Workshop #2: Nonstructural Controls and Private BMPs – How to Get Credits

April 5, 2022
1:00 PM to 3:00 PM
Today’s Agenda

1:00 PM Welcome & Introductions

1:10 PM Technical Presentation
  • Nonstructural Controls
  • Privately Owned Structural Controls

2:00 PM Panel Discussion and Open Forum
  • Maria Rose, Newton
  • Matt Shuman, Watertown
  • Stephanie Carlisle and Bridget Graziano, Medway
  • Kim Donovan, Needham

2:55 PM Next Steps

3:00 PM Adjourn
Project Team

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# Workshop Overview

<table>
<thead>
<tr>
<th>Workshop Title</th>
<th>Date &amp; Time</th>
<th>Key Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Workshop 1:</strong> All About the Loads – Baseline Loads, Impact from EPA’s RDA</td>
<td>3/8 1-3pm</td>
<td>✔ Provide baseline load methodology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✔ Update and discuss RDA</td>
</tr>
<tr>
<td><strong>Workshop 2:</strong> Non-structural Controls and Private BMPs – How to Get Credits</td>
<td>4/5 1-3pm</td>
<td>✔ Provide methodology for tracking non-structural BMPs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✔ Review data requirements for private BMP tracking</td>
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<td></td>
<td></td>
<td>✔ Regulatory guidance</td>
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<tr>
<td></td>
<td></td>
<td>✔ Best-practices open forum</td>
</tr>
<tr>
<td><strong>Workshop 3:</strong> Public BMPs – Maximizing the Cost-Benefit Equation</td>
<td>5/10 1-3pm</td>
<td>✔ Present updated BMP cost data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✔ Panel discussion on public BMP wins</td>
</tr>
<tr>
<td>Q&amp;A</td>
<td>5/24 1-3pm</td>
<td>✔ Ask regulators questions about the Permit and Phosphorus Control Planning</td>
</tr>
</tbody>
</table>
Data Request for Workshop #3 – Costs & Benefits of Public Stormwater BMPs

Three options for sharing information extended until 4/8:
• Populate an excel-based template
• Send us files which include information about BMP costs
• Participate in a phone interview with our team

Unable to participate? Let us know in the Zoom meeting chat or email.

Contact Julie Wood at jwood@crwa.org
Overview of Workshops

Workshop 1

Phosphorus load reduction requirement

Workshop 2

Phosphorus Credits for Non-Structural BMP

Workshop 3

Phosphorus Credits for Structural BMPs on Private Property

Phosphorus Credits for Publicly-Owned Structural BMPs

https://www.crwa.org/phosphorus-control-planning-support.html
Non-Structural BMP Phosphorus Credits

Opportunities and Limitations

- Nonstructural controls are typically most cost-effective strategy for meeting phosphorus reduction requirements
  - Street sweeping
  - Catch basin cleaning
  - Enhanced organic waste and leaf litter collection
- Credits are limited
BMPs on Private Properties

Opportunities and Limitations

• Stormwater BMPs on private properties can count towards phosphorus reduction requirements
• Requirements for new/re-development provides an opportunity to increase these credits
• Additional incentives can be used to encourage implementation of BMPs on private properties
• BMP costs are not directly incurred by permittee (tracking is required)
Opportunities and Limitations

• Limited public property to implement structural BMPs
• Costs incurred by permittees
• Currently gathering data about costs to implement BMPs
  • Please complete the data request. We will discuss cost effective strategies at Workshop 3
Non-Structural BMP Phosphorus Credits

Section 1.6 of the Phosphorus Control Plan Template

(1) Street Sweeping
(2) Catch Basin Cleaning
(3) Enhanced Organic Waste and Leaf Litter Collection
(4) Fertilizer Credit (future)
(5) IDDE Credit (future)
**Phosphorus Credit**

\[ P_{\text{sweeping}} = IA_{\text{swept}} \times PLER_{\text{IC-land use}} \times PRF_{\text{sweeping}} \times AF \]

**Where:**
- Credit\(_{\text{sweeping}}\) = Amount of nutrient load removed by enhanced sweeping program (lb/year)
- IA\(_{\text{swept}}\) = Area of impervious surface that is swept under the enhanced sweeping program (acres)
- PLER\(_{\text{IC-land use}}\) = Phosphorus Load Export Rate for impervious cover and specified land use (lb/acre/yr) (see Table 2-1)
- PRF\(_{\text{sweeping}}\) = Phosphorus Reduction Factor for sweeping based on sweeper type and frequency (see Table 2-4).
- AF = Annual Frequency of sweeping. For example, if sweeping does not occur in Dec/Jan/Feb, the AF would be 9 mo./12 mo. = 0.75. For year-round sweeping, AF=1.0\(^1\)

**Table 2-4: Nutrient reduction efficiency factors for sweeping impervious areas**

<table>
<thead>
<tr>
<th>Frequency(^1)</th>
<th>Sweeper Technology</th>
<th>PRF(_{\text{sweeping}})</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/year (spring and fall)(^2)</td>
<td>Mechanical Broom</td>
<td>0.01</td>
</tr>
<tr>
<td>2/year (spring and fall)(^2)</td>
<td>Vacuum Assisted</td>
<td>0.02</td>
</tr>
<tr>
<td>2/year (spring and fall)(^2)</td>
<td>High-Efficiency Regenerative Air-Vacuum</td>
<td>0.02</td>
</tr>
<tr>
<td>Monthly</td>
<td>Mechanical Broom</td>
<td>0.03</td>
</tr>
<tr>
<td>Monthly</td>
<td>Vacuum Assisted</td>
<td>0.04</td>
</tr>
<tr>
<td>Monthly</td>
<td>High Efficiency Regenerative Air-Vacuum</td>
<td>0.08</td>
</tr>
<tr>
<td>Weekly</td>
<td>Mechanical Broom</td>
<td>0.05</td>
</tr>
<tr>
<td>Weekly</td>
<td>Vacuum Assisted</td>
<td>0.08</td>
</tr>
<tr>
<td>Weekly</td>
<td>High Efficiency Regenerative Air-Vacuum</td>
<td>0.10</td>
</tr>
</tbody>
</table>

Source: 2016 MS4 Permit, Appendix F, Attachment 2
Performing Street Cleaning Credit Calcs

- Streets ‘edge of pavement’ GIS layer (need polygons, not polylines)
- Break into segments with the same equipment type and sweep frequency (each segment should have a PRF and AF value)

Example Street Network

- Mechanical broom, weekly (PRF=0.05), Sweeping 12 months of the year AF = 1.0
- Mechanical broom, monthly (PRF=0.03), Sweeping 9 months of the year AF = 0.75
Determining PLER for Streets

- Phosphorus loading export rate (PLER) **depends upon Land Use Data source**
- 2016 MassGIS Land Use data (or your own)
  - PLER = 1.95 lb/ac/yr
  - This value is not in the Permit
  - Composite value calculated for impervious areas in Charles River watershed
- 2005 MassGIS Land Use GIS data
  - Streets do not have their own land use code (except for highways)
  - Don’t use the PLER for ‘Highways’ unless your street is a highway
  - Intersect land uses with street segments to create new set of polygons
  - Determine PLER for each polygon using land-use crosswalk table (2016 MS4 Permit, Appendix F, Attachment 1, Table 1-3) and PLER table (2016 MS4 Permit, Appendix F, Attachment 1, Table 1-2)
• To be eligible for credit, minimum sump storage capacity of 50% must be maintained through the year
• Impervious area = streets

Credit_{PCB} = \text{IA}_{CB} \times \text{PLER}_{IC\text{-land use}} \times \text{PRF}_{CB}

Where:

Credit_{CB} = \text{Amount of nutrient load removed by catch basin cleaning (lb/year)}
IA_{CB} = \text{Impervious drainage area to catch basins (acres)}
PLER_{IC\text{-and use}} = \text{Phosphorus Load Export Rate for impervious cover and specified land use (lb/acre/yr) (see Table 2-1)}
PRF_{CB} = \text{Phosphorus Reduction Factor for catch basin cleaning equals 0.02}

Source: 2016 MS4 Permit, Appendix F, Attachment 2
Weekly sweeping from September 1 – December 1

- Roadways and parking lots
- Gather and remove landscaping wastes, organic debris and leaf litter
- Sweep promptly after landscaping activities

**Credit**

\[ P_{\text{leaf litter}} = (I_A \text{ leaf litter}) \times (\text{PLER IC-land use}) \times (0.05) \]  

**Where:**

- Credit _leaf litter_ = Amount of nutrient load reduction credit for organic waste and leaf litter collection program (lb/year)
- IA _leaf litter_ = Impervious area (acre) in applicable watersheds that are subject to enhanced organic waste and leaf litter collection program
- PLER IC-land use = Phosphorus Load Export Rate for impervious cover and specified land use (lbs./acre/yr.) (see Table 2-1)

Source: 2016 MS4 Permit, Appendix F, Attachment 2
• In 2012 Massachusetts enacted law limiting usage of phosphorus fertilizers
• Phosphorus Credit
  • Included in draft 2014 MS4 Permit
  • Not included in 2016 MS4 Permit
  • Will likely be included in next MS4 Permit

Table 2-5 from Draft 2014 MS4 Permit
Calculated weighted export rates and fertilizer credits for Charles River Watershed small MS4 Permittees

<table>
<thead>
<tr>
<th>Town</th>
<th>WPLER (lb/acre/yr)</th>
<th>Credit/acre/yr (lb/yr)</th>
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</thead>
<tbody>
<tr>
<td>Arlington</td>
<td>0.261</td>
<td>1.2</td>
</tr>
<tr>
<td>Ashland</td>
<td>0.207</td>
<td>1.7</td>
</tr>
<tr>
<td>Bellingham</td>
<td>0.152</td>
<td>10.8</td>
</tr>
<tr>
<td>Belmont</td>
<td>0.227</td>
<td>8.0</td>
</tr>
<tr>
<td>Brookline</td>
<td>0.273</td>
<td>53.9</td>
</tr>
<tr>
<td>Cambridge</td>
<td>0.261</td>
<td>9.0</td>
</tr>
<tr>
<td>Dedham</td>
<td>0.290</td>
<td>23.7</td>
</tr>
<tr>
<td>Dover</td>
<td>0.216</td>
<td>16.7</td>
</tr>
<tr>
<td>Foxborough</td>
<td>0.139</td>
<td>0.1</td>
</tr>
<tr>
<td>Franklin</td>
<td>0.236</td>
<td>58.8</td>
</tr>
<tr>
<td>Holliston</td>
<td>0.164</td>
<td>33.2</td>
</tr>
<tr>
<td>Hopkinton</td>
<td>0.136</td>
<td>9.5</td>
</tr>
<tr>
<td>Lexington</td>
<td>0.206</td>
<td>16.3</td>
</tr>
<tr>
<td>Lincoln</td>
<td>0.238</td>
<td>9.9</td>
</tr>
<tr>
<td>Medfield</td>
<td>0.148</td>
<td>21.6</td>
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<tr>
<td>Medway</td>
<td>0.159</td>
<td>28.8</td>
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<tr>
<td>Mendon</td>
<td>0.119</td>
<td>0.3</td>
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<tr>
<td>Milford</td>
<td>0.205</td>
<td>34.0</td>
</tr>
<tr>
<td>Millis</td>
<td>0.130</td>
<td>16.0</td>
</tr>
<tr>
<td>Natick</td>
<td>0.240</td>
<td>37.6</td>
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<td>Needham</td>
<td>0.221</td>
<td>44.8</td>
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<td>Newton</td>
<td>0.252</td>
<td>113.1</td>
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<td>Norfolk</td>
<td>0.096</td>
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<td>Sherborn</td>
<td>0.162</td>
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<tr>
<td>Somerville</td>
<td>0.291</td>
<td>8.2</td>
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<td>Walpole</td>
<td>0.156</td>
<td>3.7</td>
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<tr>
<td>Waltham</td>
<td>0.255</td>
<td>45.4</td>
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<td>Watertown</td>
<td>0.283</td>
<td>21.1</td>
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<tr>
<td>Wayland</td>
<td>0.209</td>
<td>1.4</td>
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<tr>
<td>Wellesley</td>
<td>0.220</td>
<td>56.7</td>
</tr>
<tr>
<td>Weston</td>
<td>0.159</td>
<td>40.9</td>
</tr>
<tr>
<td>Westwood</td>
<td>0.248</td>
<td>18.8</td>
</tr>
<tr>
<td>Wrentham</td>
<td>0.076</td>
<td>6.0</td>
</tr>
</tbody>
</table>
Statement of Basis for Proposed Permit Modification: NPDES General Permit for

Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4s) to

Certain Waters in the Commonwealth of Massachusetts

EPA is proposing to update the required phosphorus reductions contained in Table F-2 and Table F-3 of Appendix F Part I. The proposed increase in required phosphorus reduction target represents the removal of the presumptive watershed-wide IDDE phosphorus reduction applied to each permittee’s required phosphorus reduction target. EPA would recalculate the watershed wide phosphorus reduction due to IDDE implementation by all permittees following completion of each permittee’s IDDE program (10 years after the permit effective date). The watershed wide phosphorus reduction realized through IDDE implementation would then be distributed among the permittees to reduce each permittee specific required phosphorus reduction target following IDDE program completion. This proposed approach would more accurately reflect the phosphorus load reduced watershed wide from removal of illicit discharges.
Section 1.7 of the Phosphorus Control Plan Template

Workshop 2

- Subsurface infiltration
- Infiltration or water quality swales
- Rain gardens
- Bioretention
- Biofiltration - filter media, tree box filters, etc.
- Gravel wetland
- Enhanced biofiltration with internal storage reservoir

Private BMPs

- Phosphorus load reduction requirement
- Non-Structural BMP Phosphorus Credits
- Private Property Structural BMP Phosphorus Credits
- Publicly-Owned Structural BMP Phosphorus Credits
Types of Structural BMPs

What BMPs are Eligible?

- Subsurface infiltration
- Infiltration or water quality swales
- Rain gardens
- Bioretention
- Biofiltration - filter media, tree box filters, etc.
- Gravel wetland
- Enhanced biofiltration with internal storage reservoir
- Sand filter
- Porous pavement
- Wet pond
- Dry pond
- Impervious area disconnection using storage - rain barrels, cisterns, etc.

To learn more about individual types of BMPs see: Massachusetts Stormwater Handbook and Stormwater Standards
Four Components of Private BMPs

1. Data Needs: What information is required for credit?
2. Mechanism: How do you get private property BMPs?
3. Receive Data: How do you receive the associated data?
4. Manage Data: How do you manage the associated data?
Part 1: Data Needs for Private BMPs

1. Data Needs: What information is required for credit?

2. Mechanism: How do you get private property BMPs?

3. Receive Data: How do you receive the associated data?

4. Manage Data: How do you manage the associated data?
Part 1: Data Needs for Private BMPs

Private BMP Credit Components

P-Load Reduction Design Information

O&M Certification
Part 1: Data Needs for Private BMPs

Within each of these boundaries need the following values:

- Directly connected impervious area by land use type
- Disconnected impervious area (i.e., impervious surfaces that drain to pervious land)
- Pervious area for each combination of land use type and hydrologic soil group

Also need to know BMP Type and BMP Capacity

- Some types of BMPs require additional info (e.g., infiltration trenches require infiltration rate)
• **Project Areas Before and After Redevelopment** are used to calculate changes in the annual phosphorus export rate from the site.

• **BMP drainage area and BMP** information is used to calculate phosphorus credit.
Part 1: Data Needs for Private BMPs

Data Required to Maintain Credits

- Proof of inspection/date of last maintenance
- Confirm operating as BMP was originally designed
- In accordance with manufacturer/design specification
- O&M Plans

City of Topeka Property Owner’s Guide to Stormwater BMP Maintenance
Part 2: Mechanism to Obtain Data

1. Data Needs: What information is required for credit?
2. Mechanism: How do you get data for private BMPs?
3. Receive Data: How do you receive the associated data?
4. Manage Data: How do you manage the associated data?
What are your Stormwater Redevelopment Requirements?

Existing Regulatory Drivers/Requirements

- Enforcement authority
- Rules & Regulations vs. ordinances vs. plan review process
- Development and Re-development Standards and review thresholds
  - MS4 Permit threshold – 1 acre
  - Options for a more stringent (smaller size) trigger
  - Tradeoff for size constraints
- Resources for updated regulatory language
  - CRWA – Recommended Additions to Enhance Stormwater Regulations (April 2021)
    - Private entities completing and submitting calculations in a standardized format
  - Northern Middlesex Stormwater Collaborative Bylaw/Ordinance & Regulations
  - Neponset Stormwater Partnership Model Bylaw (May 2019)
Incentivizing private BMPs

- Stormwater Utility
- Development Incentives
- Grants
- Rebates and Installation Financing
- Awards and Recognition Programs

Equity and resiliency considerations

- Incentivize projects within disadvantaged communities
- Address climate resiliency or flood mitigation co-benefits
Using a Stormwater Utility to encourage private BMPs and increase credits

Stormwater Regulations and Fee

Mechanism to collect information on existing and new BMPs

Credit

Incentivizes property owners to install new BMPs and maintain existing BMPs, providing Permittees with low-cost credits

Credit Renewal Process

Provides an on-going mechanism for tracking O&M is adequate
Part 3: Receiving Data

1. Data Needs: What information is required for credit?
2. Mechanism: How do you get data for private BMPs?
3. Receive Data: How do you receive the associated data?
4. Manage Data: How do you manage the associated data?
Part 3: Receiving Data – Two Components

- Private BMP Credit Components
  - P-Load Reduction Design Information
  - O&M Certification
How to Receive BMP Design Data

- How does data get reported to a municipality?
  - To what department, and in what format?
  - Through plan review process or other process?
- How are calculations reported and stored?
Credits for Existing BMPs

Difference in approach between planned BMPs and already installed BMPs

- Incorporate submitted plans from past reviews into the systems developed for BMP tracking
  - Extract and digitize data
  - Incorporate these BMPs into O&M certification program
- Example mechanisms: stormwater utility, plan reviews
From Appendix F of the Permit:

“I certify under penalty of law that all source control and treatment Best Management Practices being claimed for phosphorus reduction credit have been inspected, maintained and repaired in accordance with manufacturer or design specification. I certify that, to the best of my knowledge, all Best Management Practices being claimed for a phosphorus reduction credit are performing as originally designed”
EPA Self-Certification Program

- O&M Plans submitted during permit process
- Certification submission frequency
- Audit and enforcement
### Infiltration Trench Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering “Yes” indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with this BMP Operation & Maintenance Plan. This checklist details these frequency periods, and submittal of the form (every other year) is a certification that you have met these requirements. This inspection shall be done once in every six-year period by a professional engineer (PE) or a professional landscape architect (PLA).

<table>
<thead>
<tr>
<th>Inspection Question</th>
<th>Answer</th>
<th>Describe Problem(s) and Solution(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Are there signs of human or pet encroachment in the filter strip or the trench, such as compacted or displaced rocks, tire tracks, pet waste, etc.?</td>
<td></td>
<td>Guidance: Repair or replace protection measures if damaged (e.g., fences, hedges, signs, etc.). Increase protection measures if this is a frequent problem. Repair damage to the filter strip by reestablishing grass. Repair damage to the trench by replacing pea gravel or topsoil/grass and filter fabric (when clogged). A sign specifically addressing pet waste can reduce dog waste. Also consider installation of a pet waste station (sign, pet waste bag dispenser and trash can) if the infiltration trench is in an area where dog walking is popular. Schedule: Monthly.</td>
</tr>
<tr>
<td>10. Is there any visual evidence of long-term ponding or standing water (stains, odors, etc.)?</td>
<td></td>
<td>Guidance: Ponded water inside the trench (as visible from the observation well or on the surface) longer than 24 hours or several days after a storm event is an indication that the trench is clogged. Remove and replace all of the stone aggregate and filter fabric or media. Schedule: Monthly.</td>
</tr>
</tbody>
</table>


Source: Topeka, KS Infiltration Trench Inspection Form, p. 7
1. Data Needs: What information is required for credit?

2. Mechanism: How do you get data for private BMPs?

3. Receive Data: How do you receive the associated data?

4. Manage Data: How do you manage the associated data?
Where does the data go? What tracking tools are available?

- File Management Systems/Databases
- GIS/System Mapping
- Asset Management Software
- Data management for calculations (BATT)

File Storage / Document Linking

BMP Inventory: GIS / Databases / Asset Management Software

Logging and reporting BMP Data: BATT
Break for Questions
Panel Discussion followed by Open Discussion

Panelists:
- Maria Rose, Newton
- Matt Shuman, Watertown
- Stephanie Carlisle and Bridget Graziano, Medway
- Kim Donovan, Needham
Thank you for attending

Upcoming Workshops – Tuesdays from 1:00 to 3:00 PM

• May 10  Workshop #3: Public BMPs: Maximizing the Cost-Benefit Equation
• May 24  Question & Answer Session EPA, MassDEP, and Project Team

Data Request for Workshop #3 – Costs & Benefits of Public Stormwater BMPs
Three options for sharing information extended until 4/8:
• Populate an excel-based template
• Send us files which include information about BMP costs
• Participate in a phone interview with our team

Questions? Contact Julie Wood at jwood@crwa.org
Website Resources

- https://www.crwa.org/phosphorus-control-planning-support.html
- More detail on each workshop
- Links to register
- PCP Templates & resources from FY21

Please submit your questions!

- Our team will work to address them in the remaining workshops & at the Q&A session
Connect with Us!

email: charles@crwa.org
newsletter: https://www.crwa.org/river-current.html
@charlesriverwatershed
@charlesriverwatershed
@charlesriver