

Town of Chevy Chase Environment Committee

Review of TOCC Water Drainage Ordinance

Background

In the fall of 2008, the Town Council asked the Environment Committee to conduct a review of how well the Town's water drainage ordinance, adopted in December of 2006, is working. The ordinance was adopted with two goals in mind, both arising in the context of residential construction projects:

1. to ameliorate flooding onto neighboring properties; and
2. to reduce water flowing to the Town's already over-taxed storm drains.

With the Town's hilly topography, a significant amount of storm water accumulates on certain downhill properties, a condition often aggravated when large additions or teardowns occur on uphill properties. The storm water that finds its way into storm drains ultimately runs through one pipe near the Columbia Country Club. This pipe is deteriorating and is not large enough to carry the Town's storm water during large storm events, hence the flooding on streets like Maple Ave. during large storms. Furthermore, at the location where the pipe empties into Coquelin Run, the creek isn't wide or deep enough to handle all the water that is being deposited there, resulting in a serious erosion problem along the creek bed. To address these problems, the ordinance requires large construction projects to be planned so that rainfall from 90% of annual storms – "three-month storm events" or smaller – is captured and retained on the property to slowly infiltrate into the soil rather than rushing elsewhere.

The Town's ordinance serves as a good complement to County's stormwater management requirements, as it is designed with the Town's specific needs in mind. Town requirements are meant to *supplement* those of the County, which continue to apply to the Town (though many small residential lots are exempt); the Town requirements were established with the expectation that the County will continue to enforce its own laws regarding water drainage. Since the adoption of the ordinance, 24 applications have been approved, and only four cases have gone to the Water Board -- two appeals and two requests for variances.

Procedure

A working group of the Committee interviewed various "users" of the ordinance, including:

- six resident applicants¹;
- one resident who requested a variance (only two variances have been requested);
- one builder who submitted applications for multiple properties;
- one appellant (only two appeals have been filed);

¹ There were 14 resident applicants, most of whom did not respond to our request to speak to them about the ordinance. The remaining applicants were builders.

- Town staff (including the Town Engineer);
- members of the Water Board.

The Committee also spoke with others with perspective on the ordinance, including a County engineer responsible for implementing the County's water management laws, and several Town residents who have water drainage problems on their property or on the streets adjacent to their homes. Lastly, the Committee cast a wider net by posting notices in the *Forecast* and on the Town website, soliciting comments from any and all interested residents, such as neighbors of properties where a drainage system had been installed pursuant to the ordinance. Based on all the interviews and comments received, the Committee has developed recommendations for changes that it believes will result in the ordinance operating more smoothly and effectively.

Overall Impressions

The Committee believes that the ordinance represents sound policy and is working fairly well. Although installing water infiltration systems as required by the ordinance may place a burden on residents, the alternative is to exacerbate flooding problems through the displacement of water onto neighboring properties and our already overtaxed storm drain system. The difficulties that a few residents have encountered are varied and thus cannot all be traced to a specific problem with the ordinance. In fact, most of the difficulties were due to the natural learning curve that individuals (e.g., applicants, their engineers, Town Staff, and Water Board members) experience when dealing with new, complex rules. The Committee, however, believes that some aspects of the ordinance and its implementation should be clarified. Most of the proposed changes can be accomplished through executive regulation rather than through amending the ordinance.

Issue 1: Maintenance Requirements

Background: The ordinance requires that owners of water drainage systems perform maintenance in accordance with a maintenance schedule that they submit with their drainage plan and that is approved by the Town. The "*Water Drainage Plan Inspection and Maintenance Agreement*," filed with the deed, states that a property owner must maintain his system in good condition and promptly repair and restore the system in accordance with that maintenance schedule. Neither the ordinance itself, nor the *Water Drainage Plan Inspection and Maintenance Agreement*, provides guidance on what the maintenance schedule should include, or articulates standards for maintenance requirements. The Committee believes the Town would benefit from a clear and uniform maintenance policy, and considered a number of approaches, including:

- maintenance in conformity with the manufacturer's recommendations;
- maintenance within an established number of days after every three-month storm (or some other category of storm);
- maintenance once a year;
- annual certification by the owner that maintenance obligations have been met;
- requiring owners to keep receipts of maintenance activity.

All of these approaches have drawbacks: maintenance recommendations provided by manufacturers are often very confusing, even unintelligible; some systems don't come with maintenance recommendations at all; not all systems need to be maintained on the same schedule or at the same frequency; annual certifications and receipt-keeping requirements are overly burdensome on both owners and staff.

Recommendation: The Town staff should write maintenance standards for each piece of commonly-used water retention and drainage equipment. These standards should be published on the Town website and included in the application packet. The maintenance schedules submitted with applications should recite the Town standards for each piece of equipment proposed.

The Committee wants to ensure that for each drainage system constructed pursuant to the ordinance, there is a clear historical record of maintenance obligations and activity that is available for inspection by future owners of the affected properties and other interested residents. The Town already keeps a file for each system. The Committee recommends that this filing system continue, with the following information included in each file: the manufacturer, model number, and date of installation for each piece of equipment that is part of the system, the approved maintenance schedule, and reports from the Town's annual inspections. In practical terms, this reduces the uncertainty regarding standards and requirements for residents and places a truly minimal burden on residents with properly functioning systems.

Issue 2: Town Inspections

Background: The Town should follow an inspection schedule that addresses neighbors' concerns that a drainage system is well maintained so that it will work properly over time, but also does not place too heavy a burden on the property owner. Most manufacturers recommend that equipment be monitored frequently during the first year after installation -- because if something is going to go wrong, it usually will do so in the first year -- and then serviced annually thereafter.

The Town conducts four inspections during the time that a system is being constructed. Typically, several weeks elapse between the third and the fourth inspections, allowing time for the Town engineer to make an initial assessment as to whether the system is operating properly. Currently, systems are inspected annually for a period of five years.

Recommendation: The Town's inspection protocol should be strengthened as follows:

1. The Town Engineer should inspect a new system six months after installation is complete. During the first six months of operation, large storms will likely have occurred to test the system, so any problems can be identified early and remedied.
2. After the six-month inspection, systems should be inspected by the Town annually **in perpetuity**, not just for five years.

In addition, annual notices should be sent to owners, alerting them to upcoming inspections. The notice should remind them of their maintenance obligations and notify them that the approved maintenance schedule for their system is available in the Town office should they wish to see it.

The office should publish inspection standards for each piece of commonly-used equipment, so that owners understand how much sediment accumulated in the bottom of their tank (e.g., 3" or 6") will result in a failed inspection.

The staff should design an inspection report form to be filled out by the Engineer after each inspection, and given to the homeowner, with a copy put in the office file. The report should detail any maintenance needed and state that it must be completed within 30 days. Under the ordinance, if the owner doesn't perform needed repairs within 30 days, the Town can take action and charge the owner the cost of repair and penalties.

Issue 3: Calculation Methodology

Background: The first step in designing a drainage system is calculating the amount of storm water runoff that is expected at a certain property, based on how pervious the surfaces are. The expected amount of runoff determines the water retention volume required of the system. The ordinance does not specify a particular calculation methodology; it just states that the methodology must be one set forth in the State Design Manual. Problems arise when the applicant's engineer uses a different methodology from the one used by the Town engineer. Methodologies may not produce the same result, thereby causing confusion, misunderstandings, and disagreements.

Recommendation: The Town should adopt the "Soil Conservation Service Curve Number Method" as the official calculation methodology under the ordinance. This is the methodology used by the Town Engineer. To provide more details and promote transparency, the Committee recommends that the methodology be identified and described on the Town's website and in the application packet so that all affected parties are using the same criteria in determining water runoff calculations and proposing remedial actions. The specific "curve number" that the Town Engineer assigns to different types of surfaces also should be disclosed on the website and in the application packet. These steps should help eliminate confusion and disagreements on the outcomes.

Issue 4: Permeable Surfaces

Background: The ordinance requires runoff from new impervious surfaces (greater than 700 square feet) to be retained on a property after rainstorms of specified strength. New pervious (also known as permeable) surfaces are not subject to the ordinance; thus any water runoff from pervious/permeable surfaces does not need to be captured. An issue has arisen as to whether several products being marketed as permeable should be considered pervious surfaces under the ordinance. These products, used mostly for driveways and patios, have varying degrees of permeability. Some may be almost as permeable as undeveloped ground, while others are only slightly more permeable than surfaces considered impermeable (such as asphalt and traditional concrete). Each comes with a gravel sub-base; the less permeable the surface, the deeper the sub-base.

These semi-pervious surfaces have been promoted by the staff and Engineer for use on driveways and terraces. They have the advantages of visibility – neighbors will notice them and want one of their own, whereas no one can see an underground vault. They also provide a good way of "capturing" water when the topography on a site makes it impracticable to move water up hill to an underground tank. The disadvantage with these surfaces, and the reason why the Committee has been conflicted about whether to actively promote them in the Town, is that they will become increasingly impermeable over time without constant maintenance. The biggest prob-

lem is falling leaves that are ground into the surface (more of a problem on driveways than on patios); eventually the residue from these leaves builds up and blocks water infiltration. Some manufacturers recommend vacuuming these surfaces twice a year, but with our thick tree canopy in Town, more frequent vacuuming may be necessary. At best, these surfaces may only be effective for 10-12 years. Moreover, even well maintained, semi-permeable surfaces will not absorb water if they are on slopes greater than 5%.

Two questions have been brought to the Committee's attention regarding these semi-permeable surfaces:

1. Should a semi-permeable surface be considered "pervious" within the meaning of the ordinance, and given credit for serving as its own infiltration device, i.e., absorbing the water that falls directly on it? (If not, then the property owner must provide retention tank capacity for that water.) To date, the Town Engineer *has* been crediting these surfaces as their own infiltration devices. (Not allowing this would discourage their installation as they are generally more expensive than conventional impermeable surfaces.)
2. Should semi-permeable surfaces count as retention systems, allowing rainwater from a roof to be piped onto the surface and "captured" in the gravel sub-base? This practice has been questioned because these surfaces are not capable of being inspected, maintained, and cleaned out in the manner of retention systems, and the ordinance, as noted, calls for inspections and remedial actions as necessary. The Town *has* been counting permeable surfaces as retention systems; the Water Board concluded unanimously in August 2008 that permeable surfaces *should not be* considered retention systems for the above and other reasons.

Recommendation: The Town should revise its presentations and approach so as not to count permeable surfaces as retention systems for rain water that falls on other parts of the property, but to allow these surfaces to continue to act as their own infiltration systems (i.e., for rain water that falls on these surfaces) if they are installed on slopes that are not greater than 5%. Such a policy would balance the conflicting concerns presented above. In application materials and on the website, the Town should describe each surface that will be considered "pervious" for this purpose, disclose the curve number that will be assigned for each, and the maintenance standard for each. Gravel driveways should be promoted, since they are almost as pervious as undisturbed ground.

Issue 5: Alternative Engineering Methods

Background: The conventional water drainage systems installed in the Town are "infiltration systems," which are comprised of underground retention tanks or vaults. Storm water is piped into these tanks (e.g., from down spouts) and then slowly released into the soil surrounding the tanks. Alternative engineering systems exist -- such as rain barrels for retaining water. The ordinance allows any technology that is permitted by the State Design Manual (SDM). Although the Town Engineer has said that the SDM allows rain barrels, at least one applicant was told by her engineer that they were not permitted under the Town ordinance. The Town Engineer has stated that he would not prohibit the use of alternative systems as long as any overflow is automatically directed into a more traditional infiltration system (such as an underground retention tank). Thus, he would not approve a plan that relied solely on rain barrels, but he might approve a plan that had one or more rain barrels with attached overflow tubing to direct overflow water into an underground infiltration vault.

Another circumstance in which more flexibility may be beneficial is where the new drainage system has the potential to solve existing water problems for several adjacent properties, in addition to dealing with increased runoff from new impervious surfaces on the applicant's property.

Recommendation: The Town should make it clear to applicants, through the website and otherwise, that it will consider alternative engineering methods, such as rain barrels, as long as they are permitted by the State Design Manual, and any overflow is directed into an infiltration system. Furthermore, any alternative methods must utilize permanent equipment that is capable of being inspected.

The Committee recommends deferring to a later date the question of whether the Town should deviate from standard solutions when a new drainage system has the potential to solve existing water problems for adjacent properties. Rerouting surface runoff for multiple properties goes beyond the scope of the ordinance, and fashioning a new process would be complicated and time-consuming. Meanwhile, nothing prevents a group of neighbors with water problems from contacting the County about tying into the storm drain.

Issue 6: Notice to Neighboring Properties

Background: Once a property owner files a proposed water drainage plan, the ordinance requires that the Town Manager send notice to owners of adjacent and confronting properties that the plan has been filed, along with a summary of the plan. The ordinance further requires the Town Manager to post the plan on the Town's website for at least 30 days.

Two issues have emerged with respect to notice:

1. Should neighbors who receive notice be given a forum for raising concerns during the approval process (such as a meeting with the owner and the Town Engineer)? As the ordinance stands, they have a right to notice of a plan's being submitted, but no right to be heard short of filing an appeal.
2. Should nearby neighbors who are situated downhill from the subject property be given notice of the plan? With the Town's hilly topography, there may be downhill property owners who are not technically adjacent or confronting neighbors, but who nonetheless could be adversely affected should the applicant's water drainage system malfunction.

The notice that is currently being sent to neighbors states that residents can give comments on the proposed plan to the Town Manager and Engineer prior to the approval of the plan. The Town engineer and staff provide answers to any questions residents submit about the proposed plan, holding formal meetings if necessary. If a resident were to raise valid engineering concerns, the Town Engineer would require a plan to be amended, or would deny the application. The Engineer does not typically hold meetings per se concerning his evaluation of the proposed plan. Questions from an applicant's engineer are generally specific and technical, and are almost always resolved via email or telephone.

Recommendation:

On the first issue, the Committee recommends that the Town staff continue and strengthen its procedure of notifying residents and answering their questions. The Committee believes that if neighbors have a sense that they have been heard, many disputes can be resolved informally, and appeals can be avoided. However, creating a requirement for a meeting for neighbors in all

cases may create an unnecessary bureaucratic layer at this point, given that Town staff reports that very few neighbors who are notified actually call with concerns.

On the second issue, the Committee concedes that it may be tricky to define which downhill property owners should receive notice. Instead, the Committee proposes that the Town post a large sign on the subject property giving notice that a plan has been filed and is available for review in the Town office.

Issue 7: Right to Appeal

Background: There is a concern among some applicants about residents bringing frivolous appeals, resulting in expensive delays. This is the situation in which the appellant has no legitimate, scientific basis upon which to object, but instead is motivated to attempt to prevent the construction project from happening. The question is whether the right to appeal can be limited in some way to discourage frivolous appeals without putting too heavy a burden on people who have legitimate reasons to appeal. To date, only two appeals have been brought.

Recommendation: The Committee does not recommend limiting residents' right to appeal at this time. Several ideas were discussed, such as requiring that a resident write a complaint letter during the approvals process as a condition of appeal, or charging a filing fee for an appeal, which could be made refundable if the appeal were granted. These ideas could be revisited later if the Water Board becomes overwhelmed with a large number of appeals or if the Council deems necessary to deter frivolous appeals at some future time.

Issue 8: Supplemental Guidelines

Background: Section 28-5 of the ordinance states that supplementary guidelines for water drainage plans are contained in a document on the Town's website. It does not describe the role of these guidelines. Three problems have come to the Committee's attention:

1. The language in the ordinance could be implied to mean that the guidelines are **requirements** for drainage systems, due to the fact that they appear as part of a list of other requirements applicants must meet. The requirements are listed in paragraphs (a)-(g), and the reference to the supplementary guidelines appears in paragraph (h) as follows:
"(h) Supplementary guidelines for water drainage plans are contained in the document Town of Chevy Chase Water Drainage Plan Guidelines for Single Lot Residential Construction, which the Town shall make available to the public during normal business hours at the Town office and on the Town's website."
2. There is confusion created by the fact that the supplementary guidelines posted on the Town website have a different title than the title given to them in the ordinance.
3. By stating that they will be "considered positively," the introductory phrase in the guidelines document on the website suggests that they have a greater impact on the Engineer's decision on a proposed drainage plan than they actually do:
*"As part of the review of a water drainage plan, the Town Engineer will examine how the applicant addresses the following items. In addition to the water drainage measures in the Water Drainage Ordinance, **all these will be considered positively.**"*

In actual fact, the supplementary guidelines are merely suggested best practices. Following them does not guarantee that an applicant's plan will be approved. They run the gamut from promoting use of impervious surfaces to advising that overflow pipes be placed under sidewalks. They are not technical requirements that will be checked off and given credit by the Town Engineer.

Recommendation:

First, the language of the ordinance should be modified as follows to clearly indicate that the supplementary guidelines are not requirements, but merely suggested best practices. The subsection letter (h) should be removed, and the language should read as follows:

"Best Practices' guidelines for water drainage plans are contained in the document Town of Chevy Chase Water Drainage Plan Guidelines for Single Lot Residential Construction, which the Town shall make available to the public during normal business hours at the Town office and on the Town's website."

Second, the supplementary guidelines posted on the Town's website should be renamed to be consistent with the name that the ordinance gives them: "*Town of Chevy Chase Water Drainage Plan Guidelines for Single Lot Residential Construction.*"

Third, the introductory language of the guidelines posted on the website should be changed to simply read:

"The following is a list of best practices and other items to consider when designing a water drainage plan."

January 3, 2010

Technical Amendment Suggested by Staff

Background: The Town staff and members of the Water Board believe that sections 28-5(d) and (e) should be revised. For reasons set forth below, the current language in these provisions is either not technically accurate or not workable; and in fact the Town has been following a procedure similar to the proposed language.

Currently, sections 28-5(d) and (e) read as follows:

“(d) The applicant shall provide water drainage measures that retain all stormwater from all new impervious surfaces within the property for twenty-four (24) hours for a three month storm event.

(e) For a storm event greater than a three month storm event, but not more than a ten year storm event, a water drainage system shall be designed and constructed so as not to allow site runoff to flow to any adjacent or nearby property at a rate greater than the pre-construction rate.”

The recommended language for section 28-5(d) and (e) is as follows:

“(d) The applicant shall provide a water drainage system that retains within the property the greater of the following: the volume of all stormwater runoff from all new impervious and semi-pervious surfaces for a three-month storm event, or the volume by which post-construction runoff from all such surfaces exceeds pre-construction runoff for a ten-year storm event.

(e) For a storm event greater than a three month storm event, but not more than a ten year storm event, the water drainage system shall be designed and constructed so as not to allow site runoff to flow to any adjacent property or nearby property at a volume greater than the pre-construction volume.”

The recommended additional language for section 28-2(b), which defines terms, is as follows:

“(25) Semi-pervious Surface: A surface with a runoff curve number that is greater than 85. The runoff curve number shall be computed based on the methodology developed by the USDA Natural Resources Conservation Service.”

Recommendation: Sections 28-5(d) and (e) should be revised as indicated. The recommended language changes three aspects of the original language in sections 28-5(d) and (e).

1. It requires retention of water during a three-month storm event not only from new impervious surfaces, but also from semi-pervious surfaces. This modification is necessary due to the lack of a uniform definition of impervious.

Water that falls on a semi-pervious surface that does not infiltrate into that surface should otherwise be retained on the property during a three-month storm event. Adding this semi-pervious language also requires defining the term "semi-pervious." Defining semi-pervious as any surface with a curve number of greater than 85 is a judgment call. The average residential lawn has a curve number of about 75 while the average concrete driveway has a curve number of almost 100 (i.e., it is almost totally impervious). A policy that allows homeowners to install hard surfaces with curve numbers of between 75 and 85 without having to retain the water from these surfaces would encourage homeowners to install various "green" surfaces.

2. The language deletes reference to retaining water on property for 24 hours because the point of the ordinance is to collect water and let it infiltrate into the ground over a period of time. According to the Town Engineer, the ordinance authors improperly adopted the 24-hour retention requirement due to a misunderstanding of the technical term "three-month, twenty four hour storm event." The Town Engineer's technical explanation for the need to drop the 24-hour retention requirement is as follows:

For paragraph (d), the correct description of any recurrent storm event (in this case the three-month storm event) based on standard statistical hydrology is to say the "three-month, twenty four hour storm event" or the "five-year, twenty-four hour storm event". These written descriptions identify the exact storm event in question, as the standard phraseology is to include the period of measurement, which is a distinct twenty-four hour period. The existing paragraph (d) was incorrectly written when the author mistakenly put the words "twenty-four (24) hour" before the event occurrence (e.g. three month or five years) instead of after the event occurrence. In doing so, the meaning of the phrase was changed and implies that the runoff must be retained for twenty four hours before it can be released for infiltration, which does not make sense for the constructability and function of a typical drywell system.

3. The language currently in section 28-5(e) requires that a water drainage system be designed so that the *rate* of water runoff the property is not greater than the pre-construction rate for storms between three months and 10 years in magnitude. As the Town's Engineer explains in the passage below, determining the *rate* of water flow in a residential setting is problematic. He recommends replacing the word *rate* with the word *volume*. The Town Engineer's technical explanation for this change is as follows:

In paragraph (d), the engineer is instructed to provide retainage for a volume of water: the stormwater that accumulates over the new impervious surface for a three-month, twenty four hour storm event. This is an easy calculation and allows for a standard design of a drywell system based on volume, which is typically measured as cubic feet of water. By introducing the word "rate," the engineer then has to design a system based on a flow rate of water, instead of a volume of water. Typical flow rate measurement units are in cubic feet per second or gallons per minute. On stormwater detention basins (for large land

disturbance projects like parking lots), this is a standard calculation with standard devices used to control the flow rate of water exiting the system. For a residential application, this really couldn't be any more difficult. As the Town will not allow open basins to be installed, the engineer has the only option of designing a drywell system, which cannot easily be retrofitted to control the flow rate of water infiltrating into the surrounding soil. The author of paragraph (e) did not intend for each applicant to use a separate tank for holding and then controlling the flow rate of water as the tank draws down after a storm event. This, coupled with the very difficult task of actually having to measure the flow rate, which would be on the order of 0.08 cubic feet per second (as an example); there is no readily available device on the market that can be used to measure this flow rate. Clearly, the word "rate" must be removed from the ordinance wording to dispel any need for extraordinary engineering designs and burdens on the applicant.