

Appendix O: Potential Strategies

APPENDIX O - POTENTIAL STRATEGIES

As required by Provision B.2.e, the Permittees must identify potential strategies that may result in improvements to water quality in stormdrain discharges and/or receiving waters within the watershed. The following section indicates these potential strategies that include nonstructural and structural BMPs, retrofits, and stream restoration projects, as well as those included in the Permittees' robust jurisdictional programs that include management measures and baseline programs to reduce the discharge of pollutants in stormwater from jurisdictions' MS4 to the maximum extent practicable. Potential strategies (structural and nonstructural) other than those considered in this section may be considered in future efforts for implementation by the Permittees.

Potential Nonstructural BMPs

Nonstructural BMPs considered for inclusion in the Permittees' jurisdictional strategies to address the HPWQC include:

Identification and Control of Sewage Discharge to Participating Agency Stormdrain Systems

Identification and control of sewage discharge to the stormdrain system may include water quality monitoring for indicators of human sewage constituents, stormwater conveyance system inspections to identify locations with persistent dry weather flows, an illicit discharge detection and elimination hotline for citizens to report spills or suspicious discharges, or the use of cameras or continuous automated flowmeters in sewers and stormdrains to identify or measure infiltration and/or illicit connections. Finally, special studies such as dye tracing, canine source tracking, and/or microbial source tracking may be employed to answer specific, targeted questions. Additionally, an effective fats, oil and grease inspection program to reduce sanitary sewer overflows is recognized as an important nonstructural BMP.

If human sources are determined to be a significant source of pollutant loading within the watershed, accelerated repair or upgrade of sanitary sewer and stormdrain systems would encourage proactive mitigation of bacteria and nutrient pollution resulting from the sanitary sewer system and/or groundwater. To increase the effectiveness of illicit discharge detection and elimination, current programs could be expanded to include a tiered dry weather source investigation including: (1) visual surveys of stormdrain discharges to identify dry weather flow locations, (2) GIS-based prioritization where aging sewer laterals are above and near stormdrains that are observed to occasionally flow during dry weather, (3) video survey of the stormdrains to identify leaks from the top of the pipe and/or sewer dye tracing studies, and (4) fecal source tracking studies that use canine scent tracking and/or microbial source tracking, and (5) and when beyond the jurisdiction of the MS4s, coordinate with appropriate sewerage agencies to inspect and/or repair sanitary system, as necessary.

Unauthorized Encampment Waste Management Program

In areas of the watershed where unauthorized encampments are determined to be a significant pollutant source, efforts may include establishing ordinances that reduce encampments, enhancing efforts to reduce the number of homeless people in encampments, inhibiting access to certain locations, and enforcing new and existing laws to decrease the negative impact on water quality. Options to reduce water quality impacts of unauthorized encampments can also be combined with efforts to reduce homelessness. For example, partnering with non-profit organizations to inspect and remove trash generated by encampments leverages existing social programs, watershed volunteer programs, and water quality programs to address a common concern. Unauthorized encampment waste management programs have not only targeted pollutant reduction benefits, there is the potential for these programs to support larger socio-economic issues.

Onsite Wastewater Treatment Source Reduction

In 2012, the State Board adopted a State Policy for Water Quality Control for Siting, Design, and Operation and Management of Onsite Wastewater Treatment Systems (OWTS). The policy established a statewide, risk-based, five tiered approach for the management of OWTS installations and replacements and set a level of performance and protection expected from OWTS. OWTS fall into Tier 3 if they are located near (within 600 feet) an impaired water body or a water body addressed by a TMDL implementation plan. Currently, there are no Tier 3 OWTS identified in the watershed that would require an Advanced Protection Management Program including additional inspection, and possibly advanced treatment upgrades. However, an effective OWTS inspection program is recognized as an important nonstructural BMP, where appropriate.

Irrigation Runoff Reduction and Good Landscaping Practices

Effective methods to reduce irrigation runoff could include development of educational outreach, increased inspections, punitive measures for overwatering, tiered water rates, or distribution of smart irrigation controllers and/or other financial incentive programs that decrease watering volume. Irrigation runoff reduction programs can also be integrated with BMPs that encourage landscaping and smart gardening practices that reduce the load of fertilizers and chemicals that end up in stormwater, such as integrated pest management, reducing fertilizer and pesticide use, xeriscaping, and turf conversion. To facilitate the use of these natural approaches, ordinances, education and outreach, and financial incentives can be implemented. Based on studies, it is believed that increased irrigation runoff controls, such as inspection, enforcement, and incentives in commercial and residential land uses will generate pollutant load reductions. Water use programs may be under the authority of independent water agencies and therefore coordination among MS4s with these agencies is important.

Commercial, Industrial, and Residential Good Housekeeping

Requiring good housekeeping practices involves establishing and enforcing ordinances for commercial and industrial facilities, and residential areas. Programs that address wet weather load reductions may include increased inspection and enforcement of grease removal equipment for restaurants, monitoring trash enclosures for proper waste disposal, and cleaning of private catch basins and drain inlets. Dry weather controls can also include discouraging vehicle washing, appropriate pool draining, power washing and other wash down activities that produce nuisance flows to stormdrains.

Pet Waste Program

BMPs for pet waste pick-up and disposal could include both educational outreach and enforcement to encourage residents and pet owners to clean up after their pets. Examples include park signage, waste bag distribution stations, receptacles for pet waste, designated dog parks, strict ordinances to regulate pet waste clean-up, and educational outreach at pet stores, animal shelters, veterinary offices, and other sites frequented by pet owners. Pet waste management practices may also include BMPs relating to horseback riding activities.

Animal Facilities Management

An effective source control program could include an inventory and frequent inspection of horse ranches, livestock areas, kennels and other pet service areas. Community outreach tools would include education materials that stress manure and wash water management, directing drainage away from and/or around exposed stalls, horse health, and watershed awareness. These BMPs would address both commercial and private facilities.

Redevelopment and WQMP Implementation (Source Control, LID, Hydromodification)

The Permittees require advanced stormwater treatment through site design, source control, Low Impact Development (LID), and hydromodification control implementation for all development and redevelopment as part of their Model Water Quality Management Plan (WQMP), Technical Guidance Document (TGD), and Hydromodification Management Plan (HMP). These requirements apply to residential, commercial, industrial, educational, and transportation land uses. The land development planning program and associated manuals guide applicants through the design and submittal process to ensure the necessary stormwater features are being implemented. Project designs must show runoff being infiltrated or else treated by structural BMPs, such as bioretention facilities, planter boxes, filters, settling ponds, or constructed wetlands. LID implementation provides water quality benefits for multiple pollutants of concern through hydrologic source load mitigation and the removal of multiple pollutants. Additionally, where projects discharge to susceptible channels, the

project must manage peaks and durations of project runoff to approximate a fully pervious baseline condition.

Street and Median Sweeping

Street and median sweeping is a common practice for reducing street sediment and trash thereby reducing urban runoff pollutant loads from transportation land uses. High-efficiency street sweeping equipment, such as regenerative air sweepers or vacuum assisted sweepers can significantly increase the amount of sediment removed from roadways. The street and median sweeping within the watershed appears to be an effective program for managing the sediment transport of bacteria into the stormdrain system. Street sweeping BMPs provide water quality benefits for multiple pollutants of concern through transportation-related source load mitigation and the removal of multiple associated pollutants, as well as removal of gross debris and trash.

Stormdrain Cleaning

Cleaning sediment and trash from stormdrain inlets and conveyance systems can reduce pollutant loads of bacteria, nutrients, trash, metals, and sediments in receiving waters. Load reductions that can be gained by the cleaning of drain inlets and stormdrains will depend on the extent, timing and frequency of cleaning. As technology continues to advance, high efficiency stormdrain cleaning equipment allows for improved bacteria load reductions and therefore could be phased in to replace older equipment. Stormdrain cleaning BMPs provide water quality benefits for multiple pollutants of concern through composite source load mitigation and the removal of multiple associated pollutants of concern.

Special Studies and Site Specific Objectives

The Permittees may use the Water Quality Improvement Plan development process to identify areas where developing site-specific objectives, outcomes, or pollutant source identification may be appropriate. Strategies may include special studies such as epidemiologic study(ies), quantitative microbial risk assessment (QMRA), natural source evaluation/exclusion, site-specific criteria, toxicity identification evaluation, changes to beneficial uses/use attainability analysis/variance, high flow suspensions, evaluation of wildlife impacted areas, effectiveness testing of BMPs/pilot new and/or advanced technologies, fill data gaps, or other appropriate studies.

Potential Structural BMPs

Structural BMPs considered for inclusion in the Permittees' jurisdictional strategies to address the HPWQC include:

Watercourse Rehabilitation

Stream restoration/enhancement projects are designed to add or replace impacted habitat with habitat having similar functions of equal or greater ecological value, while making adjustments to stream form, if needed, to reduce risks of future impacts. These projects are expected to result in net pollutant load reduction through the following mechanisms: volume reductions; increased hydraulic residence time; increased settleable solids; increase in decay coefficient to account for plant assimilative capacity, reduction in erosion. These projects also potentially increase infiltration capacity (and associated benefits) and have the ability to improve benthic scores.

An important aspect of watercourse rehabilitation is to continue to accommodate flood purposes and mitigate geomorphic impacts, while providing a channel form that is conducive to riparian ecosystems. This can be conceptually achieved through use of "softer" approaches (e.g., plunge pools, soft meanders, live stakes and other biotechnical streambank stabilization, riparian buffer, step-pools, etc.) in the active channel coupled with more engineered approaches.

Residential/Small-Scale Low Impact Development Incentive Program

This wet weather small-structural control is an incentive program that encourages residents and businesses to capture or redirect runoff from roofs using Low Impact Development principles to reduce flow to stormdrains. A comprehensive residential rain barrel and downspout retrofit program could include public education and outreach, as well as financial incentives. Examples of such incentives could include offering rain barrels at no or reduced cost, rebate programs for downspout retrofits, and financial assistance for conversion to sustainable landscapes.

Infiltration BMPs

Infiltration BMPs may include infiltration basins, trenches, and galleries, bioretention systems, dry wells, hybrid bioretention/dry wells, or permeable pavements. With the exception of permeable pavements, which are solely distributed, all of these may be centralized or distributed systems. These systems involve capture and filtration of stormwater into pervious soils. Distributed structural BMPs are treatment or volume mitigation BMPs implemented at the neighborhood, parcel or site scale. Distributed structural BMPs include green streets, rainwater harvesting, and other Low Impact Development type solutions.

Water Supply Augmentation

Projects that seek to augment water supply through infiltration of stormwater address multiple conditions. Capture of flows may include unnatural water balance/flow regime in channels thereby mitigating the adverse impacts that include eutrophication and presence of invasive plant species.

Capture and Use, or Rainwater Harvesting

This refers to a type of distributed BMP that works by capturing stormwater runoff and storing it to maximize efficient use of the water. By reducing the amount of stormwater runoff that flows overland into a stormdrain system, loads of bacteria and other pollutants are reduced. Onsite use of the harvested water for non-potable domestic purposes conserves potable water and, where directed to unpaved surfaces, has potential to recharge groundwater in local aquifers.

Natural Treatment of Filtration

Biofiltration BMPs are vegetated facilities that utilize natural treatment systems to capture and treat stormwater runoff through a variety of physical and biological treatment processes. Runoff that passes through a biofiltration system is treated by the natural adsorption and filtration characteristics of the plants, soils, and microbes. Biofiltration BMPs include constructed wetlands, subsurface flow wetlands, biofiltration or bioinfiltration facilities with underdrains, planter boxes, and green streets.

Advanced Treatment and Proprietary Devices

Advanced treatment, such as low flow diversions to disinfection/treatment plants, and proprietary devices, such as prefabricated, modular infiltration galleries, are additional options for stormwater treatment for bacteria and other pollutants. There are many options for proprietary devices that would fit into, combine, or expand on the BMP types listed above.

In areas where the HPWQC is a challenging pollutant such as bacteria, advanced treatment BMPs provide water quality benefits for multiple pollutants of concern (not just PWQCs or the HPWQC) as a result of required pretreatment or the removal of flows from the flow stream.

Infrastructure Improvement and Ancillary/Source Control BMPs

This option could include retrofitting sewer lines and repairing stormdrains. Though these are structural BMPs, identification of locations for improvements would be performed as part of a nonstructural BMP, for instance illicit discharge detection and elimination programs or special bacteria source tracking studies.

Pretreatment BMPs

These systems may be used as part of a treatment train to enhance the performance of other structural BMPs. Examples of pretreatment BMP types include gross solids removal (e.g., hydrodynamic devices, trash racks), biofiltration (e.g., vegetated filter strips, vegetated swales), and settling and storage (e.g., extended detention basins). Pretreated stormwater is then conveyed to an infiltration, biofiltration, or other structural BMP.

Pretreatment BMPs provide water quality benefits for multiple pollutants of concern as they remove pollutants necessary to condition water so that HPWQCs that are pollutants can be effectively treated.

Retrofits for Priority Conditions

Retrofitting projects in areas of existing development within the watershed can potentially be implemented to reduce stormwater conveyance system sources of pollutants or stressors identified under Provision B.2.d causing or contributing to the HPWQC identified under Provision B.2.c.

Catch Basin Retrofits

Examples include catch basin gates and in line baskets or filters. The debris gates are designed to remain closed during low flow conditions but open during high storm flows in order to prevent flooding. The gates keep debris out of the MS4 and within reach of street sweepers.

Nuisance Water Diversions

Dry weather diversions are also included in this category. Dry weather diversions eliminate all pollutants from the MS4 by eliminating all discharge to receiving water bodies under dry weather conditions. Flow is diverted to the sanitary sewer treatment plant where it is disinfected and can be recycled.

The table below presents a preliminary assessment of the linkages between the potential structural and nonstructural strategies to the HPWQCs.

Nexus of Potential Strategies to HPWQCs

Strategy	Human Health Risk	Unnatural Water Balance/ Flow Regime	Channel Erosion/ Geomorphologic Impacts
Nonstructural Strategies			
Identification and Control of Sewage Discharge to Participating Agency Stormdrain Systems	2	1	0
Unauthorized Encampment Waste Management Program	2	0	0
Onsite Wastewater Treatment Source Reduction	2	1	0
Irrigation Runoff Reduction and Good Landscaping Practices	1	2	0
Commercial, Industrial, and Residential Good Housekeeping	1	1	0
Pet Waste Program	2	0	0
Animal Facilities Management	2	1	0
Redevelopment and WQMP Implementation (Source Control, LID, Hydromodification)	2	1	1
Street and Median Sweeping	1	0	0
Stormdrain Cleaning	1	0	0
Special Studies and Site Specific Objectives	2	1	1
Structural Strategies			
Watercourse Rehabilitation	1	0	2
Residential/Small-Scale Low Impact Development Incentive Program	2	2	1
Infiltration BMPs	2	2	1
Water Supply Augmentation	1	2	0
Capture and Use, or Rainwater Harvesting	1	2	0
Natural Treatment or Filtration	2	0	1
Advanced Treatment and Proprietary Devices	2	0	0
Infrastructure Improvement and	1	1	0

Ancillary/Source Control BMPs			
Pretreatment BMPs	1	1	0
Retrofits for Priority Conditions	2	2	1
Nuisance Water Diversions	2	2	0
Catch Basin Retrofits	1	0	0

Key to Ranking

2: Direct and significant nexus to HPWQC

1: Partial nexus or partial contribution to HPWQC

0: No significant nexus to HPWQC