allowable discharges of municipal stormwater to waters of the state.

Storm Water Pollution Prevention Plan (SWPPP) A plan providing for temporary measures to control sediment and other pollutants during construction as required by the statewide stormwater NPDES permit for construction activities.

Stormwater Pollution Prevention Program A comprehensive program of activities designed to minimize the quantity of pollutants entering storm drains. See **Jurisdictional Urban Runoff Management Plan.**

Standard Urban Stormwater Mitigation Plan (SUSMP) Refers to various documents prepared in connection with implementation of the stormwater **NPDES permit** mandate to control pollutants from new development and redevelopment. Each **discharger** will adapt this **model countywide SUSMP** to create a **local SUSMP** for their respective jurisdiction. Applicants for development project approvals will use the local SUSMP to prepare a submittal for each **Priority Development Project** they propose.

Treatment Removal of pollutants from runoff, typically by filtration or settling.

Water Board See **Regional Water Quality Control Board.**

Water Quality Technical Report (WQTR) A document required for all Development and Redevelopment Projects, pursuant to the City of Vista Stormwater Management and Discharge Control Ordinance (Municipal Code Section 13.18) to address the water quality impacts from the project, inclusive of all project information, calculations, analyses, assumptions, and design parameters.

Water Quality Volume (WQV) For stormwater treatment facilities that depend on detention to work, the volume of water that must be detained to achieve maximum extent practicable pollutant removal. This volume of water must be detained for a specified **drawdown time**.

Start

How to Use the City of Vista's SUSMP

Review Chapters 1 and 2 to get a general understanding of the requirements. Then follow step-by-step instructions in Chapter 3 to prepare your Project Submittal.

THIS *Standard Urban Stormwater Mitigation Plan (SUSMP)* will help you ensure your project complies with the City of Vista's and San Diego Regional Water Quality Control Boards' requirements. Most applicants will require the assistance of a qualified civil engineer, architect, and/or landscape architect. Because every project is different, you should begin by checking specific requirements for your project with City of Vista Land Development staff.

To use the *SUSMP*, start by reviewing **Chapter One** to find out whether and how stormwater quality requirements apply to your project. Chapter One also provides an overview of the process of planning, design, construction, operation, and maintenance leading to compliance.

If there are terms and issues you find puzzling, try finding answers in the glossary or in **Chapter Two**. Chapter Two provides background on key stormwater concepts and water quality regulations, including design criteria.

Then proceed to **Chapter Three** and follow the step-by-step guidance to prepare a Project Submittal for your site.

Chapter Four, the Low Impact Development Design Guide, includes design procedures, calculation procedures, and instructions for presenting your design and calculations in your Project Submittal.

In **Chapter Five** you'll find a detailed description of the process for ensuring operation and maintenance of your stormwater facilities over the life of the project. The chapter includes

step-by-step instructions for preparing a maintenance agreement for the stormwater facilities including an operation and maintenance plan, as well as an access easement/agreement.

Construction-Phase Controls

Your Project Submittal for SUSMP compliance is a separate document from the construction Storm Water Pollution Prevention Plan (SWPPP). A SWPPP provides for temporary measures to control sediment and other pollutants during construction at sites that disturb one acre or more. See Section F of the City's Stormwater Standards manual and the Construction Handbook at www.cabmphandbooks.org for more information on SWPPPs.

Throughout each Chapter, you'll find references and resources to help you understand the regulations, complete your Project Submittal, and design stormwater control measures for your project.

The most recent, updated version of the *Model SUSMP*, including updates and errata between editions, is on the Project Clean Water website. This document has been adapted by the City of Vista for its development projects.

► PLAN AHEAD TO AVOID THE THREE MOST COMMON MISTAKES

The most common (and costly) errors made by applicants for development approvals with respect to stormwater quality compliance are:

1. Not planning for compliance early enough. You should think about your strategy for stormwater quality compliance before completing a conceptual site design or sketching a layout of subdivision lots (Chapter 3).
2. Assuming proprietary stormwater treatment facilities will be adequate for compliance. Most aren't (Chapter 2).
3. Not including LID BMPs (Chapter 4) in the project site design early enough.
4. Not planning for periodic inspections and maintenance of treatment and flow-control facilities. Consider who will own and who will maintain the facilities in perpetuity and how they will obtain access, and identify which arrangements are acceptable to the City of Vista (Chapter 5).

Chapter

1

Policies and Procedures

Determine if your development project must comply with stormwater quality requirements, and review the steps to compliance.

A Low Impact Development Design Procedure

The San Diego Regional Water Board reissued a municipal stormwater NPDES permit to the municipal **Copermittees, including the City of Vista (City),** in January 2007. In the City of Vista, the City Engineer is ultimately responsible for ensuring that the City maintains full compliance with all permit requirements. The permit updates and expands stormwater requirements for new developments and redevelopments. Stormwater treatment requirements have been made more stringent, minimum standards for **Low Impact Development** (LID) have been added, and the City is required to develop and implement criteria for the control of runoff peaks and durations from development sites.

To assist the land development community, streamline project reviews, and maximize cost-effective environmental benefits, the LID design procedure is a unified Countywide procedure. This design procedure integrates site planning and design measures with engineered, small-scale **Integrated Management Practices** (IMPs) such as bioretention. By following the procedure, applicants can develop a single integrated design which complies with the complex and overlapping NPDES permit LID requirements, stormwater treatment requirements, and flow-control (**hydromodification management**) requirements.

The design approach is detailed in Chapter 4. General instructions for preparing a complete Project Submittal are in Chapter 3 and supplemented with the City's documents in Appendix B.

Applicants may choose not to use this design procedure, in which case they will need to demonstrate, in their submittal, compliance with applicable LID criteria, stormwater treatment criteria, and flow-control criteria. These criteria are described in Chapter 2 and in the NPDES permit.

Requirements for All Development Projects

All development projects must include site design and source control measures to reduce the discharge of stormwater pollutants to the maximum extent practicable.

In general, for projects that are not "Priority Development Projects," this will include:

- Implementation of source control BMPs as listed in the Appendix A.
- Inclusion of some LID features that conserve natural features, set back development from natural water bodies, minimize imperviousness, maximize infiltration, and retain and slow runoff.
- Compliance with requirements for construction-phase controls on sediment and other pollutants.
- City Land Development or Water Quality Protection Program staff may also require additional controls appropriate to the project, which may include stormwater treatment controls. LID treatment controls such as infiltration or bioretention are preferred. See "Selection of Treatment Facilities" on page 24. If treatment facilities are included, provisions must be made to ensure their long-term maintenance.

Priority Development Projects

The NPDES permit requires that more runoff treatment controls be incorporated into Priority Development Projects.

► NEW DEVELOPMENT

Projects on previously undeveloped land are Priority Development Projects if they are in one or more of the categories listed in Table 1-1. If a project feature such as a parking lot falls into a Priority Development Project category, then the entire project footprint is subject to Priority Project requirements.

TABLE 1-1. Priority Development Projects.

Is the project in any of these categories?

Yes ❑	No ❑	**A**	**Housing subdivisions of 10 or more dwelling units.** Examples: single-family homes, multi-family homes, condominiums, and apartments.
Yes ❑	No ❑	**B**	**Commercial—greater than one acre.** Any development other than heavy industry or residential. Examples: hospitals; laboratories and other medical facilities; educational institutions; recreational facilities; municipal facilities; commercial nurseries; multi-apartment buildings; car wash facilities; mini-malls and other business complexes; shopping malls; hotels; office buildings; public warehouses; automotive dealerships; airfields; and other light industrial facilities.
Yes ❑	No ❑	**C**	**Heavy industry—greater than one acre.** Examples: manufacturing plants, food processing plants, metal working facilities, printing plants, and fleet storage areas (bus, truck, etc.).
Yes ❑	No ❑	**D**	**Automotive repair shops.** A facility categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539.
Yes ❑	No ❑	**E**	**Restaurants.** Any facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), where the land area for development is greater than 5,000 square feet. Restaurants where land development is less than 5,000 square feet shall meet all SUSMP requirements except for structural treatment BMP and numeric sizing criteria requirements and hydromodification requirements.
Yes ❑	No ❑	**F**	**Hillside development greater than 5,000 square feet.** Any development that creates 5,000 square feet of impervious surface and is located in an area with known erosive soil conditions, where the development will grade on any natural slope that is twenty-five percent or greater.
Yes ❑	No ❑	**G**	**Environmentally Sensitive Areas (ESAs).** All development located within or directly adjacent to or discharging directly to an ESA (where discharges from the development or redevelopment will enter receiving waters within the ESA), which either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed project site to 10% or more of its naturally occurring condition. "Directly adjacent" means situated within 200 feet of the ESA. "Discharging directly to" means outflow from a drainage conveyance system that is composed entirely of flows from the subject development or redevelopment site, and not commingled with flows from adjacent lands.
Yes ❑	No ❑	**H**	**Parking lots 5,000 square feet or more** or with 15 or more parking spaces and potentially exposed to urban runoff.
Yes ❑	No ❑	**I**	**Street, roads, highways, and freeways.** Any paved surface that is 5,000 square feet or greater used for the transportation of automobiles, trucks, motorcycles, and other vehicles.
Yes ❑	No ❑	**J**	**Retail Gasoline Outlets (RGOs)** that are: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.
Yes ❑	No ❑	**K**	**Development Projects—greater than one acre.** Any development projects that result in the disturbance of one acre or more of land.

► PREVIOUSLY DEVELOPED SITES

Projects on previously developed sites ("**redevelopment** projects") are Priority Development Projects if they create, add, or replace 5,000 square feet or more of impervious surface and also are in one of the categories listed in Table 1-1.

► THE "50% RULE" FOR PREVIOUSLY DEVELOPED PROJECTS

Projects on previously developed sites may also need to retrofit drainage of **all** impervious areas of the **entire** project site. For projects creating or replacing more than 5,000 square feet of impervious area:

- If the new project results in an increase of, or replacement of, 50% or more of the previously existing impervious surface, and the existing development was not subject to SUSMP requirements, then the entire project must be included in the treatment measure design.
- Where redevelopment results in an increase of less than 50% of the impervious surfaces of a pre-existing development, and the existing development was not subject to SUSMP requirements, the numeric sizing criteria applies only to the addition. In other words, only the additional impervious surface is subject to treatment control BMP requirements.

If a Redevelopment Project feature such as a parking lot falls into a Priority Development Project category, then the entire project footprint is subject to Priority Project requirements.

Redevelopment projects limited to interior remodels, routine maintenance or repair, roof or exterior surface replacement, resurfacing and reconfiguring surface parking lots and existing roadways, new sidewalk construction, pedestrian ramps, or bike lanes on existing roads, and routine replacement of damaged pavement such as pothole repair are not subject to treatment requirements. However, other requirements, including incorporation of appropriate source controls, still apply.

► POLLUTANT GENERATING PROJECTS WHICH DISTURB ONE ACRE OR MORE OF LAND (ITEM K IN TABLE 1-1)

Section D.1.d(1)(b) of the Municipal Storm Water Permit contains the following provisions:

> "In addition to the Priority Development Project Categories identified in [these Storm Water Standards], within three years of adoption of this Order Priority Development Projects shall also include all other pollutant generating

Development Projects that result in the disturbance of one acre or more of land."

The Municipal Storm Water Permit further defines "pollutant generating Development Projects" as "those projects that generate pollutants at levels greater than background levels."

The City of Vista will require project applicants to conform with these new requirements beginning January 24, 2010. Projects that generate pollutants at levels greater than background levels and disturb one acre or more of land are considered Priority Development Projects. Excluded from this rule are those projects that are not considered Development or Redevelopment according to the definitions in this SUSMP. Generally, all projects which include impervious surfaces and/or introduce landscaping that requires routine use of fertilizers and pesticides are considered pollutant generating above background levels. In most cases linear pathway projects that are for infrequent vehicle use, such as emergency or maintenance access, or for pedestrian or bicycle use, are not considered pollutant generating above background levels if they are built with pervious surfaces or if they sheet flow to surrounding pervious surfaces.

Compliance Process at a Glance

For the applicant for development project approval, stormwater compliance follows these general steps:

1. Discuss requirements during a pre-application meeting with City Land Development staff.
2. Review the instructions in this SUSMP before you prepare your tentative map, preliminary site plan, drainage plan, and landscaping plan.
3. Prepare your Project Submittal, which is typically made with your application for development approvals (entitlements).
4. Create your detailed project design, incorporating the features described in your Project Submittal.
5. Each stormwater compliance feature and facility must be tabulated and its location shown on the City's BMP plan sheet.
6. Prepare a Stormwater Facility Operation and Maintenance Plan and Access Agreement and submit it as required by the City.

7. Maintain both permanent and temporary construction stormwater facilities during construction and following construction in accordance with required warranties.

8. Following construction, formally transfer responsibility for maintenance to the owner.

9. The owner must regularly verify stormwater facilities are properly maintained.

Preparation of a complete and detailed Project Submittal is the key to cost-effective stormwater compliance and expeditious review of your project. Instructions for preparing your Project Submittal are in Chapter 3.

Phased Projects

CEQA
Preparers of CEQA documents may wish to visit the Project Clean Water website for guidance..

When determining whether SUSMP requirements apply, a "project" should be defined consistent with California Environmental Quality Act (CEQA) definitions of "project." That is, the "project" is the whole of an action which has the potential for adding or replacing or resulting in the addition or replacement of roofs, pavement, or other impervious surfaces and thereby resulting in increased flows and stormwater pollutants. "Whole of an action" means the project may not be segmented or piecemealed into small parts if the effect is to reduce the quantity of impervious area for any part to below the SUSMP thresholds.

Depending on the project, City Land Development or Water Quality Protection Program staff may require, as part of an application for approval of a phased development project, a conceptual or master Project Submittal which describes and illustrates, in broad outline, how the drainage for the project will comply with the SUSMP requirements. The level of detail in the conceptual or master Project Submittal should be consistent with the scope and level of detail of the development approval being considered. The conceptual or master Project Submittal should specify that a more detailed Project Submittal for each later phase or portion of the project will be submitted with subsequent applications for discretionary approvals.

Note these minimum standards for SUSMP applicability are for the purpose of ensuring a consistent minimum level or "floor" for countywide implementation consistent with the requirements of the NPDES permit.

New Subdivisions

If a tentative map approval would potentially entitle future owners to construct new or replaced impervious area which, in aggregate, could exceed one of the SUSMP thresholds (Table 1-1), then the applicant must take steps to ensure SUSMP requirements can and will be implemented as the subdivision is built out.

If the tentative map application does not include plans for site improvements, the applicant should nevertheless identify the type, size, location, and final ownership of stormwater treatment and flow-control facilities adequate to serve common private roadways and any other common areas, and to also manage runoff from an expected reasonable estimate of the square footage of future roofs, driveways, and other impervious surfaces on each individual lot. The City may condition approval of the map on implementation of stormwater treatment and other SUSMP measures when construction occurs on the individual lots. At the City's discretion, this condition may be enforced by a grant deed of development rights or by a development agreement.

If the City deems it necessary, the future impervious area of one or more lots may be limited by a deed restriction. This might be necessary when a project is exempted from one or all SUSMP provisions because the total impervious area is below a threshold, or to ensure runoff from impervious areas added after the project is approved does not overload a stormwater treatment and flow-control facility.

The City may require subdivision maps to dedicate an "open space easement, as defined by Government Code Section 51075," to suitably restrict the future building of structures at each stormwater facility location if necessary.

In general, in new subdivisions **stormwater treatment, infiltration, or flow-control facilities should not be located on individual single-family residential lots**, particularly when those facilities manage runoff from other lots, from streets, or from common areas. A better alternative is to locate stormwater facilities on one or more separate, jointly owned parcels.

After consulting with City Land Development staff, applicants for subdivision approvals will propose one of the following four options, depending on project characteristics and local policies:

1. Show the number of parcels and the total impervious area to be created on all parcels could not, in the future, exceed any of the thresholds in Table 1-1.

2. Show that, for each and every lot, the intended use can be achieved with a design which disperses runoff from roofs, driveways, streets, and other impervious areas to self-retaining pervious areas, using the criteria in Chapter 4.

3. Prepare improvement plans showing drainage to treatment and/or flow-control facilities designed in accordance with this SUSMP, and commit to constructing the facilities prior to transferring the lots.

4. Prepare improvement plans showing drainage to treatment and/or flow-control facilities designed in accordance with this SUSMP, and provide appropriate legal instruments to ensure the proposed facilities will be constructed and maintained by subsequent owners.

For the option selected, City Land Development staff will determine the appropriate conditions of approval, easements, deed restrictions, or other legal instruments necessary to assure future compliance.

Compliance with Flow-Control Requirements

Priority Development Projects (Table 1-1) must be designed so that runoff rates and durations are controlled to maintain or reduce downstream erosion conditions and protect stream habitat.

For projects disturbing areas smaller than 50 acres, this can be accomplished by implementing **Low Impact Development** (LID) design using the design criteria and procedures in Chapter 4. The criteria will be updated following RWQCB approval of the Copermittees' **Hydromodification Management Plan** (see Option 2 below).

Priority Development Projects disturbing 50 acres or more must meet the following **interim hydromodification standard**:

> "…post-project runoff flow rates and durations shall not exceed pre-project runoff flow rates and durations … where the increased discharge flow rates and durations will result in increased potential for erosion or other significant adverse impacts to beneficial uses, attributable to increased flow rates and durations."

The Copermittees are developing a Hydromodification Management Plan (HMP) in compliance with Provision D.1.g of the NPDES Permit. As required, they have adopted interim hydromodification criteria which will be superseded after the HMP is accepted by the Regional Water Board.

Compliance with the interim hydromodification criteria can be achieved by one of the following options:

1. Use a continuous simulation hydrologic computer model such as USEPA's Hydrograph Simulation Program—Fortran (HSPF) to simulate pre-project and post-project runoff, including the effect of proposed IMPs, detention basins, or

other stormwater management facilities, and demonstrate the standard is achieved.

2. Use Low Impact Development Integrated Management Practices to manage hydrograph modification impacts, using design procedures, criteria, and sizing factors (ratios of LID IMP volume or area to tributary area) specified by the Copermittees.

3. Identify an exemption applicable to the site.

► OPTION 1: CONTINUOUS SIMULATION

Prepare an analysis of pre-project and post-project runoff following the instructions in the memoranda "Using Continuous Simulation to Size Stormwater Control Facilities" (May 9, 2008) and "Development of Interim Hydromodification Criteria (IHC)" (October 30, 2007). Both memoranda are available on the Project Clean Water website.

Before preparing the analysis, discuss with City Land Development staff the required documentation for your Project Submittal and review Chapter 3 of this document, which will include assumptions and modeling parameters used in the analysis and a graphical presentation demonstrating compliance with the following:

1. For flow rates from 20% of the pre-project 5-year runoff event (0.2Q5) to the pre-project 10-year runoff event (Q10), the post-project discharge rates and durations shall not deviate above the pre-project rates and durations by more than 10% over and more than 10% of the length of the flow duration curve.

2. For flow rates from 0.2Q5 to Q5, the post-project peak flows shall not exceed pre-project peak flows. For flow rates from Q5 to Q10, post-project peak flows may exceed pre-project flows by up to 10% for a 1-year frequency interval. For example, post-project flows could exceed pre-project flows by up to 10% for the interval from Q9 to Q10 or from Q5.5 to Q6.5, but not from Q8 to Q10. (Note that the 0.2Q5 end of the range may be modified).

► OPTION 2: LID INTEGRATED MANAGEMENT PRACTICES

Low Impact Development Integrated Management Practices, such as bioretention facilities, planter boxes, and dry wells, can achieve the hydromodification standard. However, the Copermittees have not yet prepared design criteria and sizing factors for these facilities applicable to projects 50 acres or more. Project proponents for projects 50 acres or more may use Option 1 to demonstrate their IMPs meet the interim criteria.

► OPTION 3: EXEMPTION FROM HYDROMODIFICATION MANAGEMENT

Exemption from the IHC is allowed for development projects when any of the following conditions are met. (However, plans to restore a channel reach may re-introduce the applicability of hydromodification management.)

1. The project would discharge into channels that are concrete-lined or significantly hardened (e.g., with rip-rap, sackcrete, etc.) downstream to their outfall in bays or the ocean;

2. The project would discharge into underground storm drains discharging directly to bays or the ocean;

3. The project would discharge to a channel where the sub-watershed areas below the project's discharge points are highly impervious (e.g. >70%) and the potential for single-project and/or cumulative impacts is minimal; or

4. The applicant conducts an assessment incorporating sediment transport modeling across the range of geomorphically-significant flows that demonstrates project flows and sediment reductions will not detrimentally affect the receiving water. A May 15, 2008 memorandum, "Geomorphic Analysis for Interim Hydrograph Modification Plan" is available on the Project Clean Water website.

Grandfathering. Verify with City Land Development staff that projects with prior lawful approval (such as a development agreement, vested tentative map, or a building or grading permit) that have started construction before March 25, 2008, may not have to meet the interim hydromodification management requirements. Note these are interim requirements and will be superseded following approval of the HMP by the Regional Water Board in 2010. Updated hydromodification criteria for all Priority Development Projects will subsequently be incorporated into the City's SUSMP.

Waivers from Numeric Sizing Criteria

The NPDES permit allows for a project to be waived from numeric sizing criteria for stormwater treatment **only** if all available treatment facilities have been considered and found **infeasible**. Experience has shown implementation of LID facilities, as described in Chapter 4, is feasible on nearly all development sites. However, the use of LID to retrofit existing drainage systems, to manage runoff from sites smaller than one acre in pedestrian-oriented developments, or to manage runoff from widened portions of roadways, sometimes presents special challenges. In these special situations, applicants should see the discussion of "Selection of Stormwater Treatment Facilities" in Chapter 2 and evaluate the options described on page 26 in order (depending on the specific characteristics of the

project and as determined by local development review staff). All the options listed meet the numeric sizing criteria in the NPDES permit.

The City of Vista currently does not have a waiver program in place.

References and Resources:

- RWQCB Order R9-2007-0001 (Stormwater NPDES Permit)
- Project Clean Water website

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Chapter

2

Concepts and Criteria

Technical background and explanations of policies and design requirements

The Regional Water Board reissued a municipal stormwater NPDES permit to San Diego County, its 18 cities (including the City of Vista), the San Diego Unified Port District, and the San Diego Regional Airport Authority in January 2007. The permit mandates a comprehensive program to prevent stormwater pollution.

Permit Provision D.1.d. requires Copermittees to regulate projects in specific categories (Table 1-1) to:

1. Reduce discharges of pollutants to the maximum extent practicable.
2. Prevent runoff discharges from causing or contributing to a violation of water quality standards.

The Copermittees have created a Low Impact Development (LID) design procedure (Chapter 4) that ensures consistent and thorough implementation of the Regional Water Board's requirements. **This chapter explains the technical background of the LID approach and how it was derived.**

The previous permit, issued in 2001, included a requirement to control the post-development peak storm water runoff rates and velocities to maintain or reduce pre-development downstream erosion and protect stream habitat. The 2007 permit includes, in addition to this ongoing requirement, a new requirement to develop a hydromodification management plan (HMP) to identify and define a methodology and performance criteria to ensure flow rates and durations do not exceed pre-project runoff where increased runoff could cause erosion or other significant adverse impacts to beneficial uses.

As required by the NPDES permit, the Copermittees have adopted interim hydromodification criteria. See Chapter 1.

Water-Quality Regulations

Provision D.1 requires the Copermittees to condition development approvals on incorporation of specified stormwater controls.

Provision D.1 requires applicable new developments and redevelopments to:

- Design the site to conserve natural areas, existing trees and vegetation and soils, to maintain natural drainage patterns, to minimize imperviousness, to detain runoff, and to infiltrate runoff where feasible
- Cover or control sources of stormwater pollutants
- Treat runoff prior to discharge. Provision E.10 states: "Urban runoff treatment and/or mitigation must occur prior to the discharge of urban runoff into a receiving water. Federal regulations at 40 CFR 131.10(a) state that in no case shall a state adopt waste transport or waste assimilation as a designated use for any waters of the U.S."
- Ensure runoff does not exceed pre-project peaks and durations where increases could affect downstream habitat or other beneficial uses
- Maintain treatment and flow-control facilities

The City of Vista maintains a database to track approved installations of treatment facilities and to verify facilities are maintained. The City's annual report to the Regional Water Board includes a list of development projects subject to SUSMP conditions and descriptions of those projects that:

- Received a waiver from SUSMP criteria;
- Used hydrologic controls used to meet HMP requirements, including a description of the controls;
- Have an area of 50 acres or greater, thus subject to **Interim Hydromodification Criteria**; and

The Copermittees must also report the number of violations and enforcement actions taken upon development projects. The Copermittees' programs are subject to audit by the Regional Water Board.

The municipalities—not the Regional Water Board or its staff—are charged with ensuring development projects comply with the D.1 requirements. Regional Water Board staff sometimes review stormwater controls and hydromodification impacts in connection with applications for Clean Water Act Section 401 water-quality certification, which is required

for projects that involve work, such as dredging or placement of fill, within streams, creeks, or other waters of the US.

► MAXIMUM EXTENT PRACTICABLE

Clean Water Act Section 402(p)(3)(iii) sets the standard for stormwater controls as "maximum extent practicable," but doesn't define that term. As implemented, "maximum extent practicable" is ever-changing and varies with conditions.

Many stormwater controls, including LID facilities, have proven to be practicable in most site development projects. To achieve fair and effective implementation, criteria and guidance, requirements for controls must be detailed and specific—while also offering the right amount of flexibility or exceptions for special cases. The NPDES permit includes various standards, including hydrologic criteria, which have been found to comprise "maximum extent practicable." This SUSMP is to be continuously improved and refined based on the experience of municipal planners and engineers, with input from land developers and development professionals. By following this SUSMP, applicants can ensure their project design meets "maximum extent practicable."

► BEST MANAGEMENT PRACTICES

Clean Water Act Section 402(p) and USEPA regulations (40 CFR 122.26) specify a municipal program of "management practices" to control stormwater pollutants. **Best Management Practice (BMP)** refers to any kind of procedure, activity or device designed to minimize the quantity of pollutants that enter the storm drain system. BMPs are typically used in place of assigning numeric effluent limits. The criteria for source control BMPs and treatment and flow-control facilities are crafted to fulfill "maximum extent practicable."

To minimize confusion, this guidebook refers to "facilities," "features," or "controls" to be incorporated into development projects. All of these are BMPs.

Pollutants of Concern

NPDES Permit Provision D.1.d.(3) requires each Copermittee to develop and implement a procedure for pollutants of concern to be identified for each Priority Development Project. The Copermittees have considered this requirement jointly and have determined the LID design procedures in Chapters 3 and 4 of this model SUSMP fully address the need to identify pollutants of concern insofar as that identification may affect the selection of source control BMPs and treatment facilities.

Documentation of the approach to identifying pollutants of concern and selecting BMPs and facilities follows.

► GROUPING OF POTENTIAL POLLUTANTS OF CONCERN

Urban runoff from a developed site has the potential to contribute pollutants, including oil and grease, suspended solids, metals, gasoline, pesticides, and pathogens to the storm water conveyance system and receiving waters. For the purposes of identifying pollutants of concern and associated storm water BMPs, pollutants are grouped in nine general categories as follows:

- **Sediments** are soils or other surficial materials eroded and then transported or deposited by the action of wind, water, ice, or gravity. Sediments can increase turbidity, clog fish gills, reduce spawning habitat, lower young aquatic organisms survival rates, smother bottom dwelling organisms, and suppress aquatic vegetation growth.

- **Nutrients** are inorganic substances, such as nitrogen and phosphorus. They commonly exist in the form of mineral salts that are either dissolved or suspended in water. Primary sources of nutrients in urban runoff are fertilizers and eroded soils. Excessive discharge of nutrients to water bodies and streams can cause excessive aquatic algae and plant growth. Such excessive production, referred to as cultural eutrophication, may lead to excessive decay of organic matter in the water body, loss of oxygen in the water, release of toxins in sediment, and the eventual death of aquatic organisms.

- **Metals** are raw material components in non-metal products such as fuels, adhesives, paints, and other coatings. Primary sources of metal pollution in storm water are typically commercially available metals and metal products. Metals of concern include cadmium, chromium, copper, lead, mercury, and zinc. Lead and chromium have been used as corrosion inhibitors in primer coatings and cooling tower systems. At low concentrations naturally occurring in soil, metals are not toxic. However, at higher concentrations, certain metals can be toxic to aquatic life. Humans can be impacted from contaminated groundwater resources, and bioaccumulation of metals in fish and shellfish. Environmental concerns, regarding the potential for release of metals to the environment, have already led to restricted metal usage in certain applications.

- **Organic compounds** are carbon-based. Commercially available or naturally occurring organic compounds are found in pesticides, solvents, and hydrocarbons. Organic compounds can, at certain concentrations, indirectly or directly constitute a hazard to life or health. When rinsing off objects, toxic levels of solvents and cleaning compounds can be discharged to storm drains. Dirt, grease, and grime retained in the cleaning fluid or rinse water may also adsorb levels of organic compounds that are harmful or hazardous to aquatic life.

- **Trash** (such as paper, plastic, polystyrene packing foam, and aluminum materials) and biodegradable organic matter (such as leaves, grass cuttings, and food waste) are general waste products on the landscape. The presence of trash & debris may have a significant impact on the recreational value of a water body and aquatic habitat. Excess organic matter can create a high biochemical oxygen demand in a stream and thereby lower its water quality. Also, in areas where stagnant water exists, the presence of excess organic matter can promote septic conditions resulting in the growth of undesirable organisms and the release of odorous and hazardous compounds such as hydrogen sulfide.

- **Oxygen-Demanding Substances** includes biodegradable organic material as well as chemicals that react with dissolved oxygen in water to form other compounds. Proteins, carbohydrates, and fats are examples of biodegradable organic compounds. Compounds such as ammonia and hydrogen sulfide are examples of oxygen-demanding compounds. The oxygen demand of a substance can lead to depletion of dissolved oxygen in a water body and possibly the development of septic conditions.

- Primary sources of **oil and grease** are petroleum hydrocarbon products, motor products from leaking vehicles, esters, oils, fats, waxes, and high molecular-weight fatty acids. Introduction of these pollutants to the water bodies are very possible due to the wide uses and applications of some of these products in municipal, residential, commercial, industrial, and construction areas. Elevated oil and grease content can decrease the aesthetic value of the water body, as well as the water quality.

- **Bacteria and Viruses** are ubiquitous microorganisms that thrive under certain environmental conditions. Their proliferation is typically caused by the transport of animal or human fecal wastes from the watershed. Water, containing excessive bacteria and viruses can alter the aquatic habitat and create a harmful environment for humans and aquatic life. Also, the decomposition of excess organic waste causes increased growth of undesirable organisms in the water.

- **Pesticides** (including herbicides) are chemical compounds commonly used to control nuisance growth or prevalence of organisms. Excessive application of a pesticide may result in runoff containing toxic levels of its active component.

► IDENTIFYING POLLUTANTS OF CONCERN BASED ON LAND USES

Table 2-1 associates pollutants with the categories of Priority Development Projects. Pollutants associated with any hazardous material sites that have been remediated or are not threatened by the proposed project are not considered a pollutant of concern.

► WATERSHEDS WITH SPECIAL POLLUTANT CONCERNS

Local receiving water conditions may require specialized attention. The three local conditions to consider include:

- Ocean waters designated as an "Area of Special Biological Significance" (ASBS)
- 303(d) listed waters; and
- Waters with established TMDLs.

TABLE 2-1. Anticipated and Potential Pollutants Generated by Land Use Type.

General Pollutant Categories

Priority Project Categories	Sediment	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease	Bacteria & Viruses	Pesticides
Detached Residential Development	X	X			X	X	X	X	X
Attached Residential Development	X	X			X	P(1)	P(2)	P	X
Commercial Development >one acre	P(1)	P(1)	X	P(2)	X	P(5)	X	P(3)	P(5)
Heavy Industry	X		X	X	X	X	X		
Automotive Repair Shops			X	X(4)(5)	X		X		
Restaurants					X	X	X	X	P(1)
Hillside Development >5,000 ft2	X	X			X	X	X		X
Parking Lots	P(1)	P(1)	X		X	P(1)	X		P(1)
Retail Gasoline Outlets			X	X	X	X	X		
Streets, Highways & Freeways	X	P(1)	X	X(4)	X	P(5)	X	X	P(1)

X = anticipated
P = potential
(1) A potential pollutant if landscaping exists on-site.
(2) A potential pollutant if the project includes uncovered parking areas.
(3) A potential pollutant if land use involves food or animal waste products.
(4) Including petroleum hydrocarbons.
(5) Including solvents.

The State Water Resources Control Board's California Ocean Plan identifies thirty-four locations along the California coast as **Areas of Special Biological Significance (ASBS)**. San Diego County contains two ASBS locations, the La Jolla ASBS and the San Diego-Scripps ASBS. These locations are adjacent and extend from the northern bluffs of La Jolla through the UC San Diego campus of the Scripps Institute of Oceanography. Proposed development in the watershed of an ASBS may be prohibited; however, the project proponent should immediately contact the local municipalities for further guidance in contending with ASBS prohibitions.

The NPDES Permit identifies several receiving waters as impaired for constituents or water quality effects pursuant to **Section 303(d)** of the Clean Water Act. Placement of a water onto the list requires the Regional Board to make further analysis of the impairment and development of total maximum daily loads (TMDLs) for addressing the impairment. The 303(d) listing in itself does not demand that a project proponent select BMPs on the basis of the impairment; however, the project proponent should be cognizant of the impairment and the future implications a TMDL might have upon the proposed land use.

Once a TMDL is established it may impose conditions on development either through an implementation plan and schedule for the listed water, or through special conditions required of the municipality affected by the numeric criteria of the TMDL. At this time, several 303(d) listings in San Diego County are at various stages of TMDL development. The most current 303(d) listings can be found at http://www.swrcb.ca.gov/. The applicant should use the most recently adopted version of the 303(d) list. At this time, the 2006 listing is the most recently adopted list. Table 2-2 below lists the impairments located within the City of Vista and its watersheds per the 2006 303(d) listing.

TABLE 2-2 Impaired Water Quality Limited Segments, City of Vista, 2006 303(d) List.

Receiving Water	Hydrologic Unit/Area	Chloride	TDS	Bacteria	Nutrients	Sediment Toxicity	Sedimentation	DDE	DDT	Mn	Se	Sulfate
San Luis Rey (SLR)	903	X	X									
Pacific Ocean at SLR outlet	903			X								
Loma Alta Slough (LAS)	904.1			X	X							
Pacific Ocean at LAS outlet	904.1			X								
Buena Vista Creek*	904.2					X						
Buena Vista Lagoon (BVL)	904.2			X	X		X					
Pacific Ocean at BVL	904.2			X								
Buena Creek	904.3				X				X			
Agua Hedionda Creek	904.3		X							X	X	X
Agua Hedionda Lagoon	904.3			X			X					
San Marcos Creek	904.5				X	X		X				

The **adopted TMDLs** in the San Diego area can be found at http://www.swrcb.ca.gov/rwqcb9/

Under most circumstances, the use of the LID Design Guide (Chapter 4) and the Stormwater Pollutant Sources/Source Control Checklist (Appendix A) will ensure your project complies with all stormwater requirements. However, the project applicant should meet with City Land Development staff to determine if any project characteristics or watershed characteristics affect selection and design of BMPs. Where further input is necessary, applicants may contact the Water Quality Protection Program. Specifically for projects proposed within the Agua Hedionda Watershed, bacteria, nutrients, and sediments loads are pollutants of concern. As such, *Enhanced LID,* shall be considered during preliminary design and implemented where feasible. These Enhanced LIDs are as defined in the Agua Hedionda Watershed Management Plan (AWHMP, 2008) Section 6.1 NEW DEVELOPMENT SITE MANAGEMENT.

The following is an excerpt from that document,

> "The *Enhanced LID* scenario begins with the *Basic LID* scenario assumptions, but assumes a higher level of treatment, balancing feasibility and cost considerations. For instance, bioretention is not used due to the uncertainty regarding proper vegetation and potential increased cost if an underdrain system is required. Porous pavement was included but not used extensively, again due to uncertainty about infiltration. Large cisterns for irrigation water were included for the Multi-family and Commercial classes, where the combination of large roof surface area and centralized irrigation systems are assumed to make the practice more cost effective. Some of the scenarios assume impervious area reductions as well. The following specific changes implemented in the *Enhanced LID* scenario include:
>
> • Medium Density Residential – a cluster design is used, grouping the housing units closer together on smaller lots, and leaving one-third of the site as undeveloped open space. Impervious area is reduced by decreasing driveway length, sidewalk use, and overall road footprint.
>
> • Multifamily Residential – Impervious area is reduced somewhat by more efficient layout. Porous pavement is used for all sidewalks. The swales treat a greater proportion of the site. Large cisterns capture roof runoff, and reuse the water for irrigation.
>
> • Commercial – Porous pavement is used for large fraction of the parking area. Large cisterns capture roof runoff, and reuse the water for irrigation.

• Industrial – The most challenging site, with layout constraints and little economic incentive for cisterns for irrigation. Porous pavement parking spaces is assumed (a small fraction of the total paved surface), and the swales treat a greater proportion of the site."

Based on modeling analyses conducted as part of this plan development, additional reductions in Total Nitrogen and Total Phosphorous loads resulting from multi-family, commercial and industrial development were predicted. Also identified in these analyses, reductions in sediment loads and erosive conditions were predicted. The following discusses this Enhanced LID scenario:

"The previous tables demonstrate the potential benefits of using stormwater management and LID techniques to reduce pollutant load washoff from stable, developed sites. However, an additional impact from development is the increase in peak flow and runoff volume resulting of conversion of natural land cover to developed pervious and impervious surfaces. What results is an increased risk of channel erosion, from both higher peaks and longer durations of flow. Extended dry detention basins designed under the 2007 order requirements reduce the peak flow to values lower than existing conditions (assumed to be undeveloped land) for all three design storms. However, for the 5- and 10-year events there is a period of time when the post-with-BMPs flow exceeds existing conditions, resulting in a longer duration of potentially erosive conditions in the receiving stream. The *Enhanced LID* scenario incorporates large cisterns (with assumed water reuse) that provide additional runoff storage, and greatly reduce flow during the most potentially erosive portion of the post-with-BMPs hydrograph, nearly matching the existing hydrograph. LID techniques can not only improve pollutant removal, but also reduce total runoff volume and change storm event hydrologic response to more closely mimic natural conditions."

Applicants proposing projects located within the Agua Hedionda watershed, shall therefore evaluate and implement the recommended Enhanced LID scenarios where feasible, as described above.

Selection of Permanent Source Control BMPs

Based on identification of potential pollutants of concern associated with various types of facilities, the Copermittees have developed a Stormwater Pollutant Sources/Source Control Checklist (Appendix A) of "maximum extent practicable" source controls associated with each facility type. This approach ensures appropriate BMPs are applied to potential sources of each pollutant of concern.

Selection of Stormwater Treatment Facilities

This SUSMP groups pollutants of concern by how easily they are removed by various treatment processes (Table 2-3). Table 2-4 provides a general comparison of how various types of treatment facilities perform for each group of pollutants.

TABLE 2-3. Grouping of Pollutants of Concern by Fate During Stormwater Treatment

Pollutant	Coarse Sediment and Trash	Pollutants that tend to associate with fine particles during treatment	Pollutants that tend to be dissolved following treatment
Sediment	X	X	
Nutrients		X	X
Heavy Metals		X	
Organic Compounds		X	
Trash & Debris	X		
Oxygen Demanding		X	
Bacteria		X	
Oil & Grease		X	
Pesticides		X	

TABLE 2-4. Groups of Pollutants and Relative Effectiveness of Treatment Facilities

Pollutants of Concern	Bioretention Facilities (LID)	Settling Basins (Dry Ponds)	Wet Ponds and Constructed Wetlands	Infiltration Facilities or Practices (LID)	Media Filters	Higher-rate biofilters*	Higher-rate media filters*	Trash Racks & Hydro -dynamic Devices	Vegetated Swales
Coarse Sediment and Trash	High	High	High	High	High	High	High	High	High
Pollutants that tend to associate with fine particles during treatment	High	High	High	High	High	Medium	Medium	Low	Medium
Pollutants that tend to be dissolved following treatment	Medium	Low	Medium	High	Low	Low	Low	Low	Low

*See page 26 for a discussion of selection of treatment facilities in special situations.

Based on this analysis, the Copermittees have determined that the following types of facilities are appropriate for treatment of runoff potentially containing most pollutants of concern. These types of facilities or a combination thereof, can be used for stormwater treatment for all land uses in all watersheds, except where site-specific constraints make them infeasible.

- Infiltration facilities or practices, including dry wells, infiltration trenches, infiltration basins, and other facilities that infiltrate runoff to native soils (sized to detain and infiltrate a volume equivalent to the 85th percentile 24-hour event).
- Bioretention facilities and media filters that detain stormwater and filter it slowly through soil or sand (sized with a surface area at least 0.04 times the effectively impervious tributary area).
- Extended detention basins, wet ponds, and wetlands or other facilities using settling (sized to detain a volume equivalent to runoff from the tributary area generated by the 85th percentile 24-hour event).

The recommended design procedure in Chapter 4 integrates LID practices—optimizing the site design, using pervious surfaces, and dispersing of runoff to adjacent pervious areas—with the use of infiltration facilities and practices and bioretention facilities to meet NPDES permit LID requirements, treatment requirements, and flow-control requirements in a cost-effective, unified design.

Oil/water separators, storm drain inlet filters, and hydrodynamic separators, including vortex separators and continuous deflection separators ("CDS units"), are less effective means of stormwater treatment, although they may be used in series with more effective facilities.

Underground vaults typically lack the detention time required for settling of fine particles associated with stormwater pollutants. They also require frequent maintenance and may retain stagnant water, potentially providing harborage for mosquitoes. Because vaults may be "out of sight, out of mind," experience shows that the required maintenance may not occur.

Lack of space, in itself, is not a suitable justification for using a less-effective treatment on a development site, because the uses of the site and the site design can be altered as needed to accommodate bioretention facilities or planter boxes. In most cases, these effective facilities can be fit into required landscaping setbacks, easements, or other unbuildable areas.

Where possible, drainage to inlets, and drainage away from overflows and underdrains, should be by gravity. Where site topography makes it infeasible to accommodate gravity-fed facilities in the project design, the design flow may be captured in a vault or sump and pumped via force main to an effective facility.

The following situations sometimes present special challenges:

- Portions of sites which are not being developed or redeveloped, but which must be retrofit to meet treatment requirements in accordance with Provision

D.1.d.(1)(a) which states in part: "Where redevelopment results in an increase of, or replacement of, more than fifty percent of the impervious surface of a previously existing development, the numeric sizing criteria applies to the *entire* development."

- Sites smaller than one acre approved for development or redevelopment as part of the City's objective to preserve or enhance a pedestrian-oriented "smart-growth" type of urban design. The City of Vista has identified these areas as mixed land use zoning and are to be included in the City's 2010 General Plan update. These areas are primarily located in the City's downtown business areas along Vista Village Drive, Main Street and Santa Fe Avenue (approximately between Monte vista and Bobier). Project applicants should review the City's General Plan proposed update and maps for detailed locations of these areas. Design considerations for projects can then be discussed with City Land Development staff, as needed.

- Roadway widening projects.

In these special situations, the following types of facilities should each be evaluated in priority order (depending on the specific characteristics of the site and as determined by the City's Land Development staff and/or Water Quality Protection Program staff) until a feasible design is found.

1. Bioretention areas or planter boxes fed by gravity.

2. Capture of the design flow in a vault or sump and pumping to bioretention areas or planter boxes.

3. A subsurface sand or media filter with a maximum design surface loading rate of 5 inches per hour and a minimum media depth of 18 inches. The sand surface must be made accessible for periodic inspection and maintenance (for example, via a removable grating).

4. A higher-rate surface biofilter, such as a tree-pit-style unit. The grading and drainage design should minimize the area draining to each unit and maximize the number of discrete drainage areas and units.

5. A higher-rate vault-based filtration unit (for example, vaults with replaceable cartridge filters filled with inorganic media).

Proprietary Devices

Many currently available proprietary devices do not meet municipalities' requirements when used alone for stormwater treatment. Consult with City staff before proposing these devices.

Many proprietary stormwater treatment devices are currently marketed, and new brands will be introduced. Applicants and

applicants' engineers and design professionals should review with the City's Land Development and Water Quality Protection Program staff any proposals for using proprietary devices for stormwater treatment before they commence work on preliminary site layout, drainage plans, grading plans, or landscape plans.

Hydrology for NPDES Compliance

► IMPERVIOUSNESS

Schueler (1995) proposed **imperviousness** as a "unifying theme" for the efforts of planners, engineers, landscape architects, scientists, and local officials concerned with urban watershed protection. Schueler argued (1) that imperviousness is a useful indicator linking urban land development to the degradation of aquatic ecosystems, and (2) imperviousness can be quantified, managed, and controlled during land development.

Imperviousness has long been understood as the key variable in urban hydrology. Peak runoff flow and total runoff volume from small urban catchments is usually calculated as a function of the ratio of impervious area to total area **(rational method)**. The ratio correlates to the runoff factor, usually designated "C". Increased flows resulting from urban development tend to increase the frequency of small-scale flooding downstream.

Imperviousness links urban land development to degradation of aquatic ecosystems in two ways.

First, the combination of paved surfaces and piped runoff efficiently collects urban pollutants and transports them, in suspended or dissolved form, to surface waters. These pollutants may originate as airborne dust, be washed from the atmosphere during rains, or may be generated by automobiles and outdoor work activities.

Second, increased peak flows and runoff durations typically cause erosion of stream banks and beds, transport of fine sediments, and disruption of aquatic habitat. Measures taken to control stream erosion, such as hardening banks with riprap or concrete, may permanently eliminate habitat. By reducing infiltration to groundwater, imperviousness may also reduce dry-weather stream flows.

Imperviousness has two major components: rooftops and transportation (including streets, highways, and parking areas). The transportation component is usually larger and is more likely to be **directly connected** to the storm drain system.

The effects of imperviousness can be mitigated by disconnecting impervious areas from the drainage system and by encouraging detention and retention of runoff near the point where it is generated. Detention and retention reduce peak flows and volumes and allow pollutants to settle out or adhere to soils before they can be transported downstream.

► LOW IMPACT DEVELOPMENT REQUIREMENTS

The NPDES permit requires LID be used on all projects to minimize directly connected impervious area and promote infiltration. For Priority Development Projects, the minimum standards are:

- Drain a portion of impervious areas into pervious areas, if any.
- Design and construct pervious areas, if any, to effectively receive and infiltrate runoff from impervious areas, taking into account soil conditions, slope, and other pertinent factors.
- Construct a portion of paved areas with low traffic and appropriate soil conditions with permeable surfaces.

The LID design procedure in Chapter 4 incorporates these requirements into an integrated design which also meets sizing requirements for stormwater treatment facilities and flow-control (hydromodification management) requirements.

► SIZING REQUIREMENTS FOR STORMWATER TREATMENT FACILITIES

The guidance in Chapter 4 was crafted to ensure LID facilities comply with the NPDES permit's hydraulic sizing requirements for stormwater treatment facilities and flow-control facilities. The technical background follows.

Most runoff is produced by frequent storms of small or moderate intensity and duration. Treatment facilities are designed to treat smaller storms and the first flush of larger storms—approximately 80% of average annual runoff.

The NPDES permit identifies two types of treatment facilities—volume-based and flow-based.

Volume-based facilities must be designed to infiltrate, filter, or treat the volume of runoff produced from a 24-hour 85th percentile storm event as determined from the County of San Diego's 85th Percentile Precipitation Isopluvial Map. As shown on the map, rainfall depths vary from about 0.55" to 1.55".

For **flow-based** facilities, the NPDES permit specifies the rational method be used to determine flow. The rational method uses the equation

$Q = CiA$, where

Q = flow

C = weighted runoff factor between 0 and 1

i = rainfall intensity

A = area

The permit identifies two alternatives for calculating rainfall intensity:

1. the 85th percentile rainfall intensity times two, or
2. 0.2 inches per hour.

It is typically found that both methods yield similar results. The 0.2 inches per hour rainfall intensity should be used for sizing flow-based treatment facilities within the Copermittees' jurisdiction.

The 0.2 inches per hour criterion is the basis for a **consistent countywide sizing factor** for bioretention facilities when used for stormwater treatment only (i.e., not for flow control). The factor is based on maintaining a minimum percolation rate of 5 inches per hour through the engineered soil mix. The sizing factor is the ratio of the design intensity of rainfall on tributary impervious surfaces (0.2 inches/hour) to the design percolation rate in the facility (5 inches/hour), or **0.04** (dimensionless).

► FLOW-CONTROL (HYDROMODIFICATION MANAGEMENT)

The NPDES permit specifies for applicable projects:

> … post-project runoff flow rates and durations shall not exceed pre-project runoff flow rates and durations where the increased discharge flow rates and durations will result in increased potential for erosion or other significant adverse impacts to beneficial uses, attributable to changes in flow rates and durations.

Under current Interim Hydromodification Criteria, the requirement applies to projects disturbing 50 acres or more, and applicants may select among **three options** for compliance: Use a continuous simulation model to compare pre-project and post-project runoff, use LID facilities with sizing factors and design criteria developed by the Copermittees, or identify a specified exemption. See Chapter One.

The technical background for the Interim Hydromodification Criteria is in the memorandum "Development of Interim Hydromodification Criteria" (October 30, 2007) and other technical documents available on the Project Clean Water website.

Criteria for Infiltration Devices

The NPDES permit restricts the design and location of "infiltration devices" that, as designed, may bypass filtration through surface soils before reaching groundwater. These devices include:

- Infiltration basins.
- Infiltration trenches (includes French drains).
- Unlined retention basins (i.e., basins with no outlets).
- Unlined or open-bottomed vaults or boxes installed below grade (dry wells).

Infiltration devices may not be used in:

- Areas of industrial or light industrial activity; areas subject to high vehicular traffic (25,000 or greater average daily traffic on main roadway or 15,000 or more average daily traffic on any intersecting roadway);
- Automotive repair shops;
- Car washes;
- Fleet storage areas (bus, truck, etc.);
- Nurseries;
- Other areas, as determined by the City of Vista, with pollutant sources that could pose a threat to groundwater.

The vertical distance from the base of any infiltration device to the seasonal high groundwater mark shall be at least 10 feet. Infiltration devices shall be located a minimum of 100 feet horizontally from any known water supply wells.

In addition, infiltration devices are not recommended where:

- The infiltration device would receive drainage from areas where chemicals are used or stored, where vehicles or equipment are washed, or where refuse or wastes are handled.
- Surface soils or groundwater are polluted.
- The facility could receive sediment-laden runoff from disturbed areas or unstable slopes.

- Increased soil moisture could affect the stability of slopes of foundations.
- Soils are insufficiently permeable to allow the device to drain within 72 hours.

► MOST LID FEATURES AND FACILITIES ARE NOT INFILTRATION DEVICES

Self-treating and self-retaining areas, pervious pavements, bioretention facilities, and planter boxes are not considered to be infiltration devices.

Bioretention facilities work by percolating runoff through 18 inches or more of engineered soil. This removes most pollutants before the runoff is allowed to seep into native soils below. Further pollutant removal typically occurs in the unsaturated (vadose) zone before moisture reaches groundwater.

Where there is concern about the effects of increased soil moisture on slopes or foundations, an impermeable barrier may be added so the facility is "flow through" and all treated runoff is underdrained away from the facility. See the design sheets for Bioretention Facilities and Flow-Through Planters in Chapter 4.

References and Resources:

- RWQCB Order R9-2007-0001 (Stormwater NPDES Permit)
- *County of San Diego Low Impact Development Handbook*
- Clean Water Act Section 402(p)
- 40 CFR 122.26
- San Diego Regional Water Quality Control Board—TMDLs
- State Water Resources Control Board—Ocean Standards
- *Site Planning for Urban Stream Protection* (Scheuler, 1995).
- "Application of Water-Quality Engineering Fundamentals to the Assessment of Stormwater Treatment Devices" (Salvia, 2000).

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Chapter

3

Preparing Your Project Submittal

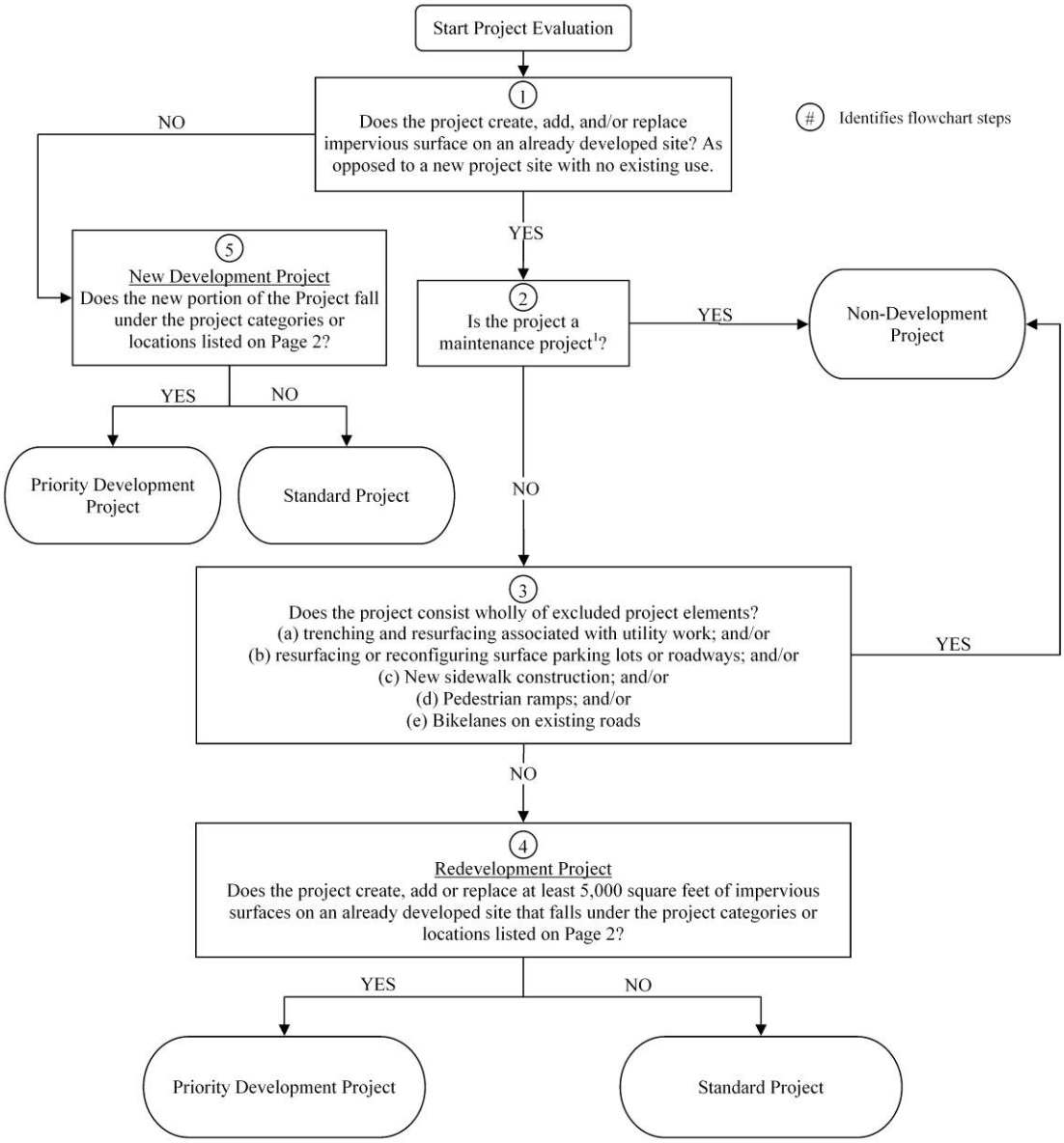
Step-by-step assistance to demonstrate compliance.

Your Project Submittal will demonstrate your project complies with all applicable requirements in the stormwater NPDES permit—to minimize imperviousness, retain or detain stormwater, slow runoff rates, incorporate required source controls, treat stormwater prior to discharge, control runoff rates and durations, and provide for operation and maintenance of treatment and flow-control facilities.

A complete and thorough Project Submittal will facilitate quicker review and fewer cycles of review. Every municipality in San Diego County requires a submittal for every applicable project. Your Project Submittal must be coordinated with your application for both ministerial and discretionary approvals and must have sufficient detail to ensure the stormwater design, site plan, and landscaping plan are congruent.

Given the unique elements and site characteristics of every project, often the first challenge you may face when preparing your submittal is determining the "type" of your project, as defined by the municipal stormwater NPDES permit and the corresponding design requirements. Determining whether or not your project falls into a Priority Development or Redevelopment Project Category, as discussed in Chapter 1, or whether it is a Standard Project, this determination is an essential first step in designing and preparing your project submittal. Chapter 1 should be referenced in making this determination. As further discussed in this Chapter, applicants are required to complete a New Development and/or Redevelopment Checklist during the early stages of the submittal process. This questionnaire as well as Figure 3-1 below may also provide guidance in determining your project type.

Figure 3-1 Project Type Determination Flowchart

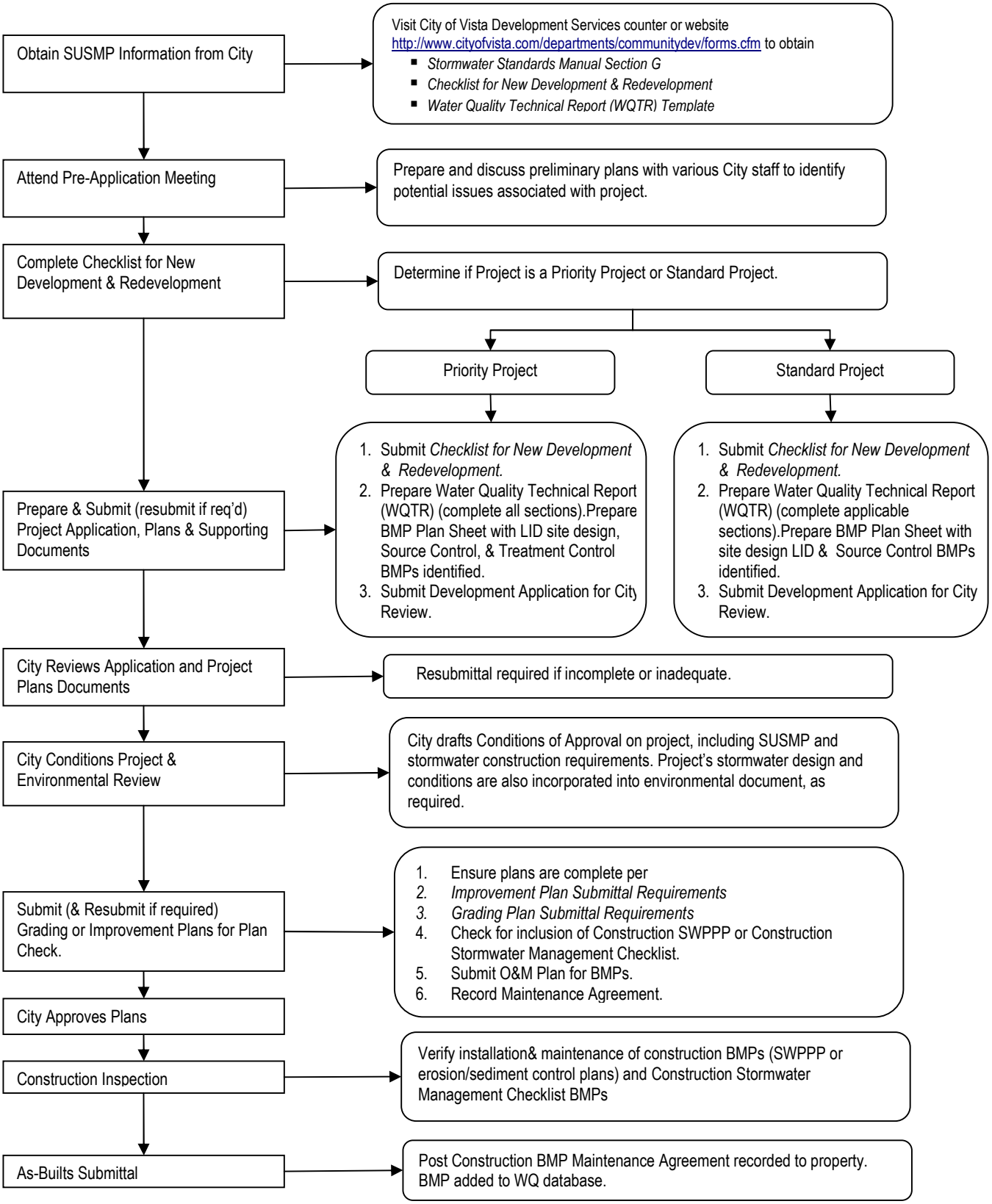


Project Type Determination Flowchart

[1]Maintenance projects are defined as those where impervious surfaces may be removed, however the underlying soils are not exposed and/or routine replacement of damaged pavement, such as pothole repair

The flowchart in Figure 3-2 (on the following page) shows the City's requirements for stormwater compliance within the development project submittal and approval process. For other projects not requiring ministerial or discretionary approvals, the required temporary construction best management practices (BMPs) are discussed in Section F of this City's Stormwater Standards Manual.

Figure 3-2 City of Vista Project Submittal/Review Process



All projects requiring discretionary approval, whether Standard or Priority, are required to submit a complete Water Quality Technical Report (WQTR) which contains sufficient information and analysis to allow the City to determine whether the applicable regional and local stormwater standards have been met. Given that Standard projects are not required to include treatment control BMPs, these sections in the WQTR are not required for Standard projects. Appendix B includes a template that may be used in developing your WQTR. The following list under the WQTR Organization and Content provides details for WQTR submittal requirements which are also included in the template. The following sections describe a methodology and steps to assemble the required information, to analyze your project and document your design of the required controls for your project. Provided all information and analysis are complete, correct and included in the WQTR, project applicants may use alternate methodologies to assemble this information.

Water Quality Technical Report

The Water Quality Technical Report and Drainage Study must be prepared by Civil Engineer registered in the State of California and in a comprehensive format and at a minimum include the following information which is also provided in a template form in Appendix B:

WQTR Organization & Content

1. Table of Contents

2. Vicinity Map

3. Project Description
    - Narrative of project activities

4. Site Map
    - Entire property included on one map (use key map if multi-sheets)
    - Drainage areas and direction of flow
    - Private storm drain system(s)
    - Nearby water bodies and municipal storm drain inlets
    - Location of storm water conveyance systems (ditches, inlets, storm drains, etc.)
    - Location of existing and proposed storm water controls
    - Location of "impervious" areas- paved areas, buildings, covered areas
    - Locations where materials would be directly exposed to storm water
    - Location of building and activity areas (e.g. fueling islands, garages, waste container area, wash racks, hazardous material storage areas, etc.)
    - Areas of potential soil erosion (including areas downstream of project)

5. Identify Pollutants of Concern in Receiving Waters
    - Identify anticipated pollutants from project area in accordance with Section 3.1.1.
    - Identify receiving waters, watershed and hydrologic unit basin number
    - Identify impaired water bodies downstream of the project and impairment
    - Identify primary pollutants of concern
    - Provide Drainage Study Report

6. Identify Conditions of Concern
    - Provide Drainage Study Report
    - Identify conditions of concern
    - Provide runoff calculations

7. Identify LID Site Design BMPs
    - Maintain pre-development rainfall runoff characteristics
    - Protect slopes and channels

8. Identify Source Control BMPs
    - Outdoor Materials Storage
    - Trash storage
    - IPM
    - Efficient irrigation and landscape design
    - Inlet stenciling and signage
    - Other controls (as applicable)

9. BMPs for individual Priority Project Categories (as applicable)
    - Private road
    - Residential driveways and guest parking
    - Dock areas
    - Maintenance bays
    - Vehicle wash areas
    - Outdoor processing areas
    - Surface parking areas
    - Non-retail fueling areas
    - Steep hillside landscaping

10. Identify Structural Treatment Control BMPs (as applicable)
    - Design criteria (include calculations)
    - Basis for selection (include targeted pollutants, justification, and alternative analysis)
    - Pollutant removal information (other than vendor specifications)

- Restrictions, if appropriate
- Location of BMPs
- Literature References

11. BMP Maintenance conditions and requirements

BMP Plan Sheet

The City has adopted an approach for ensuring verification that all permanent post construction BMPs are constructed per the requirements of the approved plans. To ensure that all permanent post construction BMPs for a particular project are installed/constructed at the conclusion of the project, the City requires developer preparation of a BMP plan sheet(s) as part of the plan submittals. For ministerial permits such as building permits, encroachment permits, hazardous material storage permits, right-of-way permits and underground/above ground storage tank permits, SUSMP requirements must be incorporated into the project design and shown on plans prior to issuance of ministerial permits. Applicants may use the City's BMP plan sheet template for locating BMPs (see Figure 3-3 or http://www.cityofvista.com/departments/communitydev/documents/BMPSheet.pdf)

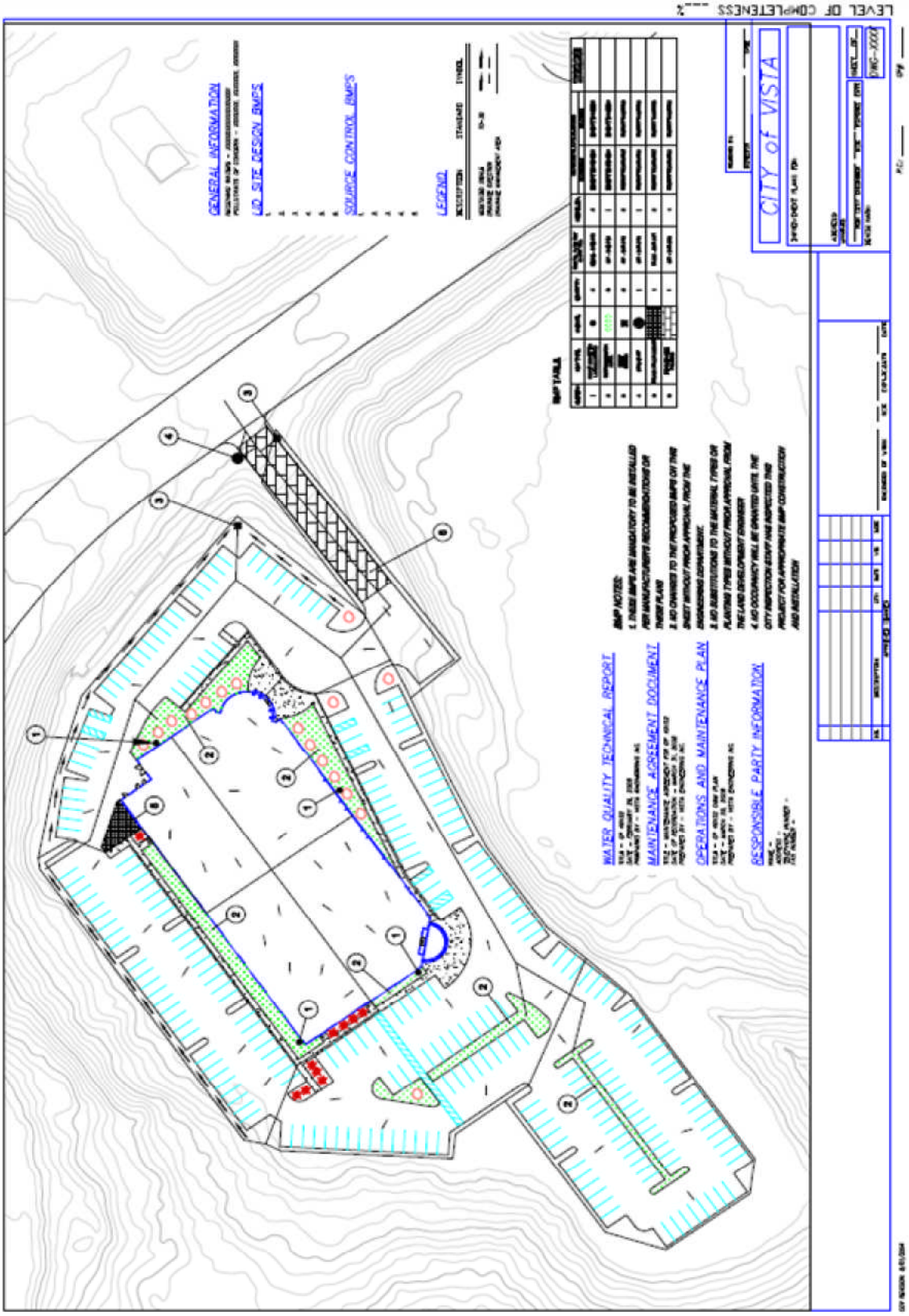
The BMP plan sheet will include a site plan of the project calling out the location of each required LID site design, source control and treatment control BMP. In addition, the plan will contain a matrix listing of the required BMPs cross referenced with a list of the specific construction drawing sheet where the specified BMP construction is detailed. A copy of the single plan BMP sheet will be attached to each construction drawing set (building, mass grading, finished grading, improvements, and grading) highlighting the BMPs.

At a minimum, the plan sheet will have the following information included:

- Entire property on one map
- Drainage areas/direction of flows
- Private storm drain systems
- Nearby waterbodies
- Location of storm drain conveyance systems
- Location of proposed stormwater controls and BMPs, including detention basins
- Locations of impervious and pervious areas (hatched)
- Location where materials would be exposed to stormwater (hatched)
- Areas of potential erosion (hatched)
- All site design and source control BMPs shown, detailed and/or listed in the General Notes on BMP Plan Sheet
- All treatment control BMPs shown, detailed and called out on the plan sheet

- Call out the 85th percentile discharge rates that are tributary to each entry point of the treatment control BMPs
- Call out the pollutant types that are expected at each treatment control BMP
- Signature Block for City Engineer
- Add As-Builts on first sheet of plans.
- Delineated areas draining to each treatment control BMP

Figure 3-3 Sample BMP Plan Sheet (required)



Step by Step

Suggested coordination with site and landscape design

Plan and design your stormwater controls integrally with the site planning and landscaping for your project. It's best to start with general project requirements and preliminary site design concepts, then prepare the detailed site design, landscape design, and stormwater control design simultaneously. **This will help ensure that your site plan, landscape plan, and Project Submittal are congruent.**

The following step-by-step procedure should optimize your design by identifying the best opportunities for stormwater controls **early in the design process.**

Begin with general project requirements and program.

Sketch conceptual site layout, building locations, and circulation.

Revise site layout, building locations, and circulation to accommodate LID design. Develop land-scaping plan.

Submit Site Plan, Landscape Plan, and SUSMP Submittal

The recommended steps are:

1. Assemble needed information.
2. Identify site opportunities and constraints.
3. Follow the LID design guidance in Chapter 4 to analyze your project for LID and to develop and document your drainage design.
4. Specify source controls using the sources/source control checklist in the Appendix A.
5. Plan for ongoing maintenance of treatment and flow-control facilities.
6. Complete the Project Submittal.

The City of Vista staff requires that you prepare and submit a preliminary site design prior to formally applying for planning and zoning approvals, typically reviewed during the pre-application meeting. Your preliminary site design should incorporate a conceptual plan for site drainage, including self-treating and self-retaining areas and the location and approximate sizes of any treatment facilities. This additional up-front design effort will save time and avoid potential delays later in the review process.

Step 1: Assemble Needed Information

To select types and locations of treatment facilities, the designer needs to know the following site characteristics:

- **Existing natural hydrologic features** and natural resources, including any contiguous natural areas, wetlands, watercourses, seeps, or springs.

- **Existing site topography**, including contours of any slopes of 4% or steeper, general direction of surface drainage, local high or low points or depressions, any outcrops or other significant geologic features.
- **Zoning**, including requirements for **setbacks** and **open space**.
- **City and County Public Works Standards** or other local codes governing minimum street widths, sidewalk construction, allowable pavement types, and drainage. .
- Soil types (including **hydrologic soil groups**) and depth to groundwater, which may determine whether infiltration is a feasible option for managing site runoff. Depending on site location and characteristics, and on the selection of treatment and flow-control facilities, site-specific information (e.g. from boring logs or geotechnical studies) may be required.
- **Existing site drainage.** For undeveloped sites, this should be obtained by inspecting the site and examining topographic maps and survey data. For previously developed sites, site drainage and connection to the municipal storm drain system can be located from site inspection, municipal storm drain maps, and plans for previous development.
- Existing **vegetative cover** and **impervious areas**, if any.

References and Resources

- *Site Planning for Urban Stream Protection* (Scheuler 1995).
- *Start at the Source* (BASMAA 1999), p. 36

Step 2: Identify Constraints & Opportunities

Review the information collected in Step 1. Identify the principal constraints on site design and selection of treatment and flow-control facilities as well as opportunities to reduce imperviousness and incorporate facilities into the site and landscape design. For example, **constraints** might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, restricted right-of-way, or safety concerns. **Opportunities** might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention facilities), and differences in elevation (which can provide hydraulic head). Note stormwater treatment facilities should not be located within protected riparian areas.

As required for your project submittal, your project description should also include a description of the site opportunities and constraints. This description will help you as you proceed with LID design and explain your design decisions to others.

Step 3: Prepare and Document Your LID Design

Use the Low Impact Development Design Guide (Chapter 4) to analyze your project for LID, design and document drainage, and specify preliminary design details for integrated management practices. **Follow the detailed instructions in Chapter 4 to ensure your project complies with NPDES permit LID requirements (Provision D.1.d.(4)) as well as stormwater treatment requirements in Provision D.1.d.(6)).** In future editions of this model SUSMP, the LID Design Guide will be updated so that additional hydromodification management requirements are also met via this unified design procedure. Chapter 4 includes calculation procedures and formats for presenting your calculations.

Your Project Submittal should include a drawing showing:

- The entire site divided into separate drainage management areas (DMAs), with each area identified as one of the following: self-treating, self-retaining, draining to a self-retaining area, or draining to an Integrated Management Practice (IMP). Each area should be clearly marked with a unique identifier.
- For each drainage area, the types of impervious area proposed, and the area of each.
- Proposed locations and sizes of treatment facilities. Each facility should be clearly marked with a unique identifier.

Compliance
The design criteria for DMAs in Chapter 4 ensure the required volume of flow from all developed portions of the project, including landscaped areas, is infiltrated, filtered, or treated (Provision D.1.d.(6)(a).

Your Project Submittal should include:

- Tabulation of proposed self-treating areas, self-retaining areas, areas draining to self-retaining areas, and areas draining to IMPs, and the corresponding IMPs identified.
- Calculations, in the format shown in Chapter 4, showing the minimum square footage required and proposed square footage for each IMP.
- Preliminary designs for each IMP. The design sheets and accompanying drawings in Chapter 4 may be used or adapted for this purpose.

The following should also be submitted to assist the reviewer in understanding your design:

- A narrative overview of your design and how your design decisions optimize the site layout, use pervious surfaces, disperse runoff from impervious surfaces, and drain impervious surfaces to engineered IMPs. See Chapter 4.

- A narrative briefly describing each **drainage management area** (DMA), its drainage, and where drainage will be directed.
- A narrative briefly describing each IMP. Include any special characteristics or features distinct from the design sheets in Chapter 4.

References and Resources

- Chapter 4
- *County of San Diego Low Impact Development Handbook*
- City of Vista's *General Plan*
- City of Vista's Zoning Ordinance and Development Codes
- *Low Impact Development Manual* (Prince George's County, Maryland, 1999).
- *Bioretention Manual* (Prince George's County, Maryland, rev. 2002)
- *Site Planning for Urban Stream Protection* (Schueler, 1995b).
  Low Impact Development Technical Guidance Manual for Puget Sound (Puget Sound Action Team, 2005)
- *LID for Big Box Retailers* (Low Impact Development Center, 2006)

Step 4. Specify Source Control BMPs

Some everyday activities – such as trash recycling/disposal and washing vehicles and equipment – generate pollutants that tend to find their way into storm drains. These pollutants can be minimized by applying **source control BMPs**.

Source control BMPs include **permanent**, structural features that must be incorporated into your project plans and **operational** BMPs, such as regular sweeping and "housekeeping," that must be implemented by the site's occupant or user. The maximum extent practicable standard typically requires both types of BMPs. In general, operational BMPs cannot be substituted for a feasible and effective permanent BMP.

Use the following procedure to specify source control BMPs for your site:

► IDENTIFY POLLUTANT SOURCES

Review the first column in the **Pollutant Sources/Source Control Checklist** (Appendix A). Check off the potential sources of pollutants that apply to your site.

► NOTE LOCATIONS ON SUBMITTAL DRAWING

Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist (Appendix A). Show the location of each pollutant source and each permanent source control BMP in your submittal drawing.

► PREPARE A TABLE AND NARRATIVE

Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist (Appendix A). Now, create a table using the format in Table 3-1. In the left column, list each potential source on your site (from Appendix, Column 1). In the middle column, list the corresponding **permanent, structural BMPs**

(from Columns 2 and 3, Appendix A) used to prevent pollutants from entering runoff. Accompany this table with a narrative that explains any special features, materials, or methods of construction that will be used to implement these permanent, structural BMPs.

► IDENTIFY OPERATIONAL SOURCE CONTROL BMPS

TABLE 3-1. Format for Table of Permanent and Operational Source Control Measures.

Potential source of runoff pollutants	*Permanent source control BMPs*	*Operational source control BMPs*

To complete your table, refer once again to the Pollutant Sources/Source Control Checklist (Appendix A, Column 4). List in the right column of your table the operational BMPs that should be implemented as long as the anticipated activities continue at the site. The same BMPs may also be required as a condition of a use permit or other revocable discretionary approval for use of the site.

References and Resources

- Appendix A: Stormwater Pollutant Sources/Source Control Checklist
- RWQCB Order R9-2007-0001, Provision D.1.d.(5)
- *Start at the Source*, Section 6.7: Details, Outdoor Work Areas
- *California Stormwater Industrial/Commercial Best Management Practice Handbook*
- *Urban Runoff Quality Management* (WEF/ASCE, 1998) Chapter 4: Source Controls

Step 5: Stormwater Facility Maintenance

As required by NPDES Permit Provision D.1.c.(5), the City requires submittal of proof of a mechanism under which ongoing long-term maintenance of stormwater treatment and flow-control facilities will be conducted. As described in Chapter 5 of this document, you must include the following items in your Project Submittal:

1. A means to finance and implement facility maintenance in perpetuity.
2. Acceptance of responsibility for maintenance from the time the facilities are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the treatment and flow-control facilities you have selected.

4. A detailed plan that sets forth a maintenance schedule for each of the treatment and flow-control facilities built on your site.

Details of these requirements, and instructions for preparing a detailed operation and maintenance plan, are in Chapter 5.

References and Resources

- *Chapter 5*
- Operation, Maintenance, and Management of Stormwater Management Systems (Watershed Management Institute, 1997)

Step 6: Complete Your Project Submittal

Your Project Submittal should document the information gathered and decisions made in Steps 1-5. A clear, complete, well-organized Project Submittal will make it possible to confirm your design meets the minimum requirements of the NPDES permit, the municipal stormwater pollution prevention ordinance, and this *SUSMP*.

► COORDINATION WITH SITE, ARCHITECTURAL, AND LANDSCAPING PLANS

Before completing your Project Submittal, ensure your stormwater control design is fully coordinated with the site plan, grading plan, and landscaping plan being proposed for the site.

Information submitted and presentations to design review committees, planning commissions, and other decision-making bodies must incorporate relevant aspects of the stormwater design. In particular, ensure:

- Curb elevations, elevations, grade breaks, and other features of the drainage design are consistent with the delineation of DMAs.
- The top edge (overflow) of each bioretention facility is level all around its perimeter—this is particularly important in parking lot medians.
- The resulting grading and drainage design is consistent with the design for parking and circulation.
- Bioretention facilities and other IMPs do not create conflicts with pedestrian access between parking and building entrances.
- Vaults and utility boxes can be accommodated outside bioretention facilities and will not be placed within bioretention facilities.
- The visual impact of stormwater facilities, including planter boxes at building foundations and any terracing or retaining walls required for the stormwater control design, is shown in renderings and other architectural drawings.

- Landscaping plans, including planting plans, show locations of bioretention facilities, and the plant requirements are consistent with the engineered soils and conditions in the bioretention facilities.
- Renderings and representation of street views incorporate any stormwater facilities located in street-side buffers and setbacks.

► CONSTRUCTION PLAN SUSMP CHECKLIST

When you submit construction plans for City review and approval, the reviewer will compare that submittal with your earlier Project Submittal. By creating a Construction Plan SUSMP Checklist for your project, you can facilitate the reviewer's comparison and speed review of your project.

TABLE 3-2. Format for Construction Plan SUSMP Checklist.

BMP ID	*BMP Type*	*BMP Symbol*	*Quantity*	*Detail Sheet No.*	*Detail No.*	*Northing*	*Easting*	*Construction Confirmation*

Here's how:

1. Create a table similar to Table 3-2 and as shown on the City's Standard BMP Plan Sheet. Number and list each measure or BMP you have specified include as much information as possible. Incorporate the table into your Project Submittal.
2. When you submit construction plans, **duplicate the table** (by photocopy or electronically). Now fill the columns identifying the plan sheets where the BMPs are shown. List all plan sheets on which the BMP appears.

Note that the updated table—or Construction Plan SUSMP Checklist—is **only a reference tool** to facilitate comparison of the construction plans to your Project Submittal. Planning Department staff can advise you regarding the process required to propose changes to your approved Project Submittal.

► CERTIFICATION

Your Project Submittal must be certified by a registered civil engineer. A signed and stamped certification statement must be included in the Water Quality Technical Report

The certification should state: "This Water Quality Technical Report (WQTR) has been prepared under the direction of the following Registered Civil Engineer. The Registered

Civil Engineer attests to the technical information contained herein and the engineering data upon which the following design, recommendations, conclusions and decisions are based. The selection, sizing, and preliminary design of stormwater treatment and other control measures in this plan meet the requirements of Regional Water Quality Control Board Order R9-2007-0001 and subsequent amendments."

► EXAMPLE PROJECT SUBMITTALS

Example Project Submittals may be available from Land Development or Water Quality Protection Program staff. Your submittal will reflect the unique character of your own project and should meet the requirements identified in this *SUSMP*. City Land Development and/or Water Quality Protection Program staff can assist you to determine how specific requirements apply to your project.

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Chapter

4

Low Impact Development Design Guide

Guidance for designing and documenting your LID site drainage, stormwater treatment facilities, and flow-control facilities

Follow the Low Impact Development (LID) design in this SUSMP to achieve compliance with the stormwater treatment requirements as well as the LID requirements in the stormwater NPDES permit.

This will require careful documentation of:

- Pervious and impervious areas in the planned project.
- Drainage from each of these areas.
- Locations, sizes, and types of proposed treatment facilities.

Your Project Submittal must include calculations showing the site drainage and proposed LID treatment facilities meet the criteria in this *SUSMP*.

This Low Impact Development Design Guide will help you:

- **Analyze your project** and identify and select options for implementing LID techniques to meet runoff treatment requirements—and flow-control requirements, if they apply.
- **Design and document drainage** for the whole site and document how that design meets this *SUSMP's* stormwater treatment criteria.
- **Specify preliminary design details** and integrate your LID drainage design with your paving and landscaping design.

Alternatives to LID design are discussed in the final section of this chapter.

Analyze Your Project for LID

Conceptually, there are four LID strategies for managing runoff from buildings and paving:

1. **Optimize the site layout** by preserving natural drainage features and designing buildings and circulation to minimize the amount of roofs and paving.

2. **Use pervious surfaces** such as turf, gravel, or pervious pavement—or use surfaces that retain rainfall, such as vegetated roofs. All drainage from these surfaces is considered to be "self-retained" (a detailed definition corresponding to this concept is on page 58). No further management of runoff is necessary. An emergency overflow should be provided for extreme events.

3. **Disperse runoff** from impervious surfaces on to adjacent pervious surfaces (e.g., direct a roof downspout to disperse runoff onto a lawn).

4. Drain impervious surfaces to engineered **Integrated Management Practices** (IMPs), such as bioretention facilities, planter boxes, cisterns, or dry wells. IMPs infiltrate runoff to groundwater and/or percolate runoff through engineered soil and allow it to drain away slowly. Subject to site conditions and local County Department of Health Services' regulations, it may be possible to harvest and reuse rainwater in conjunction with IMPs.

A combination of two or more strategies may work best for your project. With forethought in design, the four strategies can provide multiple, complementary benefits to your development. Pervious surfaces reduce heat island effects and temperature extremes. Landscaping improves air quality, creates a better place to live or work, and upgrades value for rental or sale. Retaining natural hydrology helps preserve and enhance the natural character of the area. LID drainage design can also conserve water and reduce the need for drainage infrastructure.

Table 4-1 includes ideas for applying LID strategies to site conditions and types of development.

TABLE 4-1. Ideas for Runoff Management

Site Features and Design Objectives	*Vegetated Roof*	*Self-retaining Areas*	*Pervious Pavement*	*Bioretention Facility*	*Flow-through Planter*	*Dry Well*	*Cistern with bioretention*
Clayey native soils	✓			✓	✓		✓
Permeable native soils	✓		✓	✓	✓	✓	
Very steep slopes	✓				✓		
Shallow groundwater	✓				✓		
Avoid saturating subsurface soils	✓		✓		✓		
Connect to roof downspouts		✓		✓	✓	✓	✓
Parking lots/islands and medians			✓	✓		✓	
Sites with extensive landscaping		✓	✓	✓			
Densely developed sites with limited space/landscape	✓		✓		✓	✓	✓
Fit IMPs into landscape and setback areas				✓			✓
Make drainage a design feature		✓		✓			✓
Convey as well as treat stormwater				✓			

► OPTIMIZE THE SITE LAYOUT

To minimize stormwater-related impacts, apply the following design principles to the layout of newly developed and redeveloped sites.

Conserve natural areas, soils, and vegetation. Define the development envelope and protected areas, identifying areas that are most suitable for development and areas that should be left undisturbed. Use the following guideline to determine the least sensitive areas of the site, in order of increasing sensitivity:

1. Areas devoid of vegetation, including previously graded areas and agricultural fields.
2. Areas of non-native vegetation, disturbed habitats and eucalyptus woodlands where receiving waters are not present.
3. Areas of chamise or mixed chaparral, and non-native grasslands.
4. Areas containing coastal scrub communities.
5. All other upland communities.
6. Occupied habitat of sensitive species and all wetlands (as both are defined by the local jurisdiction).

Within each of the previous categories, hillside areas should be considered more sensitive than flatter areas.

Coordination
Chapter One includes a presentation of how review of your project's site design and landscape design is coordinated with review for compliance with stormwater NPDES requirements.

Where possible, conform the site layout along natural landforms, avoid excessive grading and disturbance of vegetation and soils, and replicate the site's natural drainage patterns. Set back development from creeks, wetlands, and riparian habitats. Preserve significant trees, especially native trees and shrubs, and identify locations for planting additional native or drought tolerant trees and large shrubs. Concentrate development on portions of the site with less permeable soils, and preserve areas that can promote infiltration.

For all types of development, **limit overall coverage** of paving and roofs. This can be accomplished by designing compact, taller structures, narrower and shorter streets and sidewalks, smaller parking lots (fewer stalls, smaller stalls, and more efficient lanes), and indoor or underground parking. *Verify zoning and design standards with City Land Development staff* and do not compromise public safety and a walkable environment.— Examine site layout and circulation patterns and identify areas where landscaping can be substituted for pavement.

Detain and retain runoff throughout the site. On flatter sites, it typically works best to intersperse landscaped areas and IMPs among the buildings and paving. On hillside sites, drainage from upper areas may be collected in conventional catch basins and piped to landscaped areas and IMPs in lower areas.

Use drainage as a design element. Use depressed landscape areas, vegetated buffers, and bioretention areas as amenities and focal points within the site and landscape design. Bioretention areas can be almost any shape and should be located at low points. Bioretention areas shaped as swales can detain and treat low runoff flows and also convey higher flows.

► USE PERVIOUS SURFACES

Consider permeable pavements and surface treatments. Inventory paved areas on your preliminary site plan. Identify where permeable pavements, such as crushed aggregate, turf block, unit pavers, pervious concrete, or pervious asphalt could be substituted for impervious concrete or asphalt paving.

Consider a vegetated roof. Although not yet widely used in California, vegetated or "green" roofs are growing in popularity. Potential benefits include longer roof life, lower heating and cooling costs, and better sound insulation, in addition to air quality and water quality benefits. For SUSMP compliance purposes, vegetated roofs are considered not to produce increased runoff or runoff pollutants (i.e., any runoff from a vegetated roof requires no further treatment or detention). For more information on vegetated roofs, see www.greenroofs.org.

► DISPERSE RUNOFF TO ADJACENT PERVIOUS AREAS

Look for opportunities to direct runoff from impervious areas to adjacent landscaping. The design, including slopes and soils, must reflect a reasonable expectation that an inch of rainfall will soak into the soil and produce no runoff. For example, a lawn or garden depressed 3-4" below surrounding walkways or driveways provides a simple but functional landscape design element.

For priority project sites subject to stormwater treatment requirements only, a 2:1 maximum ratio of impervious to pervious area is acceptable. Be sure soils will drain adequately.

Under some circumstances, it may be allowable to direct runoff from impervious areas to pervious pavement (for example, from roof downspouts to a parking lot paved with crushed aggregate or turf block). The pore volume of pavement and base course must be sufficient to retain an inch of rainfall, including runoff from the tributary area. The slopes and soils must be compatible with infiltrating that volume without producing runoff.

► DIRECT RUNOFF TO INTEGRATED MANAGEMENT PRACTICES

Project Clean Water has developed design criteria for the following IMPs:

- **Bioretention facilities**, which can be configured as swales, free-form areas, or planters to integrate with your landscape design.
- **Flow-through planters**, which can be used near building foundations and other locations where infiltration to native soils is not desired.
- **Dry wells** and other infiltration facilities, which can be used only where soils are permeable.
- **Cisterns**, in combination with a bioretention facility.

See the design sheets at the end of this chapter.

It may be possible to create a site-specific design that uses cisterns to achieve stormwater flow control, stormwater treatment, and rainwater reuse for irrigation or indoor uses (**water harvesting**). Such a design could expand the multiple benefits of LID to include water conservation. Keep in mind:

- Facilities must meet criteria for capturing and treating the volume specified by Equation 4-8 below. This volume must be allowed to empty within 24 hours so runoff from additional storms, which may follow, is also captured and treated. Additional volume may be required if the system also stores runoff for longer periods for reuse.
- Storage of water for longer than 48 hours creates the potential for mosquito harborage. Cisterns must be designed to prevent entry by mosquitoes.
- Indoor uses of non-potable water may be restricted or prohibited per County Department of Health Services.

Some references and resources for water harvesting appear at the end of this chapter.

Finding the right location for treatment facilities on your site involves a careful and creative integration of several factors:

- To make the most efficient use of the site and to maximize aesthetic value, **integrate IMPs with site landscaping**. Verify City of Vista landscaping standards with Development staff, to ensure required setbacks or buffers are maintained. It may be possible to locate some or all of your site's treatment and flow-control facilities within this same area, or within utility easements or other non-buildable areas.

- Planter boxes and bioretention areas must be **level or nearly level** all the way around. Bioretention areas configured as swales may be gently sloped in the linear direction, but opposite sides must be at the same elevation.
- For effective, low-maintenance operation, **locate facilities so drainage into and out of the device is by gravity flow.** Pumped systems are feasible, but are expensive, require more maintenance, are prone to untimely failure, and can cause mosquito control problems. Most IMPs require 3 feet or more of head.
- If the property is being subdivided now or in the future, the facility should be in a **common, accessible area.** In particular, avoid locating facilities on private residential lots. Even if the facility will serve only one site owner or operator, make sure the facility is located for ready access by inspectors from the City of Vista and other regulatory agencies(RWQCB, County DHS, etc.).
- The facility must be accessible to equipment needed for its maintenance. **Access requirements for maintenance** will vary with the type of facility selected. Planter boxes and bioretention areas will typically need access for the same types of equipment used for landscape maintenance.

To complete your analysis, include in your Project Submittal a brief **narrative** documenting the site layout and site design decisions you made. This will provide background and context for how your design meets the quantitative LID design criteria.

Develop and Document Your Drainage Design

The **design documentation procedure** begins with careful delineation of pervious areas and impervious areas (including roofs) throughout the site. The procedure accounts for how runoff from each delineated area is managed. For areas draining to IMPs, the procedure ensures each IMP is appropriately sized.

The procedure results in a space-efficient, cost-efficient LID design for meeting SUSMP requirements on most residential and commercial/industrial developments. The procedure arranges documentation of drainage design and IMP sizing in a consistent format for presentation and review.

This procedure is intended to facilitate, not substitute for, creative interplay among site design, landscape design, and drainage design. **Several iterations may be needed** to optimize your drainage design as well as aesthetics, circulation, and use of available area for your site.

You should be able to complete the needed calculations using only the project's site development plan.

► STEP 1: DELINEATE DRAINAGE MANAGEMENT AREAS

This is the key first step. You must divide the **entire project area** into individual, discrete Drainage Management Areas (DMAs). Typically, lines delineating DMAs follow grade breaks and roof ridge lines. The Exhibit, tables, text, and calculations in your Project Submittal will illustrate, describe, and account for runoff from each of these areas.

Use separate DMAs for each surface type (e.g., landscaping, pervious paving, or roofs). Each DMA must be assigned a single hydrologic soil group. Assign each DMA an identification number and determine its size in square feet.

► STEP 2: CLASSIFY DMAS AND DETERMINE RUNOFF FACTORS

Next, determine how drainage from each DMA will be handled. Each DMA will be one of the following four types:

Rationale
Pollutants in rainfall and windblown dust will tend to become entrained in the vegetation and soils of landscaped areas, so no additional treatment is needed. It is assumed the self-treating landscaped areas will produce runoff less than or equal to the pre-project site condition.

1. Self-treating areas.
2. Self-retaining areas (also called "zero-discharge" areas).
3. Areas that drain to self-retaining areas.
4. Areas that drain to IMPs.

Self-treating areas are landscaped or turf areas that do not drain to IMPs, but rather drain directly off site or to the storm drain system. Examples include upslope undeveloped areas which are ditched and drained around a development and grassed slopes which drain off-site to a street or storm drain. In general, self-treating areas include no impervious areas, unless the impervious area is very small (5% or less) in relationship to the receiving pervious area and slopes are gentle enough to ensure runoff will be absorbed into the vegetation and soil. Criteria for self-treating areas are in the design sheet "Self Treating and Self-Retaining Areas" at the end of this chapter.

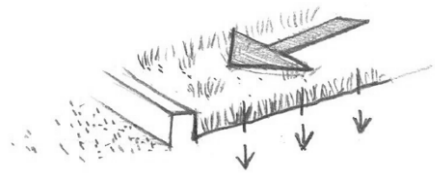


FIGURE 4-1. Self-treating areas are entirely pervious and drain directly off-site or to the storm drain system.

Self-retaining areas are designed to retain the first one inch of rainfall without producing any runoff. The technique works best on flat, heavily landscaped sites. It may be used on mild slopes if there is a reasonable expectation that a one-inch rainfall event would produce no runoff.

To create self-retaining turf and landscape areas in flat areas or on terraced slopes, berm the area or depress the grade into a concave cross-section so that these areas will retain the first inch of rainfall. Specify slopes, if any, toward the center of the pervious area. Inlets of area drains, if any, should be set 3 inches above the low point to allow ponding.

Criteria for self-retaining areas are in the design sheet "Self Treating and Self-Retaining Areas" following this chapter.

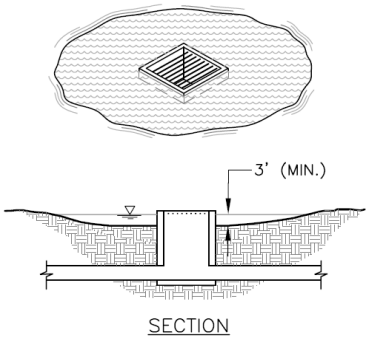


FIGURE 4-2. Self-retaining areas. Berm or depress the grade to retain at least an inch of rainfall and set inlets of any area drains at least 3 inches above low point to allow ponding.

Areas draining to self-retaining areas. Runoff from impervious or partially pervious areas can be managed by routing it to self-retaining pervious areas. For example, roof downspouts can be directed to lawns, and driveways can be sloped toward landscaped areas. The maximum ratio is 2 parts impervious area for every 1 part pervious area.

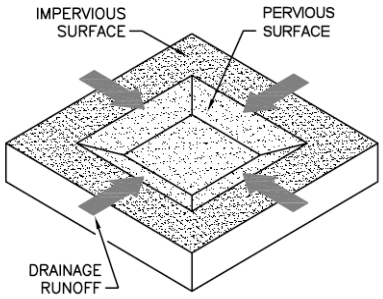


FIGURE 4-3. Relationship of impervious to pervious area for self-retaining areas. Ratio: ***pervious*** ≥ ***½ impervious***

The drainage from the impervious area must be directed to and dispersed within the pervious area, and the entire area must be designed to retain an inch of rainfall without flowing off-site. For example, if the maximum ratio of 2 parts impervious area into 1 part pervious area is used, then the pervious area must absorb 3 inches of water over its surface before overflowing to an off-site drain.

A partially pervious area may be drained to a self-retaining area. For example, a driveway composed of unit pavers may drain to an adjacent lawn. In this case, the maximum ratios are:

(Runoff factor) x (tributary area) ≤ 2 x (self-retaining area) *Equation 4-1*

Use the runoff factors in Table 4-2.

Prolonged ponding is a potential problem at higher impervious/pervious ratios. In your design, ensure that the pervious area soils can handle the additional run-on and are sufficiently well-drained.

Under some circumstances, pervious pavement (e.g., crushed stone, pervious asphalt, or pervious concrete) can be self-retaining. Adjacent roofs or impervious pavement may drain on to the pervious pavement in the same maximum ratios as described above.

To design a pervious pavement to be a self-treating area, ensure:

- The gravel base course is a minimum of four or more inches deep.
- The base course is not to be underdrained.
- A qualified engineer has been consulted regarding infiltration rates, pavement stability, and suitability for the intended traffic.

Runoff from self-treating and self-retaining areas does not require any further treatment or flow control.

TABLE 4-2. Runoff factors for surfaces draining to IMPs.

Surface	Factor
Roofs	1.0
Concrete	1.0
Pervious Concrete	0.1
Porous Asphalt	0.1
Grouted Unit Pavers	1.0
Solid Unit Pavers on granular base, min. 3/16 inch joint space	0.2
Crushed Aggregate	0.1
Turfblock	0.1
Amended, mulched soil	0.1
Landscape	0.1

Areas draining to IMPs are multiplied by a sizing factor to calculate the required size of the IMP. On most densely developed sites—such as commercial and mixed-use developments and small-lot residential subdivisions—most DMAs will drain to IMPs.

More than one drainage area can drain to the same IMP. However, because the minimum IMP sizes are determined by ratio to drainage area size, a drainage area may not drain to more than one IMP. See Figures 4-4 and 4-5.

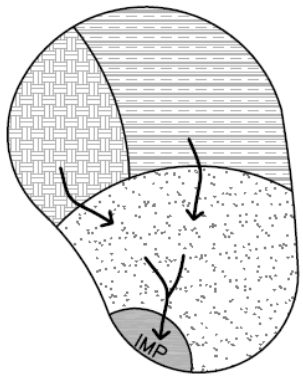


FIGURE 4-4. MORE THAN ONE
Drainage Management Area can drain to a single IMP.

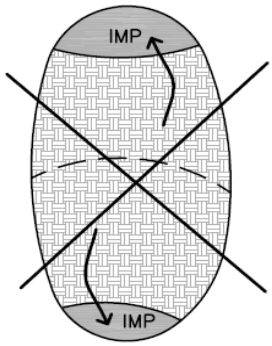


FIGURE 4-5. ONE DRAINAGE
Management Area cannot drain to more than one IMP. Use a grade break to divide the DMA.

Where possible, design site drainage so **only impervious roofs and pavement** drain to IMPs. This yields a simpler, more efficient design and also helps protect IMPs from becoming clogged by sediment.

If it is necessary to include turf, landscaping, or pervious pavements within the area draining to an IMP, list each surface as a separate DMA. A runoff factor (similar to a "C" factor used in the rational method) is applied to account for the reduction in the quantity of runoff. For example, when a turf or landscaped drainage management area drains to an IMP, the resulting increment in IMP size is:

$$\Delta\,(\text{Area}) = (\text{pervious area}) \times (\text{runoff factor}) \times (\text{sizing factor}).$$

Use the runoff factors in Table 4-2.

► STEP 3: TABULATE DRAINAGE MANAGEMENT AREAS

- Tabulate self-treating areas in the format shown in Table 4-3.
- Tabulate self-retaining areas in the format shown in Table 4-4.
- Tabulate areas draining to self-retaining areas in the format shown in Table 4-5. Check to be sure the total product of (square feet of tributary area × runoff factor) for all DMAs draining to a receiving self-retaining area is no greater than a 2:1 ratio to the square footage of the receiving self-retaining area itself.
- Compile a list of DMAs draining to IMPs. Proceed to Step 4 to check the sizing of the IMPs.

TABLE 4-3. Format for Tabulating Self-Treating Areas

DMA Name	*Area (square feet)*

TABLE 4-4. Format for Tabulating Self-Retaining Areas

DMA Name	*Area (square feet)*

TABLE 4-5. Format for Tabulating Areas Draining to Self-Retaining Areas

DMA Name	*Area (square feet)*	*Post-project surface type*	*Runoff factor*	*Receiving self-retaining DMA*	*Receiving self-retaining DMA Area (square feet)*

► STEP 4: SELECT AND LAY OUT IMPS ON SITE PLAN

Select from the list of IMPs in Table 4-6. Illustrations, designs, and design criteria for the IMPs are in the "IMP Design Details and Criteria" at the end of this chapter.

Once you have laid out the IMPs, calculate the square footage you have set aside on your site plan for each IMP.

► STEP 5: REVIEW SIZING FOR EACH IMP

For each of the IMPs, use the appropriate sizing from Table 4-6.

TABLE 4-6. IMP Sizing

Bioretention Facilities	Sizing Factor for Area = 0.04
Flow-through Planters	Sizing Factor for Area = 0.04
Dry Well or Infiltration Basin	See Step 6 to Calculate Min. Volume
Cistern with Bioretention	See Step 6 to Calculate Min. Volume of Cistern; then use 0.04 to calculate minimum size of bioretention area

► STEP 6: CALCULATE MINIMUM AREA AND VOLUME OF EACH IMP

The minimum area of bioretention facilities and flow-through planters is found by summing up the contributions of each tributary DMA and multiplying by the adjusted sizing factor for the IMP.

Equation 4-7

$$Min.\,IMP\,Area = \sum \begin{pmatrix} DMA & DMA \\ Square & \times Runoff \\ Footage & Factor \end{pmatrix} \times \begin{pmatrix} IMP \\ Sizing \\ Factor \end{pmatrix}$$

Use the format of Table 4-7 to present the calculations of the required minimum area and volumes for **bioretention areas** and **planter boxes**:

TABLE 4-7. Format for Presenting Calculations of Minimum IMP Areas for Bioretention Areas and Planter Boxes.

DMA Name	*DMA Area (square feet)*	*Post-project surface type*	*DMA Runoff factor*	*DMA Area × runoff factor*	*Soil Type:*	*IMP Name*			
					IMP Sizing factor		*Minimum Area*	*Proposed Area*	
			Total		*0.04*				***IMP Area***

To size **dry wells**, **infiltration basins**, or **infiltration trenches**, use the following procedure:

1. Use the County of San Diego's 85th Percentile Isopluvial Map to determine the minimum unit volume.
2. Determine the weighted runoff factor ("C" factor) for the area tributary to the facility. The factors in Table 4-2 may be used.
3. Multiply the weighted runoff factor times the tributary area times the minimum unit volume.

Equation 4-8

$$Volume = [Tributary\ \ Area] \times [weighted\ runoff\ \ factor] \times [unit\ volume]$$

4. Select a facility depth.
5. Determine the required facility area. Dry wells may be designed as an open vault or with rock fill. If rock fill is used, assume a porosity of 40%.
6. Ensure the facility can infiltrate the entire volume within 72 hours.

To size a **cistern in series with a bioretention facility**:

1. Use Equation 4-8 to calculate the required cistern volume.
2. Design a discharge orifice for a drawdown time of 24 hours.
3. Determine the maximum discharge from the orifice.
4. The minimum area of the bioretention facility must treat this flow based on a percolation rate of 5" per hour through the engineered soil.

► STEP 7: DETERMINE IF AVAILABLE SPACE FOR IMP IS ADEQUATE

Sizing and configuring IMPs may be an iterative process. After computing the minimum IMP area using Steps 1 – 6, review the site plan to determine if the reserved IMP area is sufficient. If so, the planned IMPs will meet the SUSMP sizing requirements. If not, revise the plan accordingly. Revisions may include:

- Reducing the overall imperviousness of the project site.
- Changing the grading and drainage to redirect some runoff toward other IMPs which may have excess capacity.
- Making tributary landscaped DMAs self-treating or self-retaining.
- Expanding IMP surface area.

► STEP 8: COMPLETE YOUR SUMMARY REPORT

Present your IMP sizing calculations in tabular form. Adapt the following format as appropriate to your project. Coordinate your presentation of DMAs and calculation of minimum IMP sizes with the WQTR and Project Submittal drawings (labeled to show delineation of DMAs and locations of IMPs). It is also helpful to incorporate a brief description of each DMA and each IMP.

Sum the total area of all DMAs and IMPs listed and show it is equal to the total project area. This step may include adjusting the square footage of some DMAs to account for area used for IMPs.

Format:

Project Name:

Project Location:

APN or Subdivision Number:

Total Project Area (square feet):

Mean Annual Precipitation at Project Site:

I. Self-treating areas:

DMA Name	*Area (square feet)*

II. Self-retaining areas:

DMA Name	*Area (square feet)*

III. Areas draining to self-retaining areas:

DMA Name	*Post-project surface type*	*Runoff factor*	*Area (square feet)*	*Receiving self-retaining DMA*	*Receiving self-retaining DMA Area (square feet)*

IV. Areas draining to IMPs (repeat for each IMP):

DMA Name	*DMA Area (square feet)*	*Post-project surface type*	*DMA Runoff factor*	*DMA Area × runoff factor*	*Soil Type:*	*IMP Name*			
					IMP Sizing factor		*Minimum Area or Volume*	*Proposed Area or Volume*	
			Total						***IMP Area***

Specify Preliminary Design Details

In your Project Submittal and/or WQTR, describe your IMPs in sufficient detail to demonstrate the area, volume, and other criteria of each can be met within the constraints of the site.

Ensure these details are consistent with preliminary site plans, landscaping plans, and architectural plans submitted with your application for planning and zoning approvals.

Following are design sheets for:

- Self-treating and self-retaining areas
- Pervious pavements
- Bioretention facilities
- Flow-through planter
- Dry wells and infiltration basins
- Cistern with bioretention facility

These design sheets include recommended configurations and details, and example applications, for these IMPs. **The information in these design sheets must be adapted and applied to the conditions specific to the development project such as unstable slopes or the lack of available head. Development Services staff have final review and approval authority over the project design.**

Keep in mind that proper and functional design of the IMP is the responsibility of the applicant. Effective operation of the IMP throughout the project's lifetime will be the responsibility of the property owner.

Alternatives to Integrated LID Design

If you believe design of features and facilities as described above is infeasible for your development site, consult with City Land Development and/or Water Quality Protection Program staff before preparing an alternative design for stormwater treatment, flow control, and LID compliance.

For all alternative designs, the applicant must prepare a complete Project Submittal, including a drawing showing the entire site divided into discrete Drainage Management Areas, text and tables showing how drainage is routed from each DMA to a treatment facility, and calculations demonstrating the design achieves the applicable design criteria for each stormwater treatment facility. Alternative treatment facilities are limited to the circumstances and selection criteria identified beginning on page 24. The Project Submittal must also show how the project meets the minimum LID criteria (page 28) and ensures runoff rates, durations, and velocities are controlled to maintain or reduce downstream erosion conditions and protect stream habitat (NPDES Permit Provision D.1.d.(10)).

► DESIGN OF ALTERNATIVE TREATMENT FACILITIES

Here are criteria and design considerations for some alternative treatment facilities:

Sand Filters. To ensure effectiveness is not compromised by compacting or clogging of the filter surface, sand filters must be maintained frequently.

The following criteria apply to sand filters:

- Calculate the design flow using the rational method with an intensity of 0.2"/hour and the "C" factors for "treatment only" from Table 4-2.
- To determine the required filter surface area, divide the design flow by an allowable design surface loading rate of 5"/hour.
- The minimum depth of filter media is 18". The media should be washed sand, with gradation similar to that specified for fine aggregate in ASTM C-33.
- The entire filter area must be accessible for easy maintenance without the need to enter a confined space.

A typical filter design includes a gravel drain layer and a perforated pipe underdrain. Filter fabric may be used to prevent the filter media from entering the gravel layer.

The design should not include any permanent pool or other standing water. Instead of including a pretreatment basin, consider the following features in the area tributary to the filter to reduce the potential for filter clogging:

- Limit the size of the Drainage Management Area.
- Include only impervious areas in the DMA.
- Stabilize slopes and eliminate sources of sediment in the DMA.
- Provide screens for trash and leaves at storm drain inlets.

For additional design considerations and details, see *Design of Stormwater Filtering Systems* by Richard A. Claytor and Thomas R. Schueler, The Center for Watershed Protection, 1996, and *California Stormwater BMP Handbooks* Fact Sheet TC-40, Media Filter.

Extended ("Dry") Detention Basins. The required detention volume is based on the 85th percentile 24-hour storm depth. The steps to calculate the required detention volume are:

1. Use the County of San Diego's 85th Percentile Isopluvial Map to determine the unit basin volume.
2. Determine the weighted runoff factor ("C" factor) for the area tributary to the basin. The factors in Table 4-2 may be used.
3. Multiply the weighted runoff factor times the tributary area times the unit basin volume.

For maximum effectiveness the basin should not be sized substantially larger than this volume.

For design considerations and details, see the *California Stormwater Best Management Practice Handbooks*, Fact Sheet TC-22, "Extended Detention Basins." The basin outlet should be designed for a 24-hour drawdown time.

As noted in Fact Sheet TC-22, "dry" detention basins may not be practicable for drainage areas less than 5 acres. The potential for mosquito harborage is a concern. In the design, do not create any areas that will hold standing water for 72 hours or more.

"Wet" Detention Ponds and Constructed Wetlands. The required detention volume is determined as with a "dry" detention basin. Before proceeding with design, contact the local mosquito control agency to coordinate the design and plan ongoing inspection and maintenance of the facility for mosquito control. For design considerations and details, see the *California Stormwater Best Management Practices Handbooks*, Fact Sheet TC-20, "Wet Ponds," and Fact Sheet TC-21, "Constructed Wetlands."

Vegetated Swales. Design recommendations for conventional vegetated swales are in the *California Stormwater Best Management Practices Handbooks*. The conventional swale design uses available on-site soils and does not include an underdrain system. Where soils are clayey, there is little infiltration. Treatment occurs as runoff flows through grass or other vegetation before exiting at the downstream end. Recommended detention times are on the order of 10 minutes.

Conventional vegetated swales may be used to meet NPDES permit treatment requirements and LID requirements. The following should be incorporated in the design:

- Determine the weighted runoff factor ("C" factor) for the area tributary to the swale. The factors in Table 4-2 may be used.
- Calculate the design flow by multiplying the weighted runoff factor times the tributary area times either (1) 0.2 inches of rainfall per hour, or (2) twice the 85th percentile hourly rainfall intensity.
- When sizing the swale, use a value of 0.25 for Manning's "n".
- Ensure that all flow enters the swale near its highest point and that no flow short-circuits treatment by entering the swale along its length.
- The swale should be a minimum 100 feet in length.
- Longitudinal slopes should not exceed 2.5%; on flatter slopes, incorporate measures to avoid prolonged surface ponding.

Consider using linear-shaped bioretention areas in place of conventional vegetated swales because:

- Conventional swale design has resulted in standing water and associated nuisances.
- Conventional swales often don't obtain even the design residence time because of the length required and because proper design requires runoff enter the swale at the upstream end rather than at various locations along its length, and
- Bioretention areas provide a more flexible drainage design, more effective practicable treatment, and more effective flow control within the same footprint.

► TREATMENT FACILITIES FOR SPECIAL CIRCUMSTANCES

Higher-rate surface filters and vault-based proprietary filters can only be used in the circumstances described beginning on page 24 and when sand filters, extended "dry"

detention basins, and "wet" detention ponds or constructed wetlands have been found infeasible.

For surface filters, the grading and drainage design should minimize the area draining to each unit and maximize the number of discrete drainage areas and units. Proprietary facilities should be installed consistent with the manufacturer's instructions.

References and Resources:

- RWQCB Order R9-2007-0001 (Stormwater NPDES Permit)
- Low Impact Development Center
- *County of San Diego Low Impact Development Handbook*
- *California Best Management Practices Handbooks*
- *Design of Stormwater Filtering Systems* (Claytor and Scheuler, 1996)
- American Rainwater Catchment Systems Association
- Water Conservation Alliance of Southern Arizona
- *Rainwater Harvesting for Drylands and Beyond*
- *The Texas Manual on Rainwater Harvesting*
- *Managing Wet Weather With Green Infrastructure: Municipal Handbook, Rainwater Harvesting Policies* (Low Impact Development Center, 2008)

Self-Treating and Self-Retaining Areas

Best Uses

- Heavily landscaped sites

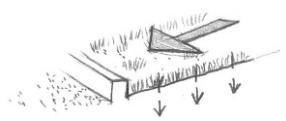
Advantages

- No maintenance verification requirement
- Complements site landscaping

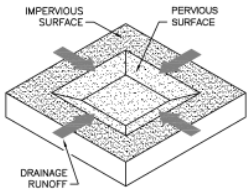
Limitations

- Requires substantial square footage
- Grading requirements must be coordinated with landscape design

► **CRITERIA**



Rainfall on self-treating areas infiltrates or—during intense storms— drains directly off-site or to the storm drain system.



Self-retaining areas are designed to retain the first one inch of rainfall without producing any runoff. During intense storms, runoff may drain off-site, to the storm drain system, or to IMPs.

LID design seeks to manage runoff from roofs and paving so effects on water quality and hydrology are minimized. Runoff from landscaping, however, does not need to be managed the same way.

Runoff from landscaping can be managed by creating self-treating and self-retaining areas.

Self-treating areas are natural, landscaped, or turf areas that drain directly off site or to the storm drain system. Examples include upslope undeveloped areas that are ditched and drained around a development and grassed slopes that drain offsite to a street or storm drain. Self-treating areas may not drain on to adjacent paved areas.

Where a landscaped area is upslope from or surrounded by paved areas, a **self-retaining area** (also called a zero-discharge area) may be created. Self-retaining areas are designed to retain the first one inch of rainfall without producing any runoff. The technique works best on flat, heavily landscaped sites. It may be used on mild slopes if there is a reasonable expectation that the first inch of rainfall would produce no runoff.

To create self-retaining turf and landscape areas in flat areas or on terraced slopes, berm the area or depress the grade into a concave cross-section so that these areas will retain the first inch of rainfall. Inlets of area drains, if any, should be set 3 inches above the low point to allow ponding.

Areas draining to self retaining areas. Drainage from roofs and paving can be directed to self-retaining areas and allowed to infiltrate into the soil. The maximum allowable ratio is 2 parts impervious: 1 part pervious.

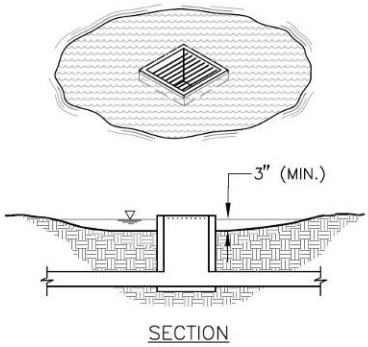
The self-retaining area must be bermed or depressed to retain an inch of rainfall including the flow from the tributary impervious area.

► DETAILS

Drainage from self-treating areas must flow to off-site streets or storm drains without flowing on to paved areas.

Pavement within a self-treating area cannot exceed 5% of the total area.

In self-retaining areas, overflows and area drain inlets should be set high enough to ensure ponding over the entire surface of the self-retaining area.



Set overflows and area drain inlets high enough to ensure ponding (3" deep) over the surface of the self-retaining area.

Self–retaining areas should be designed to promote even distribution of ponded runoff over the area.

Leave enough reveal (from pavement down to landscaped surface) to accommodate buildup of turf or mulch.

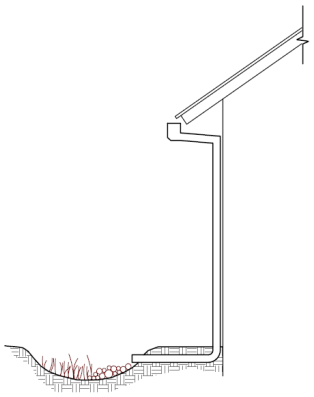
► APPLICATIONS

Lawn or landscaped areas adjacent to streets can be considered self-treating areas.

Self-retaining areas can be created by depressing lawn and landscape below surrounding sidewalks and plazas.

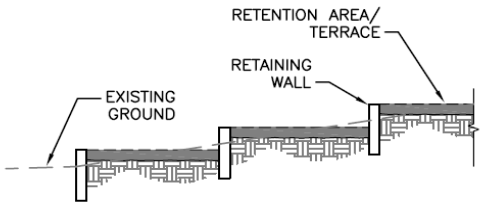
Runoff from walkways or driveways in parks and park-like areas can sheet-flow to self-retaining areas.

Roof leaders can be connected to self-retaining areas by piping beneath plazas and walkways. If necessary, a "bubble-up" can be used.



Connecting a roof leader to a self-retaining area. The head from the eave height makes it possible to route roof drainage some distance away from the building.

Self-retaining areas can be created by terracing mild slopes. The elevation difference promotes subsurface drainage.



Mild slopes can be terraced to create self-retaining areas.

► DESIGN CHECKLIST FOR SELF-TREATING AREAS

- ❒ The self-treating area is at least 95% lawn or landscaping (not more than 5% impervious).
- ❒ Re-graded or re-landscaped areas have amended soils, vegetation, and irrigation as may be required to maintain soil stability and permeability.

- ❒ Runoff from the self-treating area does not enter an IMP or another drainage management area, but goes directly to the storm drain system.

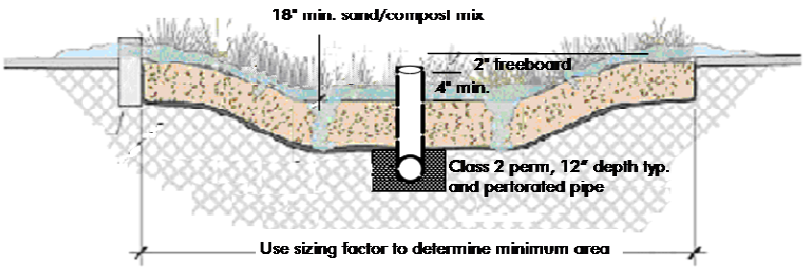
► DESIGN CHECKLIST FOR SELF-RETAINING AREAS

- ❒ Area is bermed all the way around or graded concave.
- ❒ Slopes do not exceed 4%.
- ❒ Entire area is lawn, landscaping, or pervious pavement (see criteria in Chapter 4).
- ❒ Area has amended soils, vegetation, and irrigation as may be required to maintain soil stability and permeability.
- ❒ Any area drain inlets are at least 3 inches above surrounding grade.

► DESIGN CHECKLIST FOR AREAS DRAINING TO SELF-RETAINING AREAS

- ❒ Ratio of tributary impervious area to self-retaining area is not greater than 2:1.
- ❒ Roof leaders collect runoff and route it to the self-retaining area.
- ❒ Paved areas are sloped so drainage is routed to the self-retaining area.
- ❒ Inlets are designed to protect against erosion and distribute runoff across the area.

Bioretention Facilities



Bioretention facility configured for treatment-only requirements. Bioretention facilities can rectangular, linear, or nearly any shape.

Best Uses

- Commercial areas
- Residential subdivisions
- Industrial developments
- Roadways
- Parking lots
- Fit in setbacks, medians, and other landscaped areas

Advantages

- Can be any shape
- Low maintenance
- Can be landscaped

Limitations

- Require 4% of tributary impervious square footage
- Typically requires 3-4 feet of head
- Irrigation typically required

Bioretention detains runoff in a surface reservoir, filters it through plant roots and a biologically active soil mix, and then infiltrates it into the ground. Where native soils are less permeable, an underdrain conveys treated runoff to storm drain or surface drainage.

Bioretention facilities can be configured in nearly any shape. When configured as linear **swales**, they can convey high flows while percolating and treating lower flows.

Bioretention facilities can be configured as in-ground or above-ground planter boxes, with the bottom open to allow infiltration to native soils underneath. If infiltration cannot be allowed, use the sizing factors and criteria for the Flow-Through Planter.

► CRITERIA

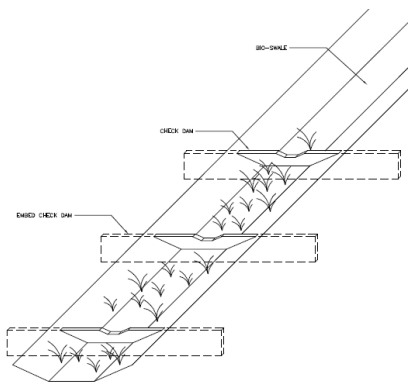
For development projects subject only to runoff treatment requirements, the following criteria apply:

Parameter	Criterion
Soil mix depth	18 inches minimum
Soil mix minimum percolation rate	5 inches per hour minimum sustained (10 inches per hour initial rate recommended)

Parameter	Criterion
Soil mix surface area	0.04 times tributary impervious area (or equivalent)
Surface reservoir depth	6 inches minimum; may be sloped to 4 inches where adjoining walkways.
Underdrain	Required in Group "C" and "D" soils. Perforated pipe embedded in gravel ("Class 2 permeable" recommended), connected to storm drain or other accepted discharge point.

► **DETAILS**

Plan. On the surface, a bioretention facility should be one level, shallow basin—or a series of basins. As runoff enters each basin, it should flood and fill throughout before runoff overflows to the outlet or to the next downstream basin. This will help prevent movement of surface mulch and soil mix.

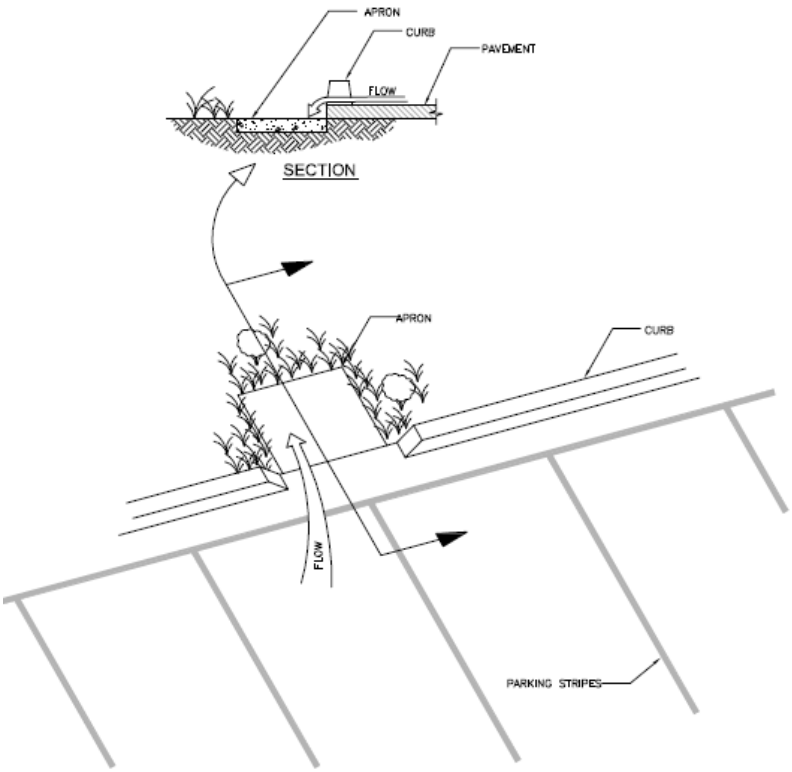


Use check dams for linear bioretention facilities (swales) on a slope.

In a linear swale, check dams should be placed so that the lip of each dam is at least as high as the toe of the next upstream dam. A similar principle applies to bioretention facilities built as terraced roadway shoulders.

Inlets. Paved areas draining to the facility should be graded, and inlets should be placed, so that runoff remains as sheet flow or as dispersed as possible. Curb cuts should be wide (12" is recommended) to avoid clogging with leaves or debris. Allow for a minimum reveal of 4"-6" between the inlet and soil mix elevations to ensure turf or mulch buildup does not

block the inlet. In addition, place an apron of stone or concrete, a foot square or larger, inside each inlet to prevent vegetation from growing up and blocking the inlet.



Recommended design details for bioretention facility inlets (see text).

Where runoff is collected in pipes or gutters and conveyed to the facility, protect the landscaping from high-velocity flows with energy-dissipating rocks. In larger installations, provide cobble-lined channels to better distribute flows throughout the facility.

Upturned pipe outlets can be used to dissipate energy when runoff is piped from roofs and upgradient paved areas.

Soil mix. The required soil mix is similar to a loamy sand. It must maintain a minimum percolation rate of 5" per hour throughout the life of the facility, and it must be suitable for maintaining plant life. Typically, on-site soils will not be suitable due to clay content.

Storage and drainage layer. "Class 2 permeable," Caltrans specification 68-1.025, is recommended. Open-graded crushed rock, washed, may be used, but requires 4"-6" washed pea gravel be substituted at the top of the crushed rock gravel layers. **Do not use**

filter fabric to separate the soil mix from the gravel drainage layer or the gravel drainage layer from the native soil.

Underdrains. No underdrain is required where native soils beneath the facility are Hydrologic Soil Group A or B. For treatment-only facilities where native soils are Group C or D, a perforated pipe must be bedded in the gravel layer and must terminate at a storm drain or other approved discharge point.

Outlets. In treatment-only facilities, outlets must be set high enough to ensure the surface reservoir fills and the entire surface area of soil mix is flooded before the outlet elevation is reached. In swales, this can be achieved with appropriately placed check dams.

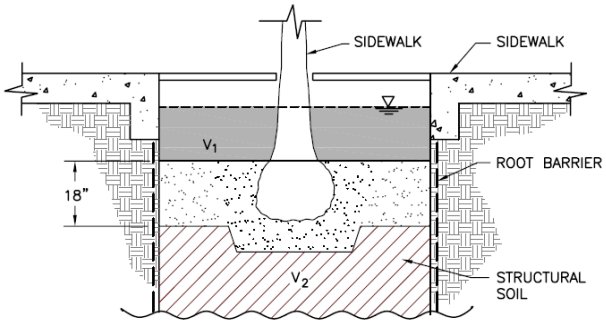
The outlet should be designed to exclude floating mulch and debris.

Vaults, utility boxes and light standards. It is best to locate utilities outside the bioretention facility—in adjacent walkways or in a separate area set aside for this purpose. If utility structures are to be placed within the facility, the locations should be anticipated and adjustments made to ensure the minimum bioretention surface area and volumes are achieved. Leaving the final locations to each individual utility can produce a haphazard, unaesthetic appearance and make the bioretention facility more difficult to maintain.

Emergency overflow. The site grading plan should anticipate extreme events and potential clogging of the overflow and route emergency overflows safely.

Trees. Bioretention areas can accommodate small or large trees. There is no need to subtract the area taken up by roots from the effective area of the facility. Extensive tree roots maintain soil permeability and help retain runoff. Normal maintenance of a bioretention facility should not affect tree lifespan.

The bioretention facility can be integrated with a tree pit of the required depth and filled with structural soil. If a root barrier is used, it can be located to allow tree roots to spread throughout the bioretention facility while protecting adjacent pavement. Locations and planting elevations should be selected to avoid blocking the facility's inlets and outlets.



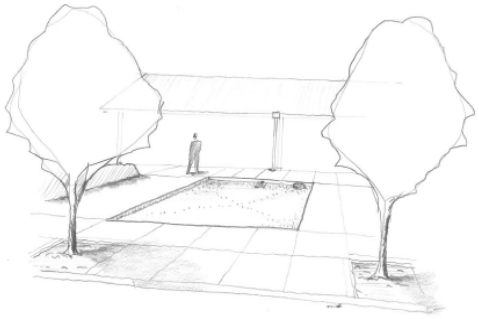
Bioretention facility configured as a tree well.
The root barrier is optional.

► APPLICATIONS

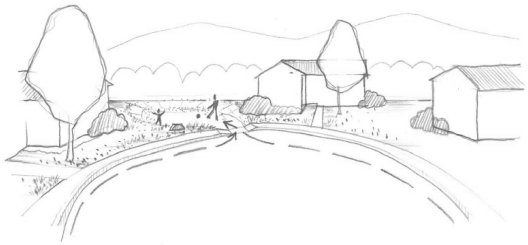
Multi-purpose landscaped areas. Bioretention facilities are easily adapted to serve multiple purposes. The loamy sand soil mix will support turf or a plant palette suitable to the location and a well-drained soil.

Example landscape treatments:

- Lawn with sloped transition to adjacent landscaping.
- Swale in setback area
- Swale in parking median
- Lawn with hardscaped edge treatment
- Decorative garden with formal or informal plantings
- Traffic island with low-maintenance landscaping
- Raised planter with seating
- Bioretention on a terraced slope



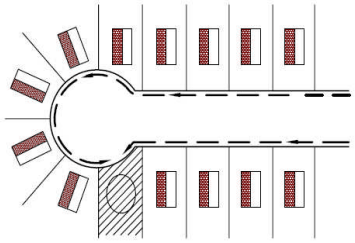
Bioretention facility configured as a recessed decorative lawn with hardscaped edge.



Bioretention facility configured and planted as a lawn/ play area.

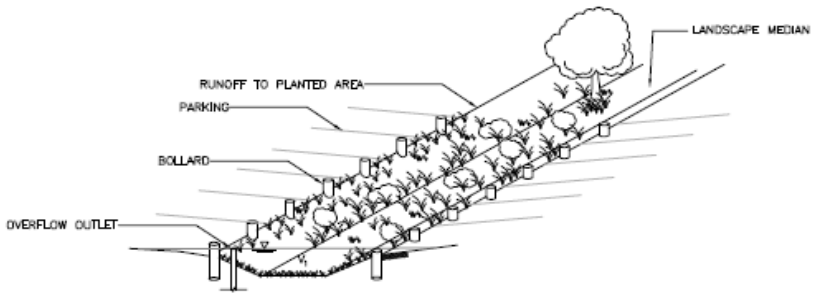
Residential subdivisions. Some subdivisions are designed to drain roofs and driveways to the streets (in the conventional manner) and then drain the streets to bioretention areas, with one bioretention area for each 1 to 6 lots, depending on subdivision layout and topography.

If allowed by the local jurisdiction, bioretention areas can be placed on a separate, dedicated parcel with joint ownership.



Bioretention facility receiving drainage from individual lots and the street in a residential subdivision.

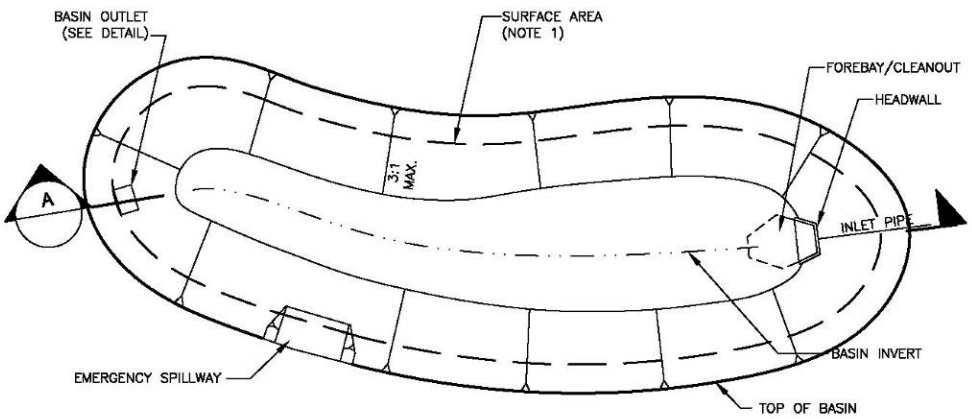
Sloped sites. Bioretention facilities must be constructed as a basin, or series of basins, with the circumference of each basin set level. It may be necessary to add curbs or low retaining walls.



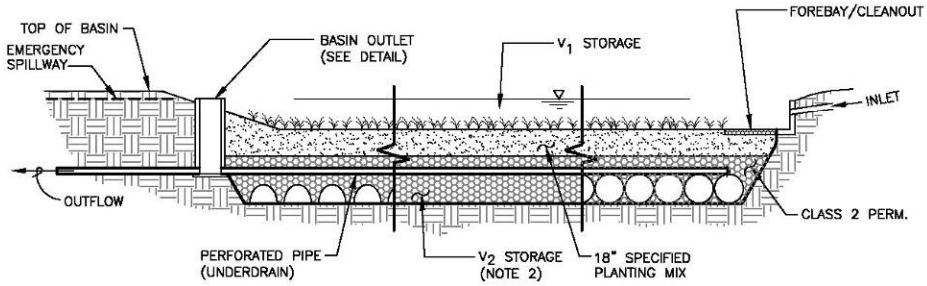
Bioretention facility configured as a parking median.
Note use of bollards in place of curbs, eliminating the need for curb cuts.

Design Checklist for Bioretention

- ❒ Volume or depth of surface reservoir meets or exceeds minimum.
- ❒ 18" depth "loamy sand" soil mix with minimum long-term percolation rate of 5"/hour.
- ❒ Area of soil mix meets or exceeds minimum.
- ❒ Perforated pipe underdrain bedded in "Class 2 perm" with connection and sufficient head to storm drain or discharge point (except in "A" or "B" soils).
- ❒ No filter fabric.
- ❒ Underdrain has a clean-out port consisting of a vertical, rigid, non-perforated PVC pipe, with a minimum diameter of 6 inches and a watertight cap.
- ❒ Location and footprint of facility are shown on site plan and landscaping plan.
- ❒ Bioretention area is designed as a basin (level edges) or a series of basins, and grading plan is consistent with these elevations. If facility is designed as a swale, check dams are set so the lip of each dam is at least as high as the toe of the next upstream dam.
- ❒ Inlets are 12" wide, have 4"-6" reveal and an apron or other provision to prevent blockage when vegetation grows in, and energy dissipation as needed.
- ❒ Overflow connected to a downstream storm drain or approved discharge point.
- ❒ Emergency spillage will be safely conveyed overland.
- ❒ Plantings are suitable to the climate and a well-drained soil.
- ❒ Irrigation system with connection to water supply.
- ❒ Vaults, utility boxes, and light standards are located outside the minimum soil mix surface area.
- ❒ When excavating, avoid smearing of the soils on bottom and side slopes. Minimize compaction of native soils and "rip" soils if clayey and/or compacted. Protect the area from construction site runoff.



PLAN VIEW
NOT TO SCALE



A SECTION
NOT TO SCALE

NOTE

1. SURFACE AREA LIMIT DETERMINED BY EXTENT OF SPECIFIED PLANTING MIX, WHICH IS GOVERNED BY THE OUTLET SPILL ELEVATION. FOR REQUIRED SURFACE AREA REFER TO THE FACTORS AND EQUATIONS IN THE STORMWATER C.3 GUIDEBOOK.

2. V_2 STORAGE ACCOMPLISHED WITH INFILTRATION ARCHES, PERFORATED PIPES, CLASS 2 PERM OR OTHER AT THE DESIGNERS DISCRETION.

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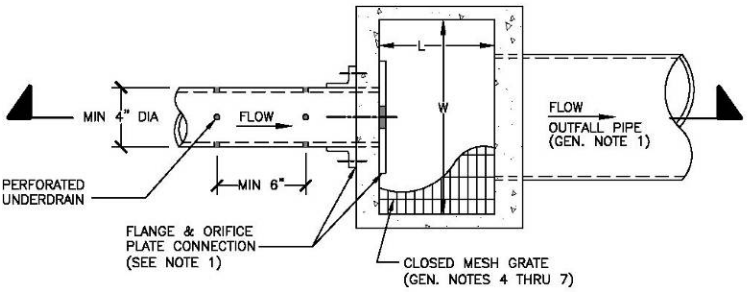
Bioretention Facility



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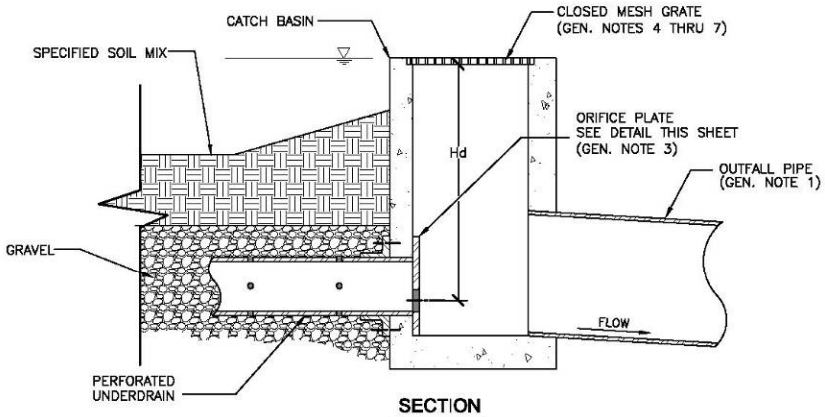

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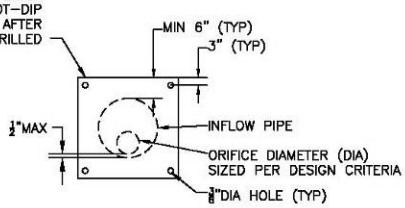
ORIFICE PLATE: MIN SQUARE DIMENSIONS 1.0 FT GREATER THAN PIPE DIA. HOT-DIP GALVANIZED PLATE AFTER HOLES HAVE BEEN DRILLED



FLOW CONTROL ORIFICE PLATE

NOTE

1. ORIFICE PLATE & FLANGE CONNECTION TO CONCRETE SHALL BE FITTED WITH 30 DUROMETER NEOPRENE RING.

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Bioretention Facility Outlet Detail - A

Flow-through Planter

Portland 2004 Stormwater Manual

Best Uses

- Management of roof runoff
- Next to buildings
- Dense urban areas
- Where infiltration is not desired

Advantages

- Can be used next to structures
- Versatile
- Can be any shape
- Low maintenance

Limitations

- Can be used for flow-control only on sites with "C" and "D" soils
- Requires underdrain
- Requires 3-4 feet of head

Flow-through planters treat and detain runoff without allowing seepage into the underlying soil. They can be used next to buildings and on slopes where stability might be affected by adding soil moisture.

Flow-through planters typically receive runoff via downspouts leading from the roofs of adjacent buildings. However, they can also be set in-ground and receive sheet flow from adjacent paved areas.

Pollutants are removed as runoff passes through the soil layer and is collected in an underlying layer of gravel or drain rock. A perforated-pipe underdrain is typically connected to a storm drain or other discharge point. An overflow inlet conveys flows which exceed the capacity of the planter.

► CRITERIA

Treatment only. For development projects subject only to runoff treatment requirements, the following criteria apply:

Parameter	Criterion
Soil mix depth	18 inches minimum
Soil mix minimum percolation rate	5 inches per hour minimum sustained (10 inches per hour initial rate recommended)

Parameter	Criterion
Soil mix surface area	0.04 times tributary impervious area (or equivalent)
Surface reservoir depth	6" minimum; may be sloped to 4" where adjoining walkways.
Underdrain	Typically used. Perforated pipe embedded in gravel ("Class 2 permeable" recommended), connected to storm drain or other accepted discharge point.

► DETAILS

Configuration. The planter must be level. To avoid standing water in the subsurface layer, set the perforated pipe underdrain and orifice as nearly flush with the planter bottom as possible.

Inlets. Protect plantings from high-velocity flows by adding rocks or other energy-dissipating structures at downspouts and other inlets.

Soil mix. The required soil mix is similar to a loamy sand. It must maintain a minimum percolation rate of 5" per hour throughout the life of the facility, and it must be suitable for maintaining plant life. Typically, on-site soils will not be suitable due to clay content.

Gravel storage and drainage layer. "Class 2 permeable," Caltrans specification 68-1.025, is recommended. Open-graded crushed rock, washed, may be used, but requires 4"-6" of washed pea gravel be substituted at the top of the crushed rock layer. **Do not use filter fabric** to separate the soil mix from the gravel drainage layer.

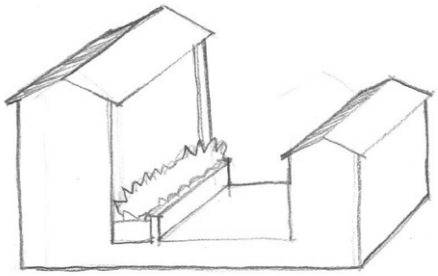
Emergency overflow. The planter design and installation should anticipate extreme events and potential clogging of the overflow and route emergency overflows safely.

► APPLICATIONS

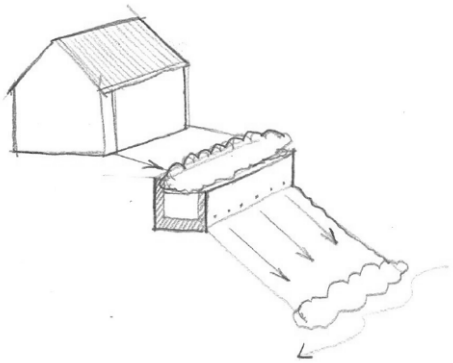
Adjacent to buildings. Flow-through planters may be located adjacent to buildings, where the planter vegetation can soften the visual effect of the building wall. A setback with a raised planter box may be appropriate even in some neo-traditional pedestrian-oriented urban streetscapes.

At plaza level. Flow-through planters have been successfully incorporated into podium-style developments, with the planters placed on the plaza level and receiving runoff from the tower roofs above. Runoff from the plaza level is typically managed separately by additional flow-through planters or bioretention facilities located at street level.

Steep slopes. Flow-through planters provide a means to detain and treat runoff on slopes that cannot accept infiltration from a bioretention facility. The planter can be built into the slope similar to a retaining wall. The design should consider the need to access the planter for periodic maintenance. Flows from the planter underdrain and overflow must be directed in accordance with local requirements. It is sometimes possible to disperse these flows to the downgradient hillside.



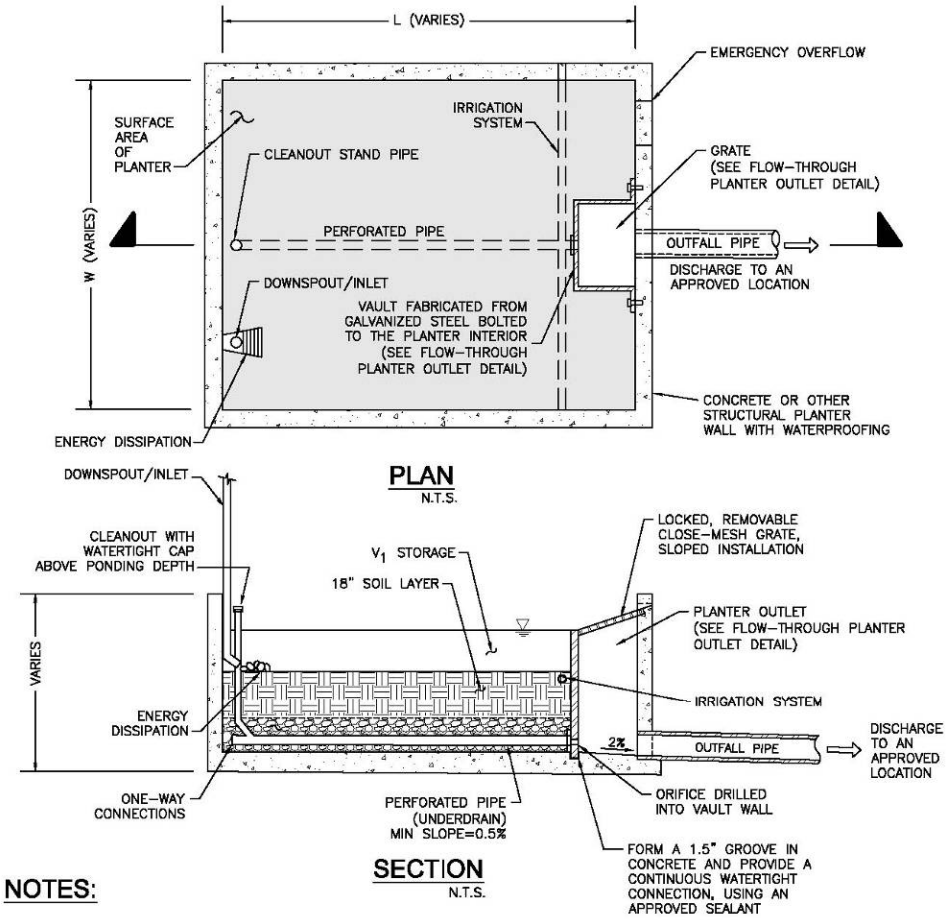
Flow-through planter on the plaza level of a podium-style development.



Flow-through planter built into a hillside. Flows from the underdrain and overflow must be directed in accordance with local requirements.

Design Checklist for Flow-through Planter

- ❒ Reservoir depth is 4-6" minimum.
- ❒ 18" depth "loamy sand" soil mix with minimum long-term infiltration rate of 5"/hour.
- ❒ Area of soil mix meets or exceeds minimum.
- ❒ "Class 2 perm" drainage layer.
- ❒ No filter fabric.
- ❒ Perforated pipe underdrain with outlet located flush or nearly flush with planter bottom. Connection with sufficient head to storm drain or discharge point.
- ❒ Underdrain has a clean-out port consisting of a vertical, rigid, non-perforated PVC pipe, with a minimum diameter of 6 inches and a watertight cap.
- ❒ Overflow connected to a downstream storm drain or approved discharge point.
- ❒ Location and footprint of facility are shown on site plan and landscaping plan.
- ❒ Planter is set level.
- ❒ Emergency spillage will be safely conveyed overland.
- ❒ Plantings are suitable to the climate and a well-drained soil.
- ❒ Irrigation system with connection to water supply.



NOTES:

1. FLOW-THROUGH PLANTER SHALL BE SIZED TO MEET CCCWP CRITERIA FOR TREATMENT AND/OR FLOW CONTROL.
2. MINIMUM SURFACE AREA OF PLANTER IS 4% OF TRIBUTARY IMPERVIOUS AREA FOR TREATMENT ONLY DESIGN. FOR FLOW CONTROL AND TREATMENT, REFER TO CCCWP SIZING TOOL CRITERIA.
3. SHAPE OF PLANTER CAN VARY TO MEET PROJECT DESIGN REQUIREMENTS AND LOCATION.
4. CLASS 2 PERMEABLE MATERIAL
5. DOWNSPOUTS/INLET PIPES REQUIRE ENERGY DISSIPATION.
6. USE COUNTY APPROVED ADDITIVE MIXTURE FOR WATERPROOFING CONCRETE.
7. PLANTINGS: SEE CCCWP RECOMMENDED PLANT LIST AND GUIDELINES.
8. PLANTER DESIGN MAY REQUIRE STRUCTURAL ENGINEERING DESIGN.
9. AREA = W x L (ABOVE). EXCLUDES AREA OF VAULT

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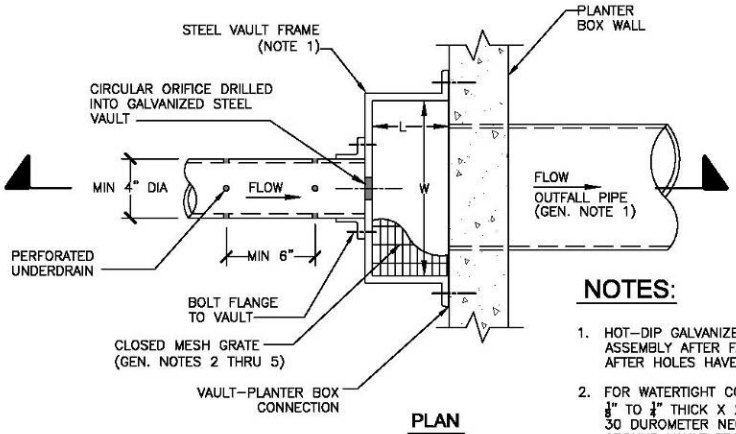
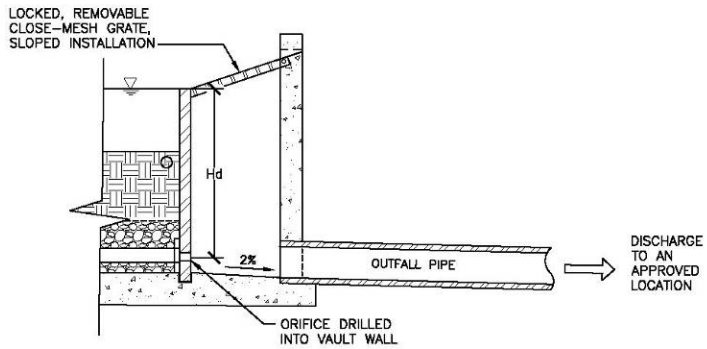
Flow-Through Planter Detail



PLAN
N.T.S.

NOTES:

1. HOT–DIP GALVANIZE ENTIRE FRAME ASSEMBLY AFTER FABRICATION AND AFTER HOLES HAVE BEEN DRILLED.
2. FOR WATERTIGHT CONNECTION, INSTALL $\frac{1}{8}$" TO $\frac{1}{4}$" THICK X 2" WIDE CONTINUOUS 30 DUROMETER NEOPRENE GASKET, ALL AROUND VAULT FRAME.



SECTION
N.T.S.

GENERAL OUTLET DETAIL NOTES:

1. OUTFALL PIPE SHALL BE SIZED TO CONVEY DESIGN STORM PER CCCWP DESIGN CRITERIA.
2. GRATE SHALL BE MOUNTED USING STAINLESS STEEL HARDWARE AND PROVIDED WITH HINGED AND LOCKABLE OR BOLTABLE ACCESS PANELS.
3. GRATE SHALL BE STAINLESS STEEL, ALUMINUM OR STEEL. STEEL GRATES SHALL BE HOT DIP GALVANIZED AND MAY BE HOT POWDER PAINTED AFTER GALVANIZING.
4. GRATE SHALL BE DESIGNED SUCH THAT THE DIAGONAL DIMENSION OF EACH OPENING IS SMALLER THAN THE DIAMETER OF THE OUTLET PIPE.
5. STRUCTURAL DESIGN OF GRATE SHALL BE BASED ON FULL HYDROSTATIC HEAD WITH ZERO HEAD DOWNSTREAM OF GRATE.

Flow-Through Planter Outlet Detail

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Dry Wells and Infiltration Basins

The typical dry well is a prefabricated structure, such as an open-bottomed vault or box, placed in an excavation or boring. The vault may be empty, which provides maximum space efficiency, or may be filled in rock.

An infiltration basin has the same functional components—a volume to store runoff and sufficient area to infiltrate that volume into the native soil—but is open rather than covered.

Best Uses

- Alternative to bioretention in areas with permeable soils

Advantages

- Compact footprint
- Can be installed in paved areas

Limitations

- Can be used only on sites with "A" and "B" soils
- Requires minimum of 10' from bottom of facility to seasonal high groundwater
- Not suitable for drainage from some industrial areas or arterial roads

► CRITERIA

Dry wells and infiltration basins must be designed with the minimum volume calculated by Equation 4-8 using a unit volume based on the County of San Diego's 85th Percentile Isopluvial Map.

Consult with the local jurisdiction engineer regarding the need to verify soil permeability and other site conditions are suitable for dry wells and infiltration basins. Some proposed criteria are on Page 5-12 of Caltrans' 2004 *BMP Retrofit Pilot Study Final Report* (CTSW-RT-01-050).

The infiltration rate and infiltrative area must be sufficient to drain a full facility within 72 hours.

► DETAILS

Dry wells should be sited to allow for the potential future need for removal and replacement.

In locations where native soils are coarser than a medium sand, the area directly beneath the facility should be over-excavated by two feet and backfilled with sand as a groundwater protection measure.

Design Checklist for Dry Well

- ❒ Volume and infiltrative area meet or exceed minimum.
- ❒ Overflow connected to a downstream storm drain or approved discharge point.
- ❒ Emergency spillage will be safely conveyed overland.
- ❒ Depth from bottom of the facility to seasonally high groundwater elevation is $\geq$10'.

- ❒ Areas tributary to the facility do not include automotive repair shops; car washes; fleet storage areas (Bus, truck, etc.); nurseries, or other uses that may present an exceptional threat to groundwater quality.
- ❒ Underlying soils are in Hydrologic Soil Group A or B. Infiltration rate is sufficient to ensure a full basin will drain completely within 72 hours. Soil infiltration rate has been confirmed.
- ❒ Set back from structures 10' or as recommended by structural or geotechnical engineer

Cistern with Bioretention Facility

A cistern in series with a bioretention facility can meet treatment requirements where space is limited. In this configuration, the cistern is equipped with a flow-control orifice and the bioretention facility is sized to treat a trickle outflow from the cistern.

Best Uses

- In series with a bioretention facility to meet treatment requirement in limited space.
- Management of roof runoff
- Dense urban areas

Advantages

- Storage volume can be in any configuration

Limitations

- Somewhat complex to design, build, and operate
- Requires head for both cistern and bioretention facility

► CRITERIA

Cistern. The cistern must detain the volume calculated by Equation 4-8 and must include an orifice or other device designed for a 24-hour drawdown time.

Bioretention facility. See the design sheet for bioretention facilities. The area of the bioretention facility must be sized to treat the maximum discharge flow, assuming a percolation rate of 5" per hour through the engineered soil.

Use with sand filter. A cistern in series with a sand filter can meet treatment requirements. See the discussion of treatment facility selection in Chapter 2 and the design guidance for sand filters in Chapter 4.

► DETAILS

Flow-control orifice. The cistern must be equipped with an orifice plate or other device to limit flow to the bioretention area.

Preventing mosquito harborage. Cisterns should be designed to drain completely, leaving no standing water. Drains should be located flush with the bottom of the cistern. Alternatively—or in addition—all entry and exit points, should be provided with traps or sealed or screened to prevent mosquito entry. Note mosquitoes can enter through openings 1/16" or larger and will fly for many feet through pipes as small as ¼".

Exclude debris. Provide leaf guards and/or screens to prevent debris from accumulating in the cistern.

Ensure access for maintenance. Design the cistern to allow for cleanout. Avoid creating the need for maintenance workers to enter a confined space. Ensure the outlet orifice can be easily accessed for cleaning and maintenance.

► APPLICATIONS

Shallow ponding on a flat roof. The "cistern" storage volume can be designed in any configuration, including simply storing rainfall on the roof where it falls and draining it away slowly. See the County of San Diego's 85th percentile isopluvial diagrams for required average depths.

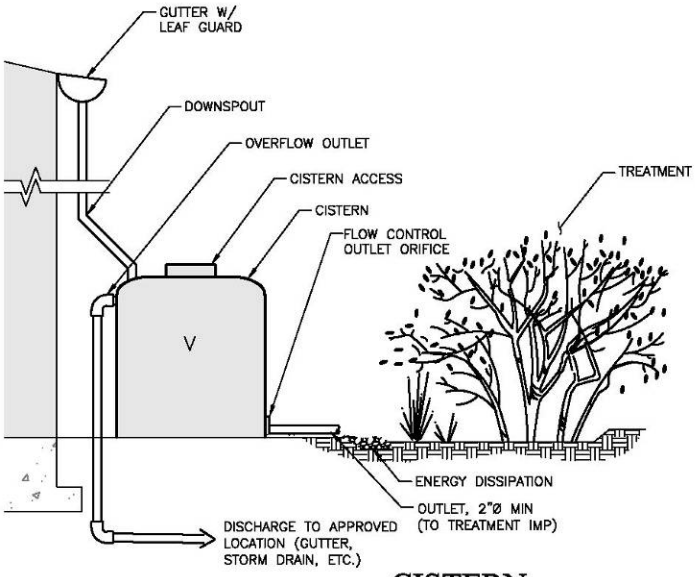
Cistern attached to a building and draining to a planter. This arrangement allows a planter box to be constructed with a smaller area.

Vault with pumped discharge to bioretention facility. In this arrangement, runoff from a parking lot and/or building roofs can be captured and detained underground and then pumped to a bioretention facility on the surface. Alternatively, treatment can be accomplished with a sand filter. See the discussion of selection of stormwater treatment facilities in Chapter 2.

Water harvesting or graywater reuse. It may be possible to create a site-specific design that uses cisterns to achieve stormwater flow control, stormwater treatment, and rainwater reuse for irrigation or indoor uses (**water harvesting**). Facilities must meet criteria for capturing and treating the volume specified by Equation 4-8. This volume must be allowed to empty within 24 hours so runoff from additional storms, which may follow, is also captured and treated. Additional volume may be required if the system also stores runoff for longer periods for reuse. Indoor uses of non-potable water may be restricted or prohibited. Check with municipal staff.

Design Checklist for Cistern

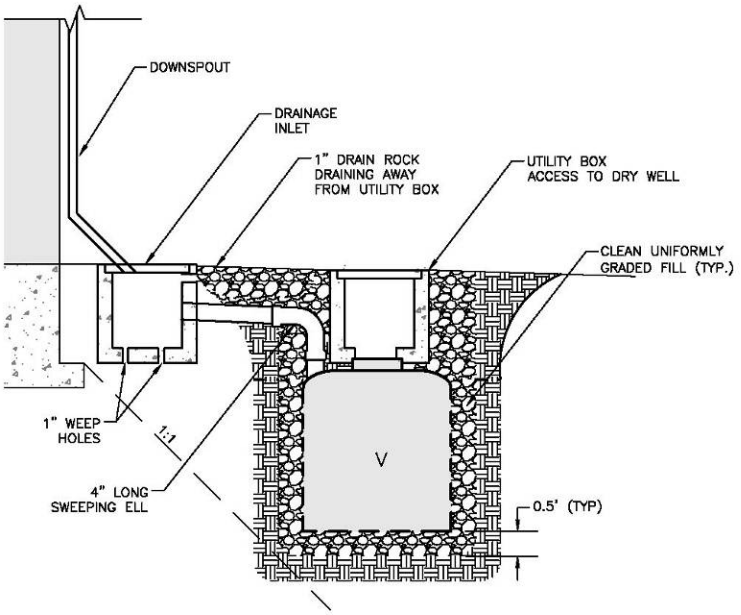
- ❒ Volume meets or exceeds minimum.
- ❒ Outlet with orifice or other flow-control device restricts flow and is designed to provide a 24-hour drawdown time.
- ❒ Outlet is piped to a bioretention facility designed to treat the maximum discharge from the cistern orifice.
- ❒ Cistern is designed to drain completely and/or sealed to prevent mosquito harborage.
- ❒ Design provides for exclusion of debris and accessibility for maintenance.
- ❒ Overflow connected to a downstream storm drain or approved discharge point.
- ❒ Emergency spillage will be safely conveyed overland.



NOTES:

1. DESIGNER SHALL ACCOUNT FOR AND ACCOMODATE FOR POSSIBLE OVERFLOW.
2. OVERFLOW OUTLET CAPACITY SHALL EQUAL OR EXCEED POTENTIAL RUNOFF VOLUME AND RATE.
3. CISTERN PROVIDES FLOW CONTROL ONLY. USE IN COMBINATION WITH TREATMENT IMP.
4. PROVIDE ACCESS FOR CLEAN OUT OF OUTLET ORIFICE. SEE FLOW-THROUGH PLANTER OUTLET DETAIL.
5. PREVENT MOSQUITO BREEDING BY SEALING OR SCREENING ALL OPENINGS TO THE WATER SURFACE AND/OR ENSURE COMPLETE DRAINAGE.

CISTERN



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Chapter

5

Operation & Maintenance of Stormwater Facilities

How to prepare a customized Stormwater Maintenance Plan for the treatment BMPs on your site.

The stormwater NPDES Permit requires each Copermittee to verify all treatment and flow-control facilities are adequately maintained. Facilities you install as part of your project will be verified for effectiveness and proper performance. Some municipalities also verify the ongoing function of stormwater management features that are not treatment or flow control facilities, such as permeable pavements and limitations on impervious area.

Operation and maintenance of stormwater facilities is a six-stage process:

1. Determine **who will own** the facility and be responsible for the maintenance of treatment facilities. Identify the means by which ongoing maintenance will be assured (for example, a maintenance agreement that runs with the land).

2. Identify typical maintenance requirements, and allow for these requirements in your project planning and preliminary design.

3. Prepare a **maintenance plan** for the site incorporating detailed requirements for **each treatment and flow-control facility**.

4. **Maintain** the facilities from the time they are constructed until ownership and maintenance responsibility is formally transferred.

5. **Formally transfer** operation and maintenance **responsibility** to the site owner or occupant. A warranty, secured by a bond, or other financial instrument, may be required to secure against lack of performance due to flaws in design or construction.

6. Maintain the facilities in perpetuity and comply with the City's self-inspection, reporting, and verification requirements.

See the schedule for these stages in Table 5-1.

Stage 1: Ownership and Responsibility

You must specify a means to **ensure maintenance** of treatment and flow-control facilities **in perpetuity.**

Depending on the intended use of your site, this may require one or more of the following:

- Execution of a maintenance agreement that "runs with the land."
- Creation of a homeowners association (HOA) and execution of an agreement by the HOA to maintain the facilities as well as an annual inspection fee.
- Formation of a new community facilities district or other special district, or addition of the properties to an existing special district.
- Dedication of fee title or easement transferring ownership of the facility (and the land under it) to the City of Vista.

Ownership and maintenance responsibility for treatment and flow-control facilities should be discussed at the **beginning of project planning**, typically at the pre-application meeting for planning and zoning review. Experience has shown provisions to finance and implement maintenance of treatment and flow-control facilities can be a major stumbling block to project approval, particularly for **small residential subdivisions**. (See "New Subdivisions" in Chapter 1.)

► PRIVATE OWNERSHIP AND MAINTENANCE

The City requires, as a condition of project approval, that a maintenance agreement be executed.

TABLE 5-1. Schedule for Planning Operation and Maintenance of Stormwater Treatment BMPs

Stage	*Description*	*Schedule*
1	Determine facility ownership and maintenance responsibility	Discuss with planning staff at pre-application meeting
2	Identify typical maintenance requirements	In initial submittal, coordinate with planning & zoning application
3	Develop detailed operation and maintenance plan	As required by the City
4	Interim operation and maintenance of facilities	During and following construction including warranty period
5	Formal transfer of operation & maintenance responsibility	On sale and transfer of property or permanent occupancy
6	Ongoing maintenance and compliance with inspection & reporting requirements	In perpetuity

The City may collect a management and/or inspection fee established by a standard fee schedule. In addition, the agreement may provide that, if the property owner fails to maintain the stormwater facility, the City may enter the property, restore the stormwater facility to good working order and obtain reimbursement, including administrative costs, from the property owner. To augment and enforce these requirements, some municipalities have established Community Facilities Districts (Mello-Roos) to cover the costs of inspections and, if necessary, maintenance and repair of individual facilities.

► TRANSFER TO PUBLIC OWNERSHIP

Municipalities may sometimes choose to have a treatment and flow-control facility deeded to the public in fee or as and easement and maintain the facility as part of the municipal storm drain system. The City may recoup the costs of maintenance through a special tax, assessment district, or similar mechanism.

Locating an IMP in a public right-of-way or easement creates an additional design constraint—along with hydraulic grade, aesthetics, landscaping, and circulation. However, because sites typically drain to the street, it may be possible to locate a bioretention swale parallel with the edge of the parcel. The facility may complement, or substitute for, an underground storm drain system.

Even if the facility is to be conveyed to the City after construction is complete, it is still the responsibility of the builder to identify general operation and maintenance requirements, prepare a detailed operation and maintenance plan, and to maintain the facility until that responsibility is formally transferred.

Stage 2: General Maintenance Requirements

Include in your Project Submittal a general description of anticipated facility maintenance requirements. This will help ensure that:

- Ongoing costs of maintenance have been considered in your facility selection and design.
- Site and landscaping plans provide for access for inspections and by maintenance equipment.
- Landscaping plans incorporate irrigation requirements for facility plantings.
- Initial maintenance and replacement of facility plantings is incorporated into landscaping contracts and guarantees.

Fact sheets available on the Project Clean Water website describe general maintenance requirements for the types of stormwater facilities featured in the LID Design Guide (Chapter 4). You can use this information to specify general maintenance requirements in your Project Submittal.

Maintenance fact sheets for conventional stormwater facilities are available in the California Stormwater BMP Handbooks.

Stage 3: Detailed Maintenance Plan

Prepare a detailed maintenance plan and submit it as required by the City. The City requires a detailed maintenance plan be included with the Project Submittal and updates to incorporate solutions to any problems or changes that occurred during project construction.

Your detailed maintenance plan should be kept on-site for use by maintenance personnel and during site inspections. It is also recommended that a copy of your initial Project Submittal be kept onsite as a reference.

► YOUR DETAILED MAINTENANCE PLAN: STEP BY STEP

The following step-by-step guidance will help you prepare your detailed maintenance plan.

Preparation of the plan will require familiarity with your stormwater facilities as they have been or will be constructed and a fair amount of "thinking through" plans for their operation and maintenance.

► STEP 1: DESIGNATE RESPONSIBLE INDIVIDUALS

To begin creating your detailed maintenance plan, designate and identify:

- The individual who will have direct responsibility for the maintenance of stormwater controls. This individual should be the designated contact with municipal inspectors and should sign self-inspection reports and any correspondence with the City regarding verification inspections.
- Employees or contractors who will report to the designated contact and are responsible for carrying out BMP operation and maintenance.
- The corporate officer authorized to negotiate and execute any contracts that might be necessary for future changes to operation and maintenance or to implement remedial measures if problems occur.
- Your designated respondent to problems, such as clogged drains or broken irrigation mains, that would require immediate response should they occur during off-hours.

Updated contact information must be provided to the City of Vista immediately whenever a property is sold and whenever designated individuals or contractors change.

Draw or sketch an **organization chart** to show the relationships of authority and responsibility between the individuals responsible for maintenance. This need not be elaborate, particularly for smaller organizations.

Describe how **funding for BMP operation and maintenance** will be assured, including sources of funds, budget category for expenditures, process for establishing the annual maintenance budget, and process for obtaining authority should unexpected expenditures for major corrective maintenance be required.

Describe how your organization will accommodate initial **training** of staff or contractors regarding the purpose, mode of operation, and maintenance requirements for the stormwater facilities on your site. Also, describe how your organization will ensure ongoing training as needed and in response to staff changes.

► STEP 2: SUMMARIZE DRAINAGE AND BMPS

Incorporate the following information from your Project Submittal into your maintenance plan:

- Figures delineating and designating pervious and impervious areas.
- Figures showing locations of stormwater facilities on the site.

- Tables of pervious and impervious areas served by each facility.

Review the Project Submittal narrative, if any, that describes each facility and its tributary drainage area and update the text to incorporate any changes that may have occurred during planning and zoning review, building permit review, or construction. Incorporate the updated text into your maintenance plan.

► STEP 3: DOCUMENT FACILITIES "AS BUILT"

Include the following information from final construction drawings:

- Plans, elevations, and details of all facilities. Annotate if necessary with designations used in the initial Project Submittal.
- Design information or calculations submitted in the detailed design phase (i.e., not included in the initial Project Submittal.)
- Specifications of construction for facilities, including sand or soil, compaction, pipe materials and bedding.

In the maintenance plan, note field changes to design drawings, including changes to any of the following:

- Location and layouts of inflow piping, flow splitter boxes, and piping to off-site discharge
- Depths and layering of soil, sand, or gravel
- Placement of filter fabric or geotextiles
- Changes or substitutions in soil or other materials.
- Natural soils encountered (e.g., sand or clay lenses)

► STEP 4: PREPARE MAINTENANCE PLANS FOR EACH FACILITY

Prepare a maintenance plan, schedule, and inspection checklists (routine, annual, and after major storms) for each facility. Plans and schedules for two or more similar facilities on the same site may be combined.

Use the following resources to prepare your customized maintenance plan, schedule, and checklists.

- Specific information noted in Steps 2 and 3, above.
- Other input from the facility designer, municipal staff, or other sources.

- Operation and Maintenance Fact Sheets (available on the Project Clean Water website).

Note any particular characteristics or circumstances that could require attention in the future, and include any troubleshooting advice.

Also include manufacturer's data, operating manuals, and maintenance requirements for any:

- Pumps or other mechanical equipment.
- Proprietary devices used as BMPs.

Manufacturers' publications should be referenced in the text (including models and serial numbers where available). Copies of the manufacturers' publications should be included as an attachment in the back of your maintenance plan or as a separate document.

► STEP 5: COMPILE MAINTENANCE PLAN

The following general outline is provided as an example. Check with City staff for specific requirements.

I. Inspection and Maintenance Log

II. Updates, Revisions and Errata

III. Introduction

A. Narrative overview describing the site; drainage areas, routing, and discharge points; and treatment facilities.

IV. Responsibility for Maintenance

A. General

(1) Name and contact information for responsible individual(s).

(2) Organization chart or charts showing organization of the maintenance function and location within the overall organization.

(3) Reference to Operation and Maintenance Agreement (if any). A copy of the agreement should be attached.

(4) Maintenance Funding

(1) Sources of funds for maintenance

(2) Budget category or line item

(3) Description of procedure and process for ensuring adequate funding for maintenance

B. Staff Training Program

C. Records

D. Safety

V. Summary of Drainage Areas and Stormwater Facilities

A. Drainage Areas

(1) Drawings showing pervious and impervious areas (copied or adapted from initial Project Submittal).

(2) Designation and description of each drainage area and how flow is routed to the corresponding facility.

B. Treatment and Flow-Control Facilities

(1) Drawings showing location and type of each facility

(2) General description of each facility (Consider a table if more than two facilities)

(1) Area drained and routing of discharge.

(2) Facility type and size

VI. Facility Documentation

A. "As-built" drawings of each facility (design drawings in the draft Plan)

B. Manufacturer's data, manuals, and maintenance requirements for pumps, mechanical or electrical equipment, and proprietary facilities (include a "placeholder" in the draft plan for information not yet available).

C. Specific operation and maintenance concerns and troubleshooting

VII. Maintenance Schedule or Matrix

A. Maintenance Schedule for each facility with specific requirements for:

(1) Routine inspection and maintenance

(2) Annual inspection and maintenance

(3) Inspection and maintenance after major storms

B. Service Agreement Information

Assemble and make copies of your maintenance plan. One copy must be submitted to the City, and at least one copy kept on-site. Here are some suggestions for formatting the maintenance plan:

- Format plans to 8½" x 11" to facilitate duplication, filing, and handling.
- Include the revision date in the footer on each page.
- Scan graphics and incorporate with text into a single electronic file. Keep the electronic file backed-up so that copies of the maintenance plan can be made if the hard copy is lost or damaged.

► STEP 6: UPDATES

Your maintenance plan will be **a living document**.

Operation and maintenance personnel may change; mechanical equipment may be replaced, and additional maintenance procedures may be needed. Throughout these changes, the maintenance plan must be kept up-to-date.

Updates may be transmitted to the City of Vista at any time. However, at a minimum, updates to the maintenance plan must accompany the annual inspection report.

Stage 4: Interim Maintenance

Applicants will typically be required to warranty stormwater facilities against lack of performance due to flaws in design or construction. The warranty may need to be secured by a bond or other financial instrument.

Stage 5: Transfer Responsibility

As part of the detailed maintenance plan, note the expected date when responsibility for operation and maintenance will be transferred. Notify the City of Vista when this transfer of responsibility takes place.

Stage 6: Operation & Maintenance Verification

Each municipality implements an operation and maintenance verification program, including periodic site inspections.

Contact the City of Vista staff to determine the frequency of inspections, whether self-inspections are allowed, and applicable fees, if any.

References and Resources

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- Operation, Maintenance, and Management of Stormwater Management Systems (Watershed Management Institute, 1997)

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WEF/ASCE. 1998. Water Environment Foundation/American Society of Civil Engineers. Urban Runoff Quality Management. WEF Manual of Practice No. 23, ASCE Manual and Report on Engineering Practice No. 87. ISBN 1-57278-039-8 ISBN 0-7844-0174-8. 259 pp. Access: Order from WEF or ASCE, www.wef.org or www.asce.org.

APPENDIX A
POLLUTANT SOURCES AND SOURCE CONTROL CHECKLIST

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APPENDIX—STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet:

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your Project-Specific SUSMP drawings.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in a table in your Project-Specific SUSMP. Use the format shown in Table 3-1 of the *SUSMP*. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternatives.

IF THESE SOURCES WILL BE ON THE PROJECT SITE	... THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on SUSMP Drawings**	**3** **Permanent Controls—List in SUSMP Table and Narrative**	**4** **Operational BMPs—Include in SUSMP Table and Narrative**
❑ **A.** On-site storm drain inlets	❑ Locations of inlets.	❑ Mark all inlets with the words "No Dumping! Flows to Bay" or similar.	❑ Maintain and periodically repaint or replace inlet markings. ❑ Provide stormwater pollution prevention information to new site owners, lessees, or operators. ❑ See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com ❑ Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."

APPENDIX—STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE	... THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on SUSMP Drawings**	**3** **Permanent Controls—List in SUSMP Table and Narrative**	**4** **Operational BMPs—Include in SUSMP Table and Narrative**
❑ **B.** Interior floor drains and elevator shaft sump pumps	-------	❑ State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	❑ Inspect and maintain drains to prevent blockages and overflow.
❑ **C.** Interior parking garages	-------	❑ State that parking garage floor drains will be plumbed to the sanitary sewer.	❑ Inspect and maintain drains to prevent blockages and overflow.
❑ **D1.** Need for future indoor & structural pest control	-------	❑ Note building design features that discourage entry of pests.	❑ Provide Integrated Pest Management information to owners, lessees, and operators.

IF THESE SOURCES WILL BE ON THE PROJECT SITE	... THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on SUSMP Drawings	3 Permanent Controls—List in SUSMP Table and Narrative	4 Operational BMPs—Include in SUSMP Table and Narrative
❑ **D2.** Landscape/ Outdoor Pesticide Use	❑ Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained. ❑ Show self-retaining landscape areas, if any. ❑ Show stormwater treatment facilities.	State that final landscape plans will accomplish all of the following. ❑ Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. ❑ Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. ❑ Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. ❑ Consider using pest-resistant plants, especially adjacent to hardscape. ❑ To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	❑ Maintain landscaping using minimum or no pesticides. ❑ See applicable operational BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com ❑ Provide IPM information to new owners, lessees and operators.

IF THESE SOURCES WILL BE ON THE PROJECT SITE	... THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on SUSMP Drawings	3 Permanent Controls—List in SUSMP Table and Narrative	4 Operational BMPs—Include in SUSMP Table and Narrative
❑ **E.** Pools, spas, ponds, decorative fountains, and other water features.	❑ Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet.	❑ If the local municipality requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.	❑ See applicable operational BMPs in Fact Sheet SC-72, "Fountain and Pool Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
❑ **F.** Food service	❑ For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment. ❑ On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.	❑ Describe the location and features of the designated cleaning area. ❑ Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.	-------

APPENDIX—STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE	... THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on SUSMP Drawings**	**3** **Permanent Controls—List in SUSMP Table and Narrative**	**4** **Operational BMPs—Include in SUSMP Table and Narrative**
❑ **G.** Refuse areas	❑ Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas. ❑ If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area. ❑ Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.	❑ State how site refuse will be handled and provide supporting detail to what is shown on plans. ❑ State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	❑ State how the following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
❑ **H.** Industrial processes.	❑ Show process area.	❑ If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."	❑ See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE	... THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on SUSMP Drawings**	**3** **Permanent Controls—List in SUSMP Table and Narrative**	**4** **Operational BMPs—Include in SUSMP Table and Narrative**
❑ **I.** Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)	❑ Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area. ❑ Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults. ❑ Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.	❑ Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains. Where appropriate, reference documentation of compliance with the requirements of local Hazardous Materials Programs for: ▪ Hazardous Waste Generation ▪ Hazardous Materials Release Response and Inventory ▪ California Accidental Release (CalARP) ▪ Aboveground Storage Tank ▪ Uniform Fire Code Article 80 Section 103(b) & (c) 1991 ▪ Underground Storage Tank	❑ See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE	... THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on SUSMP Drawings	3 Permanent Controls—List in SUSMP Table and Narrative	4 Operational BMPs—Include in SUSMP Table and Narrative
❑ **J.** Vehicle and Equipment Cleaning	❑ Show on drawings as appropriate: (1) Commercial/industrial facilities having vehicle /equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses. (2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use). (3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer. (4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.	❑ If a car wash area is not provided, describe measures taken to discourage on-site car washing and explain how these will be enforced.	Describe operational measures to implement the following (if applicable): ❑ Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system. ❑ Car dealerships and similar may rinse cars with water only. ❑ See Fact Sheet SC-21, "Vehicle and Equipment Cleaning," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE	... THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on SUSMP Drawings	3 Permanent Controls—List in SUSMP Table and Narrative	4 Operational BMPs—Include in SUSMP Table and Narrative
❑ **K.** Vehicle/Equipment Repair and Maintenance	❑ Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater. ❑ Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas. ❑ Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.	❑ State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area. ❑ State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements. ❑ State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.	In the SUSMP report, note that all of the following restrictions apply to use the site: ❑ No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains. ❑ No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately. ❑ No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.

IF THESE SOURCES WILL BE ON THE PROJECT SITE	... THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on SUSMP Drawings**	**3** **Permanent Controls—List in SUSMP Table and Narrative**	**4** **Operational BMPs—Include in SUSMP Table and Narrative**
❑ **L.** Fuel Dispensing Areas	❑ Fueling areas* shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable. ❑ Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.	-------	❑ The property owner shall dry sweep the fueling area routinely. ❑ See the Business Guide Sheet, "Automotive Service—Service Stations" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

* The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.

IF THESE SOURCES WILL BE ON THE PROJECT SITE	... THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on SUSMP Drawings	3 Permanent Controls—List in SUSMP Table and Narrative	4 Operational BMPs—Include in SUSMP Table and Narrative
❑ **M.** Loading Docks	❑ Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas should be drained to the sanitary sewer where feasible. Direct connections to storm drains from depressed loading docks are prohibited. ❑ Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation. ❑ Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.	-------	❑ Move loaded and unloaded items indoors as soon as possible. ❑ See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE	... THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on SUSMP Drawings	3 Permanent Controls—List in SUSMP Table and Narrative	4 Operational BMPs—Include in SUSMP Table and Narrative
❑ **N.** Fire Sprinkler Test Water	-------	❑ Provide a means to drain fire sprinkler test water to the sanitary sewer.	❑ See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
O. Miscellaneous Drain or Wash Water ❑ Boiler drain lines ❑ Condensate drain lines ❑ Rooftop equipment ❑ Drainage sumps ❑ Roofing, gutters, and trim.	-------	❑ Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. ❑ Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. ❑ Rooftop mounted equipment with potential to produce pollutants shall be roofed and/or have secondary containment. ❑ Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water. ❑ Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	-------

IF THESE SOURCES WILL BE ON THE PROJECT SITE	... THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on SUSMP Drawings	3 Permanent Controls—List in SUSMP Table and Narrative	4 Operational BMPs—Include in SUSMP Table and Narrative
❑ **P.** Plazas, sidewalks, and parking lots.	-------	-------	❑ Plazas, sidewalks, and parking lots shall be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing shall be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser shall be collected and discharged to the sanitary sewer and not discharged to a storm drain.

APPENDIX B
CITY OF VISTA PROJECT SUBMITTAL DOCUMENTS

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TEMPLATE

City of Vista Required
WATER QUALITY TECHNICAL REPORT

For

[Insert PROJECT NAME]

PROJECT NO. [Insert APNs, Tract Nos., City Project Nos., and/or Permit Nos., as available]

Prepared By:
[ENGINEERING/CONSULTING COMPANY NAME]
[ENGINEER/CONTACT PERSON'S NAME]
[COMPANY ADDRESS]
[COMPANY PHONE]
[CONTACT EMAIL ADDRESS]

Prepared For:
[OWNER'S NAME]
[OWNER'S ADDRESS]
[OWNER'S PHONE]
[OWNER'S EMAIL ADDRESS]

[Insert REPORT DATE and/or REVISION DATE(s)]

CERTIFICATION

This Water Quality Technical Report (WQTR) has been prepared under the direction of the following Registered Civil Engineer. The Registered Civil Engineer (Engineer) attests to the technical information contained herein and the engineering data upon which the following design, recommendations, conclusions and decisions are based. The selection, sizing, and preliminary design of stormwater treatment and other control measures in this report meet the requirements of Regional Water Quality Control Board Order R9-2007-0001 and subsequent amendments.

_____ _____

[ENGINEER'S NAME] [DATE]
REGISTERED CIVIL ENGINEER

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ATTACHMENTS

Attachment 1 – Final / Signed "City of Vista's Checklist for New Development and Redevelopment Projects" (pages 3-6 of Checklist)

[Include all supporting documents and attachments as needed, e.g. Drainage Studies, Soils Reports, etc.]

1.0 INTRODUCTION

This Water Quality Technical Report (WQTR) is required by the City of Vista (City) for all Development and Redevelopment Projects, pursuant to the City of Vista Stormwater Management and Discharge Control Ordinance (Municipal Code Section 13.18). The purpose of this WQTR is to address the water quality impacts from the proposed [Insert Project Name]. The site design, source control and treatment control Best Management Practices (BMPs) will be utilized to provide long term solution to protecting water quality. This WQTR is subject to revisions as needed to accommodate changes to the project design, or as required by the City and/or Engineer.

2.0 APPLICABILITY AND PROJECT TYPE

Based on the criteria established in Order R9-2007-0001 NPDES No. CAS0108758 Section D.1, and review of the City's Stormwater Standards Manual Section G (local SUSMP) Chapters 1 and 3, and after completion of the City of Vista's Checklist for New Development and Redevelopment Projects, the proposed project is identified as a [select Standard, Priority Development or Priority Redevelopment] Project.

[If Priority Project then, insert the following:] Since the proposed project has been identified as a Priority Project, this WQTR includes design and supporting calculations for site design Low Impact Development (LID) BMPs, Source Control BMPs, and Treatment Control BMPs.

[If Standard Project, then insert the following:] Since the proposed project has been identified as a Standard Project, this WQTR includes site design Low Impact Development (LID) BMPs and Source Control BMPs.

The final/signed "City of Vista's Checklist for New Development and Redevelopment Projects" is included as Attachment 1.

3.0 PROJECT OVERVIEW

3.1 Project Location

The project site is located in the City of Vista at [Describe project location including address, APN, etc.]. Figures 3.1 and 3.2 illustrate the project location. Figure 3.3 includes the project details, as further discussed in this section.

Figure 3.1 Vicinity Map

[Insert a local vicinity map with enough detail and surrounding references to for a clear identification of the location (e.g. aerial photo of the project location from Google Earth, or equivalent source.) Identify any nearby receiving waters and/or drainage channels.]

Figure 3.2 General Site Map

[Insert a detailed site map that includes the development site perimeter, closest cross-streets, important adjacent property features, and general drainage.]

3.2 Project Description

This project is a [Insert *type* of proposed development such as single family residential, multifamily residential, commercial, and industrial, etc.].

[Provide detailed narrative description of the proposed project including structures and facilities, structures or facilities to removed, external hardscape area, storage areas, property yard drains, private storm drain system, drainage lines, landscape areas, retaining walls, pools/spas, or other pertinent features of the project.]

[Describe property ownership (i.e. private development, planned community with a homeowners association, any infrastructure planned to be transferred to the City, etc.)].

Figure 3.3 Detailed Site Map

[Provide site map which shows the following information:

- Site boundaries
- North arrow and map scale
- Drainage areas and direction of flow
- Areas of potential soil erosion (including areas downstream of project)
- Private storm drain system(s)
- Nearby water bodies and municipal storm drain inlets
- Location of storm water conveyance systems (ditches, inlets, channels, storm drains, etc.)
- Location of existing and proposed storm water controls
- Location of "impervious" areas- paved areas, buildings, covered areas
- Locations where materials would be directly exposed to storm water
- Location of building and activity areas (e.g. fueling islands, garages, waste container area, wash racks, hazardous material storage areas, etc.)
- Areas of potential soil erosion (including areas downstream of project).]

3.3 Project Size

[Describe the project size including both the total site acreage/square feet, total disturbed acreage/square feet and developed acreage/square feet. Also include discussion of project phasing inclusive of size, etc.]

3.4 Impervious and Pervious Surface areas

[Describe the existing and final developed impervious and pervious surface areas in acres and square feet. Calculate and describe the increase or decrease in impervious area from existing to the final developed condition.].

3.5 Other

[Include any other relevant details of the project].

4.0 PROJECT SITE ASSESSMENT

This section includes information used to consider the potential water quality and hydrologic impacts from the proposed project. This information is important when considering the appropriate BMPs to reduce identified potential impacts as well as when designing low impact development (LID), source control and treatment control measures to reduce those impacts.

4.1 Land Use and Zoning

[Include the designated land use for the project site and adjacent areas].

4.2 Existing Topography

[Provide a description of the pre-development topography, slope steepness (%), site features and conditions].

4.3 Existing and Proposed Drainage

[Describe the existing and proposed drainage of site and surrounding property. Discuss modifications to the existing drainage system and connections/discharges to the City's facilities and/or receiving waters].

4.4 Watershed and Receiving Waters

The proposed project is located within the [select either San Luis Rey (HU 903) or Carlsbad (HU 904)], watershed or hydrologic unit and the subwatershed or hydrologic area of [select Lower San Luis Rey 903.1, Loma Alta 904.1, Buena Vista 904.2 or Agua Hedionda 904.3]. The surface and groundwater receiving waters located in the area and downstream of this project include [insert name, location and description of nearby waterbodies, creeks, etc.]. The designated beneficial uses of these waters include [insert designated beneficial uses per Water Quality Control Plan for the San Diego Basin, e.g. MUN, AGR, REC1. REC2, IND, WARM, WILD, etc.].

4.5 303(d) Listed Receiving Waters

[Identify receiving waterbodies such as Creeks and/or Lagoons (including ultimate receiving waterbodies, e.g. Pacific Ocean) that the project drains to that are listed on the Clean Water Act 303(d) and list pollutants for which the receiving waters are impaired. The 303(d) list can be found at the SWRCB website at http://www.swrcb.ca.gov/water_issues/programs/tmdl/docs/303dlists2006/swrcb/r9_final303dlist.pdf].

4.6 Total Maximum Daily Loads (TMDLs)

[Identify applicable pollutant Total Maximum Daily Loads (TMDLs). The list of TMDLs can be found at the SWRCB website at http://www.swrcb.ca.gov/rwqcb9/water_issues/programs/tmdls/index.shtml].

4.7 Soil Type(s) and Conditions

[Describe the site's soil type(s) and condition and provide reference for this information (i.e. soils report, etc.) Refer to Soil Conservation Service maps to determine soil type if no soils report is available].

5.0 POLLUTANTS OF CONCERN

This section of the WQTR identifies pollutants of concern. [Pollutants of concern are those that are anticipated to be generated by the proposed project during the development process, as well as from the intended use of the site. Additionally, if the project will drain to a receiving waterbody that is impaired for a pollutant, that pollutant is also a pollutant of concern. Pollutants frequently identified on the 303(d) list of California impaired water bodies include sediment, bacteria, metals, nutrients, and pesticides (for the 303(d) list go to www.swrcb.ca.gov/tmdl/303d_lists.html)]. Be sure to reference the most recently adopted 303(d) list.

5.1 Project Categories and Features

[Identify the project categories and features from Table 5-1 below that apply to the project.]

5.2 Pollutants of Concern

[List the anticipated pollutants for the project identified using Table 5-1 and those that have also been identified in 303(d) as causing impairment of receiving waters (reference Chapter 2, Table 2-2 of the City's Stormwater Standards Manual Section G).]

5.3 Project Water Quality Analyses

[Provide information from any completed CEQA documents, site approvals, resource agency permits (i.e. Department of Fish and Game, Army Corps of Engineers, etc.) or analyses related to project's potential pollutants and environmental impacts.]

5.4 Project Watershed Information

[Provide information from any relevant watershed planning documents (i.e. biological assessments, City's general plan, San Luis Rey WURMP, Carlsbad WURMP, Agua Hedionda Watershed Management Plan, other applicable watershed management plans, etc.) regarding water quality problems on or downstream of the project site, and relevant plans, policies, or water quality improvement projects.]

Table 5-1 Potential Pollutants for Project Categories

	General Pollutant Categories								
Priority Project Categories	Sediment	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease	Bacteria & Viruses	Pesticides
Detached Residential Development	X	X			X	X	X	X	X
Attached Residential Development	X	X			X	P(1)	P(2)	P	X
Commercial Development >one acre	P(1)	P(1)	X	P(2)	X	P(5)	X	P(3)	P(5)
Heavy Industry	X		X	X	X	X	X		
Automotive Repair Shops			X	X(4)(5)	X		X		
Restaurants					X	X	X	X	P(1)
Hillside Development >5,000 ft2	X	X			X	X	X		X
Parking Lots	P(1)	P(1)	X		X	P(1)	X		P(1)
Retail Gasoline Outlets			X	X	X	X	X		
Streets, Highways & Freeways	X	P(1)	X	X(4)	X	P(5)	X	X	P(1)

X = anticipated
P = potential
(1) A potential pollutant if landscaping exists on-site.
(2) A potential pollutant if the project includes uncovered parking areas.
(3) A potential pollutant if land use involves food or animal waste products.
(4) Including petroleum hydrocarbons.
(5) Including solvents.

6.0 HYDROLOGIC & GEOTECHNICAL CONDITIONS OF CONCERN/ DRAINAGE REPORT

This section of the WQTR identifies hydrologic and geotechnical conditions of concern related to the proposed project. Impacts to the hydrologic regime resulting from development typically include increased runoff volume and velocity; reduced infiltration; increased flow frequency, duration, and peaks; faster time to reach peak flow; and water quality degradation. A change to a priority project site's hydrologic regime is considered a condition of concern if the change impacts downstream channels and habitat integrity. Conditions of concern can include problems such as flooding, erosion, scour, and other impacts that can adversely and permanently affect channel and habitat integrity.

[Hydrologic or geotechnical conditions of concern are identified through a review of onsite and downstream drainage paths. If the proposed project would cause or contribute flows to problems along onsite or downstream drainage paths, these problems or future problems are considered conditions of concern.

In order to identify conditions of concern, a comprehensive understanding of flow volume, rate, duration, energy, and peak flow is necessary. A formal drainage study which considers the project area's location in the larger watershed, topography, soil and vegetation conditions, percent impervious area, natural and infrastructure drainage features, and any other relevant hydrologic and environmental factors should be prepared. The study shall include:

- Field reconnaissance to observe downstream conditions
- Computed rainfall and runoff characteristics including a minimum of peak flow rate, flow velocity, runoff volume, time of concentration and retention volume; these characteristics shall be developed for the 2-year, 10-year, and 100 year frequency, Type I storm of 6- or 24-hour duration (whichever is the closer approximation of the site's time of concentration)

If the downstream channel(s) is fully natural or partially improved with a significant potential for erosive conditions or alteration of habitat integrity to occur as a result of upstream development, a drainage study report, prepared by a registered civil engineer in the State of California, with experience in fluvial geomorphology and water resources management is required to be included in the WQTR. The drainage report may be referenced and a detailed summary provided that addresses the items above.]

[If a drainage study is required, use the following paragraph]: A drainage report was prepared for the proposed project by [insert name of engineer], as required by the City, and is included as an Attachment. A summary of the drainage report is provided below.

[If a drainage report is not required, use the following paragraph]: A drainage report was not prepared for the proposed project; however, a State of California registered civil engineer (insert name of engineer and engineering firm) reviewed the project for potential conditions of concern. The following is a summary of that review.

- Project location: [Describe the project's location within the larger watershed perspective.]
- Topography, soil and vegetation: [Describe topography, soil, and vegetation conditions of the project site.]

- Infiltration rates of soil: [Discuss soil type(s) and infiltration rates.]
- Impervious area: [Provide percent impervious area on existing site and percent after development.]
- Drainage features: [Describe natural and infrastructure drainage features.]
- Relevant hydrologic and environmental factors: [Include other relevant hydrologic and environmental factors either on-site, in the project's vicinity, adjacent property, or downstream of the site such as sensitive biological areas, areas prone to flooding, areas with erosion problems, etc.]
- Proposed hydrologic conditions: [Summarize changes in the hydrologic system resulting from proposed development (i.e. increased runoff volume, reduced infiltration, and increased flow frequency)].
- Significant impact on downstream channels and habitat integrity: [Identify any changed resulting from the project that will have significant impact on downstream channels and habitat integrity. If off-site flows will be increased, this assessment requires a review of downstream areas. Areas with existing or future potential for flooding, erosion, and/or scour should be discussed.]
- Project hydrology analyses: [Provide information from any previous analyses related to project's potential hydrologic impacts such as reports prepared for previous CEQA documents, site approvals, or permits.]
- Project watershed information: [Provide information from any relevant watershed planning documents (i.e. drainage master plans, City's general plan) regarding hydrologic problems on or downstream of the project site, and relevant plans, policies, or water quality improvement projects.]
- Hydrology Report Summary: [If applicable, provide a detailed summary of the required elements of the drainage report including a table of pre-and post- development peak flow rate, flow velocity, runoff volume, time of concentration and retention volume. Specify which storm event intensity and duration was used for calculations (2 year, 10 year, or only 100 year, 6 hour event.)]

[If a geotechnical report is required by the City, also include the following sentence and add report as an attachment to this WQTR:]

A geotechnical report was also prepared for the proposed project by [insert name of civil engineer], as required by the City, and is included as Attachment [#].

7.0 BEST MANAGEMENT PRACTICES (BMPs)

Minimizing the proposed project's effects on water quality, as well as compliance with State and local requirements can be most effectively achieved by using a combination of BMPs which include Low Impact Design (LID) Site Design, Source Control, and for Priority projects shall include Treatment Control measures. These design and control measures employ a multi-level strategy. The strategy, which is detailed in the City's Stormwater Standards Manual Section G (local SUSMP), consists of: 1) reducing or eliminating post-project runoff; 2) controlling sources of pollutants; and 3) treating stormwater runoff before discharging it to the storm drain system or to receiving waters.

This WQTR and the proposed BMPs for the proposed project have been developed to minimize drainage impacts identified in Section 5 and the introduction of pollutants identified in Section 4 into the municipal storm drain system and/or ultimate drainage receiving waterbody.

[For more detailed information on the use and design of BMPs, please refer to Chapter 4 of the City's Stormwater Standards Manual Section G (local SUSMP), or the California Stormwater Quality Association New Development and Redevelopment Handbook, available at www.cabmphandbooks.com. Additional information is also available in the County of San Diego Low Impact Development Handbook at www.sdcounty.ca.gov/dplu/LID_PR.html.]

7.1 LID Site Design Strategies and BMPs

[Complete this section for all Standard and Priority Projects]

Conceptually, there are four LID strategies for managing runoff from buildings and paving:

1. Optimize the site layout;
2. Use pervious surfaces;
3. Disperse runoff; and
4. Design Integrated Management Practices (IMPs).

Where the project is located within the Agua Hedionda Hydrologic Area (see Section 5.4), the following design strategies shall be implemented where applicable and feasible.

- Medium Density Residential – a cluster design shall be used, grouping the housing units closer together on smaller lots, and leaving one-third of the site as undeveloped open space. Impervious area shall be reduced by decreasing driveway length, sidewalk use, and overall road footprint.

- Multifamily Residential – Impervious area shall be reduced somewhat by more efficient layout. Porous pavement should be used for all sidewalks. Swales treat a greater proportion of the site. Large cisterns capture roof runoff, and reuse the water for irrigation.

- Commercial – Porous pavement shall be used for large fraction of the parking area. Large cisterns shall capture roof runoff, and reuse the water for irrigation.

- Industrial – The most challenging site, with layout constraints and little economic incentive for cisterns for irrigation. Porous pavement parking spaces shall be utilized (a small fraction of the total paved surface), and the swales shall treat a greater proportion of the site.

This section describes how these LID Site Design strategies have been implemented in the proposed project design.

7.1.1 Optimize the Site Layout

In order to minimize grading and preserve existing site features and topography, the analyses conducted in Section 6 was utilized to optimize the site layout. [Provide a narrative discussion of the LID Site Design strategies used to optimize the site layout to limit the development envelope; preserve any natural drainage features; to provide setbacks from creeks, wetlands, and riparian habitats; to minimize imperviousness; maximize infiltration; use drainage as a design element; and retain and slow runoff].

7.1.2 Use Pervious Surfaces

[Describe the use of pervious surfaces such as turf, gravel, or pervious pavement, or surfaces that retain rainfall, such as vegetated roofs. All drainage from these surfaces is considered to be "self-retained" and no further management of runoff is necessary. An emergency overflow should be provided for extreme events.]

7.1.3 Disperse Runoff

[Describe how the drainage has been designed to disperse runoff from impervious surfaces onto adjacent pervious surfaces (e.g., direct a roof downspout to disperse runoff onto a lawn).]

7.1.4 Integrated Management Practices (IMPs)

[Provide narrative description of integrated management practices (IMPs) designed into the project, such as bioretention facilities, planter boxes, cisterns, or dry wells. IMPs infiltrate runoff to groundwater and/or percolate runoff through engineered soil and allow it to drain away slowly.]. Design calculations, assumptions and further details are provided in Section 7.2 and 7.3 below.

7.2 Documentation of Drainage Management Areas (DMAs)

[Complete this section for all Priority Projects and only as needed for Standard Projects. Chapter 4 of the City's Stormwater Standards Manual Section G (local SUSMP) should be used when completing this section of your WQTR.]

7.2.1 Defining Drainage Management Areas

Prior to designing LID and/or treatment control BMPs into the proposed project, Drainage Management Areas were defined, categorized and tabulated for the entire site. The following tables summarize this information: [Complete the following tables by delineated the Drainage Management Areas (DMAs), calculating the areas of each and classifying the area as self- treating, self-retaining, draining to self-treating or draining to and Integrated Management Practice for treatment. Use one row for each DMA. Provide narrative descriptions, as needed.]

TABLE 7-1. Self-Treating Areas

DMA Name	*Area (square feet)*

TABLE 7-2. Self-Retaining Areas

DMA Name	*Area (square feet)*

[Runoff factors can be found in Table 4-2 in Chapter 4 of the City's Stormwater Standards Manual Section G. Also reference this section when evaluating pervious to impervious ratios.]

TABLE 7-3. Areas Draining to Self-Retaining Areas

DMA Name	*Area (square feet)*	*Post-project surface type*	*Runoff factor*	*Receiving self-retaining DMA Name*	*Receiving self-retaining DMA Area (square feet)*

[Compile a list of DMAs draining to IMPs. Proceed to Section 7.3 to provide sizing calculations and tabulations.]

TABLE 7-4. Areas Draining to IMPs

DMA Name	*Area (square feet)*	*IMP Name*

7.3 Treatment Control BMPs/IMP Calculations

[Chapters 2 and 4 of the City's Stormwater Standards Manual Section G should be utilized to complete this design section. This section must include all design criteria, calculations, basis for selection (include targeted pollutants, justification, and alternative analysis), pollutant removal information (other than vendor specifications) and any restrictions, location of BMPs and literature references.]

7.3.1 Selection

[Provide a narrative of treatment control BMPs that are included in your project. This should include descriptions of infiltration, detention and settling, biofiltration, filtration, flow through separation, or other systems utilized for the project. Discuss your selection process which should be based on achieving the highest removal possible of the primary pollutants of concern association with the project. Use Table 7-5 below along with the pollutants of concern identified in Section 5 of this WQTR template to select treatment control BMPs with the highest pollutant removal efficiencies. Include discussion regarding all BMPs that were considered for the project, but were not selected with detailed explanation(s) on why they were infeasible for the project. Any

infeasibility must be based on engineering reasons or high cost-to-benefit rather than due to space limitations as a result of development plans.]

Table 7-5 provides a general comparison of how various types of treatment facilities perform for each group of pollutants. The pollutants for the proposed project are identified in Section 5 above.

TABLE 7-5 Groups of Pollutants and Relative Effectiveness of Treatment Facilities.

Pollutants of Concern	Bioretention Facilities (LID)	Settling Basins (Dry Ponds)	Wet Ponds and Constructed Wetlands	Infiltration Facilities or Practices (LID)	Media Filters	Higher-rate biofilters	Higher-rate media filters	Trash Racks & Hydro-dynamic Devices	Vegetated Swales
Coarse Sediment and Trash	High	High	High	High	High	High	High	High	High
Pollutants that tend to associate with fine particles during treatment	High	High	High	High	High	Medium	Medium	Low	Medium
Pollutants that tend to be dissolved following treatment	Medium	Low	Medium	High	Low	Low	Low	Low	Low

Based on this, the following types of facilities have been selected for the proposed project:
[Select from the following and include descriptive text:

- Infiltration facilities or practices, including dry wells, infiltration trenches, infiltration basins, and other facilities that infiltrate runoff to native soils (sized to detain and infiltrate a volume equivalent to the 85th percentile 24-hour event).
- Bioretention facilities and media filters that detain stormwater and filter it slowly through soil or sand (sized with a surface area at least 0.04 times the effectively impervious tributary area).
- Extended detention basins, wet ponds, and wetlands or other facilities using settling (sized to detain a volume equivalent to runoff from the tributary area generated by the 85th percentile 24-hour event).]

7.3.2 Design and Sizing

[Show calculations and provide key design criteria to demonstrate that the selected BMPs will provide adequate treatment. Please refer to the City's Stormwater Standards Manual Section G, Chapter 4 for design sheets and criteria. Also available for design assistance is the California Stormwater Quality Association (CASQA) BMP Handbook for New Development/Redevelopment for reference www.cabmphandbooks.com. Provide cross sections and details, as appropriate. A cross section or schematic detail of each type of structural BMP should be included on the BMP exhibit to be included as part of this WQTR.]

The recommended design procedure in Chapter 4 of the City's Stormwater Standards Manual Section G integrates LID practices with the use of infiltration facilities and practices and

bioretention facilities to meet NPDES permit LID requirements, treatment requirements, and flow-control requirements in a cost-effective and unified design was utilized for this design.
The following design sheets included in Chapter 4 of the City's Stormwater Standards Manual Section G (local SUSMP) were utilized: [Select from the following list:

- Self-treating and self-retaining areas
- Pervious pavements
- Bioretention facilities
- Flow-through planter
- Dry wells and infiltration basins
- Cistern with bioretention facility

These design sheets include recommended configurations and details, and example applications, for these IMPs. The information in these design sheets must be adapted and applied to the conditions specific to the development project such as unstable slopes or the lack of available head. The City's Land Development staff has final review and approval authority over the project design.]

[Table 7-6 may be used to summarize sizing for bioretention areas and planter boxes.]

TABLE 7-6. **C**alculations of minimum IMP Areas for bioretention areas and planter boxes.

DMA Name	*DMA Area (square feet)*	*Post-project surface type*	*DMA Runoff factor*	*DMA Area × runoff factor*	*Soil Type:*	*IMP Name*			
					IMP Sizing factor		*Minimum Area*	*Proposed Area*	
			Total		***0.04***				***IMP Area***

For each of the IMPs, use the appropriate sizing from Table 7-7.

TABLE 7-7. IMP Sizing

Bioretention Facilities	Sizing Factor for Area = 0.04
Flow-through Planters	Sizing Factor for Area = 0.04
Dry Well or Infiltration Basin	See Step 6 to Calculate Min. Volume
Cistern with Bioretention	See Step 6 to Calculate Min. Volume of Cistern; then use 0.04 to calculate minimum size of bioretention area

The minimum area of bioretention facilities and flow-through planters is found by summing up the contributions of each tributary DMA and multiplying by the adjusted sizing factor for the IMP.

$$Min.\,IMP\ Area = \sum \begin{pmatrix} DMA & DMA \\ Square & \times Runoff \\ Footage & Factor \end{pmatrix} \times \begin{pmatrix} IMP \\ Sizing \\ Factor \end{pmatrix}$$

Use the format above to present the calculations of the required minimum area and volumes for bioretention areas and planter boxes:

To size dry wells, infiltration basins, or infiltration trenches, use the following procedure:

1. Use the County of San Diego's 85th Percentile Isopluvial Map to determine the minimum unit volume.
2. Determine the weighted runoff factor ("C" factor) for the area tributary to the facility. The factors in Table 7-7 may be used.
3. Multiply the weighted runoff factor times the tributary area times the minimum unit volume.
4. $Volume = [Tributary\ Area] \times [weighted\ runoff\ \ factor] \times [unit\ volume]$
5. Select a facility depth.
6. Determine the required facility area. Dry wells may be designed as an open vault or with rock fill. If rock fill is used, assume a porosity of 40%.
7. Ensure the facility can infiltrate the entire volume within 72 hours.

To size a cistern in series with a bioretention facility:

1. Use the volume equation above to calculate the required cistern volume.
2. Design a discharge orifice for a drawdown time of 24 hours.
3. Determine the maximum discharge from the orifice.

The minimum area of the bioretention facility must treat this flow based on a percolation rate of 5" per hour through the engineered soil.

7.4 Alternatives to Integrated LID Design

[If you believe design of features and facilities as described above is infeasible for your development site, consult with City Land Development and Water Quality Protection Program staff before preparing an alternative design for stormwater treatment, flow control, and LID compliance.

For all alternative designs, the applicant must prepare and complete this section of the WQTR, including a drawing showing the entire site divided into discrete Drainage Management Areas, text and tables showing how drainage is routed from each DMA to a treatment facility, and calculations demonstrating the design achieves the applicable design criteria for each stormwater treatment facility. This WQTR must also show how the project meets the minimum LID criteria and ensures runoff rates, durations, and velocities are controlled to maintain or reduce downstream erosion conditions and protect stream habitat (NPDES Permit Provision D.1.d.(10)). Chapter 4 of the City of Vista's Standards Manual Section G beginning page 63 should be referenced for considering alternative treatment controls including Sand Filters, Extended ("Dry") Detention Basins, "Wet" Detention Ponds and Constructed Wetlands, and Vegetated Swales.]

7.5 Source Control BMPs

[This Section of the WQTR is required for all Standard and Priority Projects]

It is anticipated that the following pollutants will be generated at this site: [Provide a description of site activities and anticipated sources of pollutants.]

Based on these anticipated pollutants and operational activities at the site the following Table 7-8 summarizes the Source Control BMPs to be installed and/or implemented onsite:

[Utilize the City's Stormwater Standards Manual Section G *Appendix A Stormwater Pollutant Sources/Source Control Checklist* to address the minimum required Source Control BMPs including

- Outdoor Materials Storage
- Trash storage
- Integrated Pest Management
- Efficient irrigation and landscape design
- Inlet stenciling and signage
- Other controls (as applicable)

The checklist provides a complete list of potential pollutant sources and both permanent and operational controls. Table 7-8 below provides a sample of the information contained in the checklist.]

Table 7-8 Stormwater Pollutant Sources/Source Control Checklist

How to use this worksheet.

1. **Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check the box that applies.**
2. **2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your project-specific SUSMP drawings.**
3. **Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in a table in your Project-Specific SUSMP. Use the format shown in the City's Stormwater Standards Manual Section G. Describe your specific BMPs in an accompanying narrative and explain any special conditions or situations that required omitting BMPs or substituting alternatives.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE…	**…THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs**		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls-show on SUSMP drawings	3 Permanent Controls-List in SUSMP Table and Narrative	4 Operational BMPs-Include in SUSMP Table and Narrative
☐ A. On-site storm drain inlets	☐ Location of inlets.	☐ Mark all inlets with the words "No Dumping! Drains to Creek" or similar.	☐ Maintain and periodically repaint or replace inlet markings ☐ Provide stormwater pollution prevention information to new site owners, lessees, or operators. ☐ See applicable operational BMPs in Fact Sheet SC-44,"Drainage System Maintenance," in CASQA stormwater Quality Handbooks at www.cabmphandbooks.com ☐ Include the following in lease agreements:"Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create potential discharge to storm drains."
☐ B. Interior floor drains and elevator shaft sump pumps	--------	☐ State that interior floor drains and elevator shaft sump pumps will be plumbed to the sewer.	☐ Inspect and maintain drains to prevent blockages and overflow.

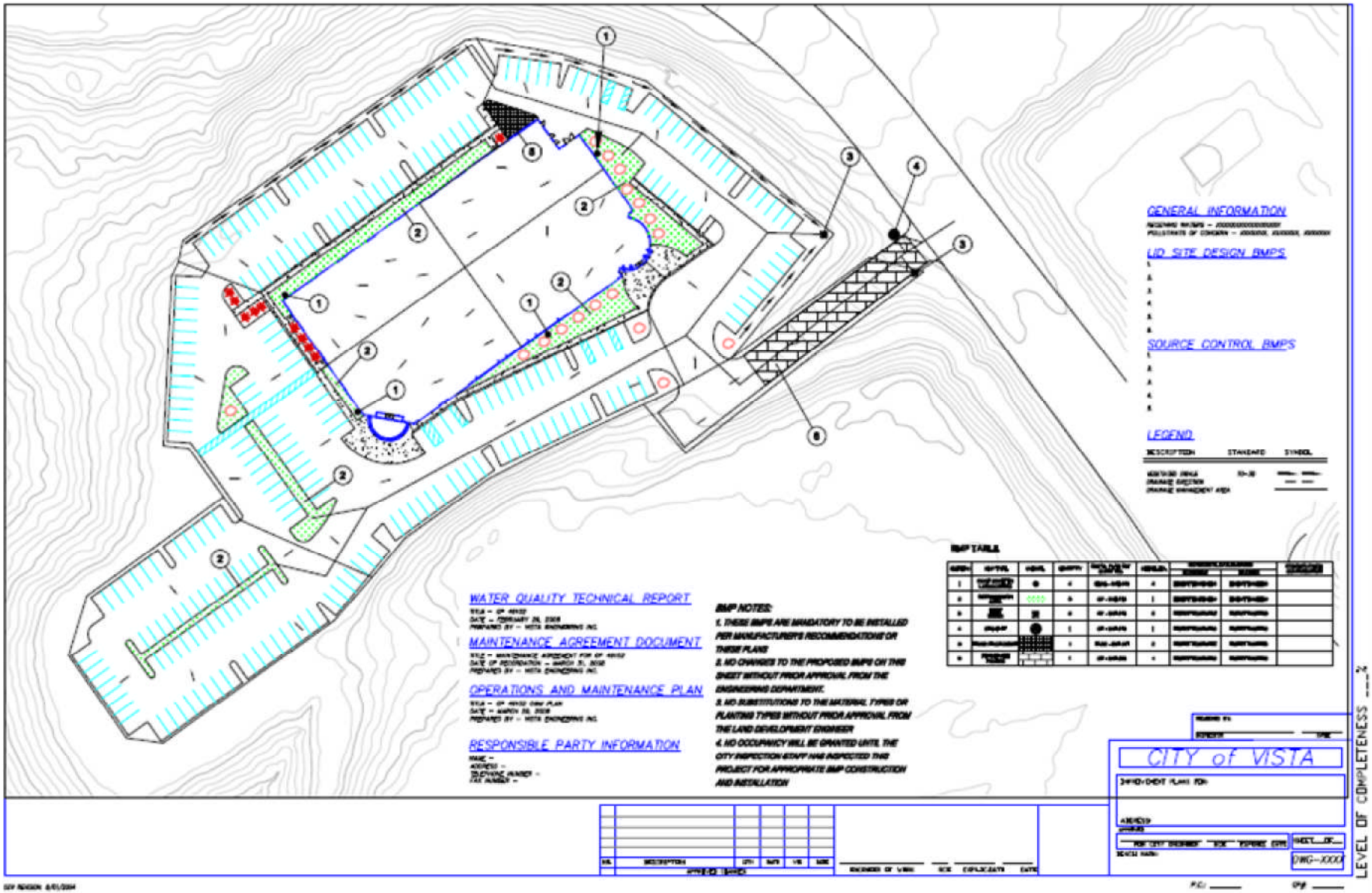
8.0 PROJECT PLAN(s) & BMP LOCATION MAP

[Required to be completed for all Standard and Priority Projects. Include a description of the location of BMP(s) and describe the relationship/flow scenario between BMPs if more than one BMP is proposed (i.e. treatment train concept).]

[Project applicants should utilize the City's BMP Sheet template or equal as approved by the City's Land Development staff. This template can be downloaded from the following location: http://www.cityofvista.com/departments/communitydev/documents/BMPSheet.pdf)]

BMP Sheet No. [insert sheet number(s)] illustrate[s] the proposed project and the BMPs that will be implemented as described in Section 7 of this WQTR. Table [insert reference number] on Sheet No. [insert sheet number(s)] summarizes these BMPs and reference location numbers.

Figure 8-1 Sample BMP Sheet Template



9.0 BMP MAINTENANCE

[Required to be completed for all Standard and Priority Projects.]

9.1 Facility Ownership & Maintenance Agreements

The following individual(s)/organization will own the facilities, including all structural and non-structural BMPs, and are responsible for maintenance in perpetuity:
[Insert the name and contact information for the property owner and/or the future property owner and contact information as the party(ies) responsible for the operation and maintenance of the site and its facilities.]

The [insert project name] project will implement the following maintenance mechanism to ensure ongoing long-term maintenance of all structural and non-structural BMPs[Select the appropriate Maintenance Mechanism for your project (delete all others)].

9.1.1 Potential Permanent BMP Maintenance Mechanisms

1. **Project proponent agreement to maintain storm water BMPs**: The City may enter into a contract with the project proponent obliging the project proponent to maintain, repair and replace the stormwater BMP as necessary into perpetuity. Security may be required. This agreement is subsequently recorded with the property. Sample agreements are included at the end of this Section 9.

2. **Assessment Districts**: The City may approve an Assessment District or other funding mechanism created by the project proponent to provide funds for stormwater BMP maintenance, repair and replacement on an ongoing basis. Any agreement with such a District shall be subject to Public Entity Maintenance Provisions.

3. **Lease Provisions**: In those cases where the City holds title to the land in question, and the land is being leased to another party for private or public use, the City may assure storm water BMP maintenance, repair and replacement through conditions in the lease.

4. **Public Entity Maintenance**: The City may approve a public or acceptable quasi-public entity (e.g., the County Flood Control District, or annex to an existing assessment district, an existing utility district, a state or federal resource agency, or a conservation conservancy) to assume responsibility for maintenance, repair and replacement of the permanent treatment BMP. Unless acceptable to the City, public entity maintenance agreements shall ensure estimated costs are front-funded or reliably guaranteed, (e.g., through a trust fund, assessment district fees, bond, letter of credit or similar means). In addition, the City may seek protection from liability by appropriate releases and indemnities. The City shall have the authority to approve storm water BMPs proposed for transfer to any other public entity within its jurisdiction before installation. The City shall be involved in the negotiation of maintenance requirements with any other public entities accepting maintenance responsibilities within their respective jurisdictions; and in negotiations with the resource agencies responsible for issuing permits for the construction and/or maintenance of the facilities. The City must be identified as a third party beneficiary empowered to enforce any such maintenance agreement within their respective jurisdictions.

The City may accept alternative maintenance mechanisms if such mechanisms are as protective as those listed above. Examples of agreements are located on the following pages at the end of this section. The type of agreement necessary will depend on the project type and size.

9.2 Operations, Maintenance and Inspection

9.2.1 Typical Maintenance Requirements

[Provide a narrative describing the typical maintenance requirements and frequencies for each of the BMPs and/or BMP types to be installed at the project site and include a reference for the maintenance type and frequency.]

9.2.2 Operation and Maintenance (O&M) Plan

[An O&M Plan must be submitted and approved by the City prior to issuing grading permits, construction approvals, permit close out, and issuance of certificates of use and occupancy.]

An O&M Plan will be prepared for the proposed project and submitted for approval by the City prior to entitlements. The O&M Plan describes the designated responsible party to manage the stormwater BMP(s), employee's training program and duties, operating schedule, maintenance frequency, routine service schedule, specific maintenance activities, copies of resource agency permits, and any other necessary activities. At a minimum, maintenance agreements shall require the inspection and servicing of all structural BMPs per manufacturer or engineering specifications. Parties responsible for the O&M Plan shall retain records for at least 5 years. These documents shall be made available to the City for inspection upon request at any time.

9.2.3 Project BMP Verification

The applicant's Engineer of Record and/or the City Engineer must verify through inspection of the site that the BMPs have been constructed and implemented as proposed in the approved WQTR. The inspection must be conducted and City approval must be obtained prior to granting a certificate of occupancy. This approval may be verified through signatures on the as-built plans, specifically on the BMP sheet.

9.2.4 Annual BMP Operation and Maintenance Verification

The BMP owner must verify annually that the O&M Plan is being implemented by submitting a self-certification statement to the City. The verification must include a record of inspection of the BMPs prior to the rainy season (October 1st of each year).

SAMPLE MAINTENANCE AGREEMENT

RECORDING REQUESTED BY:

THE CITY OF VISTA
AND WHEN RECORDED MAIL TO:

City of Vista
Land Development Division
600 Eucalyptus Avenue
Vista, California 92084

The recordation of this document is a benefit to the City.

(THIS SPACE FOR RECORDER'S USE ONLY)

STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT

This agreement is made by and between the City of Vista, a municipal corporation [City] and _____ _____, [Property Owner] the owner of property more particularly described as _____[legal description] in the City of Vista, County of San Diego, State of California.

A. Property Owner is required pursuant to the City of Vista Municipal Code, Section 13.18, and the Storm Water Standards Manual to enter into a Storm Water Management and Discharge Control Maintenance Agreement [Maintenance Agreement] for the installation and maintenance of Permanent Stormwater Best Management Practices [Permanent Stormwater BMP's] prior to the issuance of construction permits. The Maintenance Agreement is intended to ensure the establishment and maintenance of Permanent Stormwater BMP's onsite, as described in the project's Storm Water Management Plan [SWMP] and Plan File/Drawing No(s). _____.

B. Property Owner wishes to obtain an engineering and/or building permit according to Plan File/Drawing No(s). _____.

NOW, THEREFORE, the parties agree as follows:

1. Property Owner shall have prepared, or if qualified, shall prepare an Operation and Maintenance Procedure [OMP] for Permanent Stormwater BMP's, satisfactory to the City, consistent with Plan File/Drawing No(s). _____.
2. Property Owner shall install, maintain and repair or replace all Permanent Stormwater BMPs within their property, according to the OMP guidelines as described in the project's SWMP and Plan File/Drawing No(s). _____.
3. Property Owner shall maintain operation and maintenance records into perpetuity. These records shall be made available to the City for inspection upon request at any time.
4. The Property Owner shall comply with all SWMP and OMP requirements with the most recently City approved version of the applicable SWMP or OMP available at the City of Vista for the property described above.
5. Property Owner shall grant the City an easement giving the City the right to enter onto the land (and any necessary adjacent land needed for access) to maintain the BMPs.
6. The City shall have the right to maintain all Permanent Stormwater BMPs if the BMPs are not properly maintained. The cost for such maintenance will be the responsibility of the Property Owner.
7. This Maintenance Agreement shall commence upon execution of this document by all parties named hereon, and shall run with the land.

Executed by the City of Vista and by Property Owner in Vista, California.
NOTE: NOTARY ACKNOWLEDGMENTS FOR ALL SIGNATURES MUST BE NOTARIZED

_____ (Signature)	APPROVED By: _____ (City Engineer)
_____ (Print Name & Title)	_____ (Date)
_____ (Date)	

SAMPLE MAINTENANCE AGREEMENT

RECORDING REQUESTED BY:

THE CITY OF VISTA
AND WHEN RECORDED MAIL TO:

City of Vista
Land Development Division
600 Eucalyptus Avenue
Vista, California 92084
The recordation of this document is a benefit to the City

(THIS SPACE FOR RECORDER'S USE ONLY)

STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT

This agreement is made by and between the City of Vista, a municipal corporation [City] and _____ _____, [Property Owner] the owner of property more particularly described as _____[legal description] in the City of Vista, County of San Diego, State of California.

Property Owner is required pursuant to the City of Vista Municipal Code, Section 13.18, and the Storm Water Standards Manual to enter into a Storm Water Management and Discharge Control Maintenance Agreement [Maintenance Agreement] for the installation and maintenance of Permanent Stormwater Best Management Practices [Permanent Stormwater BMPs] prior to the issuance of construction permits by the City of Vista for work on the property [Improvements]. Property Owner covenants and agrees with the City of Vista as follows:

1. The Property Owner shall install, maintain, repair and replace all Permanent Storm Water Best Management Practices [Permanent Storm Water BMPs] for the Improvements as required by the City Manager, the City Engineer or their designated representative [City Manager], and as more particularly described in attached exhibit(s) and incorporated by reference. Maintenance shall include inspection and servicing of Permanent Storm Water BMPs on a minimum annual basis. The Property Owner shall maintain, repair and replace the Permanent Storm Water BMPs until all obligations under this Maintenance Agreement are assumed by a home owners association, or until the obligation is transferred to and assumed by another entity, satisfactory to the City Manager. The Property Owner shall grant the entity assuming any obligation under this Agreement all necessary access rights.

2. The Property Owner shall submit an Operation and Maintenance Procedure [OMP] for the Permanent Storm Water BMPs, satisfactory to the City Manager, at the time this Agreement is executed. The OMP shall describe employee training programs and duties, routine service and operating schedules, maintenance frequency, and specific maintenance activities, as more particularly described in attached exhibit(s) and incorporated by reference. Through the OMP, the Property Owner may also designate a Responsible Party, satisfactory to the City Manager, to maintain the Permanent Storm Water BMPs. The designation of a Responsible Party to maintain the Permanent Storm Water BMPs does not relieve the Property Owner of any of the obligations or duties under this Agreement. The Property Owner or designated Responsible Party shall retain records of the OMP for at least five years, and these records shall be made available to the City for inspection upon request.

3. The Property Owner agrees to defend, indemnify, protect, and hold harmless the City, its agents, officers and employees, from and against all claims, demands, causes of action, liability or loss asserted or established for damages or injuries to any person or property arising out of the installation, maintenance, repair or replacement of the Permanent Storm Water BMPs. Claims, demand, causes of action, liability or loss that arise from, are connected with, or are caused or claimed to be caused by the acts or omission of the Property Owner, the Property Owner's agents, officers and employees are covered.

Also covered are the claims, demands, causes of action, liability or loss arising from, connected with, caused by, or claimed to be caused by the active or passive negligence acts or omissions of the City, its agents, officers, or employees which may be in combination with the negligence of the Property Owner, its employees, agents or officers, or any third party. The Property Owner's duty to defend, indemnify, protect and hold harmless shall not include any claims or liabilities arising from the established sole negligence or sole willful misconduct of the City, its agents, officers or employees.

4. Property Owner further agrees that the indemnification agreement referred to above and the duty to defend City require Property Owner to pay any costs City incurs that are associated with enforcing the indemnification provision, and defending any claims arising from the installation, maintenance, repair or replacement of the Permanent Storm Water BMPs. If City chooses, at its own election, to conduct its own defense, participate in its own defense or obtain independent legal counsel in defense on any claim related to the installation, maintenance, repair or replacement of the permanent Storm Water BMPs, Property Owner agrees to pay the reasonable value of attorneys' fees and all of City's reasonable costs.

5. Property Owner shall grant the City an easement giving the City the right to enter onto the land (and any necessary adjacent land needed for access) to maintain the BMPs. The City shall have the right to maintain all Permanent Stormwater BMPs if the BMPs are not properly maintained. The cost for such maintenance will be the responsibility of the Property Owner.

6. The Property Owner shall maintain a policy of liability insurance, as required and in an amount approved by the City Manager. This policy, with the City also named, will protect the City from any potential claims which may arise from the installation, maintenance, repair or replacement of the Permanent Storm Water BMPs.

7. This Maintenance Agreement shall commence upon execution of this document by all parties named hereon, and shall run with the land.

Executed by the City of Vista and by Property Owner in Vista, California.

NOTE: NOTARY ACKNOWLEDGMENTS FOR ALL SIGNATURES MUST BE NOTARIZED

_____ (Duly Authorized Signature) _____ (Company Name) _____ (Print Name & Title) _____ (Date) _____ (Duly Authorized Signature) _____ (Company Name) _____ (Print Name & Title) _____ (Date)	_____ SEE ATTACHED EXHIBITS _____ SEE DRAWING NUMBERS APPROVED By: _____ (City Engineer) _____ (Date)

Project ID:

CHECKLIST FOR NEW DEVELOPMENT AND REDEVELOPMENT

Project Name: _____

Project Location: _____

INSTRUCTIONS

To address pollutants that may be generated from development, the City requires that new development and redevelopment projects incorporate permanent Stormwater Best Management Practices (BMPs) into the project design, which are described in the City's Standard Urban Storm Water Mitigation Plan (SUSMP).

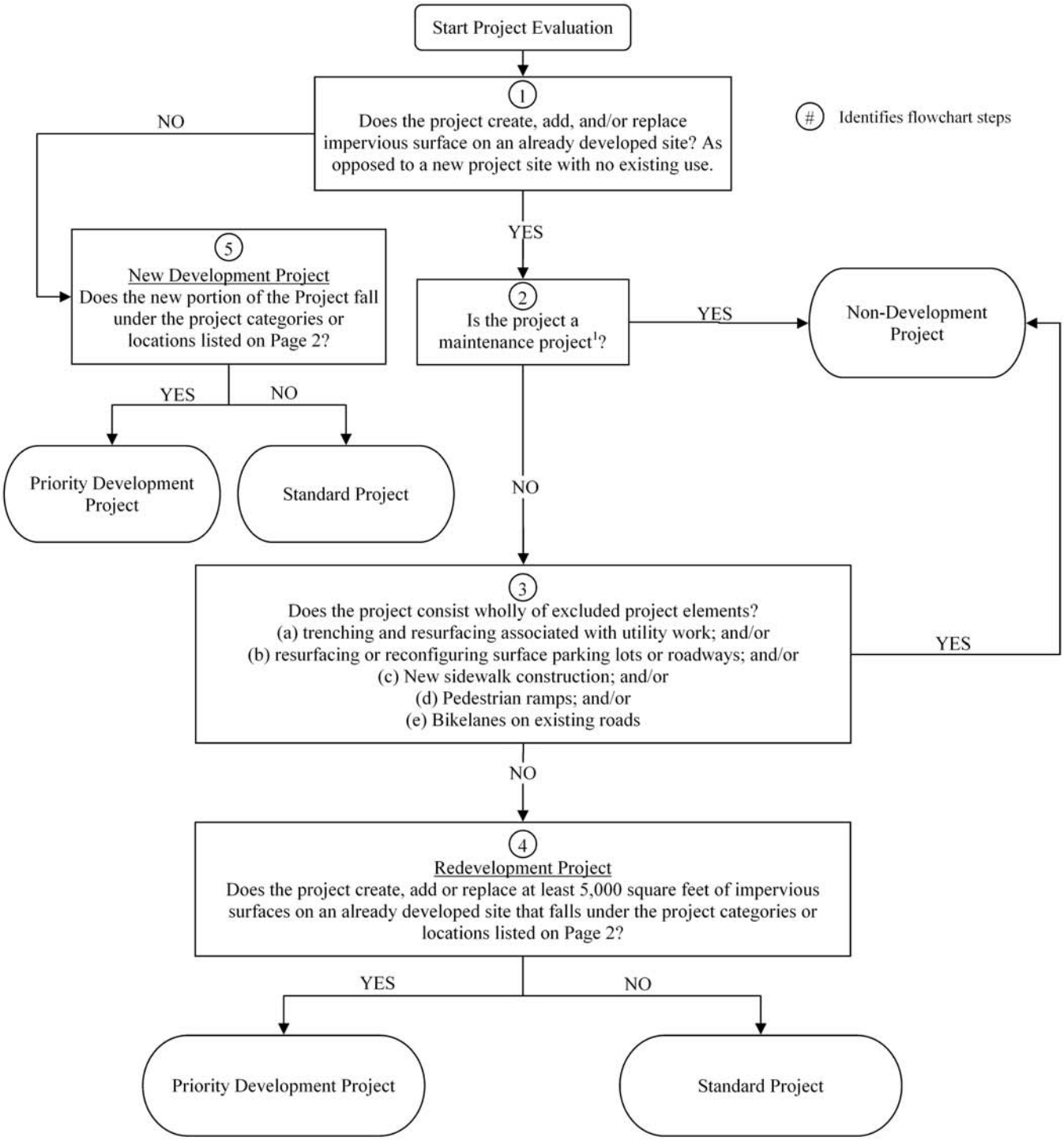
This checklist must be completed by applicant in advance of submitting a development application (subdivision and land use planning approvals and construction permits). The results of the checklist determine the level of stormwater pollution prevention standards and permanent BMPs required for the proposed development or redevelopment project. Many aspects of project site design are dependent upon these standards and requirements for a project.

Applicant responses to the checklist represent an initial assessment of the proposed project conditions and impacts. City Land Development staff have the responsibility for making the final assessment after submission of the development application. City staff determination that the development application is subject to more stringent stormwater standards than initially assessed by the applicant, will result in the return of the development application as incomplete.

If applicants are unsure about the meaning of a question or need help in determining how to respond to one or more of the questions, they are advised to seek assistance from the City Land Development staff.

A separate completed and signed checklist must be submitted for each application submittal. Only one completed and signed checklist is required when multiple development applications for the same project are submitted concurrently. In addition to this checklist, applicants for construction permits must also complete, sign and submit an Urban Runoff Threat Assessment Questionnaire for Construction Activity.

This checklist should be used to categorize new development and redevelopment projects as priority, standard or non-development projects, to determine if a project is subject to SUSMP requirements. The following flowchart, Figure 1, may assist the project applicant in categorizing the proposed project.



Project Type Determination Flowchart

[1]Maintenance projects are defined as those where impervious surfaces may be removed, however the underlying soils are not exposed and/or routine replacement of damaged pavement, such as pothole repair

SECTION 1 – Redevelopment Determination Part I

REDEVELOPMENT – PART I	YES	NO
1. Is your project a **Redevelopment Project**? ***Redevelopment*** *is defined as the creation, addition or replacement of at least 5,000 square feet of impervious surface on an* *<u>already developed site which falls under the project categories listed in Table 1 in Section 4 below</u>* ***Examples of Redevelopment*** *include, but are not limited to: the expansion of a building footprint; road widening; addition to or replacement of a structure and creation or addition of impervious surfaces; Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction.* *Redevelopment does not include trenching and resurfacing associated with utility work; resurfacing and reconfiguring surface parking lots and existing roadways; new sidewalk construction, pedestrian ramps, or bike lane on existing roads; and routine replacement of damaged pavement, such as pothole repair.* *If the Redevelopment results in an increase of less than fifty percent of the impervious surfaces of a previously existing development,* ***and*** *the existing development was not subject to SUSMP requirements, the numeric sizing criteria discussed in the City's SUSMP and R-9 Order 2007-0001 NPDES CAS0108758 Section D.1.d.applies only to the addition, and not to the entire development. Conversely, if the redevelopment results in an increase of greater than or equal to 50% of the impervious surfaces of a previously existing development, the criteria apply to the entire project.*		
If you answered **YES**, your project is considered redevelopment. Please proceed to Section 2. If you answer **NO**, then your project is not considered redevelopment. Please proceed to Section 4.		

SECTION 2 – Maintenance Projects Determination

MAINTENANCE PROJECTS	YES	NO
1. Is your project a **Maintenance Project**? *Maintenance Projects are defined as those projects where impervious surfaces may be removed, however the underlying soils are not exposed and/or routine replacement of damaged pavement, such as pothole repair or street overlay projects.*		
If you answered **YES**, your project is considered a Maintenance Project, and it is considered a Non-Development Project, and post construction requirements do not apply. Please proceed to Section 5 and check the **Non-Development Project** box. If you answered **NO,** please proceed to Section 3.		

SECTION 3 – Redevelopment Determination Part II

REDEVELOPMENT – PART II	YES	NO
1. Is your project an addition to an existing priority project type? *Priority projects are defined in Table 1, Section 4.*		
If you answered **YES**, please proceed to Question 2 of this section. If you answered **NO,** then your project is not considered redevelopment and is not subject to priority project requirements, only standard requirements. Please proceed to Section 5 and check the **Standard Project** box.		
2. Does your project consist wholly of one or more of the following:		
a. Trenching and resurfacing associated with utility work?		
b. Resurfacing and reconfiguring surface parking lots?		
c. New sidewalk construction, pedestrian ramps, or bike lanes on public and/or private existing roads?		
d. Replacement of damaged pavement?		
If you answered **NO** to **ALL** of the questions, please proceed to Question 3. If you answered **YES** to **ONE OR MORE** of the questions then your project is not a redevelopment project and is not subject to priority or standard project requirements. Please proceed to Section 5 and check the **Non-Development Project** box.		
3. Will the development create, add or replace at least 5,000 ft^2 of impervious surfaces on an existing development?		
If you answered **YES**, your project is considered a Priority Redevelopment Project and you are subject to priority project requirements. Please proceed to Section 5 and check the **Priority Development or Redevelopment Project** box. If you answered **NO,** then your project is **NOT** considered a Priority Redevelopment Project and is **NOT** subject to priority project requirements, only standard requirements. Please proceed to Section 5 and check the **Standard Project** box.		

SECTION 4 – New Development Determination

NEW DEVELOPMENT	YES	NO
1. Is your project a **New Development Project**? *New Development projects are defined as those projects listed in categories A-K in Table 1 below per R-9 Order 2007-0001 NPDES CAS0108758 Section D.1.d that are not part of an already developed site.*		

Table 1 **Is the project in any of these categories?**

Yes ❑	No ❑	A	**Housing subdivisions of 10 or more dwelling units**. Examples: single-family homes, multi-family homes, condominiums, and apartments.
Yes ❑	No ❑	B	**Commercial—greater than one acre**. Any development other than heavy industry or residential. Examples: hospitals; laboratories and other medical facilities; educational institutions; recreational facilities; municipal facilities; commercial nurseries; multi-apartment buildings; car wash facilities; mini-malls and other business complexes; shopping malls; hotels; office buildings; public warehouses; automotive dealerships; airfields; and other light industrial facilities.
Yes ❑	No ❑	C	**Heavy industry—greater than one acre.** Examples: manufacturing plants, food processing plants, metal working facilities, printing plants, and fleet storage areas (bus, truck, etc.).
Yes ❑	No ❑	D	**Automotive repair shops.** A facility categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539.
Yes ❑	No ❑	E	**Restaurants.** Any facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), where the land area for development is greater than 5,000 square feet. Restaurants where land development is less than 5,000 square feet shall meet all SUSMP requirements except for structural treatment BMP and numeric sizing criteria requirements and hydromodification requirements.
Yes ❑	No ❑	F	**Hillside development greater than 5,000 square feet.** Any development that creates 5,000 square feet of impervious surface and is located in an area with known erosive soil conditions, where the development will grade on any natural slope that is twenty-five percent or greater.
Yes ❑	No ❑	G	**Environmentally Sensitive Areas (ESAs).**[1] All development located within or directly adjacent to or discharging directly to an ESA (where discharges from the development or redevelopment will enter receiving waters within the ESA), which either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed project site to 10% or more of its naturally occurring condition. "Directly adjacent" means situated within 200 feet of the ESA. "Discharging directly to" means outflow from a drainage conveyance system that is composed entirely of flows from the subject development or redevelopment site, and not commingled with flows from adjacent lands.
Yes ❑	No ❑	H	**Parking lots 5,000 square feet or more** or with 15 or more parking spaces and potentially exposed to urban runoff.
Yes ❑	No ❑	I	**Street, roads, highways, and freeways**. Any paved surface that is 5,000 square feet or greater used for the transportation of automobiles, trucks, motorcycles, and other vehicles.
Yes ❑	No ❑	J	**Retail Gasoline Outlets (RGOs)** that are: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.
Yes ❑	No ❑	K	**Development Projects—greater than one acre.** Any development projects that result in the disturbance of one acre or more of land.

[1]Environmentally Sensitive Areas include but are not limited to all Clean Water Act Section 303(d) impaired waterbodies; areas designated as Areas of Special Biological Significance by the State Water Resources Control Board (Water Quality Control Plan for the San Diego Basin (1994) and amendments); waterbodies designated with the RARE beneficial use by the State Water Resources Control Board (Water Quality Control Plan for the San Diego Basin (1994) and amendments); areas designated as preserves or their equivalent under the Multi Species Conservation Program within the Cities and County of San Diego; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees.

[2] "Directly adjacent" means situated within 200 feet of the environmentally sensitive area.

[3] "Discharging directly to" means outflow from a drainage conveyance system that is composed entirely of flows from the subject development or redevelopment site, and not commingled with flow from adjacent lands.

If you checked **YES** for **ANY** of the categories above, the proposed project is a priority project and priority project requirements apply. Please proceed with Section 5 and check the **Priority Development** box.

If you checked **NO** for **ALL** of the categories above, then the project is a non priority project and standard project requirements apply. Please proceed with Section 5 and check the **Standard Project** box.

If your project is **NOT** new development but may be considered redevelopment, then please return to Section 3 if you have not already done so

SECTION 5 – Final Determination

Based on the information provided in Sections 1-4, this project is determined to be a:

☐ **PRIORITY DEVELOPMENT OR REDEVELOPMENT PROJECT.** PRIORITY REQUIREMENTS APPLY AND A WATER QUALITY TECHNICAL REPORT (WQTR) MUST BE SUBMITTED AT THE TIME OF APPLICATION.

☐ **STANDARD PROJECT.** STANDARD REQUIREMENTS APPLY AND APPLICABLE SECTIONS OF A WATER QUALITY TECHNICAL REPORT (WQTR) MUST BE SUBMITTED AT THE TIME OF APPLICATION.

☐ **NON DEVELOPMENT PROJECT.**

Applicant Information and Signature Box

Address:	APN(s)
Applicant Name:	Applicant Title:
Applicant Signature:	Date:

City use only

Concur:	Yes	No
By:		
Date:		
Land Dev #:		

This information is available in alternate format by request to Joan Turley at (760) 639-6100

Appendix D

Municipal Inventory

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Appendix D. Municipal Inventory

Facility	Address Number	Address Street	Description	HSA_Number	HSA_Name	Watershed	WMA	Pollutants									Adjacent to ESA (200ft)	Within HSA and generage same 303(d) pollutants
								Sediment	Nutrients	Trash	Metals	Bacteria	Oil & Grease	Organics	Pesticides	Oxygen Demanding Substances		
523 S. Santa Fe - Parking Lot	523	S. Santa Fe	Parking Lot - 523 S. Santa Fe	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X		X		
Avo Playhouse	303	Main St	Theater and Parking Lot	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X	X	X		
Breeze Hill Park	645	S. Melrose Dr.	Park and Parking Lot	904.31	Los Monos	Agua Hedionda	Carlsbad	X	X	X		X			X	X		X
Brengle Terrace Detention Basin	1100	Vale Terrace Dr.	Detention Basin	904.22	Vista	Buena Vista Creek	Carlsbad	X									X	
Brengle Terrace Park	1200	Vale Terrace Dr.	Park, Parking Lot, and Maintenance Area	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X		X			X	X	X	
Bub Williamson Park	530	Grapevine Rd	Park and Parking Lot	904.21	El Salto	Buena Vista Creek	Carlsbad	X	X	X		X			X	X		
Buena Creek Sewer Pump Station	2080	S. Melrose	Wastewater - Buena Pump Station	904.31	Los Monos	Agua Hedionda	Carlsbad	X	X	X	X	X				X	X	X
Buena Sanitation Yard	2525	Lupine Hills	Buena Station 52, Corporate Yard, and Storage	904.31	Los Monos	Agua Hedionda	Carlsbad	X	X	X	X	X	X	X	X	X		X
Buena Vista Park	2009	S. Melrose Dr.	Open Space Trails and Park (at Agua Hedionda)	904.31	Los Monos	Agua Hedionda	Carlsbad	X	X	X		X			X	X	X	X
Buena Vista Park (Duck Pond)	1749	Shadowridge Dr.	Duck Pond, Park, and Parking Lot	904.31	Los Monos	Agua Hedionda	Carlsbad	X	X	X		X			X	X		X
Creekside Park		Main St. & Wave Dr.	Park and high flow channel	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X		X			X	X	X	
Cypress Basin		Monte Vista Dr. & Cypress Dr.	Detention & Mitigation Basin	904.22	Vista	Buena Vista Creek	Carlsbad	X										
Fire Station #1	175	N. Melrose Dr	Fire Station	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X	X	X		
Fire Station #2	1050	Valley Drive	Fire Station	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X	X	X		
Fire Station #3	1070	Old Taylor St.	Fire Station	903.11	Mission	Lower San Luis Rey	San Luis Rey	X	X	X	X	X	X	X	X	X		X
Fire Station #4	2121	Thibodo Rd	Fire Station	904.32	Buena	Agua Hedionda	Carlsbad	X	X	X	X	X	X	X	X	X		X
Fire Station #5	2009	S. Melrose Dr.	Fire Station	904.31	Los Monos	Agua Hedionda	Carlsbad	X	X	X	X	X	X	X	X	X	X	X
Fire Station #6	651	E. Vista Way	Fire Station	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X	X	X	X	
HHW / Auxillary Yard	1145	E. Taylor St	Household Hazardous Waste Collection Center	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X	X	X		
Indian Rock	343	Apollo Dr	Park	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X		X			X	X		
Kiwanis Parkette		Civic Center Dr at Pala Vista Dr	Park	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X		X			X	X		
La Mirada Canyon	1219	Park Center	Open Space	904.31	Los Monos	Agua Hedionda	Carlsbad	X	X	X		X			X	X		
Landscape Maintenance	Varies			varies	varies	varies	varies	X	X	X		X			X	X	Varies	Varies
Luz Duran (Townsite) Park	340	E.Townsite Dr.	Park	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X		X			X	X		
McClellan Senior Center	1400	Vale Terrace Dr.	Senior Center and Parking lot	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X	X	X		
Monte Vista Detention Basin		Monte Vista Dr. & Valley Dr.	Detention Basin	904.22	Vista	Buena Vista Creek	Carlsbad	X										
Moon Sheriffs Office	1477	Moon Rd	Sheriff substation	904.21	El Salto	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X	X	X		
Moonlight Amphitheater	1200	Vale Terrace	Amphitheater	904.22	Vista	Buena Vista Creek	Carlsbad	X		X		X						
MS4 Maintenance	Varies		MS4 System Maintenance	varies	varies	varies	varies	X		X								
NCTD Parking Lot		W. Vista Way @ S. Emerald	Park-and-Ride, north of WB HWY 78, Emerald offramp	904.21	El Salto	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X		X		
Parking Lot C11	303 - 307	Main St	Parking Lot - by Avo Playhouse	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X		X		
Parking Lot C2		E. Broadway - Hanes Pl.	Parking Lot - east of Sonic Drive In	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X		X		
Parking Lot E1		Main St / S. Indiana Ave. S/E corner	Parking Lot - corner Vista Village and N Santa Fe	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X		X		
Parking Lot E3	200 Block	Main St	Parking Lot - north of businesses	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X		X		
Parking Lot E4		Main St - Michigan Ave.	Parking Lot - next to Lush coffee	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X		X		
Plaza and Sidewalk Cleaning	Varies			varies	varies	varies	varies	X		X		X	X				Varies	Varies
Public Works	1165	E. Taylor Street	Corporate Yard	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X	X	X		
Raceway Sewer Pump Station	2685	S. Melrose	Wastewater - Raceway Pump Station	904.31	Los Monos	Agua Hedionda	Carlsbad	X	X	X	X	X				X		X
Raintree Park	545	Townsite Dr.	Park	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X		X			X	X		
Rancho Buena Vista Adobe	640	Alta Vista	Attraction	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X		X			X		X	
Rancho Buena Vista Park (Baseball Fields)	1851	S. Melrose Dr.	Park and Parking Lot (at Shadowridge Dr)	904.31	Los Monos	Agua Hedionda	Carlsbad	X	X	X		X			X	X		X
Road and Street Maintenance	Varies			varies	varies	varies	varies	X			X		X	X		X	Varies	Varies
S. Santa Fe Detention Basin		Monte Vista Dr / S. Santa Fe Ave.	Detention Basin	904.22	Vista	Buena Vista Creek	Carlsbad	X										
San Diego County Library	700	Eucalyptus	Library and Parking Lot	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X	X	X		
Shadowridge Park	2101	Lupine Hills	Park	904.32	Buena	Agua Hedionda	Carlsbad	X	X	X		X			X	X		X

Appendix D. Municipal Inventory

Facility	Address Number	Address Street	Description	HSA_Number	HSA_Name	Watershed	WMA	Pollutants									Adjacent to ESA (200ft)	Within HSA and generage same 303(d) pollutants
								Sediment	Nutrients	Trash	Metals	Bacteria	Oil & Grease	Organics	Pesticides	Oxygen Demanding Substances		
South Buena Vista Park (Dog Park) and Basin	1602	Mountain Pass Cr.	Park and Detention Basin	904.31	Los Monos	Agua Hedionda	Carlsbad	X	X	X		X			X	X		X
Thibodo Park	1150	Lupine Hills Dr.	Park, Community Center, Parking Lot	904.32	Buena	Agua Hedionda	Carlsbad	X	X	X		X		X	X	X		X
Thibodo Sheriffs Office	2082	Thibodo	Sheriff substation	904.32	Buena	Agua Hedionda	Carlsbad	X	X	X	X	X	X	X	X	X		X
Townsite Service Center	642	Vista Village Dr.	Community Center	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X	X	X		
Townsite Sheriffs Office	340	E. Townsite	Sheriff substation	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X	X	X		
Vista Civic Center	600	Eucalyptus	City Hall, Park, and Parking Lot	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X	X	X		
Vista Sports Park	1600	Sports Park Way	Park and Sports Fields	903.11	Mission	Lower San Luis Rey	San Luis Rey	X	X	X		X			X	X		
Vista Village Sheriffs Office	30	Main St.	Sheriff substation	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X	X	X		
Vista Village Walk		Vista Village Dr / Michigan Ave.	Green Belt Walkway	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X		X			X	X		
Waste Handling and Disposal	Varies			varies	varies	varies	varies	X	X	X	X	X	X	X	X	X	Varies	Varies
Wastewater Utility Maintenance	Varies			varies	varies	varies	varies	X	X	X	X	X				X	Varies	Varies
Wave Waterpark	101	Wave Dr.	Waterpark	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X	X	X	X	X	X	X	X	
Wildwood Park	651	E. Vista Way	Park and Parking Lot (at Fire Station #6)	904.22	Vista	Buena Vista Creek	Carlsbad	X	X	X		X			X	X	X	

Notes:
SIC and NAICS codes are designed to categorize business operations and are not considered applicable to municipal facilities.
All inventoried municipal facilities are considered active.
No municipal facilities are subject to the Industrial General Permit.
Pollutant categories with an "X" indicate a *likely* or *potential* source for that pollutant.

Appendix E

Retrofitting and Rehabilitating Existing Development

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Appendix E. Retrofitting and Rehabilitating Existing Development

1 Introduction

The Regional Water Quality Control Board, San Diego Region (RWQCB) Order No. R9-2013-0001, as amended by Order No. R9-2015-0001 (MS4 Permit), requires all 21 San Diego area government agencies to identify areas of existing development to address sources of pollutants and/or stressors that contribute to the highest priority water quality conditions in the Watershed Management Areas (WMAs). Retrofit projects, such as strategically placed structural best management practices (BMPs), may be used to reduce pollutants discharged due to stormwater runoff or hydro-modification from existing development areas. In addition, the RWQCB requires agencies to develop a program to rehabilitate streams, channels, and/or habitats. In the Carlsbad and San Luis Rey WMAs, the City will focus its retrofit and rehabilitation programs on bacteria, which has been identified as the highest priority water quality condition (HPWQC) in each watershed.

Section 2 discusses the City's strategy and approach for identifying, prioritizing, and implementing candidate retrofit and stream rehabilitation projects.

2 Program Development Strategies

Regional guidance for initiating a Copermittee-specific retrofit and rehabilitation program was initiated through the Watershed Management Area Analysis (WMAA) process and development of WQIPs. Development and refinement of the City's retrofit and rehabilitation program will be influenced by gaining a better understanding of the dynamic between Oceanside's existing development and highest priority water quality conditions identified in the Water Quality Improvement Plans (WQIPs). Over time, the City will develop a retrofit and rehabilitation program that will identify feasible and cost-effective opportunities to improve water quality conditions created, in part, by existing development. The following strategies will be considered and/or implemented as the City develops its retrofit and rehabilitation program:

- Alternative compliance provisions for development projects, which allow offsite retrofit or rehabilitation projects in lieu of meeting the applicable storm water requirements solely through onsite best management practices (BMPs). This effort is being considered by the City and other Copermittees, who are collectively completing research to provide technical information that can serve as a foundation for future alternative compliance

programs. The processes for approving, implementing, maintaining, and reporting on such projects will be identified when this effort is more mature.

- Obtaining grants for storm water improvements, led by the Development Services Department and Water Utilities Department. The City has been successful in obtaining grant funding in the past, including the Loma Alta Creek Ultra-Violet Treatment Facility, and Vector Habitat Remediation Projects along Pilgrim Creek and in Loma Alta Slough. The City will continue to pursue grant opportunities, when feasible. For example, the City is awaiting formal announcement on being awarded funding for the Microbial Source Identification Study for Buccaneer Beach and Loma Alta Slough from the State Water Resources Control Board, Clean Beaches Initiative Grant Program.
- Identifying and implementing projects, such as existing facility structural BMP retrofits and green infrastructure improvements to comply with applicable Total Maximum Daily Load (TMDL) requirements.
- Restore riparian habitats to protect water quality, particularly for highly erodible areas.

Overall, the City will employ a range of strategies to facilitate the implementation or construction of retrofit and rehabilitation projects in accordance with the WQIPs. The City may also consider partnering with other neighboring jurisdictions to install regional BMPs where retrofit projects are deemed to provide a greater net benefit to the City than projects implemented only by the City.

3 Candidate Projects

The following discussion provides a framework for identifying candidate retrofit and rehabilitation project areas.

3.1 Project Criteria

As defined by the MS4 Permit, a *retrofit* is a "storm water management practice put into place after development has occurred in watersheds where the practices previously did not exist or are ineffective." Retrofit projects often involve the introduction of structural BMPs to a previously underserved area, such as constructing new detention or bioretention facilities. Retrofits can also include downspout disconnection efforts (redirecting downspouts to pervious areas); the installation of rain barrels; or implementation of 'green street' practices.

Similarly related are *rehabilitation* projects, which implement methods of in-stream restoration, off-line storm water management practices installed in the system corridor or upland areas, or a combination of in-stream and out-of-stream techniques. Rehabilitation projects may include riparian zone restoration, constructed wetlands, channel modifications, and daylighting of drainage systems.

The following criteria will be considered by the City when identifying candidate retrofit and rehabilitation projects:

- **HPWQC and WQIP numeric goals.** Priority will be assigned to retrofit and rehabilitation candidate projects that help meet WQIP numeric goals by directly targeting the HPWQC, bacteria, or by targeting conditions contributing to the HPWQC. Because numeric goals in the Carlsbad WMA apply to specific focus areas within the City, projects located in focus areas identified in the Carlsbad WQIP are especially desirable.
- **Project feasibility.** The feasibility of a project includes consideration of characteristics such as cost, constructability, pollutant-removal potential, long-term operation, and project impediments. Moreover, projects that place a considerable burden on City resources relative to their environmental and/or compliance benefit, may be infeasible.
- **Land use.** Land use of the area tributary to a potential retrofit project is an important consideration when selecting retrofit and rehabilitation project candidates. Projects that receive runoff from land uses with a higher potential to contribute pollutants associated with HPWQCs are likely to be most helpful in meeting WQIP numeric goals.
- **Multiple project benefits or uses.** Candidate projects with the potential to contribute to the overall enhancement of the local community are preferred, and preference may be given to the following:
    - Improved flood control and protection
    - Enhanced walkability, pedestrian safety, and accessibility
    - Improved access to open spaces or recreational opportunities
    - Community beautification, such as streetscape aesthetics or incorporating murals other features with significant artistic value
    - Enhanced or expanded habitat for native plant and animal communities
- **Land availability.** Land availability and ownership are critical in evaluating candidate retrofit or rehabilitation projects. For example, candidate projects consisting of multiple privately-owned properties may prove more challenging than projects sited on single-owner property. Similarly, City-owned property may provide retrofit and rehabilitation opportunities not feasible at privately-owned proprieties.
- **Maximize infiltration and retention.** Priority will be assigned to candidate projects that maximize stormwater infiltration and retention. Such projects provide multiple benefits through pollutant removal, runoff volume reduction, and groundwater recharge. Site-specific conditions (e.g., soil type, depth to groundwater, topography, existing

structures) will influence the feasibility of implementing infiltration and retention practices.

3.2 Potential Projects

Given the preceding criteria, the City will identify candidate retrofit and rehabilitation projects as strategic and feasible opportunities arise. These opportunities may emerge through alternative compliance proposals, capital improvement projects, grant funding/awards, public and citizen interest, or private-development partnerships. The San Luis Rey and Carlsbad WQIPs and previous studies, such as the regional WMAA, the Agua Hedionda Watershed Management Plan, and the San Luis Rey Comprehensive Load Reduction Plan (CLRP) also provide resources for identifying candidate retrofit and rehabilitation projects.

During preparation of the San Luis Rey CLRP, which was developed in response to the bacteria TMDL, the City and the other responsible parties identified priority storm drain catchments for implementing retrofits. Catchments were prioritized to identify infrastructure within the watershed that had the potential to generate the highest pollutant load during a rain event. In some cases, locations were identified for potential structural BMPs. These potential structural BMPs were identified within high priority catchments, and considered factors such as parcel size, land ownership, and proximity to storm drains. Additional information can be found in the San Luis Rey CLRP (Geosyntec 2012).

More recently, as part of the development of WQIPs in 2014, candidate projects were identified through the WMAA for both the Carlsbad WMA and the San Luis Rey River WMA. The WMAA includes a GIS-based analysis of each WMA's physical characteristics, such as present and anticipated future land uses, as well as locations of physical structures within streams and upland areas that impact watershed hydrology (i.e., bridges, culverts, and flood management basins). Using this information, candidate projects were discussed. The WMAA results, including discussion of candidate projects, are included as attachments to the Carlsbad WQIP (MOE 2015; Appendices D and E) and San Luis Rey WQIP (Geosyntec 2015; Appendix 3H).

References

California Regional Water Quality Control Board, San Diego Region, 2015. Order No. R9-2013-0001, as amended by Order No. R9-2015-0001. *Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of San Diego, the Incorporated Cities of San Diego County, the San Diego Unified Port District, and the San Diego County Regional Airport Authority.*

Geosyntec, 2012. *Comprehensive Load Reduction Plan for the San Luis Rey River Watershed.*

Geosyntec, 2015. *San Luis Rey Watershed Management Area Water Quality Improvement Plan.*

Mikhail Ogawa Engineering (MOE), 2015. *Carlsbad Watershed Management Area Water Quality Improvement Plan.*

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Appendix F

Construction Inspection Forms

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Contents

- Municipal NPDES Stormwater Permit Construction Site Andactivities Inspection Form
- New Construction - Activities Inspection Form Info Sheet

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MUNICIPAL NPDES STORMWATER PERMIT CONSTRUCTION SITE AND ACTIVITIES INSPECTION FORM

INSPECTION DATE: 10/1/2014 **Inspector:** NA **Inspection Season: Wet (10/1 - 4/30)**

Project Name: **Address:**

APN: **Lat:** **Long:**

Water Quality Threat Priority: High *Note: ALL Sites and Activities are HIGH TTWQ*

- **WMA: Carlsbad 904** **HA:** Buena Vista Creek 904.2 **HSA:** Upper Buena Vista Creek 904.22
- **Total Acres:** Click here to enter text. **Total Disturbed Acres:** Click here to enter text.
- **Project Application:** ☐ **LD #: :** ☐ **GP#:** ☒ **Other :**
- **Project Type:** ☐ Land Development ☐ CIP ☐ Other Agency ☐ Other: Click here to enter text.
- **Construction Start Date:** Click here to enter a date. **Construction End Date:** Click here to enter a date.
- **SUSMP Priority:** NA

Follow-Up: ☐Yes ☐No **Weekly: ☐Yes ☐No** **Date Corrected ☐ 5/14/2015**

Chance of Rain: 0% **24 hour forecast** **Rainfall: Estimate Since Last inspection:** 0 in

REAP: ☐Yes ☐No ***Date Site Notified of REAP: 5/14/2015***

NOAA: http://forecast.weather.gov ***NOTE: 50% Chance of Rain 48 hours Ahead Triggers REAP TEAM Action Plan***

☐GCP Only: REAP Onsite AND Site Stabilized within 24 hrs ☐ Yes ☐No

***If NO - Enforcement Action Required – Fill in Enforcement Action Summary Box Below**

☐Non GCP: BMPs Employed w/in 24 hrs ☐ Yes ☐No

***If NO - Enforcement Action Required – Fill in Enforcement Action Summary Box Below**

ENFORCEMENT ACTION SUMMARY (Required for REAP)

1.INSPECTOR Recommended Enforcement Action (Refer to Detailed Inspection Report and Photo Log):

Inspector Name: **NA** **☐ Other:**

☐Correction Notice (72 hours to Correct) ☐NOV ☐Stop Work

NOTE: Stop Work Must be copied to Stormwater Program Manager for Required Report to SDRWQCB w/in 5 calendar days

Inspector Signature: _____ Date:_____ Re-inspection Date:_____

Reviewed By:_____ Date:_____

Enforcement Action Approved: ☐Correction Notice (72 hours to Correct) ☐NOV ☐Stop Work ☐NA

City Supervisor Signature or Delegated Representative: _____: Date:_____

Site Representative:

Received By: _____ Print Name:_____ Date:_____

☐E-Mailed to: ☐Owner/Developer ☐QSP ☐QSD ☐Other:

BMPS are Required Year Round For Each Phase of Construction. The City Inspector Can Require Additional BMPs to Protect the City's Storm Drain System From Stormwater and Non Stormwater Discharges of Sediment and Pollutants from Construction Activities.

MUNICIPAL NPDES STORMWATER PERMIT CONSTRUCTION SITE AND ACTIVITIES INSPECTION FORM

Inspection Location(s): ☐On-Site ☐Off-Site ☐Other:

Construction Phase(s) (Use all that apply): Choose an item. Choose an item. Choose an item.

- **SWRCB CONSTRUCTION GENERAL PERMT**(Order 2009-0009/2010-0014/2012-0006) ☐ **YES** ☐ **NO**
- **WDID#:** Click here to enter text. **Risk Level: NA**
- **SWPPP/Construction BMP Plan Onsite:** ☐ **YES** ☐ **NO**
- **Dewatering**☐ **YES** ☐ **NO**
  - SDRWQCB Individual NPDES Permit (Order R9 2008-002): ☐ YES ☐ NO
  - SDRWQCB –Conditional Waiver #3 (Order R9 2014-0041) ☐ YES ☐ NO
- Discharge to Sewer ☐ YES ☐ NO Sewer Bypass Plan ☐ YES ☐ NO
- Hydrostatic Testing/Flushing (Order 2010-0003)☐ YES ☐ NO
- Utility Location: ☐ YES ☐ NO
  Utility Vault Dewatering(SWRCB Order 2006-0008/2014-0174)☐ YES ☐ NO
- Other SDRWQCB Conditional Waiver (Order R9 2014-0041): ☐ YES ☐ NO **Waiver#:** Choose an item.
- Actual Non Stormwater Discharge from Site: ☐ YES ☐ NO
  *** If Yes CC: Stormwater Program Manager**
- Sediment Tracking Offsite: ☐ YES ☐ NO
- Potential OR Actual Discharge of Pollutants ☐ YES ☐ NO
  ***If Yes CC: Stormwater Program Manager**
- Potential OR Actual Illicit Connections or Discharges ☐ YES ☐ NO
  ***If Yes CC: Stormwater Program Manager**
- **BMP INSPECTION SUMMARY:**
- **Comments:**Click here to enter text.
- **Correction (mark all that apply) and Resolution:**

BMP Missing/ Ineffective	☐	**Corrected**	☐
BMP Maintenance	☐	**Additional Corrections Needed**	☐
No REAP/ Documents	☐	**Enforcement Escalated**	☐
Discharge/ Tracking (TC 1 & 2 & NS 6)	☐	**Reported to SDRWQB & SWRCB**	☐

- **DETAILED INSPECTION REPORT**

CASQA #/Title	Status	Location	Effectiveness	Photo Log #	Comment
EC-3/EC-4/EC-5 Hydraulic Mulch/Hydroseeding/Soil Binders	Not Used	☐Onsite ☐ Offsite	NA		
EC-7 Geotextiles and Mats	Not Used	☐Onsite ☐ Offsite	NA		
SE-1 Silt Fence	Not Used	☐Onsite ☐ Offsite	NA		
SE-2/SE-3 Sediment Basin/Sediment Trap	Not Used	☐Onsite ☐ Offsite	NA		
SE-4 Check Dam	Not Used	☐Onsite ☐ Offsite	NA		
SE-5 Fiber Rolls	Not Used	☐Onsite ☐ Offsite	NA		
SE-6 Gravel Bag Berm	Not Used	☐Onsite ☐ Offsite	NA		
SE-7 Street Sweeping and Vacuuming	Not Used	☐Onsite ☐ Offsite	NA		

BMPS are Required Year Round For Each Phase of Construction. The City Inspector Can Require Additional BMPs to Protect the City's Storm Drain System From Stormwater and Non Stormwater Discharges of Sediment and Pollutants from Construction Activities.

MUNICIPAL NPDES STORMWATER PERMIT CONSTRUCTION SITE AND ACTIVITIES INSPECTION FORM

CASQA #/Title	Status	Location	Effectiveness	Photo Log #	Comment
SE-8 Sandbag Barrier	Not Used	☐Onsite ☐ Offsite	NA		
SE-10 Storm Drain Inlet Protection	Not Used	☐Onsite ☐ Offsite	NA		
WE-1 Wind Erosion Control (Dust)	Not Used	☐Onsite ☐ Offsite	NA		
TC-1/TC-2 Stabilized Construction Entrance/Exit/Roadway	Not Used	☐Onsite ☐ Offsite	NA		
NS-2 Dewatering Operations (Need Permit Prior to Start and/or Agency Approval)	Not Used	☐Onsite ☐ Offsite	NA		
NS-3 Paving & Grinding Operations	Not Used	☐Onsite ☐ Offsite	NA		
NS-6 Illicit Connection /Discharge : CC Stormwater	Not Used	☐Onsite ☐ Offsite	NA		
NS-8/NS-9/NS-10 Vehicle & Equipment/Cleaning/Fueling/Maintenance	Not Used	☐Onsite ☐ Offsite	NA		
NS-12/NS-13 Concrete Curing/Finishing	Not Used	☐Onsite ☐ Offsite	NA		
WM-1 Material Delivery and Storage	Not Used	☐Onsite ☐ Offsite	NA		
WM-3 Stockpile Management	Not Used	☐Onsite ☐ Offsite	NA		
WM-4 Spill Prevention and Control	Not Used	☐Onsite ☐ Offsite	NA		
WM-5 Solid Waste Management	Not Used	☐Onsite ☐ Offsite	NA		
WM-Hazardous Waste Management	Not Used	☐Onsite ☐ Offsite	NA		
WM-7 Contaminated Soil Management	Not Used	☐Onsite ☐ Offsite	NA		
WM-8 Concrete Waste Management	Not Used	☐Onsite ☐ Offsite	NA		
WM-9 Sanitary/Septic Waste Management	Not Used	☐Onsite ☐ Offsite	NA		
WM-10 Liquid Waste Management	Not Used	☐Onsite ☐ Offsite	NA		

BMPS are Required Year Round For Each Phase of Construction. The City Inspector Can Require Additional BMPs to Protect the City's Storm Drain System From Stormwater and Non Stormwater Discharges of Sediment and Pollutants from Construction Activities.

MUNICIPAL NPDES STORMWATER PERMIT CONSTRUCTION SITE AND ACTIVITIES INSPECTION FORM
PHOTO LOG

Photo of Correction	Photo of Resolution of Correction and Date Correction Completed
1Click here to enter text.	1
3Click here to enter text.	3
4	4
5	5

BMPS are Required Year Round For Each Phase of Construction. The City Inspector Can Require Additional BMPs to Protect the City's Storm Drain System From Stormwater and Non Stormwater Discharges of Sediment and Pollutants from Construction Activities.

MUNICIPAL NPDES STORMWATER PERMIT CONSTRUCTION SITE AND ACTIVITIES INSPECTION FORM

6	6
7	7
8	8

BMPS are Required Year Round For Each Phase of Construction. The City Inspector Can Require Additional BMPs to Protect the City's Storm Drain System From Stormwater and Non Stormwater Discharges of Sediment and Pollutants from Construction Activities.

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PROJECT NAME:	
PHASE (PERMIT ISSUED): DATE APPROVED:	
DEPARTMENT: (*LAND DEV., CIP, BUILDING*)	
PROJECT TYPE: *(RESIDENTIAL, INDUSTRIAL, COMMERCIAL, ROAD, UTILITIES, DEMOLITION)*	
APN:	
HYDROLOGIC SUB-AREA:	
WATERSHED MANAGEMENT AREA:	
HYDROLOGIC AREA:	
LAT & LONG:	
LD #:	
GRADING PLAN #:	
DATE CONSTRUCTION BMP PLAN APPROVED:	
CIP:	
OWNER:	
ADDRESS, PHONE, EMAIL	
DEVELOPER/ CONTRACTOR:	
ADDRESS, PHONE, EMAIL	
QSP NAME:	
ADDRESS, PHONE, EMAIL	
QSD NAME:	
ADDRESS, PHONE, EMAIL	
SITE CONTACT/SUPERVISOR:	
PHONE:	
EMERGENCY PHONE (24/7):	

EMAIL:	
APPROX START DATE:	
TTWQ PRIORITY: (*GCP PROJECTS ARE HIGH TTWQ*)	
INSPECTOR:	
INSPECTION FREQUENCY (WET/DRY):	
SIZE OF SITE (ACRES→ *TOTAL = ONSITE + OFFSITE IMPROVEMENTS*):	
DISTURBED AREA (ACRES→*TOTAL = ONSITE + OFFSITE IMPROVEMENTS*):	
WDID #:	

Appendix G

Dry Weather MS4 Outfall Monitoring Procedures and Storm Drain System Map

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Appendix G. Dry Weather MS4 Outfall Monitoring Procedures and Storm Drain System Map

1 Introduction

In accordance with the Regional Water Quality Control Board, San Diego Region (RWQCB) Order No. R9-2013-0001, as amended by Order No. R9-2015-0001 (MS4 Permit), the City of Vista (City), along with other Copermittees, is required to monitor discharges from its major municipal separate storm sewer system (MS4) outfalls during dry weather. Weather is considered dry if the preceding 72 hours has been without measurable precipitation (> 0.1 inch).

The Municipal Permit defines a major MS4 outfall as follows: 1) a single pipe with an inside diameter of at least 36 inches or its equivalent (i.e., discharge from a single conveyance other than a circular pipe which is associated with a drainage area of more than 50 acres); 2) any outfall that discharges from a single pipe with an inside diameter of at least 12 inches or its equivalent (i.e., discharge from other than a circular pipe associated with a drainage area of at least 2 acres) that receives runoff from an area zoned for industrial activity (based on comprehensive zoning plans or equivalent).

This procedural document describes field protocols for conducting routine dry weather MS4 outfall monitoring and for investigations to identify sources of water observed during monitoring.

2 Major MS4 Outfall Inventory

The City has identified the major outfalls within its jurisdiction and maintains an inventory of them as required by the Municipal Permit. In cases where a major outfall is permanently inaccessible (e.g., due to private property constraints, safety concerns, etc.), the nearest accessible upstream location within the MS4 is designated as a proxy for the monitoring site. The major MS4 outfall inventory includes the following information for each monitoring location:

- Latitude and longitude of major MS4 outfall (or the upstream proxy site)
- Watershed Management Area
- Hydrologic subarea
- Outfall size (inches)
- Accessibility (i.e. safety and without disturbance of critical habitat)
- Approximate drainage area (acres)

- Classification of whether the outfall is known to have persistent, transient, none, or unknown dry weather flows

A map of the City's major outfalls is included as Attachment 1.

3 Routine Dry Weather Major MS4 Outfall Site Visits

During each site visit, a field datasheet (Attachment 2) is completed. Steps for completing the datasheet are described in the following sections, which follow datasheet section headings:

3.1 Site Location and Documentation

The first task in conducting a routine site visit is locating the site. This is achieved by using GPS coordinates and the location description provided by the major outfall monitoring site inventory. A hand-held GPS device is used in the field to verify or update coordinates. Once the site has been located and verified, photos are taken to document the condition of the site. Photos are taken facing upstream and downstream of the site so they sufficiently display any water present and notable landmarks when possible.

3.2 Atmospheric Conditions

Weather conditions and rainfall information are recorded on the field datasheet. No City outfalls are influenced by the tide. Since monitoring is only permitted during dry weather, it is important to document that it is being completed during dry weather-defined conditions: >72 hours since the last rain, or <72 hours since the last ran and ≤0.1 inches of precipitation. If neither of those conditions is met, then dry weather monitoring cannot be conducted. The field team should then stop work until dry weather conditions apply again.

3.3 Flow Measurements

At each site, the outfall is assessed for the presence of flow, and the appropriate qualitative option is marked for "Water Flow."

If a site has flowing water, sampling staff should also observe whether the flow reaches the receiving water body. If the sampling site is upstream of the outfall itself due to accessibility constraints, it is usually not possible to visually observe whether the flow reaches the receiving water body. In these cases the "Unknown" option is selected.

At sites with flowing water, the flow rate is also measured and recorded on the field datasheet in gallons per minute (gpm) or cubic feet per second (cfs). If the site location is within a manhole, width, depth and velocity measurements cannot be precisely determined and the flow rate must be estimated. If an outfall has ponded water, the flow is recorded as zero gpm. If an outfall is dry, the flow rate is recorded as "Dry".

There are several methods that can be used to measure the rate of flow, but the most commonly used is the velocity-area ("leaf float") method. This is done by using a stop watch or equivalent

to measure the time it takes for a leaf or similar object to float across a pre-measured distance of flowing water. The flow rate can then be calculated by using width, depth, and velocity measurements.

The three methods used to measure flow rate and a description of each are included below:

Velocity-area method ("leaf float") - The most common method for measuring the discharge of a channel is the velocity-area method. This method requires the physical measurement of the cross-sectional area and the velocity of the flowing water. Discharge is determined as the product of the area times the velocity:

Flow rate (ft^3/sec, or cfs) = Velocity (ft/sec) x Depth (ft) x Width (ft)

The leaf float method involves using a stop watch to measure the time (in seconds) it takes for a leaf or similar object to float across a pre-measured distance (in feet) of the surface of the flowing water. The flow rate can then be calculated by using the equation above. A correction factor between 0.5 and 0.8 should be applied to the flow rate calculation while in the field, based on the width and depth of the flow, as well as on the roughness of the conveyance surface material. In general, the rougher the conveyance surface material, the lower the correction factor that must be applied to the flow rate.

Filling a bottle or known volume method - The rate can be determined by measuring the diameter of the outfall and the length of time it takes to fill a 1-liter bottle or any other container with a known volume. Dividing the volume by the time gives a flow rate. Appropriate conversion factors are then applied to convert that flow rate to gpm or cfs if needed. For example, 1 liter per second is equal to 15.85 gpm.

Partially filled pipe method - This method is applicable to discharges from circular pipes. All measurements should be converted to ft before calculation so that the final flow rate is given in cfs.

The water depth and inside pipe diameter are measured, then the following approach is applied using the partially filled pipe formula chart in Table 1.

- Calculate D/d
  - D = water depth (ft) and d = inside pipe diameter (ft)
- Find the tabulated (Ta) value on the partially filled pipe formula chart below using the D/d value (e.g., If D/d = 0.26 then Ta =0.1623)
- Find the area using the formula $a = Ta*d^2$
- Calculate flow: Q (flow, cfs) = a (ft^2) x Velocity (ft/sec)
- If desired, convert to gpm as follows: 1 cfs = 448.8 gpm

Table 1: Partially Filled Pipe Formula Chart

Calculating the Area (a) of the Cross Section of a Circular Pipe Flowing Partially Full										
D = Depth of water			a = area of water in partially filled pipe							
d = diameter of the pipe			Ta = Tabulated Value					Then a = Ta*d^2		
D/d	**0.00**	**0.01**	**0.02**	**0.03**	**0.04**	**0.05**	**0.06**	**0.07**	**0.08**	**0.09**
0.0	0.0000	0.0013	0.0037	0.0069	0.0105	0.0147	0.0192	0.0242	0.0294	0.0350
0.1	0.0409	0.0470	0.0534	0.0600	0.0668	0.0739	0.0817	0.0885	0.0951	0.1039
0.2	0.1118	0.1199	0.1281	0.1365	0.1440	0.1535	0.1623	0.1711	0.1800	0.1890
0.3	0.1982	0.2074	0.2187	0.2280	0.2355	0.2450	0.2540	0.2642	0.2780	0.2836
0.4	0.2934	0.3032	0.3130	0.3220	0.3328	0.3428	0.3527	0.3627	0.3727	0.3827
0.5	0.3980	0.4030	0.4130	0.4230	0.4330	0.4430	0.4520	0.4620	0.4720	0.4820
0.6	0.4920	0.5020	0.5120	0.5210	0.5310	0.5400	0.5500	0.5590	0.5690	0.5780
0.7	0.5870	0.5960	0.6050	0.6140	0.6230	0.6320	0.6400	0.6490	0.6570	0.6660
0.8	0.6740	0.6810	0.6890	0.6970	0.7040	0.7120	0.7190	0.7250	0.7320	0.7360
0.9	0.7450	0.7500	0.7560	0.7610	0.7660	0.7710	0.7750	0.7790	0.7820	0.7840

Source: County of San Diego. May 2011. *Dry Weather and MS4 Analytical and Field Screening Monitoring Procedures Manual*

3.4 Observations

If a site has either ponded or flowing water, a clean, clear plastic cup or a triple-rinsed clear glass container (e.g., jar, beaker, etc.) is used to collect a sample of the water. If the site is within a catch basin or a manhole, a rope attached to a triple-rinsed plastic bucket, a sampling pole, or a peristaltic pump may be used to collect the sample.

Observations for odor, color, clarity, and floatables are assessed and recorded on the datasheet. When the site is dry, the checkbox "na (dry)" is marked, meaning "not analyzed" and/or "dry site". Whenever an "Other" box is checked, a description should be written on the datasheet.

Odor: Choose any of the following options that is most representative of site conditions: none, sewage, sulfides, petroleum, manure, other. Note that "sulfides" indicates the distinct rotten egg smell associated with hydrogen sulfide gas. A petroleum odor usually refers to a smell of gasoline/diesel. Any time a sewage or petroleum odor is noted, additional source investigation should be completed and/or the appropriate authorities (sewer agency or County of San Diego Department of Environmental Health) should be notified.

Color: Choose one of the following options most representative of the water when viewed *in situ*: none, yellow, brown (silty), white (milky), gray, other.

Clarity: If the water has minimal or no turbidity, mark "Clear." For more turbid water, the clarity options "Cloudy" and "Murky" are distinguished as follows:

- Cloudy - If able to see more than 4" below the surface of the water, the clarity field is marked as "Cloudy (> 4" vis)."

- Murky - If visibility is limited to less than 4" below the surface of the water, it is marked as "Murky (<4" vis)."

Floatables: Select one or more of the following: none, trash, bubbles/foam, sheen, algae, biofilms, other. Only materials present on or very close to the surface of the water shall be included for this observation. For example, if trash is observed well below the water surface or at a dry site, trash should not be marked as a floatable. However, trash would still be recorded in the trash assessment section in these cases.

Observations of deposits, vegetation, and biology noted at the site, and the structural condition of the outfall, are recorded for all sites, even if the site is dry.

Deposits: Select one or more of the following: none, coarse particulate, fine particulate, stains/minerals, oily deposit, other. Coarse particulates include particles such as sand or gravel. Fine particulates include any particulates that are smaller than the coarse particulates, such as from the presence of clay sediment. Stains or oily deposits, if observed, may require upstream source investigations. Mineral deposits can result in orange/red deposits and oil deposits are black in color.

Vegetation: Sites within manholes will almost always have no vegetation, so "none" should be marked on the datasheet. If the vegetation is observed as less than what is typical for the site, e.g., due to excessive erosion or plant removal, the site is considered to have "Limited" vegetation. Sites with vegetation that is overgrown and is impeding, or may impede, flow from the site, or that may contribute to other water quality issues, are considered to have "Excessive" vegetation. Sites observed with typical vegetation are marked as "Normal".

Biology: Select all applicable options (more than one can be selected). Note that additional categories of organisms can also be notes by writing them in next to the "Other" option.

Structural Condition: "Damaged" means that the outfall structure is cracked, has partially collapsed, or is otherwise in need of repair. "Scour Pond" means an unpaved area just downstream of the outfall has been eroded by outfall discharges such that a depression that allows water to collect and pond has formed. Scour ponds may be sources of bacteria. "Erosion" means there is evidence of erosion at or downstream of an outfall that could either result in a blockage or water quality issues. "Blockage" means the flow path through the outfall is significantly obstructed. Outfalls to which none of the above apply and that are in good structural condition are marked as "Normal."

3.5 Trash Assessment

A trash assessment is conducted at each outfall visited for field screening. The area assessed is typically between five to 15 feet in length and width, but is ultimately determined by best professional judgment of the field team. If trash, or other observed pollutants, at the site is determined to pose a threat to human health or the environment, the reporting and response procedures described in the IDDE section of the City's Jurisdictional Runoff Management Plan will be followed. The trash assessment is conducted utilizing the following trash rating system, which was used in the regional data sharing template developed by the Copermittees' Regional Monitoring Workgroup in 2013.

Table 2. Trash Assessment Ratings

Copermittee Data Sharing Format Trash Assessment Ratings
None (0 pieces observed)
Low (<50 pieces observed)
Medium (50-400 pieces observed)
High (>400 pieces observed)

4 Source Identification and Elimination

If a site has flowing or ponded water, an upstream investigation may be necessary to assess the potential source of flow. Mapping of the City's storm drain system (MS4 map) assists with the upstream investigation. The Municipal Permit requires an investigation for sites that have ponded water. However, the source of that water might not be confirmed due to the ceased flow and dry upstream storm drain. Observations and notes are recorded on the field datasheet for evidence of an IC/ID, flow source, basis for source identification, and source elimination.

4.1 Evidence of Obvious IC/ID

Evidence of an IC/ID is documented on the field datasheet by listing physical characteristics of the flow, such as odor, color, clarity, floatables, deposits, high flow rate, non-standard connection, or anything else that may suggest evidence of an IC/ID. For example, sediment-laden water may indicate an upstream washing activity or construction site discharge. Upstream investigations are conducted immediately in cases where obvious IC/IDs are observed.

4.2 Flow Source

Potential flow source categories include groundwater, seepage, irrigation runoff, vehicle washing, wet cleaning or power washing, construction, pool or spa discharge, tidal, water line break, NPDES permitted discharge, other, or unable to determine. Examples of NPDES-

permitted discharges include line flushing by local water utilities and groundwater dewatering conducted after obtaining a discharge permit from the RWQCB. More than one source may be recorded if observed during the upstream investigation. If the site is dry, then "na" (not applicable) should be checked on the field datasheet.

If the field crew identifies the source as a controllable source of non-stormwater or illicit discharge or connection, the discharge or connection will be eliminated. Enforcement actions will be taken, as necessary, as described in the Enforcement Response Plan (Appendix B). If the City suspects the source of the non-stormwater discharge is natural in origin (i.e., non-anthropogenically influenced) and in conveyance into the MS4, then the City will document and provide the data and evidence necessary to demonstrate to the RWQCB that it is natural in origin and does not require further investigation.

4.3 Basis for Flow Source Identification

The evidence or basis for a source of observed flow is recorded on the datasheet. If the site is dry, or the source of flow is unable to be determined, "na" should be marked on the datasheet. Otherwise, one of the following should be completed:

- **Observed Discharge:** During the upstream investigation, water is observed discharging into a structure that drains to the site. For example, irrigation runoff from landscaping is observed flowing to a curb inlet upstream from the site.
- **Indirect Evidence:** An active discharge is not observed, but there is evidence of a recent discharge that may have contributed to water observed at the site. For example, a wet vehicle is parked in a driveway and ponded water with soap bubbles is observed in an upstream street gutter.
- **Historical Data:** Results of previous monitoring efforts can be useful in assessing the source of flow, even if direct (observed) or indirect evidence of a discharge is not noted at the time of the current visit. Useful historical data may also include local groundwater monitoring well data, or results from other complaint investigations or inspections.

4.4 Flow Source Elimination

If the source of observed flow or ponding is identified and eliminated, the "Yes" checkbox should indicate as such. Otherwise, "No" should be checked if the source was not eliminated, or "na" checked if the site was dry. An example of flow source elimination is if a business's washing is stopped after talking with the responsible party and reporting the issue to the City. If multiple sources were identified, and some but not all sources were eliminated, "No" should be marked, and a full explanation of actions taken to eliminate any flow source should be described in the comments.

4.5 Prioritization for Followup Investigations

As previously described, an upstream investigation will be conducted if flowing or ponded water is observed during outfall monitoring activities. Select outfalls with persistent flow will be identified for discharge monitoring (i.e., samples of the flow will be taken; see Section 5). When a discharge or flow source cannot be identified during the time of field visit, followup investigations may be conducted at a later date. Followup investigations will be conducted considering the following criteria:

- Illicit discharge/illegal connection – Observed illicit discharges or illegal connections will be investigated immediately. Samples may be taken to help evaluate the pollutants present and their concentrations if deemed necessary to support the investigation or enforcement efforts.
- Source of discharge – Known or likely sources of flow or pollutants will be investigated and pursued more readily than unknown sources. Consideration will be given to physical characteristics observed during outfall monitoring, as well as any monitoring data available for the outfall site.
- Pollutant type – Where data is available, priority will be given to outfall discharges that consistently exhibit the following:
    - Cause or contribute to highest priority water quality conditions identified in San Luis Rey and Carlsbad WQIPs
    - Cause or contribute to impairment of 303(d) listed waterbodies
    - Cause or contribute to an exceedance of a NAL
- Flow rate and volume – Consideration will be given to the quantity and quality of outfall discharge, relative to storm drain system or receiving waterbody. Priority will be given to outfalls with flows observed to reach, or are highly likely to reach, a receiving water body. Persistent flowing water will be of priority compared to dry, ponded, or transient flows.

4.6 Additional Flow Source Investigation Methods

If a flow source cannot be identified using the typical investigation methods described above, and there is persistent flow or it is possible an IC/ID may be contributing flow to the site, the field team may use alternate methods for identifying the flow source. Further details regarding different monitoring parameters and investigative procedures for each source category can be found in the County of San Diego's *San Diego County Permittees Draft Investigation Procedures* Manual. A few of the more common alternate source investigation methods are summarized below.

Additional Water Quality Parameters

Although not required for routine site visits under the new Municipal Permit, it may be necessary to perform additional field or laboratory tests to investigate the source of a persistent flow. The field team should be equipped with field meters that are capable of measuring parameters such as pH, conductivity, and temperature. Sample collection bottles and a cooler should also be available in the event laboratory analysis is necessary.

- Measuring the chlorine concentration and conductivity to assess whether a water line break or leak may be contributing to flow at the site.
- Measuring levels of ammonia, bacteria, and detergents (methylene blue active substances) to assess whether sewage may be a contributing source.
- Measuring the conductivity at the site. Higher conductivity values may indicate the infiltration of groundwater into the MS4 pipe, and further investigation may be necessary to confirm this conclusion (e.g. analyzing local ground water monitoring well data if available, sending a camera through the MS4 line, etc).

Review of Plans

As-built plans for the area of interest can be reviewed to verify intended storm drain and sanitary sewer pipe connections. However, an illegal connection may have occurred after the as-built drawings were created, so additional in-field confirmation is likely necessary.

Dye Testing

Dye testing can confirm hydraulic connections between a potential source and a downstream location. Fluorescent dye is introduced at the source of the potential IC/ID and presence of the dye is monitored downstream. This method is used only when necessary, because the public and appropriate regulatory agencies in the surrounding area need to be informed about the cause of the water discoloration.

Smoke Testing

By introducing smoke into an underground sewer system, smoke testing can be an effective means of identifying cross-connections between storm drain and sanitary sewers. Due to potential concerns with the presence of smoke (and inferring of a fire), the public and appropriate agencies need to be informed when smoke testing is conducted.

Closed Circuit Television Inspection Monitoring

Closed Circuit Television Inspection (CCTV) cameras may be used to record video of underground storm drain and sanitary sewer. CCTV can be effective at identifying cross-connections and defects that may contribute to an illicit discharge. The public and regulatory agencies generally do not need to be informed prior to initiating this kind of investigation.

Confined Space Entry

Confined space entry may be used to physically enter storm drains, sanitary sewers, or other restricted-entry facilities. All applicable health and safety regulations must be followed. The public and regulatory agencies, however, generally do not need to be informed prior to initiating a confined space entry.

5 Non-Stormwater Persistent Flow MS4 Outfall Discharge Monitoring

Pursuant to Section D.2.b.(2) of the Municipal Permit, if during transitional and routine MS4 outfall discharge monitoring, sites are found to have persistent flow, the City will collect samples for laboratory analysis at the highest priority sites with persistent flow. At least five sites per WMA must be considered high priority and monitored, except that when there are less than five persistently flowing sites in a WMA, the City will monitor all of its major MS4 outfalls within that WMA that have persistent flows. Test results from these samples will be compared to the Non-stormwater Action Levels (NAL) included in Provision C of the Municipal Permit, unless alternative NALs have been established in the Carlsbad or San Luis Rey WQIP. As of this writing no alternative NALs have been established through the WQIPs.

The highest priority sites will be monitored during dry weather at least semi-annually until one of the following occurs:

- The non-stormwater discharges have been effectively eliminated (i.e., no flowing, pooled, or ponded water) for three consecutive dry weather monitoring events.
- The source(s) of the persistent flows has been identified as a category of non-stormwater discharges that does not require an NPDES permit and does not have to be addressed as an illegal discharge because it was not identified as a source of pollutants (i.e., parameters in non-stormwater discharge do not exceed NALs), and the persistent flow can be re-prioritized to a lower priority.
- The parameters in the persistent flow non-stormwater discharge do not exceed NALs, and the persistent flow can be re-prioritized to a lower priority.
- The source(s) of the persistent flows has been identified as a non-stormwater discharge authorized by a separate NPDES permit.

If none of the conditions listed on the following page is met, but the threat to water quality has been reduced, the site can be reprioritized as a lower priority. The City records removal or re-prioritization of the highest priority persistently flowing MS4 outfalls in the Water Quality Improvement Plan Annual Reports.

5.1 Non-Stormwater Persistent Flow Major MS4 Outfall Discharge Monitoring Parameters

Non-stormwater persistent flow MS4 outfall sites will be monitored semi-annually for the parameters listed in Table D-7 of the MS4 Permit. Additional parameters associated with NALs and 303(d) listings are also required to be tested; these parameters vary by watershed. A full list of parameters to be tested at each persistent flow monitoring site can be found by referencing Attachment D of the Carlsbad WQIP Monitoring Plan and Appendix 4A of the San Luis Rey WQIP.

Sampling, analysis and quality assurance/quality control are conducted in accordance with the procedures in the monitoring plans in the Carlsbad WQIP (Attachment D) and San Luis Rey WQIP (Appendix 4A). Table D-1 of the Carlsbad WQIP Monitoring Plan and Appendix 4A of the San Luis Rey WQIP specify suggested target reporting limits and analytical methods. All chemical, bacteriological, and toxicity analyses will be conducted at a laboratory certified for such analyses by the California Department of Public Health or a laboratory approved by the RWQCB. Attachment F of the Carlsbad WQIP Monitoring Plan provides more detail on quality assurance/quality control procedures for MS4 outfall monitoring.

6 Enforcement

If the source of a discharge is identified as a category of non-exempt non-stormwater discharges, and the discharge is in exceedance of NALs listed in the Water Quality Improvement Plan, then the City will determine if it is either of the following: 1) an isolated incident or a set of circumstances that will be addressed through its Enforcement Response Plan, or; 2) a prohibited discharge that will also be addressed through measures (likely escalated) described in the Enforcement Response Plan.

7 Reporting

All field datasheets, reports, and data associated with the City's MS4 outfall monitoring program will be made available to the RWQCB in a standardized and compatible format. The City's Jurisdiction Runoff Management Program (JRMP) Annual Report will also include the number of IC/IDs detected, identified, and eliminated within the reporting period. Reporting IC/IDs to other agencies such as the RWQCB and the County of San Diego Department of Environmental Health is discussed in Section 3 (Illicit Discharge Detection and Elimination) of the City's JRMP document.

8 References

California Regional Water Quality Control Board, San Diego Region. May 8, 2013. *Order No. R9-2013-0001.*

County of San Diego. May 2011. *Dry Weather and MS4 Analytical and Field Screening Monitoring Procedures Manual*

County of San Diego. June 2013. *San Diego County Permittees Draft Investigation Procedures*

Attachment 1

Storm Drain System and Monitoring Locations Map

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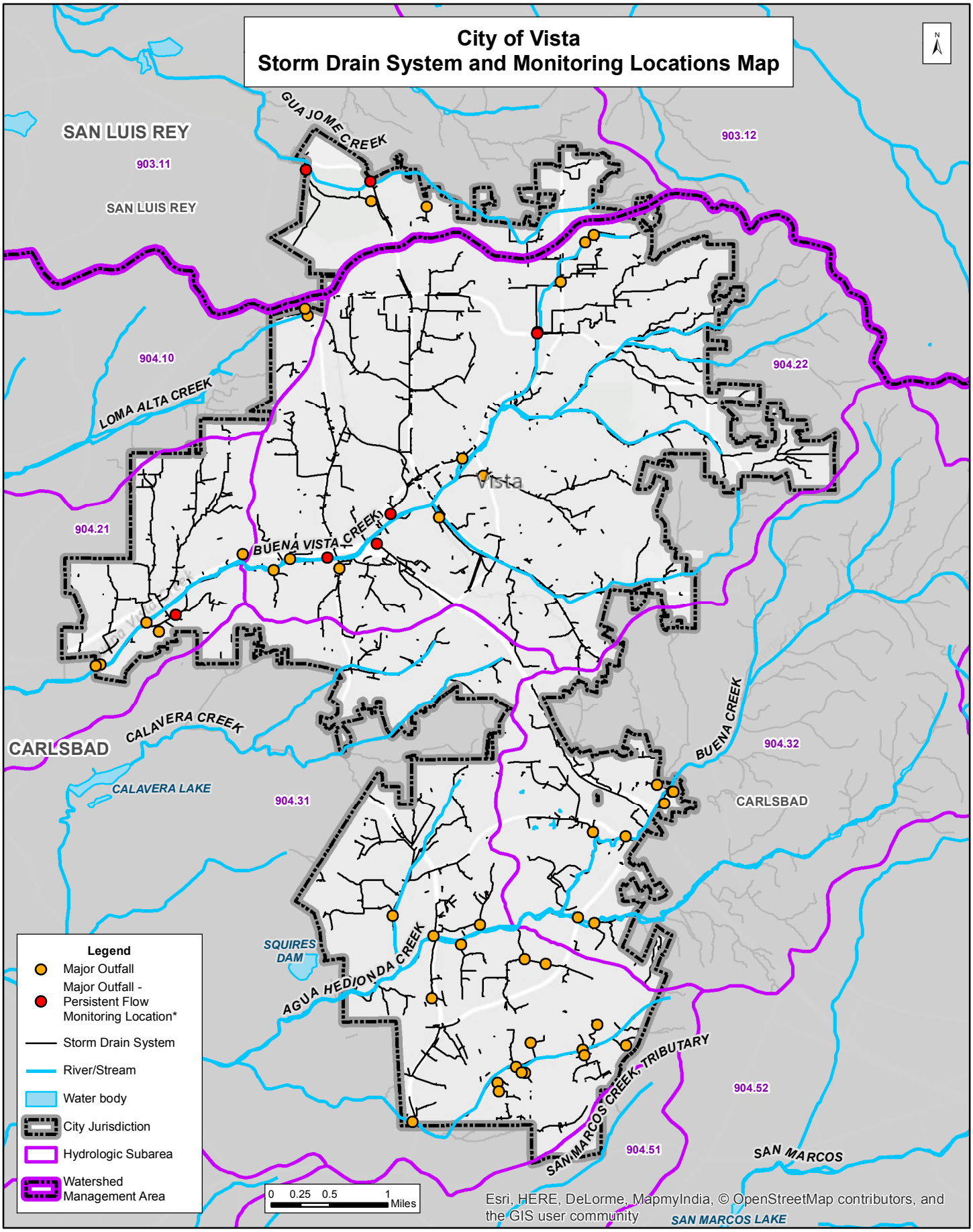

Base Data Sources: SanGIS and City of Vista

*The status of major MS4 outfalls as having persistent flow, transient flow, or being dry will change in the future as the City collects more data from outfall monitoring and as sources of flow are eliminated. For similar reasons, the sites at which persistent flow analytical monitoring is completed will likely change over time. Updates will be provided through the WQIP annual reporting process.

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Attachment 2

MS4 Outfall Monitoring Field Datasheet

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City of Vista
MS4 Outfall Visual Observations Field Datasheet

Visit Type: ☐ Visual ☐ Follow-Up ***Site Type:*** ☐ Storm Drain ☐ Receiving Water ☐ Both ***Station Class:*** ☐ Field ☐ Removed,_____

Site ID:	**Latitude:**	**Outfall Size:**
Location:	**Longitude:**	**Drainage Area (Ac):**
	HSA:	**Industrial Land Use?** ☐ Yes
	Observer(s):	
Date: **Time:**		

Conveyance (select only one) ☐ Outlet ☐ Manhole ☐ Concrete Channel ☐ Natural Creek ☐ Earthen Channel ☐ Other

Atmospheric Conditions

Weather ☐ Clear ☐ Partly Cloudy ☐ Overcast ☐ Fog

Tide ☐ N/A ☐ Low ☐ Incoming ☐ High ☐ Outgoing **Tide Height:**_____ft.

Last Rain ☐ > 72 hours ☐ < 72 hours but ≤ 0.1"

Flow

Water Flow ☐ Flowing ☐ Ponded ☐ Dry ☐ Tidal **Flow reaches receiving water?:** ☐ Yes ☐ No

Flow Rate: _____ ☐ gpm ☐ cfs *Fill in flow rate calculation supporting information below if applicable.* ☐ Unknown

Flowing Pipe

Diameter		ft
Depth		ft
Velocity		ft/sec

*Flow rate(gpm) = area(ft²)*velocity(ft/sec)*448.8*
*Area = Ta*diameter² (See tabulated values (Ta) chart)*

Filling a Bottle or Known Volume

Volume		mL
Time to Fill		sec

1 Liter/sec = 15.85 gpm

Velocity Area Method (Leaf Float)

Width		in
Depth		in
Velocity		ft/sec

*Flow rate(gpm) = width(ft)*depth(ft)*velocity(ft/sec)*448.8*
Use correction factor of 0.5 to 0.9 depending on conveyance surface roughness.

Observations

Odor	☐ None	☐ Sewage	☐ Sulfides	☐ Petroleum	☐ Manure	☐ Other	☐ na (dry)
Color	☐ None	☐ Yellow	☐ Brown	☐ White	☐ Gray	☐ Other	☐ na (dry)
Clarity	☐ Clear	☐ Cloudy (> 4" vis)	☐ Murky (< 4" vis)			☐ Other	☐ na (dry)
Floatables	☐ None	☐ Trash	☐ Bubbles	☐ Foam	☐ Oily Sheen	☐ Other	☐ na (dry)
Deposits	☐ None	☐ Coarse Particulates	☐ Fine Particulates	☐ Stains	☐ Oily Deposits	☐ Other	
Vegetation	☐ None	☐ Limited	☐ Normal	☐ Excessive		☐ Other	
Biology	☐ None	☐ Insects ☐ Algae	☐ Fish	☐ Snails	☐ Mussels/ Barnacles	☐ Other	
Structural Condition (select only one)	☐ Normal	☐ Damaged	☐ Scour Pond	☐ Erosion	☐ Blockage	☐ Other	

Trash Assessment

Rating ☐ High (>400 pieces) ☐ Medium (50 to 400 pieces) ☐ Low (<50 pieces) ☐ None

Evidence of Illegal Dumping: ☐ Yes *(describe in comments)* ☐ No **Potential Threat To:** ☐ Human Health ☐ Aquatic Health

Comments: _____

Source Identification and Elimination

Evidence of Obvious IC/ID: ☐ Odor ☐ Color ☐ Clarity ☐ Floatables ☐ High Flow ☐ Non-Standard Connection ☐ Other _____ ☐ No

Flow Source: ☐ Groundwater ☐ Seepage ☐ Irrigation Runoff ☐ Vehicle Washing ☐ Wet Cleaning ☐ Construction ☐ na (dry)
☐ Pool or Spa ☐ Tidal ☐ Water Line Break ☐ NPDES Permitted Discharge ☐ Other_____ ☐ Unable to Determine

Basis for Source Identification: ☐ Observed Discharge ☐ Indirect Evidence ☐ Historical Data ☐ Other_____ ☐ na (Not Determined/Dry)

If Identified, Was Source Eliminated? *(If yes, describe in notes below)* ☐ Yes ☐ No ☐ na (dry)

Source ID/Elimination Notes:

Source Location(s):

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Appendix H

Environmentally Sensitive Areas

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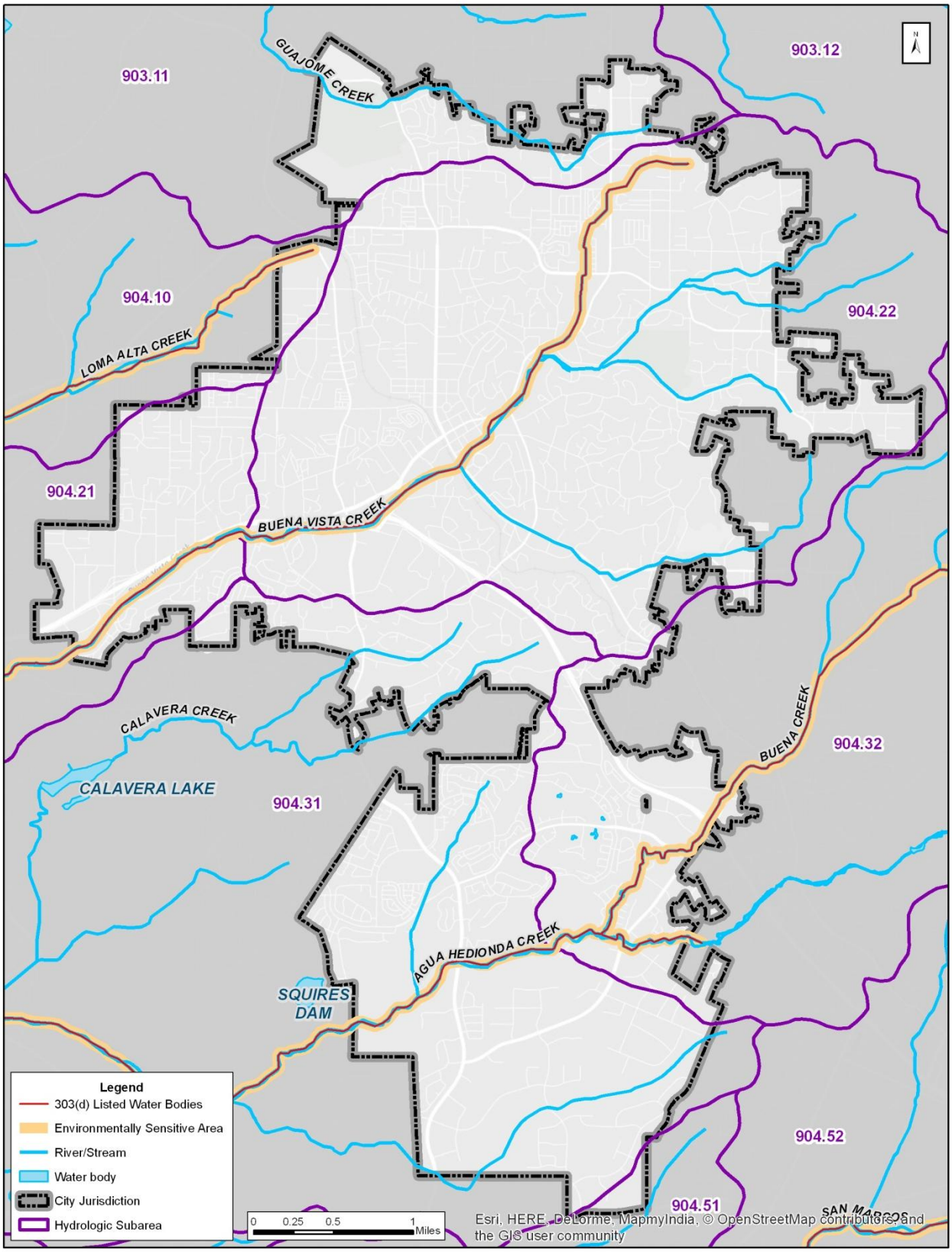
Appendix H. Environmentally Sensitive Areas



Base Data Sources: State Water Resources Control Board and SANGIS
Note that the Environmentally Sensitive Areas (ESA), as shown on the map, include a 200 foot buffer on either side of each ESA. Facilities or activities within this buffer area are considered "directly adjacent to" an ESA, as defined in the MS4 Permit.

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Appendix I

Summary of City of Vista Water Quality Improvement Plan Strategies

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Appendix I. Summary of City of Vista Water Quality Improvement Strategies

Strategy	Geographic Extent of Implementation	Location in JRMP (Section or Appendix)
Irrigation Runoff Reduction Program	Agua Hedionda Focus Area AH-04	Sections 3, 6, 9, 10
Property Based/Patrol Inspections	Agua Hedionda Focus Area AH-04	Sections 6, 9
Irrigation Runoff Reduction Program	Buena Vista Focus Areas BV-06	Sections 3, 6, 9, 10
Perform Property Based Inspections/Patrol	Buena Vista Focus Areas BV-06	Sections 6, 9
Runoff and Nutrients Source Reduction	Loma Alta Focus Area LA 1B	Sections 3, 6, 7, 9, 10
Administrative BMPs[1, 2]	Citywide[3]	Sections '3 - 10
Construction Site Inspections[2]	Citywide[3]	Section 5
Development and Redevelopment Requirements[2]	Citywide[3]	Section 4
Employee Training[2]	Citywide[3]	Section 10
Enforcement[2]	Citywide[3]	Appendix B (Enforcement Response Plan)
Existing Development Facilities, Areas and Activities Inspections[2]	Citywide[3]	Sections 6, 7, 8
General Education and Outreach[2]	Citywide[3]	Section 10
Investigations[2]	Citywide[3]	Section 3
MS4 Inspections/ Cleaning[2]	Citywide[3]	Section 8
Outfall Monitoring	Citywide[3]	Section 3
Partnership Program(s) [2]	Citywide[3]	Section 10
Program for Retrofitting Areas of Existing Development[2]	Citywide[3]	Appendix E (Retrofitting and Rehabilitating Existing Development)
Program for Stream, Channel and/or Habitat Restoration in Areas of Existing Development[2]	Citywide[3]	Appendix E (Retrofitting and Rehabilitating Existing Development)
Street Sweeping[2]	Citywide[3]	Section 8

Notes

- Optional WQIP strategies and strategies applicable only to other jurisdictions are not included in this table.

1. Examples of Administrative BMPs include plan development, program standardization, maintaining and prioritizing inventories, updating education materials, etc.
2. General descriptions of these strategies are included as an appendix to the WQIP.
3. Citywide strategies are implemented throughout the City, in both the Carlsbad and San Luis Rey Watershed Management Areas.

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