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U.S. Department of Transportation
Federal Highway Administration

Web Forum 1: Water Quality Post-Construction BMPs and Project Delivery Web Forum Questions and Answers

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11:00 am – 12:30 pm (EST)

Are the forms or checklists that were mentioned during the North Carolina Department of Transportation (NCDOT) presentation for each of the Concurrence Points available?

The NCDOT website has details on the combined 404/National Environmental Policy Act (NEPA) process. If you are interested in this information, e-mail Andy (ahmcdaniel@ncdot.gov) and he will send you the link.

How do you maintain the Permeable Friction Course (PFC)? Is it vacuumed periodically? How often? Can PFC be used in cold climates?

PFC does not have to be vacuumed. Some Departments of Transportations (DOTs) have used it in cold climates, however sand cannot be used for traction control with PFC. If the overlay ravelers it needs to be replaced, this generally happens before its water quality effectiveness is lost. Generally, it needs to be replaced about every 10 years and maintenance is expected to be minimal.

NCDOT asked North Carolina State University to research PFC and one of their investigation sites had PFC that had been installed for 10 years. This site had very little degradation in the performance of the PFC, and it was not vacuumed. In California, PFC has not been monitored for water quality for too long, but when PFC is applied for noise, it has a life expectancy of 10 years.

Do you have a water quality monitoring program to determine Best Management Practice (BMP) performance? If so, is there documentation available outlining what has worked and what has not?

Washington State Department of Transportation (WSDOT) has a National Pollutant Discharge Elimination System (NPDES) municipal permit that requires a monitoring program. BMP performance is a part of that monitoring program. The permit is renewed every five years, and during the development of each permit, WSDOT discusses with the regulators the BMPs that will be monitored for effectiveness during the permit term. The number of BMPs monitored for effectiveness are a small sample of the BMPs installed statewide. The results from the monitoring are available, but it usually takes a couple years for the Quality Assurance\Quality Control (QA\QC) process before they are published and made available to the public.

NCDOT also has an NPDES permit requirement to have a BMP performance research program and it requires that NCDOT use state universities or other independent organizations for that research, such as

the United States Geological Survey (USGS). Most of the NCDOT research is published in academic publications, which are available on NCDOT's [website](#).

The California Department of Transportation (Caltrans) has a similar monitoring program in its NPDES permit which requires that BMPs are monitored for effectiveness. It is a new requirement that Caltrans has just begun implementing.

Do any of the panelists know of states that utilize open graded friction courses for BMP in cold weather climates? How well does the permeable friction course overlay perform in states that experience freeze thaw cycles and use studded tires?

WSDOT allows the use of studded tires between November 1 and April 1, and they have found that the open graded friction course does not last long enough to justify its use under these conditions. The overlays are very useful in states with warmer climates, especially in the southwest and southern California. In Washington State, they are just not practical because of the use of studded tires.

North Carolina is not a cold weather climate per se, but NCDOT has used PFC widely and has evaluated it through a couple research studies. NCDOT is considering adding it to its BMP Toolbox Manual because it can be considered a BMP. As shown in the Caltrans presentation, the PFC can reduce Total Suspended Solids (TSS) dramatically. The results are mixed for other constituents, but to address TSS and safety, it is highly recommended.

Regarding Media Filter Drains, where can we find standard plans and specifications? Are there any issues with maintenance of Media Filter Drains?

WSDOT has standard plans available in its [Highway Runoff Manual](#). For follow up questions on Media Filter Drains, contact Kenneth Stone, WSDOT Environmental Manager, at stonek@wsdot.wa.gov. Washington State University researched the longevity of the Ecology Media Mix, which the trench is filled with and provides most of the pollutant removal. The research results indicate that the mix is effective for at least 10 years before it might need to be replaced.

Will implementing post-construction BMPs as part of delivery be sufficient for meeting TMDLs?

Caltrans' NPDES Permit does not allow it to receive TMDL compliance credit if the BMP was installed to meet permit post-construction requirements. No credit is received above and beyond these requirements. If it does go above and beyond, what is treated for post-construction can be applied for TMDL compliance credit.

TMDLs are not approved as self enforcing, but they have to be coupled with an NPDES Permit or a federal or state rule that requires their implementation. NCDOT has attempted to separate TMDL compliance from individual project decision making. They are advocating a watershed approach to TMDL compliance rather than a project by project approach to TMDL compliance. There are many advantages to this process, with the top one being that compliance with a Waste Load Allocation does not have to be demonstrated for any individual project if you use a more holistic approach.

Regarding LID and Green Roofs, are admin buildings using LID, green roofs, rain gardens, etc., in order to offset impacts from the overall MS4?

WSDOT has not used green roofs or rain gardens at its maintenance facilities which are also covered under its permit. More conventional BMPs and the same LID BMPs that have been applied along their roadways have been sufficient at maintenance and other non-highway facilities so far.

Are Categorically Exempt (CE) scope projects like Bridge replacements and resurfacing projects subject to the Post-Construction requirements within Phase 2 regulated areas?

An [NCHRP Study 25-42 Report 778](#) addresses this topic for bridges. The general answer is yes, a bridge replacement project would require compliance with post-construction stormwater control program because (especially in North Carolina) bridge replacement projects generally involve some kind of widening for safety reasons. This results in an increase in built upon area which is the trigger for the post-construction stormwater control program.

In highly urbanized areas with limited right of way, for example soundwall to soundwall, are DOTs required to implement post-construction requirements?

For WSDOT, yes, and if it becomes impractical or infeasible to put BMPs in that situation, there are some alternate methods that can be used to meet the permit requirements, including treating an equivalent amount of impervious surface somewhere else in the same watershed.

Caltrans has similar requirements for alternative compliance in its permit, and for Total Maximum Daily Loads, it has instituted a cooperative implementation agreement process that allows Caltrans to go offsite and give a financial contribution, then the local sponsor is responsible for maintenance but Caltrans gets credit against its TMDL obligation.

NCDOT has the obligation of doing the Maximum Extent Practicable for every site. They have to show that they have tried every reasonable and economically feasible alternative. However, they do not currently have a provision in their permit that would require or allow them to go offsite in lieu of treating onsite. It is more of an MEP standard in those types of situations.

How do you guarantee to the regulatory agency that the PFC will forever be replaced in kind if it was used as a permanent water quality BMP?

The process is the same for any BMP that comes to the end of its service life. In the case of PFC, the service life is somewhat shorter than some other treatment controls. If PFC is included as a part of the project design documents as a water quality feature, then it is placed in the DOT tracking system this way, and cannot be replaced by a conventional overlay in the future.

Is there a good resource with more information on emerging BMPs?

The panelists do not know of any specific publications on this topic. More information is available on the internet regarding the emerging BMPs discussed on the webinar.

For infiltration devices, why do you put a limit on the maximum infiltration rate of 9in/hr?

This is done to protect groundwater resources. If the infiltration rate is too high, there is not the opportunity for pollutants to be filtered, adsorbed and sorbed in the soil matrix.

The infiltration modular systems did not appear to have access for maintenance. Was there a pretreatment device to capture gross solids before entering the chambers?

Reducing TSS prior to infiltration is highly desirable prior to underground infiltration. In this case, the sand layer in the channel invert is serving the purpose to reduce TSS prior to flow entering the modular system.

What is the typical depth of the PFC on the surface?

A typical overlay thickness for PFC ranges from 1.5 to 2.5 inches, with 2 inches being typical.

Are infiltration modular systems considered injection wells?

Modular systems may be considered injection wells subject to regulation in certain cases. The USEPA has fact sheets that describe injection, or Class V wells. The basic definition of an injection well is a bored, drilled or driven shaft whose depth is greater than the largest surface dimension; or, a dug hole whose depth is greater than the largest surface dimension.

Do you apply the PFC regardless of location with the State, or only in Phase 2 regulated areas?

Yes, except that there is not much impetus in areas that are very rural for water quality, or that have vegetated strips adjacent to the roadway.

What is the average SF cost for the Infiltration modular systems?

This is highly variable depending on the project size, construction conditions, and work area.

How is the Infiltration modular system accessed/maintained?

For the case shown in the webinar, if the modular system fails, it will have to be excavated and replaced.

Have you performed modeling to evaluate runoff reduction capability from implementation of LID practices – specifically flood flow peak discharges?

There are various tools available for this purpose. NCHRP Report 802 has a spreadsheet tool designed for the DOT practitioner. Other computer programs, such as SWMM and HSPF can model infiltration.

What size (HUC) watershed can the equivalent treatment occur?

This varies by permit authority and local jurisdiction.