For the National Pollutant Discharge Elimination System/State Disposal System General Stormwater Permit for Construction Activity

Permit Minnesota R100001

The National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) General Stormwater Permit for Construction Activity (MN R100001) dated August 1, 2008, is being reissued by the Minnesota Pollution Control Agency (MPCA). The draft NPDES/SDS general permit regulates the discharge of stormwater associated with construction activity into waters of the state of Minnesota incorporates a number of revisions.

This factsheet has been prepared according to Minn. R. 7001.0100, subp. 3. This fact sheet has been prepared in order to document the decisions that were made in the determination of the limitations and conditions of this permit.

I. Facility/Activity Description

This permit is required when “construction activity” that results in land disturbance of equal to or greater than one acre occurs and authorizes, subject to the terms and conditions of this permit, the discharge of stormwater associated with construction activity. “Construction activity” includes construction activity as described in 40 CFR § pt. 122.26(b)(14)(x) and small construction activity as described in 40 CFR § pt. 122.26(b)(15) and construction activity as defined by Minn. R. 7090.0080, subp. 4. Construction activity includes the disturbance of less than one acre of total land area that is a part of a larger common plan of development or sale if the larger common plan will ultimately disturb one (1) acre or more. Construction activity includes clearing, grading, filling, and excavating. Construction activity does not include a disturbance to the land of less than five acres for the purpose of routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, and original purpose of the facility.

II. Location of Permitted Facility and/or Activity

This general permit is proposed to apply to any construction activity located in Minnesota that meets the eligibility requirements of this permit.

III. Criteria for Issuing a General Permit

General permits are authorized under 40 CFR § 122.28 and Minn. R. 7001.0210. The MPCA has determined that a general permit is appropriate to regulate discharges associated with construction activity because all construction activity involves substantially similar processes that disturb and expose topsoil and that result in discharges of sediment and potentially other pollutants associated with construction. Construction activity usually converts pervious areas to impervious areas, which results in increased volume and velocity of runoff, causing degradation of surface water and discharges of sediment associated with erosion and pollutants associated with urban activity. Because the pollutants associated with construction activity are substantially similar regardless of the size and location of the construction activity, substantially similar standards, limitations, and operating requirements and
monitoring requirements can be imposed on all construction activities subject to the permit. The MPCA is specifically authorized to issue a general permit to any category of point source stormwater discharges by Minn. Stat. § 115.03, subd. 5c (2012).

IV. Type and Quantity of Pollutants

The primary pollutant that will be treated and controlled under this permit is sediment. Other pollutants associated with construction activity include phosphorous, nitrogen, bacteria, metals and inorganics, pesticides, construction chemicals, petroleum products and volatile organic chemicals. This permit will also control the direct and indirect pollution resulting from the uncontrolled discharge of large volumes of stormwater from impervious surfaces.

The quantities of pollutants/pollution potential associated with construction activity will vary dependent on the type of construction activity conducted at the site, the amount of land disturbance, topography, and the specific operating conditions at the site. Fluctuating rainfall and snow levels will also significantly affect discharge quantities. The permit will address these differences by requiring each Permittee to develop and implement a Stormwater Pollution Prevention Plan (SWPPP) in compliance with the permit, prior to conducting construction activity. The SWPPP will allow each Permittee to choose the appropriate “Best Management Practices” or “BMPs” to address the potential discharge of sediment and other potential pollutants from the construction site, and to control the indirect pollution and degradation of surface waters resulting from the uncontrolled discharge of volumes of stormwater from impervious surfaces.

V. Basis for Draft Permit Conditions

The Federal Clean Water Act, 33 U.S.C. § 1342 (p), requires states to issue NPDES permits for stormwater discharges “associated with industrial activity.” The U.S. Environmental Protection Agency (EPA) has classified “construction activity” as an “industrial activity” for which a permit is required to discharge stormwater. 40 CFR § 122.26(14). Minn. Stat. § 115.03, subd. 5, authorizes the MPCA to issue permits with conditions as necessary to comply with provisions of the Federal Water Pollution Control Act (Clean Water Act) applicable to the states, and Minn. Stat. § 115.03, subd. 5c, specifically authorizes the MPCA to issue a general permit to categories of stormwater dischargers. In 2009, the EPA adopted 40 CFR 450 to establish effluent guidelines for stormwater discharge permits applicable to construction activity. State permits must incorporate these provisions.

Permit revisions affecting this general permit

The MPCA has modified the existing NPDES/SDS General Permit No. MNR100001 to meet new federal requirements promulgated in the 2009 Effluent Limitations Guidelines and Standards for the Construction and Development (C&D) Point Source Category Rule at 40 Code of Federal Regulations pt. 450 (available at: www.ecfr.gov/cgi-bin/ECFR?page=browse ). These EPA rule requirements include added BMP design and site considerations, buffer requirements during construction, temporary sediment basin floating discharge devices and pollution prevention considerations. Appendix A to this fact sheet includes a section titled Proposed Permit Modifications to address the Federal 40 CFR 450 Rule, and lists the major changes proposed for permit reissuance that reflect federal rule. The federal citations related to the requirement are in parenthesis.

The next list of proposed permit modifications in Appendix A is titled Additional MPCA Proposed Permit Modifications. This list includes modifications to the existing permit that the MPCA identified as necessary or that were required to address state requirements, including the requirements to develop design standards to promote “low impact development” as required by Minn. Stat. § 115.03, subp. 5c. The MPCA is proposing to modify the following: the amount of permanent treatment required and the addition of volume reduction requirements, and permanent treatment compliance when the project is under the jurisdiction of a current Municipal Separate Storm Sewer Systems (MS4) permit (discussed
further below); permit transfer and termination requirements; BMPs required on public waters during fish spawning periods; design and maintenance for dewatering activities; inspection and recording requirements; and SWPPP content. With regard to SWPPP content, the MPCA has consolidated SWPPP content requirements that previously appeared in various sections of the prior permit and added some requirements. In particular, the SWPPP includes a requirement that where the permit allows for requirements to be avoided on the grounds that they are “infeasible” for a particular site, the SWPPP include documentation of the infeasible conditions that were encountered and the alternative BMPs that will be employed. The MPCA proposes for electronic submission to be the standard method of submitting applications. The MPCA proposes that training requirements include refresher training be attended every three years. The draft permit also includes numerous updates, permit language reorganization, definitions and clarifications to make the permit more concise, and to cut duplicative or unneeded language. A stakeholder input and participation group meeting was held by the MPCA on December 17, 2012, to introduce these issues.

In addition to these changes, the draft permit also includes numerous edits to clarify the permit and make it more concise and easier to apply.

A stakeholder input and participation group meeting was held by the MPCA on December 17, 2012, to introduce these issues and to provide input opportunity into this permit revision process.

**Volume management**

In Part III.D (Permanent Stormwater Management System) of the permit, the MPCA has added the requirement that:

Where a project’s ultimate development replaces vegetation and/or other pervious surfaces with one or more acres of cumulative impervious surface, the Permittee(s) must design the project so that the water quality volume of one inch of runoff from the new impervious surfaces created by the project is retained on site (i.e. infiltration or other volume reduction practices) and not discharged to a surface water. This requirement shall not be construed to prohibit runoff from entering man-made drainage systems that convey stormwater to a constructed permanent stormwater management facility.

The MPCA has added this requirement for the reasons set forth below.

In the natural, undisturbed environment, precipitation is intercepted by trees and other vegetation, stored in natural depressions until evaporated, or absorbed by soils and humus on the surface of the ground. This moisture is then used by plants, recharges shallow groundwater that enters streams, lakes and wetlands, or infiltrates more deeply to recharge deeper aquifers. During most storms, very little rainfall becomes stormwater runoff. Traditional development practices, however, disrupt the water holding capacity of the natural environment. Development results in impervious surfaces such as roads, driveways, sidewalks, and buildings. Remaining soils, even those under vegetated areas, are often heavily compacted and relatively impervious. As a result, even a small rainfall event creates stormwater runoff that is carried away by curb and gutter systems. The collective force of the increased stormwater flows can scour streambeds, erode stream banks, and cause large pulses of sediment and other entrained pollutants, such as metals, nutrients and trash, to enter downstream receiving waters. Research shows a high correlation between the area of impervious surface in a watershed and the degree of overall degradation of downstream water quality and aquatic habitats. See [http://www.dnr.state.md.us/irc/bibs/effectsdevelopment.html](http://www.dnr.state.md.us/irc/bibs/effectsdevelopment.html).

Minn. Stat. § 115.01, subd. 13, defines “water pollution” to include “the alteration made or induced by human activity of the chemical, physical, biological, or radiological integrity of waters of the state.” Consistent with this definition, the Minnesota legislature has specifically authorized the MPCA to regulate storm water discharges, including with regard to the deleterious impacts of increased stormwater flows related to development. In 2009, the legislature required the MPCA to:
. . . develop performance standards, design standards, or other tools to enable and promote the implementation of low-impact development and other stormwater management techniques. For the purposes of this section, "low-impact development" means an approach to stormwater management that mimics a site's natural hydrology as the landscape is developed. Using the low-impact development approach, stormwater is managed on-site and the rate and volume of predevelopment stormwater reaching receiving waters is unchanged. The calculation of predevelopment hydrology is based on native soil and vegetation.

Minn. Stat. § 115.03, subd. 5c (2009 legislative session).

Over the past three years, the MPCA has examined scientific research and looked at standards employed by other states and governmental units to determine what would constitute reasonable performance and design standards that would promote the implementation of low-impact development that mimics a site’s natural hydrology as the landscape is developed.¹

The conclusion of this research was that treatment of about the first one inch of impervious surface runoff represents a volume that appears to reasonably represent the volume that is fully infiltrated in a modern-day natural condition and thus should be managed onsite to restore and maintain the pre-development hydrology of receiving waters. The MPCA finds that management of this volume is generally feasible, and that this requirement has been successfully implemented by various Water Management Organizations in the Twin Cities Metro Area and in many locations around the nation under a wide variety of climates and conditions. However, the MPCA recognizes that, for a particular site, a permittee may not be able to comply fully with the new requirement because of unique conditions, for example, where infiltration is prohibited or limited due to the presence of contamination or shallow bedrock, or linear sites (roads). For this reason, the MPCA has provided that other permanent treatment methods, such as grassed swales, filtration systems, smaller ponds, or grit chambers, can be utilized prior to discharge to surface waters in lieu of infiltration, so long as the infeasibility is documented in the SWPPP.

The MPCA finds that there are a number of models that developers can employ to determine whether the one inch standard is being met on the site. Because models are always under refinement, the MPCA has chosen not to require permittees to utilize a particular model to document compliance with the permit requirement.

The proposed permanent stormwater management requirement to manage water on the development site is consistent with the federal effluent guidelines for stormwater management during construction. See 40 CFR § 450.21(a)(1).

The research listed in Appendix B supports the need for better management of stormwater flows by retention, and the MPCA’s proposed standard for the volume of water that must be managed on site.

VI. Availability

The draft permit and fact sheet are available for review at the MPCA office located at 520 Lafayette Road North, St. Paul, Minnesota 55155, during regular business hours of 8:00 a.m. to 4:30 p.m., Monday through Friday, and at the MPCA Regional Offices. Location information for the regional offices is available on the MPCA website at: www.pca.state.mn.us/about/regions/index.html. You may also view a

¹ To date, post-construction stormwater management approaches generally have been focused primarily on rate controls for flood management, with a heavy reliance upon extended detention controls (i.e., collecting water short-term, usually in a large basin, and discharging it to the receiving water over the period of one to several days, depending on the size of the storm) or on in-pipe or end-of-pipe treatment systems. Extended detention approaches are intended to reduce downstream flooding to the extent necessary to protect public safety and private and public property. End-of-pipe systems are typically intended to provide pollutant sedimentation and filtration. However, as noted by the National Research Council in their 2008 report, these traditional stormwater treatments do not sufficiently reduce the suite of pollutants in stormwater, particularly dissolved and colloidal compounds such as phosphorus, to the extent necessary to prevent downstream degradation. Further, rate control practices generally do not address aquatic habitat degradation attributable to increased discharge volumes (stream bank erosion, incision and shock loading).

A free copy of the draft permit and fact sheet is also available upon request by calling 651-296-3890 or 1-800-657-3864, or for users of Telecommunications Device for the Deaf call 651-297-5353. Only one copy will be sent per request.

**VII. Standard Applicable to Issuance**

The permit will be issued if the MPCA determines that the proposed Permittee(s) will, with respect to the facility or activity to be permitted, comply with all applicable state and federal pollution control statutes and rules administered by the MPCA and the conditions of the permit, and that all applicable requirements of Minn. Stat. ch. 116D and the rules promulgated thereunder have been fulfilled.

**VIII. Preliminary Determination**

The MPCA Commissioner’s determination that the permit should be issued is preliminary.

**IX. Proceecures for Reaching a Final Decision on the Draft Permit**

Public comment period begins: February 4, 2013
Public comment period ends: March 20, 2013

There are four formal procedures for public participation in the MPCA’s consideration of permit issuance. Interested persons may (1) submit written comments on the draft permit; (2) request that the MPCA hold a public informational meeting;* (3) request the MPCA hold a contested case hearing; and/or (4) submit a petition to the Commissioner requesting that the MPCA Citizens’ Board (Board) consider the permit matter.

A public informational meeting is an informal meeting that the MPCA may hold to help clarify and resolve issues concerning the preliminary determination to issue a permit, or the terms of the draft permit.

*The MPCA has scheduled a public meeting for this proposed permit. The meeting will be held on Friday, March 8, 2013, at the MPCA St. Paul office located at 520 Lafayette Road North, St. Paul, Minnesota 55155. The meeting will be held from 9:00 a.m. to 3:00 p.m. or until all attendees have had an opportunity to participate, whichever occurs first.

A contested case hearing is a formal hearing before an administrative law judge. A contested case hearing is designed to determine whether a material issue of fact or of the application of facts to law related to the preliminary determination or the terms of the draft permit, in areas under the MPCA’s jurisdiction, and having a reasonable basis underlying issues of fact or law, should change the preliminary determination of issuance, or the terms of the permit.

**Persons who submit comments or petitions to the MPCA must state the following:**

1. their interest in the permit application or the draft permit
2. the action they wish the MPCA to take, including specific references to sections of the draft permit that they believe should be changed
3. the reasons supporting their position stated with sufficient specificity as to allow the Commissioner to investigate the merits of their position

Comments submitted to the MPCA during the public comment period will be included as part of the public record.
Public informational meeting

In accordance with Minn. R. 7000.0650 and Minn. R. 7001.0110, your petition requesting a public informational meeting must identify the matter of concern and must include items 1 through 3 identified above; a statement of the reasons the MPCA should hold the meeting; and the issues you would like the MPCA to address at the meeting.

The MPCA has scheduled and will host a public information meeting to discuss the draft Construction Stormwater (CSW) permit. The meeting will be held on Friday, March 8, 2013, at the MPCA St. Paul office located at 520 Lafayette Road North, St. Paul, Minnesota 55155. The meeting will be held from 9:00 a.m. to 3:00 p.m. or until all attendees have had an opportunity to participate, whichever occurs first.

Access to the MPCA is controlled, and to attend a meeting you will be asked to sign in at the security desk and provide photo identification, such as a Minnesota driver’s license. In order to help the MPCA better plan for space and seating, please RSVP by calling 651-296-3890 or 800-657-3864, and let us know if you are planning to attend this meeting.

The public information meeting will also be webcast; the link to the webcast will be provided on the MPCA Construction Stormwater webpage at: http://www.pca.state.mn.us/wfhya5b. Please note that the webcast is not interactive; you will be able to view the meeting only. The meeting will not be rescheduled in the event that the webcast video fails.

Procedures for requesting a contested case hearing

In accordance with Minn. R. 7000.1800, your petition requesting a contested case hearing must include a statement of reasons or proposed findings supporting an agency decision to hold a contested case hearing pursuant to the criteria identified in Minn. R. 7000.1900, subp. 1. The statement must include the issues proposed to be addressed by a contested case hearing and the specific relief requested or resolution of the matter. To the extent known, your petition may also include a proposed list of witnesses to be presented at the hearing, a proposed list of publications, references or studies to be introduced at the hearing, and an estimate of time required for you to present the matter at hearing. The decision whether to hold a contested case hearing will be made under Minn. R. 7000.1900.

The above description is intended to assist persons in understanding their rights. The MPCA strongly recommends persons who are seeking a contested case hearing to review the applicable rules carefully before proceeding.

Other procedures by which the public may participate in the Minnesota Pollution Control Agency’s consideration of the permit application

During the public comment period, you may also request that the draft permit be presented to the MPCA Board for final decision. You may participate in the activities of the MPCA Board as provided in Minn. R. 7000.0650. The decision whether to issue the permit and, if so, under what terms, will be presented to the MPCA Board for decision if (1) the Commissioner grants the petition requesting the matter be presented to the Board; (2) a MPCA Board member requests to hear the matter prior to the time the Commissioner makes a final decision on the permit; or (3) a request for a contested case hearing is pending.
Name, address, and telephone number of contact person for more information

Comments on the draft permit must be received in writing during the public comment period identified above. Comments, petitions, and/or requests should be mailed to:

Lawrence S. Zdon  
Minnesota Pollution Control Agency  
Municipal Division  
Stormwater Policy and Technical Assistance Unit  
520 Lafayette Road North  
St. Paul, MN 55155-4194  
Phone: 651-757-2839  
E-mail: lawrence.zdon@pca.state.mn.us.

All written comments, requests, and petitions received during the public comment period will be considered in the final decisions regarding the permit and will be included in the record supporting the decision. The MPCA may revise the draft permit to reflect any comments received during the public comment period. If the MPCA does not receive any written comments, requests, or petitions during the public comment period, the Commissioner or other MPCA staff as authorized by the Commissioner will make the final decision concerning the draft permit.
Appendix A

List of Major Proposed Permit Modifications:

1. Proposed Permit Modifications to address the Federal 40 CFR 450 Rule. (federal citation in parenthesis)
   - The SWPPP must account for expected amount, frequency, intensity, and duration of precipitation in design of BMPs. §450.21(a)(2); (5).
   - The SWPPP must address the range of soil particle sizes expected to be present on the site. §450.21(a)(2); (5).
   - The SWPPP must account for nature of stormwater runoff and run-on at the site, including factors such as expected flow from impervious surfaces, slopes, and site drainage features. §450.21(a)(2); (5).
   - The SWPPP must design stormwater controls to control both peak flowrates and total stormwater volume for water channelized at the site and at outlets and to minimize downstream channel and streambank erosion. §450.21(a)(2); (5).
   - Design conveyance channels to route water around unstabilized areas and use erosion controls and velocity dissipation devices. §450.21(a)(1); (2); (3); (4).
   - Identify in the SWPPP areas of steep slopes on the site map and minimize disturbance for steep slopes. Delete the requirement to break slopes of greater than 3:1 into 75 foot lengths. §450.21(a)(4).
   - The site map must include locations of all potential pollutant-generating activities. §450.21(d); (e).
   - Document in the SWPPP any specific chemicals and the chemical treatment plan. §450.21(a)(5).
   - Address fueling operations, spill prevention and response. §450.21(d)(3); (e)(3).
   - The temporary sediment basin’s outlet structure must be designed to withdraw water from the surface unless during frozen conditions. §450.21(a)(2); (f).
   - Sediment Basins must be located outside of any natural buffers. §450.21(a)(2); (6).
   - During construction preserve natural buffers from surface waters or redundant sediment controls if a buffer is not feasible. §450.21(a)(6).
   - Unless infeasible, direct discharges from stormwater controls to vegetated areas and use velocity dissipation devices if necessary to prevent erosion. §450.21(a)(6).
   - Maintenance of perimeter control devices must be repaired, replaced, or supplemented when they become nonfunctional or the sediment reaches ½. §450.21(a).
   - Backwash water from filters must be either hauled away for disposal or return it to the beginning of the treatment process. Replace and clean the filter media. §450.21(a)(5).
   - Minimize soil compaction and, unless infeasible, preserve topsoil. §450.21(a)(7).
   - Stabilization of exposed soil areas must be initiated immediately when work is ceased vs. “as soon as possible.” §450.21(b).
   - Runoff from the external washing of trucks and other construction vehicles (includes equipment) must be contained in a sediment basin or other similarly effective control and that soaps, detergents, or solvents must be properly stored to prevent spills. §450.21(d)(1).
   - Minimize the exposure to stormwater of the storage, handling, and disposal of construction products, materials, and wastes. §450.21(d)(2); (e)(3).
   - Provide either cover or other means of protection for pesticides, herbicides, insecticides, fertilizers, treatment chemicals, and landscape materials. §450.21(d)(2).
   - Position portable toilets so that they are secure and dispose of sanitary waste properly. §450.21(d)(2).
   - All liquid and solid wastes generated by washout operations including stucco, paint, form release oils, curing compounds and other construction materials must be contained. §450.21(e)(2).
• Hazardous Materials, toxic waste, oil, diesel fuel, gasoline, hydraulic fluids, paint, solvents, petroleum-based products, wood preservatives, additives, curing compounds, and acids must be properly stored. §450.21(e)(3).

• Clarifying the types of non-stormwater discharges that are prohibited. §450.21(e).

2. Additional MPCA Proposed Permit Modifications:

• Permanent Treatment requires one inch of new impervious surface runoff must be held on site and infiltrated, harvested or reused if feasible. Minn. Stat. § 115.03, subd. 5a. More information regarding this requirement is provided in Appendix B.

• Allow projects located in an NPDES permitted MS4 that have a permanent treatment requirement that meets the current MS4 permit to comply with that MS4 permanent treatment requirement. Note: it is the intent of the MPCA that the upcoming reissuance of the MS4 permit will contain provisions for permanent treatment that would match or satisfy the permanent treatment requirements proposed in this reissuance of the CSW permit.

• Applications are to be submitted electronically and permit coverage will be provided in seven days.

• Erosion and Sediment Control Training requirements require that refresher training must be attended every three years.

• Stabilization in areas adjacent to and draining to Minnesota Department of Natural Resources (DNR) public waters that have restrictions on work during fish spawning time frames must be complete no later than 24 hours after ceasing work in the area.

• Dewatering discharge water that is found to contain oil or grease must be treated by use of an oil-water separator or suitable filtration device.

• The backwash water from using filters for dewatering must either be hauled away for disposal, returned to the beginning of the treatment process, or incorporated into the site in a manner that does not cause erosion. Filter media must be replaced and cleaned when required.

• The construction site must be inspected within 24 hours after a rainfall event greater than 0.25 inches in 24 hours (and delete the existing storm threshold for inspections of ½ inch) and the inspector must record inspection data and ensure that maintenance is undertaken within 24 hours.

• Rainfall amounts must be measured in a rain gauge installed onsite.

• Documentation of locations of corrective actions and changes/amendments made to the SWPPP must be within seven calendar days.

• During inspection, identify all points of the property from which there is a discharge occurring. Observe and document with photographs the visual quality of the discharge, and take note of the characteristics of the stormwater discharge.

• Document in the SWPPP if the Permittee(s) determine that compliance with requirements is infeasible on the project site.

• Definitions added for the two year, 24 hour storm event to determine the wetted perimeter for ditches and new definitions for “project;” “steep slopes;” “initiated immediately;” “natural buffer;” and “infeasible”.

• Permit requirements governing transfer and termination consolidated.
3. Proposed Permit Deletions:
   - Delete the differentiation of small construction activity to construction activity clarifying that all construction activity of one acre or requires permit coverage.
   - Delete Combinations of Practices and Alternative Method from Permanent Stormwater Management System.
   - Delete the statement that a compacted clay liner that does not allow washout liquids to enter groundwater is considered an impermeable liner.
   - Delete the requirement for applicant to obtain an approval letter from the DNR prior to application when discharge to a fen is involved and require Appendix A C1 and C2 BMPs.
   - Delete the provision that officials other than EPA or MPCA officials can indicate the SWPPP is not effective or the discharge is causing water quality standard exceedances.

4. Proposed Clarifications (no change from standard in 2008 permit):
   - Clarify that for final stabilization, the 70 percent density of vegetative cover is 70 percent of its expected final growth density.
   - Clarify that after the permit is terminated, if there is unfinished development on the site, new permit coverage must be obtained if the remaining development land disturbing activities add up to over one acre in size.
   - Clarify that “Aerial radius measurement” means the shortest straight line distance measurement between the point of stormwater discharge from a project construction site to the nearest edge of the water body the stormwater will flow to.
   - Clarify that agricultural crop or other seeding alone is not stabilization.
   - Clarify that mulch materials must achieve 90 percent ground coverage to be adequate.
   - Clarify that “Surface Water or Waters” definition does not include treatment basins or treatment ponds.
   - Clarify that “Sediment Control” includes, bio rolls, rock logs, compost logs, and not pipe slope drains or floating silt curtain placed in the water.
Appendix B

The following research supports the need for better management of stormwater flows by retention, and the MPCA’s proposed standard for the volume of water that must be managed on site.


