

**CARPC Environmental Resources Technical Advisory Committee
Runoff Volume Control Performance Standard**

**Kick-off Meeting
City County Building (210 Martin Luther King Jr. Blvd.) Room 315
November 12, 2009 - 1 p.m. to 3 p.m.**

Agenda

1. Introductions of TAC members and CARPC staff
2. Review / Revise Agenda
3. Purpose / Goals
 - a. The TAC will provide the CARPC with written recommendations, based on a review of the existing science, that address the following questions:
 - i. Is there agreement on the need for an improved stormwater runoff volume control standard?
 - ii. If yes, in what watersheds (i.e. EWR, OWR, cold water fisheries, warm water fisheries, high quality wetlands, areas with flooding issues, etc.)
 - iii. If yes, in what form (i.e. 90% or 100%, rainfall series or range of design storms, specified depth of rainfall, etc.)
4. Proposed Process: ~ 4 meetings over 4 months
 - a. Meeting 1 - Kickoff
 - b. Meeting 2 – Further discussion of available information
 - c. Meeting 3 – Draft recommendations
 - d. Meeting 4 – Finalize recommendations
5. Background Materials
 - a. Selected findings on volume control
 - i. Volume-Based Hydrology (Reese 2009)
 - ii. Fundamental of Urban Runoff Management (Shaver et. al. 2007)
 - iii. Urban Stormwater Management in the United States (National Research Council 2008)
 - b. Summary of selected volume control standards
 - c. Identify any additional information needs
6. Information Sharing
 - a. Initial thoughts, issues, concerns, etc.
7. Next Meeting
 - a. Date
 - b. Follow-up tasks

CARPC Environmental Technical Advisory Committee
November 12, 2009
-- Minutes --

Members Present: C. DeWitt, J. Schellpfeffer, G. Fries for R. Phillips, L. Nelson, P. Hughes and Krista Stensvold for C. Peters, P. Woodard, R. Montgomery, K. Potter, E. Rortvedt for L. Helmuth, K Connors, and K. Bradbury. Staff: K. Mesbah, M. Rupiper, and M. Kakuska

Kamran Mesbah welcomed everyone. The purpose of the meeting is to initiate a series of technical discussions evaluating the need for an improved stormwater runoff volume control standard. The purpose of the TAC is to provide technical, scientific recommendations on the topic by consensus, if one can be reached. Recommendations by the TAC will be forwarded to the RPC by April 2010.

Michael Rupiper reviewed the agenda and background materials summarizing selected reports and research findings on volume control. Committee members took turns providing their thoughts and insight.

Currently there is both agreement and uncertainty on the need for an improved stormwater runoff volume control standards. The primary reservation is whether or not a more stringent volume control standard is realistic. Follow up information will be provided for discussion at the next scheduled meeting.

Comments:

There is a lot of merit, but skeptical how to accomplish

Admirable goal, but realistic?

Breaking new ground

Trying to maintain existing hydrology is the best thing we can do

DNR focuses primarily on water quality; there is no federal standard for volume control

EPA is looking at the issue of volume

There is no debate in the literature relating development, increased volumes, and stream degradation

Water quality really isn't an issue; current rules are sufficient. We are experiencing increased volumes of runoff and flooding in the Yahara Lakes, Sugar River, and elsewhere

We also need to consider the effects of climate change. While there is a lot of variability and uncertainty it is one way to hedge against it by providing better controls

This is where we should be headed

We will probably be going beyond state standards

We need to be realistic, technically, where we end up

The distinction between runoff volume controls and infiltration needs to be made; increasing infiltration will increase recharge resulting in increased groundwater, which may be problematic

Need to think about a standard applied countywide, both incorporated and incorporated areas (equity considerations)

Don't limit innovation; look at the demand side as well (rather than only regulations), such as Leadership in Energy and Environmental Design (LEED), sustainable development, conservation and reuse, etc.

While an admirable goal, we have a lot to learn from our current technologies (e.g. success with infiltration), get that figured out first

There are hydrologic metrics that can be used to relate to biologic metrics; generally, higher levels of urbanization results in reductions in habitat and water quality and poorer biological health

We're pretty solid on the technical evaluation end, how to make it work will be the biggest challenge

We should be outcome oriented and not prescriptive, foster creative work by engineers towards that outcome; volume control speaks to an outcome not how it should be done

The research is pretty clear: impervious cover is tied to aquatic degradation
The best outcome would be to establish a set of standards, standards that are not a moving target; this results in unnecessary uncertainty and inequity
Of approx. 10 stormwater parameters, we can really only model one as a surrogate and even then we can't possibly get everything exactly right for each particular site – therefore, focus on volume
There is concern that more groundwater infiltration will impact wastewater collection systems
Volume standards would be very positive, there seems to be consensus
Need to address maintaining springs and wetlands; i.e., both increases and decreases in groundwater supplies
Need to address stream biotic outcomes; i.e., plant and fish communities

Mike Rupiper provided examples of existing volume control standards. There are a wide variety of approaches, is what we currently have enough? Are there additional information needs? What kind of volume are we looking at?

Comments:

RPC staff typically recommends three or four requirements for development proposals; can they all be met simultaneously? Suggests modeling various development projects. Will the additional recharge overload infiltration systems?
Specific examples would be very helpful
Instead of making predictions lets look at what has actually happened, do we have anything to show the location and extent of the problem?
We can model stormwater management practices we've been putting in and what particular aspects have we seen being made to improve conditions
We need to compile the necessary information to assess our effectiveness, therefore invest funding to evaluate practices (in the long term)
Consider fees-in-lieu (such as Middleton) to site practices where they will be more effective, evaluate their effectiveness, and direct intervention in specific problem areas
Consider volume control at the watershed level
There appears to be consensus for minimizing hydrologic impact; however, at the practical level practices such as rainfall harvesting, etc. are often difficult to implement because of permitting or ordinance constraints
Tighten up the existing rules, for example don't have so many exemptions
Needs to be expanded to the watershed level
Costs are certainly an issue, such as construction, maintenance, and purchase of land
Costs need to relate to benefits
Needs to be equitable and based on reality
USGS will pull together information on a Low Impact Development in Cross Plains compared to a typical development
Would like to see some of the proposed controls modeled on a residential site in Madison.
Pinpoint specific problem areas, whether any homes have been removed due to flooding, determine whether the current regulations have failed in these cases
There's a loophole with development allowed on prior-converted wetlands, which makes it vulnerable to future flooding
Attempt to validate existing models
Address issues of equity; areas with large Urban Service Areas are at an advantage
Consider intra-watershed trading; do not limit ourselves unnecessarily with particular site constraints
What incremental things do we need to look at, what's our next incremental move?

Mike Rupiper asked for initial thoughts on the need for an improved standard. About half of the TAC members are in agreement, about half are unsure, and there was one no. Additional comments were:
Develop a hydrologic model, focus on the watershed rather than the site, we are currently promoting continued deficit mitigating with existing practices
Should be based on water body sensitivity (e.g., Yahara Lakes)
The complication is equity and working out the details; hard to do
Maintain hydrologic conditions, stream corridors, and biology
Applauds an ecosystem approach, maintaining pre-development hydrologic conditions, watershed management, volume controls
Not until we get more answers, especially costs
It is good to protect stream biology; once impervious cover increases the biology crashes
If we want to protect the resource then (publicly) purchase areas in the watershed to address the impacts
Not sure, depends on how implemented

Next meeting

USGS will provide summaries of their research projects relevant to this issue.

CARPC, City of Madison, and Dane County staff will work together to model a variety of volume control standards so that they can be more easily compared and evaluated.

**CARPC Environmental Resources Technical Advisory Committee
Runoff Volume Control Performance Standard**

**Second Meeting
Fen Oak (1 Fen Oak Court) Room 1A
December 16, 2009 - 9 a.m. to 11 a.m.**

Agenda

1. Review / Revise Agenda
2. USGS Summary of Relevant Studies
3. Volume Standards Comparison
 - a. Discussion of modeling results
4. Information Sharing
 - a. Thoughts, issues, concerns, etc.
 - b. Potential volume standard
5. Next Meeting
 - a. Date
 - b. Follow-up tasks

CARPC Environmental Technical Advisory Committee
December 16, 2009
-- Minutes --

Members Present: P. Hughes for C. Peters, J. Balousek for K Connors, J. Schellpfeffer, G. Fries for R. Phillips, L. Nelson, P. Woodard, S. Gaffield for R. Montgomery, K. Potter, E. Rortvedt for L. Helmuth, and K. Bradbury. Staff: K. Mesbah, M. Rupiper, and M. Kakuska

Michael Rupiper welcomed everyone. The purpose of the meeting was to follow up on the scientific information and discussion from the November TAC meeting in developing an improved stormwater runoff volume control standard.

USGS Summary of Relevant Studies

Peter Hughes spoke on a powerpoint presentation entitled: *Comparison of Stormwater Runoff Quantity and Quality Using Conventional and Low-Impact Development (LID) Strategies: Cross Plains, WI., 1999-2005* (see CARPC website). Results of the study indicated that LID reduces the number of discharge events, which reduces the volume of stormwater discharged to the receiving water. The magnitude of the stormwater runoff peak flow rates are also reduced. The LID site resulted in about half as much runoff than from the conventionally developed site. These results are consistent with research also conducted in Maryland. However, LID does not mean there will be no impact; just less than conventional development. Peter pointed out that our knowledge-base and practices are getting better, since the Cross Plains LID project would not have met current NR 151 stormwater standards adopted in the fall of 2002 and in effect since the fall of 2004. Take home points for LID include: 1) Reduced runoff through infiltration of smaller storms, 2) Reduced pollutant loads via reduction in runoff volume, 3) Majority of runoff and pollutant load dominated by a few large precipitation events, 4) Infiltration basin could be improved by better designs, attention to specifications,

Comments:

Correct installation of practices is very important. Field verification with soil borings is very important. What is the effect of higher densities more typical of urban development and less typical of suburban LID?

Using the carrying capacity of the stream we may find that in some cases no more development should be approved or that development may not be appropriate for a particular area. That is a policy decision. What is the relevance of LID to the challenge of volume based controls? The Cross Plains LID example provides less mitigation than is commonly being incorporated into developments today.

Volume Standards Comparison

Mike Rupiper distributed a handout entitled: *Volume Control Performance Standard Comparison Case Study – Shady Wood Residential Development*. Based on the last TAC meeting the members thought it would be useful to calculate and compare the runoff volumes and required volume control under various performance standards for a typical residential development. The preliminary Effective Infiltration Area was estimated to allow comparison of the land areas that could be required by the alternative standards. The conclusion from the modeling is that jumping from 90 percent volume control to 100 percent control approximately doubles the effective infiltration area from 0.6 acres to 1.3 acres, respectively, for the 44 acre development. General observations indicate soil compaction typical in many developments significantly increases runoff volumes and the resulting control volume required. Alternatively, deep tilling significantly reduces runoff volumes and the resulting control volume required. Timing of the rainfall is also important.

Comments:

Some designs use 0.13 in./hr., which is lower than the assumption modeled here (0.5 in./hr.); therefore, land requirements would be higher than indicated here. However, infiltration was modeled here not practices such as bioretention, or engineered soils. The modeling was done to provide a reasonable comparison of the volume standards for the case study area, not to model worst case scenarios. While deep tilling can have a significant effect, individual lots may be too small to deep till. Consider the maximum event; the average annual basis is a lot easier to accommodate than large events. Under the worst case scenario notice the infiltration would require 10 percent land dedication, but also notice the street terraces make up 10 percent of the land area. Unless rooftops are directed to over 30 feet of grass, they are effectively connected stormwater sources. Need to look at rain gardens in terraces, as well as changing the tree policy towards more water tolerant species. It can be difficult to meet both recharge and infiltration requirements. Meeting the infiltration requirement with bioretention may actually decrease recharge (i.e., more water is lost to evapotranspiration). The problem with low density residential is it is difficult to collect enough runoff to focus recharge. It is actually easier to accomplish this on commercial sites. Ultimately this needs to be coordinated at the watershed level through, for example, inter-jurisdictional agreements and also potential retrofits. Concern was raised that many current infiltration areas are not working properly. Maybe it would be better to wait on raising the bar until those problems are addressed. On the other hand, we've made significant progress in just the last few years, learning as we go. An updated standard will help push innovation and greater experience in this regard. We need to be careful we are not creating other problems such as groundwater mounding, flooding of basements, etc. through enhanced infiltration or recharge. Groundwater impacts should be evaluated in every case. For the Shady Wood development, eight of the 44 acres are already dedicated to stormwater management. Increased standards could result in a project that is no longer financially viable. Credits should be given to communities that go above the standard. Middleton's fee in lieu of on-site stormwater management could be used as an example by other municipalities to transfer stormwater mitigation offsite to other areas of the watershed that are more suitable/preferential.

Thoughts on how to move forward.

This effort could highlight opportunities to do more, at least where there are better soils. It will depend on the trade-offs and compromises that can be made. This is the right direction to be going in, although there are a lot of details to be figured out. Can the impacts on the resource be quantified? There is a lot more work to be done. Maybe there is an interim step. A 90 percent infiltration standard with no cap seems like a good interim step. No developer so far has come in to meet the recharge standard (based on the experience in the City of Madison). The 60 percent standard for non-residential is flawed (requires no work in many cases). That could be upgraded to 90 percent. Make future decisions based on the failure/success of devices over the long term in deciding whether to focus on infiltration or recharge. It seems trying to concentrate water to meet recharge requirements may increase the failure rate of practices. There is need for caution so we do not vilify urban development. People will simply build on wells and septic to bypass stringent urban requirements. It's a matter of economic tradeoff – a 20% land requirement for stormwater management measures is pretty close to making the development no longer financially viable. Ten percent is actually closer to the limit.

Questioned whether porous pavement might be a good option, some municipal representatives doubted its practicality/viability due to potentially significant maintenance problems/issues.

We don't adequately model Spring and Fall precipitation when most of the recharge occurs. These facilities do work during Spring and Fall. We need to fix that in RECARGA.

Look at fees in lieu of onsite stormwater management and build offsite facilities where they may be more successful.

We may need to commit to 100 percent control in the Lake Mendota watershed at some point because of flooding.

Once a recommendation is made there should be a public process and hearings before anything is adopted.

The public is looking for improvements in water quality. Be careful not to oversell expectations on what can actually be accomplished.

Whatever standard is chosen, we should look at bracketing the land area requirements with various soil types

The standard should be applied on the watershed scale, not site by site, maybe cumulatively plat by plat. Just pick one standard. Notice the ten year requirement is only slightly greater than the requirement for the 1 year event.

Keep the standard at 90 percent. There is no real urgency for the 100 percent standard until more information is known on the cost and effectiveness.

**CARPC Environmental Resources Technical Advisory Committee
Runoff Volume Control Performance Standard**

**Third Meeting
Fen Oak (1 Fen Oak Court) Room 1A
January 25, 2009 - 1 p.m. to 3 p.m.**

Agenda

1. Review / Revise Agenda
2. Montgomery Associates Presentation - Analysis approach used to arrive at the 90% volume control standard recommended in the Badger Mill Creek - Sugar River Study
3. Discussion Items
 - a. Are there some watersheds (i.e. flood prone areas, closed basins, sensitive receiving waters) that should have a standard of control to 100% of predevelopment volumes at this time?
 - b. What should be the timeframe for the additional research and data collection before reevaluating the standard of control to 100% of predevelopment volumes?
 - c. Should updated rainfall data be used when it becomes available from the Wisconsin Initiative on Climate Change Impacts (WICCI) Stormwater Working Group and/or the National Weather Services Hydrometeorological Design Studies Center Precipitation Frequency Data Server?
 - d. Review, discussion, and revision of draft TAC recommendations
4. Next Meeting
 - a. Date
 - b. Follow-up tasks

CARPC Environmental Technical Advisory Committee
January 25, 2010
-- Minutes --

Members Present: P. Hughes for C. Peters, J. Balousek for K. Connors, J. Schellpfeffer, G. Fries for R. Phillips, L. Nelson, P. Woodard, S. Gaffield for R. Montgomery, K. Potter, Doris D. Rusch, and K. Bradbury. Staff: K. Mesbah, M. Rupiper, and M. Kakuska

Michael Rupiper welcomed everyone. The purpose of the meeting was to follow up on the scientific information and discussion from the December TAC meeting as well as provide review, comments, and any revisions to a draft TAC recommendations document to the CARPC in developing an improved stormwater runoff volume control standard.

Montgomery Associates Presentation on the Analysis Approach used to Arrive at a 90% Volume Control Standard Recommended in the Badger Mill Creek-Sugar River Study

Steve Gaffield began with a description of the study area and approach including an assessment of the resource condition, its sensitivity to change, the County stormwater ordinance as the baseline or point of departure for a volume standard, watershed-specific performance standards, implementation, and monitoring. The stream and wetland assessment found high quality wetlands associated with the State Natural Resource Area west of Verona, the presence of reproducing populations of brown trout, and marginal temperature and dissolved oxygen. Biotic sensitivity, represented by stability indices for fish fry and adult trout, were based on stream temperature and dissolved oxygen. Fish fry were more vulnerable than adults, particularly during summer months, and fish in Badger Mill Creek were more vulnerable than those in the Sugar River. Winter conditions were found to be good. In terms of stream stability the Sugar River appeared stable while Badger Mill Creek appeared to be at risk. RECARGA modeling was also used to simulate the effect of different development densities on different soils types in the study area, how well could infiltration be expected to perform, and what the effects were of the one and two percent caps. It was pointed out that RECARGA does not take into account the higher levels of recharge in the early spring and late fall. This needs to be improved in the model. In practice, it was pointed out, that rarely do developers default to the secondary recharge standard, being able to meet the current infiltration standard instead.

Recommendations from the study included maintaining groundwater recharge, directing runoff away from the State Natural Area, and a proposed infiltration standard of the County minimum requirements plus maintaining 7.6 in/yr. recharge (county average) for areas draining to the Sugar River; and all sites meeting 90 percent infiltration (with two percent cap) for areas draining to Badger Mill Creek. The 90 percent infiltration control provides greater volume control for Badger Mill Creek, which was found to be relatively less stable than the Sugar River. Cumulative impacts using a 2050 build out scenario incorporating the above stormwater controls were found to be small: one and two percent increase in runoff for the Upper Sugar River and Badger Mill Creek, respectively. This is in comparison to the 62 and 11 percent runoff volume increase onsite, respectively, for the proposed Verona development. In other words, the one percent increase in runoff volume for the Sugar River reflects the relatively small increase in projected developed area. The two percent increase in volume for Badger Mill Creek reflect the more stringent volume control standard applied to all new development. This is compared to a 10-15 percent cumulative volume increase for Badger Mill Creek using the County stormwater ordinance.

In summary, the approach uses the County ordinance as a starting point and suggests watershed-based stormwater controls, based on an analysis of resource conditions, vulnerability, monitoring, and periodic review and adaptive management.

It was asked if the habitat suitability indices were re-calculated to reflect the 2050 watershed scenario. Another question was if the study looked at the predicted changes in the flow duration curve for more frequent storms, such as those with less than one-year re-occurrence (partial series). The question of the increased frequency and duration of erosive or channel forming flows (typically one- and two-year storms) was raised. Steve replied that the recommendations were made based on a more qualitative, rather than quantitative analysis.

Discussion Items

Do any areas warrant 100 percent pre-development volume controls at this time?

Flooding of the Yahara Lakes was suggested as a high priority for continued study. We do not know exactly what strategies/actions are needed to mitigate high lake levels. One concern is the standard practice of using the 1981 rainfall time series for stormwater calculations. It was suggested that we should be looking at what effect a 90 percent control standard has using heavier precipitation years (e.g., 1993, 2000, 2004, and 2008). In terms of flooding; it should be evaluated whether event based, or cumulative effects are more critical. A comment was made that this standard shouldn't necessarily address flooding of the Yahara Lakes, especially if this can be resolved by other means (e.g., lowering lake operating limits, operating the lakes closer to the minimum level, etc.). It would be useful to check the sensitivity of the lakes. This could be relatively easily accomplished by looking at stage/discharge relationships. A SWAT model is being prepared for the Yahara Lakes watershed.

Other priority areas include DNR Outstanding and Exceptional Resource Waters, and closed basins. A suggestion for Badger Mill Creek was no increase in rates/volumes using actual conditions based on aerial photos, as opposed to modeling. 1995 was suggested as the base year because of the aerial photography available. It was suggested that 1995 represented a more accurate pre-development condition. A comment was made that a 90 percent standard using the curve number in the ordinance may be equivalent to 100 percent of actual conditions now. This should be a topic of future discussion. We also need to add a spring and early fall recharge component to RECARGA.

It would also be useful to study infiltration practices; how they are working and if they are not working, why not? This information could go into a handbook for better design.

It would also be good to have more information on the instream biological effects of development, with and without controls.

What should be the timeline for additional research and data collection before re-evaluating the volume control standard?

It was agreed that five years would be a good target to try and collect this information and re-evaluate whether any revisions to the 90 percent standard was needed.

Should updated rainfall data be used when it becomes available?

Regarding climate change and precipitation, it appears that we are years away from any models that will be useful as it relates to precipitation. The variation of results among current models is very large. The belief is that there will be more precipitation in the spring and that it will be in liquid vs. solid or frozen form. The National Oceanic and Atmospheric Administration (NOAA) has not detected any significant increases in total precipitation over the last couple decades. NOAA is in the process of updating the precipitation frequency data for Wisconsin. Dane County intends to incorporate the new data into its

stormwater ordinance when they are available. Since the proposed CARPC standard parallels the Dane County ordinance, it would follow suit.

Review, Discussion and Revision of the draft TAC Recommendations

Mike Rupiper went through the draft recommendations line by line in terms of consensus among the committee members. Overall, the members present reached agreement on the revised document. There was a dissenting opinion expressed that did not support the 100 percent volume goal. This was because of questions as to the feasibility of implementation and potential unintended effects, such as promoting sprawl. The statement was revised to read the TAC recognizes the potential benefits of 100 percent volume control. It was also suggested that CARPC adopt a phased approach and that the 90 percent standard be re-evaluated in five years to determine whether a more stringent control is needed.

In terms of an infiltration cap, exemptions, and exclusions it was agreed to use Dane County Chapter 14 and NR 151 stormwater ordinances as a base. The cap would be set at two percent for both commercial and residential land uses, with an alternate recharge standard beyond that. Recharge targets will be based on estimates published by the Wisconsin Geological and Natural History Survey, with the option for more detailed field-based information if available.

In terms of future research, it was recommended that biological information (i.e., flora, fauna, habitat) should also be evaluated as to the effects of the proposed 90 percent volume standard, and whether or not the standard should be changed.

Next Meeting

A subsequent meeting will be scheduled in February to review the final draft, make any further changes, and release it as a recommendation document to the Capital Area Regional Planning Commission.

**CARPC Environmental Resources Technical Advisory Committee
Runoff Volume Control Performance Standard**

**Fourth Meeting
Fitchburg City Hall (5520 Lacy Road) Meeting Room
February 22, 2010 - 1 p.m. to 3 p.m.**

Agenda

1. Review / revise agenda
2. Discussion and approval of previous meeting minutes
3. Review and discussion of water balance graphic
4. Review and discussion of proposed revisions to NR 151 related to infiltration
5. Review, discussion, and revision of second draft of TAC recommendations
6. Next meeting (if necessary)

CARPC Environmental Technical Advisory Committee
February 22, 2010
-- Minutes --

Members Present: P. Hughes for C. Peters, J. Balousek for K. Connors, J. Schellpfeffer, G. Fries for R. Phillips, L. Nelson, P. Woodard, K. Potter, Doris D. Rusch, M. Slavney, and K. Bradbury. Staff: K. Mesbah, M. Rupiper, and M. Kakuska

Michael Rupiper welcomed everyone. The purpose of the meeting was to follow up on final revisions to the draft recommendations document prior to it being released to the full TAC for consensus approval and subsequent release to the CARPC for its consideration.

Discussion and Approval of Previous Meeting Minutes

Committee members approved previous meeting minutes without any significant changes.

Review and Discussion of the Water Balance Graphic Comparing Pre- and Post-Development Conditions

Rupiper walked the committee members through an example graphic he developed comparing the water balance of pre- and post-development conditions using RECARGA. The graphic puts into perspective what the 90 percent pre-development stay-on standard means in terms of runoff volume. Discussion ensued regarding the assumptions made for curve numbers used in the model with respect to different types of land use as a pre-developed condition (i.e., different types of soil, cropping, farm practices, etc.). A comment was made that the graphic was very helpful for the layperson in understanding what is actually meant by a 90 percent pre-development stay-on standard. Another comment was made that it was important that the standard be referenced as a “design rate,” as opposed to an actual or measured rate. Using a design rate provides an added safety factor, since conservative soil infiltration rates are required according to the design standard, thereby erring on the side of providing more protection (i.e. actual infiltration rates are higher than design rates; actual runoff volumes and rates are lower than design rates). In terms of exemptions and exclusions (for purposes of groundwater quality protection), the standard references the County stormwater ordinance as the base, as opposed to minimum state NR 151 stormwater requirements.

Review and Discussion of Proposed Revisions to NR 151 Related to Infiltration

Proposed revisions to NR 151 are currently out for public review and comments. Instead of two categories; residential and non-residential development, the infiltration requirements are proposed to be broken down by three levels of imperviousness. There were concerns that the proposed state requirements seem to provide conflicting incentives. Comments will be taken until March 12. The current state and county infiltration requirements are more protective than the proposed changes for some medium-density and high-density residential developments and less protective than the proposed changes for some commercial developments.

Review, Discussion, and Revision of the Second Draft of the TAC Recommendations

Rupiper went through the draft recommendations section by section. Discussion ensued among the committee members and revisions suggested for incorporation into the document. Discussion and recommendations included:

- Re-evaluating the proposed volume standard five years after adoption based on additional research and modeling suggested in the recommendations
- Including maximum runoff curve numbers for calculating agricultural pre-development conditions
- Allowing off-site mitigation and promoting inter-jurisdictional cooperation in meeting the standard on watershed basis
- Monitoring biological indicators of development impacts on water resources, collecting more information on the performance and life expectancy of infiltration practices and the causes if failure occurs
- Conducting a cost/benefit analysis of going beyond 90 percent volume control. While there was general consensus that 90 percent was feasible in most cases, there were questions and considerable uncertainty regarding the cost and relative benefits of going to 100 percent
- Recommending the Dane County Board also adopt this volume control standard thereby applying it to all new development and not only to sewer service area expansions.

Next Steps

CARPC staff will incorporate the proposed changes into the draft recommendations document and distribute it to the TAC for consensus approval. The approved recommendation and any potentially dissenting opinions will be forwarded to the Capital Area Regional Planning Commission for their consideration and any further action.