Chapter 4

Proprietary Stormwater BMPs

Proprietary Stormwater best management practices are manufactured systems that use proprietary settling, filtration, absorption/adsorption, vortex principles, vegetation, and other processes to meet the Stormwater Management Standards. There are two general types of Proprietary BMPs: hydrodynamic separators and filtering systems. Both types may be used for retrofits.

Hydrodynamic separators typically use either chambered systems or swirl concentrators to trap and retain sediment from a designed stormwater flow, and use different methods to help prevent the resuspension of sediment during high flow storm events. The retained sediment is removed through periodic maintenance.

Filtering systems typically use a settling chamber and filtering system that removes specific pollutants. The choice of filtering media or cartridges is typically based on the target pollutants.

Subsurface structures, even those that have manufactured storage chambers, are not proprietary BMPs, since the treatment occurs in the soil below the structure not the structure itself.

The effectiveness of Proprietary BMPs varies with the size of the unit, flow requirements, and specific site conditions. The UMass Stormwater Technologies Clearinghouse database evaluates the quality of proprietary BMP effectiveness studies. MassDEP urges Conservation Commissions to use this database when verifying the effectiveness of Proprietary BMPs: www.mastep.net

Advantages/Benefits:

- Useful for pretreatment/removal of TSS
- Can be an excellent choice in ultra-urban or other constrained sites
- Useful for redevelopments and to improve local conditions
- Longevity can be high with proper maintenance

Disadvantages/Limitations:

- Must be sized carefully to achieve design removal efficiencies
- Efficiency may be affected by size of sediment and rate of sediment loading
- Must ensure regular maintenance to achieve design removal efficiencies
- Not appropriate for terminal treatment for runoff from LUHPPLs or discharges near or to critical areas, unless determined suitable for such use by TARP or STEP.

Two Ways to Approve or Deny the Use of Proprietary Stormwater BMPs

1. MassDEP has reviewed the performance of a technology as determined by TARP or STEP and assigned a TSS removal efficiency.
   - If the conditions under which it is proposed to be used are similar to those in the performance testing, presume that the proprietary BMP achieves the assigned TSS removal rate
   - Look at sizing, flow and site conditions.
2. Issuing Authority makes a case-by-case assessment of a specific proposed use of a proprietary technology at a particular site and assigns a TSS removal efficiency.
   - Proponent must submit reports or studies showing effectiveness of BMP.
   - MassDEP strongly recommends using UMass Stormwater Technologies Clearinghouse database to ensure that reports and studies are of high quality (www.mastep.net).
   - Look at sizing, flow and site conditions.
   - For ultra-urban and constrained sites, proprietary BMPs may be the best choice.

Evaluation of Proprietary Stormwater Systems

Local agencies see a range of proposed stormwater management systems ranging from LID systems that mimic natural hydrology to traditional dry detention basins and manufactured systems.

The Stormwater Management Standards require proponents to consider the use of environmentally sensitive site design and LID techniques *before* selecting the appropriate BMPs for their development or redevelopment projects. After that consideration, the proponents may choose among a variety of stormwater BMPs to provide pretreatment, treatment, peak rate attenuation, and infiltration. These include LID BMPS, the traditional BMPs listed in the BMP charts presented in Volume 1, Chapter One, as well as a number of Proprietary BMPs.

MassDEP encourages proponents to consider proprietary BMPs, particularly where site constraints limit the use of LID techniques or traditional BMPs. If sized properly, manufactured (or "proprietary") BMPs can play a pivotal role in meeting the Stormwater Management Standards, particularly on smaller sites where adequate space for other BMPs is not available.

This Chapter provides the following information:

- Process To Approve or Deny the Use of Proprietary Stormwater Technology
- How to Evaluate the Effectiveness of Proprietary BMPs that Do Not Have a MassDEP TSS Removal Efficiency Rating
- Additional Information about Proprietary BMPs, including sources of information and detailed evaluation guidance for each of the 10 Stormwater Standards

If a developer proposes to include a proprietary BMP as a component of the stormwater management system, the local permitting authority must determine

- whether the proprietary BMP can meet the applicable Stormwater Standards;
- if proposed to meet the TSS removal requirements of Standard 4, whether there is sufficient information available to assess the TSS removal efficiency of the proposed proprietary BMP and, if so;
- assign a TSS removal credit.

This task is not easy. Only a few proprietary technologies have had their TSS removal effectiveness evaluated and approved by the Commonwealth. The overwhelming majority of proprietary technologies have not been evaluated by the state. Those technologies may still be used in Massachusetts, if the Conservation Commission or other local permitting authority determines that they can be used to meet the Stormwater Management Standards at a particular site.

Although MassDEP encourages proponents to consider the use of proprietary technologies to manage stormwater, local permitting agencies have the authority and responsibility to decide how these innovative or manufactured systems may be used, whether they are sized correctly for the intended purpose, and, in most cases, assess the proprietary BMP's ability to remove TSS.

Accordingly, **MassDEP encourages Conservation Commissions** and other local agencies to:

- Evaluate proposed proprietary BMPs by consulting the UMASS Stormwater Technologies Clearinghouse (www.mastep.net) and reviewing the information on the proposed technology.

- Ensure that BMPs described as already having been assessed by Massachusetts (through EEA's legacy STEP program) meet the conditions of those approvals, including model numbers, sizing requirements and site conditions. If such a BMP does not meet all applicable conditions, the TSS removal efficiency number established by the State can be questioned by the local permitting authority.
- Use proprietary systems for specialized situations – like heavily constrained redevelopment sites or other locations - where LID techniques or traditional structural BMPs may not provide needed improvements.

MassDEP encourages manufacturers of proprietary technologies to:

- Have their BMP's operating parameters evaluated though the multi-state Technology Acceptance Reciprocity Partnership (TARP) Program. When a technology completes TARP process, MassDEP will assign a specific TSS removal number or range for the tested use of that technology.
- Submit the results of other studies to the UMASS stormwater technology database clearinghouse (www.mastep.net).
- Promote specialized and niche uses of proprietary technologies to provide Conservation Commissions with more tools to improve the environment.

Ideally the developer of a property proposing these kinds of systems and the local agency evaluating the use of a manufactured or innovative stormwater technology will work cooperatively and agree that the proposed technology is appropriate for its intended use and likely to achieve the results intended.

To do that, developers must provide sufficient analytical information to the local agency (preferably third party analysis) so that it can evaluate the proprietary BMP. The local agency may reasonably deny the use of a proposed technology, if it finds that: (a) there is not sufficient information to assess the effectiveness of the technology; or (b) based on the available information, the proposed use of the technology does not meet all the requirements of the Stormwater Management Standards. In order to perform that analysis, local agencies must evaluate the studies provided to them describing the use and effectiveness of these technologies. Local agencies may not unreasonably deny the use of a proposed technology.

Process To Approve or Deny the Use of Proprietary Stormwater Technology

There are only two ways to evaluate a proposed use of a proprietary BMP in Massachusetts:

1. The Commonwealth has evaluated the performance of the technology and assigned a TSS removal efficiency.

In this case, Conservation Commissions and MassDEP shall presume that the proprietary BMP achieves the assigned TSS removal, provided the conditions under which it is proposed to be used are similar to those in the performance testing. MassDEP reserves the right to change the TSS removal number assigned to a proprietary technology based upon its review of subsequent studies.

The performance of a small number of proprietary BMPs was evaluated through EEA's legacy STEP program. In almost all cases, these STEP approvals were for specific sizing and flow requirements and specific site conditions. Those conditions are listed in the STEP reports. When

reviewing this information, Conservation Commissions must analyze the STEP report to verify that the unit being proposed is within the scope of the STEP approval.

Although the STEP program no longer conducts these evaluations, MassDEP will review the performance of and assign a TSS removal efficiency to any proprietary BMPs that successfully complete the multi-state "Technology Acceptance and Reciprocity Partnership" (TARP) assessment process. Currently, MassDEP has not made a similar commitment to assign TSS removal efficiencies based on evaluations conducted under similar programs in other states or third party studies. MassDEP reserves the right to do so in the future.

2. The issuing authority has evaluated the proposed use of a particular proprietary BMP at a specific site and assigned a TSS removal efficiency based upon its own case-by-case review of the effectiveness and intended use of the proprietary BMP.

MassDEP strongly recommends that the issuing authority evaluate proposed BMPs using studies reviewed by the University of Massachusetts and posted on its stormwater database website (www.mastep.net). That database includes information on the relative quality of the studies, and should be used as the basis for a local agency's evaluation of the effectiveness of a proprietary system. Based on this information, the issuing authority may decide to approve or deny the use of any proprietary technology. The issuing authority may not unreasonably deny the use of a proposed technology.

If the operating parameters and performance claims of a proprietary technology have not been fully verified by STEP or TARP and a MassDEP removal efficiency rating has not been assigned, the technology vendor must submit evaluative information to the local agency regarding the technology's effectiveness.

> *Please note that Proprietary BMPs are NOT required to be evaluated by MassDEP to be used in Massachusetts. Only a small number of proprietary BMPs have been evaluated by the Commonwealth, and those evaluations are limited to the specific conditions that were reviewed. In most case in Massachusetts, a proposed use of a particular proprietary BMP at a specific site will be reviewed by the local agency on a case–by-case basis.*

How to Evaluate the Effectiveness of Proprietary BMPs that Do Not Have a MassDEP TSS Removal Efficiency Rating

MassDEP recognizes that the process of reviewing a proposed use of a particular proprietary BMP at a specific site may be daunting. MassDEP has prepared guidance for conducting this review.

Step One: Information that should be submitted as part of the Wetlands NOI.

As more fully set out below, issuing authorities require sufficient information to evaluate proposed uses of proprietary BMPs. If sufficient information is not submitted with the NOI, the Conservation Commission should request additional information as part of the review process.

Specific information that a Conservation Commission may want to request prior to a hearing include:

A A complete description of the proprietary technology or product including a discussion of the advantages of the technology when compared to conventional stormwater treatment systems and LID practices, including:

- Size: What volume is it designed to hold and/or treat? How is the system sized to meet the performance standards in order to handle the required water quality volume, rate of runoff, and types of storms? Standard 4 requires treatment for a required water quality volume, not for a specified design flow rate.
- Technical description, schematic and process flow diagram: How does it work? What are the technical configurations of the unit? Are there any pretreatment requirements? How does it fit in combination with other treatment systems?
- Capital costs and installation process and costs: What does this size system cost? Are there any consumable materials that need to be replaced and if so, how often and how much do they cost? How will the system be installed and who will supervise the installation to ensure that it is done properly? What mistakes can happen during installation? Is any special handling, installation techniques or equipment required?
- Potential disadvantages at this site: Any physical constraints? Weight or buoyancy issues? Durability issues? Energy requirements?
- Operation and maintenance (O&M) requirements and costs: New technologies will not have long-term data on O&M requirements, so it is particularly important that an applicant provide all available information for evaluation.

B. Data on how well the alternative technology works:

- Flow proportional sampling from laboratory testing and full-scale operations that is representative of the potential range of rainfall events (for example, a sufficient number of storms is generally at least 15) and located at sites similar to the conditions of the installation under review.
- Calculation of TSS removal rate should be presented. If there is a removal rating for a similar technology and use posted at http://www.mass.gov/dep/, and the proponent makes a claim for a higher TSS removal rate than for the similar system posted, the applicant must provide sufficient data to support the claim. Removal rates should show removal of various particle sizes across the full range of operating conditions including maximum, minimum and optimal conditions for reliable performance.
- A copy of the site's operation and maintenance plan including operational details on any full-scale installations: e.g., locations, length of time in operation, maintenance logs (logs should record the dates of inspections and cleaning, actions performed, quantities of solids removed, and time required for work).
- Information on any system failures, what those failures were, and how were they corrected.
- Copies of any articles from peer-reviewed, scientific or engineering journals.
- Any approvals or permits from other authorities.
- References along with contact information from other installations.

C. Operation and Maintenance (O&M) Plan:

- To ensure that the system will function as designed, all stormwater management systems must have a written operation and maintenance plan in accordance with Stormwater Management Standard 9. MassDEP stresses the importance of routine maintenance for all stormwater control technologies. A number of alternative technologies perform very well,

but only if they are installed and maintained as specified by the manufacturer. For example, some alternative wet vaults may be able to achieve a high TSS removal rate, but only if they are cleaned often enough to prevent re-entrainment of previously trapped sediment.

- The O & M Plan shall
    - Identify access points to all components of the stormwater system;
    - Specify equipment, personnel, and training needed to inspect and maintain system;
    - Include a list of any safety equipment and safety training required for personnel;
    - Set forth a suggested frequency of inspection and cleaning; and
    - Provide a sample inspection checklist and maintenance log.

Please refer to Standard 9 in the Stormwater Technical Handbook (Volume 1, Chapter 1 and Volume 2, Chapter 1) for further guidance about O&M.

Step Two: Evaluate the submitted information.

An issuing authority (Conservation Commission or MassDEP upon appeal) may want to ask the questions set forth below to determine whether a proposed use of an alternative technology, either as a stand-alone product or in combination with other stormwater control practices and technologies, meets all of the Stormwater Management Standards:

A. **Why is this technology being proposed for this site?** Possible reasons are the alternative technology provides a higher level of environmental protection, uses less land area, and is less expensive on a capital or operation and maintenance cost basis. The performance data and other information provided with the application must support these claims. For example, if the applicant proposes an alternative technology, because it is less expensive to maintain than a conventional stormwater control technology system, the applicant must submit information supporting that claim.

B. **How convincing is the performance data?** Applicants must be able to demonstrate that their calculations show satisfactory performance in a laboratory, and preferably, adequate field-testing results. Were performance data (laboratory or field) collected by the technology developer or by independent organizations? Independent data are preferable, but may not always be available. If applicable, do the data and calculations support the claim of a higher TSS removal rate? Is the site similar to other locations where the alternative technology is already properly operating? The greater the similarity in key factors (e.g., soil conditions, climate, sediment loading rates, surficial geography, slopes), the greater the likelihood that the technology will properly work at the proposed site.

C. **Are the data sets complete?** If there are any gaps, why? Are you satisfied with the reasons given as to why there are gaps? For example, if maintenance data are provided for a two-year period, and there is a six-month gap in the record, a reasonable explanation for the gap should be provided. Is there enough information to persuade the issuing authority that the technology will work as proposed?

D. **Technologies may not work all the time or at all locations, and therefore, failures may be expected.** If there have been failures, either in the laboratory or in real settings, is the applicant able to adequately explain the reasons for the failure? Examples could be poor design, improper sizing, and higher sediment loading than anticipated, extreme hydrologic events, poor installation, or poor maintenance. If it was a design problem, has the design of the technology been modified

to address the problem? For failures that were not design related, what corrections were made to prevent future failure? Were systems rechecked to see if they were functioning properly after corrections were made?

E. **If only limited data is available, is it possible to assess how the technology will work over its expected life?** If seasonality is an issue, the Commission should see data collected over a full change of seasons that reflect a normal weather year, or at least an estimate of normal annual operations based on available data. Can the technology function well for the full range of storm events that must be controlled? If not, is there a way to address this problem?

F. **Is it possible that a technology may effectively meet one Standard, but hamper compliance with other Standards?** For example, a technology might increase the rate of TSS removal, but limit the annual recharge. The applicant should provide documentation to help the Commission make this evaluation. Do the advantages of the technology potentially outweigh its disadvantages?

G. **Check any references provided by the applicant to find out whether previous installations are properly functioning.** If the information indicates that other Conservation Commissions have previously approved this technology for use in their municipalities, check with those Commissions to verify that the system has performed properly. Were there unexpected operation and maintenance costs? If there were problems, did the vendor assist in resolving them?

See the Detailed Proprietary BMP Evaluation Guidance below for more information.

Step Three: Make a decision on the filings.

If there appears to be sufficient information, the Conservation Commission must issue a decision approving (with or without special conditions) or denying the use of the proposed technology to meet the Stormwater Management Standards. There may be instances where the Conservation Commission may want to add conditions to the Order of Conditions to ensure the proper functioning of the alternative stormwater control technology and, if covered in a local wetlands bylaw, require a bond to be posted to pay for any repairs that may be necessary if the alternative system does not perform as designed. Particular attention to inspection and maintenance is advised and should be included in the conditions.

If a Conservation Commission denies the use of a proprietary technology, it must specify the reasons in writing. Because these decisions are subject to appeal, written documentation is critical.

If insufficient information exists, and the Commission cannot adequately evaluate the proposed technology, the Conservation Commission may either deny the project based on the lack of information (and specify what information is lacking in the denial) or ask the applicant to supply additional information The Conservation Commission may also direct the technology vendor to the TARP contacts listed in the References Section of this Chapter.

Other Proprietary BMP Information

Information about the STEP and TARP programs

The two Massachusetts-accepted evaluation programs - the Massachusetts Strategic Envirotechnology Partnership (STEP) and the multi-state "Technology Acceptance and Reciprocity Partnership" (TARP), were established to ensure rigorous testing and independent analysis of the effectiveness of manufactured or innovative (i.e., "proprietary") stormwater systems. Since each of these programs require significant testing, only a small number of systems have completed the programs and have had their effectiveness officially evaluated.

TARP

TARP was formed by the states of California, Illinois, Maryland, Massachusetts, New Jersey, New York, Pennsylvania, and Virginia to provide reliable performance information about emerging technologies and to reduce the regulatory and permit hurdles that slow down or prevent their use. More information on TARP is available at this web site:
http://www.dep.state.pa.us/dep/deputate/pollprev/techservices/tarp/

STEP

Before ending in 2003, the STEP program evaluated a number of different emerging technologies. STEP produced 2 reports and fact sheets on 3 stormwater technologies. Each was assigned a TSS removal efficiency. The reports are located here
http://www.mass.gov/envir/lean_green/documents/techassessments.htm
and the Facts Sheets are located here:
http://www.mass.gov/envir/lean_green/documents/factsheets.htm

Local agencies must note that the STEP verifications are limited to the specific models being used under specific conditions. If the conditions being proposed are significantly different than the conditions under which the units were tested, or the proposed models are different than the model tested, or the flow rates proposed are different than the flow rates tested, the local permitting authority may question whether the evaluations are applicable and may determine that the proposed proprietary technology is not appropriate for the proposed use or may not be able to remove TSS at the proposed rate.

Since the STEP process was less rigorous than the TARP process, and since the conditions under which STEP evaluations occurred were more limited than the TARP's protocol, developers proposing STEP technologies MUST provide the entire STEP Fact Sheet describing the proposed technology. A Conservation Commission may ask to see the entire report, and, upon request, the developer must provide it.

Conservation Commissions and other local agencies shall NEVER rely solely on information contained in STEP-related letters or excerpts from the STEP Fact Sheets or Reports found in vendor-provided literature or advertising when evaluating these systems.

When developers propose a specific use of a particular proprietary stormwater technology that has not been evaluated by the TARP or STEP program, the local agency is responsible for developing a TSS removal number based upon the site conditions, the proposed use of the technology, and information assessing the effectiveness of the technology.

If a proprietary BMP is proposed that has not been evaluated by STEP or TARP, MassDEP strongly encourages local agencies to use third party studies listed on the UMASS Stormwater Technologies Clearinghouse database (www.mastep.net) as the basis for their evaluation of the effectiveness of the proprietary system. While manufactured stormwater technologies are not required to have third party studies to be used in Massachusetts, local agencies in turn are not required to approve the use of these technologies.

The UMASS website (www.mastep.net) grades the quality of the studies evaluating proprietary BMPs. Local agencies must consider this information when deciding whether to approve the use of the proposed technology or what TSS number it will assign to a proposed use of a particular proprietary technology.

If a local agency denies the specific use of a particular alternative technology, the reasons should be specified in writing. This written documentation is important, because denials are subject to appeal and may be overturned, if permission is unreasonably withheld.

Other Sources of Information about Manufactured Stormwater Systems

There are other sources of information about the effectiveness of proprietary BMPs that may be used by local agencies to estimate TSS removal rates.

- ETV: This federal EPA verification program's information can be found at http://www.epa.gov/etv/verifications/vcenter9-9.html. EPA Region I hosts a "virtual trade show" of stormwater technologies with vendor provided information at http://www.epa.gov/ne/assistance/ceitts/stormwater/techs.html.
- New Jersey has a searchable database found at http://www.njcat.org/verification/Verifications.cfm
- Washington Department of Ecology evaluates emerging stormwater treatment technologies, more information and state approvals are found at http://www.ecy.wa.gov/programs/wq/stormwater/newtech
- CSTEV: The University of New Hampshire (UNH) Stormwater Center is evaluating the performance of several stormwater control technology technologies real time and on the ground. Information can be found at http://www.unh.edu/erg/cstev/.
- The American Society of Civil Engineers, EPA and others sponsor an international stormwater best management practices database at http://www.stormwater control technologydatabase.org/.
- MassDEP at http://www.mass.gov/dep/water/wastewater/stormwat.htm has information about stormwater.
- The University of Connecticut: UConn's website at http://nemo.uconn.edu/tools/stormwater/ has information about the interrelationship between increased stormwater runoff and associate pollutants.
- Center for Watershed Protection*:* This national non-profit at http://www.cwp.org/ provides resource information for local officials.

How To Evaluate the Use of Proprietary BMPs in Critical Areas and for Land Uses with Higher Potential Pollution Load: Standards 5 and 6

The Stormwater Management Standards limits the type of stormwater systems that may be used for treatment in **Critical Areas and Land Uses with Higher Potential Pollutant Loads.**

For new development, proprietary stormwater systems[1] may be used in such areas ONLY as a pretreatment device to one of the devices listed in the Stormwater Management Handbook as suitable for such areas or land uses. See Volume 1, Chapter One. For redevelopment sites, these systems may be used for discharges to Critical Areas or from Land Uses with Higher Potential Pollutant Loads ONLY if site constraints prevent use of the devices determined by MassDEP to be suitable for such areas and land uses.

Since the devices listed by MassDEP for discharges to Critical Areas or from Land Uses with Higher Potential Pollutant Loads were selected based on their ability to capture or treat constituents in addition to TSS (such as toxics, pathogens, nutrients, or temperature), proprietary systems proposed for redevelopment projects in these areas must provide similar capabilities.

How Proprietary Stormwater Systems Can Improve Local Conditions

In some cases local agencies will look further than TSS removal in analyzing the effectiveness of proprietary stormwater systems. Removal efficiencies can vary substantially with the size of particles and there are other valid ways than TSS to measure sediment reductions, so local agencies may need to examine closely the system's effectiveness for the specific site at which it is proposed.

Local agencies may be concerned about other contaminants such as toxics (metals such as lead, copper, zinc, or nickel), nutrients, pathogens or physical changes (such as temperature). If a Conservation Commission or other local agency is concerned about any of these parameters, because the receiving water is impaired or the designated use of the receiving water dictates removal of other pollutants, the local agency may want to request and analyze that kind of data.

Detailed Proprietary BMP Evaluation Guidance for each of the 10 Stormwater Standards

The purpose of this detailed guidance is to provide proponents and local agencies with the kinds of questions used by states when verifying the effectiveness of Proprietary BMPs. These questions should be used to address specific questions local agencies may have about the effectiveness of Proprietary BMPs to meet a specific Stormwater Management Standard. This guidance is not intended as a mandatory checklist that every proponent must submit for every Proprietary BMP.

Both proponents and reviewers of proprietary BMPs can use the following questions to determine if the information submitted about a proprietary BMP is sufficient to allow the proposed use.

[1] Subsurface structures, even if they have manufactured storage chambers, are not proprietary BMPs, since the treatment occurs in the soil below the structure, not in the structure itself.

Using these questions will help proponents and reviewers determine whether a sufficient evaluation of the proprietary BMP has been performed, identify where deficiencies may be present, and reasonably predict the performance of a proprietary BMP at the project site.

General Information

Has the applicant provided a detailed description of the characteristics of the site, described how the proposed proprietary product addresses the unique storm water management requirements of the site, and shown that the proprietary product is in compliance with the Stormwater Management Standards? Has the applicant shown that the BMP is advantageous to the site? Have LID and site design techniques been considered when developing the site design? Items to consider include but are not limited to:

- What is the BMP's proposed use: pretreatment or treatment? Separator, filtration, infiltration or other use?
- Is the project for new development or re-development?
- Are there site constraints that limit what other BMPs can be used?
- Is it in an area of higher potential pollutant loads? (See Standard 5)
- Is there discharge to or near a critical area? (See Standard 6)
- Is there a high flow contribution from off-site?
- Is there a high TSS contribution anticipated from site soils, winter sand application, or other source?
- Are there TMDL requirements or recommendations applicable to the site?
- Are there other reasons that specific pollutants in addition to TSS should be reduced (e.g., Phosphorus, Nitrogen, Bacteria, hydrocarbons)?

Has the applicant provided documentation that the sizing of the device is correct? Is there any reason to allow a smaller size than proposed? Has the applicant demonstrated that the device meets both of the following:

- The Stormwater Management Standards; and
- The sizing procedures and calculations established by the manufacturer and verified through laboratory/field testing.

Has the applicant provided documentation that the product manufacturer's performance claims have been verified through laboratory and/or field-testing? Does the evaluation indicate that the device will work well on this specific site?

- Has the product been approved for use by other agencies in other states; if so, for what pollutants, pollutant levels and/or land use?
- Has the product been listed in the UMASS Stormwater Technologies database, and if so, how have the studies of the product been rated?

Is the product intended for construction period erosion and sedimentation control? If so, has the applicant provided documentation that the product is effective for such use? (See Standard 8 below.)

Did the STEP program evaluate the proposed BMP model and size and assess its TSS removal efficiency? If so, has the applicant:

- provided the complete STEP report (not excerpts or manufacturers' letters)?
- shown that the BMP proposed is one of the models that was evaluated?
- shown that the proposed sizing is the same as the sizing used for the STEP evaluation?

Is the product listed in the UMASS Stormwater Technologies database? If not, has the applicant provided documentation comparable to the studies cited in the database?

If not, are there compelling site-specific reasons why the proprietary BMP should be used (e.g., severe location or space constraints, need to reduce a specific pollutant, flooding, filter devices proposed)?

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Information Required to Address Specific Stormwater Management Standards

<u>Standard 1: (Untreated discharges)</u>: No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

No new untreated discharges

- Does the use of the product enable the applicant to provide adequate treatment for its new discharges?
- Does the use of the product enable the applicant to retrofit an existing discharge, achieving an improvement over existing conditions (see Standard 7)?
- Is the system designed to prevent erosion and scour?

<u>Standard 2: (Peak rate control and flood prevention)</u>: Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

Peak rate control

- Does the product have a significant function in managing peak rates of runoff?
- If so, has the applicant documented this function with hydrologic/hydraulic data in lab or field studies?
- How is product performance affected by peak discharges?
- Has the applicant documented its performance with hydrologic/hydraulic in lab or field studies?
- Is the product susceptible to re-suspension and flushing of captured contaminants during a 2 -year or 10-year storm?
- Is the product designed to prevent such re-suspension and flushing? Is this documented in the laboratory/field studies? Was the particle size in those studies comparable to that used to calculate the performance and size of the proprietary BMP?
- If the product is not designed to address re-suspension and flushing, does the project design provide for "off-line" placement of the device?
- Is the product subject to damage or filling by sediment during a flood event or a coastal storm event?

<u>Standard 3: (Recharge)</u>: Loss of annual recharge to ground water shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

Recharge

- Is the product proposed as part of a recharge system? If so,
- Is it a pre-treatment device intended to remove particulates and/or other pollutants prior to discharge to a recharge BMP?
- Is it a recharge BMP that requires protection by another pre-treatment BMP?
- Does it provide both pre-treatment and recharge?

Standard 4: (80% TSS Removal): Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This standard is met when:

a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan and thereafter are implemented and maintained;

b. Stormwater best management practices are sized to capture the prescribed runoff volume; and

c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

Water Quality Treatment

- Does the product remove TSS?
- Has the applicant provided documentation that the TSS removal capability of the device is based on a particle size distribution meeting accepted evaluation protocols? (See www.mastep.net)
- Does the product provide for control or prevention of re-suspension, scour, and/or flushing of captured solids or other contaminants treated by the product?
- Has the product been sized per manufacturer's standards, as verified by laboratory/filed testing?
- Does the product treat other pollutants, and if so, has applicant provided performance documentation (with verification documented by or consistent with the MassSTEP Database)?
- Is the proposed use of the product in the correct sequence in the "treatment train"?

    - Pretreatment (e.g., coarse particle separation, e.g., sand sized particles such as OK-110 floatables removal)
    - Terminal treatment (e.g. fine particle settling, e.g., silt and fine sand particles such as NJDEP PSD)
    - Polishing treatment (e.g., filtration, bacteria absorption or adsorption)
    - Infiltration

- How will the future use of the site influence the kinds of pollutants to be treated and loading rates of those pollutants (e.g., residential may mean more nutrients, a roadway may mean more coarse TSS)?

Standard 5 (Land Use with Higher Potential Pollutant Loads (LUHPPL)): For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater

discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

Land Uses with Higher Potential Pollutant Loads (LUHPPL)

Does this standard apply to the site? If so,

- Is the product used consistent with the source control requirements of the Stormwater Management Standards?
- Does the technology provide pretreatment prior to discharge to a technology that has been determined to be suitable for runoff LUHPPL? ?
- What pollutants are associated with the LUHPPL? What demonstration can be provided that shows that the proposed BMP is capable of removing and/or treating those pollutants?
- Does the LUHPPL have the potential to generate stormwater runoff that has high concentrations of oil and grease? If so, has the technology been proposed in addition to an oil grit separator or sand filter or as an alternative method of achieving oil and grease removal in place of an oil grit separator or sand filter? If the technology is proposed in place of an oil grit separator or sand filter, what evidence is there that the technology is effective in removing oil and grease?

<u>Standard 6 (Critical Areas)</u>: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or to any other critical area require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area, if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

Critical Areas

Does this standard apply to the site? If so,

- Is the product used for pretreatment prior to discharge to a technology that the Department has determined is suitable for the particular critical area?
- Does the product have any operating characteristics that could adversely affect the critical area, such as
    - Thermal impacts to coldwater fisheries
    - Release of bacteria to shellfish growing areas, bathing beaches
    - Release of previously captured pollutants (scour)

<u>Standard 7 (Redevelopment)</u>: A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice

requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

Redevelopment

- Do site constraints make a proprietary BMP a better choice than a traditional BMP?
- Does the product performance documentation enable the Conservation Commission to determine a quantitative rating of the product for achieving one or more of Standards 2-6?
- If the answers to both b and c are "no", does the product documentation enable the Commission to qualitatively determine that the product improves existing conditions relative to one or more of Standards 2-6?

Standard 8: (Erosion, Sediment Control): A plan to control construction related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

Erosion and Sediment Control

- Is the product intended to control erosion and sedimentation during the construction process?
- If so, has the applicant documented this function? How does it fit into the construction period erosion, sedimentation and pollution prevention plan?
- Is the product susceptible to adverse impact by erosion and sedimentation during construction, and if so, has the applicant documented how the product will be protected from such impact?

Standard 9: (Operation and Maintenance): A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

Operation and Maintenance

- Has the applicant completely described the installation, operation, and maintenance of the device? Has the applicant documented how the required maintenance will be done and who will do it?
- Has the applicant included a copy of the manufacturer's installation, inspection, operation, and maintenance procedures in the project O&M plan?
- Is the proposed BMP included in the project's O&M plan?
- Does the product require special materials or equipment for cleaning? If so, what materials or equipment are necessary?
- Has the O&M plan funding accounted for such equipment and materials?
- Does the inspection or maintenance of the device require confined space entry protocols?
- Is the frequency of maintenance and cleaning documented by pollutant loading/removal estimates, experience at other installations, or other information demonstrating that the proposed frequency is adequate?
- How will the future use of site influence O&M needs? More frequent? Less frequent?

Standard 10 (Illicit Discharges): All illicit discharges to the stormwater management system are prohibited.

Have steps been taken to prevent illicit discharges from entering the proprietary BMP?