Web Forum: Strategies for Addressing Impaired Waters and Achieving Project Delivery, Regulatory Compliance, and Watershed Management Goals

Summary

May 10, 2019

A web forum was held for Department of Transportation (DOT) stormwater practitioners to discuss the organizational attributes that are key to promoting surface water quality protection, including insights into the practice of these attributes, and the integration of stormwater program requirements into day-to-day business practices of the DOT organization. The following is a brief summary of the main points discussed by each of the presenters.

Presentation 1

Henry Barbaro, Stormwater Program Supervisor, Highway Division, Massachusetts Department of Transportation, ***MassDOT Impaired Waters Program***

Mr. Barbaro discussed how Massachusetts Department of Transportation (MassDOT) developed a methodology to minimize MassDOT's role in contributing contaminant loading to impaired waters. **History**: In 2008, the Conservation Law Foundation sued MassDOT in federal court on the premise that MassDOT was not complying with the state's municipal separate storm sewer system (MS4) permit, which was issued in 2003. In 2010, it was ruled that MassDOT's programmed projects were not enough to meet the guidance outlined in the MS4 permit. The court (and U.S. EPA) deemed that MassDOT should engage in retrofit best management practice (BMP) projects (standalone projects) to remediate stormwater discharges in the near future, rather than wait for programmed projects designated in the statewide transportation improvement program, giving rise to MassDOT's Impaired Waters Program.

The DOT uses information such as roadway locations, impaired water body locations, and urban areas to help determine locations where retrofit projects make sense and where stormwater improvements will have the greatest benefits to water quality. The Impaired Waters Program consists of assessing MassDOT's contribution to impaired waterbodies, preliminary design evaluation, engineering design, construction phase oversight, and tracking and accounting.

First, an assessment is conducted, and the watershed to the impaired waterbody is evaluated to determine the type of impairment. The DOT looks for impairments unrelated to highway runoff. If there is no total maximum daily load (TMDL) report or clear waste load allocation associated with the impaired water, the DOT looks at its contribution in terms of the contributing watershed area of the highway corridors, and the percent of impervious cover. When the impervious cover is less than 10 percent of a watershed, stormwater is less likely to cause water quality impairments. MassDOT uses this impervious area ratio to determine its necessity to reduce the DOT's own impervious cover that directly discharges to the impaired water body. As part of this assessment effort, the DOT looks at record plans and conducts field investigations to determine where MassDOT stormwater goes, including closed drainage systems and their outfalls, and conducts site visits to identify potential illicit

connections and culverted streams.

The most critical part of the retrofit program involves determining MassDOT's contribution to the impairments of the water bodies. If a BMP is necessary, a standalone retrofit BMP project must be constructed. When choosing candidate locations, the DOT fits these BMPs into a linear roadway configuration. Typical constraints include space, wetlands, and utilities. Potential BMP's are identified via desktop reviews, and sites are visited, and calculations are made to quantify the stormwater impacts. Effective impervious cover and phosphorus load reductions are used to quantify the added benefit of a BMP. A retrofit project decision tree is used to help decide whether a retrofit BMP is warranted for installation in a particular impaired waterway location.

The overall goal of the MS4 permit is for discharges to not cause or contribute to water quality exceedances. The watershed is assessed to determine the DOT's level of contribution. U.S. EPA has found that if you are not at 10 percent or lower, stormwater-caused impairments will be minimal. MassDOT uses the same U.S. EPA number for its own reduction ratio but strives for 9 percent or lower. This is done through infiltration practices and disconnecting drainage. MassDOT uses stormwater BMPs either "bundled" with other projects or as standalone retrofits. Bundled projects include "book jobs," which do not undergo design (e.g., pavement resurfacing). Cost effective stormwater BMPs are considered for design. For standalone retrofits, stormwater BMP implementation is the main objective with a 3 to 1 cost ratio. These BMPs are time-effective but not cost-effective.

Examples of retrofit BMPs include infiltration basins, swales with check dams, swales with check dams, and swales with overflow spillways. The next part of the program is construction phase oversight. A lesson learned here was to use loose enough soil in basins. To track and account for the BMPs being designed and installed, MassDOT uses a database compatible with U.S. EPA reporting requirements, as well as MassDOT's asset management program. The database is populated using design consultants and a water quality data form to collect BMP information for all programmed projects. The database was developed in ArcGIS to track BMPs, status, impervious cover, and pollutant reduction, and as a planning tool for upcoming programmed projects to determine whether future BMPs will be needed. Currently, all impaired waters assessments are complete.

The DOT has assessed over 700 impaired water body segments over five years. Retrofit construction projects have been advertised for more than 250 structural treatment measures. The DOT has spent $27.5 million (rounded to $28 million) in construction and $11.5 million (rounded to $12 million) in assessment design. From here, the DOT is focusing on asset management, which includes compliance tracking, the illicit discharge detection program, and good housekeeping measures. The next phase will focus on maintaining built BMPs, tracking progress, having more flexibility in complying with the next permit, choosing BMPs, and looking for areas to get the best water quality treatment, all in the most effective and economically achievable manner. The DOT anticipates that the MassDOT Individual Transportation Separate Storm Sewer System (TS4) Permit will be issued by U.S. EPA in 2019.

Presentation 2

Tracey Harmon, VDOT TMDL Program Manager, Virginia Department of Transportation, ***VDOT's Chesapeake Bay TMDL Action Plan Implementation***

Ms. Harmon discussed the Virginia Department of Transportation (VDOT) Chesapeake Bay Total Maximum Daily Load Action (TMDL) Plan, including exploring BMP opportunities, cost comparisons, and progress. The DOT permit requires reductions in nitrogen, phosphorus, and sediment in the form of total suspended solids (TSS). Loads are calculated using census urbanized areas. The permit requirement is to achieve 36 percent (cumulative) pollutant reduction by June 30, 2022.

Load reductions must occur for the James, Potomac, Rappahannock, and York River Basins. VDOT's action plan includes historical BMPs, redevelopment, stream restoration and stabilization, outfall and dry channel stabilization, shoreline stabilization, land cover conversion, street sweeping and other annual pollutants, purchase of nutrient credits, structural BMP enhancements, and retrofits. Ninety percent of the DOT phosphorus load reductions for the 36 percent plan is focused on two BMP types: shoreline and stream restoration and stabilization. BMPs planned for reductions through 2022 reliance by total phosphorus. Others include redevelopment (2 percent, 181 pounds), outfall and channel stabilization (1 percent, 82 pounds), and land cover conversion (1 percent, 128 pounds).

Stream restoration – While assessing recent storm damage, some observed benefits were sediment deposits on the floodplain bench and woody debris left over from project clearing that could be used for roughness and habitat potential, as well as vegetative growth along with the log structures. Big returns on nutrient and sediment reduction resulted from moving streams away from eroded banks, introducing woody structures, using structures to control the change in slope and velocity and building a floodplain bench along the side of the stream. Much wetlands vegetation is taking hold naturally along the stream bank and floodplain bench, helping to reestablish the floodplain connection. Benthic sampling was done before starting the project, and salvaged cobble was used to recolonize the channel, which improved the outcome and Stream Condition Index (SCI) post-restoration. Fish sampling was also conducted and showed improved conditions post-shoreline stabilization.

Shoreline stabilization – Partnering with state agencies aided severely eroded shorelines. A geographic information system (GIS) desktop evaluation/analysis determined 22 priority sites with initial reduction estimates. Shoreline mapping data was used to estimate erosion rates of total phosphorus and nitrogen loads. Sixteen priority sites on eight state properties were found based on the desktop analysis of total phosphorus and loading rates. A site reconnaissance was conducted to refine the mapping and load reduction, and preliminary site schematics were developed. Part of the site reconnaissance effort was to verify bank heights. Twelve sites on seven state properties were found, one project in each location. VDOT performed additional data collection and analyses for each location, including inshore and offshore geotech; survey; wave analysis; rock size analysis; cultural resources; rare, threatened, and endangered species; submerged aquatic vegetation; and private oyster leases.

Updated schematics and cost estimates were performed. The DOT looked at breakwater design that had a beach nourishment component, along with low marsh and high marsh components. One agency did a memorandum of understanding (MOU) with the DOT. Phosphorus reduction requirements were more achievable than nitrogen (2:1 ratio). Land cover conversion opportunities included mapping of the right of way, planting trees, and not mowing to encourage natural growth. Considerations and constraints included concerns of falling trees with distance and zone clearing, increasing sight distance, species selection, interior right of way only, avoiding blocking commercial views, distance from bridges, utilities, drainage structures, maintenance access, traffic cameras and counters, and permanent storage sites. VDOT released a press release to inform about the DOT concerns.

BMP retrofits – VDOT considering converting dry detention basins to wet ponds using land cover components, including BMPs for less than $15,000 per pound. The most inexpensive BMPs are stream restoration, followed by shoreline stabilization and land cover conversion. BMP retrofits are the most expensive.

Nutrient credit purchases – The VDOT cost basis of $15,000 per pound of phosphorus is based on existing Design Division credits. There is a range of $12,000 to $16,000 per pound. VDOT has an existing nutrient trading regulation that allows bankers to sell nutrient credits. VDOT decided to go after nitrogen credits to break down the costs of phosphorus [removal]. Nitrogen and phosphorus removal progress is going up.

Presentation 3

Con Kontaxis, Watershed Manager, California Department of Transportation, ***TMDLS and Cooperative Implementation Agreements***

Mr. Kontaxis discussed ways in which the California Department of Transportation (Caltrans) is complying with its National Pollutant Discharge Elimination System (NPDES) Permit, focusing on TMDLs. Caltrans' initial NPDES permit was issued in 1999. It was renewed on September 19, 2012, and became effective July 1, 2013. Permit Attachment IV, TMDL Implementation Requirements, was adopted May 20, 2014, and became effective July 2014. The U.S. EPA has delegated its authority to the State Water Board of California, which in turn delegates to the nine Regional Water Boards. Caltrans has 12 Districts. Several Districts have multiple Regional Water Boards to deal with, making compliance a challenge. The 2012 permit identified 84 TMDLs, and Caltrans is a named stakeholder in all of them. Caltrans has over 4,100 centerline miles of Caltrans highway, 28 percent of state highway, and 56,000 acres estimated total TMDL right of way. Two-thirds of the state drains to impaired water bodies, many of which do not currently have a TMDL. TMDLs are likely to increase as the DOT move forward. Caltrans discharge comprises less than 2 percent of the watershed.

Caltrans has three pots of accessible funding: 1) the governor's enacted budget, used for capital outlay support, maintenance, traffic operations, and legal; 2) the State Highway Operation Protection Plan (SHOPP), used for retrofitting DOT highways to treat stormwater runoff; and 3) capital projects, used for transportation projects and consisting of the State Transportation Improvement Fund, SHOPP, and local assistance, and covering temporary construction BMPs, permanent design pollution prevention BMPs, permanent post-construction BMPs, regulatory orders, and enforcement actions. Using these funds, Caltrans must meet the post-construction treatment requirement and encourages the Districts to go above these requirements to achieve compliance credits.

In past years, Caltrans had very prescriptive individual requirements and 84 ways of doing business to meet TMDL requirements. These were very basin plan/watershed-specific, addressed Caltrans waste load allocations, and had varied timelines ranging from 10 to more than 30 years. Caltrans used a three-pronged approach to retrofits (SHOPP and capital projects), institutional controls, and public education (such as the previous "Don't Trash California" and current "Protect Every Drop" educational outreach campaigns). The results were unsustainable. It was everything, everywhere, and difficult to prioritize.

In 2012, Caltrans started over and attempted to employ a consistent, statewide approach. The timeline for compliance was 20 years. Caltrans performance measures are called "compliance units." One compliance unit is equal to 1 acre treated of Caltrans right of way, a credit received upon programming a project. However, there were too many variables between project programming and project construction, so Caltrans accepted the credit following construction completion. This was a great way to achieve compliance with TMDLs, as Caltrans had to find performance measures. Of the 56,000 acres of the treatable right of way, there was some overlap between TMDLs, so it ended up being 33,000 acres. Dividing 33,000 by 20 years equals 1,650 compliance units—Caltrans' measure on an annual basis. This gave some flexibility in SHOPP for BMP retrofits, post-treatment requirements, and cooperative implementation agreements.

Attachment IV of the permit requires Caltrans to submit to the State Water Board a reach prioritization scoring matrix based on impairment status, Caltrans' contributing drainage area, proximity to the receiving water, and community environmental health impact based on eight pollutant categories used to identify different TMDLs. The permit allows participation in a grant program for compliance credit. $88,000 spent outside Caltrans' right of way earns the DOT 1 compliance unit. $88,000 is based on

Caltrans' average cost of implementing a BMP is $176,000, so 2 compliance units are received for the cost of building a BMP.

Most Caltrans TMDLs are in the northern part of the state (trash and mercury), but half are in the Los Angeles region, which includes the entire suite of TMDLs. Caltrans has programmatic agreements with third parties in the form of cooperative implementation agreements, which have been highly successful. Caltrans works with local agencies often and develops informal selection criteria to determine what projects to fund.

The section criteria are as follows:

1. Reach priority list (posted on the State Water Board website. Caltrans has to be a listed stakeholder in the TMDL. There are about 300 reach priorities; Caltrans is looking at the top 100 for right now. What reach is the project located in and where on the priority list does it land?
2. Number of pollutant categories treated (list TMDLs) include: 1) sediment, nutrients, mercury, siltation, turbidity; 2) metals, toxics, pesticides; 3) trash; 4) bacteria; 5) diazinon; 6) selenium; 7) temperature; and 8) chloride.
3. Project stage (conceptual, environmental documents and permits, design); is the project conceptual? What environmental documents and permits been obtained? Is the project in design? Project schedule and funding requested by local MS4s include project schedule and total funding (show funds broken down by fiscal year).
4. Maintenance and operation costs, design support cost, and capital cost. Will the maintenance and operation costs be solely borne by the MS4?
5. Number of stakeholders benefitted from the project how many local MS4s will benefit from the project? please list MS4s.
6. What amount (acres) of runoff from Caltrans right of way (if any) will be treated?
7. Lead agency – Will Caltrans be dealing with an individual MS4, JPA, stakeholder group?
8. Type of BMP to be built (e.g., full capture, reuse, etc.)
9. Number of acres treated (BMP type, dry and wet weather flows, etc.)

Caltrans developed a "generic" cooperative implementation agreement and submitted it to local agencies. Council approval has been the only impediment to implementation; overall, it has expedited the review and approval time between Caltrans and individual MS4 agencies. Funding availability (if any) will be determined March/April of each fiscal year. Funds are not an annual allocated amount but a part of Caltrans' stormwater operating expenses. Funds encumbered for projects need to be used within three fiscal years, including the year encumbered.

After the presentations, the panelists addressed the questions submitted by the attendees.