State Water Resources Control Board

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FACT SHEET
FOR
WATER QUALITY ORDER 2007-XX-DWQ

STATE WATER RESOURCES CONTROL BOARD (STATE WATER BOARD)
1001 I STREET, SACRAMENTO, CALIFORNIA 95814

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR
STORM WATER DISCHARGES ASSOCIATED WITH
CONSTRUCTION ACTIVITY (GENERAL PERMIT)

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

I. BACKGROUND

A. History

In 1972, the Federal Water Pollution Control Act (also referred to as the Clean Water Act [CWA]) was amended to provide that the discharge of pollutants to waters of the United States from any point source is unlawful unless the discharge is in compliance with an NPDES permit. The 1987 amendments to the CWA added Section 402(p), which establishes a framework for regulating municipal and industrial storm water discharges under the NPDES Program. On November 16, 1990, the U.S. Environmental Protection Agency (USEPA) published final regulations that established storm water permit application requirements for specified categories of industries. The regulations provide that discharges of storm water to waters of the United States from construction projects that encompass five or more acres of soil disturbance are effectively prohibited unless the discharge is in compliance with an NPDES Permit. Regulations (Phase II Rule) that became final on December 8, 1999 lowered the permitting threshold from five acres to one acre.

While federal regulations allow two permitting options for storm water discharges (Individual Permits and General Permits), the State Water Board has elected to adopt only one statewide General Permit at this time that will apply to most storm water discharges associated with construction activity.

On August 19, 1999, the State Water Resources Control Board (State Water Board) reissued the General Construction Storm Water Permit (Water Quality Order 99-08-DWQ). On [insert date], the State Water Board amended Order 99-08-DWQ to apply to sites as small as one acre.

The General Permit accompanying this fact sheet regulates storm water runoff from construction sites. Regulating many storm water discharges under one permit will greatly reduce the administrative burden associated with permitting individual storm water discharges. To obtain coverage under this General Permit, dischargers shall electronically submit the Permit Registration Documents (PRDs) which includes a Notice of Intent (NOI), Storm Water Pollution Prevention Plan (SWPPP), and SWPPP Compliance Checklist and mail the appropriate permit fee to the State Water Board. It is expected that as the storm water program develops, the Regional Water Boards may issue General Permits or Individual Permits containing more specific permit provisions. When this occurs, this General Permit will no longer regulate those dischargers.

B. Legal Challenges and Court Decisions

1. Early Court Decisions and Amendments to CWA and USEPA Regulations

Shortly after the 1972 legislation, the USEPA promulgated regulations exempting most storm water discharges from the NPDES permit requirements. (*Costle, supra,* 568 F.2d at p. 1372; see *Defenders of Wildlife v. Browner* (9th Cir.1999) 191 F.3d 1159, 1163 (*Defenders of Wildlife*).) When environmental groups challenged this exemption in federal court, the Ninth Circuit held a storm sewer is a point source and the USEPA did not have the authority to exempt categories of point sources from the CWA's NPDES permit requirements. (*Costle, supra,* 568 F.2d at pp. 1374-1383.) The *Costle* court rejected the USEPA's argument that effluent-based storm sewer regulation was administratively infeasible because of the variable nature of storm water pollution and the number of affected storm sewers throughout the country. (*Id.* at pp. 1377-1382.) Although the court acknowledged the practical problems relating to storm sewer regulation, the court found the USEPA had the flexibility under the CWA to design regulations that would overcome these problems. (*Id.* at pp. 1379-1383.) In particular, the court pointed to general permits and permits based on requiring best management practices (BMPs).

During the next 15 years, the USEPA made numerous attempts to reconcile the statutory requirement of point source regulation with the practical problem of regulating possibly millions of diverse point source discharges of storm water. (*Defenders of Wildlife, supra,* 191 F.3d at p. 1163; see Gallagher, Clean Water Act in Environmental Law Handbook (Sullivan, edit., 2003) p. 300 (Environmental Law Handbook); Eisen, *Toward a Sustainable Urbanism: Lessons from Federal Regulation of Urban Stormwater Runoff* (1995) 48 Wash. U.J. Urb. & Contemp. L. 1, 40-41 (Regulation of Urban Stormwater Runoff).)

Eventually, in 1987, Congress amended the CWA to add provisions that specifically required NPDES permit requirements for storm sewer discharges. (§ 1342(p); see *Defenders of Wildlife, supra,* 191 F.3d at p. 1163; *Natural Resources Defense Council v. U.S. E.P.A.* (1992) 966 F.2d 1292, 1296.) In these amendments, enacted as part of the Water Quality Act of 1987, Congress distinguished between industrial and municipal storm water discharges. With respect to industrial storm water discharges, Congress provided that NPDES permits "shall meet all applicable provisions of this section and section 1311 [requiring the USEPA to establish effluent limitations under specific timetables]" (§ 1342(p)(3)(A); see *Defenders of Wildlife, supra,* 191 F.3d at p. 1163.)

In 1990, USEPA adopted regulations specifying what activities were considered "industrial" and thus required coverage under NPDES permits for discharges of storm water associated with those activities. (Vol. 55 Federal Register (Fed. Reg.) at 47990 *et seq.*; 40 Code of Federal Regulations (C.F.R.) Part 122.26(b)(14).) Construction activities are deemed to be a subset of the industrial activities that must be regulated by an NPDES permit. (40 C.F.R. Part 122.26(b)(14)(x).) In 1999, USEPA issued regulations for "Phase II" of storm water regulation, including requiring most small construction sites (1-5 acres) to be regulated. (Vol. 64 Fed. Reg. At 68722 *et seq.*; 40 C.F.R. Part 122.26(b)(15)(i).)

2. Legal Challenge to 99-08-DWQ

The San Francisco BayKeeper, Santa Monica BayKeeper, San Diego BayKeeper, and Orange Coast Keeper filed a petition for writ of mandate challenging the Order 99-08-DWQ in Superior Court, County of Sacramento. The court issued a judgment and writ of mandate on September 15, 2000. The court directed the State Water Board to modify the provisions of the General Permit to require permittees to implement specific sampling and analytical procedures to determine whether BMPs implemented on a construction site are: (1) preventing further impairment by sediment in storm waters discharged directly into waters listed as impaired for sediment or silt, and (2) preventing other pollutants, that are known or should be known by permittees to occur on construction sites and that are not visually detectable in storm water discharges, from causing or contributing to exceedances of water quality objectives. The monitoring, sampling and analysis provisions in the General Permit were modified pursuant to the court order and issued as Resolution No. 2001-046, adopted by the State Water Board on April 26, 2001.

On December 27, 2001, the Court issued an Order Enforcing Writ of Mandate. In that order, the Court acknowledged that the permit had been modified, but required further actions by the State Water Board. The State Water Board issued a fact sheet amendment intending to respond to the Court's further instructions. In general, the Court expressed concern that certain aspects of the modifications might be ambiguous and might result in misinterpretation by dischargers. This amendment was intended to avoid such potential ambiguities and misinterpretations and to help explain the requirements and provide suggestions for compliance. The legal case was dismissed on May 18, 2005. This General Permit incorporates portions of the legal rulings that are applicable. The monitoring requirements, however, are much broader than in the 1999 permit and the specific monitoring requirements in that amended permit are no longer required.

3. Court Decisions on Public Participation

On January 14, 2003, the Ninth Circuit issued its decision in *Environmental Defense Center v. USEPA* (344 F.3d 832). This ruling found that USEPA's Phase II regulations were deficient on three procedural grounds. In summary, the court determined that applications for general permit coverage (including the NOI and Storm Water Management Program [SWMP]) must be made available to the public, the applications must be reviewed and determined to meet the applicable standard by the permitting authority before coverage commences, and there must be a process to accommodate public hearings. The basis of the ruling was that the regulations did not require specific provisions and that it allowed dischargers, in essence, to write their own permits.

On February 28, 2005, the Second Circuit Court issued its decision in *WaterKeeper Alliance v USEPA* (2nd Cir. 2005), which concerns USEPA's Confined Animal Feeding Operation (CAFO) regulations. This ruling held that the CAFO regulation is an impermissible "self-regulating" scheme where dischargers write their own nutrient management plans, there is no meaningful review, and the plans are not spelled out in the permit.

The rulings by the Ninth and Second Circuits were based on the minimal permitting requirements contained in USEPA's regulations for Phase II storm water and CAFO discharges, and the fact that permittees essentially "wrote their own permits" in the associated management plans. This General Permit has many more specific requirements than the minimum requirements in USEPA's regulation. It includes action levels (ALs), numeric effluent limitations (NELs), and very detailed management practices. The SWPPPs are much more limited, and are meant to demonstrate compliance with the detailed permit requirements. Thus, it cannot be said that dischargers subject to this General Permit "write their own permits." In addition, this General Permit does enable public review and hearings on permit applications. Finally, neither of these court cases is directly applicable to states who implement the USEPA regulations. Rather, they are directed at USEPA who must revise its regulations.

C. Blue Ribbon Panel of Experts and Feasibility of Numeric Effluent Limitations

In 2005 and 2006, the State Water Board convened an expert panel (panel) to address the feasibility of NELs in California's storm water permits. Specifically, the panel was asked to address:

"Is it technically feasible to establish numeric effluent limitations, or some other quantifiable limit, for inclusion in storm water permits? How would such

limitations or criteria be established, and what information and data would be required?"

"The answers should address industrial general permits, construction general permits, and area-wide municipal permits. The answers should also address both technology-based limitations or criteria and water quality-based limitations or criteria. In evaluating establishment of any objective criteria, the panel should address all of the following:

1. The ability of the State Water Board to establish appropriate objective limitations or criteria;

2. how compliance determinations would be made;

3. the ability of dischargers and inspectors to monitor for compliance; and

4. the technical and financial ability of dischargers to comply with the limitations or criteria."

Through a series of public participation processes, (State Water Board meetings, State Water Board workshops and solicitation of written comments), a number of problems were identified, some of which are address through this General Permit. Problems that are not addressed through this General Permit are briefly discussed in the section, Overall Storm Water Program Strategy.

1. Summary of Panel Findings on Construction Activities

The panel's final report can be downloaded and viewed through links at www.waterboards.ca.gov or by clicking here[1].

The panel made the following observations:

- *"Limited field studies indicate that traditional erosion and sediment controls are highly variable in performance, resulting in highly variable turbidity levels in the site discharge.*

- *Site-to-site variability in runoff turbidity from undeveloped sites can also be quite large in many areas of California, particularly in more arid regions with less natural vegetative cover and steep slopes.*

- *Active treatment technologies involving the use of polymers with relatively large storage systems now exist that can provide much more consistent and very low discharge turbidity. However, these technologies have as yet only been applied to larger construction sites,*

[1] http://www.waterboards.ca.gov/stormwtr/docs/numeric/swpanel_final_report.pdf

generally five acres or greater. Furthermore, toxicity has been observed at some locations, although at the vast majority of sites, toxicity has not occurred. There is also the potential for an accidental large release of such chemicals with their use.

- *To date most of the construction permits have focused on TSS and turbidity, but have not addressed other, potentially significant pollutants such as phosphorus and an assortment of chemicals used at construction sites.*

- *Currently, there is no required training or certification program for contractors, preparers of soil erosion and sediment control Stormwater Pollution Prevention Plans, or field inspectors.*

- *The quality of stormwater discharges from construction sites that effectively employ BMPs likely varies due to site conditions such as climate, soil, and topography.*

- *The States of Oregon and Washington have recently adopted similar concepts to the Action Levels described earlier."*

In addition, the panel made the following conclusions:

- *"It is the consensus of the Panel that active treatment technologies make Numeric Limits technically feasible for pollutants commonly associated with stormwater discharges from construction sites (e.g. TSS and turbidity) for larger construction sites. Technical practicalities and cost-effectiveness may make these technologies less feasible for smaller sites, including small drainages within a larger site, as these technologies have seen limited use at small construction sites. If chemical addition is not permitted, then Numeric Limits are not likely feasible."*

- *"The Board should consider Numeric Limits or Action Levels for other pollutants of relevance to construction sites, but in particular pH. It is of particular concern where fresh concrete or wash water from cement mixers/equipment is exposed to stormwater."*

- *"The Board should consider the phased implementation of Numeric Limits and Action Levels, commensurate with the capacity of the dischargers and support industry to respond."*

2. How the Panel's Findings are Used in this General Permit

State Water Board staff carefully considered the findings of the panel and related public comments. We also reviewed and considered the comments

provided to the State Water Board on a statewide storm water policy and the reissuance of the Industrial permit. Based on this input, we developed the strategy discussed in Section III.A of this fact sheet. From the input received and the strategy's framework, we identified some permit and program performance gaps that we wanted to address in this General Permit. The significant changes (below) in this General Permit are a direct result of this process.

D. Summary of Significant Changes and Additions to this General Permit

This General Permit differs from Order 99-08-DWQ in the following significant ways:

- **Technology-based Numeric Action Levels (ALs):** this General Permit includes ALs for pH, turbidity, and Total Petroleum Hydrocarbons (TPH).

- **Technology-based Numeric Effluent Limitations (NELs):** this General Permit includes a time schedule (18 months) to implement NELs for pH in all discharges of storm water from construction activities.

- **Action Level Exceedance Evaluation Report (ALEER):** this General Permit requires any discharger who exceeds two consecutive ALs for a single parameter at a single effluent sampling location to electronically submit to the State Water Board (and make publicly available) a report of the exceedance and their response, etc.

- **Risk-based Permitting Approach:** this General Permit includes a three-tiered system for discharges that is based on the relative risk their project poses to causing water quality impacts. The site and project-specific factors used in this determination include the “R” factor, proximity to receiving waters, acreage of site to be graded, dominant soil type, design of sedimentation basins, and slope-length of disturbed area.

- **Minimum Requirements Specified:** this General Permit now specifies more minimum BMPs and requirements that were previously only required as elements of the SWPPP or were suggested by guidance.

- **Project Site Soil Characteristics Monitoring and Reporting:** this General Permit requires all projects to monitor and report the soil characteristics at the project location. This primary purpose of this requirement is to provide better risk determination and eventually better program evaluation.

- **Effluent Monitoring and Reporting:** this General Permit requires effluent monitoring and reporting for pH, turbidity and TPH in storm water discharges. The primary purpose of this monitoring is to compare against

the NEL of pH and ALs for the other parameters. The secondary purpose is to provide needed information to use in overall program evaluation.

- **Receiving Water Monitoring and Reporting:** this General Permit requires medium risk dischargers to monitor receiving waters when there are two exceedances of ALs or two exceedances of the NEL for pH. High risk dischargers are required to monitor receiving waters when there are two Exceedance of ALs or one Exceedance of the NEL for pH. The primary purpose is to provide needed information to use in overall program evaluation.

- **Active Treatment System (ATS) or Specific Source Control Requirements:** this General Permit requires that if the soils to be exposed on a site contain more than 10% (by weight) particle sizes smaller than 0.02 mm (medium silt), the discharger shall either deploy an ATS or implement specific source control requirements to prevent the mobilization of small sediment particles that are difficult to treat using conventional BMPs.

- **New and Re-development Performance Standards for Hydromodification Impacts:** this General Permit requires all sites to meet new and re-development performance standards designed to encourage all constructed sites disturbing over one acre in California to avoid, minimize and/or mitigate the hydromodification impacts.

- **Rain Event Action Plan (REAP):** this General Permit requires sites to develop and implement a REAP that must be designed to protect all exposed portions of the site within 48 hours prior to any likely precipitation event.

- **Site Photographic Self Monitoring and Reporting:** this General Permit requires all medium and high risk projects to self-report photographs of their sites at least once quarterly if there are rain events that cause a discharge. The purpose of this requirement is to help Regional Water Board staff prioritize their compliance evaluation measures (inspections, etc.). In addition this reporting will provide more transparency of compliance related information to the public.

- **Annual Reporting:** this General Permit requires all projects that are enrolled for more than one quarter to submit information and annually certify that their site is in compliance with these requirements. Most of the information required to be reported is supposed to be submitted all throughout the year (usually within some specified time after a triggering event occurs). The primary purpose of this requirement is to provide information needed for overall program evaluation and pubic participation.

- **Certification/Training Requirements for Key Project Personnel:** this General Permit requires that key personnel (e.g., SWPPP preparers, inspectors, etc.) have specific training or certifications to ensure their level of knowledge and skills are adequate to ensure compliance.

II. General Permit Approach and COMPLIANCE

The purpose of this General Permit is to address the potential impacts associated with construction activities. Some of these impacts are characterized as the "wastewater" characteristics of the discharges associated with the actual construction activities (i.e., during the construction phases). Other impacts are direct effects of the construction activities that occur after construction is complete.

A. General Permit Approach

A general permit for construction activities is an appropriate permitting approach for the following reasons:

- A general permit is an efficient method to establish the essential regulatory requirements that are appropriate for a broad range of construction activities;
- A general permit is the most efficient method to handle the large number of construction storm water permit applications;
- The application requirements for coverage under a general permit are far less rigorous than individual permit application requirements and hence more cost effective;
- A general permit is consistent with USEPA's four-tier permitting strategy, the purpose of which is to use the flexibility provided by the CWA in designing a workable and reasonable permitting system; and
- A general permit is designed to provide coverage for a group of related facilities or operations of a specific industry type or group of industries. It is appropriate when the discharge characteristics are sufficiently similar, and a standard set of permit requirements can effectively provide environmental protection and comply with water quality standards for discharges. In most cases, the proposed general permit will provide sufficient and appropriate storm water management requirements for discharges of storm water from construction site.

This approach recognizes that there may be instances where a general permit is not appropriate for a specific construction project. A Regional Water Board may require any discharger under the General Permit to apply for and obtain an Individual Permit or a more specific General Permit if the Regional Water Board determines that this General Permit does not provide adequate assurance that water quality will be protected, or there is a site-specific reason for an individual permit.

1. Pollutant Characterization and Other Impacts Addressed By This General Permit

Construction activity can lead to impairment of beneficial uses in two main ways. First, during the actual construction activities, discharges can lead to chemical, biological and physical impacts to downstream receiving waters. The most likely pollutant is sediment, due the disturbance of the landscape, although pH and TPH are also of concern. See (a) through (c) below.

Second, after most construction activities have been completed at a site, the constructed project can result in significant modification of the site's water balance during and after precipitation events. The water balance at any site is roughly divided into three main elements: runoff, infiltration, and evapotranspiration. Under past practices new development and re-development projects have almost always altered this water balance, and usually in a significant manner, resulting in hydrograph modification (referred to as hydromodification in this fact sheet and General Permit). See (d) below.

Due to the inherent variability in construction sites, management practices, and weather, it is difficult to characterize the storm water from construction activities in terms of the average rate or frequency of discharges, or the average or estimated range in pounds per day, of pollutants. Pollutants expected in the discharge from construction activity include pH, sediment (i.e., suspended solids, turbidity), and TPH.

These pollutants and other impacts are described in the subsequent paragraphs.

a. pH

Construction storm water may become contaminated from alkaline construction materials resulting in high pH (greater than pH 7). Alkaline construction materials include, but are not limited to, concrete, mortar, lime, cement kiln dust (CKD), Portland cement treated base (CTB), fly ash, recycled concrete, and masonry work.

b. Sediment as Turbidity

Construction activity involves land-disturbing operations such as clearing, grading, stockpiling, and excavating. Disturbed soils that are exposed to precipitation are subject to erosion resulting in runoff contaminated with suspended sediment. Suspended sediment is the primary constituent in construction storm water and is commonly measured as turbidity.

Turbidity, expressed as Nephelometric Turbidity Units (NTU), is a measure of the ability of light to penetrate the water. Turbidity is a function of the suspended solids in water. It has been demonstrated to exhibit control over biological functions, such as the ability of submerged aquatic vegetation to receive light and the ability of fish gills to absorb dissolved oxygen.

c. TPH

Petroleum products may contaminate stormwater if they are spilled or leaked from heavy equipment, diesel pumps, fuel tanks, or vehicles.

d. Hydromodification Impacts

Under past practices, new and re-development construction activities resulted in urbanization, which in turn modified natural watershed and stream processes. Urbanization does this by altering the terrain, modifying the vegetation and soil characteristics, introducing impervious surfaces such as pavement and buildings, and altering the condition of stream channels through straightening, deepening, and armoring. These changes affect hydrologic characteristics in the watershed and affect the supply and transport of sediment in the stream system.

B. Construction Activities Covered By This General Permit

Construction activity subject to this General Permit includes demolition, clearing, grading, excavation, and other land disturbance activities that results in soil disturbances of at least one acre of total land area, including any off-site staging areas or material storage areas. Construction activity that results in soil disturbances of less than one acre is subject to this General Permit if the construction activity is part of a larger common plan of development that encompasses one or more acres of soil disturbance or if there is significant water quality impairment resulting from the activity.

Disturbances to the ground, related to agricultural operations such as disking, harrowing, listing up beds, digging irrigation ditches, or preparing the ground for orchard planting, are not subject to this General Permit. However, the construction of features on lands that are currently used for agriculture, but which are part of residential or commercial development, are subject to this General Permit. Examples include the construction of roads for future residential development, as evidenced by subdivision maps for the site or the construction of curbs and gutters. This Permit also regulates construction activities for buildings, such as a dairy barns or food processing facilities, which are related to agriculture but are considered industrial pursuant to USEPA regulations.

Small linear underground/overhead projects which disturb at least 1 acre (including trenching and staging areas), but less than 5 acres may be covered by the Statewide General Permit for Storm Water Discharges Associated with Construction Activity from Small Linear Underground/Overhead Projects (Small LUP General Permit Order # 2003-0007-DWQ). The Small LUP General Permit has varying application and permitting requirements based on the type and complexity of the project. Linear projects disturbing five or more acres of land may obtain coverage under this General Permit. Dischargers must obtain coverage under one of the two permits described above.

Dischargers should confirm with the appropriate Regional Water Board whether or not a particular routine maintenance activity is subject to this General Permit.

A construction project which includes a dredge and/or fill discharge to any jurisdictional surface water (e.g., wetland, channel, pond, or marine water) will also need a CWA Section 404 permit from the U.S. Army Corps of Engineers and a CWA Section 401 Water Quality Certification from the Regional Water Board/State Water Board. Storm water discharges from dredge spoil placement which occurs outside of Corps jurisdiction (upland sites) and are part of construction activity that disturbs one or more acres of land are covered by this General Permit. Proponents of construction projects, that disturb one or more acres of land within the jurisdictional boundaries of a CWA Section 404 permit, should contact the appropriate Regional Water Board to determine the applicability of this permit to the project.

C. Construction Activities Not Covered By This General Permit

This General Permit does not apply to storm water discharges from:

- Those areas on Tribal Lands. Construction on Tribal Lands is regulated by an USEPA permit.

- The Lake Tahoe Hydrologic Unit. The Lahontan Regional Water Board has adopted its own permit to regulate storm water discharges from construction activity in the Lake Tahoe Hydrologic Unit (Regional Water Board 6SLT). Owners of construction projects in this watershed must apply for the Regional Board permit rather than the statewide Construction General Permit. Owners of construction projects in this watershed must apply for the Regional Board permit rather than the statewide Construction General Permit. Construction projects within the Lahontan region must comply with the Lahontan Region Project Guideline for Erosion Control (R6T-2005-0007 Section), which can be found at http://www.waterboards.ca.gov/lahontan/Adopted_Orders/2005/r6t_2005_0007.pdf

- Construction disturbing less than one acre, unless part of a larger common plan of development or sale.

- Projects covered by an individual NPDES Permit for storm water discharges associated with construction activity.

- California Department of Transportation (Caltrans) projects. The State Water Board has adopted a separate NPDES permit for Caltrans projects.

- Landfill construction that is subject to the General Industrial Permit.

- Construction activities that discharge to Combined Sewer Systems. Discharges from construction activities to Combined Sewer Systems are not required to obtain storm water permits in accordance with the Federal Storm Water Regulations Section 122.26(a)(k). Conveyances that discharge storm water runoff combined with municipal sewage are point sources that must obtain NPDES permits in accordance with the procedures of Section 122.21 and are not subject to the provisions of this General Permit.

- Qualified oil and gas exploration projects. On June 12, 2006, USEPA published a rule that exempts construction activities at oil and gas sites from the requirement to obtain an NPDES permit for storm water discharges except in very limited instances. These amendments are consistent with the Energy Policy Act of 2005 signed by the President of the United States on August 8, 2005. This action also encourages voluntary application of BMPs for construction activities associated with oil and gas field activities and operations to minimize erosion and control sediment to protect surface water quality. The final rule became effective June 12, 2006. This exemption includes disturbances to the ground from oil and gas exploration, production, processing, and treatment operations or transmission facilities including gathering lines, flow-lines, feeder lines, and transmission lines.

D. Requirements to Obtain and Terminate Permit Coverage

It is the responsibility of the discharger to obtain coverage under this General Permit prior to commencement of construction activities. For proposed construction activity on easements or on nearby property by agreement or permission, the entity responsible for the construction activity must obtain coverage under this General permit prior to commencement of construction activities.

The application requirements of the General Permit are intended to establish a mechanism that can be used to clearly identify the responsible parties, locations,

and scope of operations of dischargers covered by the General Permit and to document the discharger's knowledge of the General Permit's requirements.

Dischargers shall file a Notice of Termination (NOT) with the Regional Water Board when construction is complete or ownership has been transferred. The discharger shall certify that all State and local requirements have been met in accordance with this General Permit. In order for construction to be complete, the discharger must install post-construction storm water management measures and establish a long-term maintenance plan. This requirement is intended to ensure that the post-construction conditions at the project site do not cause or contribute to upstream and downstream water quality impacts (i.e., pollution and/or hydromodification). Specifically, the discharger shall demonstrate compliance with the new and re-development standards set forth in this General Permit (Section IX.K.). The owner/discharger is responsible for all compliance issues including all annual fees until the application has been filed and approved by the local Regional Water Board.

Dischargers who fail to obtain coverage under this General Permit for storm water discharges to surface waters will be in violation of the CWA and the California Water Code.

E. Discharge Prohibitions

This General Permit authorizes the discharge of storm water to surface waters from construction activities that result in the disturbance of one or more acres of land. It prohibits the discharge of materials other than storm water and authorized non-storm water discharges and all discharges which contain a hazardous substance in excess of reportable quantities established at 40 Code of Federal Regulations (CFR) 117.3 or 40 CFR 302.4 unless a separate NPDES Permit has been issued to regulate those discharges. In addition, this General Permit incorporates discharge prohibitions contained in water quality control plans, as implemented through the nine Regional Water Boards. Discharges to Areas of Special Biological Significance (ASBS) are prohibited unless covered by an exception that has been issued by the State Water Board.

F. Narrative Effluent Limitations

Permits for storm water discharges associated with construction activity shall meet all applicable provisions of Sections 301 and 402 of the CWA. These provisions require controls of pollutant discharges that utilize BAT and BCT to reduce pollutants and any more stringent controls necessary to meet water quality standards. BAT/BCT technologies not only include passive systems such as conventional runoff and sediment control, when appropriate, but also treatment systems such as coagulation/flocculation using sand filtration. Such technologies allow for effective treatment of soil particles less 0.02 mm (medium silt) in diameter. The discharger shall install structural controls, as necessary,

such as erosion and sediment control, which will constitute BAT and BCT and will achieve compliance with water quality standards. The narrative effluent limitations constitute compliance with the requirements of the CWA.

G. Non-storm Water Discharges

This General Permit requires the elimination or reduction of non-storm water discharges. Non-storm water discharges may contribute a significant pollutant load to receiving waters. Non-storm water discharges include a wide variety of sources, including improper dumping, spills, or leakage from storage tanks or transfer areas. Measures to control spills, leakage, and dumping and to prevent illicit connections during construction shall be addressed through structural as well as non-structural BMPs. This General Permit prohibits the discharge of materials other than storm water and authorized non-storm water discharges. It is recognized that certain non-storm water discharges may be necessary for the completion of construction projects. Such discharges are allowed by this General Permit provided they are not relied upon to clean up failed or inadequate construction or post-construction BMPs designed to keep materials onsite.

These authorized non-storm water discharges shall:

(a) be infeasible to eliminate;

(b) comply with BMPs as described in the SWPPP;

(c) filter or treat, using appropriate technology, all dewatering discharges from sedimentation basins;

(d) meet the NELs and ALs for a pH, turbidity and TPH; and

(e) not cause or contribute to a violation of water quality standards.

Additionally, these discharges may be required to be permitted by the local Regional Water Board (e.g., some Regional Water Boards have adopted General Permits for dewatering discharges). This General Permit prohibits the discharge of storm water that causes or threatens to cause pollution, contamination, or nuisance; but it also allows the discharger to determine the most economical, effective, and innovative BMPs.

H. Receiving Water Limitations

Construction related activities, which cause or contribute to an exceedance of water quality standards must be corrected. The dynamic nature of construction activity allows the discharger the ability to quickly identify and correct the source of the exceedances.

This General Permit requires that storm water discharges and authorized non-storm water discharges shall not contain pollutants that cause or contribute to an exceedance of any applicable water quality objectives or water quality standards. The modifications to the monitoring program require sampling and analysis procedures to help determine whether BMPs installed and maintained are preventing pollutants in discharges from the construction site from causing or contributing to exceedance of water quality standards.

Water quality standards consist of the designation of beneficial uses of surface waters and the adoption of ambient criteria necessary to protect those uses. (40 CFR §131.3(i)) When adopted by the State Water Board or a Regional Water Board, the criteria are termed "water quality objectives." (Water Code §13241; the terms are used interchangeably here.) If storm water runoff from construction sites contains pollutants, there is a risk that those pollutants could enter surface waters and cause or contribute to exceedance of water quality standards. For that reason, dischargers should be aware of the applicable water quality standards in their receiving waters. (The best method to ensure compliance with receiving water limitations is to implement BMPs that prevent pollutants from contact with storm water or from leaving the construction site in runoff).

In California, water quality standards are published in the Basin Plans adopted by each Regional Water Board, the California Toxics Rule (CTR), the National Toxics Rule (NTR), and the Ocean Plan.

Dischargers can determine the applicable water quality standards by contacting Regional Water Board staff or from one of the following sources. The actual plans that contain the water quality standards can be viewed at the site of the appropriate Regional Water Board for Basin Plans (http://www.waterboards.ca.gov/regions.html), the State Water Board site for statewide plans (http://www.waterboards.ca.gov/plnspols/index.html), or the USEPA regulations for the NTR and CTR (40 CFR Title 131). Basin Plans and statewide plans are also available by mail from the appropriate Regional Water Board or the State Water Board. The USEPA regulations are available at http://www.epa.gov/. Additional information concerning water quality standards can be accessed through http://www.waterboards.ca.gov/stormwtr/gen_const.html

I. Total Maximum Daily Loads (TMDLs) and Waste Load Allocations

Dischargers located within the watershed of a 303(d) impaired water body, for which a TMDL has been adopted by the Regional Water Board or USEPA, may be required by a separate Regional Water Board action to implement additional BMPs, conduct additional monitoring activities, and/or comply with an applicable waste load allocation and implementation schedule. If a specific waste load allocation has been established that would apply to a specefic discharge, the Regional Water Board must adopt an Order requiring specific implementation actions necessary to meet that allocation. In the instance where an approved TMDL has specified a general waste load allocation to construction storm water

discharges, but no specific requirements for construction sites have been identified in the TMDL, dischargers shall consult with the state TMDL authority http://www.waterboards.ca.gov/tmdl/tmdl.html to confirm that adherence to a SWPPP that meets the requirements of the General Permit will be consistent with the approved TMDL.

J. Retention of Records

The discharger is required to retain records of all monitoring information, copies of all reports required by this General Permit, and records of all data used to complete the NOI for all construction activities to be covered by the General Permit for a period of at least three years from the date the Regional Water Board approves the NOT. This period may be extended by request of the State Water Board and/or Regional Water Board. With the exception of reporting noncompliance to the appropriate Regional Water Board, dischargers are not required to submit the records, except by specific requirement by the Regional Water Board.

III. General construction PERMIT rationale

A. Overall Storm Water Program Strategy

Urban storm water pollution in California is regulated via statewide permits issued by the State Water Board and 26 permits issued by the Regional Water Boards to larger (Phase I) communities that operate municipal separate storm sewer systems (MS4s). The statewide permits include: construction, industrial, linear (e.g. subsurface utilities that cross regions and watersheds), Caltrans, and smaller (Phase II) communities that operate MS4s. State and Regional permits require that all dischargers do not cause or contribute to water pollution so that there would be violations of standards for receiving water objectives as specified in Basin Plans adopted by the boards. The permits also require BMPs to prevent storm water pollution or hydromodification from harming beneficial uses of the waters. Hydromodification occurs when construction leads to a significant change in the total volume of storm water flows from a parcel or alters the rate at which water flows off a site. The rationale is that a sudden surge of water can damage the ecosystem.

1. Problem Statement

Storm water pollution and hydromodification from urbanization may impair beneficial uses of California waters. Much more information on particular environmental and public health problems can be provided upon request. It is critical to recognize that the BMP solution to storm water problems has been inadequate, based on 15+ years of experience with construction, industrial, and Phase I MS4 storm water permits. There are over 2,100 impaired water bodies in California today; the list has been growing; and there are several

hundred more waters that environmental groups want added to the list. More effective regulatory tools for storm water management are needed.

There are also significant problems in two arenas associated with the Water Boards' efforts in this area. From a management perspective, there are inconsistencies among regions in their regulatory approaches to Phase I MS4s. Some of these inconsistencies are unnecessary. In addition, increases in the cost of compliance need to be managed over time.

2. Solution Approach

Our solution approach includes many elements. The key elements with respect to the most controversial issues – NELs and hydromodification standards – are bulleted below.

- At this time, staff does not recommend relying primarily on NELs to improve storm water quality. While acknowledging the advocacy for this approach, staff believes that there is other less costly and contentious ways to increase performance that are worth trying first.

- In general, ALs seem to be better tools at this time for measuring and enhancing the performance of BMPs, especially with respect to whether BMPs are protecting water quality in the bodies of water receiving the discharges. Exceedance of ALs does not constitute a permit violation, but it does trigger mandatory follow up action.

- However, selected NELs will be used to supplement the AL approach, for two reasons. First, this will allow for lessons learned about how both the NEL and AL approach work. If the AL approach does not work well, an NEL approach can be considered. Second, using a few NELs will create an incentive for dischargers to make the AL approach work.

- Measures to control hydromodification are possible at many new construction sites at reasonable cost. We intend to phase in such measures over time, with a yet to be determined triage process to determine which projects require them. Measures that control hydromodification at existing urban facilities can be more expensive to address; we do not have a uniform statewide approach to this issue yet. The storm water program roundtable is working on this issue in order to develop a coherent and defensible statewide approach, even if that approach is implemented via separate Phase I MS4 permits at the regional level.

3. Implementation Sequence

These issues and possible solutions will be developed through a three-step process. First, statewide construction and industrial permits will be reissued in 2007. During review, we will solicit stakeholder input on such questions as when variation between regions should be allowed, if at all. There are some legitimate reasons for variation. Second, during 2008, we will reissue the statewide Phase II MS4, and again create consistency whenever needed, but allow variation when justified. This is a major task with respect to MS4s. Third, as we perform the second task, or perhaps shortly thereafter, we will consider issuance of a statewide Phase I MS4 permit that creates the desired mix of consistency and variation, building on the lessons learned in the three statewide permit revision processes. These three steps will have the same benefits as development of a statewide storm water policy, at lower cost and in less time.

4. Performance-based Storm Water Program

The State Water Board has received comments[2] in the past few years expressing interest in overall improvement in storm water program performance. The stakeholders also expressed a desire to have the measurement system transparent and easy to understand.

A formal performance-based approach will take some time and require multiple steps to be fully developed, so we will implement an initial strategy. The following observed program performance gaps (i.e., "problems") are driving this strategy.

- We lack a comprehensive set of **monitoring/measurement** tools to evaluate the overall performance of the storm water program (or the whole organization, for that matter). In particular, we do not know and cannot know without better monitoring if compliance with technology based standards will be adequate to prevent exceedances of receiving water objectives.

- **Hydromodification** is a major cause of most current and future water quality issues associated with urban runoff (storm water). The projected population growth and pressure to develop new landscapes compounds this problem.

- The current General Permit suffers from language or omissions that affect its **enforceability** in areas/elements critical to the overall performance of the program.

[2] In the past two years the State Water Board has solicited public comments on a statewide storm water policy, the reissuance of the Industrial permit, and the blue ribbon panel.

- We do not currently have adequate public participation in our General Permit process. The outcome of the 9th and 2nd Circuit Court decisions, as well as other recent court decisions, suggests that we need to provide better **public participation** in our administrative processes associated with all general NPDES permits (the storm water program has three, two of which are due to be reissued).

B. Specific problems addressed by this general permit

1. Program Monitoring (Performance) Strategy

The Water Board has begun a shift towards performance-based management. The principles of performance-based management break the type of measures we currently gather into four main categories, which are discussed below.

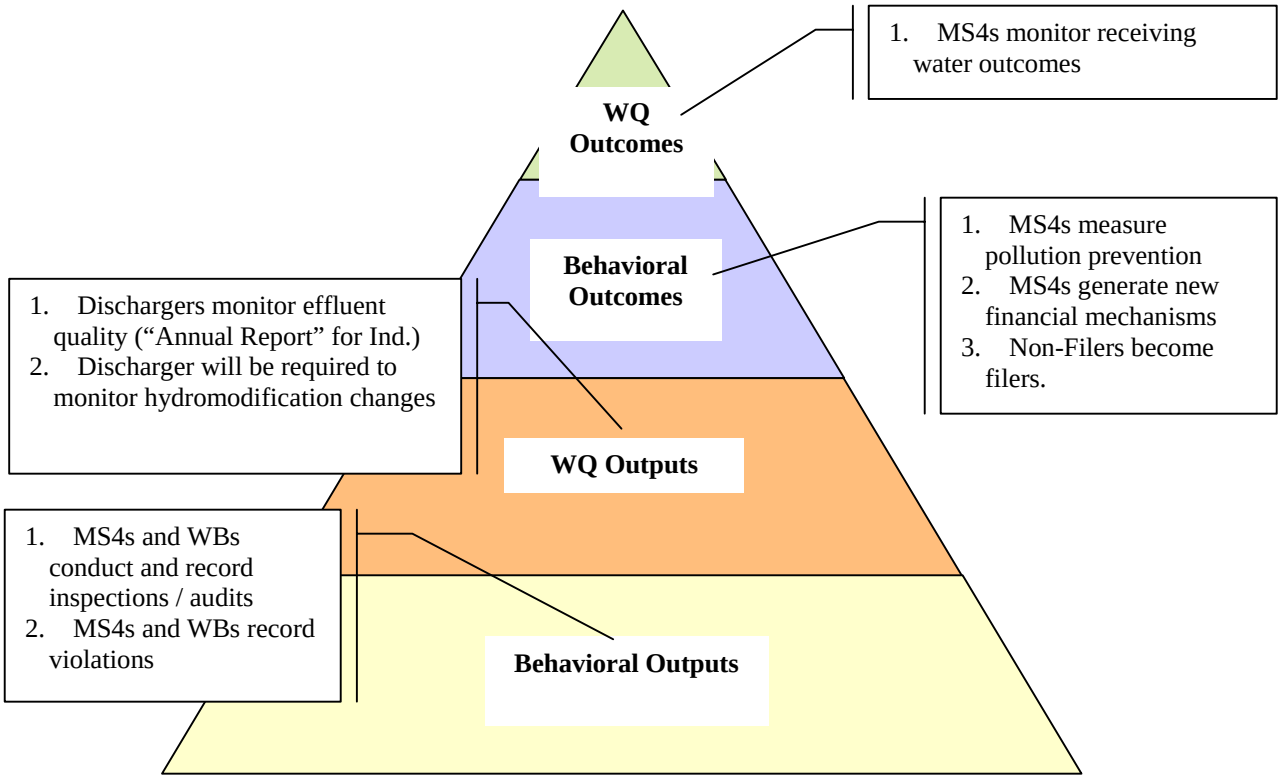


Figure 1 - Performance Measurement Framework and Examples for the Storm Water Program

Tier 1 - Water Quality Outcomes: are external results - water quality, or environmental, results that can be measured directly. We plan to measure receiving water quality and beneficial use support by enhancing existing efforts (e.g., SWAMP, 305b and 303d, etc.).

Tier 2 - Behavioral Outcomes: are external results - societal behaviors that, when measured, indicate a water quality outcome. For example, if we measure that people have reduced or prevented pollution from being exposed to our waters (e.g., moved pollutants indoors, wash cars only on lawns, etc.), we can assume this has a positive effect on water quality.

Tier 3 - Water Quality Outputs: are internal "products" that, when measured, are directly related to water quality but are not direct measures of external results. For example, an industrial storm water discharger can measure the quality of the effluent from their facility, which indicates receiving water quality outcomes, but is not a direct measure of the outcome. NELs and violations of them are measured only at this level.

Tier 4 - Behavioral Outputs: are internal "products" that the facility, the MS4, or an agency (like us) uses to indirectly measure our efforts to produce outcomes. Examples are number of inspections, specificity of expectations/requirements our in permits, development of a SWPPP, violations of BMP requirements, etc.

This General Permit requires the development and implementation of a Construction Site Monitoring Program (CSMP). The CSMP shall be developed prior to the commencement of construction activities, and revised as necessary to reflect project revisions. The CSMP shall be developed and implemented to address the following objectives:

- to demonstrate that the site is in compliance with the requirements (e.g. Discharge Prohibitions, ALs, NELs etc.) of this General Permit;

- to determine whether immediate corrective actions, additional BMP implementation, or SWPPP revisions are necessary to reduce pollutants in storm water discharges and authorized non-storm water discharges;

- to determine whether BMPs implemented on the site are effective in preventing or reducing pollutants in storm water discharges and authorized non-storm water discharges. Equipment, materials, and workers must be available for rapid response to failures and emergencies. All corrective maintenance to BMPs shall be performed as soon as possible, depending upon worker safety; and

- to develop a database of storm water quality at some medium and high risk sites under a variety of BMPs and storm conditions, with receiving water quality under those same storm conditions

a. Types of Monitoring and Reporting Required

This permit requires effluent monitoring at all medium and high risk sites. Visual inspections are required at all sites. Under some conditions, receiving water monitoring is required at medium and high risk sites.

All sites are required to submit annual reports, which contain various types of information, depending on the site characteristics and events. Some medium and high risk sites are required to submit ALEERs, depending on events at the site. A summary of the monitoring and reporting requirements are listed in Table 1.

Table 1 - Risk and Monitoring and Reporting Requirements

Monitoring	**Low Risk**	**Medium Risk**	**High Risk**
Visual Monitoring	Yes	Yes	Yes
Effluent Monitoring	No	Yes	Yes
Receiving Water Monitoring	No	Maybe[3]	Maybe[4]
Reporting			
ALEER	No	Maybe[5]	Maybe[5]
Annual Report	Yes	Yes	Yes

b. Visual Inspections (Monitoring)

All dischargers are required to conduct quarterly non-storm water visual inspections. For these inspections, the discharger shall visually observe each drainage area for the presence of (or indications of prior) unauthorized and authorized non-storm water discharges and their sources. For storm related inspections, dischargers shall visually observe storm water discharges at all discharge locations within one business day after each inch of precipitation from a storm event. Within two business

[3] Receiving water monitoring is only required at medium risk sites when the discharge from any drainage area exceeds the AL for turbidity or the NEL for pH for two consecutive storm events, medium risk dischargers shall sample receiving waters for the parameter(s) that consecutively exceeded the AL or NEL.
[4] Receiving water monitoring is only required at high risk sites when the discharge from any drainage area exceeds the AL for turbidity or the NEL for pH during any storm event, that discharger shall immediately sample receiving waters for the parameter(s) that exceeded the AL or NEL.
[5] Only required if storm water discharges or non-storm water discharges have caused or contributed to AL exceedances for the same parameter (pH, turbidity or TPH) in two consecutive storm events within the same drainage area.

days after each storm event that produces precipitation of 1/2 inch or more, dischargers shall conduct a post storm event inspection to (1) identify whether BMPs were adequately designed, implemented, and effective, (2) identify additional BMPs and revise the SWPPP accordingly, and (3) photograph each drainage area discharge location and structural BMPs. Dischargers shall maintain on-site records of all visual observations, personnel performing the observations, observation dates, weather conditions, locations observed, and corrective actions taken in response to the observations.

c. Effluent Monitoring

Dischargers with medium and high risk construction projects shall collect storm water samples from each drainage area within one business day after the initial ½ inch of measured precipitation from a storm event, and every one inch thereafter. Dischargers shall collect samples of stored or contained storm water that is discharged subsequent to a storm event producing precipitation of 1/2 inch or more at the time of discharge. Dischargers with medium and high risk construction projects shall analyze samples for (1) pH, turbidity and TPH, (2) parameters indicating the presence of pollutants identified in the pollutant source assessment required in Section IX.I.5 contained in the General Permit, and (3) any additional parameters for which monitoring is required by the Regional Water Board.

d. Receiving Water Monitoring

High risk sites shall monitor the relevant receiving water(s) whenever the discharge from one or more drainage areas at their site exceeds the pH or turbidity AL or pH NEL. Medium risk sites shall similarly monitor the relevant receiving water(s) when any discharge from one or more drainage areas on their site exceeds the pH or turbidity AL or the pH NEL for two consecutive storm events.

e. Action Level Exceedance Evaluation Report (ALEER)

Whenever effluent monitoring indicates that storm water discharges or non-storm water discharges have caused or contributed to AL exceedances for the same parameter (pH, turbidity or TPH) in two consecutive storm events within the same drainage area, the discharger shall electronically submit to the State Water Board (and make publicly available) a report of the exceedance and their response.

The requirement to report this information is to help the Boards understand more about the characteristics of runoff from construction sites, how response measures serve to alter these characteristics, and

general knowledge regarding sampling and monitoring construction activity runoff.

For the discharger, the ALEER will provide a learning opportunity regarding what measures work (and what may not work as well) for controlling pollutants on the site.

Overall the information in the ALEER will serve to inform all stakeholders (e.g., municipalities, public citizens, academics) on the performance of the program. Most of the information in an ALEER would be considered behavioral outputs (e.g., BMPs and other response measures) and water quality outputs (effluent monitoring). In some cases the ALEER will provide correlated receiving water outcome information after an exceedance of an AL has occurred.

f. Annual Report

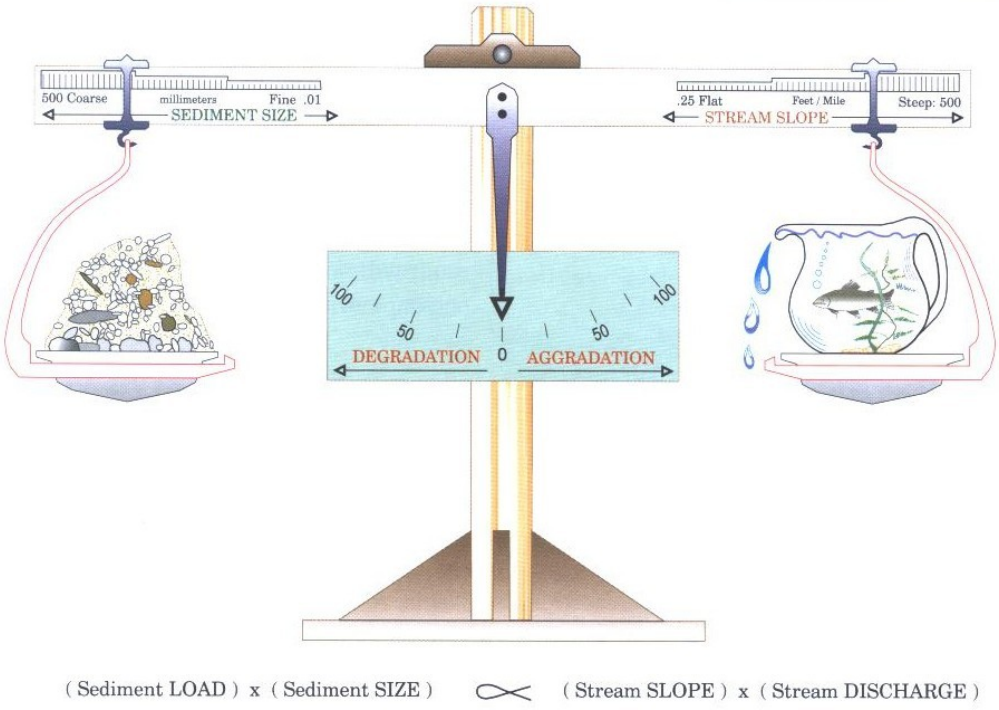
All dischargers shall prepare and electronically submit an annual report no later than January 1 of each year using the Storm Water Annual Report Module (SWARM). The Annual Report shall include a summary and evaluation of all sampling and analysis results, original laboratory reports, a summary of all corrective actions taken during the compliance year, identification of any compliance activities or corrective actions that were not implemented.

2. New and Re-development Performance Standards for Hydromodification Impacts

General Permit 99-08-DWQ does not address hydromodification impacts. In order to address hydromodification from urbanization, a basic understanding of fluvial geomorphic concepts is necessary. A dominant paradigm in fluvial geomorphology holds that streams adjust their channel dimensions (width and depth) in response to long-term changes in sediment supply and bankfull discharge (1.5 to 2 year recurrence interval). The bankfull stage corresponds to the discharge at which channel maintenance is the most effective, that is, the discharge at which the moving sediment, forming or removing bars, forming or changing bends and meanders, and generally doing work that results in the average morphologic characteristics of channels.[6] Lane (1955 as cited in Rosgen 1996[7]) showed the generalized relationship between sediment load, sediment size, stream discharge and stream slope in Figure 2. A change in any one of these variables sets up a series of mutual adjustments in the companion variables with a resulting direct change in the physical characteristics of the river.

[6] Dunne, T and L.B. Leopold. 1978. Water in Environmental Planning. San Francisco W.H. Freeman and Company
[7] Rosgen. D.L. 1996. Applied River Morphology. Pagosa Springs. Wildland Hydrology

Figure 2 - Schematic of the Lane Relationship



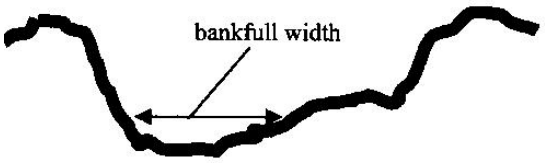
After Lane (1955) as cited in Rosgen (1996)

Urbanization affects all four variables. During construction, sediment loads can increase from 2 to 40,000 times over pre-construction levels.[8] Most of this sediment is delivered to stream channels during large, episodic rain events.[9] This increased sediment load leads to an aggradation phase (Figure 2 and Figure 3).

[8] Goldman S.J., K. Jackson, and T.A. Bursztynsky. 1986. Erosion and Sediment Control Handbook. McGraw Hill. San Francisco.
[9] Wolman 1967 as cited in Paul, M.P. and J.L. Meyer. 2001. Streams in the Urban Landscape. *Annu. Rev.Ecol. Syst.* 32: 333-365.

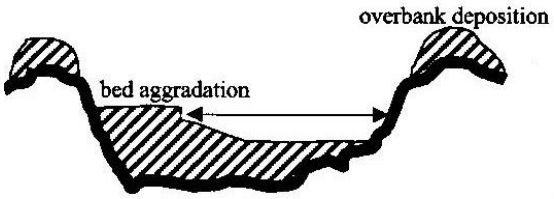
Figure 3 - Channel Changes Associated with Urbanization

Pre-development



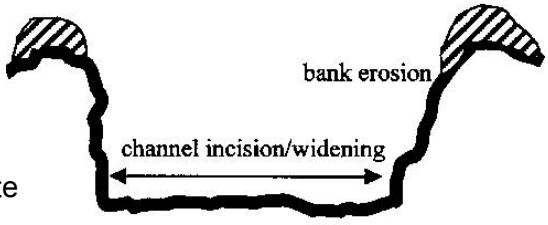
Aggradation Phase

- hillslope erosion is largest sediment source
- width:depth may increase or stay constant
- cross-sectional area increases



Degradation Phase

- channel erosion is largest sediment source
- width:depth increase eventually
- cross-sectional area increased to accommodate larger bankfull discharge



From Paul and Myer 2001[9]

During the aggradation phase, stream depths may decrease as sediment fills the channel, decreasing channel capacity and increasing flooding and overbank deposition.

A degradation phase initiates after construction is completed. Connected impervious area and compaction of pervious surfaces increase the frequency and volume of bankfull discharges.[6,10] Increased flows begin to erode the

[10] Booth, D. B. and C. R. Jackson. 1997. Urbanization of Aquatic Systems: Degradation

channel and the channel deepens and widens to accommodate the increased bankfull discharge.[11,12] Channels may actually narrow during this phase as entrained sediment from incision is deposited laterally in the channel.[6] After incised channels begin to migrate laterally, bank erosion begins, which leads to general channel widening.[10,12,13] As the channel readjusts, a majority of the sediment that leaves a drainage area comes from within the channel, as opposed to the background and construction related hillslope contribution.[13]

The magnitude of the geomorphic sequence discussed above varies along a stream network as well as with the age of development, slope, geology, sediment characteristics, type of urbanization, and land use history.

Sediment size is also altered during urbanization. Altered discharges and sediment supply alteration lead to less fine sediment, increased coarse sand fractions, and decreased gravel. This can alter the existing balance between aggradation and degradation.[14,15]

Encroachment of stream channels leads to an increase in channel slope and increased velocities, which in turn, have the ability to transport more sediment within the channel.

There are other adverse hydrological impacts due to urbanization. In Maryland, Klein[16] noted that baseflow decreases as extent of urbanization increases. Ferguson and Suckling[17] noted a similar relation in watersheds in Georgia. On Long Island, Spinello and Simmons[18] noted substantial decreases in base flow in intensely urbanized watersheds.

Traditional structural water quality BMPs (e.g. detention basins and other devices) do not adequately protect receiving waters from accelerated channel bed and bank erosion,[10] do not address post-development increases in runoff

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Thresholds, Stormwater Detection, and the Limits of Mitigation. *Journal of the American Water Resources Association* Vol. 33, No.5, pp. 1077-1089.

[11] Hammer, T.R. 1973. Effects of Urbanization on Stream Channels and Stream Flow. Regional Science Research Institute, Philadelphia. PA.

[12] Booth, D.B. 1990. Stream Channel Incision Following Drainage Basin Urbanization. *Water Resour. Bull.* 26:407-417.

[13] Trimble, S.W. 1997. Contribution of Stream Channel Erosion to Sediment Yield from an Urbanizing Watershed. *Science*: Vol. 278 (21), pp. 1442-1444.

[14] Finkenbine, J.K., D.S. Atwater, and D.S. Mavinic. 2000. Stream health after urbanization. *J. Am. Water Resour. Assoc.* 36:1149-60.

[15] Pizzuto, J.E. W.S. Hession, and M. McBride. 2000. Comparing gravel-bed rivers in paired urban and rural catchments of southeastern Pennsylvania. *Geology* 28:79-82.

[16] Klein, Richard D. 1979. Urbanization and Stream Quality Impairment. *Water Resources Bulletin* Vol.15, No.4, pp. 948-963.

[17] Ferguson, B. K. and P. W. Suckling. 1990. Changing Rainfall-Runoff Relationships in the Urbanizing Peachtree Creek Watershed, Atlanta, Georgia. *Water Resources Bulletin* vol. 26, no.2 pp. 313-21.

[18] Center for Watershed Protection (CWP). 2000. The Practice of Watershed Protection: Techniques for protecting our nation's streams, lakes, rivers, and estuaries. Ellicott City, MD. 741 pp.

volume, and do not mitigate the decline in benthic macroinvertebrate communities in the receiving waters (Maxted and Shaver, 1997, 1999 as cited in DDNR 2004[19]). Horner et. al.,[20] suggest that structural BMPs are not as effective in protecting aquatic communities as a continuous riparian buffer of native vegetation. This is supported by the findings of Zucker and White (1996, as cited in DDNR 2004[19]), where instream biological metrics were correlated with extent of forested buffers.

Site design BMPs (e.g. rooftop and impervious disconnection, vegetated swales, setbacks and buffers) filter and settle out pollutants and provide for more infiltration than is possible for traditional centralized structural BMPs placed at the lowest point in a site. They provide source control for runoff and lead to a reduction in pollutant loads. When implemented, they also help reduce the magnitude and volume of larger, less frequent storm events (e.g., 10-yr, 24-hour storm), thereby reducing the need for expensive flood control infrastructure. Nonstructural BMPs can also be a landscape amenity, instead of a large isolated structure requiring substantial area for ancillary access, buffering, screening and maintenance facilities.[21] The multiple benefits of using non-structural benefits will be critically important as the state's population increases and imposes strains upon our existing water resources.

This permit requires dischargers to comply with two new development and re-development standards and encourages dischargers to implement setbacks. The first standard requires dischargers to replicate the pre-project runoff volume. The easiest and most cost-effective way to comply with the standard is to maximize the use of site design BMPs close to the source of runoff generation. BMPs implemented close to the source of runoff generation cost less than end-of the pipe measures.[22] Dischargers are given the option of using the State's Volume Calculator to calculate the required runoff volume or a watershed process-based, continuous simulation model such as the EPA's Storm Water Management Model (SWMMM) or Hydrologic Simulation Program Fortran (HSPF). The second standard, preserving drainage divides and maximizing time of concentration, is designed to reduce post-development peak flows and volumes in areas not covered under a municipal permit. The most effective way to preserve drainage areas and maximize time of concentration is to implement landform grading, incorporate site design BMPs and implement distributed structural BMPs (e.g., bioretention

[19] Delaware Department of Natural Resources (DDNR). 2004. Green Technology: The Delaware Urban Runoff Management Approach. Dover, DE. 117 pp.
[20] Horner, R.R. 2006. Investigation of the Feasibility and Benefits of Low-Impact Site Design Practices (LID) for the San Diego Region. Available at: http://www.projectcleanwater.org/pdf/permit/case-study_lid.pdf
[21] Delaware Department of Natural Resources (DDNR). 2004. Green Technology: The Delaware Urban Runoff Management Approach. Dover, DE. 117 pp.
[22] Bay Area Stormwater Management Agencies Association (BASMAA). 1997. Start at the Source: Residential Site Planning and Design Guidance Manual for Stormwater Quality Protection. Palo Alto, CA.

cells, rain gardens, rain cisterns). For those dischargers that are held to specific hydromodification standards in a municipal permit, preserving drainage areas and maximizing time of concentration will help the discharger achieve compliance with these standards. Encouraging dischargers to implement setbacks reduces channel slope and velocity changes that can lead to aquatic habitat degradation.

3. Public Participation Strategy

Over the last two years, two different federal Courts of Appeals have issued rulings regarding regulatory review and approval and public access for general permit application documents, based on the conclusion that the dischargers were, in effect, writing their own permits. These decisions are not directly applicable to the State Water Board and this permit includes many detailed requirements. Nonetheless, this General Permit includes provisions to comply with the spirit of these decisions by making the application process more open to public review and comment. This General Permit allows for NOI and SWPPP review process and public participation process to the extent practicable, given the thousands of NOIs and SWPPPs throughout the state. After evaluating the current General Permit regulatory and public review process and information technology capabilities (California Integrated Water Quality System (CIWQS), Stormwater Muliti Application Reporting and Tracking System (SMARTS), SWARM), staff considered various alternatives mainly focused on enhancing, to varying degrees of complexity and cost, the storm water program's electronic capabilities. Staff selected the alternative that is the least costly, can be developed with the least risk, meets the current permitting timeframes, and would attain the goal of significantly increasing public participation and Regional Water Board review. This alternative significantly reduces future processing impacts, logistical and storage problems, and provides the public immediate access to vital permitting information.

The State Water Board will, in the future, mandate the electronic filing of all industrial and construction General Permit documents consisting of an NOI, site map, SWPPP and SWPPP Compliance Checklist. The State Water Board will, also, mandate the electronic filing of all NEC applications, NOTs, Annual Reports, and other discharger documents. The system will include an efficient registration process that minimizes the need to accept paper "wet" signatures. The system would be enhanced to accommodate all the above documents and to determine if these documents are complete and acceptable. All the above documents, as well as appropriate status reports, shall be made available to the public (and to the Regional Water Boards) on the State Water Board website. Upon acceptance of an application, the system will generate an initial application fee submittal form (Fee Form) that would be downloaded by the discharger and then mailed to State Water Board with check. The system shall allow applicants to update existing

information (including SWPPPs), to identify subordinate account holders who may enter/update annual report and SWPPP related information, and to identify subordinate account holders who have been authorized to submit annual reports, NOTs, and SWPPP updates. The system will provide subordinate password and login to subordinate account holders. Construction permit dischargers would be required to use the system to update project acreage status and the system, as appropriate, would recalculate permitting fees based upon updated permit acreage totals. The system should also allow dischargers to update contact name and phone number automatically. For owner name and address updates dischargers may submit the request to change, but the system does not update the information until the request approved by a Regional or State Water Board staff person.

It is not necessary to have individual approval of each SWPPP because the permit has explicit about BMPs implementation requirements. The purpose of the SWPPP is to demonstrate compliance, not to allow dischargers to "write their own permits."

4. Permit Improvements to Lessen Water Quality Impacts

a. Wet Weather Enforceability Problem - Rain Event Action Plan

The Permit 99-08-DWQ requires that during the nonrainy season, the discharger is responsible for ensuring that adequate sediment control materials are available to control sediment discharges at the downgrade perimeter and operational inlets in the event of a predicted storm. It also requires, the discharger to consider a full range of sediment controls (e.g., straw bale dikes, earth dikes, brush barriers, drainage swales, check dams, subsurface drain, sandbag dikes, fiber rolls) and at a minimum implement an effective combination of erosion and sediment controls on all disturbed areas during the rainy season. It has been the experience of Regional Water Board staff that dischargers often wait until the last minute to order supplies and to increase staff, and therefore often fail to implement erosion and sediment control measures in a timely fashion.

This General Permit requires dischargers to develop and implement a Rain Event Action Plan (REAP) designed to protect all exposed portions of their site within 48 hours prior to any likely precipitation event. The REAP requirement is designed to ensure that the discharger has adequate materials, staff, and time to deploy erosion and sediment control measures that are intended to reduce the amount of sediment and other pollutants generated from the active site. A REAP shall be developed when there is a 30% or greater forecast of receiving precipitation in the project area. The National Oceanic and Atmospheric Administration (NOAA) define a chance of precipitation as a probability of precipitation of

30% to 50% chance of producing precipitation in the project area[23]. NOAA defines the probability of precipitation (PoP) as the likelihood of occurrence (expressed as a percent) of a measurable amount (0.01 inch or more) of liquid precipitation (or the water equivalent of frozen precipitation) during a specified period of time at any given point in the forecast area. Forecasts are normally issued for 12-hour time periods. Descriptive terms for uncertainty and aerial coverage are used as follows:

Table 2 - National Oceanic and Atmospheric Administration (NOAA) Definition of Probability of Precipitation (PoP)

PoP	Expressions of Uncertainty	Areal Coverage
0%	none used	none used
10%	none used	**isolated**
20%	**slight chance**	**isolated**
30-50%	**chance**	**scattered**
60-70%	**likely**	**numerous**
80-100%	none used	none used

The discharger shall obtain likely precipitation forecast information from the National Weather Service Forecast Office (http://www.srh.noaa.gov/).

b. Site Planning and Appropriate Measures of Control, etc.

There are two major site planning-related requirements of this permit. The first requirement requires dischargers to place their projects into a low, medium, or high risk category, based on a Sediment Transport Risk Worksheet. Worksheet parameters include proximity of a project to receiving waters, size of project, rainfall erosivity during mass grading, soil erodibility, runoff potential of soils, sheet flow length and slope steepness, percentage of soils finer than silt, and proposed sediment basin design. The worksheet is designed to allow projects that are away from receiving waters and that mass grade during the dry season to be considered low risk, thus exempting them from some permitting requirements.

The second requirement requires dischargers to complete a soil particle size analysis, using test method ASTM D-422 (Standard Test Method for Particle-Size Analysis of Soils), as revised, to determine the percentages

[23] http://www.crh.noaa.gov/lot/severe/wxterms.php

of sand, very fine sand, silt, and clay on the site. The percentage of particles less than 0.02 mm in diameter shall also be determined. The 0.02 mm particle size (medium silt) is relevant for sediment basin design. Soils consisting of particles smaller than 0.02 mm (medium silt, fine silt, and clay) by weight cannot be managed by sediment control devices such as fiber rolls and are not candidates for gravitational settling devices such as basins or traps. On large sites, several particle size analyses may need to be conducted to ensure that differences in soil texture are detected. Based on the results of the particle size analysis(es), the designer is better equipped to develop an effective erosion and sediment control strategy.

This General Permit requires that if the soils to be exposed on a site contain more than 10% (by weight) particle sizes smaller than 0.02 mm, the discharger shall either deploy an ATS or implement specific source control requirements to prevent the mobilization of small sediment particles that are difficult to treat using conventional BMPs.

c. Technology-based Numeric Action Levels (ALs)

This General Permit contains technology-based ALs for pH, turbidity, and TPH, and requirements for effluent monitoring at medium and high risk sites.

The primary purpose of ALs for the dischargers is to inform them of the effectiveness of their on-site measures. Construction sites need to employ many different systems that must work together to achieve compliance with the permit's requirements. The ALs chosen should indicate whether the systems are working as intended. Since these are technology-based numbers, though, they are not necessarily good indicators of compliance with downstream water quality standards.

The primary purpose of ALs for the non-dischargers is to provide them with information regarding construction activities and water quality impacts. This data will provide the Water Boards and the rest of the storm water community with more information about levels and types of pollutants present in runoff and how effective the dischargers' BMPs are at reducing their presence in effluent. We also hope to learn more about the linkage between effluent and receiving water quality. In addition, these requirements will inform us on the mechanics needed to establish compliance monitoring programs at construction sites in the event that further NELs are considered necessary.

i. pH

The chosen proposed limits were established by calculating one standard deviation above and below the mean pH of runoff from highway construction sites[24] in California. Proper implementation of BMPs should result in discharges that are within the range of 6.5 to 8.5 pH Units.

The Caltrans study included 33 highway construction sites throughout California over a period of four years, which included 120 storm events. All of these sites had typical BMPs in place that would be conventional at all types of construction sites in California.

ii. Turbidity

The turbidity action level of 500 NTU was determined from calculated average sediment loads for each of the five California ecoregions described in USEPA's Development Document for Final Action for Effluent Guidelines and Standards for the Construction and Development Category[25]. USEPA used the Revised Universal Soil Loss Equation (RUSLE)[26] to determine average annual sediment loads under ambient and construction conditions for three slope/slope length combinations (3% slope/200 foot slope length, 7% slope/140 foot slope length, and 12% slope/100 foot slope length) and the dominant soil textures in each ecoregion. The RUSLE estimates sediment loads from sheet and rill erosion, the dominant erosion processes on a construction site. Sheet and rill erosion can usually be managed with conventional runoff control, soil stabilization, and sediment control measures. The equation is as follows:

$$A = (R)(K)(LS)(C)(P)$$

Where: A = the rate of sheet and rill erosion (tons per acre per year)
R = rainfall-runoff erosivity factor
K = soil erodibility factor
LS = length-slope factor
C = cover factor (erosion controls)
P = management operations and support practices (sediment controls)

[24] Caltrans Construction Sites Runoff Characterization Study, 2002. Available at: http://www.dot.ca.gov/hq/env/stormwater/pdf/CTSW-RT-02-055.pdf
[25] http://www.epa.gov/waterscience/guide/construction/devdoc/final.htm
[26] Renard, K.G., G.R. Foster, G.A. Weesies, D.K. McCool, and D.C. Yoder, coordinators. 1997. Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE). U.S. Department of Agriculture, Agriculture Handbook No. 703, 404 pp.

The product of R, K, and LS yields an annual estimate of sheet and rill erosion for bare ground areas of construction sites.

Staff used the Modified Universal Soil Loss Equation (MUSLE) (Williams 1977 as described in Fifield 2004[27]) to develop sediment load estimates for the 2-year, 24-hour storm event. The equation is as follows:

$$T = 95(Q_p * V)^{0.56}(K)(LS)(C)(P)$$

Where: T = Sediment yield for specific storm event (tons)
Q_p = Peak flow for specific storm event (cubic ft. per second)
V = Volume of specific storm event (acre-feet)
K = soil erodibility factor
LS = length-slope factor
C = cover factor
P = management operations and support practices

Staff used the K and LS factors from USEPA's Development Document and 2-year, 24-hour storm event data from the Western Regional Climate Center.[28] A C factor of 0.08 was used in the analysis for 3% and 7% slopes and 0.09 for 12% slope. This simulates 50% open ground with dust suppressant and 50% cover with straw mulch applied at a rate of 2 tons per acre. A P factor of 0.1 was used to simulate a sediment basin designed in accordance with Attachment H in the General Permit. The sediment loads were converted to suspended sediment concentration. A 1:1 relationship between turbidity (expressed as NTU) and suspended sediment concentration (expressed as mg/L) was assumed.

iii. Total Petroleum Hydrocarbons (TPH)

This General Permit requires medium and high risk dischargers to monitor their effluent for the presence of petroleum hydrocarbons. This General Permit requires dischargers to use analytical method, DHS Method 8015M (direct injection), for determining the presence of TPH-diesel. Dischargers are required to run the range of hydrocarbons including, C_{12} to C_{28}, and to quantify the results as TPH-diesel (essentially the sum of the compounds found between C_{12} to C_{28}). State Water Board staff recognizes that this scan will represent a composite of many specific hydrocarbons, some of which are more a concern for water quality than others.

[27] Fifield, J.S. 2004. Designing for Effective Sediment and Erosion Control on Construction Sites. Forester Communications-2nd Edition, Santa Barbara, CA.
[28] Western Regional Climate Center-Western U.S. Precipitation Frequency Maps. Available at: http://www.wrcc.dri.edu/pcpnfreq.html

The literature[29] shows that typical oil water separators (one BMP available to treat diesel-contaminated runoff) should be designed and maintained to reduce effluent concentrations to 15 mg/L. Thus, the action level for TPH-diesel is set at 15 mg/L.

d. Numeric Effluent Limitations (NELs)

i. pH NELs for Medium and High Risk Discharges

Under state and federal law and regulations, a discharge permit must establish limitations equivalent to best available technology economically achievable (BAT) for toxic pollutants and best conventional pollutant control technology (BCT) for conventional pollutants. For some industrial categories, such limitations have already been established by the USEPA. This is not the case with construction discharges, thus the State Water Board has used best professional judgment (BPJ) limits equivalent to BAT and BCT. Given the potential contaminants, it is the opinion of the State Water Board that the minimum standard method for control of pH in runoff is preventive measures such as avoiding concrete pours during rainy weather, covering concrete and directing flow away from it if a pour does occur during rain, covering scrap drywall and stucco materials when stored outside and potentially exposed to rain, and other housekeeping measures. If necessary, the pH impaired storm water from construction sites can be treated in a filter or settling pond or basin, with additional natural or chemical treatment required to meet pH limits set forth in this permit. The basin or pond acts as a collection point and allows storm water to be held for a sufficient period for the contaminants to be settled out, either naturally or artificially, as well as allowing any additionally required treatment to take place. The State Water Board believes that these techniques are equivalent to BCT. In determining the proposed pH concentration limit for discharges, the State Water Board used BPJ to set these limitations.

The chosen proposed limits were established by calculating two standard deviations above and below the mean pH of runoff from highway construction sites[30] in California. Proper implementation of BMPs should result in discharges that are within the range of 5.8 to 9.0 pH Units.

While we believe these limits are feasible to comply with immediately, we have set them to a compliance schedule to become effective 18

[29] City of Tacoma. 2003. Surface Water Manual. Volume 5-Runoff Treatment BMPs.
[30] Caltrans Construction Sites Runoff Characterization Study, 2002. Available at: http://www.dot.ca.gov/hq/env/stormwater/pdf/CTSW-RT-02-055.pdf

months after the adoption of this General Permit. This time schedule is needed to ensure that dischargers have adequate time to adjust construction practices, if necessary, and to ensure that compliance monitoring guidelines are established and disseminated to all stakeholders.

ii. NELs for Active Treatment System (ATS) Discharges

Currently in California, no regulatory or toxicity requirements have been established for operating and monitoring an ATS. Many developers are using these systems to treat storm water discharges from their construction sites. There are a number of reasons why an ATS may be necessary. For example, the use of an ATS may be appropriate when site constraints inhibit the ability to correctly size a sediment basin, when clayey and/or highly erosive soils are present, or when the site has very steep or long slope lengths.[31]

NELs have been established in this General Permit for discharges from construction sites that utilize an ATS. These systems lend themselves to NELs for turbidity and pH because of their known reliable treatment. These systems can consistently produce a discharge less than 10 NTU and have been used successfully at many sites in several states since 1995 to reduce turbidity to very low levels.[32] These systems can be very effective in reducing the sediment in storm water runoff, but the systems that use additives/polymers to enhance sedimentation also pose a potential risk to water quality (e.g., operational failure, equipment failure, additive/polymer release, etc.).

The State Water Board is concerned about the potential acute and chronic impacts that the polymers and other chemical additives may have on fish and aquatic organisms if released in sufficient quantities or concentrations. In addition to anecdotal evidence of polymer releases causing aquatic toxicity in California, the literature supports this concern.[33] For example, cationic polymers have been shown to bind with the negatively charged gills of fish, resulting in mechanical suffocation.[31,34] Due to the potential toxicity impacts, which may be caused by the release of additives/polymers into receiving waters,

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[31] Pitt, R., S. Clark, and D. Lake. 2006. Construction Site Erosion and Sediment Controls: Planning, Design, and Performance. DEStech Publications. Lancaster, PA. 370pp.
[32] Currier, B., G. Minton, R. Pitt, L. Roesner, K. Schiff, M. Stenstrom, E. Strassler, and E. Strecker. 2006. The Feasibility of Numeric Effluent Limits Applicable to Discharges of Storm Water Associated with Municipal, Industrial and Construction Activities.
[33] RomØen, K., B. Thu, and Ø. Evensen. 2002. Immersion delivery of plasmid DNA II. A study of the potentials of a chitosan based delivery system in rainbow trout (*Oncorhynchus mykiss*) fry. *Journal of Controlled Release* **85**: 215-225.
[34] Bullock, G., V. Blazer, S. Tsukuda, and S. Summerfelt. 2000. Toxicity of acidified chitosan for cultured rainbow trout ((*Oncorhynchus mykiss*). *Aquaculture* **185**:273-280.

toxicity requirements have been established in this General Permit for discharges from construction sites that utilize an ATS in order to protect receiving water quality and beneficial uses.

e. Specific Source Control and Treatment Requirements

Permit 99-08-DWQ does not address the difficulty of trapping dislodged soils that are high in clay and fine silt. In general soils with particles smaller than 0.02 mm (medium silt) do not settle easily using conventional measures for sediment control (i.e., sediment basins). Given their long settling time, disruption of such soils results in a significant risk that fine particles will be released into surface waters and cause unacceptable downstream impacts. This General Permit requires dischargers to implement source controls or treatment controls if the soils to be exposed on the construction site contain more than 10% (by weight) particle sizes smaller than 0.02 mm. The intent is to achieve compliance with BAT/BCT technology-based standards and with water quality standards.

f. Storm Water Pollution Prevention Plan (SWPPP)

The Permit 99-08-DWQ does not require that qualified personnel prepare SWPPPs or conduct inspections. USEPA's Construction General Permit requires that qualified personnel conduct inspections. USEPA defines qualified personnel as a person knowledgeable in the principles and practice of erosion and sediment controls who possesses the skills to assess conditions at the construction site that could impact storm water quality and to assess effectiveness of any sediment and erosion control measures selected to control the quality of storm water discharges from the construction activity. USEPA also suggests that qualified personnel prepare SWPPPs and points to numerous states that require certified professionals to be on construction sites at all times (http://www.epa.gov/npdes/pubs/sw_swppp_guide.pdf). States that have certification programs include Washington, Georgia, Florida, Delaware, Maryland, and New Jersey. To ensure that water quality is being protected this General Permit requires that all SWPPPs be written, amended and certified by a Qualified SWPPP Developer. A Qualified SWPPP Developer shall possess one of the eight certifications and or registrations specified in Section X.A. of this General Permit and effective two years after the adoption date of this General Permit, shall have attended a State Water Board-sponsored or approved Qualified SWPPP Developer training course.

The previous versions of the General Permit required development and implementation of a SWPPP as the primary compliance mechanism. This General Permit is shifting some of the measures that were covered by this general requirement to specific permit requirements, each individually

enforceable as a permit term. This General Permit emphasizes the use of appropriately selected, correctly installed and maintained pollution reduction BMPs. This approach provides the flexibility necessary to establish BMPs that can effectively address source control of pollutants during changing construction activities. These specific requirements also improve the clarity of the General Permit and its enforceability. The requirements are specified in the permit so that dischargers understand the requirements and the public can determine whether discharges are in compliance with permit requirements.

For medium and high risk sites a SWPPP must be prepared prior to disturbing soil at a site. The SWPPP must be implemented at the appropriate level to protect water quality at all times throughout the life of the project. The SWPPP shall remain on the site while the site is under construction, commencing with the initial mobilization and ending with the termination of coverage under the permit.

The SWPPP has two major objectives: (1) to help identify the sources of sediment and other pollutants that affect the quality of storm water discharges and (2) to describe and ensure the implementation of BMPs to reduce or eliminate sediment and other pollutants in storm water as well as non-storm water discharges. The SWPPP shall include BMPs that address source control, BMPs that address pollutant control, and BMPs that address treatment control.

Required elements of a SWPPP include, but are not limited to: (1) site description addressing the elements and characteristics specific to the site, (2) descriptions of BMPs for source and treatment control, (3) descriptions of BMPs for construction waste handling and disposal, (4) a description of the implementation of approved local plans, (5) proposed post-construction controls, including description of local post-construction erosion and sediment control requirements, and (6) a description of non-storm water management BMPs.

The Regional Water Board may request orally or in writing the submittal of the SWPPP from the discharger or the authorized representative of the discharger. Upon this request, the appropriate party must submit a copy of the SWPPP and all SWPPP amendments to the Regional Water Board within seven (7) calendar days. SWPPPs are reports that can also be made available to the public under Section 308(b) of the CWA and will be made available by the Regional Water Board upon request.