FY2025 COUNTYWIDE TMDL STORMWATER IMPLEMENTATION PLAN

December 2025

Charles County, Maryland

Department of Planning and Growth Management

FY2025 Countywide TMDL Stormwater Implementation Plan

December 2025

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Table of Contents

List of Tables

List of Figures

Appendices

Acronyms

BMP	Best Management Practice
CAST	Chesapeake Assessment Scenario Tool
CBP WM	Chesapeake Bay Program Watershed Model
CONV	Conversion BMP
DA	Drainage Area
EOR	Edge of River
EOS	Edge of Stream
EOT	Edge of Tide
EPA	Environmental Protection Agency
FIBI	Fish Index of Biotic Integrity
FY	Fiscal Year
IR	Integrated Report
MBSS	Maryland Biological Stream Survey
MDE	Maryland Department of The Environment
MEP	Maximum Extent Practicable
MOS	Margin of Safety
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
P	Planning
PAXMH	Patuxent River Mesohaline
PCBs	Polychlorinated Biphenyls
REST	New Restoration BMP
SW-WLAs	Stormwater Wasteload Allocations
TBD	To Be Determined
TIPP	Implementation Progress and Planning Tool
TMDL	Total Maximum Daily Load
TN	Nitrogen
TP	Phosphorus
TSS	Sediment
UC	Under Construction
WIP	Watershed Implementation Plan
WS	Watershed

1 Introduction

This Charles County TMDL Stormwater Implementation Plan (Countywide Plan) satisfies the requirements of PART IV.F.3.a through c. of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit 22-DP-3322 MD0068365 dated December 30, 2022, as described in further detail in Section 1.1 below. The Countywide Plan provides progress and planning updates for Charles County's ten Total Maximum Daily Load (TMDL) stormwater wasteload allocations (SW-WLAs), two of which are for the Chesapeake Bay TMDL. The TMDL SW-WLAs address impairments for total nitrogen (TN), total phosphorus (TP), sediment (TSS), fecal coliform, and polychlorinated biphenyls (PCBs). The purpose of the Countywide Plan is to continue to track and report annual and cumulative progress and present planned implementation to achieve SW-WLAs originally presented in the County's *Municipal Stormwater Restoration Plan* (Restoration Plan).

Charles County first developed and submitted to the Maryland Department of the Environment (MDE) a Restoration Plan in June 2016, satisfying the requirements of PART IV.E.2.a. and b. of the County's previous MS4 permit (11-DP-3322 MD0068365) dated December 26, 2014. The Restoration Plan presented a long-term plan to address Charles County's portion of SW-WLAs for all TMDLs approved by the Environmental Protection Agency (EPA) in Charles County as well as achieving impervious restoration treatment goals required of the County's NPDES MS4 permit. The plan included final dates for meeting applicable SW-WLAs, a schedule for implementing structural and nonstructural water quality improvement projects for meeting applicable SW-WLAs, detailed cost estimates, and modeled baseline, progress, and planned pollutant loads and load reductions to document progress toward meeting SW-WLAs. Development of the Restoration Plan included a 30-day public review period and a comment/response document that addressed public comments as an attachment to the Restoration Plan. The County updated the Restoration Plan in December 2017 based on MDE comments.

The 2017 Restoration Plan presented the projects and programs to be implemented by Charles County to meet the NPDES MS4 requirements for local TMDL SW-WLAs in the Mattawoman Creek (nutrients) and Lower Patuxent River (bacteria) watersheds, and restoration goals for the Chesapeake Bay TMDL and associated impervious surface treatment. The Lower Patuxent River sediment and Port Tobacco sediment TMDLs were not addressed in the Restoration Plan due to the timing of the approval dates for each, which were after the plan was completed. Charles County submitted a Restoration Plan for the Port Tobacco sediment TMDL to MDE on October 9, 2020, after a public meeting and 30-day public comment period was advertised and public meeting held on October 5, 2020. The plan was submitted to MDE and the final version of the plan was completed in 2021. The County's Lower Patuxent River sediment TMDL is discussed further in Section 1.2 below.

Annual updates on implementation and modeled pollutant load reductions were included in the Restoration Plans section of the County's Annual Report from 2017 through 2022. The Restoration Plan was updated again in 2023 due to the transition of modeling under Phase 6 of the Chesapeake Bay Watershed Model (CBWM) following MDE's *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits* (MDE 2021 Accounting Guidance; MDE, 2021). Additionally, the 2023 Restoration Plan included new best management practice (BMP) types now approved by MDE, updates to progress and programs to meet the new load reductions, revised final dates and benchmarks, and new plans for adaptive

management. This Countywide Plan includes lists of projects and programs to meet the new load reductions, describes analysis and modeling methods, and includes final dates and benchmarks. This Countywide Plan will be updated annually to document progress for each TMDL SW-WLA with pollutants reduced and provide updates to projects, programs, costs, and schedules.

Adaptive Management

The County will monitor implementation progress on an annual basis and present results in this Countywide Plan. The Countywide Plan's estimated dates and costs for completion of various projects may change over time, and projects may be substituted based on lessons learned as implementation progresses.

The County will take an adaptive management approach and will re-evaluate treatment needs as feasibility studies progress. The County will continue to track the overall effectiveness of the various BMP strategies and will adapt the suite of solutions based on the results. New technologies are continuously developed and evaluated to determine their pollutant control efficiencies. The County will also continue to monitor changes in regulations and policy that could impact the program. Charles County will continue to work with technical, outreach, and funding partners to ensure that the County's waterways are protected and restored, stormwater impacts are reduced, and that the County is doing its part for the restoration of the Chesapeake Bay.

1.1 Charles County MS4 Permit

Charles County, along with other medium and large Phase I jurisdictions in Maryland, is operating its MS4 under an NPDES permit issued by MDE. The County's current MS4 permit (22-DP-3322, MD0068365; MDE 2022a), issued December 30, 2022, requires compliance with pollutant load limits from both the Chesapeake Bay TMDL and local TMDLs with approved SW-WLAs. The County is also required to meet an impervious surface treatment goal of 1,083 impervious acres that have not been treated to the maximum extent practicable (MEP) by the end of the current 5-year permit term (December 29, 2027). See Section 1.3 for details.

A requirement of the MS4 permit is the development of a Countywide TMDL Stormwater Implementation Plan (Countywide Plan) that, as described by MDE, includes lists of projects and programs to meet the load reductions, describes analysis and modeling methods, and includes final dates and benchmarks, where applicable. The Countywide Plan is to be updated annually to document progress for each TMDL SW-WLA with net pollutants reduced and provide updates to projects, programs, costs, and schedules. An excerpt from the current permit PART IV.F.3. is included here:

> 3. For all TMDLs and WLAs listed in Appendix A [of the County's permit], the County shall annually document, in one Countywide Stormwater TMDL Implementation Plan, updated progress toward meeting these TMDL WLAs. This Countywide Stormwater TMDL Implementation Plan shall include:
>
> a. A summary of all completed BMPs, programmatic initiatives, alternative control practices, or other actions implemented for each TMDL stormwater WLA;
> b. An analysis and table summary of the net pollutant reductions achieved annually and cumulatively for each TMDL stormwater WLA; and

c. An updated list of proposed BMPs, programmatic initiatives, and alternative control practices, as necessary, to demonstrate adequate progress toward meeting the Department's approved benchmarks and final stormwater WLA implementation dates.

Per the County's permit, PART IV.F.2., as new TMDLs with SW-WLAs applicable to the County are developed, restoration plans for those pollutants will need to be prepared within one year of EPA approval. Once the implementation plan is approved by MDE, the new TMDL will be incorporated in the Countywide Plan and the information required under PART IV.F.3. will be reported.

When a new MS4 permit is issued in the future, if there are any significant changes in TMDL analyses, methods, or pollutant reductions, the County will update all TMDL implementation plans by the new permit's one year anniversary. The County will then add the MDE approved TMDL implementation plans to the Countywide Plan for annual progress updates for the remainder of the permit term.

To ensure the County is meeting permit conditions, the Countywide Plan is organized as follows:

Section 1 Introduction

Section 2 Describes the modeling used to calculate baseline loads, fiscal year 2025 (FY25) Progress reductions, and planned reductions presented in this Countywide Plan.

Section 3 Presents local TMDL progress organized by watershed. This section includes summary tables of all completed BMPs, programmatic initiatives, alternative control practices, or other actions implemented for each local TMDL SW-WLA and associated load reductions, per permit requirements in **PART IV.F.3.a.**, and **PART IV.F.3.b**. A summary of proposed BMPs needed to meet final SW-WLA goals and their associated load reductions is also included, per **PART IV.F.3.c.** Progress implementation benchmark evaluations are also provided in this section.

Section 4 Includes summary tables of all completed BMPs, programmatic initiatives, alternative control practices, or other actions implemented for the Chesapeake Bay TMDL SW-WLAs and associated load reductions, per permit requirements in **PART IV.F.3.a.** and **PART IV.F.3.b.** A summary of proposed BMPs and their associated load reductions is also included, per **PART IV.F.3.c.**

1.2 TMDL Allocations

Table 1-1 lists the TMDLs, watersheds, impairments, the year each TMDL was approved by the EPA, and the year each of the County's TMDL implementation plans were approved by MDE.

Table 1-1. Charles County TMDLs

TMDL Report	Location	Impairment	Year Approved by EPA	Year County Implementation Plan Approved by MDE
Lower Patuxent River Bacteria – 7 Shellfish Harvesting Areas	Indian Creek	Fecal Coliform	2005	2017
Lower Patuxent Sediment	8 Digit WS 02131101 / Patuxent River Lower	TSS	2018	N/A[1]
Mattawoman Creek Nutrients	8 Digit WS 02140111 / Mattawoman Creek	TN	2005	2017
		TP		
Patuxent River PCBs	Segmentshed PAXMH / Patuxent River Mesohaline	PCBs	2017	N/A[2]
Piscataway Creek and Mattawoman Creek PCBs	Segmentshed MATTF / Mattawoman Creek Tidal Fresh	PCBs	2019	N/A[2]
Port Tobacco Sediment	8 Digit WS 02140109 / Port Tobacco River	TSS	2019	2021
Tidal Potomac and Anacostia River PCBs	8 Digit WS 02140201 / Potomac River, Upper	PCBs	2007	N/A[2]
	8 Digit WS 02140102 / Potomac River, Middle			
	8 Digit WS 02140101 / Potomac River, Lower			
The Chesapeake Bay TMDL	Countywide	TN	2010	2017
		TP		
		TSS		

[1]Lower Patuxent Sediment TMDL– County is pursuing watershed de-listing monitoring

[2]PCBs TMDLs – implementation plan is not required for County MS4 Phase I urban sector

The TMDLs listed in Table 1-1 shown above are also included in Appendix A of the County's current MS4 permit, which lists the TMDLs and SW-WLAs applicable to Charles County. Several additional TMDLs are listed in Appendix A of the MS4 permit but are not included in this Countywide Plan either because the County has no SW-WLA assigned and therefore no responsibility, or the TMDL is being addressed in a separate plan. These TMDLs are described here.

Patuxent River, Mattawoman Creek, and Tidal Potomac River PCBS TMDLs

Charles County is included in several TMDLs for polychlorinated biphenyls (PCBs), as shown in Table 1-1 above. For the Patuxent River PCB TMDL, Charles County is located in the mesohaline tidal segment

(PAXMH) which is not assigned a reduction requirement. In the PCB TMDL development process for the others, an explicit 5% protective margin of safety (MOS) was included to account for a level of uncertainty in load estimations from sources including the NPDES stormwater sector. Because of the MOS, a 5% PCB load reduction was applied to the NPDES regulated stormwater sector, resulting in a 5% reduction allocated to Charles County. The County's 5% reduction was included solely to meet the MOS for the TMDL. According to the TMDLs, the 5% MOS reduction is expected to be achieved through the proposed 93% reduction in atmospheric deposition; therefore, reductions in PCB loads from the stormwater sector of Charles County are not necessary to meet the overall TMDLs. These TMDLs are not addressed further in this Countywide Plan.

Lower Patuxent River Sediment TMDL

The Lower Patuxent River Sediment TMDL was not addressed in the 2017 Restoration Plan because the TMDL was approved on July 2, 2018, after the completion of the Restoration Plan. Charles County began working on the Lower Patuxent River Sediment TMDL Restoration Plan in early 2019 and it was discovered that historic Maryland Biological Stream Survey (MBSS) biological data indicated that streams within the Lower Patuxent River watershed are in good biological condition and a Restoration Plan was unnecessary. Communication with MDE was initiated, and a sampling plan was developed for the County to re-sample the six previously sampled MBSS sites. In spring and summer of 2019, the County completed MBSS sampling of benthic macroinvertebrate and fish communities and found that the sites remained in good biological condition. A report detailing the findings was submitted to MDE in October 2019.

Additional communication with MDE resulted in the option for the County to pursue delisting its portion of the watershed from the Integrated Report (IR) impairment listing. Following MDE's Delisting Methodology for Biological Assessments in Maryland's Integrated Report, an "Initial Request for Delisting" was submitted to MDE in June 2022, which presented past biomonitoring data as well as the future sampling plan to confirm conditions required for delisting. MDE requested two additional sampling sites, one on Indian Creek and one on an Unnamed Tributary to the Patuxent River, which would provide data on catchments not previously sampled. These sites were sampled for the first time in the spring and summer of 2022 and were sampled again in 2023. PAXL-115-R, which was sampled in 2004 by MBSS and in 2019 by KCI, was re-sampled in 2022 and 2023 to satisfy the delisting requirements that non-Tier II sites be sampled twice within the most recent 10-year period. After reviewing all data in late 2023, it was identified that one site (PAXL-115-X) had a fish index of biotic integrity (FIBI) score below the impairment threshold of 3.00 in 2022, therefore following the 2023 sampling, which was above the threshold, a final 2024 sampling was also completed to get the two successive sampling events above the threshold. With all of the data and threshold requirements now met, the County submitted a Final Justification for Delisting (Charles County, 2025a) for the watershed to MDE in November 2025.

Indian Creek Bacteria TMDL

The Indian Creek bacteria TMDL was first addressed in the 2017 Restoration Plan. Charles County is currently revising the plan based on the latest MDE TMDL implementation plan guidance for bacteria impairments. See Section 3.3 for a summary of the County's plan.

Chesapeake Bay Sediment TMDL

There is no TSS target reduction for the Chesapeake Bay TMDL. Rather, it is assumed that the TSS target will be met if the County meets the TP target.

1.2.1 Local TMDLs

All local TMDLs with SW-WLAs assigned to Charles County are shown in Figure 1-1. Table 1-2 provides a summary of Charles County's portions of target reductions towards the nutrient and sediment local TMDLs.

The County's bacteria TMDL is excluded from Table 1-2. MDE also published their bacteria guidance document, *Guidance for Developing Bacteria TMDL (Total Maximum Daily Load) Stormwater Wasteload Allocation (SW-WLA) Watershed Implementation Plans (WIPs)*, in February 2022 (MDE, 2022b). Implementation plans developed for bacteria TMDLs under the most recent guidance are focused on source identification, remediation, monitoring, and showing implementation progress over time rather than achieving SW-WLAs by a final target date. Because the focus for bacteria is currently on source tracking, MDE has recommended in the guidance that modeling bacteria loads and reductions is not helpful or necessary at this stage.

The terms listed below are used throughout the plan and are presented and defined here to assist the reader in understanding the definitions of each and how they were derived:

- **EOS lbs/yr:** An edge of stream (EOS) load is the amount of pollutant that is transported from a source to the nearest stream.
- **EOR lbs/yr:** An edge of river (EOR) load is the amount of pollutant transported from a smaller stream to a larger river. A stream-to-river delivery factor is available for each land-river segment of the Bay watershed and can be applied to the EOS loads to account for the fate and transport of nutrients and sediment from a small stream to a large river. Rather than focusing on the loads to the small tributary streams of the watershed, the EOR scale is used when the impairment is in the downstream receiving water such as a reservoir not in the tributary streams. In Charles County, EOR scale is applicable to the nutrient impairments in the Mattawoman Creek.
- **Baseline Load:** Baseline pollutant load levels (i.e., land use loads with baseline BMPs) from baseline year conditions in the Charles County MS4 source sector using MDE's TMDL Implementation Progress and Planning Tool (TIPP) spreadsheet tool, which is described further in Section 2. The baseline load was re-calculated due to data updates in FY25 and differs from what was presented in the FY24 Countywide Plan.
- **Target % Reduction:** Percent reductions assigned to Charles County Phase I MS4 stormwater sector (MS4 Permit - Appendix A and WLA Search tool available in MDE's TMDL Data Center; https://wlat.mde.state.md.us/WLASearch.aspx). As a result of the baseline load being re-calculated in FY25, the target % reduction was also re-calculated and differs from what was presented in the FY24 Countywide Plan.
- **Target Reduction:** Target reduction translated by multiplying the Baseline Load by the published Target % Reduction. As a result of the baseline load being re-calculated in FY25, the target reduction was also re-calculated and differs from what was presented in the FY24 Countywide Plan.

- **Target Load (SW-WLA):** Stormwater wasteload allocations (SW-WLA) are allocated loads derived from using the following calculation: Baseline Load – (Baseline Load x Target % Reduction). The SW-WLA is the portion of the overall TMDL that is assigned to or 'allocated' to the responsibility of the stormwater sector. As a result of the baseline load being re-calculated in FY25, the target load was also re-calculated and differs from what was presented in the FY24 Countywide Plan.
- **Target Year:** Projected year when the local TMDL target reduction goal will be achieved through modeling.

Table 1-2. Charles County Local TMDL Baseline and Target Loads

Watershed Name	8-Digit Watershed Number	TMDL Pollutant	Units	Baseline Year	Baseline Load	Target % Reduction	Target Reduction	Target Load (SW-WLA)	Target Year
Mattawoman Creek	02130906	TN	EOR lbs/yr	2000	94,589	54.0%	51,078	43,511	TBD
		TP	EOR lbs/yr	2000	11,763	47.0%	5,528	6,234	2053
Port Tobacco River	02140109	TSS	EOS lbs/yr	2009	13,629,101	34.0%	4,633,894	8,995,207	2039

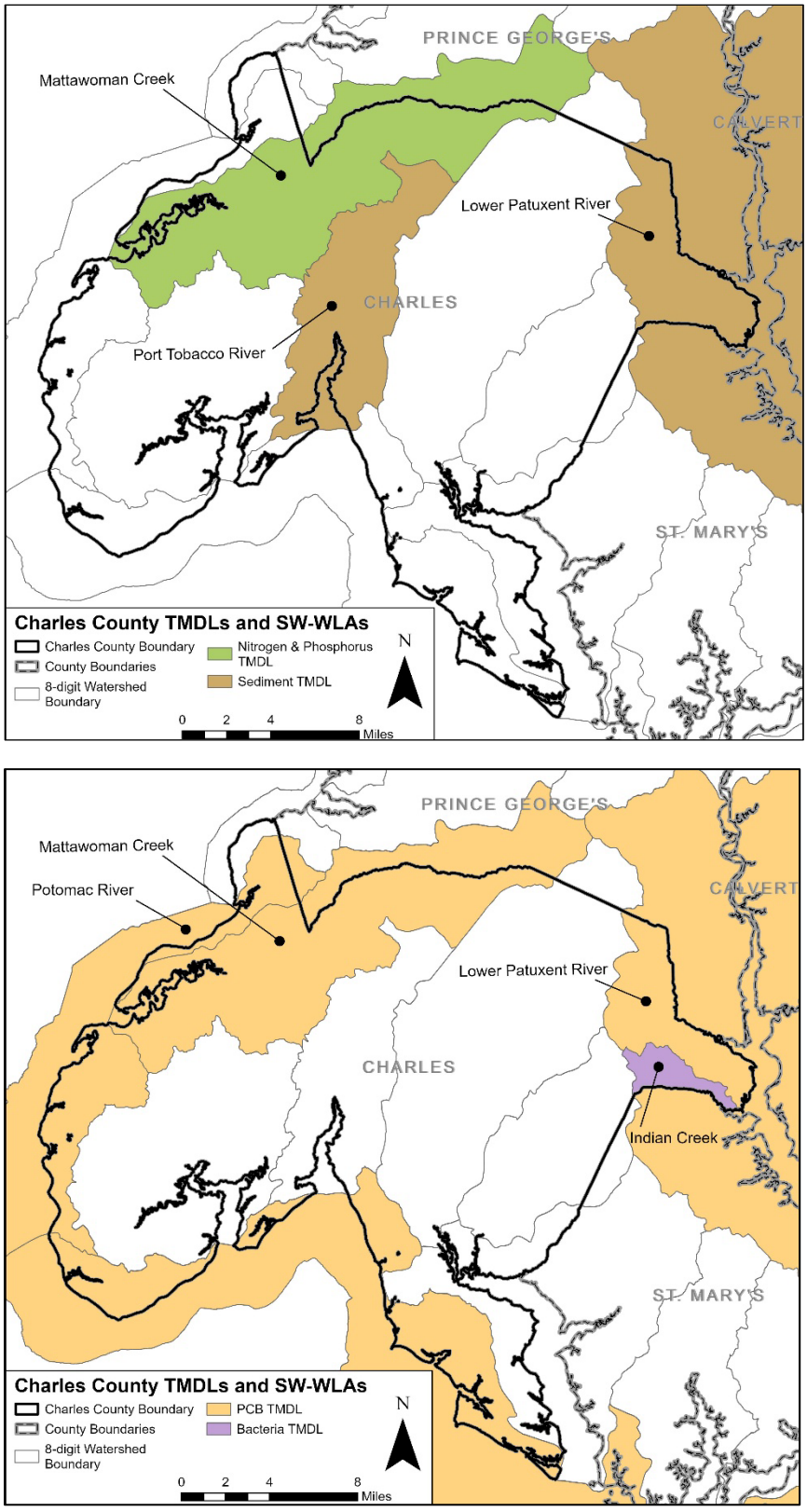

Figure 1-1. Charles County Local TMDLs with SW-WLAs

1.2.2 Chesapeake Bay TMDL

The Chesapeake Bay TMDL, established by the EPA (EPA, 2010), sets pollution limits for TN, TP, and TSS in the Chesapeake Bay Watershed. Compliance with the Chesapeake Bay TMDL is regulated in the MS4 permit through the use of the impervious surface treatment strategy as described in Section 1.3 below. The Chesapeake Bay TMDL is listed in Appendix A of the MS4 permit with SW-WLAs for TN and TP presented at the Bay segmentshed scale for informational purposes. Per communication from MDE (MDE, 2022a), Countywide implementation or restoration plans developed and tracked at the Countywide scale are also acceptable for the current permit term.

Unlike TN and TP, there is no required percent reduction for TSS in the Chesapeake Bay TMDL; rather, it is assumed that the TSS target will be met if the TP target is met. Although a TSS target reduction is not included for the Chesapeake Bay TMDL, the County is presenting the TSS reductions associated with restoration BMPs in this Countywide Plan.

Table 1-3 provides a summary of Charles County's portions of target edge of tide (EOT) reductions towards the Bay TMDL. The terms listed below are used throughout the plan and are presented and defined here to assist the reader in understanding the definitions of each and how they were derived:

- **EOT lbs/yr:** An edge of tide load (EOT load) is the amount of pollutant that is transported to the tidal waters of the Chesapeake Bay. EOT loads are generally less than EOS loads due to losses during transport from streams to the Bay. The Bay TMDL analysis is conducted and presented at the EOT scale.
- **2010 Baseline Load:** Baseline pollutant load levels (i.e., land use loads with baseline BMPs) from 2010 conditions in the Charles County MS4 source sector using MDE's TIPP spreadsheet tool, which is described further in Section 2. The baseline load was re-calculated due to data updates in FY25 and differs from what was presented in the FY24 Countywide Plan.
- **Target % Reduction:** Percent reductions required in the TMDL and assigned to Charles County Phase I MS4 stormwater sector (MS4 Permit Appendix A and WLA Search tool available in MDE's TMDL Data Center; https://wlat.mde.state.md.us/WLASearch.aspx). Per MDE, if TP target is met, TSS target will be met. As a result of the baseline load being re-calculated in FY25, the target % reduction was also re-calculated and differs from what was presented in the FY24 Countywide Plan.
- **Target Reduction:** Target reduction translated by multiplying the 2010 baseline load by the target % reduction. If TP target is met, TSS target will be met. As a result of the baseline load being re-calculated in FY25, the target reduction was also re-calculated and differs from what was presented in the FY24 Countywide Plan.
- **Target Load (SW-WLA):** Stormwater wasteload allocations (SW-WLA) are allocated loads derived using the following calculation for the Bay TMDL: 2010 Baseline Load – (2010 Baseline Load x Target % Reduction). The SW-WLA is the portion of the overall TMDL that is assigned to of 'allocated' to the responsibility of the stormwater sector. As a result of the baseline load being re-calculated in FY25, the target load was also re-calculated and differs from what was presented in the FY24 Countywide Plan.
- **Target Year:** For the Chesapeake Bay TMDL, the Target Year was established by the EPA as 2025.

Table 1-3. Charles County Chesapeake Bay TMDL Target Loads

TMDL Pollutant	2010 Baseline Load EOT lbs/yr	Target % Reduction	Target Reduction EOT lbs/yr	Target Load (SW-WLA) EOT lbs/yr	Target Year
TN	256,319	20.24%	51,879	204,440	2025
TP	30,441	38.26%	6,161	24,280	2025
TSS	39,269,192	n/a	n/a	n/a	n/a

1.3 Impervious Restoration

Under the County's current MS4 permit, PART IV.E. Stormwater Restoration, MDE requires the County to meet an impervious surface treatment goal of 1,083 impervious acres that have not been treated to the MEP by the end of the current 5-year permit term (December 29, 2027). Per the County's permit, the impervious acre restoration requirements and associated pollutant reductions are consistent with Maryland's Phase III Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL and 2025 nutrient load targets and for local TMDL implementation targets.

The County will continue to complete the impervious analysis based on MEP and report results in the County's annual report to MDE. Although impervious crediting and reporting are not included in this Countywide Plan, the County will complete planning with impervious crediting requirements and restoration benchmarks as outlined in Table 1 of the new permit (PART IV.E.7.) in mind.

2 Modeling Approach

MDE's TMDL Implementation Progress and Planning Tool (TIPP) spreadsheet tool (Version: 01/25/2024; MDE, 2024) was used to assess nutrient and sediment local TMDL FY25 progress and whether goals were met. The tool calculates pollutant load reductions based on the data of existing, programmed, and potential identified MDE approved BMPs that are maintained in the County's NPDES geodatabase. The TIPP was developed by MDE for use by MS4 jurisdictions for local TMDL modeling and planning. The TIPP uses methods associated with Phase 6 of the Chesapeake Bay Watershed Model (CBWM), which is consistent with the MDE 2021 Accounting Guidance. Additional information on the TIPP, including frequently asked questions and live walkthrough and demo, can be found on MDE's website at https://mde.maryland.gov/programs/water/TMDL/DataCenter/Pages/TMDLStormwaterToolkit.aspx.

The Chesapeake Bay Program's Chesapeake Assessment Scenario Tool (CAST; Version Phase 6—8.0.0.; CBP, 2024) was used to estimate load reductions applied towards the Chesapeake Bay TMDL. CAST uses methods associated the Chesapeake Bay Program Partnership Watershed Model (CBP WM Phase 6), which is consistent with the MDE 2021 Accounting Guidance. CAST was developed specifically for Bay-scale modeling for the Bay TMDL pollutants and was therefore determined to be the most appropriate Bay TMDL modeling tool. Only MDE approved BMPs were used in the County's CAST scenarios. Model documentation and training materials can be found on the CAST website at https://cast.chesapeakebay.net/.

Stream restoration and outfall stabilization projects were modeled outside of CAST using protocol calculations when project information was available and default rates when not available.

Per guidance from MDE (2022c), unlike nutrient and sediment TMDLs, bacteria baseline and progress modeling is not a requirement for bacteria TMDLs. Implementation plans developed for bacteria TMDLs under the most recent guidance are focused on source identification, remediation, monitoring, and showing implementation progress over time rather than achieving SW-WLAs by a final target date. Charles County provides progress updates on the bacteria TMDL implementation plan in Section 3.3.

3 Local TMDLs

Completed BMP implementation and loads for FY25 annual progress, FY25 cumulative progress, and planned BMP implementation and loads required to meet all nutrient and sediment SW-WLAs are presented in the sections below for the Mattawoman Creek and Port Tobacco River watersheds. Progress is assessed by comparing the calculated percent reduction achieved for each TMDL against the MDE published target percent reduction assigned to Charles County. Planned BMPs summarized in the tables below represent what is needed to achieve individual SW-WLA targets. A list of planned BMPs is provided in Appendix A.

The terms listed below are used throughout this section, and also in Section 4 - Chesapeake Bay TMDL, and are presented and defined here to assist the reader in understanding the definitions of each:

BMP Implementation

- **Unit:** Total number of projects and amount of area or length of stream that is treated by the BMP. Unit is specified by BMP type.
- **FY25:** Restoration BMPs implemented during the fiscal year 2025 (FY25) reporting period with built dates between July 1, 2024, and June 30, 2025, the end of the reporting period for this Countywide Plan.
- **Cumulative Progress:** All restoration BMPs currently implemented. Includes BMPs with built dates between the TMDL baseline date and June 30, 2025, the end of the reporting period for this Countywide Plan. The projects have been inspected and verified to ensure that they meet MDE's requirements.
- **Planned:** Planned is a representation of what is needed to achieve the remaining reduction targets. Planned BMPs include those BMPs with the status of Planning, In Design, or Under Construction that have been identified as a potential project or strategy through a previous watershed assessment or restoration assessment effort. They generally have a location, a BMP type identified, and some project parameters such as project size, drainage area, length, estimated load reduction and/or impervious surface reduction, and preliminary cost estimate.
  In the occurrence where project load reductions from currently planned projects did not achieve reduction targets, a suite of possible BMP types were exampled to help achieve required reductions. These additional BMPs are hypothetical BMPs where project information is not available at this time. The number of BMPs are estimated using the calculated average treatment per project by BMP type using completed BMP data in the County's geodatabase. Planned BMPs are listed by County project in Appendix A.
- **Total:** Sum of the BMP implementation included in the following restoration tiers: Cumulative Progress and Planned. This represents all restoration BMPs needed to achieve the local TMDL targets.

Load Reductions

- **Target % Reduction:** Percent reduction of baseline load required in the TMDL and assigned to Charles County Phase I MS4 stormwater sector (MS4 Permit Appendix A and WLA Search tool available in MDE's TMDL Data Center; https://wlat.mde.state.md.us/WLASearch.aspx).
- **Target Reduction:** Target reduction calculation by multiplying the baseline load by the target % reduction.
- **Target Load (SW-WLA):** Stormwater wasteload allocations (SW-WLA) are allocated loads derived using the following calculation: Baseline Load – (Baseline Load x Target % Reduction). The SW-WLA is the portion of the overall TMDL that is assigned to of 'allocated' to the responsibility of the stormwater sector.
- **FY25 Annual Restoration Reduction:** Annual pollutant reduction associated with the BMP implementation completed in only the FY25 reporting period with built dates between July 1, 2024, and June 30, 2025.
- **FY25 Annual Restoration % Reduction:** Percent reduction associated with the BMP implementation completed in only the FY25 reporting period with built dates between July 1, 2024, and June 30, 2025.
- **FY25 Cumulative Progress Reduction:** Cumulative pollutant reduction associated with all completed BMPs with built dates between the baseline date and June 30, 2025.
- **FY25 Cumulative Progress % Reduction:** Percent reduction associated with cumulative pollutant reductions from all completed BMPs with built dates between the baseline date and June 30, 2025. This % reduction is compared against the Target % Reduction to assess progress.
- **Planned Restoration Reduction:** Pollutant reduction associated with planned BMP implementation.
- **Planned Restoration % Reduction:** Percent reduction associated with the planned BMP implementation.
- **Total Implementation Reductions:** Sum of pollutant reduction from FY25 Cumulative Progress and Planned Restoration.
- **Total Implementation % Reduction:** Percent reduction associated with the Total Implementation Reduction, defined above. This % reduction is assessed against the Target % Reduction. The Total Implementation % Reduction should match or exceed the Target % Reduction.
- **Target Year:** Projected year when the local TMDL target reduction goal will be achieved through modeling.

3.1 Mattawoman Creek TMDL for Nitrogen and Phosphorus

Mattawoman Creek is located in northwestern Charles County, Maryland, and drains directly into the Potomac River, which ultimately drains to the Chesapeake Bay (Figure 3-1). Mattawoman Creek divides Charles County to the south and Prince George's County to the north in the upper portion of the creek. The Waldorf urban area is located along the eastern portion of the watershed, with US Highway 301 (Crain Highway) running from the northern extent of the watershed through to the southeastern extent along the eastern boundary. The Town of Indian Head is in the western portion of the watershed. Mattawoman Creek is approximately 34 miles long from the headwaters to confluence with the Potomac River with approximately 70 square miles of its watershed contained within Charles County.

Charles County is responsible for two TMDLs within the Mattawoman Creek watershed: TN and TP. Because the nutrients impairments of the TMDL are within the Mattawoman Creek receiving waters, and not in the watershed's tributary streams, TIPP modeling is completed at the EOR scale.

The original TMDL analysis by MDE did not separate out septic systems specifically in the Mattawoman as a unique source, the loads were distributed to other sectors including the stormwater sector. Because of this, Charles County included septic systems in the 2017 Restoration Plan for Mattawoman both in terms of baseline loads and taking credit for septic practices. This method was given the approval of MDE at the time. The TIPP model in the current analysis accounts for septic sources but includes them as a specific load source separate from the stormwater sector. Therefore, in the current analysis using the TIPP model, rather than add baseline loads from septics, the County is modeling without the septic sources, and without septic practices, and is applying the 54% TN reduction to only the stormwater load source.

In addition to septic systems, the County has identified through both sanitary sewer pipe inspections and inflow and infiltration studies that exfiltration, leaking, and/or damaged wastewater system pipes, and sanitary system overflows may be contributing untreated wastewater to the watershed from major sanitary sewer lines running through the Mattawoman floodplain. This load source is unaccounted for in the modeling and is likely implicitly included in the stormwater sector. This load source requires additional research and investigation.

As described in previous plans, developing a practical plan to meet the 54% TN TMDL percent reduction goal within the stormwater sector continues to be very difficult. In the sections that follow, Charles County will demonstrate some of the challenges to full implementation and present alternative planning scenarios with room for flexibility and adaptive management to close the gap and meet the TMDL. Additionally, the County is researching water quality datasets for the Mattawoman to compile data captured since the initial TMDL was published in 2005 to determine if any refinement to the TMDL is necessary. The County will coordinate with MDE in 2026 on findings and implications.

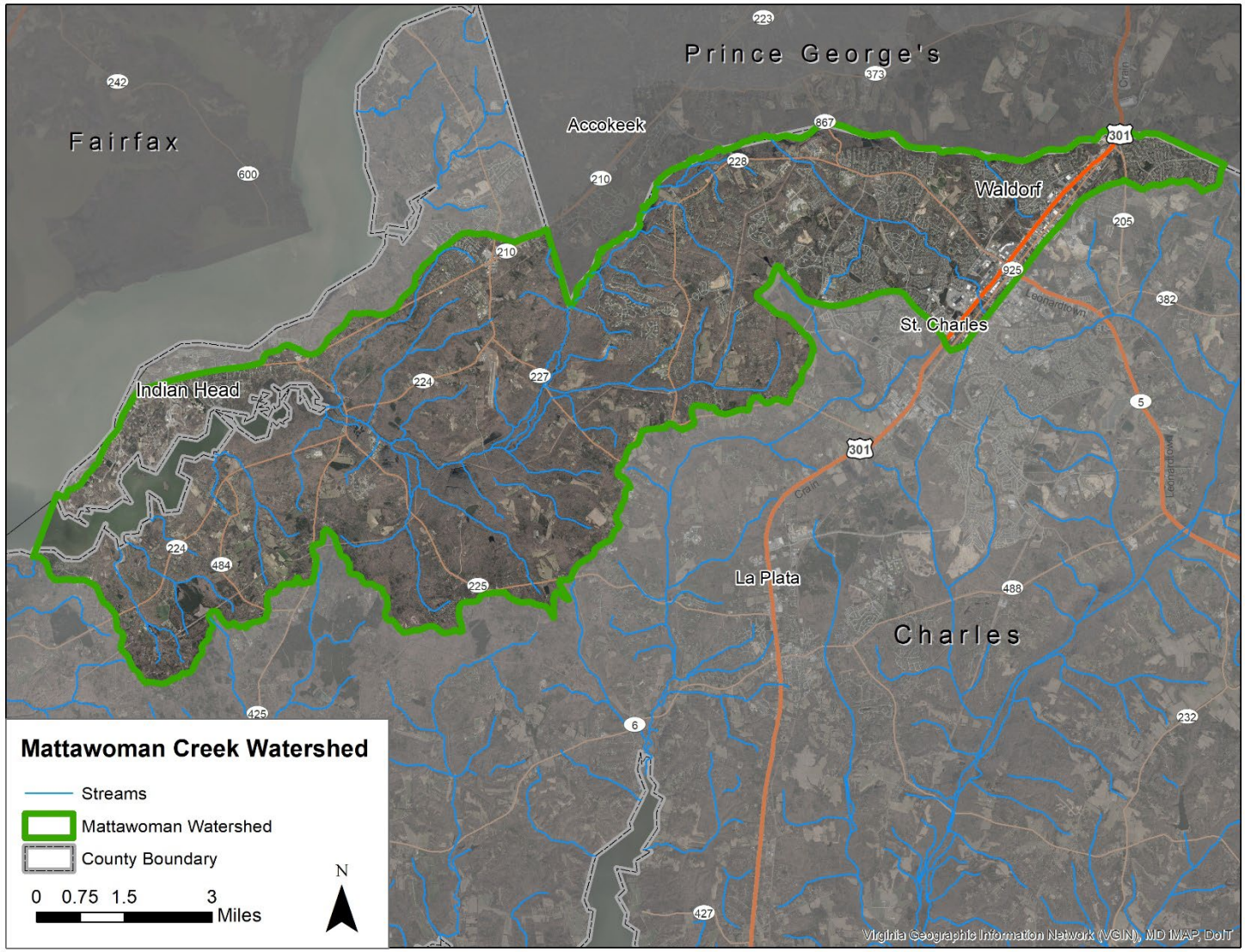

Figure 3-1. Aerial Photography of the Mattawoman Creek Watershed

3.1.1 BMP Implementation

Table 3-1 presents BMP implementation achieved during FY25 (July 1, 2024, through June 30, 2025), as well as cumulative implementation (restoration BMPs implemented after the TMDL baseline year through FY25), planned implementation to meet the TP SW-WLA goal (planned BMPs implemented through the Interim TP Target Year), and total implementation (sum of cumulative progress and planned implementation) for the nutrient local TMDL in the Mattawoman Creek watershed.

Four new restoration BMPs were completed in FY25 including two submerged gravel wetlands, one stream restoration, and one outfall stabilization. Inlet cleaning efforts also increased by 10.8 tons relative to FY24 implementation.

Urban Nutrient Management data comes from a statewide number of acres provided to MDE by Maryland Department of Agriculture. These acres are distributed by the CBP WM P6 to County/watershed implementation levels (2024 Progress CAST scenario; CBP, 2024). The County's modeling previously used 2022 Progress urban nutrient management BMP acres and was updated this year to include BMP acres from the official 2024 Progress CAST scenario. This update resulted in lower pollutant reduction estimates, as current urban nutrient management BMP acres are now less than those previously modeled (5,304.1 acres in FY25 vs. 6,097.8 acres in FY24).

A list of planned BMPs is provided in Appendix A and includes future projects from the County's geodatabase. Because projected load reductions from currently planned projects did not achieve the TN and TP target loads in the Mattawoman Creek watershed, a suite of possible BMP types were examined to help achieve the TP required load reduction (47% reduction). These additional BMPs needed to meet the TP load reduction are also included in the Planned column in Table 3-1 and in Appendix A. The TN reductions associated with the additional BMPs needed to meet the TP load reduction target, were not enough to achieve the TN target (54%). This is discussed in detail in Section 3.1.3.

Table 3-1. BMP Implementation for the Mattawoman Creek Nutrients Local TMDLs

BMP	Unit	FY25		Cumulative Progress		Planned		Total	
		Amount	# of BMP	Amount	# of BMP	Amount	# of BMP	Amount	# of BMP
Bioretention	drainage acres	0.0	0	0.0	0	600.0	776	600.0	776
Bioswale	drainage acres	0.0	0	13.6	4	300.0	145	313.6	149
Filter	drainage acres	0.0	0	280.3	4	300.0	101	580.3	105
Infiltration practices	drainage acres	0.0	0	9.8	1	300.0	27	309.8	28
Permeable pavement	drainage acres	0.0	0	0.0	0	60.0	157	60.0	157
Vegetated open channels	drainage acres	0.0	0	85.9	12	0.0	0	85.9	12

BMP	Unit	FY25		Cumulative Progress		Planned		Total	
		Amount	# of BMP	Amount	# of BMP	Amount	# of BMP	Amount	# of BMP
Wet ponds and wetlands	drainage acres	5.7	2	1,020.0	15	1,100	121	2,120.0	136
Stormwater retrofits	drainage acres	0.0	0	0.0	0	0.0	0	0.0	0
Sheetflow to conservation area	drainage acres	0.0	0	0.0	0	0.0	0	0.0	0
Conservation landscaping	acres converted	0.0	0	0.0	0	100.0	5,000	100.0	5,000
Forest planting	acres converted	0.0	0	0.0	0	195.7	44	195.7	44
Riparian forest planting	acres converted	0.0	0	0.0	0	180.8	67	180.8	67
Urban tree canopy planting	acres converted	0.0	0	0.0	0	200.0	20,000*	200.0	20,000*
Street trees	acres converted	0.0	0	0.0	0	20.0	2,000*	20.0	2,000*
Urban soil restoration	acres converted	0.0	0	0.0	0	456.1	1,824	456.1	1,824
Stream restoration	linear feet	2,499.0	1	8,977.0	6	11,476.0	7	20453.0	13
Outfall stabilization	linear feet	57.0	1	458.0	2	419.0	2	877.0	4
Inlet cleaning	tons removed	53.7	n/a	53.7	n/a	56.1	n/a	56.1	n/a
Urban nutrient management	turf acres treated	5,304.1	n/a	5,304.1	n/a	0.0	n/a	5,304.1	n/a

*Number of trees planted

3.1.2 Load Reductions

Table 3-2 below presents pollutant reductions achieved for FY25 annual progress, cumulative reductions for FY25 progress, reductions from Planned BMPs, and total reductions (sum of reductions associated with FY25 cumulative progress and planned BMPs) for the nutrient TMDL SW-WLAs in the Mattawoman Creek watershed.

The planned BMPs include planned BMPs already identified by the County as well as a suite of BMPs identified for this Countywide Plan that will be required to meet the TP load reduction goals. The TN reductions associated with the additional BMPs needed to meet the TP load reduction target, were not enough to achieve the TN target (54%). This is discussed in detail in Section 3.1.3. The implementation of restoration BMPs in the Mattawoman Creek watershed in FY25 resulted in an increase in cumulative progress % reduction relative to FY24 results.

Table 3-2. Progress and Planned Reductions for the Nutrient Local TMDLs in the Mattawoman Creek Watershed

	Mattawoman Creek	
	TN EOR lbs/yr	TP EOR lbs/yr
Baseline Loads and Target Reductions		
TMDL Baseline Year	2000	2000
Baseline Load	94,589	11,763
Target % Reduction	54.0%	47.0%
Target Reduction	51,078	5,528
Target Load (SW-WLA)	43,511	6,234
FY25 Annual Restoration Reductions* (annual treatment from 7/1/2024 through 6/30/2025)		
FY25 Annual Restoration Reduction	3,637	383
FY25 Annual Restoration % Reduction	3.8%	3.3%
FY25 Cumulative Progress Reductions (cumulative treatment between 7/1/2000 and 6/30/2025)		
FY25 Cumulative Progress Reduction	12,762	2,210
FY25 Cumulative Progress % Reduction	13.5%	18.8%
Planned Restoration Reductions		
Planned Restoration Reduction	19,142	3,335
Planned Restoration % Reduction	20.2%	28.3%
Total Implementation (Cumulative Progress + Planned Restoration Reductions)		
Total Implementation Reductions	31,904	5,545
Total Implementation % Reduction	33.7%	47.1%
Target Year	TBD	2053

*Includes reductions from inlet cleaning and urban nutrient management BMPs

3.1.3 Progress Implementation Benchmark Evaluation

Milestone dates for Milestone 1 (2033), Milestone 2 (2043), and Interim TP Target Year (2053) for TP and TN are presented in Figure 3-2 and Figure 3-3, respectively, which shows baseline and progress loads (blue bars) and future loads (orange bars) compared to the Mattawoman Creek watershed local TMDL SW-WLA (red line) for TP and TN, respectively. In 2025, the baseline loads were re-assessed based on projects currently in the geodatabase. This update did not alter the TMDL target end dates nor benchmark milestones.

As mentioned in Section 3.1.1 (see Table 3-1), progress is underway with the implementation of strategies throughout the watershed. Based on future modeling in the TIPP tool, after implementing the future BMPs described in Section 3.1.1, Charles County will meet its TP SW-WLA for the Mattawoman Creek watershed by the end of FY2053. The TN SW-WLA is discussed below.

Table 3-3: Mattawoman Creek Nutrient Local TMDLs % Reduction Remaining

Local TMDL Watershed Name	Pollutant	Target % Reduction	FY25 Progress % Reduction	% Reduction Remaining	Cost	Target Year	Years Remaining to Complete
Mattawoman Creek	TN	54.0%	13.5%	40.5%	$250,794,000	TBD	TBD
	TP	47.0%	18.8%	28.2%	$114,671,000	2053	28

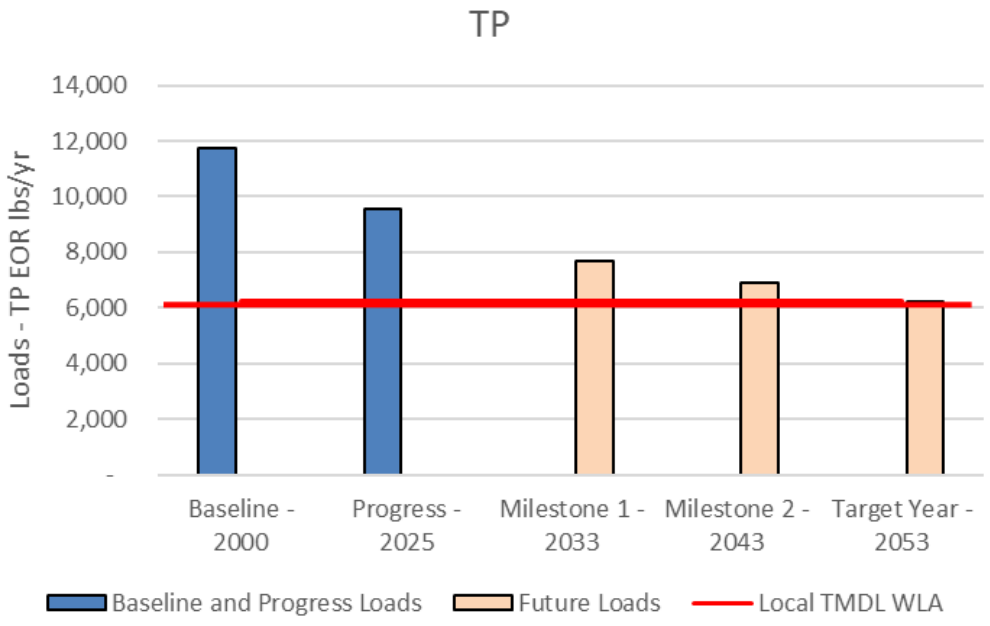

Figure 3-2. Mattawoman Creek TP Progress and Planned Loads

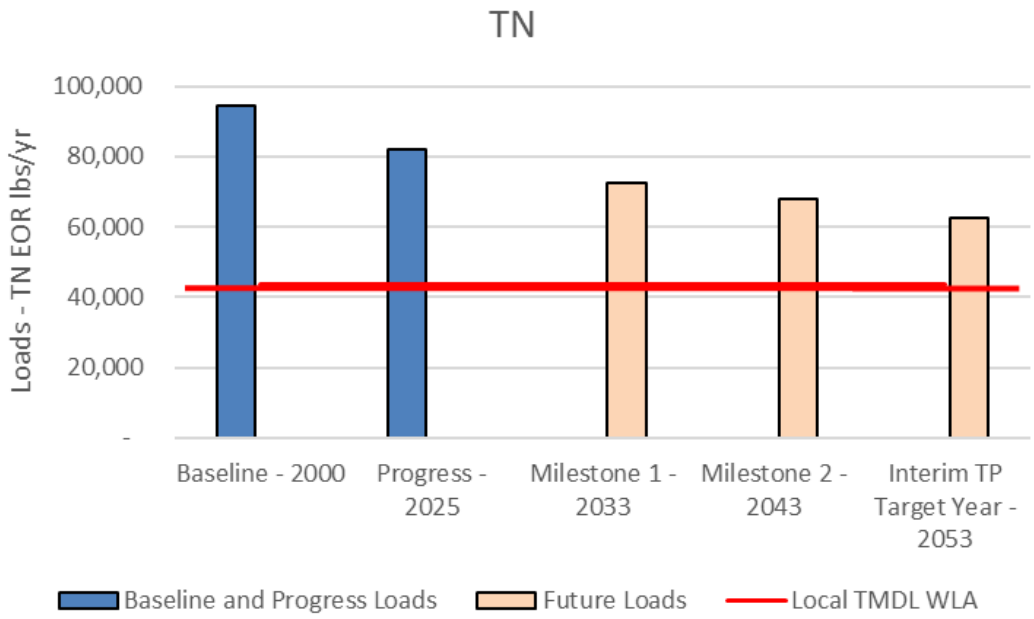

Figure 3-3. Mattawoman Creek TN Progress and Planned Loads

Future BMP implementation in the Mattawoman Creek watershed is shown in Table 3-1. The County's geodatabase lists several future projects in the Mattawoman Creek watershed including stream restoration, outfall stabilization, forest planting, and stormwater retrofit. Pollutant load reduction modeling results of future implementation for projects currently identified in the County's geodatabase for the Mattawoman Creek watershed resulted in the following reductions: 1.5% reduction in TN and 1.6% reduction in TP.

Additional implementation above what has been identified to date is needed to meet the 54% and 47% TN and TP reduction targets, respectively. Because projected load reductions from currently planned projects did not achieve the TN and TP target loads in the Mattawoman Creek watershed, a suite of possible BMP types were examined to help achieve the required TP load reduction. BMP types with the highest TN and TP removal efficiencies were prioritized including stream restoration, tree planting, wet pond retrofits, filtering practices, bioretention, bioswale, and infiltration practices. Pollutant load reduction modeling results for these additional planned projects for the Mattawoman Creek watershed resulted in the following cumulative reductions: 18.7% reduction in TN and 26.7% reduction in TP.

Additional BMPs Needed to Achieve Nitrogen SW-WLA

The future BMPs presented in this Countywide Plan achieve just over half (62.4%) of the target TN % reduction resulting in 33.7% TN reduction in the Mattawoman Creek watershed.

Where traditional stormwater BMPs cannot treat the TN load to meet the target, alternative BMPs must be implemented. These would include practices such as stream restoration and land use conversion BMPs (e.g., forest planting, riparian buffer, and tree planting). These types of BMPs also have their limitations in effectiveness for TN reduction. More importantly, there are limited available linear feet of stream to restore or turf acres to convert to forest/tree plantings.

In this Countywide Plan, the County modeled a hypothetical future planning scenario to determine how many additional BMPs, above those currently planned for the TP target, are needed to achieve the 54% TN reduction. The additional BMPs and approximate treatment (drainage area acres and linear feet) are listed below and demonstrate that this level of implementation is not feasible and may exceed existing amounts of available restoration opportunities (meaning eroded stream length, stormwater sector area etc.) that can realistically be treated in the watershed.

Additional BMPs needed to achieve 54% TN reduction in the Mattawoman Creek watershed:

- 13 SW BMP pond conversions (100 drainage area acres)
- 1,512 new SW BMPs (3,210 drainage area acres)
- 1 stream restoration project (920 linear feet)

For example, the drainage area for additional new ponds needed when added to the drainage area for new ponds needed to hit the TP target (3,210 acres) may not be feasible.

The cost to implement the additional BMPs needed to achieve the TN SW-WLA would be $250,794,000 which is $136,123,000 more than the plan to meet the TP SW-WLA.

The County will periodically reevaluate the feasibility of meeting the full 54% TN reduction target as progress moves forward and/or when changes in BMP technologies or crediting methods are implemented. Feasibility assessment will include in depth desktop and potentially additional field investigation of restorable and treatable areas and streams to determine the full extent of the County's restoration opportunities.

3.2 Port Tobacco TMDL for Sediment

The Port Tobacco River watershed is situated in the central portion of the County, with Mattawoman Creek watershed to the north, Nanjemoy Creek watershed to the west, and Zekiah Swamp watershed to the east (Figure 3-4). The watershed falls entirely within Charles County's boundary. The Port Tobacco River watershed drains directly south into the Port Tobacco River, which drains to the Potomac River, which ultimately leads to the Chesapeake Bay. Communities within the Port Tobacco watershed include La Plata, Pomfret, and Port Tobacco. The Port Tobacco River watershed is approximately 30,100 acres (47.0 square miles) in area and contains approximately 104 total miles of streams. The watershed includes several named streams, including Hoghole Run, Wills Branch, and Jennie Run.

Charles County is responsible for one TSS TMDL within the Port Tobacco River watershed.

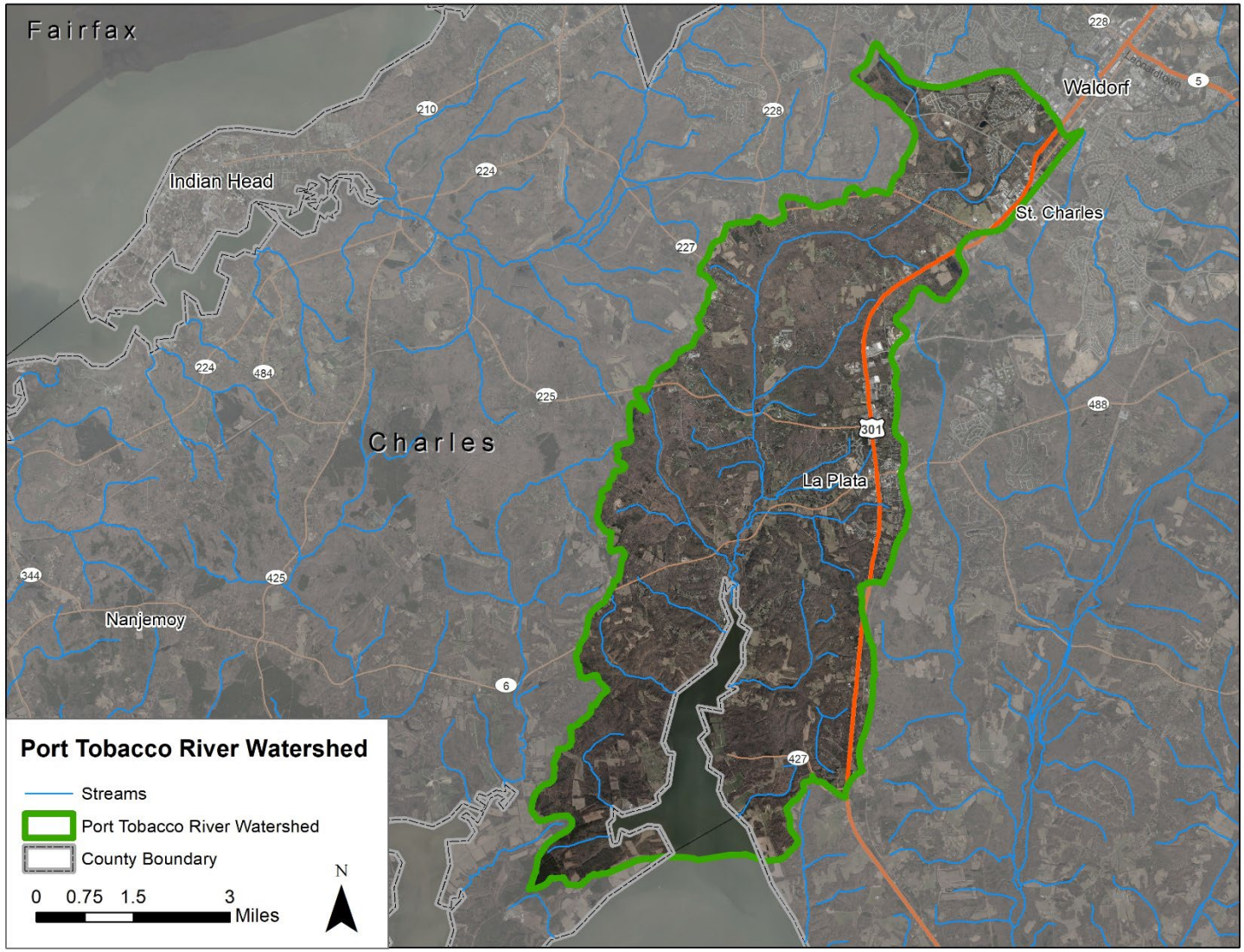

Figure 3-4. Aerial Photography of the Port Tobacco Creek Watershed

3.2.1 BMP Implementation

Table 3-4 below presents restoration BMP implementation achieved during FY25 (July 1, 2024, through June 30, 2025), as well as cumulative implementation (restoration BMPs implemented from the TMDL baseline year through FY25), planned implementation (only BMPs with a 'Planned' status), and total implementation (sum of cumulative progress and planned implementation) for the sediment local TMDL in the Port Tobacco River watershed.

One conversion of an existing BMP was completed in FY25. Inlet cleaning efforts also increased by 1.4 tons relative to FY24 implementation. Because projected load reductions from currently planned projects did not achieve the TSS target load in the Port Tobacco River watershed, a suite of possible BMP types were examined to help achieve the TSS required load reduction (34% reduction). These additional BMPs were hypothetical projects based on projects identified during various watershed assessments including, Port Tobacco River Watershed NPDES: MS4 Retrofit Study (Vista Design, 2015) and Port Tobacco River Watershed Assessment (KCI, 2015). These additional BMPs needed to meet the TSS load reduction are also included in the Planned column in Table 3-4 and in Appendix A.

Table 3-4. BMP Implementation for the Port Tobacco River Sediment Local TMDL

BMP	Unit	FY25		Cumulative Progress		Planned		Total	
		Amount	# of BMP	Amount	# of BMP	Amount	# of BMP	Amount	# of BMP
Bioretention	drainage acres	0.0	0	0.0	0	0.0	0	0.0	0
Bioswale	drainage acres	0.0	0	0.0	0	391.6	4	391.6	4
Filter	drainage acres	0.0	0	0.0	0	258.8	3	258.8	3
Wet ponds and wetlands	drainage acres	34.9	1	34.9	1	296.0	2	330.9	3
Sheetflow to conservation area	drainage acres	0.0	0	0.0	0	24.8	1	24.8	1
Forest planting	acres converted	0.0	0	0.0	0	3.5	2	3.5	2
Riparian forest planting	acres converted	0.0	0	0.0	0	0.0	0	0.0	0
Urban soil restoration	acres converted	0.0	0	0.0	0	0.0	0	0.0	0
Stream restoration	linear feet	0.0	0	1,330.0	1	9,774.0	8	11,104.0	9
Inlet cleaning	tons removed	1.6	n/a	1.6	n/a	0.0	n/a	1.6	n/a

3.2.2 Load Reductions

Table 3-5 below presents pollutant reductions achieved for FY25 annual progress, cumulative reductions for FY25 progress, reductions from Planned BMPs, and total reductions (sum of reductions associated with FY25 cumulative progress and planned BMPs) associated with full implementation of the BMPs detailed above in Table 3-4. Based on the current modeling analysis of those BMPs, it is estimated that implementation of the completed cumulative projects and the planned projects will yield a load reduction of 34.6%, which is just beyond the required 34% target percent reduction.

The implementation of a conversion BMP in the Port Tobacco River watershed in FY25 resulted in an increase in cumulative progress % reduction relative to FY24 results.

Table 3-5. Progress and Planned Reductions for the Sediment local TMDL in the Port Tobacco River Watershed

	Port Tobacco River TSS EOS lbs/yr
Baseline Loads and Target Reductions	
TMDL Baseline Year	2009
Baseline Load	13,629,101
Target % Reduction	34.0%
Target Reduction	4,633,894
Target Load (SW-WLA)	8,995,207
FY25 Annual Restoration Reductions* (annual treatment from 7/1/2024 through 6/30/2025)	
FY25 Restoration Reduction	60,066
FY25 Restoration % Reduction	0.4%
FY25 Cumulative Progress Reductions (cumulative treatment between 7/1/2009 and 6/30/2025)	
FY25 Cumulative Progress Reduction	634,626
FY25 Cumulative Progress % Reduction	4.7%
Planned Restoration Reductions	
Planned Restoration Reduction	4,063,985
Planned Restoration % Reduction	29.8%
Total Implementation (Cumulative Progress + Planned Restoration Reductions)	
Total Implementation Reductions	4,698,611
Total Implementation % Reduction	34.5%
Target Year	2039

*Includes reductions from inlet cleaning and urban nutrient management BMPs

3.2.3 Progress Implementation Benchmark Evaluation

Planning loads for Milestone 1 (2028), Milestone 2 (2034), and the final Target Year (2039) are presented in Figure 3-5 which shows baseline and progress loads (blue bars) and future loads (orange bars) compared to the Port Tobacco River watershed local TMDL SW-WLA (red line) for sediment.

As mentioned in Section 3.2.1 (see Table 3-4), progress is underway with the implementation of strategies throughout the watershed. Based on future modeling in the TIPP tool, after implementing the future BMPs described in Section 3.2.1, Charles County will meet its TSS SW-WLA for the Port Tobacco River watershed by the end of FY2039.

Table 3-6. Port Tobacco Sediment Local TMDL % Reduction Remaining

Local TMDL Watershed Name	Pollutant	Target % Reduction	FY25 Progress % Reduction	% Reduction Remaining	Cost	Target Year	Years Remaining to Complete
Port Tobacco River	TSS	34.0%	4.7%	29.3%	$13,622,000	2039	14

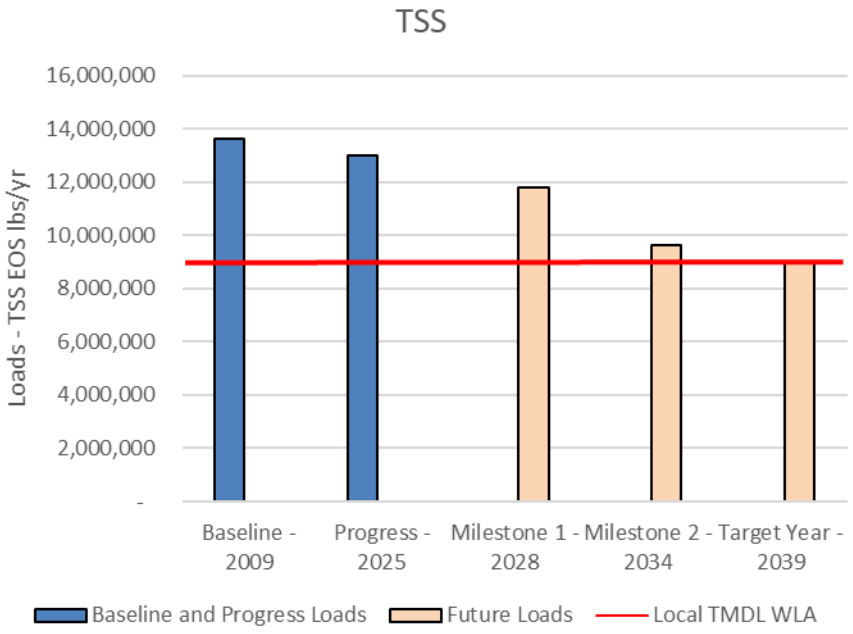

Figure 3-5. Port Tobacco River TSS Progress and Planned Loads

3.3 Lower Patuxent Bacteria TMDL (Indian Creek)

Charles County prepared a bacteria TMDL plan following MDE's Bacteria Implementation Plan Guidance published in February 2022 (MDE, 2022b). The bacteria TMDL plan framework is focused on identifying the bacteria sources (spatially and by source type) through desktop analysis and monitoring. Once potential sources are identified and confirmed, they will be addressed, and monitoring will continue so that trends and ideally a reduction can be detected.

In preparation of the Lower Patuxent Bacteria TMDL Implementation Plan in 2024, the County researched and compiled data under a Desktop Source Identification, with results documented in a Data Compilation Results technical memorandum listing the datasets researched and compiled to support the analysis. Data sources compiled include spatial data, monitoring data, data related to human sources, and data to describe potential non-human sources. Data fall into general categories related to land use, municipal stormwater infrastructure, municipal sanitary sewer systems, on-site disposal systems, landfills, wildlife, pet related elements such as dog parks, illicit discharges, and data to characterize potential exposures such as water contact recreation areas and beaches.

The Implementation Plan included a review and analysis of the compiled spatial and monitoring data to identify potential sources of bacterial contamination, both by type or source and by location. Because the data indicated only potential and unconfirmed sources, and because bacteria monitoring data in the freshwater portions of the watershed did not exist at the time, the plan recommended that a monitoring strategy first be implemented before any conclusions on bacteria sources were drawn and before any specific remediation strategies were presented or undertaken. The monitoring plan elements of the overall implementation plan include a Source Identification Phase, sampling freshwater sites for a period of at least one year, followed by a Source Trackdown Phase, where necessary to identify more specifically the sources of bacteria identified in the first phase.

The County's bacteria TMDL Implementation Plan (Charles County, 2024) was submitted to MDE on April 30, 2024, along with a spatial data package used in the spatial analysis for potential sources. MDE approved the plan on July 31, 2024, with minor comments and the County and MDE coordinated in late 2024 to further refine the sampling strategy. Charles County initiated a new monitoring program in 2025 to complete the Source Identification Phase sampling. Bacteria sampling using *E. coli* as the fecal indicator bacteria began in April 2025 at three sites in the watershed with two sites on the mainstem of Indian Creek and one site on the largest tributary to Indian Creek.

Results of the FY25 sampling (April-June 2025) are included in the Indian Creek Bacteria TMDL Monitoring summary report (Charles County, 2025b) submitted to MDE with the County's FY25 MS4 Annual Report. The Bacteria TMDL Monitoring summary report includes a map of the monitoring sites, a description of the monitoring strategy and sampling frequency, and data analysis approach. Subsequent monitoring reports will include data from the first full year of sampling, and later years as needed, and will therefore have additional conclusions based on a more complete dataset. The County will determine if revisions of the Implementation Plan are necessary as more monitoring data is collected and analyzed.

4 Chesapeake Bay TMDL

Countywide completed BMP implementation and loads for FY25 annual progress and FY25 cumulative progress are presented in the sections below. Progress is assessed by comparing the calculated percent reduction achieved for TN and TP against the MDE published percent reductions assigned for Charles County's portion of the Chesapeake Bay TMDL. As stated in Section 1.2.2., unlike TN and TP, there is no required percent reduction for TSS in the Chesapeake Bay TMDL; rather, it is assumed that the TSS target will be met if the TP target is met. Although a TSS target reduction is not included for the Chesapeake Bay TMDL, the County is presenting the TSS reductions associated with restoration BMPs in this Countywide Plan. Planned BMP implementation and loads are also summarized in the tables below.

The terms listed below are unique to the County's tracking approach used in this Countywide Plan for the Bay TMDL. Refer to Section 3 for additional definitions used throughout Sections 4.1 and 4.2.

BMP Implementation

- **Planned Through 2053:** Projects that have a proposed completion date on or after July 1, 2025, and through June 30, 2053, the target year for the local TMDL requirement with the longest planning timeline. These projects are associated with implementation needed to achieve all the County's local TMDL requirements.
- **Total:** Sum of the BMP implementation included in the following restoration tiers: FY25 Cumulative Progress and planned. This represents all restoration BMPs needed to achieve the local TMDL targets at the Countywide scale.

Load Reductions

- **Planned Through 2053 Reduction:** Pollutant reduction (in EOT lbs/yr) associated with planned BMP implementation that have a proposed completion date on or after July 1, 2025, and projected through June 30, 2053, the target year for the local TMDL requirement with the longest planning timeline.
- **Planned Through 2053 % Reduction:** Percent reduction associated with planned BMP implementation that have a proposed completion date on or after July 1, 2025, and projected through June 30, 2053, the target year for the local TMDL requirement with the longest planning timeline.
- **Total Implementation Reductions Through 2053:** Sum of pollutant reduction (in EOT lbs/yr) from FY25 Cumulative Progress Reduction and Planned Through 2053 Reduction.
- **Total Implementation % Reductions Through 2053:** Percent reduction associated with the Total Implementation Reductions Through 2053, as defined above.

4.1 BMP Implementation

Table 4-1 presents Countywide BMP implementation achieved during FY25, as well as cumulative implementation (restoration BMPs implemented after the 2010 TMDL baseline year through FY25), planned implementation for BMPs with a projected implementation date through 2053, and total implementation through 2053, the scenario used to meet the Mattawoman TP reduction target. A list of planned BMPs is provided in Appendix A and includes future projects from the County's geodatabase, and additional implementation needed to achieve local TMDL goals (see Section 3.1 and 3.2).

Table 4-1: BMP Implementation for the Chesapeake Bay TMDL Through 2053

BMP	Unit	FY25		Cumulative Progress		Planned Through 2053		Total	
		Amount	# of BMP	Amount	# of BMP	Amount	# of BMP	Amount	# of BMP
Bioretention	drainage acres	0.0	0	0.2	1	601.9	777	602.0	778
Bioswale	drainage acres	0.0	0	13.6	4	691.6	149	705.3	153
Filter	drainage acres	0.0	0	314.4	5	578.6	105	893.0	110
Impervious surface reduction	acres converted	0.0	0	0.0	0	1.1	1	1.1	1
Infiltration practices	drainage acres	0.0	0	9.8	1	300.0	27	309.8	28
Permeable pavement	drainage acres	0.0	0	60.0	157	60.0	157	120.0	314
Vegetated open channels	drainage acres	0.0	0	111.3	19	0.0	0	111.3	19
Wet ponds and wetlands	drainage acres	0.0	0	1,335.0	19	2,002.7	130	3,337.7	149
Stormwater retrofit	drainage acres	0.0	0	0.0	0	0.0	0	0.0	0
Sheetflow to conservation area	drainage acres	0.0	0	0.0	0	30.5	2	30.5	2
Conservation landscaping	acres converted	0.0	0	0.0	0	100.0	5,000	100.0	5,000
Urban soil restoration	acres	0.0	0	0.0	0	456.1	1,824	456.1	1,824
Forest planting	acres converted	0.0	0	0.0	0	207.5	53	207.5	53
Riparian forest planting	acres converted	0.0	0	0.0	0	180.8	67	180.8	67
Urban tree canopy planting	acres converted	0.0	0	1.5	1	200.0	20,000*	201.5	20,001*
Street tree planting	acres converted	0.0	0	0.0	0	20.0	2,000*	20.0	2,000*
Shoreline restoration	linear feet	0.0	0	34,349.0	101	0.0	0	34,349.0	101

BMP	Unit	FY25		Cumulative Progress		Planned Through 2053		Total	
		Amount	# of BMP	Amount	# of BMP	Amount	# of BMP	Amount	# of BMP
Stream restoration	linear feet	2,449.0	1	12,339.0	9	29,375.0	21	41,714.0	30
Outfall stabilization	linear feet	57.0	1	458.0	2	419.0	2	877.0	4
Inlet cleaning	tons removed	84.6	n/a	84.6	n/a	115.1	n/a	115.1	n/a
Urban nutrient management	turf acres treated	24,835.5	n/a	24,835.5	n/a	0.0	n/a	24,835.5	n/a

*Number of trees planted

4.2 Load Reductions

Table 4-2 below presents Countywide pollutant reductions achieved for FY25 annual progress, cumulative reductions for FY25 progress, and total reductions (sum of reductions associated with FY25 cumulative progress and planned BMPs) for the nutrient and sediment TMDL SW-WLAs in the Chesapeake Bay watershed. These represent the modeled reductions related to the BMPs listed above in Table 4-1.

Further, Table 4-2 also includes the reductions related to the implementation described in above in Table 4-1 representing the planned reductions associated with achieving the Mattawoman local TMDL TP SW-WLA in 2053.

Table 4-2. Progress and Planned Reductions for the Chesapeake Bay TMDL

	Chesapeake Bay TMDL		
	TN EOT lbs/yr	TP EOT lbs/yr	TSS EOT lbs/yr
Baseline Loads and Target Reductions			
Baseline Year	2010	2010	2010
Baseline Load	256,319	30,441	39,269,192
Target % Reduction	20.24%	38.26%	n/a
Target Reduction	51,879	11,647	n/a
Target Load (SW-WLA)	204,440	18,794	n/a
FY25 Annual Restoration Reductions (7/1/2024 through 6/30/2025)*			
FY25 Annual Restoration Reduction	737	101	43,104
FY25 Annual Restoration % Reduction	0.3%	0.3%	0.1%
FY25 Cumulative Progress Reductions (7/1/2010 through 6/30/2025)			
FY25 Cumulative Progress Reduction	8,311	1,691	2,395,894
FY25 Cumulative Progress % Reduction	3.2%	5.6%	6.1%
Planned Restoration Reductions			
Planned Through 2053 Reduction	12,226	2,701	5,287,505
Planned Through 2053 % Reduction	4.8%	8.9%	13.5%
Total Implementation (Cumulative Progress + Planned Restoration)			
Total Implementation Reductions Through 2053	20,536	4,392	7,683,399
Total Implementation % Reduction Through 2053	8.0%	14.4%	19.6%

*Includes reductions from inlet cleaning and urban nutrient management BMPs

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Appendix A: Future Implementation Project List

8 Digit Watershed Name	Site Name	Construction Purpose	MDE BMP Description	Unit	Treatment	Cost ($)	Status	Projected Implementation Year
Gilbert Swamp	DSP 200025 / Oak Ridge Park West Stream Restoration	REST	Stream Restoration	Linear Feet	3,240.0	$870,140	P	2027
Gilbert Swamp	Oak Ridge Park (East)	REST	Stream Restoration	Linear Feet	900.0	$442,330	P	2027
Gilbert Swamp	GI_TP_1	REST	Forest Planting	Acres	1.4	$15,400	P	2028
Gilbert Swamp	GI_TP_2	REST	Forest Planting	Acres	0.5	$8,500	P	2028
Mattawoman Creek	North Point High School	REST	Outfall Stabilization	Linear Feet	200.0	$150,000	P	2030
Mattawoman Creek	DSP 190107 / Marbella Stream Restoration	REST	Stream Restoration	Linear Feet	2,396.0	$2,165,664	P	2027
Mattawoman Creek	DSP 190107 / Marbella Outfall Stabilization	REST	Outfall Stabilization	Linear Feet	219.0	$56,696	P	2027
Mattawoman Creek	Elite Gymnastics	REST	Impervious Surface Reduction	DA Acres	1.1	$83,801	P	2027
Mattawoman Creek	MW_TP_19	REST	Forest Planting	Acres	0.4	$8,398	P	2028
Mattawoman Creek	MW_TP_11	REST	Forest Planting	Acres	0.6	$6,070	P	2028
Mattawoman Creek	MW_TP_16	REST	Forest Planting	Acres	3.3	$55,726	P	2028
Mattawoman Creek	MW_TP_12	REST	Forest Planting	Acres	0.3	$2,798	P	2028

8 Digit Watershed Name	Site Name	Construction Purpose	MDE BMP Description	Unit	Treatment	Cost ($)	Status	Projected Implementation Year
Mattawoman Creek	MW_TP_10	REST	Forest Planting	Acres	0.9	$10,191	P	2028
Mattawoman Creek	MW_TP_5	REST	Forest Planting	Acres	0.2	$3,740	P	2028
Mattawoman Creek	Merganser Court	CONV	Sheetflow to Conservation Area	DA Acres	5.7	$30,000	P	2030
Port Tobacco River	DSP200035 / Port Tobacco Stream Restoration	REST	Stream Restoration	Linear Feet	1,150.0	$2,718,740	P	2028
Port Tobacco River	Locust Grove Farm Stream	REST	Stream Restoration	Linear Feet	1,184.0	$309,500	P	2028
Port Tobacco River	Port Tobacco - Mudd Farm	REST	Stream Restoration	Linear Feet	1,250.0	$1,000,000	P	2028
Port Tobacco River	Warren J Willet Stream	REST	Stream Restoration	Linear Feet	500.0	$350,000	P	2027
Port Tobacco River	PT_TP_4	REST	Forest Planting	Acres	2.8	$47,600	P	2028
Port Tobacco River	PT_TP_6	REST	Forest Planting	Acres	0.7	$11,900	P	2028
Port Tobacco River	Warren C Eller Street	REST	Submerged Gravel Wetland	DA Acres	0.4	$350,000	P	2031
Port Tobacco River	Pheasant Farms Entrance	REST	Shallow Marsh	DA Acres	39.3	$150,000	P	2030
Port Tobacco River	Warren J Willet Subdivision	REST	Submerged Gravel Wetland	DA Acres	240.0	$117,000	P	2028
Port Tobacco River	Esprit Pl and Southwinds Dr	REST	Sheetflow to Conservation Area	DA Acres	24.8	$25,000	P	2030

8 Digit Watershed Name	Site Name	Construction Purpose	MDE BMP Description	Unit	Treatment	Cost ($)	Status	Projected Implementation Year
Potomac River Lower Tidal	Garner Shoreline	REST	Shoreline Management	Linear Feet	1,597.0	$2,450,000	P	2027
Potomac River Lower Tidal	Full Delivery - Projects TBD	REST	Stream Restoration	Linear Feet	1,250.0	$1,000,000	P	2028
Potomac River Middle Tidal	PM_TP_1	REST	Forest Planting	Acres	1.0	$17,000	P	2028
Potomac River Middle Tidal	South Hampton - Sir Douglas Pond Retrofit	CONV	Wet Extended Detention Pond	DA Acres	10.5	$184,214	P	2027
Potomac River Middle Tidal	South Hampton - Walden Pond Retrofit	CONV	Wet Extended Detention Pond	DA Acres	14.0	$226,320	P	2027
Potomac River Middle Tidal	South Hampton – Amherst	REST	Dry Channel Regenerative Step Pool	DA Acres	19.8	$121,055	P	2027
Potomac River Middle Tidal	South Hampton - Greenville Pond Retrofit	CONV	Wet Extended Detention Pond	DA Acres	31.2	$418,670	P	2027
Zekiah Swamp	Huntington Stream	REST	Stream Restoration	Linear Feet	750.0	$650,000	P	2028
Zekiah Swamp	Milton Somers MS	REST	Stream Restoration	Linear Feet	1,125.0	$1,294,047	P	2027
Zekiah Swamp	DSP 200029 / Walter Mitchell Stream Restoration	REST	Stream Restoration	Linear Feet	860.0	$1,890,384	P	2026
Zekiah Swamp	ZE_TP_1	REST	Forest Planting	Acres	0.9	$9,790	P	2028

8 Digit Watershed Name	Site Name	Construction Purpose	MDE BMP Description	Unit	Treatment	Cost ($)	Status	Projected Implementation Year
Zekiah Swamp	ZE_TP_8	REST	Forest Planting	Acres	2.4	$26,400	P	2028
Zekiah Swamp	ZE_TP_2	REST	Forest Planting	Acres	2.1	$23,540	P	2028

Charles County Future Implementation Project List- Additional Planned Projects

8 Digit Watershed Name	Site Name	MDE BMP Description	Unit	Treatment	Projected Cost ($)	Source Document	Prioritization Ranking
Mattawoman Creek	TBD Stream Restoration	Stream Restoration	Linear Feet	9,080.0	$4,253,128	TP TIPP	n/a
Mattawoman Creek	TBD Urban Soil Restoration	Urban Soil Restoration	DA Acres	456.1	$3,580,150	TP TIPP	n/a
Mattawoman Creek	TBD Conservation Landscaping	Conservation Landscaping	DA Acres	100.0	$47,800	TP TIPP	n/a
Mattawoman Creek	TBD Street Trees	Street Trees	DA Acres	20.0	$240,011	TP TIPP	n/a
Mattawoman Creek	TBD Forest Planting	Forest Planting	DA Acres	190.0	$2,280,000	TP TIPP	n/a
Mattawoman Creek	TBD Riparian Buffer	Riparian Buffer	DA Acres	180.8	$2,169,960	TP TIPP	n/a
Mattawoman Creek	TBD Urban Tree Canopy	Urban Tree Canopy	DA Acres	200.0	$2,400,109	TP TIPP	n/a
Mattawoman Creek	TBD Permeable Pavement	Permeable pavement	DA Acres	60.0	$8,439,512	TP TIPP	n/a
Mattawoman Creek	TBD Bioswale	Bioswale	DA Acres	300.0	$27,337,528	TP TIPP	n/a

8 Digit Watershed Name	Site Name	MDE BMP Description	Unit	Treatment	Projected Cost ($)	Source Document	Prioritization Ranking
Mattawoman Creek	TBD Stormwater Retrofit	Stormwater Retrofit	DA Acres	800.0	$6,625,210	TP TIPP	n/a
Mattawoman Creek	TBD Wet Pond - Wetland	Wet Pond - Wetland	DA Acres	300.0	$2,484,454	TP TIPP	n/a
Mattawoman Creek	TBD Bioretention	Bioretention	DA Acres	600.0	$33,657,218	TP TIPP	n/a
Mattawoman Creek	TBD Filter	Filter	DA Acres	300.0	$10,539,876	TP TIPP	n/a
Mattawoman Creek	TBD Infiltration	Infiltration Basin	DA Acres	300.0	$5,771,629	TP TIPP	n/a
Port Tobacco River	TBD Stream Restoration	Stream Restoration	Linear Feet	5,690.0	$4,724,409	Port Tobacco TIPP	n/a
Port Tobacco River	TBD Bioswale	Bioswale	DA Acres	391.6	$1,954,572	Port Tobacco TIPP	n/a
Port Tobacco River	TBD Wet Pond - Wetland	Wet Pond - Wetland	DA Acres	256.8	$466,642	Port Tobacco TIPP	n/a
Port Tobacco River	TBD Filter	Filter	DA Acres	18.4	$761,431	Port Tobacco TIPP	n/a

Appendix B: TIPP Excel Workbooks

Excel Files Included:

- MDE_TIPP_2025 - Mattawoman - TN_2025.12.10.xlsx
- MDE_TIPP_2025 - Mattawoman - TP_2025.12.10.xlsx
- MDE_TIPP_2025 - PortTobacco_2025.12.10.xlsx