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May 31, 2000

Ms. Elizabeth M. Jennings, Esq.
Office of Chief Counsel
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-0100

And,

Mr. Xavier Swamikannu
Storm Water Program
California Regional Water Quality Control Board – LA Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013

Dear Ms. Jennings and Mr. Swamikannu:

Enclosed are several items that may help you understand the goals attributed to Maryland's stormwater management program. The Maryland Department of the Environment is nearing 20 years worth of experience in administering an urban runoff program. Some basic tenets of the program and the successes and failures are described in the three reports provided.

Additionally, a brief background summary is provided in order to explain the transition we are making from current requirements to those proposed in the "2000 Maryland Stormwater Design Manual." This summary also helped to better answer the design and performance standards questions that you posed regarding stormwater management in our State. We hope this material will be of some use to you.

If you have any questions or need any more information, please call me at 410-631-3543.

Sincerely,

Brian S. Clevenger
Water Management Administration

w\Enclosures

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MARYLAND'S STORMWATER MANAGEMENT PROGRAM
SUMMARY

Introduction

The State of Maryland has recently completed the development of the "*2000 Maryland Stormwater Design Manual*" (Manual). This document took nearly 5 years to compose and is intended to improve the State's stormwater management program that has been in existence since 1982. The Maryland Department of the Environment, Water Management Administration (MDE/WMA) provides here a synopsis of Maryland's program's evolution over the last 18 years. This summary will provide the perspective needed to answer questions regarding programmatic goals, performance standards, and strengths and weaknesses. Apologies for the lack of brevity.

Background

Maryland's stormwater management program was a logical progression from its erosion and sediment control efforts. The Attorney General of the State declared "sediment" a pollutant in 1969. The next year a statute was passed that required sediment control practices to be implemented for any earth disturbing activities over 5,000 square feet. Maryland's erosion and sediment control program was implemented statewide by local government beginning in 1970.

The next step from controlling runoff from grading and construction would obviously be controlling runoff after development has been completed. This progression then, is stormwater management. Recognizing that urban runoff was a contributing factor to water quality degradation, the Maryland legislature passed the Stormwater Management Act in 1982. This law, and commensurate regulations adopted the following year, sought to ensure that pre-development runoff characteristics were maintained after development.

During the mid 1980s when Maryland's program was first conceived and implemented, the prevailing attitude was that if peak discharge increases caused by urbanization were controlled, the receiving waters would be protected from excess volume, increased velocities, channel erosion, sedimentation, flooding, etc. Therefore, Maryland's program was, and is currently, based on this flood control perspective. Current State regulations require that all new development project designs include provisions for reducing peak discharge increases for the 2 and 10 year frequency storm events back to pre-development conditions. Clearly, this requires a best management practice (BMP) approach and typically, the BMP of choice is a pond.

Because of the prevailing attitudes regarding how best to control stormwater (e.g., flood management), very little specific design criteria were included in Maryland's stormwater management program. The approach taken, and the one we work under currently, was a "preferred practices" list. State regulations require that infiltration be considered first and, if not feasible, the designer would then progress through a list of BMPs each with lesser water quality efficiency than the one previous. In latter years, rules-of-thumb for water quality design were implemented sporadically throughout the State (e.g., one half inch times total site

imperviousness). However, Maryland still operates under its original design criteria (e.g., 2 and 10 year management and the preferred practices list).

Chesapeake Bay Protection and Environmental Awareness

Given the above historical explanation, several points need to be made that will provide other factors affecting program implementation and help explain why a major change of philosophy has been contemplated with the Manual. First, it cannot be overemphasized how much Chesapeake Bay restoration efforts play on bringing to the forefront environmental concerns, especially those related to water quality. Chesapeake Bay garners much attention in the State, region, and, arguably, the world for protection and restoration. This was the case in 1983 when the Six Bay states and Washington, D.C signed the original "Chesapeake Bay Agreement." Therefore, the protection of this valuable resource was very much a factor for implementing an urban runoff program.

Another factor contributing to Maryland's stormwater management program development was the groundswell of environmental awareness caused primarily by nutrient enrichment of the Chesapeake Bay. Nutrient reduction goals, wetland protection, and sediment control all served as catalysts for grass roots organizations to bring to light the importance of environmental issues. This public and sometimes political support cannot be overlooked.

Technical Program Improvements Needed

Finally, because of over 12 years of program oversight and experience, changes with our program were clearly needed in the mid 1990s. Some issues have been mentioned above (e.g., no specific water quality design standards; too much flood control emphasis). However, explaining a couple of technical issues related to our program will address questions regarding stormwater management program goals and specific issues such as redevelopment.

As originally conceived, the State program makes no mention of where new development takes place. Nor does it specify what land use types are affected. If 5,000 square feet of earth is disturbed with new development, you must address stormwater runoff. This would presumably include redevelopment or in-fill situations. However, as with most regulatory programs, Maryland's stormwater regulations contain exemptions and allow for waivers provided certain conditions are met. Since 1982, certain projects have been waived depending on hydrological circumstances. Three major waiver categories have been allowed and these demonstrate the flood management program emphasis on which the program was founded. These categories are:

1) Less than a ten percent increase in the pre-development 2 year storm event,
2) Direct discharges to tidewater, and
3) Projects completely surrounded by an existing storm drain system of sufficient capacity to convey the increase in discharge caused by the new development.

The emphasis on peak management and flood control is quite obvious. It was MDE's want to change this emphasis when regulatory changes were proposed and the Manual was conceived in

1995. Beginning with the Manual's composition, the issue of stormwater control for redevelopment projects was debated vigorously.

The above waiver provisions that local jurisdictions applied to certain "new development" caused most redevelopment and in-fill work to avoid BMP implementation. A fast food restaurant built in the corner of a shopping mall parking lot would surely not change hydrologic characteristics, especially peak discharge. Additionally, this and similar urban "redevelopment" would most likely be surrounded by an existing storm drain system of adequate capacity. Therefore, most redevelopment is waived under Maryland's original and current stormwater regulations. This was an additional reason why MDE felt improvements were warranted.

Summary

Under increased environmental awareness caused by Chesapeake Bay protection concerns, Maryland instituted a stormwater management program that emphasized peak flood management for new development projects disturbing 5,000 square feet of earth. Relatively little specific water quality control design criteria were included in original regulations as a "preferred practices" list was used. With an obvious flood control emphasis, most redevelopment projects were waived because pre-development hydrologic conditions remained after construction completion.

With over 12 years of program implementation experience, a recognition that improved water quality management was needed, and a need to eliminate many waivers of stormwater management requirements for such things as redevelopment, MDE developed the "*2000 Maryland Stormwater Design Manual.*" This document, along with major regulatory modifications, is intended to address many of Maryland's stormwater management program weaknesses. When adopted later this year, major improvement to controlling urban runoff is expected.

POLICY STATEMENT ON CONTROLS AND REQUIREMENTS FOR NEW DEVELOPMENT AND REDEVELOPMENT IN THE STATE OF MARYLAND

i) Why did your state elect to have requirements on new development and redevelopment?

In 1982, restoration and protection of Chesapeake Bay was one of the most important factors contributing to the development of Maryland's stormwater management program. Heightened environmental awareness and a recognition that urban runoff contributed to water quality degradation combined to produce a program that emphasized peak flood control. Because of this emphasis on peak management, typical redevelopment projects were often waived from stormwater controls.

To address various program shortcomings, MDE development the "*2000 Maryland Stormwater Design Manual*" (Manual). This document is intended to provide better water quality control, an area not specifically addressed currently. Relative to redevelopment, the choice to impose requirements was based primarily on "everyone contributes runoff, everyone ought contribute

management." However, a balance between management contributions for environmental purposes, and, practical requirements that make economic sense must be struck. Everyone should contribute management. However, conventional BMPs (e.g., ponds) are not feasible in major metropolitan areas where land values prevent typical management strategies. Flexibility is key.

ii) Does your state have design standards and performance standards for treatment control BMPs for new development/redevelopment?

Currently, there are no performance standards for BMPs only design standards. Maryland requires that BMPs be designed to maintain pre-development peak discharges for the 2 and 10 year storm events in most of the State.

Maryland's proposed Manual contains both design standards and performance standards.. A suite of design volumes has been developed to address recharge (Re_v), water quality (WQ_v), channel protection (Cp_v), and overbank flood protection (Q_p). All of these volumes need to be included in new development designs. Additionally, BMP performance standards are implicit in Maryland's proposed Manual. Based on pollutant removal efficiency studies, all BMPs in the Manual have been equated in terms of efficiency. If a BMP is designed according to the criteria specified in the Manual, an 80% total suspended solids (TSS) and a 40% total phosphorus (P) reduction will both be realized. In fact, this 80:40 criteria is used to judge whether new technology is allowed to be used to address the required suite of volumes above. If the proverbial "new mousetrap" can meet 80% TSS and 40% P removal, it can be used as a stand alone BMP.

iii) Do you have thresholds for new development and or redevelopment (impervious area; size; etc.) for requirements to apply?

If a project disturbs 5,000 square feet of earth in Maryland, the site design must address stormwater management.

iv) What development categories do the requirements apply to [i.e. commercial; parking lots; residential, etc.]?

There are no specific development categories. If you disturb 5,000 square feet with any new development, you automatically are included. State regulations, however, do "exempt" agricultural land management activities.

v) How long have such requirements been in place? Are they statewide or region specific?

Stormwater management has been on the books since 1982. This is a statewide program that does have design variations based on hydrologic areas of the State (e.g., no 10 year management requirements in the Coastal Plain on our "Eastern Shore."

vi) Have the design standards and performance standards unduly burdened cities and builders with unsupportable costs? Has compliance been difficult? Has change been for the better or have you seen none? Any noticeable improvements in water quality?

All of these questions have been, are, and will not doubt continue to be debated. Volumes could be written to explain perspectives for burdens, costs, compliance, or noticeable improvements. To avoid this, some very random thoughts about these issues.

Generally, the answer to all of these questions could be "it depends on whom you ask" or "it depends on where you ask it." Maryland has three distinct geographic areas. These are a "Western" section; a central, "Urban" area; and our "Eastern Shore." The Urban area houses most of the State's population; can be defined in terms of the corridor between Washington, D.C., Baltimore, and toward Philadelphia, PA; and, not coincidentally, contains the most sophisticated stormwater programs in our State. It is not uncommon for a central Maryland county to have 8 or 10 plan reviewers and as many field staff dedicated solely to stormwater functions. The burden on these places currently is minimal.

As you travel west or east from this Urban region, the stormwater programs locally tend to become more burdensome. There is less sophistication technically, less resources, and obviously less compliance. In Western Maryland and on our Eastern Shore, localities may only have a single staff person to perform both review and inspection. The burden associated with changing to the proposed Manual in these regions will increase dramatically. However, again, it depends on whom you ask.

Environmental groups have told us we are not doing enough and have actually demanded "zero discharge" from new development. Developers and builders believe we are making them do too much now and are severely questioning our proposed changes and the Manual requirements. Frankly, and with tongue only partially in cheek, we believe we are close to where we need to be with the Manual because we have aggravated an equal number of people on both sides of this regulatory fence.

Some really random thoughts:

- In the beginning of the program (circa 1982), the design standards were very burdensome. Localities had to hire staff and purchase vehicles and equipment. Developers endured the added cost of BMP construction.
- Currently, stormwater management on both sides is a routine part of the development process.
- Compliance varies with the level of resources and the distance from Urban Maryland as described above. One difficulty we do have is the interpretation of the same requirement differently from locality to locality.
- We have seen only modest water quality improvement. This is expected to change dramatically with our Manual.

vii) Typically, what is your estimate of the range in additional cost (in percent of project cost) that the requirements have imposed on builders?

Obviously, this depends on that real estate saying "location, location, location." However, currently, stormwater management for 2 and 10 year control ranges from 0% to 20%. We have proposed to make optional the control of the 10 year storm. Because "lots are money" and "more stormwater means less lots," costs are anticipated to decrease about 20% of current costs without 10 year management. Costs will increase commensurately with 10 year management under the Manual.

viii) How have municipalities ensured that the post construction BMPs O & M has been provided and/or BMPs are properly maintained?

Operation and Maintenance Agreements are required as a condition of plan approval and permit issuance. Localities are required by State regulation to inspect and cause to be maintained BMPs every three years. Some jurisdictions assume ownership of BMPs. This is best for ensuring future maintenance. Other localities require private ownership, which makes it difficult for requiring maintenance due to the limited resources of entities such as homeowners' associations.

ix) What are the policy goals that the standards are intended to achieve (reverse impairment; hold the line; etc.)?

Basically, the best way to describe our proposed program's goal is to minimize damage caused by urban runoff. For us, this boils down to basic hydrology. When you change natural conditions to developed conditions, bad things happen to water quality. We also know that all soils have some recharge value, sustained bankfull discharges create severe channel erosion, and minimizing impervious surfaces is the best way to mimic pre-development hydrology. Therefore, we are hoping to change how development occurs. Hopefully, we can incorporate water management early in the site design process rather than having a BMP placed at the bottom discharge point of a site as an afterthought.

Individual volume goals and design criteria:

1) Recharge (Re_v) – mimic existing annual groundwater recharge rates.
2) Water quality volume (WQ_v) – 80% TSS removal (a Coastal Zone Management Act requirement), 40% P removal (a Chesapeake Bay Program goal), and treatment of 90% of the average annual rainfall.
3) Channel protection volume (Cp_v) – the 2 year storm control policy has actually created more channel erosion in some cases. This method sustains bankfull discharges over a longer period of time. Therefore, more frequent storm event control is essential. We are choosing the 1 year storm using extended detention. This is delaying the 1 year storm's inflow hydrograph by 24 hours.
4) Overbank flood protection (Q_p) – 10 year storm control is optional provided no additional downstream flooding occurs.

5) Redevelopment – the goal is to reduce by 20% the total site imperviousness. If not feasible, BMPs elsewhere in the watershed, stream restoration, fees paid are all acceptable but subject to local approval.