State Water Resources Control Board

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FACT SHEET
FOR
WATER QUALITY ORDER 2008-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)

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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 Board reissued the General Construction Storm Water Permit (Water Quality Order 99-08-DWQ). On December 8, 1999 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 file the Permit Registration Documents (PRDs), which includes a Notice of Intent (NOI), Storm Water Pollution Prevention Plan (SWPPP), and other compliance related documents required by this General Permit and mail the appropriate permit fee to the State Water Board. It is expected that as the storm water program develops, the Regional Water Quality Control Boards (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 (*Natural Resources Defense Council, v. Costle,* (D.C. Cir. 1977) 568 F.2d 1369, 1372 (*Costle*); 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 District of Columbia Circuit held that a storm sewer is a point source and that the USEPA did not have the authority to exempt categories of point sources from the CWA's NPDES permit requirements (*Costle,* 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]).

In 1987, Congress amended the CWA to add provisions that specifically required NPDES permits 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. 1163-64).

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

On August 19, 1999 the State Water Board first adopted Order No. 99-08-DWQ as the statewide general permit regulating construction discharges. A subsequent legal challenge to that Permit resulted in a court order directing that the State Water Board's General Permit must 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. A later court order that required further action to clarify ambiguities resulted in an amended fact sheet, adopted on December 27, 2001. This General Permit incorporates applicable portions of these legal rulings.

3. Court Decisions on Public Participation

On January 14, 2003, the Ninth Circuit issued a decision in *Environmental Defense Center v. USEPA* (344 F.3d 832). This ruling found that certain aspects of USEPA's Phase II regulations governing municipal separate storm sewer systems were deficient on three procedural grounds. 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 permit provisions.

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 upon the minimal permitting requirements contained in USEPA's regulations for Phase II storm water and CAFO discharges. Express regulatory requirements were not sufficiently specified in the permits themselves, so that permittees essentially "wrote their own permits" by specifying their compliance measures in the associated management plans.

Neither of these court cases are directly applicable to states implementing the USEPA regulations. Rather, they are directed at USEPA, which must revise its regulations. However, the State Water Board's Office of Chief Counsel has recommended that the new General Permit address the Court's rulings where possible. This General Permit includes many more specific requirements than the minimum requirements in USEPA's regulations and in the previous General Permit. This General Permit includes, for example, numeric action levels (NALs), numeric effluent limitations (NELs), and very detailed management practices. Now the purpose of requiring a discharger to submit, implement and amend a SWPPP is to demonstrate a discharger's compliance with the detailed General Permit requirements and outcomes, compared to the SWPPP in previous version of this General Permit, where it served to provide the documentation of how the discharger would comply with the general requirements. Thus, it cannot be said that dischargers subject to this General Permit "write their own permits." This General Permit requires dischargers to electronically file all permit related compliance documents. These documents include, but are not limited to, NOI, SWPPPs, annual reports, Notice of Terminations (NOTs), NAL exceedance reports, etc. Electronically submitted compliance information shall be immediately available to the public, as well as the Regional Board offices, via the Internet. In addition, this General Permit does enable public review and hearings on permit applications when appropriate.

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 water quality, public process and overall program effectiveness problems were identified, some of which are addressed 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, 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."*

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

- *"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. March 2007 Preliminary Draft and Subsequent Stakeholder Process

State Water Board staff released a preliminary draft of this General Permit on March 2, 2007. The purpose of this release of a "preliminary draft" was to initiate a dialog amongst the various stakeholders prior to a formal permit adoption process. The State Water Board held two informal workshops (no quorum) - one in Southern California and one in Sacramento - to both explain the regulatory approach reflected in the draft permit and to solicit some initial feedback from stakeholders. Written comments on this preliminary draft were accepted up until May 4, 2007. Staff received many written comments prior to the deadline.

All the written comments received are posted here:

http://www.waterboards.ca.gov/stormwtr/constpermits_comments.html

Summaries of the comments received on key topics can be found here:

ftp://swrcb2a.waterboards.ca.gov/pub/swrcb/dwq/stormwater/Construction%20Permit%20Meetings

In June and July, State Water Board staff reviewed the comments and determined that a number of the concerns raised by stakeholders could be best addressed through a series of focused stakeholder meetings. State Water Board staff held stakeholder meetings in July, August and September where, together with the stakeholders, we identified common interests and various alternatives to satisfy these interests.

State Water Board staff held a final meeting to close out the preliminary stakeholder process on October 3. The purpose of this meeting was to explain staff positions on a number of key issues leading up to the release of a Tentative Order. The key issues identified and discussed during this process are described briefly below.

Monitoring
The water quality monitoring required of dischargers (usually as self-monitoring) subject to NPDES permits is usually aimed at serving at least these three information needs/goals:

- to determine discharger compliance with effluent limitations;
- to determine discharger compliance with receiving water standards; and
- to inform the community regarding overall permit and program effectiveness.

This General Permit and the overall program does not fit the traditional NPDES model (i.e., discharger provides all this information to us) well because of various reasons, but mainly because (1) this community of dischargers is generally not accustomed to or adept at water quality sampling procedures, and (2) we have not developed a set of tried and tested procedures for obtaining high-quality representative samples of storm water effluent from construction sites.

The storm water program needs this information, especially as it grows and evolves to include more performance-based expectations. So the common interests are that we all recognize the need for information useful in:

- characterizing construction site effluent, statewide, regionally, etc.;
- characterizing the relationship between construction site runoff and receiving water impacts (effect on beneficial uses);
- evaluating site-specific performance (feedback for site "operators"); and
- determining compliance with permit requirements.

During our process, there was general agreement that these interests are shared amongst the stakeholders. As a result, there are many alternative ways (e.g., contracted sampling for effluent, receiving water, monitoring coalitions, etc.) to get the desired information, besides making dischargers perform all the sampling, analysis and reporting. During this process we evaluated these alternatives and the General Permit language reflects the preferred alternative(s).

One specific alternative not chosen was considered to be more viable than the others - this is one where the discharger would do essentially no self-monitoring of water quality (for all the common interests) and instead the State Water Board would convene a team to conduct the monitoring (for all purposes). The concept was not fully developed, but one idea was to fund this team, composed of mostly contractors, using fees and then conduct random sampling of sites (sort of a third-party model). The main "pro" of this alternative is that the quality of the data would be relatively high, allowing for maximum use in program analysis, compliance evaluation, etc. The main "con" of it is that, unless the team monitors a site, there would be virtually no information available for compliance evaluation purposes.

Some minimal self-monitoring is needed to ensure that the Water Boards, the MS4s and the public have access to this information. Implementing this alternative would take significant amount of time and require funding logistics to be built from scratch (we currently don't have authority to direct fees to this effort). Therefore, after considerable review and debate, we concluded that the main features of this alternative could be blended with the chosen alternative - that is, we could always add on third-party monitoring efforts (e.g., receiving

water or watershed monitoring) to a self-monitoring approach to augment the quality and amount of information available for program review and other purposes. This General Permit contains a placeholder to allow third-party monitoring as an alternative to required receiving water monitoring elements.

Project Phase-Specific Requirements
Many of the stakeholders supported our initial attempt to characterize construction in terms of the different phases (e.g., mass grading, vertical build). This General Permit includes requirements that relate specifically to these phases, or stages, of the project. For example, a project in mass grading phase will have applicable erosion and sediment control requirements, whereas a project in the vertical build stage will have more emphasis on controlling the various types of pollutants and pollutant-generating activities relevant to that phase.

Risk
Many stakeholders supported the risk-based approach in the initial draft permit. As a result of the stakeholder process and further consideration of the comments, this General Permit presents a risk approach that better approximates a project's actual risk of impacting water quality during construction activities.

This General Permit contains an approach for estimating both sediment and receiving water risk separately, and an overall risk determination framework that reflects the applicable levels of implementation and monitoring for three risk levels. Projects determined to be Risk Level 4 (the highest risk category) will not be covered by this general permit – individual permits will be needed for these projects.

Active Treatment Systems
Stakeholders contended that our preliminary draft inadvertently served to drive some projects towards being required to employ an Active Treatment System (ATS) to treat their discharge by suggesting when it was appropriate to use ATS. State Water Board staff believes that the decision to use or not use an ATS (versus other measures) should be at the discretion of the discharger and that this General Permit should provide the specific requirements necessary to ensure that ATS discharges do not cause or contribute to exceedances of receiving water standards.

Numeric Action Levels
This General Permit uses a methodology to develop site-specific NALs for turbidity (or other pollutants, as appropriate to the phase). The methodology is based on the Modified Universal Soil Loss Equation (MUSLE), which is used to estimate site-specific, storm-event-specific runoff values using erosion and sediment control measures, which in turn serves as the site's NALs.

Numeric Effluent Limitations for pH

The preliminary draft mistakenly contained an NEL for pH that applied at all times. This General Permit clarifies that the pH NEL only applies to site effluent where and when there are activities that could result in harmful pH discharges.

Turbidity Numeric Action Levels (NALs) Methodology

This General Permit uses a methodology to develop site-specific NALs for turbidity (or other pollutants, as appropriate to the phase). The methodology is based on the MUSLE, which is used to estimate site-specific, storm-event-specific runoff values using erosion and sediment control measures, which in turn serves as the site's NALs. The MUSLE methodology has been used to estimate sediment yields for a wide variety of land disturbance activities, including construction. [2,3,33]

During our process, the building industry suggested one alternative (that ultimately was not chosen) - this alternative was to have one, statewide numeric action level of 500 NTU for turbidity. The main "pro" of this alternative is that it would be simpler to understand and implement. The main "con" of it is that it does not convey any specific meaning or relationship to site conditions and therefore does not teach the principles of soil erosion and sediment control. We also determined that the chosen alternative is relatively simple to implement (as simple as a single, statewide NAL) and the benefits gained from calculating the site-specific NAL outweigh the costs associated with the method's complexity.

For example, the chosen method requires that a site-specific NAL for turbidity be calculated once (prior to the SWPPP being submitted, etc.) and from that point on the NAL remains the same for the life of the project. This is very much analogous to the longtime practice of calculating pre-project runoff volumes and peak flows for site drainage design. Once the site personnel become aware of the site's NAL, there is little difference between implementing a static, site-specific NAL and a static, statewide NAL. And in the process of calculating the site-specific NAL the discharger has the potential to learn which site characteristics (e.g., soil type, slope length and steepness, storm type, etc.) are driving the NAL's estimate of sediment yield and transport (and therefore which control measures might work best).

In contrast with the other approaches, the chosen approach will help the discharger select and evaluate (through the use of BMP-specific C and P factors in the MUSLE equation) specific BMPs that may best serve to control sediment discharges at their site. Additionally, the information yielded from implementing this approach will inform the Water Boards, the MS4s and the public of how sediment yield estimation and paired control measures (and other discharger

[2] Texas Department of Transporation. 2002. Stormwater Management Guidelines for Construction Activities. Section 3.0

[3] B.J. Barfield, et al., Design Hydrology and Sedimentology for Small Catchments. (New York: Academic Press, 1994) 273-300.

interventions) perform to control sediment from construction site discharges. This information in turn will help better characterize construction site runoff in California and help develop the role of numerics in our general NPDES permits for stormwater discharges.

The Role of Numerics in this General Permit for Measuring/Controlling Effluent Turbidity

After discussing with various stakeholders (including those responsible for enforcing the requirements of the General Permit) the role of numerics in this General Permit, State Water Board staff arrived at the concept of site-specific, NALs for turbidity. The stakeholders, as well as the expert panel, almost universally supported NALs as a logical transition from the current "narrative" approach for effluent limitations to a more quantitative one. Stakeholders agreed that NALs should only serve to inform site operators regarding erosion and sediment control measure performance. A site-specific derived turbidity NAL provides more meaningful feedback to a site operator than a single, statewide turbidity NAL for all sites.

Turbidity Numeric Effluent Limitations (NELs)

The site-specific NAL approach should have some sort of ceiling, though, so that no discharger' s NAL is so high that it might have other compliance problems. So this General Permit contains a limit to this NAL, currently set at 1000 NTU. In addition, key stakeholders suggested that determining compliance with this General Permit should be made a more efficient process, since staff resources are limited. In other words, the stakeholders requested this action level limit be a quantitative tool that allows staff to use their best professional judgment to evaluate compliance directly. If the effluent exceeds this limit, the site could be alleged to be in violation of the General Permit, and the staff could move on to evaluate compliance at other sites. This would improve our current approach to determining compliance and significantly reduce time it takes staff to evaluate compliance with all the narrative requirements, document the results, and analyze the record for potential enforcement actions.

And finally, this level of turbidity (1000 NTU) in construction site effluent being discharged to almost any jurisdictional water body in California poses a potential threat to cause or contribute to exceedance of receiving water quality objectives. As a result of all these factors, staff took this NAL limit and made it also an NEL that represents the current, best approach to using an NEL to control sediment (in the form of turbidity) discharges from construction activities.

New Development and Re-development Storm Water Performance Standards (i.e., Runoff Reduction Requirements)

There were many comments submitted regarding the post-construction control requirements in the preliminary draft. Some commenters supported have runoff reduction requirements in this permit vehicle. Others supported having runoff

reduction requirements, but not in this permit vehicle. Others directly opposed any kind of runoff reduction requirements all together.

There were a significant number of comments challenging the technical approach and contending that these requirements may not be appropriate measures to control hydromodification. As a result, State Water Board staff has clarified our terminology by stating that the standards and measures identified in this General Permit are "runoff reduction" measures aimed at lessening the problems caused by changing the landscape and related hydrology associated with new and redevelopment projects. The previous rationale and permit language instead referred to these collectively as standards and measures aimed at mitigating impacts associated with hydromodification. As discussed later, hydromodification management strategies must take into account a channel's stage of adjustment and account for future changes in the evolution of channel form.

There were also significant comments submitted arguing that these runoff reduction requirements were duplicative at best and confusing at worst when applied in areas where other post-construction storm water requirements exist. As a result, this General Permit clarifies that its runoff reduction requirements only apply to projects that lie outside of jurisdictions covered by SUSMP (or more protective) post construction requirements in either Phase I or Phase II permits.

Figures 1 and 2, below, show the General Permit enrollees (to Order 99-08-DWQ, as of March 10, 2008) overlaid upon a map with SUSMP (or more protective) areas in blue and purple. This gives an idea of the parts of California where this General Permit's runoff reduction requirements would actually apply (where there are no blue or purple counties/cities).

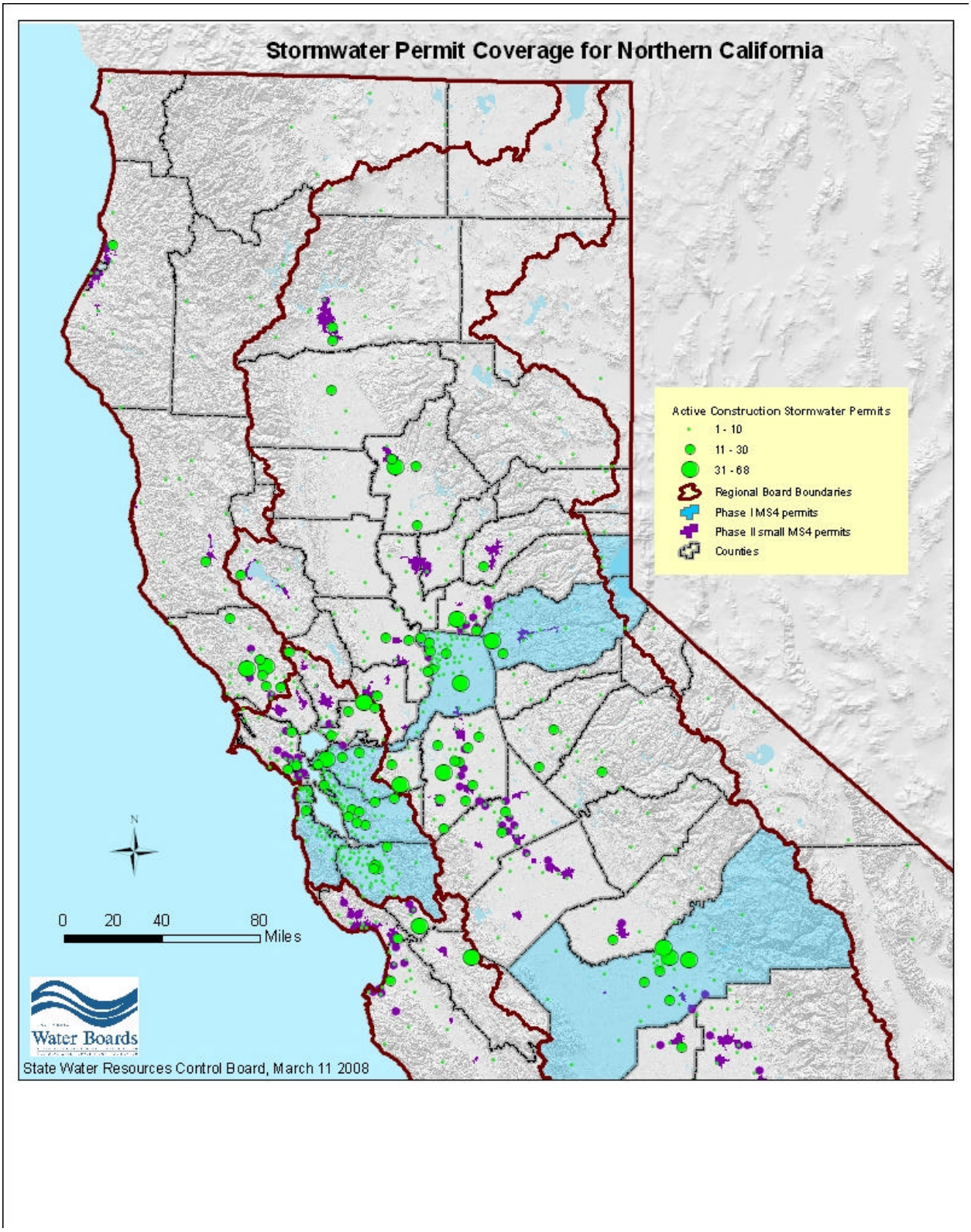


Figure 1 - Construction Stormwater Permit Coverage for Northern CA (current) Overlaid On Counties / Cities with SUSMP-plus Coverage

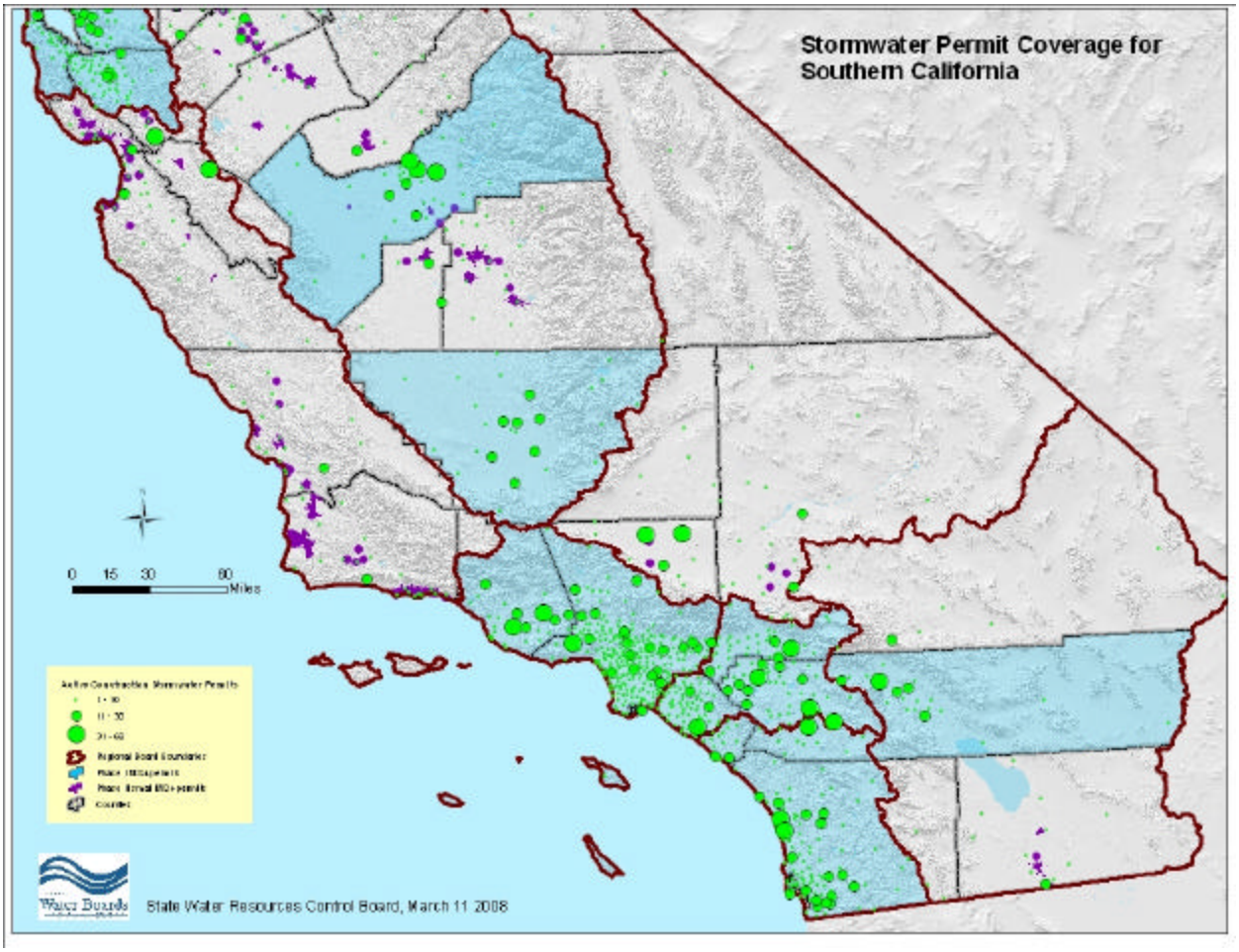


Figure 2 - Construction Stormwater Permit Coverage for Southern CA (current) Overlaid On Counties / Cities with SUSMP-plus Coverage

State Water Board staff maintains that the runoff reduction requirements in this General Permit are needed to ensure that construction activities avoid, minimize and mitigate for harm caused by the post-construction state of the site.

Public Participation and "Permit Waiting Period"

There was much concern over the "90-day waiting period" contained in the preliminary draft. This is no longer a significant issue, because this General Permit contains NELs for the primary pollutants and very specific, risk-based requirements for the dischargers to include their SWPPPs. As a result, the PRDs are less critical to the process, although there will still be an electronic application process. The specificity of the Permit provisions, together with the public availability of PRD filings, obviates the need for a separate public process to consider how these documents constitute compliance with the Permit itself. There will still be a process for comment submittal and, under some circumstances, an opportunity for a public hearing to be held prior to project approval. This General Permit will require all PRDs to be complete in order to obtain permit coverage.

Overall Construction Program Support Efforts
In conjunction with the reissuance of this General Permit, State Water Board staff has been working to update some other, non-permit elements of the program. For example, staff is committed to improving the effectiveness and consistency (statewide) of the inspections conducted as part of this program. State Water Board staff is developing new standardized training and administrative procedures for all Water Board construction site inspectors.

In addition, State Water Board staff is working on informational documents to help support and improve the overall storm water monitoring strategy (i.e., role/use of third parties, watershed focus, SWAMP input, etc.).

E. Summary of Significant Changes and Additions to this General Permit from Order 99-08-DWQ

As a result of the proceedings and processes described above, State Water Board staff has proposed significant changes to Order 99-08-DWQ. This General Permit differs from Order 99-08-DWQ in the following significant ways:

- **Technology-based Numeric Action Levels:** this General Permit includes NALs for pH and turbidity.

- **Technology-based Numeric Effluent Limitations:** this General Permit contains NELs for pH during any construction phase where there is a high risk of pH discharge and turbidity for all discharges. The turbidity NEL of 1000 NTU is essentially the intersection of the realm of minimum-technology that sites have to employ (to meet the traditional Best Available Technology Economically Achievable (BAT)/ Best Conventional Pollutant Control Technology (BCT) standard) and the traditional, numeric receiving water limitations for turbidity.

- **Risk-based Permitting Approach:** this General Permit establishes a four-level risk calculation, with only the lowest three levels covered under this General Permit. Those dischargers that are determined to be Risk Level 4 are not covered by this General Permit, and thereby are required to submit a Report of Waste Discharge (ROWD) to the appropriate Regional Water Board and seek coverage under an individual or other applicable general permit.

- **Minimum Requirements Specified:** this General Permit 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 dischargers 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 and turbidity in storm water discharges. The purpose of this monitoring is to be used to determine compliance with the NELs and evaluate whether NALs included in this General Permit are exceeded.

- **Receiving Water Monitoring and Reporting:** this General Permit requires some Risk Level 2 and Risk Level 3 dischargers to monitor receiving waters.

- **New Development and Re-development Storm Water Performance Standards:** this General Permit specifies runoff reduction requirements for all sites not covered by a Phase I or Phase II MS4 NPDES permit, to avoid, minimize and/or mitigate post-construction storm water runoff impacts. .

- **Rain Event Action Plan:** this General Permit requires sites to develop and implement a Rain Event Action Plan (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 projects to provide photographs of their sites at least once quarterly if there are rain events causing a discharge during that quarter. The purpose of this requirement is to help Regional Water Board staff prioritize their compliance evaluation measures (inspections, etc.). In addition, this reporting will make compliance related-information more available to the public.

- **Annual Reporting:** this General Permit requires all projects that are enrolled for more than one continuous three-month period to submit information and annually certify that their site is in compliance with these requirements. The primary purpose of this requirement is to provide information needed for overall program evaluation and pubic information.

- **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 their ability to design and evaluate project specifications that will comply with Permit requirements.

II. General Permit Approach and Compliance

The purpose of this General Permit is to control the potential impacts associated with storm water runoff from construction activities. Some of these impacts are characterized as "wastewater" discharges resulting from actual construction activities (i.e., during the construction phases). Other impacts are direct effects of the construction activities that occur after construction is complete, such as hydromodification impacts and pollution associated with post-construction activities.

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 for a broad range of construction activities under differing site conditions;
- A general permit is the most efficient method to handle the large number of construction storm water permit applications;
- The application process for coverage under a general permit is far less onerous than that for individual permit 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 efficient 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 management requirements to protect the quality of receiving waters from discharges of storm water from construction sites.
- There may be instances where a general permit is not appropriate for a specific construction project. A Regional Water Board may require any discharger otherwise covered under the General Permit to apply for and obtain an Individual Permit or apply for coverage under a more specific General Permit. The Regional Water Board must determine that this General Permit does not provide adequate assurance that water quality will be protected, or that there is a site-specific reason why an individual permit should be required.

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 effects on downstream receiving waters. The most likely pollutant is sediment, due the disturbance of the landscape, although pH and other non-visible pollutants are also of concern. See (a) through (c) below.

Second, after most construction activities have been completed at a site, the constructed project may have resulted in significant modification of the site's response to precipitation. With typical past practices, new development and re-development projects have almost always resulted in more precipitation ending up as runoff and less precipitation intercepted, evapotranspired, and infiltrated, resulting in permanent post-construction impacts water quality impacts. 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 sediment concentration (SSC), turbidity), and non-visible pollutants.

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

a. pH

Construction storm water may become contaminated from contact with 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 susceptible 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 affect biological functions, such as the ability of submerged aquatic vegetation to receive light and the ability of fish gills to absorb dissolved oxygen.

c. Non Visible Pollutants

There are a variety of materials used or present on a construction site that may contain non-visible pollutants and pose a potential risk to water quality if they are exposed to precipitation or storm water runoff. Examples of such materials include, but are not limited to, soil stabilizers, paint, pesticides, herbicides, chemical/fecal contamination from portable toilets, nutrients such as nitrogen or phosphorus, and fluids from vehicles.

d. Post-construction Impacts

Under past practices, new and re-development construction activities have resulted in modified natural watershed and stream processes. This is caused by altering the terrain, modifying the vegetation and soil characteristics, introducing impervious surfaces such as pavement and buildings, increasing drainage density through pipes and channels, and altering the condition of stream channels through straightening, deepening, and armoring. These changes result in a drainage system where sediment transport capacity is increased and sediment supply is decreased. A receiving channel's response is dependent on dominant channel materials and its stage of adjustment (See Section III.B.2).

B. Construction Activities Covered By This General Permit

Construction activity subject to this General Permit includes any construction or demolition activity, clearing, grading, grubbing, or excavation or any other activity that results in a land disturbance. Construction does not include emergency construction activities required to immediately protect public health and safety or routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility. As used above, routine maintenance only applies to road shoulder work, dirt or gravel road re-grading, or ditch clean-outs. For municipal operators, repaving of asphalt roads is routine maintenance except where the underlying and/or surrounding soil is cleared, graded, or excavated as part of the repaving operation. Where clearing, grading, or excavating of underlying soil takes place, permit coverage is required if more than one acre is disturbed or part of a larger plan or if the activity is part of more activities part of a municipality's Capital Improvement Project Plan.

Construction activity that results in land surface 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 or the sale of one or more acres of disturbed land surface.

Construction related to residential, commercial, or industrial development on lands currently used for agriculture, are subject to this General Permit. This includes the construction of buildings, such as a dairy barns or food processing

facilities, which are related to agriculture but are considered industrial pursuant to USEPA regulations. However, disturbances to the land surfaces related to agricultural operations such as disking, harrowing, terracing and leveling, soil preparation, etc, are not covered by this General Permit.

Small linear underground/overhead projects that 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) requires 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 or 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 surface 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 whether this permit applies to the project.

C. Construction Activities Not Covered By This General Permit

This General Permit does not apply to the following storm water discharges.

- Dischargers from construction projects that qualify as a Risk Level 4 project.

- Discharges from areas on tribal lands do not need to apply for this General Permit. Construction on Tribal Lands is regulated by an USEPA permit.

- Discharges within the Lake Tahoe Hydrologic Unit do not need to apply for this General Permit. 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 Water 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

- Discharges from construction activity disturbing less than one acre of land surface, unless part of a larger common plan of development or sale, do not need to apply for this General Permit.

- Discharges from projects covered by an individual NPDES Permit for storm water discharges associated with construction activity do not need to apply for this General Permit.

- Discharges from landfill construction activity that is subject to the General Industrial Permit do not need to apply for this General Permit.

- Discharges from construction activities that discharge to Combined Sewer Systems do not need to apply for this General Permit. 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)(7).

- 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.

- Discharges from qualified oil and gas exploration projects do not need to apply for this General Permit. On June 12, 2006, USEPA published a rule, effective on that date, 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. . 40 C.F.R. § 122.26(a)(2)(ii). These amendments are consistent with the Energy Policy Act of 2005 signed by the President of the United States on August 8, 2005. The regulation 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. 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.

- Discharges from routine maintenance.

- Discharges from emergency construction activities required to protect public health and safety do not need to apply for this General Permit.

- Discharges to non-jurisdictional waters (as determined by the US Army Corps of Engineers)

D. Common Plan of Development or Sale

USEPA regulations include the term "common plan of development or sale" to insure that acreage within a common project does not artificially escape the permit requirements because construction activities are phased, split among smaller parcels, or completed by different owners/developers. In the absence of an exact definition of "common plan of development or sale", the State Water Board shall exercise its regulatory discretion in providing a common sense interpretation of the term as it applies to construction projects and permit coverage. An overbroad interpretation of the term would render meaningless the clear "one acre" federal permitting threshold and would potentially trigger permitting of almost any construction activity that occurs within an area that had previously received area-wide utility or road improvements.

Construction projects generally receive grading and/or building permits (Local Permits) from local authorities prior to initiating construction activity. These Local Permits spell out the scope of the project, the parcels involved, the type of construction approved, etc. Referring to the Local Permit helps define "common plan of development or sale". In cases such as tract home development, a Local Permit will include all phases of the construction project including rough grading, utility and road installation, and vertical construction. All construction activities approved in the Local Permit are part of the common plan and must remain under the General Permit until construction is completed. For custom home construction , Local Permits typically only approve vertical construction as the rough grading, utilities, and road improvements were already independently completed under the a previous Local Permit. In the case of a custom home site, the homeowner must submit plans and obtain a distinct and separate Local Permit from the local authority in order to proceed. It is not the intent of the State Water Board to require permitting for an individual homeowner building a custom home on a private lot of less than one acre if it is subject to a separate Local Permit. Similarly, the installation of a swimming pool, deck, or landscaping that disturbs less than one acre that was not part of any previous Local Permit are not required to be permitted.

The following are several examples of construction activity of less than one acre that would require permit coverage:

1. A landowner receives a building permit(s) to build tract homes on a 100-acre site split into 200 one-third acre parcels, (the remaining acreage consists of streets and parkways) which are sold to individual homeowners as they are completed. The landowner completes and sells all the parcels except for two.

Although the remaining two parcels combined are less than one acre, the landowner must continue permit coverage for the two parcels.

2. One of the parcels discussed above is sold to another owner who intends to complete the construction as already approved in the Local permit. The new landowner must file PRDs to complete the construction even if the new landowner is required to obtain a separate Local permit.

3. Landowner in (1) above purchases 50 additional one half-acre parcels adjacent to the original 200-acre project. The landowner seeks a Local Permit (or amendment to existing Local permit) to build on 20 parcels while leaving the remaining 30 parcels for future development. The landowner must amend PRDs to include the 20 parcels 14 days prior to commencement of construction activity on those parcels.

E. 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 establish a mechanism 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 an 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 found 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, direct or indirect 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 VIII.I.). 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.

Failure to obtain coverage under this General Permit for storm water discharges to surface waters is a violation of the CWA and the California Water Code.

F. 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, if Permit conditions are met. It prohibits the discharge of materials other than storm water and authorized non-storm water discharges, and prohibits 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 by the nine Regional Water Boards. Discharges to Areas of Special Biological Significance (ASBS) are prohibited unless covered by an exception that has been approved by the State Water Board.

G. 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, but also when appropriate 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 controls, that meet BAT and BCT and will achieve compliance with water quality standards. The narrative effluent limitations constitute compliance with the requirements of the CWA.

H. Non-storm Water Discharges

Non-storm water discharges include a wide variety of sources, including improper dumping, spills, or leakage from storage tanks or transfer areas. Non-storm water discharges may contribute significant pollutant loads to receiving waters. 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 any water or 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:

i. be infeasible to eliminate;

ii. comply with BMPs as described in the SWPPP;

iii. filter or treat, using appropriate technology, all dewatering discharges from sedimentation basins;

iv. meet the NELs and NALs for pH and turbidity; and

v. not cause or contribute to a violation of water quality standards.

Additionally, these discharges may be required to be permitted by the applicable 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.

I. Receiving Water Limitations

Construction related activities that 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 is because sediment mobilized by storm water provides visual cues as to where corrective actions should take place and how effective they are once implemented.

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 objective or water quality standards. The monitoring requirements in this General Permit for sampling and analysis procedures will help determine whether BMPs installed and maintained are preventing pollutants in discharges from the construction site that may cause or contribute to an 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 by consulting 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

J. 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 specific 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.

K. Retention of Records

The discharger is required to retain paper or electronic copies of all records required by this General Permit for a period of at least three years from the date generated or the date submitted to the State Water Board or Regional Water Boards. A discharger shall retain records for a period beyond three years as directed by Regional Water Board.

III. General Construction Permit Rationale

A. Overall Storm Water Program

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 Phase I communities that operate municipal separate storm sewer systems (MS4s) that serve a population of more than 100,000 persons. The statewide permits include: construction, industrial, linear (e.g. subsurface utilities that cross regions and watersheds), Caltrans, and Small Phase II communities that operate MS4s that serve a population less than 100,000 persons. 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.

1. Towards a Performance-based Storm Water Program

The State Water Board has received comments[4] 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.

- **Post-construction storm water impacts** are a major cause of most current water quality issues associated with urban runoff (storm water).

[4] 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.

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.

- The outcome of the 9th and 2nd Circuit Court decisions, as well as other recent court decisions, suggests that the Water Boards need to provide better **public access** to compliance related documents such as SWPPPs, annual reports, etc, but also, to the extent possible, improved **public participation** in our administrative processes associated with the review and approval of compliance related documents.

B. Specific problems addressed by this General Permit

1. Program Monitoring (Performance) Strategy

The Water Board has begun a shift towards performance-based management.

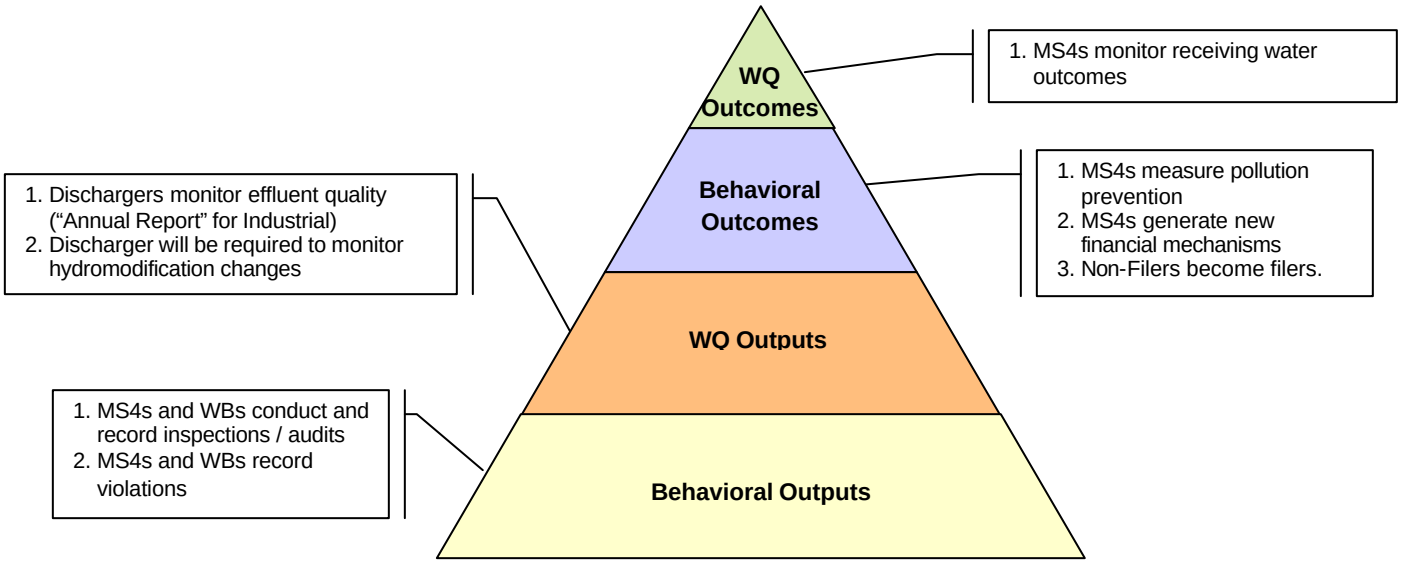


Figure 3 - Performance Measurement Framework and Examples for the Storm Water Program

The principles of performance-based management break the type of measures we currently gather into four main categories, which are discussed below.

Tier 1 - Water Quality Outcomes: are external results - water quality, or environmental, results that can be measured directly. We plan to enhance our ability to collect and report receiving water quality and beneficial use information via the receiving water monitoring requirements in this General Permit and other 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 but does not measure receiving water quality outcomes. NELs and violations of NELs are measured only at this level.

Tier 4 - Behavioral Outputs: are internal "products" that the facility, the MS4, or an agency (like the State Water Board) 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 is required to:

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

- 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;

- 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

- 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 visual and effluent water quality monitoring at all sites. This General Permit requires receiving water monitoring at some Risk Level 2 and all Risk Level 3 sites. All sites are required to submit annual reports, which contain various types of information, depending on the site characteristics and events. A summary of the monitoring and reporting requirements are listed in Table 1.

Table 1 - Required Monitoring Elements for Risk Levels

	Visual	Non-visible Pollutant	Effluent	Receiving Water
Risk Level 1	Three types required: Non-storm Water, Pre-Rain and Post-rain	As needed (see below)	pH, turbidity	Not ever required
Risk Level 2			pH, turbidity [if turbidity NEL exceeded, also monitor for SSC]	If any NEL is exceeded
Risk Level 3			pH, turbidity, SSC	Always

i. **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 days after each storm event that produces precipitation of ½ inch or more, dischargers shall conduct a post storm event inspection to (1) identify whether BMPs were adequately designed, implemented, and effective, (2) identify any additional BMPs necessary 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.

Table 2 - Visual Monitoring/Inspection Requirements by Risk Level

	Non-storm Water	Pre-rain Event	Post-rain Event
Risk Level 1	one inspection non-SW quarterly	one inspection within 48 hours of a qualifying rain event	one inspection within 2 days after a qualifying rain event
Risk Level 2			
Risk Level 3		one inspection within 48 hours of a qualifying rain event, plus photograph	one inspection within 2 days after a qualifying rain event, plus photograph

ii. **Non-visible Pollutant Monitoring**

This General Permit requires that all dischargers develop a sampling and analysis strategy for monitoring pollutants that are not visually detectable in storm water. Monitoring for non-visible pollutants shall be required at any construction site when the exposure of construction materials occurs and where a discharge can cause or contribute to an exceedance of a water quality objective.

A significant concern for construction discharges are the pollutants found in materials used in large quantities at construction sites throughout California and exposed throughout the rainy season, such as cement, flyash, and other recycled materials or by-products of combustion. The water quality standards that apply to these materials will depend on their composition. Some of the more common storm water pollutants from construction activity are not CTR pollutants. These include glyphosate (herbicides), diazinon and chlopyrifos (pesticides), nutrients (fertilizers), and molybdenum (lubricants). The use of diazinon and chlopyrifos is a common practice among landscaping professionals and may trigger sampling and analysis requirements if these materials come into contact with storm water. High pH values from cement and gypsum, high pH and SSC from wash waters, and chemical/fecal contamination from portable toilets, also are not CTR pollutants. Although some of these constituents do have numeric water quality objectives in individual Basin Plans, many do not and are subject only to narrative water quality standards (i.e. not causing toxicity). Dischargers are encouraged to discuss these issues with Regional Water Board staff and other Storm Water Quality Professionals.

The most effective way to avoid the sampling and analysis requirements, and to ensure permit compliance, is to avoid the exposure of construction materials to precipitation and storm water runoff. Materials that are not exposed do not have the potential to enter storm water runoff, and therefore receiving waters sampling is

not required. Preventing contact between storm water and construction materials is one of the most important BMPs at any construction site.

Preventing or eliminating the exposure of pollutants at construction sites is not always possible. Some materials, such as soil amendments, are designed to be used in a manner that will result in exposure to storm water. In these cases, it is important to make sure that these materials are applied according to the manufacturer's instructions and at a time when they are unlikely to be washed away. Other construction materials can be exposed when storage, waste disposal or the application of the material is done in a manner not protective of water quality. For these situations, sampling is required unless there is capture and containment of all storm water that has been exposed. In cases where construction materials may be exposed to storm water, but the storm water is contained and is not allowed to run off the site, sampling will only be required when inspections show that the containment failed or is breached, resulting in potential exposure or discharge to receiving waters.

The discharger shall develop a list of potential pollutants based on a review of potential sources, which will include construction related materials, soil amendments, soil treatments, and historic contamination at the site. The discharger shall review existing environmental and real estate documentation to determine the potential for pollutants that could be present on the construction site as a result of past land use activities.

Good sources of information on previously existing pollution and past land uses include:

- Environmental Assessments;
- Initial Studies;
- Phase 1 Assessments prepared for property transfers; and
- Environmental Impact Reports or Environmental Impact Statements prepared under the requirements of the National Environmental Policy Act or the California Environmental Quality Act.

In some instances, the results of soil chemical analyses may be available and can provide additional information on potential contamination.

The potential pollutant list shall include all non-visible pollutants that are known or should be known to occur on the construction site including, but not limited to, materials that:

- are being used in construction activities;
- are stored on the construction site;
- were spilled during construction operations and not cleaned up;
- were stored (or used) in a manner that created the potential for a release of the materials during past land use activities;
- were spilled during previous land use activities and not cleaned up; or
- were applied to the soil as part of past land use activities.

iii. **Effluent Monitoring**

All construction projects shall collect storm water samples from each drainage area 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 ½ inch or more at the time of discharge.

Table 3 - Storm Water Effluent Monitoring Requirements by Risk Level

	Frequency	Effluent Monitoring (Section E, below)
Risk Level 1	one sample per storm event	turbidity and pH plus non-visible pollutant parameters (if applicable)
Risk Level 2	one sample beginning the first hour of any new discharge[5] and one sample during the first and last hour of every day of normal operations for the duration of the discharge event	turbidity, pH, and suspended sediment concentration (SSC)[6] (only if turbidity NEL exceeded) plus non-visible pollutant parameters (if applicable)
Risk Level 3	one sample beginning the first hour of any new discharge and one sample during the first and last hour of every day of normal operations for the duration of the discharge event **OR** continuous at any discharge point where sampling results exceed the turbidity NEL	turbidity, pH and SSC plus non-visible pollutant parameters (if applicable)

Risk level 1 dischargers shall analyze samples for:

- pH and turbidity (a transparency tube may be substituted for turbidity); and
- any parameters indicating the presence of pollutants identified in the pollutant source assessment required in Section VIII.G.5 contained in the General Permit.

Risk Level 2 dischargers shall analyze samples for:

- pH and turbidity (if turbidity NEL exceeded, SSC required);
- any parameters indicating the presence of pollutants identified in the pollutant source assessment required in Section VIII.G.5 contained in the General Permit, and

[5] A new discharge is defined here as any type of discharge (storm water or non-storm water) that goes beyond the property boundary after at least a 48 hour period of no discharge.
[6] Suspended Sediment Concentration monitoring is required for any Level 2 site that exceeds its turbidity NEL.

- any additional parameters for which monitoring is required by the Regional Water Board.

Risk Level 3 dischargers shall analyze samples for:

- pH, turbidity and SSC;
- any parameters indicating the presence of pollutants identified in the pollutant source assessment required in Section VIII.G.5 contained in the General Permit, and
- any additional parameters for which monitoring is required by the Regional Water Board.

iv. **Receiving Water Monitoring**

Risk Level 2 sites shall only monitor the downstream receiving water(s) for turbidity, SSC and pH when an NEL is violated. Risk Level 3 sites shall always monitor the downstream receiving water(s) for turbidity, SSC and pH.

Table 4 - Receiving Water Monitoring Requirements by Risk Level

	Trigger	Receiving Water Monitoring Parameters
Risk Level 1	not required	not required
Risk Level 2	if NEL exceeded, next sampling event shall include RW monitoring	turbidity, pH, and SSC[1] (only if turbidity NEL exceeded),
Risk Level 3	none - all sampling events shall include effluent and receiving water monitoring	turbidity, pH, SSC and bioassessment

v. **NEL Violation Report**

If a discharger detects in their effluent any exceedance of an NEL in this General Permit, the discharger must report this to the Regional Water Board within 2 days. The purpose of this is to notify the Regional Water Board, stakeholder agencies and organizations and the general public of the exceedance so that they can prepare for any followup (e.g., inspection, enforcement, etc.) necessary to determine whether the site is brought into compliance.

vi. **NAL Exceedance Report**

If a discharger conducts any effluent and/or receiving water monitoring, the results must be submitted to the Regional Water Board within 10

days of the initial monitoring effort. The purpose of this is to provide the Regional Water Board, stakeholder agencies and organizations and the general public with the water quality information.

Specifically the NAL Exceedance Report is required to contain:

- a summary and evaluation of all sampling and analysis results, including original laboratory reports;
- the analytical method(s), method reporting unit(s), and method detection limit(s) of each analytical parameter (analytical results that are less than the method detection limit shall be reported as "less than the method detection limit"); and
- the date, place, time of sampling, visual observation (inspections), and/or measurements, including precipitation.

vii. **Annual Report**

All dischargers shall prepare and electronically submit an annual report no later than February 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, and identification of any compliance activities or corrective actions that were not implemented.

2. New Development and Re-development Storm Water Performance Standards

General Permit 99-08-DWQ does not specifically address post-construction controls. An effective storm water management strategy must address the full suite of storm events (water quality, channel protection, overbank flood protection, extreme flood protection) (Figure 4).

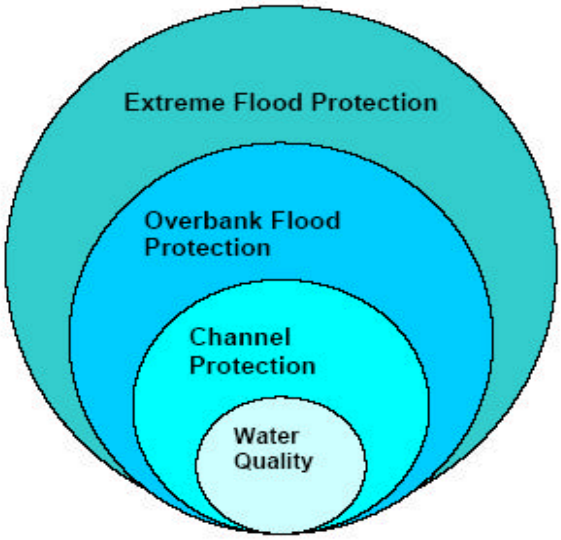


Figure 4 - Suite of Storm Events

The new development and re-development storm water performance standards specifically address water quality and channel protection events. Overbank flood protection and extreme flood protection events are traditionally dealt with in local drainage and flood protection ordinances. However, measures in this General Permit to address water quality and channel protection also reduce overbank and extreme flooding impacts.

Water Quality

The permit requires dischargers to replicate the pre-project runoff water balance (for this permit, defined as the amount of rainfall that ends up as runoff) for the smallest storms up to the 85th percentile storm event (or the smallest storm event that generates runoff, whichever is larger). Contemporary storm water management generally routes these flows directly to the drainage system, increasing pollutant loads and potentially causing adverse effects on receiving waters. These smaller water quality events happen much more frequently than larger events and generate much higher pollutant loads on an annual basis. There are other adverse hydrological impacts that result from not designing according to the site's pre-construction water balance. In Maryland, Klein[7] noted that baseflow decreases as extent of urbanization increases. Ferguson and Suckling[8] noted a similar relation in watersheds in Georgia. On Long Island, Spinello and Simmons[9] noted substantial decreases in base flow in intensely urbanized watersheds.

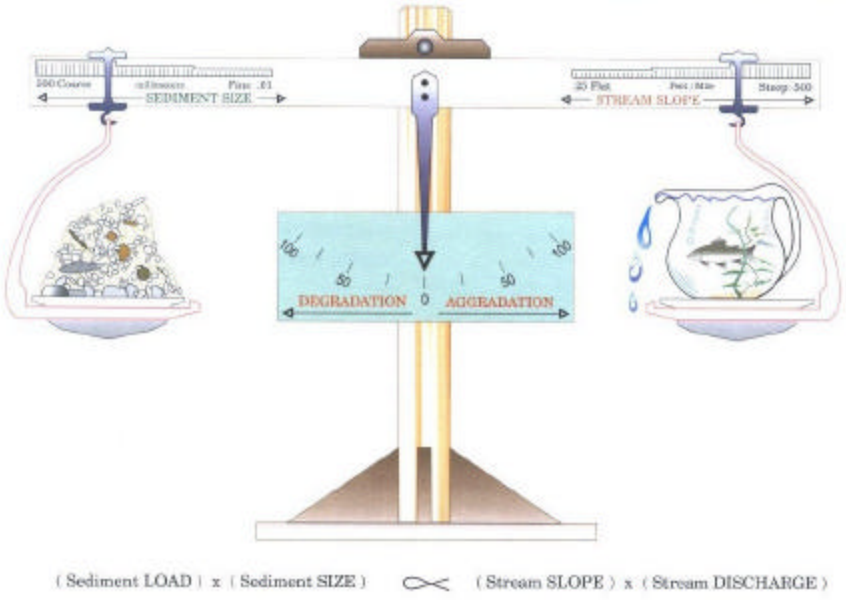
[7] Klein 1979 as cited in Delaware Department of Natural Resources (DDNR). 2004. Green Technology: The Delaware Urban Runoff Management Approach. Dover, DE. 117 pp.
[8] Ferguson and Suckling 1990 as cited Delaware Department of Natural Resources (DDNR). 2004. Green Technology: The Delaware Urban Runoff Management Approach. Dover, DE. 117 pp.
[9] 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.

The permit emphasizes runoff reduction through on-site storm water reuse, interception, evapotranspiration and infiltration through non-structural controls and conservation design measures (e.g., downspout disconnection, soil quality preservation/enhancement, interceptor trees). Employing these measures close to the source of runoff generation is the easiest and most cost-effective way to comply with the pre-construction water balance standard. Using low-tech runoff reduction techniques close to the source is consistent with a number of recommendations in the literature.[10,11,12,13] In many cases, BMPs implemented close to the source of runoff generation cost less than end-of the pipe measures.[11] Dischargers are given the option of using Attachment F 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).

Channel Protection

In order to address channel protection, 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. [14] Lane (1955 as cited in Rosgen 1996[15]) showed the generalized relationship between sediment load, sediment size, stream discharge and stream slope in Figure 5. 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 stream channel.

[10] 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.
[11] McCuen, R.H. 2003. Smart growth: hydrologic perspective. Journal of professional issues in engineering education and practice. Vol (129), pp. 151-154.
[12] Moglen, G.E. and S. Kim. 2007. Impervious imperviousness-are threshold-based policies a good idea? Journal of the American Planning Association, Vol 73, No. 2. pp 161-171.
[13] Delaware Department of Natural Resources (DDNR). 2004. Green Technology: The Delaware Urban Runoff Management Approach. Dover, DE. 117 pp.
[14] Dunne, T and L.B. Leopold. 1978. Water in Environmental Planning. San Francisco W.H. Freeman and Company
[15] Rosgen. D.L. 1996. Applied River Morphology. Pagosa Springs. Wildland Hydrology



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

Figure 5 - Schematic of the Lane Relationship

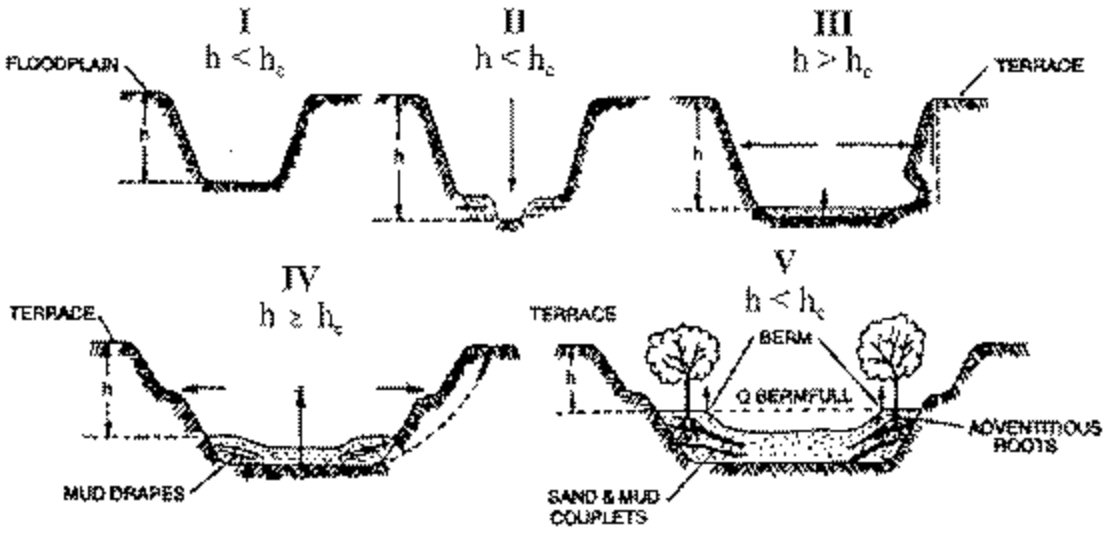
Stream slope times stream discharge (the right side of the scale) is essentially an approximation of stream power, a unifying concept in fluvial geomorphology (Bledsoe 1999). Urbanization generally increases stream power and affects the resisting forces in a channel (sediment load and sediment size represented on the left side of the scale).

During construction, sediment loads can increase from 2 to 40,000 times over pre-construction levels.[16] Most of this sediment is delivered to stream channels during large, episodic rain events.[17] This increased sediment load leads to an initial aggradation phase where stream depths may decrease as sediment fills the channel, leading to a decrease in channel capacity and increase in flooding and overbank deposition. A degradation phase initiates after construction is completed.

[16] Goldman S.J., K. Jackson, and T.A. Bursztynsky. 1986. Erosion and Sediment Control Handbook. McGraw Hill. San Francisco.
[17] 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.

Schumm et al (1984) developed a channel evolution model that describes the series of adjustments from initial downcutting, to widening, to establishing new floodplains at lower elevations (Figure 6).

Figure 6 - Channel Changes Associated with Urbanization



After Incised Channel Evolution Sequence in Schumm et. al 1984

Channel incision (Stage II) and widening (Stages III and to a lesser degree, Stage IV) are due to a number of fundamental changes on the landscape. Connected impervious area and compaction of pervious surfaces increase the frequency and volume of bankfull discharges.[12,18] Increased drainage density (miles of stream length per square mile of watershed) also negatively impacts receiving stream channels.[19,20] Increased drainage density and hydraulic efficiency leads to an increase in the frequency and volume of bankfull discharges because the time of concentration is shortened. Flows from engineered pipes and channels are also often "sediment starved" and seek to replenish their sediment supply from the channel.

[18] Booth, D. B. and C. R. Jackson. 1997. Urbanization of Aquatic Systems: Degradation Thresholds, Stormwater Detection, and the Limits of Mitigation. *Journal of the American Water Resources Association* Vol. 33, No.5, pp. 1077-1089.

[19] May, C.W. 1998. Cumulative effects of urbanization on small streams in the Puget Sound Lowland ecoregion. Conference proceedings from Puget Sound Research '98 held March 12, 13 1998 in Seattle, WA.

[20] Santa Clara Valley Urban Runoff Pollution Prevention Program. 2002. Hydromodification Management Plan Literature Review. 80 pp.

Encroachment of stream channels can also lead to an increase in stream slope, which leads to an increase in stream power. In addition, watershed sediment loads and sediment size (with size generally represented as the median bed and bank particle size, or d_{50}) decrease during urbanization[21,22]. This means that even if pre- and post- development stream power are the same, more erosion will occur in the post-development stage because the smaller particles are less resistant (provided they are non-cohesive).

As shown in Stages II and III, the channel deepens and widens to accommodate the increased stream power [23,24] and decrease in sediment load and sediment size. Channels may actually narrow as entrained sediment from incision is deposited laterally in the channel.[12] After incised channels begin to migrate laterally (Stage III), bank erosion begins, which leads to general channel widening.[16,20,25] At this point, 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.[12] Stage IV is characterized by more aggradation and localized bank instability. Stage V represents a new quasi-equilibrium channel morphology in balance with the new flow and sediment supply regime. In other words, stream power is in balance with sediment load and sediment size.

The magnitude of the channel morphology changes discussed above varies along a stream network as well as with the age of development, slope, geology (sand-bedded channels may cycle through the evolution sequence in a matter of decades whereas clay-dominated channels may take much longer), watershed sediment load and size, type of urbanization, and land use history. It is also dependent on a channel's stage in the channel evolution sequence when urbanization occurs. Management strategies must take into account a channel's stage of adjustment and account for future changes in the evolution of channel form (Stein and Zaleski 2005) [26] .

Traditional structural water quality BMPs (e.g. detention basins and other devices used to store volumes of runoff) unless they are highly engineered to provide adequate flow duration control, do not adequately protect receiving waters from accelerated channel bed and bank erosion,[16] do not address

[21] Finkenbine, J.K., D.S. Atwater, and D.S. Mavinic. 2000. Stream health after urbanization. *J. Am. Water Resour. Assoc.* 36:1149-60.
[22] 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.
[23] Hammer 1973 as cited in Delaware Department of Natural Resources (DDNR). 2004. Green Technology: The Delaware Urban Runoff Management Approach. Dover, DE. 117 pp.
[24] Booth, D.B. 1990. Stream Channel Incision Following Drainage Basin Urbanization. *Water Resour. Bull.* 26:407-417.
[25] Trimble, S.W. 1997. Contribution of Stream Channel Erosion to Sediment Yield from an Urbanizing Watershed. *Science*: Vol. 278 (21), pp. 1442-1444.
[26] Stein, E.S. and S. Zaleski. 2005.Managing runoff to protect natural stream: the latest developments on investigation and management of hydromodification in California. Southern California Coastal Water Research Project Technical Report 475. 26 pp.

post-development increases in runoff volume, and do not mitigate the decline in benthic macroinvertebrate communities in the receiving waters (DDNR 2004)[14]. Horner et. al.,[27] 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[28]), where instream biological metrics were correlated with extent of forested buffers.

This permit requires dischargers to maintain pre-development drainage densities and times of concentration in order protect channels and encourages dischargers to implement setbacks to reduce channel slope and velocity changes that can lead to aquatic habitat degradation. The permit also requires dischargers to predict post-construction average annual soil loss using the RUSLE. This serves as an estimate of sediment supply which, as described above, plays a crucial role in channel stability.

There are a number of other approaches for modeling fluvial systems, including statistical and physical models and simpler stream power models.[29] The use of these models in California is described in Stein and Zaleski (2005).[30] Rather than prescribe a specific one-size-fits all modeling method in this permit, staff intends to develop a stream power and channel evolution model-based framework to assess channels and develop a hierarchy of suitable analysis methods and management strategies. In time, this framework may become a State Water Board water quality control policy.

Permit Linkage to Overbank and Extreme Flood Protection

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 and larger), 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.[25] The multiple benefits of using non-structural benefits will be critically important as

[27] 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

[28] Delaware Department of Natural Resources (DDNR). 2004. Green Technology: The Delaware Urban Runoff Management Approach. Dover, DE. 117 pp.

[29] Finlayson, D.P. and D.R. Montgomery. 2003. Modeling large-scale fluvial erosion in geographic information systems. Geomorphology (53), pp. 147-164).

[30] Stein, E.S. and S. Zaleski. 2005.Managing runoff to protect natural stream: the latest developments on investigation and management of hydromodification in California. Southern California Coastal Water Research Project Technical Report 475. 26 pp.

the state's population increases and imposes strains upon our existing water resources.

Maintaining pre-development drainage densities and times of concentration will help 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 cells, rain gardens, rain cisterns).

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 remanded portions of regulations adopted by US EPA and are not directly applicable to the State Water Board. Further, this permit includes measurable limits and many detailed requirements to ensure protection of water quality. Nonetheless, this General Permit includes provisions to comply with the spirit of these decisions by making discharger General Permit documents readily available to the public for review and comment. This General Permit allows for NOI and SWPPP review process and public participation process to the extent practicable. Given the tens of thousands of construction sites throughout the state, the Regional Boards will focus their resources on those priority construction sites that pose significant harm to the environment or that have inadequately complied with the permit registration requirements.

To improve public access to compliance related documents, staff first evaluated the current General Permit regulatory and public review process and information technology capabilities (California Integrated Water Quality System (CIWQS), Stormwater Multi Application Reporting and Tracking System (SMARTS), SWARM. Since maintaining paper copies of hundreds of thousands of compliance documents would pose a myriad of logistical complexities while still not providing reasonably swift public access, staff considered various alternatives mainly focused on enhancing the storm water program's electronic capabilities, to varying degrees of complexity and cost. Upon reviewing the various alternatives, we decided to pursue improved electronic capabilities to support the filing of all permit-related compliance documents via the Internet. This alternative would attain the goal of significantly increasing public access to permit compliance documents and significantly enhance the ability of the Regional Water Boards to review such documents. In addition, the electronic solution significantly reduces or negates future impacts on the State Water Board's business process, logistical and storage problems.

The State Water Board is requiring in this General Permit that all dischargers electronically file all PRDs, including an NOI, site map, SWPPP and other required permit registration documents. Once a discharger has obtained permit coverage, NOTs, Annual Reports, and other discharger compliance documents are also required to be electronically filed.

The system includes an efficient registration process that minimizes the need to accept paper "wet" signatures. The system will determine if the permit registration and other compliance documents are administratively complete and acceptable. All electronically submitted 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 the PRDs, 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 a check. The system allows 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 provides subordinate password and login to subordinate account holders. Construction permit dischargers are required to use the system to update project acreage status and the system, as appropriate, will recalculate permitting fees based upon updated permit acreage totals. The system allows dischargers to update contact name and phone number automatically. For owner name and address updates, dischargers may submit a request to change, but must wait for approval by a Regional or State Water Board staff person.

There may be unusual circumstances when Regional Water Boards will need to individually approve coverage under this General permit. However, we believe that such individual approvals will likely be unnecessary and rarely needed, since the General Permit is now explicit in terms of BMP implementation requirements and compliance outcomes. The purpose of the SWPPP is to demonstrate how a discharger is complying with the BMP implementation requirements and compliance outcomes, 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 (REAP)

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. These measures are intended to ensure prompt action to order supplies and to increase staff, and thereby implement erosion and sediment control measures in a timely fashion.

This General Permit requires dischargers to develop and implement a 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 50% or greater forecast of 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[31]. 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 5 - 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 the precipitation forecast information from the National Weather Service Forecast Office (http://www.srh.noaa.gov/).

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

b. Site Planning and Appropriate Measures of Control

There are two major site planning-related requirements of this permit. The first requirement requires dischargers to place their projects into one of the four risk levels based on the results of the Construction Project Risk Worksheet (Attachment I). 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 directs 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 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.

c. Technology-based Numeric Action Levels (NALs)

This General Permit contains technology-based NALs for pH and turbidity, and requirements for effluent monitoring at all sites.

The primary purpose of NALs is to assist dischargers in evaluating 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 NALs 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.

Another purpose of NALs is to provide 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[32] 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

Turbidity NALs will be site specific and will be calculated by the discharger using the Modified Universal Soil Loss Equation (MUSLE) (Williams 1977 as described in Fifield 2004[33]). The MUSLE 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 (erosion controls)
P = management operations and support practices (sediment controls)

To generate site-specific action levels, dischargers will use site-specific values for the 2-year, 24-hour storm event, K, and LS factors and simulate minimal erosion control BMPs (C factor = 0.5) on all exposed soil, e.g., dust binder, temporary seeding, etc., and an appropriately designed sediment basin (P factor = 0.2). These C and P factors came from removal efficiency data from a Washington State Department of Transportation Document entitled "Improving the Cost Effectiveness of

[32] Caltrans Construction Sites Runoff Characterization Study, 2002. Available at: http://www.dot.ca.gov/hq/env/stormwater/pdf/CTSW-RT-02-055.pdf
[33] Fifield, J.S. 2004. Designing for Effective Sediment and Erosion Control on Construction Sites. Forester Communications-2nd Edition, Santa Barbara, CA

Highway Construction Site Erosion and Pollution Control" (http://www.wsdot.wa.gov/research/reports/fullreports/200.1.pdf) In this study, one storm that produced 1.43.inches of rain in 30 days produced effluent total suspended sediment concentrations of over 32,000 mg/L.

d. Numeric Effluent Limitations (NELs)

Under state and federal law and regulations, a discharge permit must establish limitations equivalent to the best practicable control technology currently available (BPT) for conventional, priority, and non-conventional pollutants, the best available technology economically achievable (BAT) for toxic pollutants and the best conventional pollutant control technology (BCT) for conventional pollutants. For some industrial categories, such limitations, known as effluent limitation guidelines (ELGs), USEPA has already established them. This is not the case with construction discharges. This permit contains both narrative effluent limitations, set using BPJ equivalent to BAT and BCT and new numeric effluent limitations for pH and turbidity. The narrative effluent limitations are essentially the same as those set by State Water Board Order No. 99-08-DWQ. State Water Board staff has used best professional judgment (BPJ) to set the numeric effluent limitations for pH and turbidity equivalent to BPT and BCT.

The numeric effluent limitations for pH and turbidity are based upon Best Professional Judgment (BPJ) which authorizes the State Water Board to issue a permit containing "such conditions as the Administrator determines are necessary to carry out the provisions of this Act" (CWA Section 402(a)(1)). To the extent that EPA-promulgated effluent limitations are inapplicable, the State Water Board shall consider the appropriate technology for the category or class of point sources, based upon all available information and any unique factors relating to the sources. In addition, the permitting authority must consider a number of factors including the cost of achieving effluent reductions in relation to the effluent reduction benefits, the age of the equipment and facilities, the processes employed and any required process changes, engineering aspects of the control technologies, non-water quality environmental impacts (including energy requirements), and other such other factors as the State Water Board deems appropriate (CWA 304(b)(1)(B)).

Traditionally, BPT effluent limitations are based on the average of the best performances of facilities within the industry of various ages, sizes, processes or other common characteristic. Where, however, existing performance is uniformly inadequate, the regulatory authority may require higher levels of control than currently in place in an industrial category if the authority determines that the technology can

be practically applied. We have concluded that there are no applicable performance standards representing a degree of effluent reduction achievable beyond BPT, and therefore that BCT shall be equivalent to BPT.

We did not consider the age of equipment or facilities to be a factor in the selection of BPT because all construction sites are new operations where age is immaterial. Additionally, we concluded that the establishment of BPT/BCT will not create or aggravate other environmental problems through increases in air pollution, solid waste generation, or energy consumption. While there may be a slight increase in non-water quality impacts due to the implementation of additional monitoring or the construction of additional BMPs, these impacts will be negligible in comparison with the construction activities taking place on site and would be justified by the water quality benefits associated with compliance.

Considerations related to the processes employed and the changes necessitated by the adoption of the BPT/BCT effluent limits have been assessed throughout the stakeholder process (e.g., the Blue Ribbon Panel and the March 2007 preliminary draft) and are discussed in detail in Section I. D of this Fact Sheet. In the following sections, we present the engineering aspects of the control technologies and the rationale for the determination of the numeric effluents for pH and turbidity.

In addition, the Act requires a cost-reasonableness assessment for BPT limitations. In determining the BPT limits, the State Water Board has considered the total cost of treatment technologies in relation to the effluent reduction benefits achieved. This inquiry does not limit the Board's broad discretion to adopt BPT limitations that are achievable with available technology unless the required additional reductions are ``wholly out of proportion to the costs of achieving such marginal level of reduction'' (See Legislative History, op. cit., p. 170). Moreover, the inquiry does not require the State Water Board to quantify benefits in monetary terms (See, for example, American Iron and Steel Institute v. EPA, 526 F. 2d 1027 (3rd Cir., 1975)).

In balancing costs against the benefits of effluent reduction, the State Water Boards has considered the volume and nature of expected discharges after application of BPT, the general environmental effects of pollutants, and the cost and economic impacts of the required level of pollution control as described in Section I.D of the Fact Sheet.

In consideration of the costs for the establishment of BPT and BCT limits for pH and turbidity, we note that existing requirements for the control of stormwater pollution from construction sites have been

established by USEPA and the previous Construction General Permit (State Water Board Order No. 99-08-DWQ) issued by the State Water Board. And the numeric effluent limitations themselves represent a minimum technology standard. In other words, the additional numeric effluent limitations, compared to the existing permit's narrative effluent limitations, does not raise the bar of compliance requirements - they simply represent a point where one can quantitatively measure compliance with the lower end of the range of required technologies. Therefore, the compliance costs associated with the BPT/BCT numeric effluent limitations in this permit only differ by the costs required to measure compliance with the NELs when compared to the baseline compliance costs to comply with the limitations already established through EPA regulations and the existing Construction General Permit.

We estimate these measurement costs to be approximately $1000 per construction site for the duration of the project. This essentially represents the estimated cost of purchasing (or renting) monitoring equipment, which are in this case a turbidimeter (~$600) and a pH meter (~$400). In some cases the costs will be less. In some cases these costs may be higher. Costs could be less if the discharger chooses to design and implement the project in a manner where effluent monitoring is likely to be avoided (e.g., no exposure during wet-weather seasons, no discharge due to containment, etc.). Costs could be more if the project is subject to many effluent monitoring events or if NELs are exceeded and additional monitoring requirements are triggered.

i. pH NELs

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 BPT and BCT. Given the potential contaminants, we consider 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, 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. We consider these techniques to be 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 three standard deviations above and below the mean pH of runoff from highway construction sites[34] in California. Proper implementation of BMPs should result in discharges that are within the range of 6.0 to 9.0 pH Units.

ii. Turbidity NEL

The Turbidity NEL of 1000 NTU was developed using an ecoregion-specific dataset developed by Simon et. al. (2004) [35] and Statewide Regional Water Quality Control Board Enforcement Data. A 1:3 relationship between turbidity (expressed as NTU) and suspended sediment concentration (expressed as mg/L) is assumed based on a review of suspended sediment and turbidity data from three gages used in the USGS National Water Quality Assessment Program:

- USGS 11074000 SANTA ANA R BL PRADO DAM CA
- USGS 11447650 SACRAMENTO R A FREEPORT CA
- USGS 11303500 SAN JOAQUIN R NR VERNALIS CA

In addition to representing the minimal technology expected, the turbidity NEL represents a bridge between the narrative effluent limitations and receiving water limitations. To support this NEL we analyzed construction site discharge information (some monitoring data, some estimates) and receiving water monitoring information.

Since the turbidity NEL represents minimal technology expected at a site, compliance with this value does not represent compliance with either the narrative effluent limitations (as enforced through the BAT/BCT standard) or the receiving water limitations. In the San Diego region some inland surface waters have a receiving water objective for turbidity equal to 20 NTU. Obviously a discharge up to, but not exceeding, the turbidity NEL of 1000 NTU, may still cause or contribute to the exceedance of the 20 NTU standard. Most of the waters of the State are protected by turbidity objectives based on background conditions.

[34] Caltrans Construction Sites Runoff Characterization Study, 2002. Available at: http://www.dot.ca.gov/hq/env/stormwater/pdf/CTSW-RT-02-055.pdf

[35] Simon, A., W.D. Dickerson, and A. Heins. 2004. Suspended-sediment transport rates at the 1.5-year recurrence interval for ecoregions of the United States: transport conditions at the bankfull and effective discharge. Geomorphology 58: pp. 243-262

Table 6 - Regional Water Board Basin Plans, Water Quality Objectives for Turbidity

RWQCB	WQ Objective	Background/Natural Turbidity	Maximum Increase
1	Based on background	All levels	20%
2	Based on background	> 50 NTU	10%
3	Based on background	0-50 JTU 50-100 JTU > 100 JTU	20% 10 JTU 10%
4	Based on background	0-50 NTU > 50 NTU	20% 10%
5	Based on background	0-5 NTU 5-50 NTU 50-100 NTU >100 NTU	1 NTU 20% 10 NTU 10%
6	Based on background	All levels	10%
7	Based on background	N/A	N/A
8	Based on background	0-50 NTU 50-100 NTU >100 NTU	20% 10 NTU 10%
9	Inland Surface Waters, 20 NTU All others, based on background	 0-50 NTU 50-100 NTU >100 NTU	 20% 10 NTU 10%

Table 7 shows the suspended sediment concentrations at the 1.5 year flow recurrence interval for the 12 ecoregions in California from Simon et. al (2004).

Table 7 - Results of Ecoregion Analysis

Ecoregion	Percent of California Land Area	Median Suspended Sediment Concentration (mg/L)
1	9.1	874
4	0.2	120
5	8.8	35.6
6	20.7	1530
7	7.7	122
8	3.0	47.4
9	9.4	284
13	5.2	143
14	21.7	5150
78	8.1	581
80	2.4	199
81	3.7	503
	Area-weighted average	1633

If a 1:3 relationship between turbidity and suspended sediment is assumed, the median turbidity is 544 NTU.

Statewide Regional Water Quality Control Board turbidity data for construction site ACL's issued between January 2005 and December 2008 were examined. The data chosen did not take into account the local background NTU level due to fact that an issuance of an ACL is evidence that the permittee was in violation of water quality standards. Six out of the 52 ACL's issued in the time period had NTU sampling and four of those had samples collected by Regional Board Staff. Only sites where Regional Board Staff took samples were used to ensure that correct sampling techniques were used. All of the samples were characterized as run-off in the ACL's and there was no documentation showing evidence of abnormal background NTU levels at any site. Statistical calculations using measures of central tendency and dispersion were used to find a mean NTU value used for enforcement. The NTU mean value came to be 1625 NTUs with a standard deviation of 10.6 NTUs and a median of 1629 NTUs. The median NTU value of 1629 shows that values close to this number indicate that water quality is being threatened and should result in an enforcement action. No ACL was issued in this time period with sampling done by Regional Board Staff that possessed an NTU value under 1400 NTU. This indicates that the Regional Water Boards do not have a history of enforcing construction sites with turbidity samples close to the value of 1000 NTUs.

Table 8 - Sampling Data taken by Regional Water Board Staff

WDID#	Region	Site Name	NTU Value Measured
5S34C331884	5S	Bradshaw Interceptor Section 6B	1800
5S05C325110	5S	Bridal wood Subdivision	1670
5S48C336297	5S	Cheyenne at Browns Valley	1629
5R32C314271	5R	Grizzly Ranch Construction	1400

The results of the review of the Simon et. al. dataset and construction site ACL data suggest that an appropriate turbidity numeric effluent limit may fall in the range of 500 to 1650 NTU. It also bears mentioning that turbidimeters commonly used for field measurement tend to have an effective measurement range of 0-1000 NTU. So to keep this parameter and the costs of compliance as low as possible, we have determined, using our BPJ, it is most cost-effective to set the numeric effluent limitation for turbidity to be 1000 NTU.

iii. NELs for Active Treatment System Discharges

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. Advanced systems have been in use in some form since the mid-1990s and at this time there are two general types of systems. Both types of systems are considered reliable, 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.[36]

e. Source Control and Treatment BMP Requirements

The best way to minimize the risk of creating erosion and sedimentation problems by construction is to disturb as little of the land surface as possible by fitting the development to the terrain. When development is tailored to the natural contours of the land, little grading is necessary and erosion potential is consequently lower.[14] Other effective erosion controls include: preserving existing vegetation where feasible, limiting disturbance, and stabilizing and re-vegetating disturbed areas as soon as

[36] 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.

possible after grading or construction activities. Particular attention must be paid to large mass-graded sites where the potential for soil exposure to the erosive effects of rainfall and wind is great and where there is potential for significant sediment discharge from the site to surface waters. Until permanent vegetation is established, soil cover is the most cost-effective and expeditious method to protect soil particles from detachment and transport by rainfall. Temporary soil stabilization can be the single-most important factor in reducing erosion at construction sites. The discharger shall consider measures such as: covering disturbed areas with mulch, temporary seeding, soil stabilizers, binders, fiber rolls or blankets, temporary vegetation, permanent seeding, etc. These erosion control measures are only examples of what should be considered and are not exclusive of new or innovative approaches currently available or being developed. Erosion control BMPs should be the primary means of preventing storm water contamination, and sediment control techniques should be used to capture any soil that does get eroded.[37]

There are instances on construction sites where traditional erosion and sediment controls do not effectively control accelerated erosion. Under these types of circumstances, or under circumstances where storm water discharges leaving the site may cause or contribute to an exceedance of a water quality standard, the use of an ATS may be appropriate or needed. 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.[38]

Although treatment systems have been in use in some form since the mid-1990s, the ATS industry in California is relatively young, and detailed regulatory standards have not yet been developed. Many developers are using these systems to treat storm water discharges from their construction sites and there are a number of reasons why an ATS may be necessary. The new ATS requirements set forth in this General Construction Permit are based on those in place for small wastewater treatment systems, ATS regulations from the Central Valley Regional Water Quality Board (September 2005 memorandum "2005/2006 Rainy Season – Monitoring Requirements for Stormwater Treatment Systems that Utilize Chemical Additives to Enhance Sedimentation"), the Construction Stormwater Program at the State of Washington's Department of Ecology, as well as recent advances in technology and knowledge of coagulant performance and aquatic safety.

[37] Environmental Protection Agency. 2007. Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Sites.

[38] Pitt, R., S. Clark, and D. Lake. 2006. Construction Site Erosion and Sediment Controls: Planning, Design, and Performance. DEStech Publications. Lancaster, PA. 370pp.

The effective design of an ATS requires a detailed survey and analysis of site conditions. All factors and statistical analysis of potential complications must be taken into consideration. However, with efficient planning, ATS performance can provide exceptional water quality discharge and prevent significant impacts to surface water quality, even under extreme environmental conditions.

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.). We are 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.[39] For example, cationic polymers have been shown to bind with the negatively charged gills of fish, resulting in mechanical suffocation.[37,40] Due to the potential toxicity impacts, which may be caused by the release of additives/polymers into receiving waters, residual polymer monitoring and 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.

The primary treatment process in an ATS is coagulation/flocculation. ATS's operate on the principle that the added coagulant is bound to suspended sediment, forming floc, which is gravitationally settled in tanks or a basin, or removed by sand filters. A typical installation utilizes an injection pump upstream from the clarifier tank, basin, or sand filters, which is electronically metered to both flow rate and suspended solids level of the influent, assuring a constant dose. The coagulant mixes and reacts with the influent, forming a dense floc. The floc may be removed by gravitational setting in a clarifier tank or basin, or by filtration. Water from the clarifier tank, basin, or sand filters may be routed through cartridge(s) and/or bag filters for final polishing. Vendor-specific systems use various methods of dose control, sediment/floc removal, filtration, etc., that are detailed in project-specific documentation. The particular coagulant/flocculant to be used for a given project is determined based on the water chemistry of the site because the coagulants are specific in their reactions with various types of sediments. Appropriate selection of dosage must be carefully matched to the characteristics of each site.

[39] 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.

[40] Bullock, G., V. Blazer, S. Tsukuda, and S. Summerfelt. 2000. Toxicity of acidified chitosan for cultured rainbow trout ((*Oncorhynchus mykiss*). *Aquaculture* **185**:273-280.

ATS's are operated in two differing modes, either Batch or Flow-Through. Batch treatment can be defined as Pump-Treat-Hold-Test-Release. In Batch treatment, water is held in a basin or tank, and is not discharged until treatment is complete. Batch treatment involves holding or recirculating the treated water in a holding basin or tank(s) until treatment is complete or the basin or storage tank(s) is full. In Flow-Through treatment, water is pumped into the ATS directly from the runoff collection system or storm water holding pond, where it is treated and filtered as it flows through the system, and is then directly discharged. "Flow-Through Treatment" is also referred to as "Continuous Treatment."

Operator training is critical to the safe and efficient operation and maintenance of the system, and to assure that all State Water Board monitoring and sampling requirements are met. The General Permit requires all ATS operators shall have training specific to ATS's using liquid coagulants.

f. Storm Water Pollution Prevention Plan

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 IX.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.

This General Permit specifically includes the following, new direct requirements (many of which used to be required elements of the SWPPP):

- Project Planning Requirements
  - Risk Determination
- Project Implementation Requirements
  - Numeric Action Levels (NALs)
  - Erosion Control
  - Runon and Runoff Controls
  - Sediment Controls
  - Active Treatment System (ATS)
  - Good Housekeeping
  - Non-Storm Water Management
  - New Development and Re-development Storm Water Performance Standards
  - Inspection, Maintenance and Repair
  - Training and Qualifications
- SWPPP Preparation, Implementation and Oversight
  - Qualified SWPPP Developer
  - Qualified SWPPP Practitioner
- Rain Event Action Plan
- Electronic Reporting

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.