

**Center for Environmental Excellence by AASHTO  
Stormwater Management Community of Practice (CoP)**

**CONSTRUCTION STORMWATER MANAGEMENT  
STATE-OF-THE-PRACTICE REPORT**

**June 2009**

# **CENTER FOR ENVIRONMENTAL EXCELLENCE BY AASHTO STORMWATER MANAGEMENT COMMUNITY OF PRACTICE**

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### **INTRODUCTION**

The Center for Environmental Excellence by AASHTO recently established a Stormwater Management Community of Practice (CoP). The purpose of the Stormwater Management CoP is to create a forum where State Department of Transportation (DOT) practitioners can engage in facilitated discussions on emerging issues, research data needs, and innovative stormwater quality compliance solutions. The CoP has two primary goals, the first of which is to extend each state DOT's network and contacts, enabling them to share experiences and engage in technology transfer. In this regard, the program is a continuation of efforts that were initiated on June 23-25, 2008 at the First National AASHTO Stormwater conference that was held in San Diego, California. The second goal is to develop a State-of-the-Practice Report (this document) on a selected focus topic. The Stormwater Management CoP consists of representatives from 16 state DOTs, the Federal Highway Administration (FHWA), and the Federal Transportation Administration (FTA). The Stormwater Management CoP members held an initial conference call to consider several possible topic areas but agreed that DOT Construction Stormwater Management and Compliance should be the top priority for the first phase of the CoP. A number of state DOTs are currently faced with stringent requirements and challenges for construction site stormwater compliance. Some DOTs are also engaged in various forms of litigation due to construction stormwater compliance issues.

The State-of-the-Practice report discusses federal and state construction site stormwater quality requirements, challenges, and current state-of-the practice of state DOTs; identifies possible research needs; and provides case studies on construction stormwater compliance.

### **BACKGROUND**

#### **EPA Regulations**

The Clean Water Act (CWA), as implemented through the U.S. Environmental Protection Agency's National Pollutant Discharge Elimination System (NPDES), requires control of construction site stormwater runoff water quality. State transportation agencies are

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This state-of-the-practice report summarizes the discussions of CoP members who spoke as individual members of the community and does not necessarily represent their agency's views or positions. In addition, the contents of this report do not necessarily represent the views or positions of AASHTO or the Center for Environmental Excellence.

regulated either by the EPA's Construction General Permit<sup>1</sup> or, if the state has been delegated authority by the EPA to implement the NPDES program, by a state construction NPDES permit program. The construction NPDES program is a part of the EPA's industrial NPDES permit stormwater quality program. The EPA Construction General Permit requires the DOT construction stormwater program to implement Best Management Practices (BMPs) to reduce or eliminate toxic pollutants using the Best Available Technology Economically Achievable (BAT) and implement BMPs to reduce or eliminate conventional pollutants using the Best Conventional Pollutant Control Technology (BCT). The BAT and BCT standard of care is comprised of a suite of BMPs that have been found through testing, research, and experience to be effective in controlling construction site runoff water quality problems.

A term derived from Section 301(b) of the Clean Water Act, BAT refers to BMPs or other procedures used to reduce toxic and non-conventional pollutants in discharges from construction sites. Toxic pollutants are those defined in § 307(a) (1) of the Clean Water Act and include heavy metals and manufactured organic chemicals. Non-conventional pollutants are those not included in the definition of conventional and toxic pollutants and include ammonia, chloride, chlorine, nitrogen, and phosphorus.

A term also derived from Section 301(b) of the Clean Water Act, BCT refers to BMPs intended to control conventional pollutants in discharges (applicable to construction site stormwater runoff). Conventional pollutants and indicators include biochemical oxygen demand, total suspended solids, oil and grease, fecal coliform, and pH (a measure of acidity/alkalinity).

In 2003, the EPA and state programs required the implementation of erosion and sediment controls at construction sites that disturbed at least one acre of land. The permits also require post-construction stormwater management practices in some cases, and may also require the control of non-stormwater and basic good housekeeping practices, such as trash management, material storage, and material use. The most recent EPA Construction General Permit was issued in 2008. Each DOT should determine their state's authorization status for the EPA Construction General Permit<sup>2</sup>.

The EPA has recently issued a notice of proposed rulemaking on effluent limitation guidelines (ELGs)<sup>3</sup> and new source performance standards (NSPS) to control the discharge of pollutants from construction sites. It is anticipated that this proposed rule will be adopted by December 2009. The new regulation may require new methods, standards, and actions to control the discharge of pollutants from construction sites. The proposed rule, as written, could be difficult to implement for linear construction projects such as freeways and highways, which differ substantially from those of residential and commercial development. The concerns with EPA's proposed ELGs include: 1) The lack of emphasis for watershed based approaches; 2) the overall benefits for many receiving waters; 3) the feasibility and cost of the requirements for linear projects; and 4) the inability of conventional passive controls to achieve the turbidity levels suggested in the proposed rule.

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<sup>1</sup> <http://epa.gov/npdes/stormwater/cgp.cfm>

<sup>2</sup> <http://cfpub.epa.gov/npdes/stormwater/authorizationstatus.cfm>

<sup>3</sup> <http://www.epa.gov/guide/construction/>

## **FHWA Guidance**

In 1992, the FHWA adopted the AASHTO Highway Drainage Guidelines, Volume III, Erosion and Sediment Control in Highway Construction as guidelines to be followed on all construction projects funded under Title 23, United States Code. These guidelines do not preempt any requirements made by or under state law if such requirements are more stringent than the federal guidelines. The guidelines are part of FHWA's policy that "all highways funded under Title 23 of the United States Code be located, designed, constructed, and operated according to standards that will minimize erosion and sediment damage to the highway and adjacent properties and abate pollution of surface and ground water resources."<sup>4</sup> The Highway Drainage Guidelines provide a consolidated overview of highway hydraulic design and discusses possible hydrology problems in the following areas:

- Hydraulic Considerations in Highway Planning and Location
- Hydrology
- Erosion and Sediment Control in Highway Construction
- The Legal Aspects of Highway Drainage
- Hydraulic Analysis and Design of Open Channels
- Evaluating Highway Effects on Surface Water Environments
- Highways Along Coastal Zones and Lakeshores
- Stormwater Management

## **STATE-OF-THE PRACTICE: COMPLIANCE PROGRAMS**

The findings below summarize selected states' internal programs for construction site compliance inspections and auditing, and conducting long-term self-monitoring of their DOT program by an outside regulatory agency. This information is summarized in Table 1.

### **Compliance Inspections and Auditing**

- Only Tennessee DOT was found to have a third party inspection or site assessment process.
- Most DOTs have created internal programs and processes to handle construction site stormwater compliance inspections, with periodic regulatory oversight by their respective state regulators. North Carolina DOT, for example, has instituted an internal site auditing process, in addition to routine site inspections.
- Most state regulatory agencies perform audits of DOT programs. Audits are generally conducted as frequently as annually or as infrequently as every three years. Their purpose is to ensure that the DOT is complying with regulations. In Delaware, for example, the Department of Natural Resources and Environmental Control audits Delaware DOT once every three years.

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<sup>4</sup> <http://www.fhwa.dot.gov/construction/cqit/erosion.cfm>

## Long-Term Self-Monitoring Program Approach

Most DOTs have self-monitoring programs with oversight by the state regulator. Many DOT programs include some or all of the following components that increase their effectiveness at maintaining compliance and protecting natural resources:

1. DOT staff dedicated to performing inspections and permit compliance assessments;
2. Training for DOT and contractor staff on Erosion Prevention and Sediment Control (EPSC);
3. Coordination between DOT and state regulator field staff, including joint training on EPSC; and
4. Authority to take action against contractors for EPSC or other permit compliance problems in the field.

**Table 1: Summary of Selected DOT Construction Stormwater Compliance Programs**

State DOT	Internal Program for Compliance Inspections	Self-Monitoring	Regulatory agency conduct audit of DOT program?
Alabama (ALDOT)	◆	◆	◆
California (Caltrans)	◆	◆	◆
Colorado (CDOT)	◆	◆	◆
Delaware (DeIDOT)	◆		◆
Georgia (GDOT)	◆		◆
Illinois (IDOT)	◆	◆	
Maine (MaineDOT)	◆	◆	
Michigan (MDOT)	◆	◆	◆
Minnesota (MNDOT)	◆	◆	◆
New York (NYSDOT)	◆	◆	
North Carolina (NCDOT)	◆	◆	
Oregon (ODOT)	◆	◆	◆
Tennessee (TDOT)	◆	◆	◆
Texas (TxDOT)	◆	◆	
Vermont (VTRANS)	◆		◆
Virginia (VDOT)	◆		◆
Washington (WSDOT)	◆	◆	◆

## **STATE-OF-THE PRACTICE: SELECTED STATE GENERAL PROGRAM INFORMATION**

The findings below provide information on state-of-the-practice for construction stormwater compliance programs in the United States as practiced by selected states.

### ***Alabama Department of Transportation (ALDOT)***

- Weekly EPSC inspections are performed by a Qualified Credentialed Inspector (someone who has completed the Qualified Credentialed Inspector Program) that works directly for the contractor or developer. Daily inspections are required by both ALDOT and the contractor. ALDOT/contractor joint inspections with formal report are required weekly and after qualifying rain events. Both ALDOT and contractor inspectors require Qualified Credentialed Inspector (QCI) certification.
- Every six months, compliance inspections are made by a Qualified Credentialed Professional (QCP) who is an outside consultant, such as a Professional Engineer (PE), Professional Geologist (PG), Certified Professional in Stormwater Quality (CPSWQ), or Certified Professional in Erosion and Sediment Control (CPESC).
- QCPs review and approve every inspection report, and provide on-site review and assistance as needed. Alabama Department of Environmental Management (ADEM) regulations require varying frequencies of QCP inspections based on timeframes, rainfall, and the type of work.
- The Alabama Department of Conservation and Natural Resources and/or ADEM may make unannounced visits and/or respond to complaints.

### ***California Department of Transportation (Caltrans)***

- For compliance monitoring, in each Caltrans District, an average of 150 projects are selected, and an outside consultant assesses the site on a bi-monthly basis. The consultant gives the site a “1” (best) to “4” (worst) rating.
- In some cases, the California State Water Resources Control Board is involved in the monthly inspections, especially if the site received a poor rating previously.
- The consultants that are hired for the monthly assessments are interviewed and pre-approved by Caltrans. Firms employing PEs and CPESCs are generally preferred.
- During the non-rainy season, EPSC inspections are required by the Contractor on a bi-weekly basis. During the “rainy season,” weekly EPSC inspections are required.
- The Contractor is required to include in the Stormwater Pollution Prevention Plan (SWPPP) a plan for EPSC inspections to be conducted by a properly trained technician (24-hour training certified by Caltrans). They may also hire a consultant to do their weekly EPSC inspections.

### ***Colorado Department of Transportation (CDOT)***

- The Colorado Department of Transportation (CDOT) has numerous processes and programs in place to assist with Stormwater Construction Permit (SCP) compliance. CDOT has had an Erosion Control Supervisor (ECS) certification program in place since 1992. All CDOT water quality inspectors are required to

hold this certification. Many CDOT project engineers, resident engineers, and maintenance workers have attended this certification program as well. The training has been so successful that many non-CDOT related contractors, developers, and local governments require the training for their field staff. To date, thousands have attended the ECS training.

- CDOT specifications require that CDOT contractors designate an ECS on all permitted projects. Their responsibility is to maintain each project in compliance with permit requirements. The ECS performs the required 14-day and post-precipitation event inspections, as well as updates the project Stormwater Management Plan (SWMP, Colorado version of the SWPPP).
- CDOT's MS4 permit requires that 60 Regional Erosion Control Assessment Team (RECAT) inspections be performed annually as a quality assurance quality control measure. The RECAT team consists of CDOT Headquarters water quality mentors, regional Water Pollution Control Managers, hydraulic engineers, and maintenance staff. The RECAT thoroughly reviews all aspects of the project from paperwork to field inspections. The team ensures that the ECS is performing per specification and SCP requirements.
- Unfortunately, even with the processes CDOT has in place, the Department was issued a Notice of Violation (NOV) and, more recently, a Consent Order that spells out additional program requirements. Since January 1, 2009, CDOT now requires the ECS on permitted projects to perform daily inspections. CDOT was also required to hire six additional Water Pollution Control Managers, one for each of CDOT's six regions. They are required to perform monthly inspections on each of the regions' open permitted sites and to attend preconstruction meetings to discuss water quality and specification issues. Even with these additional inspections, the 14-day ECS inspection requirement is still in place. All attendees of the preconstruction meeting must sign an attendance roster certifying that they have been informed of the new Consent Order requirements that have been incorporated into the Department's specifications, existing specifications, and SCP requirements.
- Additionally, the CDOT Chief Engineer has been designated Director of Stormwater Compliance and is required to submit semi-annual reports to the Colorado Department of Public Health and Environment (CDPHE) summarizing the results of the monthly inspections. CDOT is also developing a new outdoor facility that can provide rainfall simulation for extensive training on water quality topics from design and performance of temporary and permanent BMPs to advanced site inspection.

### ***Delaware Department of Transportation (DelDOT)***

- A Stormwater Management and Erosion and Sediment Law was established in 1991. It regulates all land disturbing activities greater than 5,000 square feet. At that time, DelDOT became a delegated agency for the Department of Natural Resources and Environmental Control (DNREC).
- DelDOT is a "self-policing" agency. DNREC audits DelDOT every three years to ensure compliance and provides recommendations as necessary.
- The State of Delaware has its own erosion and sediment control certification called Certified Construction Reviewer (CCR), a three and one half day course, as taught and certified by DNREC.

- Section 110 of the DelDOT Standard Specifications on Erosion and Sediment Control was updated January 2008. Section 110 details DelDOT and contractor responsibilities for erosion and sediment and outlines four successive steps that DelDOT can enforce for non-compliance.
- Each DelDOT project is reviewed and rated for erosion and sediment significance, which dictates the level of CCR supervision required for the project by the contractor. The levels are insignificant, “minor”, “medium”, and “major”. “Medium” projects require one CCR to be on-site, and “major” projects require two CCRs. DelDOT projects require contractors to submit CCR reports every seven days and within 24 hours of rain events exceeding 1/2 inch within a 24-hour period. Temporary stabilization is required on any areas of inactive construction within 14 days, and final stabilization is required within seven days of areas meeting final grade.
- All CCR reports are forwarded to the Stormwater Engineer’s office and filed as a permanent record for the project, which would be looked at during the delegation review by DNREC. CCR reports are reviewed weekly by the Environmental Compliance Supervisor, who regularly performs on-site visits to all active projects statewide, ensuring compliance with the NPDES permit, erosion and sediment and Environmental Permits, and/or performing independent CCR Site Reviews. The Environmental Compliance Supervisor generates a weekly CCR status report for the Stormwater Engineer, noting compliant and non-compliant projects.

#### ***Georgia Department of Transportation (GDOT)***

- GDOT has set up an internal department, Environmental Compliance, which has less than ten employees and visits most DOT sites once every two weeks to ensure they are in compliance with NPDES permits, the Aquatic Resource Alteration Permit (ARAPs), etc. and that all BMPs are properly installed in accordance with erosion and sediment control plans. They also check all paperwork, such as weekly inspections and rainfall data.
- If the Georgia Environmental Protection Division (GEPD) receives a public complaint, they will generally first contact the GDOT Environmental Compliance department. In some cases, GEPD may visit higher profile projects.
- If the GEPD determines that a site is out of compliance, they will give GDOT a set period of time to correct the problem and will schedule a follow-up visit to inspect the corrections.
- Contractors are responsible for weekly inspections and may hire an outside consultant.

#### ***Illinois Department of Transportation (IDOT)***

- Currently, IDOT names one construction inspector on each project to perform required inspections as one of their various inspection responsibilities. An IDOT form used to assist in the inspection along with inspection and maintenance guidelines for various BMPs is available to contractors and inspectors on the IDOT website.
- Illinois is a self-reporting state. When an IDOT inspection uncovers any noncompliance with the permit (interpreted to mean a release of sediment from the

project site), the Department is required to phone, fax, or email a report of the release to the Illinois Environmental Protection Agency (IEPA) within 24 hours of observing the issue followed by a more detailed written report mailed within five days. Failure to report is a violation of the permit.

- IEPA contracts with 17 Soil and Water Conservation Districts (SWCD) covering the 19 more metropolitan of 102 counties throughout the state. SWCD randomly visit projects within their jurisdiction for NPDES permit compliance. SWCD usually works with project staff to resolve issues and rarely escalates issues to IEPA. If IEPA receives a public complaint, they will generally investigate the site then follow up with IDOT project representatives. IEPA may also visit projects themselves, though rarely is this done.
- An independent consultant with CPESC certification currently conducts random inspections of construction sites. Their observations are reported monthly only to IDOT.
- IDOT prepares the SWPPP and Erosion Control Plans providing individual pay items for Erosion and Sediment control BMPs. Housekeeping BMPs are required at no additional expense to the State.
- IDOT has an Erosion Control Deficiency Deduction for violations of orders of the Engineer related to NPDES permits. These can be assessed without receiving a Violation Notice from EPA and are imposed as Liquidated Damages. IDOT will also pass on any fines imposed on IDOT by regulatory agencies.
- A brief synopsis of IDOT stormwater initiatives can be found at: <http://www.dot.il.gov/desenv/environmental/stormwater.html>

### ***Maine Department of Transportation (MaineDOT)***

- MaineDOT has had a Memorandum of Agreement (MOA) with the Maine Department of Environmental Protection (DEP) since 1997 (revised 2007). It grants authority to MaineDOT to administer and enforce an erosion and sedimentation control program for their construction and maintenance earthmoving activities. In exchange, the MaineDOT requires Erosion Protection and Sediment Control (EPSC) plans for all earthmoving activities regardless of acreage disturbed.
- MaineDOT provides DEP with a written annual report and a review meeting. The DEP may audit compliance of any MaineDOT project at any time.
- NPDES II permit requirements regarding construction activities are satisfied by the MOA with the addition of batch submittals of Notices of Intent (NOIs) and Notices of Termination (NOTs) to the DEP.
- Contractors prepare the EPSC plan according to a standard specification with a lump sum pay item, and provisions contained in the *MaineDOT Best Management Practices for Erosion and Sedimentation Control*.
- The MaineDOT Surface Water Quality Unit (SWQU) field staff submits a special provision to the contract bid package with additional project specific requirements to be included in the EPSC Plan; reviews and recommends approval of by the construction resident of the EPSC Plan; and performs routine inspections for compliance. Frequency of inspection is at the discretion of the SWQU field staff and is dependent on project scope, and proximity to and sensitivity of the water resource.

- The standard specification specifies that the Contractor is liable for state and federal permit violations and be a DEP approved Certified Contractor in Erosion and Sedimentation Control.

#### ***Michigan Department of Transportation (MDOT)***

- MDOT is an Authorized Public Agency (APA) under the Michigan Department of Environmental Quality (MDEQ) Soil Erosion and Sediment Control (SESC) Program. The MDEQ Stormwater program in turn recognizes the SESC program as a qualifying local program for the SESC portion of the construction site stormwater management program.
- As an APA, MDOT's program is self-enforcing and subject to MDEQ audit every five years. MDEQ conducts periodic site reviews as part of the APA audit process. MDEQ may issue a notice of violation and require MDOT to submit written corrective action plans if stormwater runoff problems are noted during these site reviews.
- Road and bridge design staff are required to complete a comprehensive SESC training course conducted by the MDEQ. The MDOT design manual was revised in 2008 to provide specific guidance on the consideration for and incorporation of both temporary and permanent SESC measures on plans.
- Weekly site inspections are conducted by MDOT staff certified by MDEQ as SESC inspectors and as construction storm water operators. Site inspection and documentation of non-sediment related stormwater runoff impacts is combined with SESC inspections.
- MDOT central office environmental staff conducts periodic site reviews with project staff as part of the department's SESC Quality Assurance (QA) process. In addition, inspection reports are centrally reviewed to identify trends in SESC device failures and other program deficiencies. Feedback from this QA process is provided to project offices and is used to improve the overall program.
- MDOT has recently approved development of an in-house SESC training class as part of the Construction Quality Partnership (CQP) to augment the certification training required and conducted by MDEQ. This training will be provided to contractors and contract maintenance agencies, as well as MDOT staff.
- MDOT has developed a special provision for SESC compliance, which is included in all projects that involve earth-disturbing activities. It allows for negative contract adjustments if a contractor does not adequately maintain SESC measures or fails to complete corrective action within established timeframes.
- As the standard specifications for construction and the construction manual are being revised, the SESC portions are being reviewed and revised to ensure that SESC measures are proactively constructed and maintained to prevent loss of sediment to the waters of the state or to adjacent properties.

#### ***Minnesota Department of Transportation (MNDOT)***

- MNDOT follows maintenance timeframes from the MN General Permit for Construction Stormwater. All Erosion Protection and Sediment Control (EPSC) Best Management Practices (BMPs) must be inspected to ensure integrity and effectiveness. All nonfunctional BMPs must be repaired, replaced, or supplemented

with functional BMPs. The DOT must investigate and comply with the following inspection and maintenance requirements:

- a. All silt fences must be repaired, replaced, or supplemented when they become nonfunctional or the sediment reaches one third of the height of the fence. These repairs must be made within 24 hours of discovery, or as soon as field conditions allow access.
  - b. Temporary and permanent sedimentation basins must be drained and the sediment removed when the depth of sediment collected in the basin reaches one-half the storage volume. Drainage and removal must be completed within 72 hours of discovery, or as soon as field conditions allow access.
  - c. Surface waters, including drainage ditches and conveyance systems, must be inspected for evidence of sediment being deposited by erosion. The Permittee(s) must remove all deltas and sediment deposited in surface waters, including drainage ways, catch basins, and other drainage systems, and re-stabilize the areas where sediment removal results in exposed soil. The removal and stabilization must take place within seven days of discovery unless precluded by legal, regulatory, or physical access constraints. The Permittee shall use all reasonable efforts to obtain access. If precluded, removal and stabilization must take place within seven calendar days of obtaining access. The Permittee is responsible for contacting all local, regional, state, and federal authorities and for receiving any applicable permits, prior to conducting any work.
  - d. Construction site vehicle exit locations must be inspected for evidence of off-site sediment tracking onto paved surfaces. Tracked sediment must be removed from all off-site paved surfaces within 24 hours of discovery or, if applicable, within a shorter time.
  - e. The Permittee(s) are responsible for the operation and maintenance of temporary and permanent water quality management BMPs, as well as all EPSC BMPs, for the duration of the construction work at the site. The Permittee(s) are responsible until another Permittee has assumed control over all areas of the site that have not been finally stabilized or until the site has undergone final stabilization, and an NOT has been submitted to the Minnesota Pollution Control Agency (MPCA).
  - f. If sediment escapes the construction site, off-site accumulations of sediment must be removed in a manner and at a frequency sufficient to minimize off-site impacts (e.g., fugitive sediment in streets could be washed into storm sewers by the next rain and/or pose a safety hazard to users of public streets).
- From MNDOT training information:
    - a. Sediment removal must be scheduled for perimeter sediment control BMPs when accumulated material reaches one third of the height or be replaced with a functional BMP within 24 hours of discovery.

- b. For temporary basins, sediment must be removed when accumulated material reaches one-half the storage volume of a basin or one-half the height of the riser.
- c. The Permit requires removal be completed within 72 hours of discovery or as soon as site conditions permit access.
- d. Non-functional BMPs require repair or replacement within 24 hours of discovery.

***New York State Department of Transportation (NYSDOT)***

- Contractors are required to inspect sites every seven days and after storm events of one half inch or more. Inspections shall be done within 24 hours of rain event, and maintenance shall be done within 72 hours of inspection. Contractors are required to designate an erosion and sediment control supervisor for each project.
- For projects covered under a State Pollutant Discharge Elimination System (SPDES) General Permit, NYSDOT is required to perform weekly inspections, Contractors and NYSDOT inspectors are required to have certification of training by April 30, 2010, and contractors are required to sign certifications that they will comply with project SWPPPs.
- Contractors are required to have the capability of seeding/mulching site on any given day, in order to reduce reliance on subcontractors that may not always be on-site.
- New York State Department of Environmental Conservation (NYSDEC) and/or New York City Department of Environmental Protection (NYCDEP) may make unannounced visits and/or respond to complaints.

***North Carolina Department of Transportation (NCDOT)***

- Currently, NCDOT site inspectors perform weekly inspections. Projects let after January 2006 are required to have the contractor provide a certified erosion and sediment control/stormwater (E&SC/SW) site supervisor on the project. The certified supervisor is required to perform the weekly inspections. The certification program was developed by NCDOT and North Carolina State University (NCSU), and it is administered by NCSU.
- Seven Field Operations Engineers (FOEs) (Roadside Environmental Section) perform monthly audits of every site in their region, with one FOE per two divisions. Most of these individuals are CPESCs and PEs. They can recommend that work on a project be suspended because of an immediate corrective action (ICA) citation, and the Resident Engineer (RE) has the authority to suspend work. Nearly all of the requests to suspend work on a project are approved by the RE.
- ICAs can be issued for non-compliances such as potential for off-site sedimentation, an actual sediment release, and/or failure to provide groundcover or severe erosion on-site.
- Roadside Environmental provides customized training to bridge maintenance, construction, and contractor personnel when special emphasis is needed. Training is conducted in English and Spanish, when needed.
- NCDOT coordinates with state regulators frequently. They conduct a quarterly calibration meeting with the Land Quality Section of the Department of

Environment and Natural Resources (DENR) (the group responsible for overseeing the EPSC program in NC), where they travel to construction sites to audit them together. This on-site calibration helps to keep transparency between the NCDOT inspection staff and the Land Quality Section inspection staff.

- Before beginning a new project, permit boundaries in the field are defined with orange safety fencing, and an Environmental Preconstruction meeting is conducted. During this meeting, all permits and restrictions are reviewed for understanding.
- Maintenance timeframes: Inspectors working under the Resident Engineer make a weekly punch list for use after a one-half inch rain event in conjunction with the contractor's erosion and sediment control/stormwater supervisor. An abatement date is placed in the report. Major maintenance items must be completed or repaired within 24 hours and minor items in three to five days. Seeding and mulching must be completed within 21 days.

#### ***Oregon Department of Transportation (ODOT)***

- The Oregon Department of Transportation (ODOT) is in the process of developing an Inspection Quality Assurance Program. The purpose of the program is to provide adequate training and resources for Construction Inspectors and to ensure consistent administration of highway construction contracts. Although the program is still in the development stage, ODOT is implementing a Training and Certification Program for Inspectors<sup>5</sup>.

#### ***Tennessee Department of Transportation (TDOT)***

- The Environmental Construction Compliance (Quality Assurance/Quality Control or QA/QC) Section is currently responsible for oversight of Water Quality and Stormwater Permits conformance during construction on projects with NPDES permits. The Section covers all projects with NPDES or Aquatic Resource Alteration Permits (ARAP) permits in the future. The Section works closely with the Environmental Division - Technical Studies Office, Design Division, Construction Division, Right-of-Way Division, Maintenance Division, and the Tennessee Department of Environment and Conservation (TDEC).
- Consultants currently conduct routine inspection (dictated by a Consent Decree).
- TDOT is currently developing a Comprehensive Inspections program to guide the performance of construction project inspections.
- A Statewide Stormwater Management Plan was recently developed to address construction activities.

#### ***Texas Department of Transportation (TxDOT)***

- TxDOT District staff inspects all projects on a schedule that is compliant with the state Construction General Permit – typically every seven days.
- TxDOT District staff performs comprehensive environmental and storm water compliance evaluations on select projects on a variable schedule.

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<sup>5</sup> <http://www.oregon.gov/ODOT/HWY/CONSTRUCTION/Cert/InspCert.shtml>

- The EPA and the Texas Commission on Environmental Quality (TCEQ) periodically investigate select projects, usually on a random schedule or as the result of public complaint.
- An Environmental Management System (EMS) is under development. The EMS will most likely incorporate much more detailed inspection procedures, as well as more detailed and formal evaluation of environmental issues at each project stage, such as planning and Plans, Specifications, and Estimates (PS&E) development, as well as construction. Built-in feedback loops (e.g., from construction to PS&E) facilitate continuous improvement.

#### ***Vermont Department of Transportation (VTrans)***

- A VTrans Professional Engineer (PE) or Certified Professional in Erosion and Sediment Control (CPESC) performs weekly EPSC inspections.
- Other high profile or sensitive projects may require an outside consultant or PE/CPESC to perform inspections or be on-site as decided by VTrans.
- The Vermont Department of Natural Resources (DNR) may make unannounced visits and/or respond to complaints.

#### ***Virginia Department of Transportation (VDOT)***

- From the VA General Permit for Construction Stormwater and from VDOT training:

“The SWPPP must include a description and schedule of procedures to maintain in good and effective operating conditions vegetation, erosion and sediment control measures and other protective measures during construction identified in the site plan. If site inspections required by Section II D 4 [of the General Permit] identify BMPs that are not operating effectively, maintenance shall be performed before the next anticipated storm event, or as soon as practicable to maintain the continued effectiveness of stormwater controls.”

#### ***Washington Department of Transportation (WSDOT)***

- Washington is a delegated state for purposes of implementing federal Clean Water Act programs, including the NPDES permit program. The Washington State Department of Ecology (Ecology) is the designated state water quality agency. Ecology issued an NPDES Construction General Permit (CGP) which WSDOT obtains coverage under.
- Washington State standard specifications for bridge and roadway construction require that the contractor provide a trained and certified Erosion Control Lead on projects. The Erosion Control Lead training and certification is provided by the AGC of Washington and University of Washington Extension. WSDOT construction inspectors are required to take erosion control training classes, but are not “certified”.
- The CGP requires weekly monitoring of stormwater discharges for turbidity and pH. This sampling data is submitted monthly to Ecology on a Discharge

Monitoring Report form. WSDOT has developed monitoring protocols and a data base to contain this monitoring data which allows data analysis and long-term self-monitoring.

- The protocols – WSDOT Construction Water Quality Sampling and Reporting – are contained in the WSDOT *Highway Runoff Manual* Chapter Six and have been updated to reflect the NPDES CGP monitoring requirements as well as protocols for sampling during in-water work activities. The Water Quality Monitoring database automatically flags data that does not comply with permit requirements, prompting the user to report the event to the WSDOT project engineer. All data must be entered into this database to ensure permit reporting requirements are met.
- WSDOT has Environmental Compliance Assurance Procedures for Construction Projects and Activities. These procedures are contained in the Standard Specifications<sup>6</sup> and the WSDOT *Construction Manual*<sup>7</sup>, and are used to track non-compliance events, reporting on same, and commitments made to resolve non-compliance events.
- Each fall, WSDOT Environmental Services Office (ESO) staff, in conjunction with project office staff, assesses non-completed construction projects, with a moderate to high potential for erosion, for readiness for the upcoming rainy season. Deficiencies are noted and communicated to WSDOT executives, and results of the fall assessment are reported to the legislature, governor, and the public in WSDOT's quarterly performance report *The Gray Notebook*. After the deficiencies are corrected by the project office, ESO staff is available to, and often do, re-assess the project site to ensure readiness.
- Ecology does not conduct a formal on-site auditing program. Ecology water quality inspectors occasionally visit unannounced to inspect a project site. Otherwise Ecology has the opportunity to audit WSDOT's CGP compliance through review of submitted Discharge Monitoring Reports.

## SUGGESTED RESEARCH AND FUTURE TOPICS

Following are research and data needs and topic focus areas suggested during the initial CoP conference call for future discussion as a part of the CoP. Additional topics and research ideas related to construction stormwater issues are included based on DOT feedback during the June 2008 AASHTO Stormwater Conference and the AASHTO Transportation and Environment Research Ideas (TERI) database list. They are listed in no particular order of priority.

- Off-site areas tributary to DOT construction sites are a problem, especially run-on from land uses such as agriculture. Once off-site runoff is intercepted by a DOT storm drain, the regulatory agencies require the DOT to be responsible for the quality. Monitoring inflow and outflow to document the inflow 'baseline' may be one solution. Legislated relief may also be another solution.
- What is working/not working with the construction site water quality QA/QC program?

<sup>6</sup> <http://www.wsdot.wa.gov/fasc/EngineeringPublications/Manuals/2006SS/2006SS.pdf>

<sup>7</sup> <http://www.wsdot.wa.gov/fasc/EngineeringPublications/Manuals/Construction.pdf>

- How is the training of contractor and engineers, and inspectors completed?
- What management practices need additional study, specifically, the use of polyacrylamide for erosion control? Is there a problem with pollution from polyacrylamide?
- Is there parity for money being spent on design versus compliance in the field?
- How are specifications and contracts for enforcement being used?
- What is working/not working when interfacing with regulators?
- Should the contractor or the DOT prepare the erosion control plan?
- Discuss the costs and benefits of transportation-specific MS4 and construction permitting. Research the elements of a transportation specific CGP and the associated costs and benefits of developing such a permit.
- When developing a framework for new multi-state collaborative program to appraise effectiveness of highway stormwater runoff treatment options, focus on a suite of methods for data collection, sampling, and characterizing stormwater properties, and for assessing the performance of a full range of construction and post-construction BMPs.
- Discuss the costs and benefits of transportation-specific MS4 and construction permitting.
- Examine long-term construction and maintenance costs.
- Could compost filters/berms potentially become hazardous waste?
- What are the short-and long-term effects of highway construction on water quality?
- Discuss managing environmental impacts of erosion and sedimentation from low-volume roads.
- Discuss testing of construction site BMPs.

## ACRONYMS AND ABBREVIATIONS

The following acronyms and abbreviations are used in this report:

AASHTO	American Association of Highway and Transportation Officials
ADEM	Alabama Department of Environmental Management
ALDOT	Alabama Department of Transportation
APA	Authorized Public Agency
ARAP	Aquatic Resource Alteration Permit
ARAP	Aquatic Resource Alterations Permits
BAT	Best Available Technology Economically Achievable
BCT	Best Conventional Pollutant Control Technology
BMP	Best Management Practice
Caltrans	California Department of Transportation
CCR	Certified Construction Reviewer
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department Of Public Health and Environment
CGP	Construction General Permit
CoP	Community of Practice
CPESC	Certified Professional in Erosion and Sediment Control
CQP	Construction Quality Partnership

CWA	Clean Water Act
DelDOT	Delaware Department of Transportation
DEP	Department of Environmental Protection
DNR	Department of Natural Resources
DNREC	Department of Natural Resources and Environmental Control
DOT	Department of Transportation
ECS	Erosion Control Supervisor
ELGs	Effluent Limitations Guidelines
EMS	Environmental Management System
EPA	Environmental Protection Agency
EPSC	Erosion Prevention and Sediment Control
FHWA	Federal Highway Administration
FOE	Field Operations Engineer
FTA	Federal Transportation Administration
GDOT	Georgia Department of Transportation
GEPD	Georgia Environmental Protection Division
ICA	Immediate corrective action
IDOT	Illinois Department of Transportation
IEPA	Illinois Environmental Protection Agency
MaineDOT	Maine Department of Transportation
MDEQ	Michigan Department of Environmental Quality
MDOT	Michigan Department of Transportation
MNDOT	Minnesota Department of Transportation
MOA	Memorandum of Agreement
MPCA	Minnesota Pollution Control Agency
MS4	Municipal Separate Storm Sewer System
NCDOT	North Carolina Department of Transportation
NCSU	North Carolina State University
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
NYCDEP	New York City Department of Environmental Protection
NYSDEC	New York State Department of Environmental Conservation
NYSDOT	New York Department of Transportation
ODOT	Oregon Department of Transportation
PE	Professional Engineer
PG	Professional Geologist
QA	Quality Assurance
QC	Quality Control
QCI	Qualified Credentialed Inspector
RE	Resident Engineer
RECAT	Region Erosion Control Assessment Team
SCP	Stormwater Construction Permit
SESC	Soil Erosion and Sediment Control
SPDES	State Pollutant Discharge Elimination System
SWCD	Soil and Water Conservation Districts
SWPPP	Stormwater Pollution Prevention Plan

SWQU	Surface Water Quality Unit
TCEQ	Texas Commission on Environmental Quality
TDEC	Tennessee Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
TERI	Transportation and Environment Research Ideas
TxDOT	Texas Department of Transportation
VDOT	Virginia Department of Transportation
VTrans	Vermont Department of Transportation
WSDOT	Washington Department of Transportation