

IMPLEMENTING STORM WATER DEVELOPMENT REGULATIONS – EXPERIENCES IN GWINNETT COUNTY, GEORGIA

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Abstract. Gwinnett County, Georgia received a National Pollutant Discharge System (NPDES) Phase I Municipal Separate Storm Sewer System (MS4) storm water discharge permit in 1994. Over the last 10 years, Gwinnett has learned several lessons on what has worked for us and what has not worked. As municipalities strive to implement the storm water management programs, it is important that we share this kind of information among ourselves.

Gwinnett implemented new Post-Construction storm water management regulations similar to the four storm water management design criteria found in the Georgia Storm Water Management Manual in November of 1999. The keys to a smooth implementation are public participation, training, and having procedures and checklist ready before the regulations are effective. Based on our experience the most important storm water management (SWM) best management practices (BMPs) are plan review, construction site inspections, erosion control, channel protection and as-built inspections.

INTRODUCTION

EPA promulgated rules in 1990 under the Clean Water Act that required municipalities to implement storm water management programs within their jurisdictions as a part of the National Pollutant Discharge Elimination System (NPDES). The last step identified in the Storm Water Phase II Final Rule was to require jurisdictions with a population of less than 100,000, known as Phase II communities, to obtain a Municipal Separate Storm Sewer System (MS4) Storm Water Discharge Permit by March of 2003. The six minimum criteria of the NPDES permit are: Public Education, Public Participation, Water Quality Protection, Construction Site Pollution Control, Post-construction Storm Water Management, and Operation and Maintenance. Gwinnett County is classified a Phase I municipality and was required to obtain a NPDES MS4 storm water discharge permit in 1994. In addition to the six minimum criteria, Gwinnett also has Planning and Monitoring program elements (Chastant, 2003).

Gwinnett County added Post-construction Storm Water Management requirements to the development regulations in April of 1999. Our regulations include the six model

ordinances adopted by the Metropolitan North Georgia Water Planning District. The District's model ordinances are:

- Post-Development Stormwater Management
- Floodplain Management
- Conservation Subdivision / Open Space Development
- Illicit Discharge and Illegal Connection
- Litter Control
- Stream Buffer Protection.

Our experiences with implementing these regulations could help other municipalities develop their own Storm Water Management program or at least advise them of problems they may face. To help compare our program to other municipalities, Gwinnett County has a land area of 437 square miles with a population of over 700,000. The county has been growing by over 20,000 people a year and since 1980 has increased the resident population by a factor approaching 6.

IMPLEMENTATION

The keys to implementing new regulations are public participation, training, checklists, and procedures. One may become tired of hearing about the importance of public participation, but the value cannot be understated. When we developed our Watershed Protection Plan and implemented the first water quality regulations, Gwinnett County created special citizen advisory groups. We also had and still have two committees that review any proposed regulation revisions. Input from these two committees helps Gwinnett create rules that are understood by the regulated community, can be practically implemented, and minimize unforeseen impacts.

Training never seems to stop. Developers, designers, staff and inspectors should all be included in the training. The review staff and inspectors need training because they are the people that see that the rules are put into practice.

Checklists and procedures should be developed and ready to use the day the regulations go into effect. Although the regulation may be in place, if no one is checking to see that the regulation is done, chances are that it will not be done. Unfortunately, designers seem to

design to the checklist instead of the regulations. In addition, the process to follow up on the requirements from plan submittal, review, inspection and project sign off must also be in place.

Our experience with Residential Drainage Plans (RDPs) is an example of the need for procedures to be in place. Gwinnett County has had a requirement for RDPs for several years on lots that had floodplain or drop inlets on them. The existing procedure was that the Storm Water Management Division would approve the RDP before the building permit was issued. Then the procedure stopped and did not include who was responsible for a field inspection or how the inspection was recorded. As a result, RDPs were often not followed in the field. After a few threats of a law suit, we revised the regulations and procedure to include an inspection and certification by a design professional before the certificate of occupation could be issued on the house. In implementing this regulation, however, the training of staff was not as complete as it should have been and the start of the requirements was not as smooth as hoped.

TOP SWM CONTROLS

The top development storm water management controls are the ones that do the most to protect the streams for the least amount of resources. The top controls are plan review, erosion control inspections, BMPs that detain the 1-year storm for 24 hours, and BMP as-built inspections.

Unfortunately for the professional disciplines, my experience has been that without plan review, prescriptive regulations, site inspections, and as-built inspections, the county has no guarantee that we are getting the end product that is required. Without adequate oversight, engineers and developers are pressured to lower their standards to compete in the market place. I often hear the call for performance standards and not prescriptive regulations as in a recent article by Bowser, 2001. The problem is that the engineers and developers do not take responsibility for their design and construction. In this age of corporations created just for the life of the development and designers who are forced to limit their liability in order lower their fees, there is no one left to take responsibility for the design or construction once the homes and buildings are released for occupancy. By performing review and inspection, however, the County may be inadvertently shifting the burden for quality work onto the county. All too often the blame for an engineer's or contractor's work is misdirected on the County.

My best example of this issue is the as-built surveys we require for SWM BMPs. We have required these as-builts for years as a means to ensure that the contractor was building the BMPs correctly. Without surveying the BMPs, it is impossible to determine if the stage-storage and stage-discharge relationships are correct. We

received the surveys and the studies that always said that the facility was built correctly, but a subsequent visit in the field would invariably show that the facility was not built correctly.

We revised the SWM BMP acceptance procedure to include a final inspection after the as-built was received to see if the facility looked like the drawing submitted. If not, we send a letter to the surveyors and engineers asking for an explanation and threaten to report them to the professional license board. When we started, we received many angry responses to our letters and the most common explanation was that the contractor promised to do the work so they turned the as-built in. The new procedure has improved the quality of the BMPs tremendously and only supports my belief that an independent check must be made when the ultimate owner is not the designer, contractor, or developer.

MOST DIFFICULT CONTROLS TO IMPLEMENT

The most difficult regulations to implement continue to be stream buffers, erosion control, redevelopment, and water quality design and construction. All of these regulations add cost to the development without a perceived end value to the developer. Stream buffers have been the lightning rod of the regulation revisions. While redevelopment has not been controversial during regulation development because redevelopment is not a large segment of the market, it is extremely difficult to implement.

Stream buffers drastically affect development since they dictate the size and shape of the developable land. The biggest controversies have been over the definition of a stream, on-stream detention, and what mitigation if any is appropriate for buffer disturbance. Enforcement is also a large issue because the engineer is relied on to locate and identify the streams and they are being paid to develop the property to its maximum potential. In addition, a plan may not show a buffer encroachment like a deck, but once the development is approved and homebuilders start building on each lot, it is difficult to regulate an encroachment like a deck. A deck can go up in a day and once it is up, it is difficult to require the removal of it.

One problem with on-stream detention is the lack of agreement on the impact to stream health. No one can deny that the type of ecological environment changes when a stream is converted to a pond, but does that pond adversely affect the rest of the stream and how much conversion of the length of a stream to a pond can be tolerated by the stream ecology. Another issue is how effective on-stream detention is in improving water quality or lowering peaks and what volume is needed to affect this result.

Erosion control is difficult to regulate for two reasons. The regulations are a performance standard and so during plan review the reviewers can only ask for basic items. There is a design standard for the individual construction BMPs but not a design for the site. This often leads to problems in the field since the contractors have based their bids on the plans and when the inspectors in the field ask for more erosion controls measures. The contractors are understandably very reluctant to exceed what they have bid. The second problem is fines in the field must follow warnings. Basically there is no penalty for the contractors since the BMPs that the inspectors ask for should have been installed in the first place. The contractor who puts in the least is actually rewarded when the inspector does not ask for any extra BMPs. This shifts the risk from the contractor to the stream or property owner who is damaged when sediment leaves the site.

Redevelopment regulations basically require the developer to upgrade the detention and water quality mitigation requirements to meet current standards. Often developers are revitalizing an old shopping center or site that has been vacant for some time. Thus the developer's request for variance from the regulations falls on sympathetic ears from not only the county commissioners, but also from the citizens who live near the site or who are looking for jobs in their neighborhood. The developer's argument is logical when they claim that they are not making things worse. The area was paved before and it will be paved when they are finished. The counter argument to this is that the streams are damaged and continue to be damaged by the past development and only by mitigating this past development can the stream's health improve. The damage happened one site at a time and must be mitigated in the same way.

Water quality design and construction continues to be a problem to implement because the requirements are still new. Change is often difficult because it takes more time to do something that is unfamiliar to you and time is money to the engineer, contractor and developer.

SPECIFIC REQUIREMENTS

Some specific requirements we have implemented to solve problems were with regard to retaining walls, outlet control structure design, as-built inspections, residential drainage plans, and downstream investigations. In each of these cases, we had problems in the field and changed our regulations or procedures to address the problem.

With the cost of land increasing, it is becoming more common for detention pond embankments to be built out of a retaining wall instead of earth. Since these walls are usually built in low-lying areas, the soils are often poor. The combination of poor soils and special design requirements has led to several dam failures. We revised our procedures to require a certification by a geotechnical

engineer that the wall was inspected in the field and the wall construction is consistent with the design parameters.

Our initial design for the protection of the small orifices used for water quality BMPs included wrapping a perforated pipe with filter fabric. Unfortunately, the filter fabric clogged and water would not drain out of the pond. By eliminating the filter fabric and placing Number 4 stone around the perforated pipe we have minimized the standing water. We rely on the detention time in the BMP to settle the silt out of the water rather than filtering it out.

Two revised procedures were mentioned earlier. We revised our field construction approval process to include a final inspection once we received an as-built of the facility. This has greatly improved the quality of the facilities that are constructed. We also changed the approval procedure for lots with Residential Drainage Plans since they were not being followed in the field.

We were having problems with developments discharging into natural draws below the development with no defined channel or drainage easement on the draw. The development studies showed that the peak flow was not increased downstream, but the studies often did not address the fact that now the flow were concentrated. We now require pictures of the downstream receiving channel and may require additional measures such as obtaining easements and/or installation of a conveyance system by the developer if there is a potential problem.

CONTINUING NEEDS

Education will always be important, but it is crucial when beginning a program. Everyone including the developer, designer, reviewer, contractor, and property owner needs to understand what is trying to be built and how it is supposed to function. Any one of the people involved can thwart the end value of the BMP. Helping people understand the complexity of water quality design is a part of education that needs to occur. The design requirements to mimic the natural system require more attention to detail than most contractors and inspectors are familiar with. Such designs are not well suited to current construction practices.

Detailed studies are needed to determine if the structural BMPs that are being specified really do function as desired. Developers are spending great sums of money on the BMPs and regulators are depending on the BMPs to keep the streams in their jurisdiction healthy. Studies to improve their efficiency and their constructability need to be performed.

The long-term maintenance of the BMPs must be addressed. While development regulations can require that they be installed, only a program that follows up and requires the maintenance of the BMPs will insure that the BMPs are effective. While Gwinnett County has such a

program, the needs are large for funding, staff and management support.

A better way of holding the designer and contractor responsible for their work needs to be developed. Current practice allows contractors to have limited liability shell companies build the development that subsequently dissolve. Designers appear to be counting on the fact that if a real problem occurs with a development, the plaintiff will most likely sue the local government since they have more resources to remedy the situation. This problem of responsibility is linked to the problem of have performance criteria versus proscriptive regulations as discussed above.

As mentioned above, enforcement for erosion control and other development violations needs to omit the notification stage and go straight to a fine. A notification phase is reasonable when regulations are first implemented, but erosion control regulations have been in place for 30 years and not knowing the requirement is no longer a reasonable excuse for not having the measures in place.

All of the issues above are reasons for being concerned about low impact design. Low impact BMPs are even further complicated by the fact that soil conditions are often critical to the design and the soil type can not really be verified until the BMP is constructed in the field. In addition, these BMPs, such as infiltration trenches and rain gardens, often have underground components that cannot be verified once the BMP is constructed.

When infiltration BMPs should be constructed is an issue. If the land developer installs them before the houses are constructed, then it is very likely that the BMPs will be rendered ineffective from sediment leaving the house construction sites and clogging the filtration material. If the house contractors install them on each house site after the house is built, then an army of inspectors is needed.

Another issue with low impact designs is the number and location of these BMPs. The BMPs will need to be inspected to insure they are built properly and that they continue to operate properly. The number of small BMPs on private properties is a potential inspection and maintenance nightmare. Having the BMPs on private residential property is also an enforcement problem. The obvious solution is to have BMPs that the public wants and is willing to maintain. The public does not want the current LID solutions that require ditches and shallow ponding areas on their property. Bio-retention areas (rain gardens) hold promise, but no development has used them for water quality in Gwinnett County.

SUMMARY

Current state and federal regulations will require local governments to implement stricter quantity and quality

controls. Hopefully Gwinnett County's experience can help other jurisdictions. We have specifically revised our procedures to address problems with retaining walls, outlet control structure design, as-built inspections, residential drainage plans, and downstream investigations. There are many challenges ahead concerning the implementation of low impact designs and improving the review and enforcement procedure. Sharing ideas, requiring responsible design and construction, and educating everyone involved can solve these issues.

LITERATURE CITED

- Bowser, Clark. 2004. "Why Stormwater Management." Stormwater September/October 2004: 8-9.
- Chastant, David. 2003. "Watershed Protection Plan Implementation In Gwinnett County, Georgia. Proceedings of the 2003 Georgia Water Resources Conference, held April 23-24, 2003, at the University of Georgia, Kathryn J. Hatcher. Editor, Institute of Ecology, The University of Georgia, Athens, Georgia. Metropolitan North Georgia Water Planning District. Model Stormwater Management Ordinances. 2002. October 3, 2002.
- Storm Water Phase II Final Rule. 2000. United States Environmental Protection Agency Office of Water. EPA 833-F-00-001 January 2000. <<http://www.epa.gov/npdes/pubs/fact1-0.pdf>>.