Town of Westwood, MA

Stormwater Management Program (SWMP): Volume 5

NPDES Phase II Small MS4 General Permit

September 2023

PHOSPHORUS CONTROL PLAN

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PHOSPHORUS CONTROL PLAN

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Prepared for: Town of Westwood

September 2023

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1.0 PHASE 1

The 2016 National Pollutant Discharge Elimination System General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts ("MS4 Permit" or "the Permit") took effect on July 1, 2018. The Permit was subsequently modified on December 7, 2020. The MS4 Permit conditions the operation, regulation, and management of MS4s in subject Massachusetts municipalities. Terms and conditions include requirements across six Minimum Control Measures (also referred to as Maximum Extent Practicable or MEP provisions), and water quality-based effluent limitations (WQBEL), including requirements for waterbodies with approved Total Maximum Daily Loads (TMDLs) and other water quality-limited waters.

There are two approved nutrient TMDLs for the Charles River; one for the Lower Charles River Basin, published in 2007[1], and one for the Upper/Middle Charles River Basin, published in 2011[2]. As an element of the Permit's WQBEL provisions, communities within the Charles River watershed are obligated to address phosphorus impairments through the development and implementation of a Phosphorus Control Plan (PCP). Appendix F of the MS4 Permit describes specific requirements of the PCP, implementation of which is anticipated to achieve the TMDL-established targeted phosphorus reductions over a 20-year timeframe. PCP implementation includes structural and non-structural best management practices (BMPs) executed through programs, projects, and policies. The PCP must be fully implemented within 20 years of the Permit effective date (i.e., by 2038), as illustrated in Table 1-1. The targeted phosphorus reductions are broken out into interim mandatory milestones, culminating in achievement of the allowable TMDL phosphorus loads for each municipality at the end of the 20-year schedule.

Table 1-1. General PCP Implementation Timeline for Charles River Watershed Communities

1-5 years after permit effective date [2018-2023]	5-10 years after permit effective date [2023-2028]	10-15 years after permit effective date [2028-2033]	15-20 years after permit effective date [2033-2038]
Create Phase 1 Plan	Implement Phase 1 Plan		
	Create Phase 2 Plan	Implement Phase 2 Plan	
		Create Phase 3 Plan	Implement Phase 3 Plan

1.1 OVERVIEW OF ALL PCP PHASE 1 MILESTONES

Phase 1 of the PCP must achieve the first 25% of each permittee's phosphorus load reduction requirement within 10 years (i.e., by June 30, 2028), with an interim milestone of achieving the first 20%

[1] *Massachusetts Department of Environmental Protection. 2007. Final TMDL for Nutrients in the Lower Charles River Basin. CN 301.1*

[2] *Massachusetts Department of Environmental Protection. 2011. Total Maximum Daily Load for Nutrients in the Upper/Middle Charles River Basin, Massachusetts. CN 272.0*

of phosphorus load reduction by Year 8 (i.e., by June 30, 2026). The detailed components of the PCP due within Phase 1 are outlined in Table 1-2.

Table 1-2. Phase 1 Component Deadlines

Permit Year #	Year-End (June 30th)	PCP Component(s) Due
Year 1	2019	N/A
Year 2	2020	Legal Analysis
Year 3	2021	Funding Source Assessment
Year 4	2022	PCP Scope
Year 5	2023	Descriptions of the following Phase 1 items: - Nonstructural controls - Structural controls - O&M program for structural controls - Implementation schedule - Phase 1 cost estimate - Written Phase 1 PCP - Full implementation of nonstructural controls
Year 6	2024	Performance Evaluation
Year 7	2025	Performance Evaluation
Year 8	2026	Performance Evaluation & Implementation of structural controls to achieve 20% of target phosphorus reduction
Year 9	2027	Performance Evaluation
Year 10	2028	Performance Evaluation & Implementation of structural controls to achieve 25% of target phosphorus reduction

The Town of Westwood acknowledges that to meet the phosphorus reduction deadlines set forth in the MS4 Permit, significant preparation is required. In order to plan, allocate funds to, design, and construct structural controls to meet the Year 8 and Year 10 reduction deadlines, there is significant work to be completed during the initial years of PCP implementation. Some controls that rely on local bylaw or regulatory updates, or engaging landowners directly through incentives, may take even longer to implement. This is taken into account in the Phase 1 implementation schedule.

1.2 WATERSHED AND COMMUNITY CHARACTERIZATION

The Charles River collects water from a total land area of 308 square miles. The River twists and turns on an 80-mile route from Hopkinton to Boston Harbor. The River flows through 23 communities and the total watershed encompasses 35 communities, adding many political complexities to watershed management. Some 80 brooks and streams, and several major aquifers, feed the Charles River. The watershed contains many lakes and ponds, most of them manmade, many through the construction of dams. The river drops about 350 feet in its unhurried journey to the sea. Lacking speed and force, the slow-moving Charles River is naturally brownish in color, because the water steeps like tea through the abundant wetlands along its path.

The Charles River watershed is home to over a million residents. As an urban river, it is impaired for multiple pollutants and has many areas with altered and degraded habitat. Three Total Maximum Daily Loads (TMDLs) have been developed for the watershed: two for nutrients and one for bacteria. The river has borne the brunt of much of the development in the greater Boston area through damming, pollution, and traditional development practices. A nearly five-decade cleanup effort has resulted in water quality improvements, primarily from elimination of industrial discharges and a significant reduction in untreated sewage flowing into the river. The primary challenge facing the river today is stormwater runoff. Phosphorus loading in stormwater runoff is a particular challenge to the river, leading to summertime cyanobacteria blooms and overgrowth of invasive aquatic plants in many areas of the watershed.

Two portions of Westwood are within the Charles River Watershed. Westwood abuts the Charles River for only a short distance so direct discharge form the Town to the river is minimal. However, tributaries including Powessett Brook, Rock Meadow Brook and Lowder Brook convey stormwater runoff from low-density residential to commercial areas to the Charles River.

1.3 PCP LOAD REDUCTION TARGETS

1.3.1 PCP Area, Baseline Phosphorus Load, Allowable Phosphorus Load, and Stormwater Phosphorus Reduction Requirement from MS4 Permit

Town of Westwood has the option to implement its PCP within the entirety of the community that falls within the Charles River watershed, or just the MS4-regulated area of our community within the Charles River watershed.

Based on an assessment of factors relevant to the selection criteria, Westwood will implement the PCP on urban areas and therefore be held to the Allowable Phosphorus Load reported in TABLE F-3 of the MS4 Permit. The Allowable Phosphorus Load reported in TABLE F-3 of Appendix F for Westwood is shown in Table 1-3.

Westwood is opting to implement the PCP within the MS4-regulated (urbanized) area because it is a smaller load and a smaller, more manageable area. We anticipate having the available space within this area to meet our MS4 Permit phosphorus reduction requirements. We do anticipate, however, that there will be improvements to stormwater management practices outside of this designated area as well due to the adoption of new stormwater policies and requirements implemented at the municipal scale. We understand that these improvements will not count towards Westwood's phosphorus reduction requirement.

Table 1-3. PCP Timeline of Phase 1 Reduction Requirements

Condition	Value (lbs/yr)
Baseline P-Load	*763*
Allowable P-Load	*448*
Stormwater P-Load Reduction Requirement	*315*
Year 8 Milestone: 20% of Reduction	*63*
Year 10 Milestone: 25% of Reduction	*79*

To achieve the target of reducing phosphorus loads by 79 lbs/yr by 2028, the Town of Westwood will be planning and implementing a series of structural and non-structural BMPs, updating regulatory mechanisms as necessary to aid with achieving these goals, evaluating funding mechanisms and costs, and developing its O&M and recordkeeping programs to ensure continued compliance and functionality of all installed BMPs.

1.3.2 Increases or Decreases to Baseline Phosphorus Load Since 2005

The Baseline Load displayed in Table 1-3 above was calculated using land use data from 2005. Due to development in the Town of Westwood, availability of more accurate existing conditions data, and refinement of the MS4 watershed areas, the calculated phosphorus load changes over time. The Table 1-4 summarizes the calculation of the current (2022) PLoad condition.

Table 1-4 – Phosphorus Load Conditions for the Town of Westwood

PLoad Condition	Value (lbs/yr)	Reduction Requirement (lbs/yr)
EPA Allowable PLoad	448	-
EPA Baseline PLoad (2005)	763	315
BETA Baseline PLoad (2022)	639.3	191.3

As land use, development, and impervious cover continue to change, this information will be updated, ensuring that the Town of Westwood is on track to still achieve the required 20% and 25% reduction milestones by Years 8 and 10.

The 2005 watershed area was reviewed and adjusted to reflect on the ground field observations. Areas associated with other MS4 entities including MassDOT, MBTA, DCR and other federal land will also be removed from Westwood's Charles River Watershed MS4 Area. The Town GIS department developed a new detailed impervious surface layer for the watershed by using the 2022 layer from Nearmap updated using ariel photogrammetry from MassGIS. Updated land use data provided by the Charles River Watershed Association (CRWA) was used to replace the 2005 data. After rerunning the phosphorus load calculations for this new data, the overall phosphorus load from Westwood to the Charles River was reduced to 639.3 lbs/yr.

This data was sent to EPA for their review and approval. Until the Town receives notice that this new calculation is acceptable, the PCP plan will be based on the overall phosphorus load calculated in 2005 of 763 lbs/yr and reduction requirements calculated in 2005 and incorporated in the 2016 MS4 Permit of 315 lbs/yr.

The phosphorus load will be adjusted annually for all land use and impervious surfaces.

Table 1-5. Phosphorus Load Characteristics

Parameter	Value (lbs/yr)
Baseline Load 2005	*763*
Allowable Load	*448*
Stormwater P-Load Reduction Requirement	*315*
Calculations to Update to Current Conditions	
Changes in P-Load Since 2005	*Awaiting EPA Approval for revised baseline*
Current Phosphorus Load = Baseline +/- Impacts	*743.68*
Updated Phosphorus Reduction Required to Meet Allowable Load (Allowable Load)	*295.68*
Year 8 Reduction Milestone: 20% of Reduction	*63*
Year 10 Reduction Milestone: 25% of Reduction	*79*
Total Reduction from Non-Structural BMPs	11.25
Total Reduction from Structural BMPs	8.07

1.4 LEGAL ANALYSIS

Permit Requirement: *The permittee shall develop and implement an analysis that identifies existing regulatory mechanisms available to the MS4 such as bylaws and ordinances, and describes any changes to regulatory mechanisms that may be necessary to effectively implement the entire PCP. This may include the creation or amendment of financial and regulatory authorities. The permittee shall adopt necessary regulatory changes by the end of the permit term.*

Appendix F of the MS4 Permit requires the Town of Westwood to develop and implement an analysis that identifies existing regulatory mechanisms available to the MS4 such as bylaws and ordinances, and describes any changes to regulatory mechanisms that may be necessary to effectively implement the entire PCP (the "Legal Analysis"). This may include the creation or amendment of financial and regulatory authorities. Town of Westwood's Legal Analysis is attached as Appendix A.

1.5 FUNDING SOURCE ASSESSMENT

Permit Requirement: *The permittee shall describe known and anticipated funding mechanisms (e.g. general funding, enterprise funding, stormwater utilities) that will be used to fund PCP implementation. The permittee shall describe the steps it will take to implement its funding plan. This may include but is not limited to conceptual development, outreach to affected parties, and development of legal authorities.*

Appendix F of the MS4 Permit requires Town of Westwood to describe known and anticipated funding mechanisms (e.g., general funding, enterprise funding, stormwater utilities) that will be used to fund PCP implementation (the "Funding Source Assessment"). Town of Westwood must describe the steps it will take to implement its funding plan. This may include but is not limited to conceptual development, outreach to affected parties, and development of legal authorities. Town of Westwood's Funding Source Assessment is attached as Appendix B.

1.6 NON-STRUCTURAL CONTROLS

Permit Requirement: *The permittee shall describe the non-structural stormwater control measures necessary to support achievement of the phosphorus export milestones in Table F-1 [of Appendix F of the MS4 Permit]. The description of non-structural controls shall include the planned measures, the areas where the measures will be implemented, and the annual phosphorus reductions that are expected to result from their implementation in units of mass/yr. Annual phosphorus reduction from non-structural BMPs shall be calculated consistent with Attachment 2 to Appendix F.*

Town of Westwood's approach for non-structural BMP implementation for PCP compliance is detailed in this section.

1.6.1 Current Non-Structural BMPs

Town of Westwood has already implemented enhanced non-structural BMPs, which can qualify for phosphorus reduction credits. These are presented in Table 1-. Credits were calculated using the updated phosphorus load export rates reported in Attachment 2 to Appendix F. These credits will count towards the required phosphorus reduction outlined in Table 1-4. Current non-structural BMPs are those that are anticipated to continue at current resource levels, or 'business as usual'. The information presented in Table 1-6 is further detailed in Appendix C and the Town's Stormwater Management Plan (SWMP).

Table 1-6. Existing Non-Structural BMPs

Current Non-Structural BMP	Implementation Levels	Average Annual P-Reduction (lbs/yr)
Street Sweeping	Every 2 weeks - mechanical March- November	6.38
CB Cleaning	Annually & additional cleaning to maintain >50% capacity	4.87
Leaf Litter Program	Every 2 weeks - mechanical September - November	0
Total Existing Non-Structural Credit		11.25

The existing non-structural controls have already contributed 11.25 lbs/yr to the annual phosphorus reduction requirement of 315 lb/yr.

1.6.2 Planned Non-Structural BMPs

Town of Westwood is planning on making the following changes to their non-structure controls starting in permit year 5. Phosphorus reductions are presented in Table 1-7.

The Town currently utilizes two mechanical sweepers. The routes will be increased from biweekly for nine months to weekly year around. This will also provide a higher credit for leaf litter cleanup as these weekly sweeping will continue September through December.

Catchbasin cleaning will continue, each catchbasin will be cleaned annually and supplemental cleaning will be provided to maintain 50% capacity or more.

Table 1-7. Planned Non-Structural Control Summary

Planned Non-Structural BMP	Average Annual Acres Managed	Average Annual P-Reduction (lbs/yr)	Anticipated Implementation
Street Sweeping	205	17.02	2024
CB Cleaning	145	4.87	Current
Leaf Litter Program	205	17.02	2024
Total Planned Non-Structural Credit		38.90	2024

1.7 STRUCTURAL CONTROLS

Permit Requirement: *The permittee shall develop a priority ranking of areas and infrastructure within the municipality for potential implementation of structural phosphorus controls during Phase 1. The ranking shall be developed through the use of available screening and monitoring results collected during the permit term either by the permittee or another entity and the mapping required pursuant to part 2.3.4.6 of the Permit. The permittee shall also include in this priority ranking a detailed assessment of site suitability for potential phosphorus control measures based on soil types and other factors. The permittee shall coordinate this activity with the requirements of part 2.3.6.8.b of the Permit. A description and the results of this priority ranking shall be included in Phase 1 of the PCP. The permittee shall describe the structural stormwater control measures necessary to support achievement of the phosphorus export milestones in Table F-1 [of Appendix F of the MS4 Permit]. The description of structural controls shall include the planned and existing measures, the areas where the measures will be implemented or are currently implemented, and the annual phosphorus reductions in units of mass/yr that are expected to result from their implementation. Structural measures to be implemented by a third party may be included in a municipal PCP. Annual phosphorus reductions from structural BMPs shall be calculated consistent with Attachment 3 to Appendix F.*

The Westwood community will employ structural BMPs to detain, treat, and better manage runoff from well-defined areas of impervious surface, such as roads, parking lots, or rooftops. Semi-structural BMPs are more passive stormwater management approaches that can still produce excellent water quality benefits such as rainwater harvesting, impervious area disconnection, conversion of impervious area to pervious, and enhancement of pervious areas. For the purposes of this document, the term structural controls refers to both structural and semi-structural BMPs, natural basins as described below.

Structural BMPs have been incorporated into all Town of Westwood via stormwater compliance projects (for public and private development projects), using developer and other various sources of grant funding, or as part of our capital infrastructure program. Structural BMPs that have already been implemented are evaluated in Section 1.7.1.

Planning in support of PCP development determined that investment in structural BMPs will be required to achieve the required target phosphorus reductions. Structural BMP opportunities were evaluated to allow for adaptive management during the development and execution of the PCP, that is presented below.

The following sections describe the assessment, performance, and implementation of Current Structural BMPs (those that were built or designed and are planned for implementation prior to development of this PCP) and Proposed Structural BMPs (those that were newly identified for PCP compliance or will be implemented after this written PCP is submitted).

1.7.1 Current Structural BMPs - Public

The Town already employs a mix of regulatory, incentive programs and capital improvement programs to implement structural BMPs. Constructed structural BMPs have resulted in phosphorus reductions outlined in Table 1-8 and further detailed in Appendix E. The reductions are presented on a high-level for summary, and all of the calculations were performed following the equations and requirements in Attachment 3 to Appendix F of the Permit.

Table 1-8. Summary of Current Structural Controls

Current Structural BMP Type	BMP-ID(s)	Total Acres Managed	Total Annual P-Reduction (lbs/yr)
Infiltration System	BMP-2	1.84	2.242
Infiltration System	BMP-3	0.346	0.346
Detention Basin	BMP-4	0.232	0.232
Leaching CB	BMP-14	-	-
Infiltration Trench	BMP-19	0.496	0.496
Leaching CB	BMP-21	0.108	0.108
Leaching CB	BMP-22	0.312	0.312
Leaching CB	BMP-23	0.944	0.944
Leaching CB	BMP-24	0.43	0.43
Infiltration Basin	BMP-25	0.392	0.392
Leaching CB	BMP-28	0.661	0.661
Infiltration System	BMP-41	1.053	1.053
Infiltration System	BMP-44(A/B)	0.036	0.036
Infiltration System	BMP-44C	0.145	0.145
Infiltration System	BMP-45	0.143	0.143
Infiltration System	BMP-46	0.16	0.16

Infiltration System	BMP-47	0.278	0.278
Water Quality Swale	BMP-48	0.091	0.091
Total Phosphorus Credit from Current Structural BMPs			8.07lbs/yr

Existing structural BMPs have contributed to an annual load reduction of 8.07 lbs/yr.

1.7.2 Current Structural BMPs - Private

The Town has required structural BMPs on private development site including residences through the implementation of required Bylaws and Regulations. The Town, through the Stormwater Authority, is developing a system to collect required design calculations, construction observations of during installation and inspection and maintenance reports for the owners. The Town will then calculate phosphorous load reduction in a separate BATT Excel Workbook. This will be evaluated and updated on a yearly basis to receive credit for these BMPs.

1.7.3 Planned Semi-Structural

The Town has identified a handful of subwatersheds that currently drain to “natural basins”, typically a natural depression in A or B rated soils that has adequate volume with no outlet other than exfiltration. These areas have been added to the annual BMP inspections to confirm that the topography has not been modified and they are still functioning as basins.

1.7.4 Planned Structural BMPs

The Town has several strategies to provide the required phosphorus load reductions including incorporating BMP retrofits for pavement management projects, Town facility upgrades, and other capital projects within the watershed. Also, the Nutrient Source Identification Report identified stormwater outfalls that discharge the highest phosphorus loads. Those identified drainage systems that can be retrofitted with infiltration systems in A or B rated soils will be incorporated in special projects as needed to meet the threshold requirements. The plan is for these to be installed with in-house DPW staff or on-call contractor.

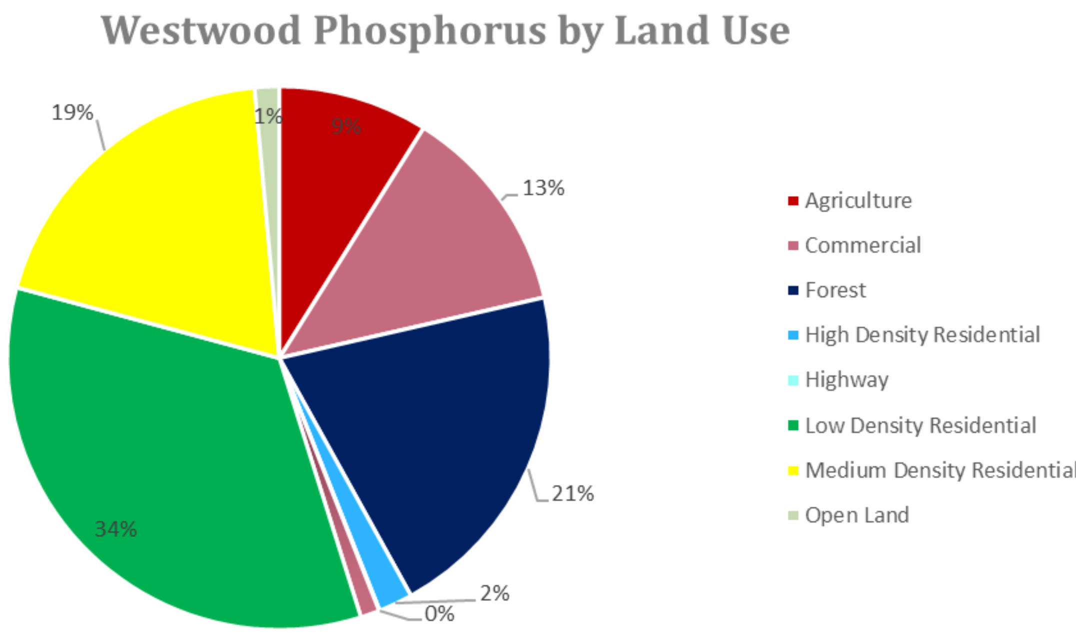
Town of Westwood has developed a priority ranking of areas and infrastructure within the municipality for potential implementation of structural phosphorus controls during Phase 1. This priority ranking was prepared as follows:

An initial inventory of stormwater infrastructure was completed and drain catchments were identified. That inventory was used to define catchment areas within the TMDL area utilizing ArcGIS. These catchment areas were then intersected with existing land use, impervious surfaces, and soils information to calculate phosphorus loading. Catchment areas were subsequently ranked based on the following parameters:

1. Potential phosphorus reductions
2. Catchment area
3. Soil type
4. Accessibility and other structural considerations

These rankings were also informed by information from the outfall report completed as part of the MS4 permit as well as distance to listed waters, primarily Rock Meadow Brook.

Implementation of structural BMPs is dependent on physical constraints and opportunities. Much of the phosphorus in Town of Westwood is coming from the following land uses:



This evaluation leads us to believe that the highest impact can be had by focusing on BMPs in residential areas of the town. Some potential project areas primarily within these residential areas have been identified and are included in Appendix D.

Additionally, a high-level BMP suitability assessment was conducted using Excel, ArcGIS, and Google Earth to determine what structural BMPs could be implemented to mitigate phosphorus and to help to prioritize an implementation schedule.

Several other factors besides phosphorus reduction were used to determine structural BMP selection, siting, and prioritization such as:

1. Catchment Size
2. Overview of site conditions from Google Earth and prior MS4 reporting efforts
3. Soil types with a preference towards catchments with a high % of A and B soils
4. BMP cost

The planned structural BMPs are listed in Appendix F. Potential reductions of up to 129.9 lbs/yr based on implementing BMPs in all of the listed catchments have been identified. BMPs will be implemented in a combination of these locations to reach the 16.4 lbs/yr reduction requirements by 2026, and 32.2 lbs/yr requirements which must be met by 2028.

1.8 DESCRIPTION OF OPERATION AND MAINTENANCE (O&M) PROGRAM FOR ALL PLANNED AND EXISTING STRUCTURAL BMPS

Permit Requirement: *The permittee shall establish an Operation and Maintenance Program for all structural BMPs being claimed for phosphorus reduction credit as part of Phase 1 of the PCP. This* *includes BMPs implemented to date as well as BMPs to be implemented during Phase 1 of the PCP. The Operation and Maintenance Program shall become part of the PCP and include: (1) inspection and maintenance schedule for each BMP according to BMP design or manufacturer specification and (2) program or department responsible for BMP maintenance.*

The Town completed and inventory of all municipally owned BMPs and developed an inspection and maintenance matrix that identifies typical maintenance required for each BMP and noting when maintenance is completed. Currently the Town provides, through contracts between the DPW and third-party venders, annual inspection of all structural BMPs. Maintenance is typically completed by the DPW department as necessary to continue to provide proper function. As new BMPs come into use, they will be added to the inspection matrix maintained in the SWMP. This matrix will be updated and submitted annually. The Town's Operation and Maintenance Program is documented in the Stormwater Management Program (SWMP) Volume 3.

For privately owned BMPs the Town will implement the following program.

- Each proposed BMP will be reviewed to confirm existing soil conditions, surface cover, land use, hydrology and proper engineering design all meets local, state, and federal requirements.
- The Town will include a condition in all permits that submission of signed inspection and maintenance reports is submitted on or before May 30th each year to the Conservation Agent.
- An agent of the Town will observe to confirm native soils upon excavation and installation of the system is completed in accordance with the approved design.
- The Town will also issue letters to private BMP owners requesting that they submit an inspection and maintenance annually on or before May 30th each year as well.
- Phosphorus load reductions, for BMPs will be calculated based on design information using the BATT tool. Only BMPs that meet the above requirements will be tallied and reported annually.
- The Town is currently working on a GIS based application to facilitate private owners ability to upload annual inspection and maintenance reports to ease record keeping effort.

1.9 PHASE 1 IMPLEMENTATION SCHEDULE

Permit Requirement: *A schedule for implementation of all planned Phase 1 BMPs, including, as appropriate: obtaining funding, training, purchasing, construction, inspections, monitoring, operation and maintenance activities, and other assessment and evaluation components of implementation. Implementation of planned BMPs must begin upon completion of the Phase 1 Plan, and all non-structural BMPs shall be fully implemented within six years of the permit effective date. Structural BMPs shall be designed and constructed to ensure the permittee will comply with the 8 and 10 year phosphorus load milestones established in Table F-1 [of Appendix F of the MS4 Permit]. The Phase 1 plan shall be fully implemented as soon as possible, but no later than 10 years after the effective date of permit.*

Town of Westwood has prepared an implementation schedule for Phase 1 of the PCP. This schedule is included in Appendix F of the PCP. Additional detail is available from Department of Public Works as Town of Westwood incorporate tasks in the plan.

By Year 6, non-structural BMPs are anticipated to reduce a total of 38.90 lbs/yr of phosphorus in Phase 1 of the PCP, or 49.4% of the target phosphorus reduction for Phase 1 (by Year 10).

By Year 10, structural and semi-structural BMPs are anticipated to reduce a total of 78.8 lbs/yr. of phosphorus in Phase 1 of the PCP, or 25% of the target phosphorus reduction using the mechanisms described above. The implementation schedule in Appendix F further details the schedule for BMP implementation.

1.10 ESTIMATED COST FOR IMPLEMENTING PHASE 1 OF THE PCP

Permit Requirement: *The permittee shall estimate the cost of implementing the Phase 1 non-structural and structural controls and associated Operation and Maintenance Program. This cost estimate can be used to assess the validity of the funding source assessment completed by year 3 after the permit effective date and to update funding sources as necessary to complete Phase 1.*

Town of Westwood has developed an estimated cost to implement Phase 1 of the PCP including non-structural, and structural BMPs.

1.10.1 Non-Structural BMPs.

In addition to current practice, implementation of new enhanced non-structural BMPs will include weekly sweeping of all streets in the watershed. Additional expenses for staff, equipment, and disposal for roads within the watershed is estimated to cost the Town $115,000 annually.

1.10.2 Structural BMPs - Private.

Implementation and management of private BMPs inspection, maintenance and reporting program will require staff time and expenses estimated to increase by $15,000 annually.

1.10.3 Structural BMPs - Public.

Most outfalls to waters tributary to the Charles River are from residential areas where infiltration BMP retrofits are anticipated. Basic typical infiltration retrofit practices were analyzed and implementation costs developed. Typically, these will cost $40,000 to $100,000 per pound of phosphorous removed. Based on the 2005 Phosphorus Load Calculations Phase I the PCP will need to implement BMPs to provide 31.88 lbs./yr. at a cost in the range of $1,271,200 to $3,188,000.

Potential reductions in the cost could include some or all of the following:

1. Acceptance of phosphorus load recalculation based on 2022 data by EPA.
2. Credits for private BMP program.
3. Implementation of structural BMPs by Town staff.

1.11 PERFORMANCE EVALUATIONS

Permit Requirement: *The permittee shall evaluate the effectiveness of the PCP by tracking the phosphorus reductions achieved through implementation of structural and non-structural BMPs and tracking increases resulting from development. Phosphorus reductions shall be calculated consistent with Attachment 2 to Appendix F (non-structural BMP performance) and Attachment 3 to Appendix F (structural BMP performance) for all BMPs implemented to date. Phosphorus export increases since 2005 due to development shall be calculated consistent with Attachment 1 to Appendix F. Phosphorus loading increases and reductions in unit of mass/yr shall be added or subtracted from the applicable Baseline Phosphorus Load given in Table F-2 or Table F-3 [of Appendix F of the MS4 Permit] depending on the Scope of PCP chosen to estimate the yearly phosphorous export rate from the PCP Area. The permittee shall also include all information required in part I.2 of this Appendix in each performance evaluation. Performance evaluations will be included as part of each permittee's annual report as required by part 4.4 of the Permit*

The following is an outline for evaluations to be completed in future years to assess PCP progress.

1.11.1 Performance Evaluation for Year 6

Town of Westwood has completed the required Performance Evaluation that assesses our PCP progress through Year 6. Documentation of the Land Development Impacts and Phosphorus Credits for this effort is included in in the MS4 Year 6 Annual Report.

A summary of Westwood's performance through Year 6 is included in Table 1-9.

Table 1-9. Year 6 Performance Evaluation Summary

Parameter	Value (lbs./yr)
Baseline Load	*763*
Allowable Load	*448*
Calculations to Update to Current Conditions	
Changes in P-Load Since 2005	*None Documented for Year 6*
Current Phosphorus Load = Baseline +/- Impacts	*763*
Updated Phosphorus Reduction Required to Meet Allowable Load (Allowable Load)	*315*
Year 8 Milestone (lbs./yr)	*63*
Year 10 Milestone (lbs./yr)	*79*
Phosphorus Credits for Year 6	
Total Reduction from Non-Structural BMPs	*11.25*
Total Reduction from Structural BMPs	*8.4*
Evaluation	
Remaining Phosphorus Reduction Requirement (Updated Phosphorus Reduction Requirement to Meet Allowable Load – Total Reductions)	*295.35*

Based on this year's evaluation, Town of Westwood has successfully reduced phosphorus by 19.65 lbs./yr, and 59.35 lbs./yr is required to meet the Phase 1 milestone reduction of 79 lbs./yr.

Based on this evaluation, the Town is on track to meet the Year 8 milestone of 20% progress toward meeting our required reduction. To meet this milestone, we have to continue to implement BMPs to achieve credits at a rate of 21.68 lbs./yr. and based on our implementation schedule outlined in Section 9, we are on track to meet this goal.

1.11.2 Performance Evaluation for Year 7

Town of Westwood has completed the required Performance Evaluation that assesses our PCP progress through Year 7. Documentation of the Land Development Impacts and Phosphorus Credits for this effort is included in ##LOCATION##.

A summary of Westwood's performance through Year 7 is included in Table 1-10.

Table 1-10. Year 7 Performance Evaluation Summary

Parameter	Value (lbs/yr)
Baseline Load	*763*
Allowable Load	*448*
Calculations to Update to Current Conditions	
Changes in P-Load Since 2005	*None Documented for Year 7*
Current Phosphorus Load = Baseline +/- Impacts	*763*
Updated Phosphorus Reduction Required to Meet Allowable Load (Allowable Load)	*315*
Year 8 Milestone (lbs/yr)	*63*
Year 10 Milestone (lbs/yr)	*79*
Phosphorus Credits for Year 7	
Total Reduction from Non-Structural BMPs	*11.25*
Total Reduction from Structural BMPs	*8.4*
Evaluation	
Remaining Phosphorus Reduction Requirement (Updated Phosphorus Reduction Requirement to Meet Allowable Load – Total Reductions)	*295.35*

Based on this year's evaluation, Town of Westwood has successfully reduced phosphorus by 19.65 lbs./yr, and 59.35 lbs./yr is required to meet the Phase 1 milestone reduction of 79 lbs./yr. Based on this evaluation, the Town is on track to meet the Year 8 milestone of 20% progress toward meeting our required reduction. To meet this milestone, we have to continue to implement BMPs to achieve credits at a rate of 21.68 lbs./yr. and based on our implementation schedule outlined in Section 9, we are on track to meet this goal.

1.11.3 Performance Evaluation for Year 8

Town of Westwood has completed the required Performance Evaluation that assesses our PCP progress through Year 8. Documentation of the Land Development Impacts and Phosphorus Credits for this effort is included in ##LOCATION##.

A summary of Westwood's performance through Year 8 is included in Table 1-11.

Table 1-11. Year 8 Performance Evaluation Summary

Parameter	Value (lbs/yr)
Baseline Load	
Allowable Load	
Calculations to Update to Current Conditions	
Changes in P-Load Since 2005	
Current Phosphorus Load = Baseline +/- Impacts	
Updated Phosphorus Reduction Required to Meet Allowable Load (Allowable Load)	
Year 8 Milestone (lbs/yr)	
Year 10 Milestone (lbs/yr)	
Phosphorus Credits for Year 8	
Total Reduction from Non-Structural BMPs	
Total Reduction from Structural BMPs	
Evaluation	
Remaining Phosphorus Reduction Requirement (Updated Phosphorus Reduction Requirement to Meet Allowable Load – Total Reductions)	

Based on this year's evaluation, Town of Westwood has successfully reduced phosphorus by ##AMOUNT## lbs/yr, and ##HAS OR HAS NOT## met the Phase 1 milestone reduction of ##PHASE 1 MILESTONE##.

1.11.4 Performance evaluation for Year 9

Town of Westwood has completed the required Performance Evaluation that assesses our PCP progress through Year 9. Documentation of the Land Development Impacts and Phosphorus Credits for this effort is included in ##LOCATION##.

A summary of Westwood's performance through Year 9 is included in Table 1-2.

Table 1-12. Year 9 Performance Evaluation Summary

Parameter	Value (lbs/yr)
Baseline Load	
Allowable Load	
Calculations to Update to Current Conditions	
Changes in P-Load Since 2005	
Current Phosphorus Load = Baseline +/- Impacts	
Updated Phosphorus Reduction Required to Meet Allowable Load (Allowable Load)	
Year 8 Milestone (lbs/yr)	
Year 10 Milestone (lbs/yr)	
Phosphorus Credits for Year 9	
Total Reduction from Non-Structural BMPs	
Total Reduction from Structural BMPs	
Evaluation	
Remaining Phosphorus Reduction Requirement (Updated Phosphorus Reduction Requirement to Meet Allowable Load – Total Reductions)	

Based on this year's evaluation, Town of Westwood has successfully reduced phosphorus by ##AMOUNT## lbs/yr, and ##REMAINING## lbs/yr is required to meet the Phase 1 milestone reduction of ##PHASE 1 MILESTONE##.

Based on this evaluation, the Town ##IS OR IS NOT## on track to meet the Year 10 milestone of ##PERCENT## reduction. To meet this milestone, we have to continue to implement BMPs to achieve credits at a rate of ##LBS/YR##, and based on our implementation schedule outlined in Section 9, we are on track to meet this implementation rate.

1.11.5 Performance evaluation for Year 10

Town of Westwood has completed the required Performance Evaluation that assesses our PCP progress through Year 10. Documentation of the Land Development Impacts and Phosphorus Credits for this effort is included in ##LOCATION##.

A summary of Westwood's performance through Year 10 is included in Table 1-3.

Table 1-13. Year 10 Performance Evaluation Summary

Parameter	Value (lbs/yr)
Baseline Load	
Allowable Load	
Calculations to Update to Current Conditions	
Changes in P-Load Since 2005	
Current Phosphorus Load = Baseline +/- Impacts	
Updated Phosphorus Reduction Required to Meet Allowable Load (Allowable Load)	
Year 8 Milestone (lbs/yr)	
Year 10 Milestone (lbs/yr)	
Phosphorus Credits for Year 10	
Total Reduction from Non-Structural BMPs	
Total Reduction from Structural BMPs	
Evaluation	
Remaining Phosphorus Reduction Requirement (Updated Phosphorus Reduction Requirement to Meet Allowable Load – Total Reductions)	

Based on this year's evaluation, Town of Westwood has successfully reduced phosphorus by ##AMOUNT## lbs/yr, and ##HAS OR HAS NOT## met the Phase 1 milestone reduction of ##PHASE 1 MILESTONE##.

2.0 PUBLIC COMMENT

Permit Requirement: *The permittee shall make the Phase 1 Plan available to the public for public comment during Phase 1 Plan development. EPA encourages the permittee to post the Phase 1 Plan online to facilitate public involvement.*

In conformance with the Permit's requirements for each Phase of the PCP, Town of Westwood made the draft written Phase 1 PCP available for public comment. Appendix G provides documentation of public engagement, including:

- Public Meeting/Public Hearing at ____(Board/Commission/etc.) on ___ (date).
- Website
- Social media posts
- Etc.

Here is a summary of the comments received:

##insert summary of comments received in bulleted or paragraph form##

3.0 Phases 2 and 3

Table 3-1. Phases 2 and 3 Schedule

Phase 2 Permit Year (year)	Phase 3 Permit Year (year)	PCP Component(s) Due
As necessary	As necessary	Legal Analysis
N/A	N/A	Funding Source Assessment
N/A	N/A	PCP Scope
10 (2028)	15 (2033)	Descriptions of the following Phase 2/3 items: - Nonstructural controls - Structural controls - O&M program for structural controls - Implementation schedule - Phase 2/3 cost estimate - Written Phase 2/3 PCP - Full implementation of nonstructural controls
11 (2029)	16 (2034)	Performance Evaluation
12 (2030)	17 (2035)	Performance Evaluation
13 (2031)	18 (2036)	Performance Evaluation & Implementation of structural controls to achieve XX% of target phosphorus reduction[1]
14 (2032)	19 (2037)	Performance Evaluation
15 (2033)	20 (2038)	Performance Evaluation & Implementation of structural controls to achieve XX% of target phosphorus reduction[2]

[1]Interim target of 35% for Phase 2; 70% for Phase 3

[2]Final Phase target of 50% for Phase 2; 100% for Phase 3

4.0 Documentation and Reporting

The most current information for annual updates to Westwood's PCP progress can be found in the following appendices:

- For non-structural controls: Appendix C
- For structural controls: Appendix D
- For the operations and maintenance program: Appendix E

This data is also tracked in each year's Annual Reports, which can be found at Stormwater Management Program | Town of Westwood, MA.

APPENDIX A – Legal Analysis

APPENDIX B – Funding Source Assessment

APPENDIX C
Current Non-Structural BMP P-Load Reduction

APPENDIX E
Current Structural BMP P-Load Reduction

APPENDIX F
Planned Structural BMP P-Load Reduction