

**DCR Stormwater Management Regulation Revision Process
Water Quantity Criteria Work Group Meeting #2
May 20, 2008
Patrick Henry Building
State Capital Complex
Richmond, VA**

Water Quality Control Criteria Workgroup Members Present

Randy Bartlett, Fairfax County
Joe Battiata, Contech Stormwater Solutions
Doug Beisch, Williamsburg Environmental Group
Michelle Brickner, Fairfax County
Glen Brooks, Albemarle County
Scott Crafton, DCR
Daryl Cook, James City County
Jeff Cowan, Dewberry & HBAV
Mike Gerel, Chesapeake Bay Foundation
Lee Hill, DCR
Steve Kindy, VDOT (for Roy Mills)
Sarah Lawson, Cabell Brand Center
Ved Malhotra, P.E.
Jon Matusik, The Engineering Group and ESI
Fernando Pasquel, Baker Engineering
Michael Rolband, Wetland Studies & Solutions
Ridge Schuyler, The Nature Conservancy
John Tippet, Friends of the Rappahannock
Keith White, Henrico County

Water Quality Control Criteria Workgroup Members Not Present

Dr. Joanna Curran, University of Virginia
Joe Modica, Kimly Horn & TBA
Pete Rigby, Pacculli Simmons & NVBIA
Dan Sweet, VHB

DCR Staff Present

Ryan Brown
Michael Fletcher
Christine Watlington
Chuck Deitz
John McCutcheon

Others Present

Elizabeth Andrews, Office of the Attorney General
Dr. Gregory Hancock, William and Mary
Dave Hirschman, Center for Watershed Protection

Introductions/Logistical Items

Mr. Crafton called the meeting to order. He noted that several documents had been sent to members and that copies of the work plan document as well as information pertaining to Dr. Hancock's study were available. These documents are available from DCR.

Mr. Crafton introduced Dr. Greg Hancock, Associate Professor of Geology at the College of William and Mary and also a Director of the Colonial Soil and Water Conservation District. He said that Dr. Hancock's group has been monitoring stormwater management facilities in James City County. Dr. Hancock will present some of the group's findings.

Presentation on Detention BMP Research

Dr. Hancock thanked the working group for the opportunity to present. He also thanked Daryl Cook of James City County. He said that James City County had been very open and supportive of the study.

Dr. Hancock said that he would be talking about water quantity control. However, the focus of the study has been on both water quantity and water quality. He noted that the document distributed focuses more on the water quantity issues.

He said that the work he was addressing had been done by a variety of undergraduate researchers at the College of William and Mary. He noted that the study has been funded largely by the Virginia Water Resources Research Center at Virginia Tech.

Dr. Hancock said he would address the Department's motivations for the study, how outcomes and outflows were measured, and what the measured flows look like when compared to design flows for engineering designs that went into constructing the pond, as well as to natural flows.

Dr. Hancock said that there are relatively few studies of as-built performance of retention ponds, in terms of stormwater quantity, that allow an evaluation of how the ponds are performing relative to both design and regulation.

He said that James City County has a relatively progressive standard for stormwater control that includes the retention of the 1-year, 24-hour storm for a 24-hour period. He said that one of the things that James City County was interested in was trying to evaluate whether that detention period is occurring in these ponds and whether it is helping with stream protection.

Dr. Hancock said there are known issues with retention pond performance. Some of those include:

- focusing on reducing peak flow rather than total volume flow
- unlikely to mimic natural flow
- maintenance is essential on many of these retention ponds
- studies have shown that if there are multiple retention ponds at the watershed scale, the combination of flows may negate the benefits of any individual pond

Dr. Hancock said that very few of these observations have been based on studies that involve the collection of inflow and outflow data. Studies are typically based on a relatively limited data set. He said a motivation of the study was to collect data to more thoroughly evaluate some of these concerns.

Dr. Hancock said that some of the research questions were:

- Do these constructed ponds actually protect the streams as they are intended to do?
- Do these ponds function in a manner that is consistent with the way they are designed?
- Do these ponds actually meet the regulatory requirements?
- Do these ponds mimic natural conditions?

Dr. Hancock gave an overview of the research. He said that the retention ponds were very important components of the hydrologic cycle.

He said that a number of ponds within James City County have been investigated. These retention ponds are fairly standard wet retention ponds located in typical suburban developments.

In addition to making measurements in the retention ponds, there is also a forested watershed used as a reference condition. This forested watershed of about 70 acres is much larger than the urban watersheds being monitored. The reason for that is that it is very difficult in this area to find a stream that is supported by drainage areas as low as any of the areas being studied.

Dr. Hancock reviewed how the measurements of inflow and outflow to the ponds were done. In each of the ponds a stilling well has been installed. In that stilling well there is a pressure transducer that is recording the height of the water within the pond. That data is recorded on a data logger, and the elevation of the pond is tracked every five minutes.

With that measurement of the pond water elevation and using the rating curves from the design plans, a relationship is established between the elevation of the pond and the outflow from the pond. In addition, by measuring the elevation and using the designs, a relationship can be established between the elevation of the pond and the volume of the

pond, which shows how the pond is changing through time. With information regarding the pond volume and the pond outflow through time, the inflow to the pond can be calculated.

Dr. Hancock reviewed some of the results from the study. A copy of the graphic representations of these results is available from DCR.

Dr. Hancock said that there is never actually a perfect one-year storm, which means that there cannot be a comparison between the 1-year, 10-year, and 100-year storms. But the data can be used to assess how the ponds would perform should a storm like that occur. He said that many storms do not exceed the 1-year, 24-hour storm. There are many peak outflows that do not exceed what is anticipated. However, he noted storm events where there was a peak outflow from the pond that was larger than predicted for the rainstorm that generated the outflow.

Dr. Hancock reviewed the retention time criteria that James City County uses. These graphic representations are available from DCR.

Dr. Hancock reviewed the Issues with Pond Performance:

Retention pond design:

1. Estimate pre- and post-development surface conditions (e.g., runoff coefficients, curve numbers, drainage area) - **may not adequately predict runoff**
2. Design pond to retain runoff from one-year, 24-hour storm for 24 hours (*primary James City County criteria*) - **should not use Kerplunk method to achieve**
3. Determine runoff from less frequent storms (10-yr, 100-yr) and design outflow structures to accommodate - **focus on passage of water, not retention**

Dr. Hancock gave the following conclusions:

- Measured pond inflows frequently exceed design inflows
- Measured pond outflows frequently exceed design outflows
- Measured retention times suggest required 24-hour retention is seldom achieved
- Observed pond outflows do not mimic natural flows
- Stream protection provided by retention ponds is not adequate
- Some causes: minimal regulatory review, inappropriate pond design strategies, and poor maintenance

A member asked if any consideration was given to 6-hour storms that might be of a higher intensity.

Dr. Hancock said that the study only focused on 24-hour storms. He said that some of the storms were more intense, some less. He said that a shorter duration should be considered, but that the regulatory goal is the 24-hour storm.

A member asked if any of the designs stopped at a minimum size.

Dr. Hancock said that in order to avoid the possibility of having a small orifice clog, the size was limited to no less than three inches. He said the alternative would be to make the pond bigger. The outflow coming out of the pond was calculated based on the three-inch orifice.

A member asked if everyone in the group used the centrally offset method.

A member said that the simplicity of the Kerplunk method had previously ruled the day. He said that in paper exercises, the different methods did not reveal a significant difference.

A member said that in the guidance, if using a 24-hour draw down on a site would yield something less than three inches, the idea was to choose a different type of BMP. He said there were a lot of conflicting strategies and that some just would not work depending on the size of the drainage area - at least not without making the pond area larger.

Mr. Crafton thanked Dr. Hancock for his presentation.

Discussion of Work Plan Topics

Mr. Crafton said at the previous meeting the group had asked staff to develop a work plan. He said that several members had provided comments. Mr. Hirschman had commented on all areas of the plan. The result was the work plan document was distributed to members.

Mr. Crafton said the intent would be to work through as much of the agenda as possible and resume the discussion at the May 27 meeting. He noted that the first meeting of the full Technical Advisory Committee was scheduled for June 10.

Mr. Crafton said that the intent was to complete the work of the group and provide the TAC with some solid recommendations based on consensus of the group.

Mr. Crafton said that in terms of the regulatory thresholds, he added the following question: *Should Virginia establish a requirement for groundwater recharge?*

Mr. Crafton said that when the TAC was meeting in 2007, members made a recommendation that a volume control or groundwater recharge requirement be added. He said that, at the time, the intent was to push forward to get a draft regulation before the Board in September 2007 and that topic was not addressed. He said that since there is some extra time now, he added that back in for discussion purposes.

Mr. Crafton gave a recap of goals from the work plan.

Develop criteria for managing the quantity of runoff leaving a development site so as to replicate the pre-development hydrology and runoff characteristics of the site as much as feasible by:

1. Providing for groundwater recharge to preserve the existing water table elevations, thereby maintaining the hydrology of streams and wetlands during dry weather.
2. Preventing channel erosion.
3. Minimizing nuisance flooding.
4. Establishing a consistent framework for incorporating the volume reduction credits associated with water quality protection into the criteria established for 2 and 3 above.
5. Keeping the basic criteria simple so that compliance methods are straightforward and understandable for local review staff and site designers with less training and experience; however, some flexibility must be provided for localities to allow more complex compliance methods, if they are willing and technically able to review such methods for compliance.

After reviewing the goals, Mr. Crafton returned to the question: Should Virginia establish a requirement for some level of groundwater recharge?

Mr. Crafton said that examples were provided. In the appendices included were the approaches used by Maryland and Massachusetts. The second section was the approach that Pennsylvania has recommended. However, he noted that the Pennsylvania approach is voluntary and not a regulatory requirement.

Mr. Crafton said that the Maryland method, because it is associated with runoff coefficients, is very similar to the volume reduction methodology that the Center for Watershed protection has developed. He said it might be easier to combine the two methodologies if a recharge requirement is included.

Mr. Crafton asked members to comment on whether the separate recharge requirement was needed.

A member said that he viewed groundwater recharge as a subset of the larger issue of shaving volume off of what is entering the stream. Groundwater recharge is one of the methods for doing that. However, he said the driving issue is reducing the excess volume that is causing the excess stream bank erosion. He said he would phrase the question in the sense of runoff volume control.

The member said that in the context of the Pennsylvania recommendation, it should be noted that they included additional tools for shaving off volume, such as evaporation and reuse. While these may be minimal, they are worth considering, as various tools are considered for the purpose of promoting and incentivizing volume reduction.

Regarding whether the approach the Center for Watershed put forward is adequate, a member said that he liked the approach and it incentivized and pushed folks toward the use of practices that would get water back into the ground.

The member said he has concerns with the 3-step approach where step 2 is to apply as much of the runoff reduction practices as possible, and step 3 says if results aren't achieved then ponds and other treatment practices would be applied to meet the rest of the requirements.

The member said that there appeared to be nothing in the regulatory requirements that would prevent going directly from step 1 to step 3. He noted that the argument had been given that it would be difficult to achieve the regulations without using the runoff reduction practices. He said that he was not convinced that was the case. He said the question was whether the innovation of runoff reduction could be avoided by going back to the same old way of doing things.

The member noted that the charrettes were focused on water quality design and trying to receive a certain pollutant load reduction. Participants in the charrettes were not tasked with achieving a certain rate. He said his concern was that this was another issue and that it involved more water that had to be retained to achieve a certain reduction rate at the site. He said that as he understood the runoff practices, they were generally shaving off the front of the hydrograph instead of the top and also that they were not particularly effective at pulling down the rate until the point of the hydrograph where the peak was located has been passed.

The member said that since discharge rates were not involved in the charrettes, the solutions weren't based in reality, because reality meant the need to deal with a certain rate coming off the site. Thus, when there are real rate control requirements, the issue of where to store the water would revert back to the need for ponds.

Mr. Hirschman said that it was hard to be conclusive. He said that at the charrettes there were some difficult sites and that it wasn't always possible for a team to go directly to step 3. He said regarding the issue of whether the runoff reduction practices reduce the peak, there was feedback during the charrettes that, if the State is going through this effort to put runoff reduction practices into place, there should be some kind of peak on the runoff control. He said that was in the work plan and that one of the substantial contributions the work group could make would be to say what is a justifiable and defensible way of doing distributed runoff to adjust the hydrograph to account for the distributed volume reduction practices. He said there were a variety of methods.

Mr. Crafton referenced the Milwaukee approach distributed at the previous meeting. He said that he had visited their website and that the proposal discussed is now a part of the City of Milwaukee's regulatory program. He said that methodology is being used and was apparently vetted by a group similar to this working group.

Mr. Hirschman suggested that this issue was a difficult starting place for the discussion. He said that the question would be whether step 2 is about runoff reduction as a requirement, or if there is a minimum level of due diligence with a broader definition of runoff reduction.

A member said that regarding the Maryland program, they are mandating design practices. They know that on higher impervious sites, that there will be a second pond or detention basin for peak flow rate control. The challenge is what is the value of those other methods when dealing with the larger storms.

Mr. Hill said that there was a need to be careful with the question of groundwater recharge. He said that with groundwater recharge, you need to consider if you are creating class five injection wells. He said the terminology was important.

Mr. Hill said that group must address the issue of recharging or infiltrating some portion of the runoff to groundwater. That is part of the overall reduction.

A member said that there should not be a regulatory requirement because the sites are variable. He said that the runoff reduction method encouraged getting rid of as much volume as possible.

Mr. Crafton said that his preference would be that the compliance solution would resolve the issue and that finding a solution would not demand a separate requirement.

A member asked for an explanation of a Class V injection well.

Mr. Capps said that a Class V injection well is an EPA classification subject to a separate permit and rule. It applies to improved sinkholes. You are actually injecting into and changing a system. It also can apply to any stormwater infiltration BMP that is not wider than it is deep. It may also apply to a distribution system, such as an infiltration BMP that spreads water out.

Mr. Capps said that when speaking of recharge, there is the issue of reuse. He said that you couldn't just inject water into the ground system that may or may not be polluted. Recharge has a different definition than infiltration. He said that would involve another permitting system over which DCR does not have authority.

Mr. Crafton suggested moving on to the next item: *Criteria for triggering channel protection requirements?*

Mr. Crafton said that there were four criteria suggested.

- a. Acreage, disturbed acreage, impervious acreage threshold?
- b. Shortcut hydrologic rule (ESC 1% rule, other)

- c. Actual site analysis – analyze site runoff and receiving channel to establish applicability
- d. Watershed position or other factors

A member asked what good the channel protection would be if the channel were too short to begin with?

Mr. Crafton said that once the threshold is passed, the operator is bound by the channel protection requirement.

A member noted the possibility of exemptions and said that it would be good to give regulatory discretion to the communities in implementing the program. If this is not in the communities' best interest, perhaps they could exempt this requirement.

Mr. Hill said that the law indicates that if there is an existing flooding or channel erosion problem, the developer must improve the situation.

Mr. Hill noted that under current requirements, flooding, erosion and adequate channels must be addressed. It is possible to ask for an exception to the stormwater requirement. He said that the group needed to address the question of accepting other minimum thresholds or some exemption criteria.

A member said that if the regulations include provisions for comprehensive watershed plans done by a locality, then the improvements that needed to be achieved with respect to the site could be addressed by participating in a comprehensive or regional program.

Mr. Hill said that would be an exception based on the watershed management plan that would then be approved as part of the overall package that the locality has.

Mr. Crafton said that DCR is concerned about how much discretion to provide. He noted that the larger counties have the appropriate staff to make those qualitative decisions, but smaller counties don't have those resources.

A member said that it wasn't possible to regulate against incompetence. DCR has to have the discretion to oversee the activities to make sure they are being done in a competent manner. The challenge is to write a regulation that sets forth standards that are achievable.

Mr. Crafton said that the rules and program handbook established by DCR need to be sufficient. He said it might be more appropriate to include those recommendations in guidance rather than the regulations.

A member said that the regulations need to have a process or a minimum methodology for getting a watershed plan approved.

A member suggested that there were two options. In the absence of a watershed plan or a local program, the regulations need to be specific. The other option would be for localities that have a program and that have created a watershed plan.

Mr. Hirschman said that where a locality wants to use alternative methods, they need to be based on a watershed plan. He said that he would note that channel protection is not synonymous with channel adequacy.

A member suggested the need to review and rewrite the MS19 regulations.

Mr. Hill said that at some point it would be necessary to open up the Erosion and Sediment Control regulations and amend the MS19 to be consistent. However, he noted that there is still a requirement for adequate channels and stormwater management.

Mr. Hill said that the working group should not be limited by what the MS19 regulations say. He said there is a need to look at the whole channel protection component, and that this working group needed to address water quantity from a standpoint of adequate channel. He said this group was charged with making recommendations to the TAC.

A member said that there is a need to establish criteria for item 2. There will be thresholds, but there is a need to have more than just one. He said that he had a list of items posed for discussion that could perhaps be addressed in a brainstorming session, then narrowed down.

Mr. Crafton said that the concern is the time frame. He suggested that members with ideas on the subject to expand the list of options provide those to staff prior to the next meeting. He said that the reality is that while this process was intended to improve the regulations and to make progress, not every action will be addressed. But with new research and information, those can be addressed in a future regulatory process.

Mr. Crafton said that his sense was that there would be some fundamental threshold.

A member said it might be helpful to define what some of those thresholds are.

A member said that it should be considered that small sites might have to be penalized. He asked if there was a way to measure relative peaks of discharge.

A member said that he would prefer to see the measure at the point of discharge rather than at the site. Another member noted that every discharge point from a site must discharge into an adequate outfall.

Mr. Crafton said the next step would be to develop a strawman proposal for the group to review.

A member said that it may be unrealistic to think that the group could address the issues prior to the first TAC meeting.

Mr. Crafton noted that the draft regulation has provisions that refer to locally adopted watershed plans approved by the Board. This authorized the locality to make exceptions to some of the water criteria if there is a watershed plan.

Mr. Hill said that it was the charge of the working group to address quantity, channel adequacy, and flooding. He said if the group could develop recommendations, staff would take them to the TAC. Otherwise the criteria would have to be developed in the context of the TAC meetings.

A member said that the concept of strawman language would help the group have a tangible product to move forward.

A member said that a lot of the discussion seemed centered on a 1-year storm. He said that perhaps the way to proceed was to agree on that portion and to work backwards from that.

A member said that the group should focus on what is wanted in general and then worry about the specifics.

At this time the group recessed for lunch.

Following lunch, Mr. Crafton addressed the issue of design storm. He said that a document sent to members was a technical document that supported the current Maryland uniform sizing criteria. That document is available from DCR. He invited Mr. Rolband to explain the analysis he had prepared for the group.

Mr. Rolband said that what he refers to as the energy method, Fairfax County calls the detention method. He noted that he was on the committee to help implement that method in Fairfax County. He said that a change in state law was needed to implement the method.

He said that a client had a redevelopment project. Wetland Studies was hired to do stream restoration for the redevelopment of the Vienna Metro station. There was a need to do several thousand feet of stream restoration.

Mr. Rolband said that the Homeowner's Association was opposed to the stream restoration project. He said that there was no allowance for any water to leave the site in order to meet the outfall requirements. No exceptions are allowed in Fairfax County.

He said that the peak flow rate multiplied by the volume measures the proportionate energy going into the system. He said that when volume is increased, there is a need to halve the peak flow rate. That is the fundamental concept of the energy balance method.

For the analysis, Mr. Rolband said that he used the 1.5-year storm. He said that he thought the energy balance method should use a design storm somewhere between the one and two year method.

Mr. Rolband said that when the law was changed to support this, there were many stakeholder groups involved. The agreement was to design for the 1-year, 24-hour release. There was also an agreement to control the 10-year storm.

A member asked if there were different kinds of concentrations.

Mr. Rolband said that the results could have been changed with different kinds of concentration. But for the analysis, they were kept the same. He said that there was a time limit with the study and that they wanted to review more.

He said there is a fundamental problem with the 1-year, 24-hour release rate alone as the criteria. The different assumptions can be changed, but there would be less treatment for a higher density site. He said that the energy balance method would be the opposite--the more you increase the volume the more you must detain.

A member asked if this information was distilled in a white paper. Mr. Rolband said one had not been developed at this point.

Mr. Hill said that the method is reflected in the law.

A member asked if there were hydrographs accompanying his analysis. Mr. Rolband shared those hydrographs with the group. Copies are available from DCR.

A member noted that an influence on the draw-down design was the geometry. If there is a shallow basin there is a larger orifice.

Mr. Rolband said that the study just used the 1-year orifice for the study.

The member said that looking at different scenarios would help to identify the pitfalls.

Mr. Hill said the third component of the recent amendment of the law would authorize this energy balance approach.

Mr. Rolband said that the focus for this discussion should be on the energy balance method.

Mr. Cook said that one of the appeals to go to the 1-year storm design was to get away from the pre versus post analysis.

Mr. Rolband said that the theory this is based on was for stable streams in a certain period. He said that, unless over time there is redevelopment and stream conditions are restored, the watershed will not be restored.

A member said that the relationship seems intuitive. He asked if the relationship could be not 1-to-1 but, ultimately, perhaps something like twice the peak flow half the volume. Is there a way to try to figure that out? If so, could that be done and fit a regression line to that, or are there too many variables?

Mr. Rolband said that he thought, intuitively, that the flow rate times the volume reflects the work going through the system.

A member said it could be done on a more sophisticated level, on a case-by-case basis.

A member said the question is, can the centralized approach be validated computationally looking at those methods? He said it could be validated for or against those methods. He said there was a need to take an extra step to show the background work.

A member said that one of his concerns was that the group was still looking at things from the hydrology standpoint, focusing on the discharge. He said the problem is that this information was being put into a system controlled by hydrology that is unnatural. The system may be capable of handling the discharge based on assumptions, but that changes when the discharge goes through the first culvert. The culvert is a very unnatural condition. The downstream side of that culvert will become a flood path.

Mr. Rolband said that the simpler the better, and the method could be applied across the state. He said what he recommended for the 10-year storm was detaining to meet the forested conditions in the 10-year event. He said he didn't suggest applying the volume reduction energy balance to the 10-year storm, just to match the forested condition.

Mr. Hill said that the concept was based on how natural streams develop. If the stream is kept at the forested condition, it could handle the discharge. If in an undeveloped watershed, every development project met this condition, there would never be a problem with the streams in that area. He said that the question would be what happens in the case of flooding.

Mr. Hill said that ideally, if the 10-year storm were used as the basis for the flooding guidance, the post-development 10-year peak would have to match the peak for the forested conditions. That 10-year would stay the same for all the projects.

Mr. Rolband said that this would be an improvement upon typical practices. He said what typically happens is, if the stream is inadequate, most localities will give a waiver. There are proportional improvements on the site to contribute to the long-term solution.

Mr. Hill said the law says there is existing erosion or flooding control problem you are improving upon that by reducing your contribution.

A member said that what has been done is addressing channel adequacy. He said that channel stability couldn't be addressed without addressing hydrology.

A member suggested adding analysis using peak offset.

Mr. Rolband said that the duration would be longer, but the flow would be lower.

Mr. Crafton said that there would be a longer duration close to the bank full.

Mr. Rolband said that a lower flow would still be a change in frequency. There will still be runoff.

Mr. Hirschman said that the numbers could be adjusted for times of concentration.

Mr. Rolband said that the key was to make the method as consistent as possible. He said the purpose of including the 10-year event was to address the adequacy. The intent was to not have the downstream flooding problems.

A member asked if compliance with the 10-year event criteria could be waived if there were no downstream flooding problems.

Mr. Rolband said that he thought it should remain.

A member asked about a 36-hour detention.

Mr. Crafton said that would result in a bigger detention if there were not sufficient volume. He said there have already been questions regarding extra work and extra cost.

Mr. Crafton said that part of what DCR was tasked with was to develop an economic impact analysis.

A member said that since DCR had just gone through the MS4 TAC process it was important to look at the infrastructure costs for the MS4.

A member said that the ability to embrace the intent of the law was demonstrated in Fairfax. He said that it would hold the developer responsible for that which he can control. It might add cost to the development.

Mr. Hill said that if the regulations address natural channel flow assuming that a channel must carry a 1.5-year storm then, if the channel meets the other conditions, it is considered adequate. He said an engineered structure would be a different story.

He said that this was a simplified approach. He noted that there was a difference between what was scientific and what was implementable.

Mr. Rolband said that the intent was to get something before the group and the TAC for furthering the discussion.

A member asked about amending the regulations in the future.

Mr. Hill said that once the regulations are approved by the TAC and the Board there was still approximately a 12-15 month process for the finalization of regulations. A complicated regulation, such as this one, can take several years to change.

Mr. Crafton said that the process of amending a single technical issue was quicker if there were clear signs of support. He said that what is being undertaken here is a comprehensive revision of the regulations.

A member said that he would rather ensure that the regulations are correct now than assume that future corrections could be made.

A member said that it made more sense to do a more specific analysis now before the regulations are released for the public comment period.

A member said that he would prefer to see additional analysis to be comfortable with the recommendations.

Another member said that the group could say they provisionally support the method pending verification.

Another member said that without verification, he could not move forward with confidence.

Mr. Rolband said that he thought water quantity and water quality should be integrated.

A member noted that Mr. Rolband's proposal was to take the stream back to a semblance of a forested condition to protect the biology of the stream. However, he noted that the law requires the stream be returned to the existing pre-development runoff characteristics. The regulations are written to implement the law.

A member said that it was not possible to replicate the pre-developed hydrology.

A member said that redevelopment should be considered a separate issue.

Mr. Crafton said that the development community had fought hard for the language because of the fear of a requirement to force them to go back to pre-existing conditions. He said that the ultimate issue would be cost.

A member said that the concept should be to protect the stream. The question is at what kind of cost.

A member said that the starting point is channel protection. Start at that point and work back from there.

Mr. Hill said that basically the concept would be that new development sites must have adequate channels and redevelopment must not make existing conditions worse.

A member said there is a need to define how to determine adequacy and what is meant by redevelopment. He said there should be consideration of what that would do to improve erosion and sediment problems.

Mr. Brown noted that the TAC does have the ability to revise the definitions.

Mr. Hirschman said that it appeared the group was moving toward a tiered system. Step one would be channel protection, step two would be to replicate some of the hydrology methods for the site.

A member said that the thought is to protect the channel, either by using the energy balance method or showing the channel is improved.

Mr. Rolband said that the key would be to document what needs to be repaired.

Mr. Hill said that if this were the answer for stormwater, it would also be the answer for MS19.

Mr. Crafton asked Ms. Brickner to see if there was documentation in Fairfax County regarding what was originally approved there.

Mr. Crafton said the group was beginning to come to consensus on the way to structure the proposal. He said staff would attempt to draft and circulate the proposal.

Mr. Crafton thanked members for coming and asked that those with additional comments contact him via email prior to the next meeting.

The meeting was adjourned.