

# Baltimore City's Implementation Plan

## Non-tidal Baltimore Harbor Sediment TMDL



BALTIMORE CITY  
**DEPARTMENT OF  
PUBLIC WORKS**

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## **ACRONYMS**

AS – Ammonia Screening

BH – Baltimore Harbor

BIBI – Benthic index of biotic integrity

BMP – Best Management Practice

DO – Dissolved oxygen

DPW –Department of Public Works

EPA – U.S. Environmental Protection Agency

ESC – Erosion and sediment control

ESD – Environmental Site Design

FAP – Financial Assurance Plan

FIBI – Fish index of biotic integrity

ISR – Impervious surface restoration

LA – Load Allocation

lbs – Pounds

LU/LC - Land use / land cover

MDE – Maryland Department of the Environment

MD DNR – Maryland Department of Natural Resources

mg / L - milligrams per liter

MS4 – Municipal Separate Storm Sewer System

NDPES – National Pollution Discharge Elimination System

SIS – Stream Impact Sampling

TIPP – TMDL Implementation Planning and Progress

TMDL – Total Maximum Daily Load

TSS – Total suspended solids

WLA – Waste Load Allocation

WSA – Watershed Assessment

## DEFINITIONS

Best Management Practices (BMP): The practice or combination of practices that are determined to be the most effective, practicable means of preventing or reducing the amount of pollution generated by point and nonpoint sources to a level compatible with water quality goals. BMPs are defined in 40 CFR 122.2 as schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States.

Nonpoint Source: Diffuse sources of pollution that are not otherwise channeled through a point source in the environment. These sources may be large or small, but they are generally numerous throughout a watershed. Nonpoint Sources include urban, agricultural, or industrial areas, roads, highways, construction sites, recreational boating activities, and habitat degradation. Nonpoint Source pollution occurs year-round when rainfall, snowmelt, irrigation, or any other source of water runs over land or through the ground, picks up pollutants from these numerous, diffuse sources and deposits them into rivers, lakes, and coastal waters.

Permittee: Any permittee or co-permittee of a stormwater permit.

Point Source: Any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture.

Total Maximum Daily Load (TMDL): A TMDL for a given pollutant and waterbody is composed of the sum of individual waste load allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background conditions. In addition, the TMDL must include a margin of safety (MOS) to account for uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody. The TMDL components are illustrated using the following equation:

TMDL Target: Quantitative value used to measure whether the applicable water quality standard is being attained.

Wasteload allocation (WLA): The portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution

## Executive Summary

On January 27, 2022, the United States Environmental Protection Agency (EPA) approved the sediment Total Maximum Daily Load (TMDL) in the non-tidal portion of the Baltimore Harbor watershed. The TMDL was established to address impairments of water quality as identified on Maryland's Section 303(d) List. The TMDL was based on a report developed by the Maryland Department of the Environment (MDE), entitled "*Total Maximum Daily Load of Sediment in the Baltimore Harbor Watershed, Baltimore City, Baltimore County, and Anne Arundel County, Maryland*". The baseline year for this TMDL was 2009.

This TMDL Implementation Plan (Plan) has been developed to present strategies to meet the waste load allocations (WLA) specifically for Baltimore City Phase I MS4 area, based on the MDE Technical Memo entitled "*Point Sources of Sediment in the Non-Tidal Baltimore Harbor Watershed*", dated December 2021. The Baltimore City Phase I Municipal Separate Storm Sewer System (MS4) permit area consists of the current 8-digit watershed boundaries, excluding the other properties regulated under National Pollutant Discharge Elimination System (NPDES) permits, including state and federal Phase II MS4 permits and industrial discharge permits.

This Plan was developed based on watershed conditions documented in a report entitled "*Baltimore Harbor Watershed Assessment*", issued by the Baltimore City Department of Public Works (DPW) in April 2019, plus previously submitted Baltimore City MS4 Annual Reports and a portfolio of programmatic, upland, and in-stream best management practices (BMPs) submitted in August 2019, then revised in April and May 2020. This portfolio was the basis of the stormwater restoration mandates listed in Part IV.E of the City's current MS4 permit.

The TMDL was established to provide a level of sediment loading (lbs / year) that would ensure acceptable biological integrity in the watershed's streams, using a reference watershed approach and loadings results from the Phase 5.3.2 Chesapeake Bay Watershed Mode (Bay Model). This Plan was developed using MDE's TMDL Implementation Planning and Progress (TIPP) tool, which includes a series of spreadsheets based on a different version of the Bay Model. Since the TIPP uses loading rates from a different version of the Bay Model, this Plan used the metric of "% reduction" (comparing baseline loads to reduced loads) instead of the WLA (lbs/ year) to assess its ability to meet the goals of the TMDL.

This Plan was developed to meet the criteria listed in Part IV.F.2 of the current MS4 permit. Additionally, this Plan includes information on funding strategies and accountability. Based on the TIPP results, Baltimore City will be able to achieve the TMDL goal for the Phase I MS4 permit area by the end of this current permit (November 2026). Typically, the execution of a TMDL Implementation Plan would not start until MDE's approval of the implementation plan; however, the BMPs and milestones listed in this Plan align with the proposed activities planned to meet Part IV.E (Stormwater Restoration) of the City's current MS4 permit, so the City will proceed immediately with executing this Plan.

# 1 Introduction

Sediment is made up of soil particles, gravel, and other materials. In urban areas like Baltimore, sediment can accumulate in roadways and parking lots and be transported to the public storm drain system during storms. Sources of sediment can also include eroding stream banks and bare earth ground surfaces, plus uncontrolled construction activities.

Once sediment reaches our waterways, it can degrade water quality in many ways. Small sediment particles may remain suspended in the water column or deposited onto the streambed. Suspended sediments increase the turbidity of the water, which causes the water to be cloudy; obstructs sunlight and limits photosynthesis of aquatic plants; reduces biologically available oxygen; and increases water temperature. Additionally, sediment often carries other pollutants, such as nutrients, heavy metals, organic chemicals, bacteria, and other pathogens.

On January 27, 2022, the United States Environmental Protection Agency (EPA) approved the sediment total maximum daily load (TMDL) for the Baltimore Harbor (BH) watershed. The TMDL was established to address impairments of water quality caused by sediment, as identified on Maryland's Section 303(d) List. The TMDL was based on a report developed by the Maryland Department of the Environment (MDE), entitled "*Total Maximum Daily Load of Sediment in the Baltimore Harbor Watershed, Baltimore City, Baltimore County, and Anne Arundel County, Maryland*" (TMDL Report).

Since 1993, the City of Baltimore (City) has been regulated under a National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer (MS4) permit. Part IV.F.2 of the current MS4 permit requires the City to develop an TMDL Implementation Plan (Plan) and include the following elements:

- A list of stormwater best management practices (BMPs), programmatic initiatives, or alternative control practices that will be implemented to reduce pollutants for the TMDL;
- A description of the City's analyses and methods, and how they are comparable with the Department's TMDL analyses; and
- Final implementation dates and benchmarks for meeting the TMDL's applicable stormwater waste load allocation (WLA).

This Plan was developed to present strategies to meet the reduction goal (measured as the % reduction from baseline loads), specifically for the area regulated under the Baltimore City Phase I MS4 permit, as listed in the MDE Technical Memo entitled "*Point Sources of Sediment in the Non-Tidal Baltimore Harbor Watershed*", dated December 2021, and summarized in Table 1. Although the TMDL was issued in 2022, the baseline load is based on land use conditions and installed BMPs for the year 2009. A draft version of this Plan was made available for a 30-day public comment on June 16, 2023; the relevant comments and DPW's response are provided in Appendix A of this Plan. Typically, the execution of the strategies would be pending MDE's approval of the implementation plan; however, the BMPs and milestones listed in this Plan align with the proposed activities planned to meet Part IV.E (Stormwater Restoration) of the current MS4 permit so the City will proceed immediately with implementing the proposed strategies and schedule.

**Table 1: Sediment TMDL Summary**

<b>Area</b>	<b>Baseline Load (tons / year)</b>	<b>WLA (tons / year)</b>	<b>Reduction</b>
Baltimore Harbor Watershed	6,982	3,247*	53%
NPDES Regulated Stormwater	6,804	3,069	55%
Baltimore City Phase I MS4 Permit Area	2,109	886	58%

\* Value indicates the TMDL which includes both WLAs from point sources and load allocations (LA) from non-point sources.

## 2 Background

Baltimore City issued a report entitled, “Baltimore Harbor Watershed Assessment” (BH-WSA), dated April 2019. The BH-WSA provided an in-depth watershed characterization, identified priority areas and presented appropriate water quality improvement strategies. The following sections are meant to only summarize portions of the BH-WSA and identify any changes that may have occurred since 2019.

### 2.1 Regulated Stormwater Area

The BH watershed is one of five (5) watersheds within Baltimore City, as designated by MDE at the 8-digit scale and shown in Figure 1. Although the BH watershed encroaches into adjacent counties, it is not considered as interjurisdiction for the City. The other four watersheds in the City have already been issued a sediment TMDL, as listed in Table 2.

**Table 2 – Summary of Sediment TMDLs Issued for Watersheds in the City**

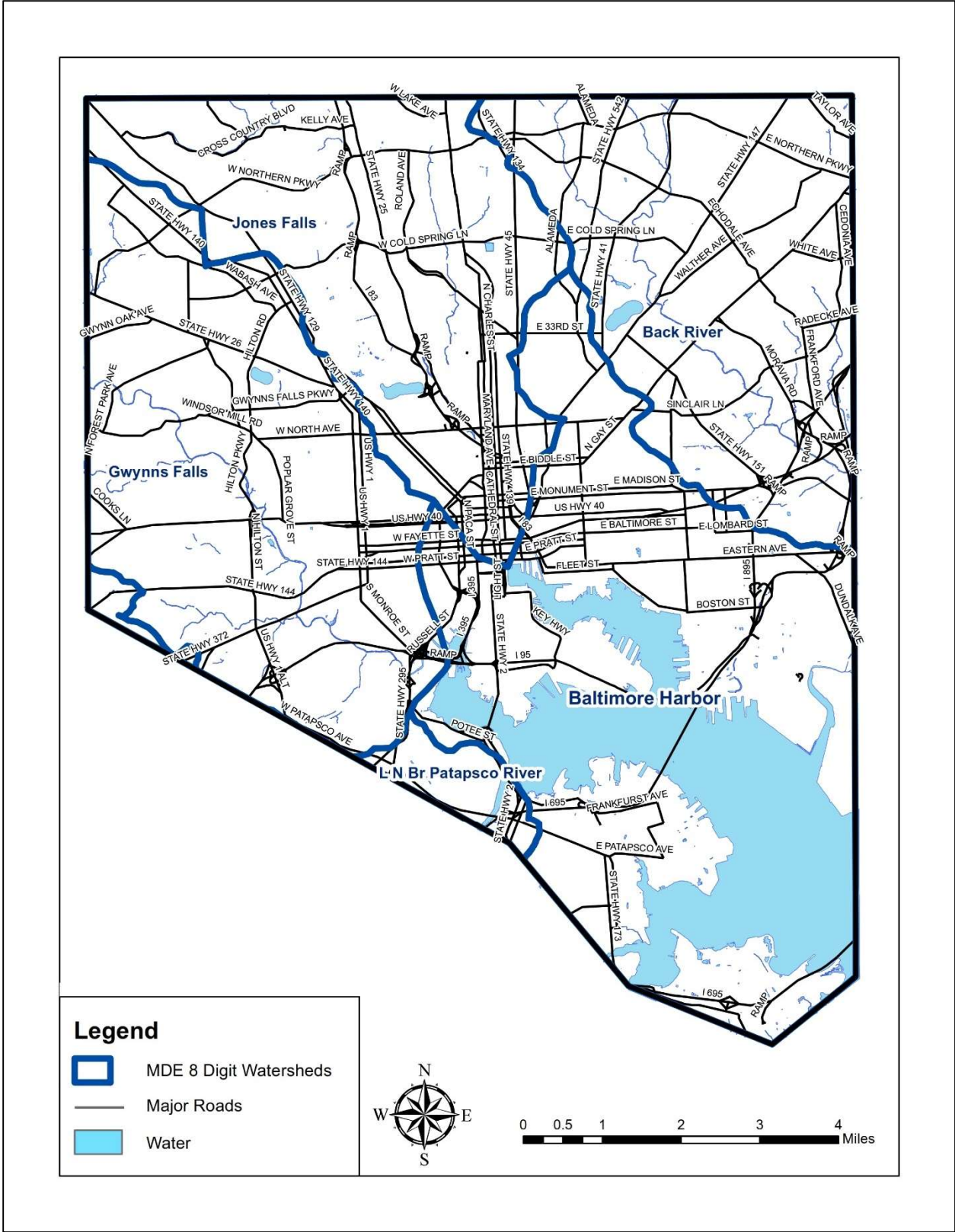
<b>Watershed</b>	<b>Year Issued</b>	<b>Reduction</b>
Back River	2018	75%
Gwynns Falls	2010	47%
Jones Falls	2011	26%
Patapsco River Lower North Branch	2011	25%

Baltimore’s public storm drain system within the BH watershed consists of approximately 381 miles of pipes, 16,614 inlets and 491 outfalls. The majority of the outfalls discharge directly to tidal waterways. Approximately 57% of storm drain pipes within the BH watershed were installed prior to 1950 and are subject to degradation and groundwater infiltration. As a condition of previous MS4 permits, the Department of Public Works (DPW) delineated drainage areas associated with the outfalls of the City’s public storm drain system. The outfalls and associated drainage areas were submitted as part of the MS4 geodatabase to MDE.

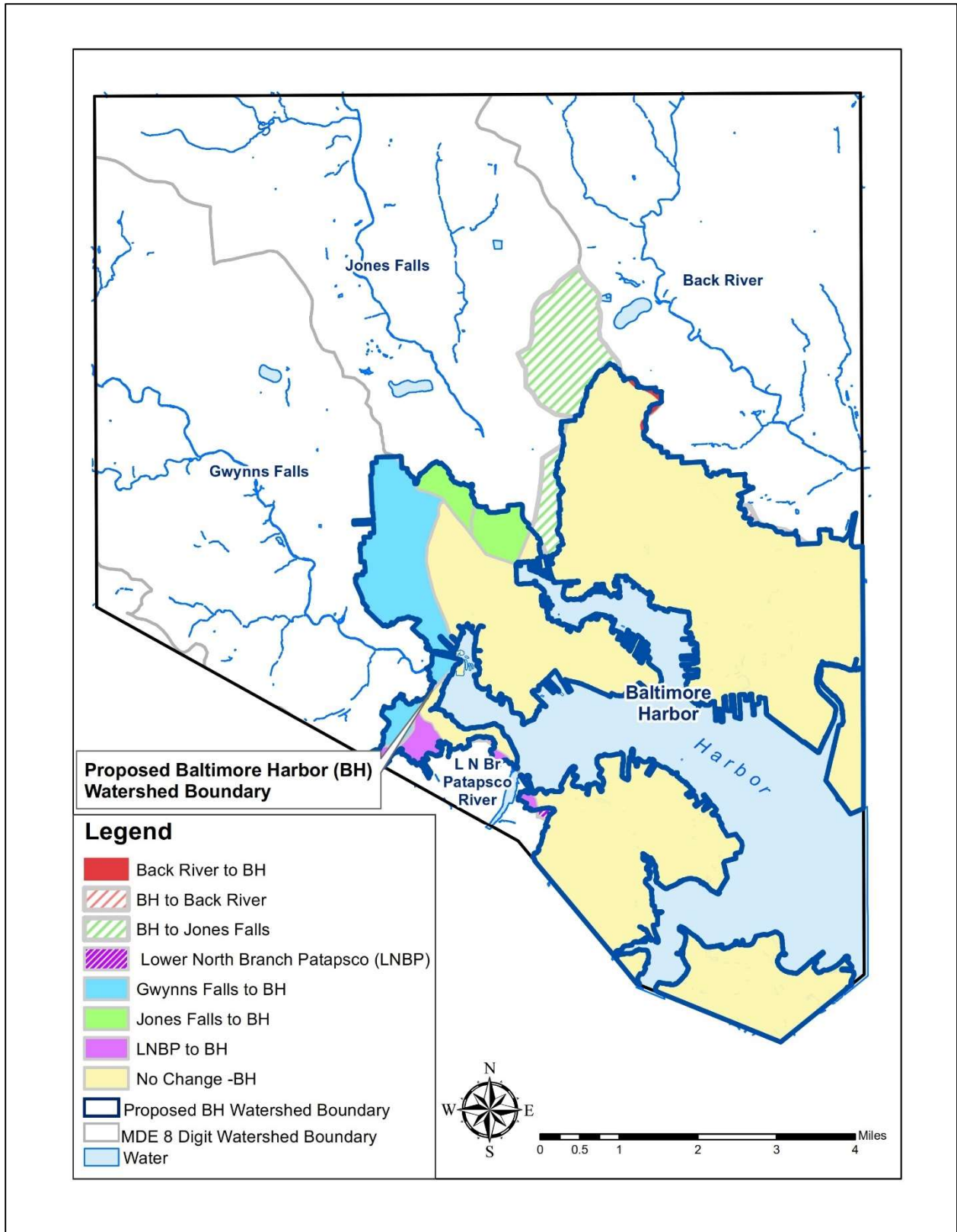
The BH-WSA had compared the current 8-digit watershed boundary designated by MDE with City’s outfall drainage area delineations (MS4 geodatabase). The differences in boundaries are shown in Figure 2 and are likely due to fact that the MS4 outfall drainage areas delineations were developed based on Baltimore’s public storm drain system, not just topographic patterns. Baltimore City is working with MDE to determine how the proposed boundaries may be formerly adopted. For the purposes of this Plan, only the current, MDE designated 8-digit watershed boundary will be used.

This Plan is based on the regulated stormwater area of the City’s Phase I MS4 permit. It does not include any state or federal-owned properties, nor any properties currently permitted under an NPDES Industrial permit. These areas were designated separately by MDE in the TMDL Report and were assigned specific WLAs and reduction goals. The excluded areas are shown in Figure 3.



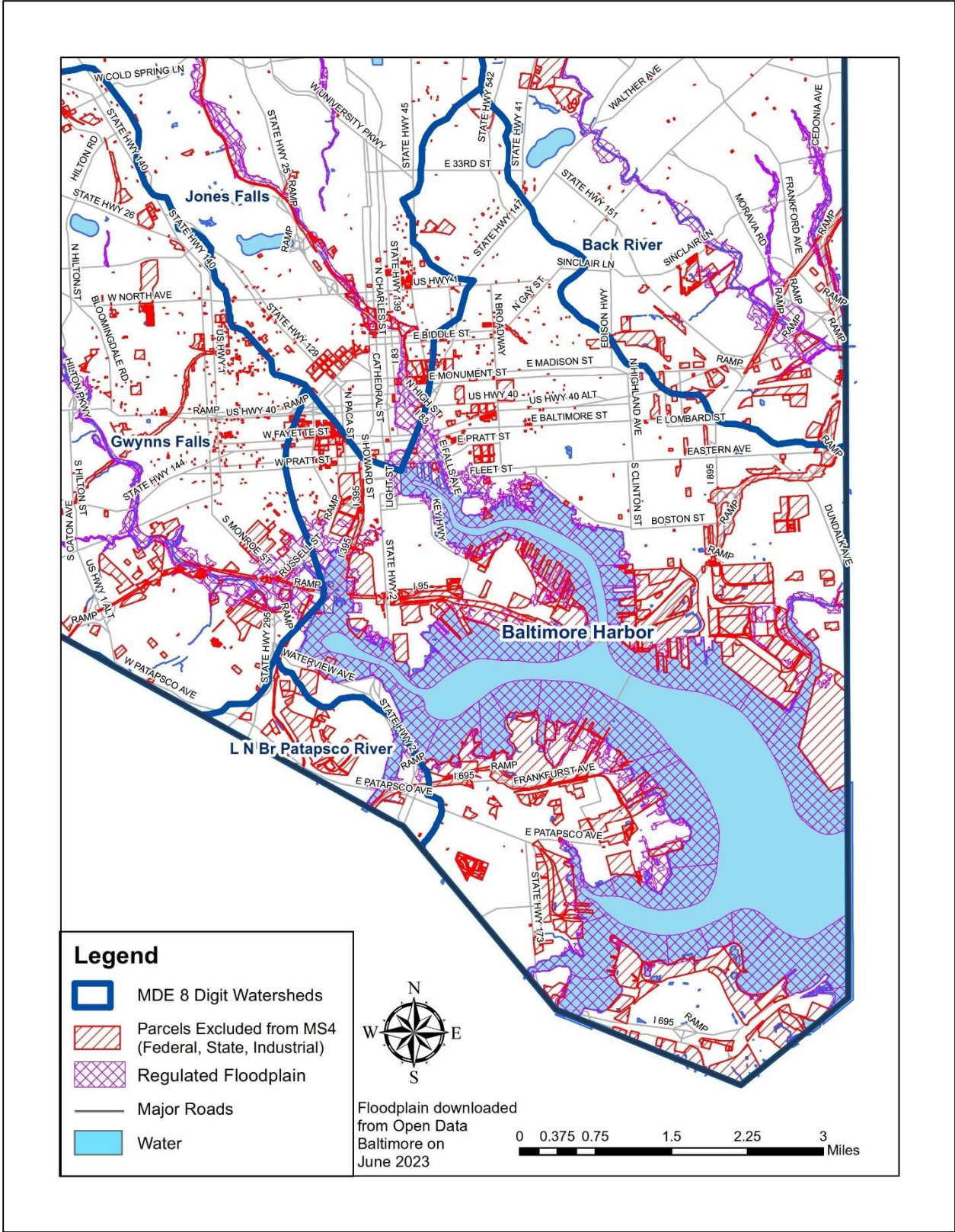


**Figure 1: Baltimore City Watersheds (8-digit)**



**Figure 2: 8-digit Watershed Boundary Variation**





**Figure 3: Areas Excluded from the Phase I MS4 Regulated Area**

## 2.2 Non-tidal Surface Waters

Sediment loadings can be affected by altered drainage patterns and increased runoff (typically from land use / land cover changes), which can increase stream channel erosion and scouring. However, the BH watershed only has approximately 6.3 miles of stream and 200 acres of associated riparian buffer. Most of the historic waterways in the BH watershed were piped in the early 20<sup>th</sup> century to allow development and address public health concerns related to water-borne diseases. Figure 4 shows the historic waterways compared to the current stream channels within the watersheds. None of the streams in the entire BH watershed are designated as “high quality” or Tier II stream segments.

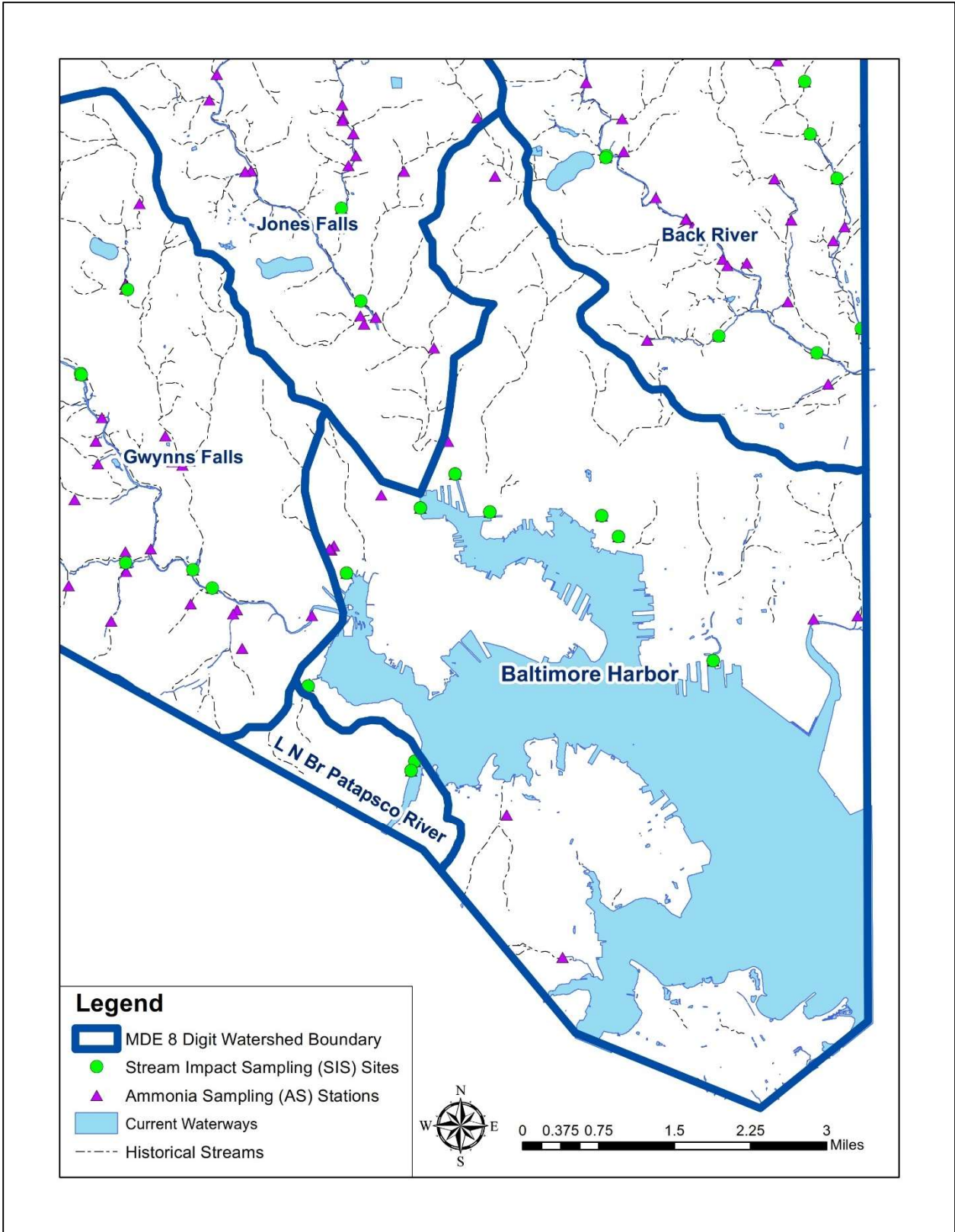
The sediment TMDL was based on biological assessments, summarized in MDE’s report, entitled “*Watershed Report for Biological Impairment of the Baltimore harbor Watershed in Baltimore City, Baltimore and Anne Arundel Counties Maryland: Biological Stressor Identification Analysis Results and Interpretation*” (*Biological Assessment*), dated March 2014. The report summarized the Maryland Department of Natural Resource’s (MD DNR) assessment of the benthic and / or fish index of biotic integrity (BIBI, FIBI), following Maryland Biological Stream Sampling (MBSS) protocols. This sampling was conducted in 1995-1997 and 2000-2004 at twenty-eight (28) sampling sites. Twenty-one of those sites were ranked as poor to very poor (i.e. BIBI/ FIBI scores were significantly less than 3.0). Only one station (BALT-108-R-2001) was located within the City, near the head waters of Gorsuch Creek; it had a failing score.

Each Spring, DPW performs biological and habitat assessments at both fixed and random stations throughout the City, following MBSS protocols. However, DPW had conducted only one biological assessment within the BH watershed within the last 10 years. The site was located near the headwater of Janey Run and the resultant BIBI score was less than 2.0.

Since the mid-1990’s, DPW has conducted two routine monitoring programs: Ammonia Screening (AS) and Stream Impact Sampling (SIS). Figure 4 shows the 15 fixed monitoring sites located within the BH watershed; only 7 AS sites and 2 SIS sites are located in the non-tidal portion of the watershed. Many of the non-tidal sites sample the base flow (historic streams) within the public storm drain system. All sampling results are posted on the City’s Open Baltimore website. The AS program measures dissolved oxygen levels which can impact biological integrity. The SIS program includes total suspended solid measurements, direct measurement of sediment loading. Sampling results of the non-tidal sites are summarized in Table 3.

**Table 3: DPW Non-tidal Sampling Results for January 2010 to December 2023**

Parameter	Number of Samples	Range
Dissolved oxygen	685	0.34 to 13.36 mg / l
Total suspended solids	218	1 to 101 mg / l



**Figure 4 DPW Routine Monitoring Sites related to Current and Historic Waterways**



### 2.3 Land Use / Land Cover

Figure 5 shows the major land use / land cover (LU/LC) designations used when developing the TIPP tool. The map is based on the Chesapeake Bay Program LU/LC georeferenced dataset for 2017 and 2018, consolidating the land use designations into 6 major terms (bold type), shown in Table 4.

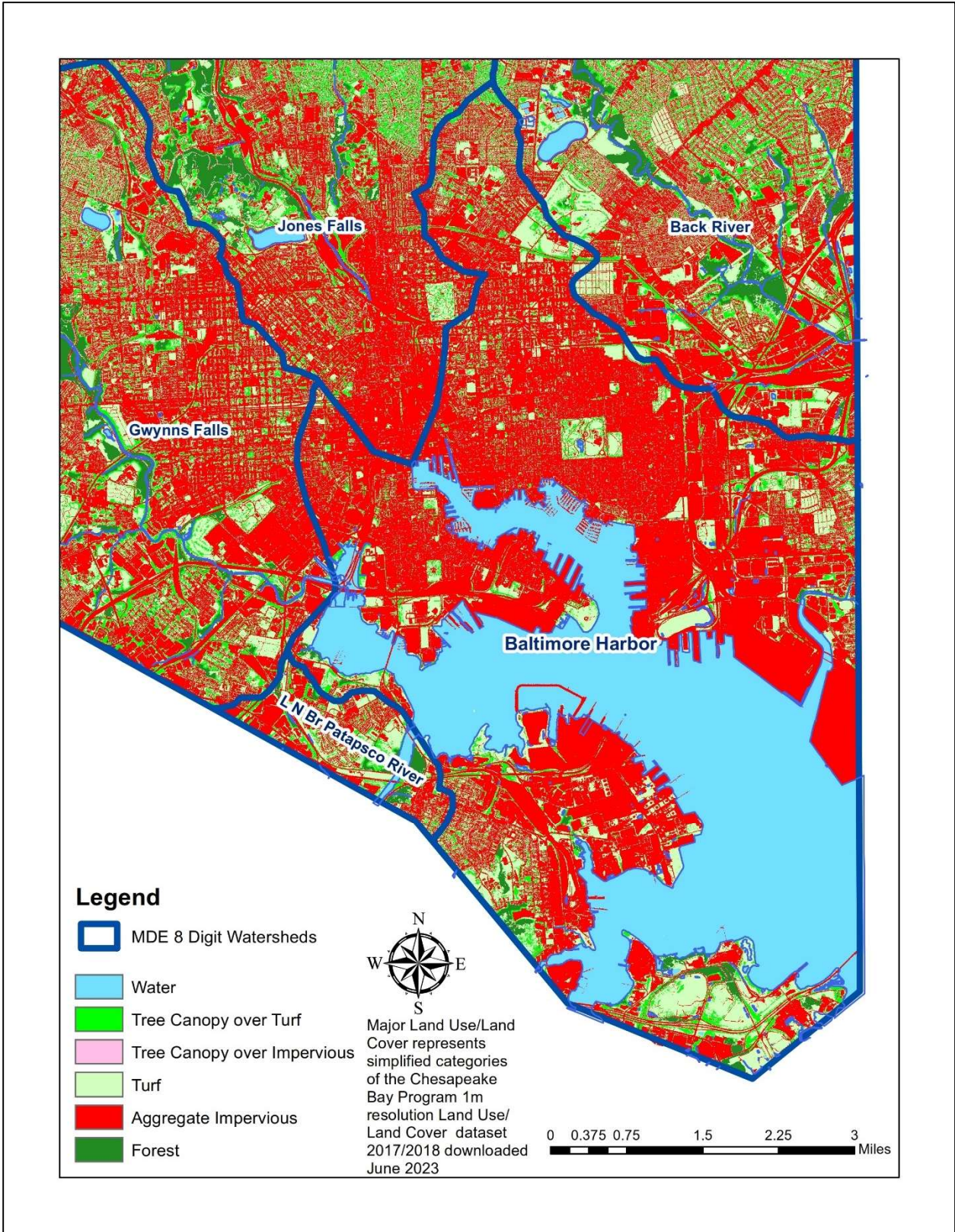
**Table 4 – LU/LC Designation Consolidation**

<b>Aggregate Impervious</b> Roads Structures Other Impervious	<b>Turf</b> Bare Shore Cropland Barren Extractive Barren
<b>Tree Canopy over Aggregate Impervious</b> Tree Canopy Over Roads Tree Canopy Over Structures Tree Canopy Over Other Impervious	Natural Succession Barren Natural Succession Herbaceous Natural Succession Scrub/Shrub Pasture/Hay Barren
<b>Tree Canopy over Turf</b> Riverine Wetlands Tree Canopy Terrene Wetlands Tree Canopy Tidal Wetlands Tree Canopy Tree Canopy Over Turf Grass Other Tree Canopy	Pasture/Hay Herbaceous Riverine Wetlands Barren Riverine Wetlands Herbaceous Riverine Wetlands Scrub/Shrub Suspended Succession Barren Suspended Succession Herbaceous Suspended Succession Scrub/Shrub
<b>Forest – not included in TIPP</b> Riverine Wetlands Forest Terrene Wetlands Forest Tidal Wetlands Forest	Terrene Wetlands Barren Terrene Wetlands Herbaceous Terrene Wetlands Scrub/Shrub
<b>Water – not included in TIPP</b> Estuarine/Marine Lakes and Reservoirs Lotic Water (fresh) Riverine Ponds Terrene Ponds	Tidal Wetlands Barren Tidal Wetlands Herbaceous Tidal Wetlands Scrub/Shrub Transitional Barren Turf Grass

In order to estimate the LU/LC conditions for the baseline year (2009), the tree canopy areas from the Bay LU/LC dataset were reduced based on the tree planting efforts from 2010 to 2017, previously reported to MDE in the Alternative BMP feature class tables of the MS4 geodatabase. Forest areas were not included in the TIPP because the TMDL assumed negligible sediment loading.

### 2.4 Land Disturbance Activities

Many of the development projects within the BH watershed are considered as redevelopment, so existing impervious area is either reduced or runoff is controlled by on-site BMPs. DPW has delegated authority for erosion and sediment control (ESC) plan review and has 10 full-time positions dedicated to ESC inspections. In addition to the inspections of construction activities, DPW investigates complaints of ESC issues received through the City’s 3-1-1 non-emergency system.



**Figure 5 Land Use / Land Cover**

### 3 Implementation Plan Development

In addition to sediment, the BH watershed is impaired by nutrients, bacteria, and PCBs. TMDLs have been established for these pollutants, as listed in Attachment A of the current MS4 permit. The City has already submitted implementations plans for these other TMDLs to MDE.

The current MS4 permit requires stormwater restoration based on a metric of equivalent impervious surface restoration (ISR). During negotiations with MDE regarding the current permit, DPW developed a portfolio of the best management practices (BMP Portfolio) and estimated ISR and associated nutrient and sediment reductions within the City that could be achieved within the 5-year permit period, in addition to continuing operations of street sweeping and storm drain cleaning from the expiration of the last permit (FY 2019). The estimations were based on MDE's guidance document entitled "*Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated: Guidance for the National Pollutant Discharge Elimination System Stormwater Permits*" (MS4 Accounting Guidance). This Plan was developed based on the BMP Portfolio; no additional strategies are being proposed in this Plan.

#### 3.1 TIPP Development

Loading and reduction scenarios were estimated using the TMDL Implementation Planning and Progress (TIPP) tool, developed by MDE to standardize the calculated estimates of pollutant load reductions for nutrient and sediment TMDLs at various points in the watershed planning process. The TIPP tool is based on the Chesapeake Bay Phase 6 CAST-2017d Watershed Model No Action (No BMP) scenario loading rates with disaggregated stream bed and bank loads at the 8-digit watershed scale. Appendix B includes the following TIPP reports:

- Summary: combination of tables summarizing the other report sections; the final table confirms the total % reduction
- Baseline: land use conditions and BMPs installed by the baseline year (2009)
- Progress: land use conditions and BMPs installed at the end of the last permit (FY 2019)
- Implementation: planned efforts by Milestone 1 (2026, end of current MS4 permit)

#### 3.2 Best Management Practices

The City's ultra-urban setting consists of significant impervious surface land cover, highly compacted soils, dense underground infrastructure, and limited opportunities to intercept and treat stormwater runoff. Table 5 provides a summary of the BMPs proposed to meet the ISR requirements of the MS4 permit within the non-tidal portion of the BH watershed, listed as BMP categories of the TIPP reports. Given the challenges of an ultra-urban setting, sediment reductions will be primarily achieved by annual operations like street sweeping and storm drain cleaning. The size and type of stormwater BMPs were based on previous feasibility and siting studies, plus development trends for implementation.

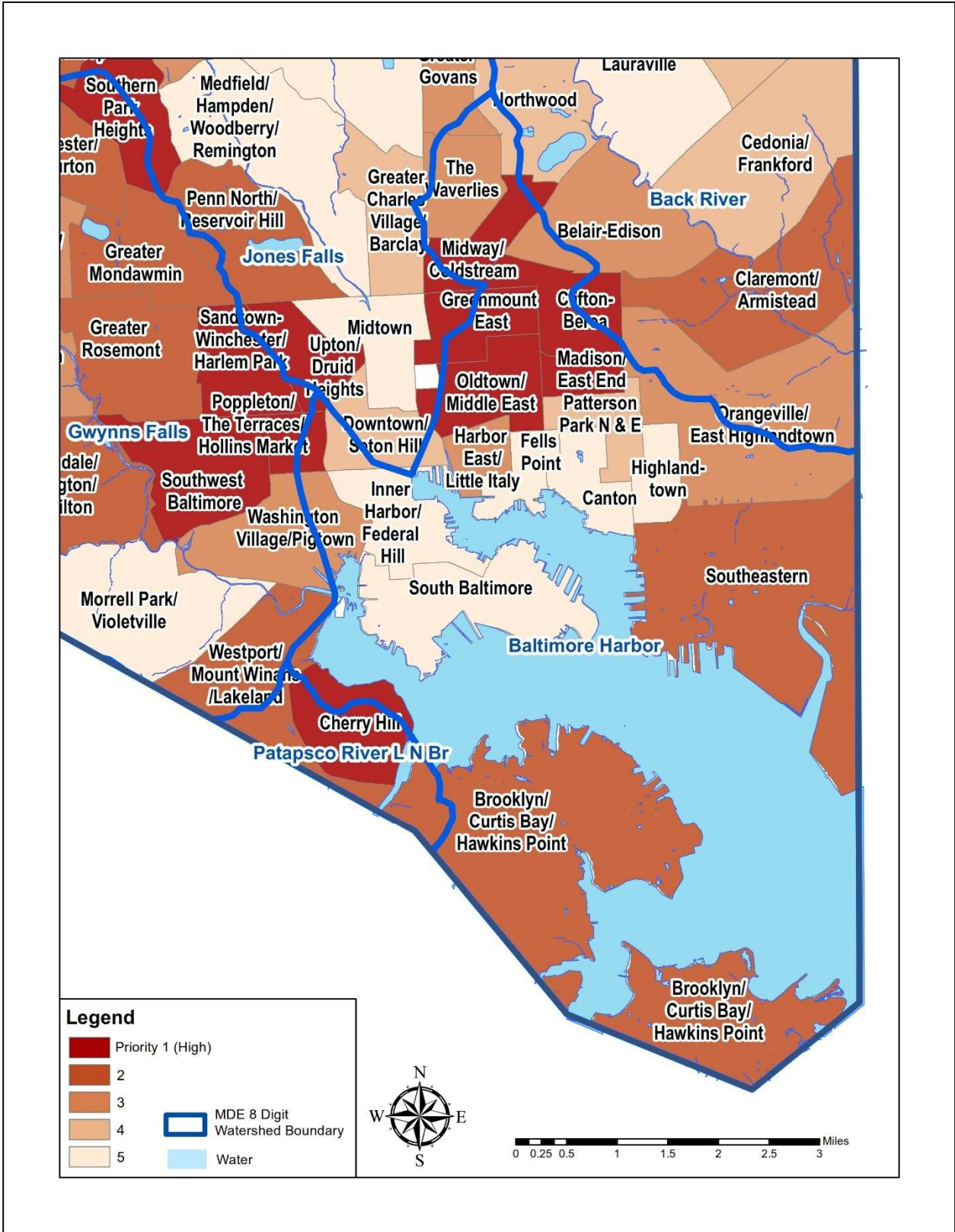


**Table 5 Summary of TIPP Implementation Scenarios**

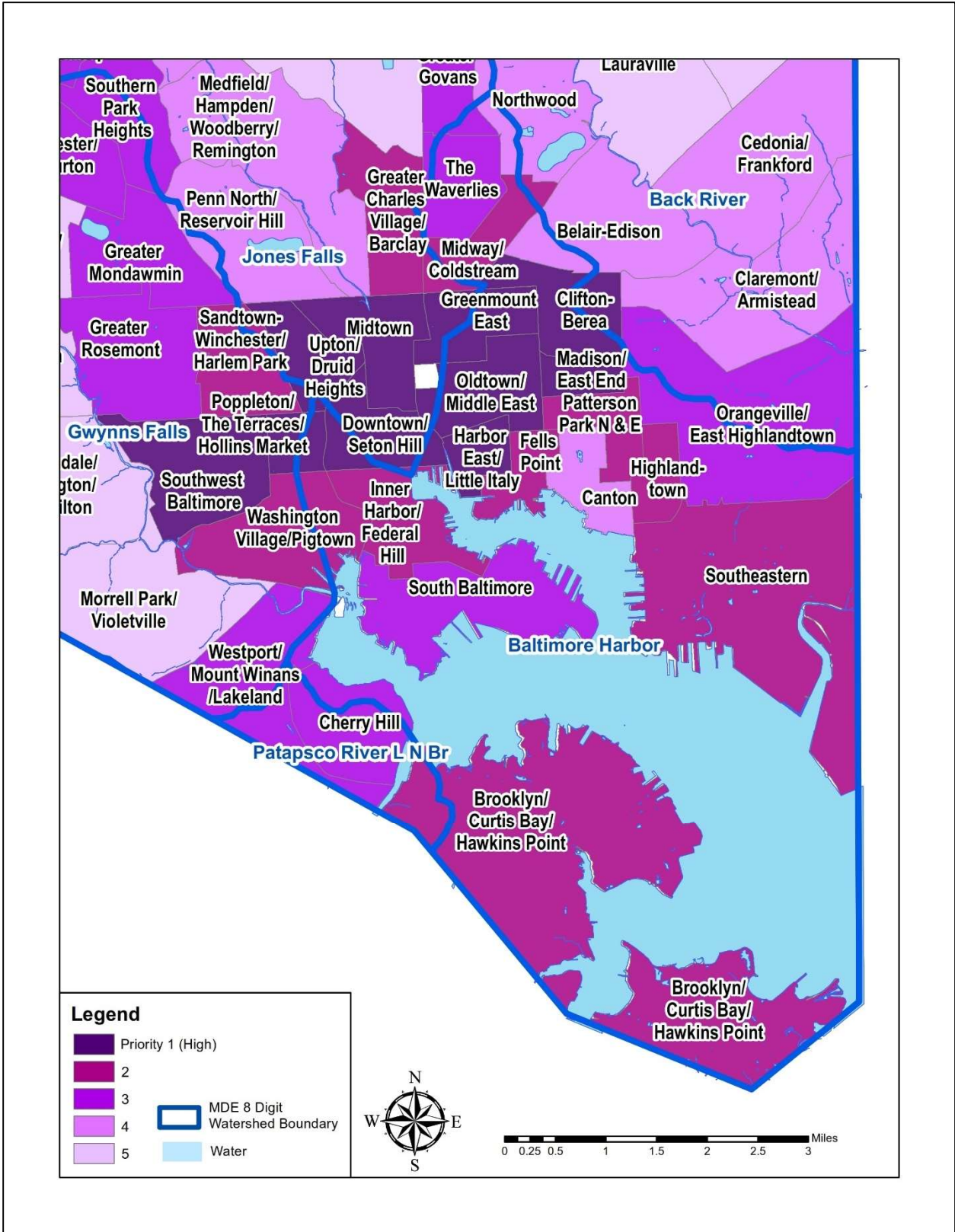
Category	Baseline	Progress	Milestone	Total	Basis
Stream Restoration (LF)	0	0	175	175	Regenerative stormwater conveyance project already in design.
Street Sweeping (miles)	23,801	10,433	2,960	37,194	Progress report is continuing operations required by the current permit, plus quadrant sweeping. Milestone report estimates % increase due to efficiency (same fleet).
Storm Drain Cleaning (lb)	0	374,080	560,671	934,751	Progress report is continuing operations required by permit. Milestone report estimates % increase due increased resources (increased fleet and staff)
Land Use Conversion (acres)	1,335	73	84	1,492	Milestone report is based on Tree Baltimore data up to FY 2022, plus capital projects in design and estimated distribution of afforestation and development (BMP Portfolio)
Stormwater BMP (acres)	10.1	43.7	167.1	220.9	Milestone is capital projects in design, plus estimated distribution of new BMPs and development (BMP Portfolio)

### 3.3 Spatial Prioritization

Street sweeping routes extend throughout all public roads within the BH watershed. Pro-active storm drain cleaning operations are targeted based on topography, population density, and historic reports of choked inlet and dirty streets and alleys complaints. Land use conversions and stormwater BMPs include a mixture of development trends (redevelopment), volunteer restoration efforts, and DPW capital projects. About half of the DPW capital projects were already in design at the end of the last permit. DPW focused site selection for new stormwater BMPs on priority areas (Figures 6 to 9) that were identified in the BH-WSA. Figure 10 shows potential stormwater restoration BMPs (DPW capital projects) in addition to sites identified as not feasible. DPW tracks feasibility of each site based on both BMP design criteria (applicability and design constraints) and accessibility, in order to assess the City’s ability to meet regulatory mandates to the maximum extent practicable. All of the potential stormwater BMP locations will not be required to be implemented in order to achieve the TMDL goals and may be implemented to meet future regulatory mandates.



**Figure 6** Prioritization Map based on Equity (Socio-Economic Factors)  
 Baltimore City's Non-tidal Baltimore Harbor  
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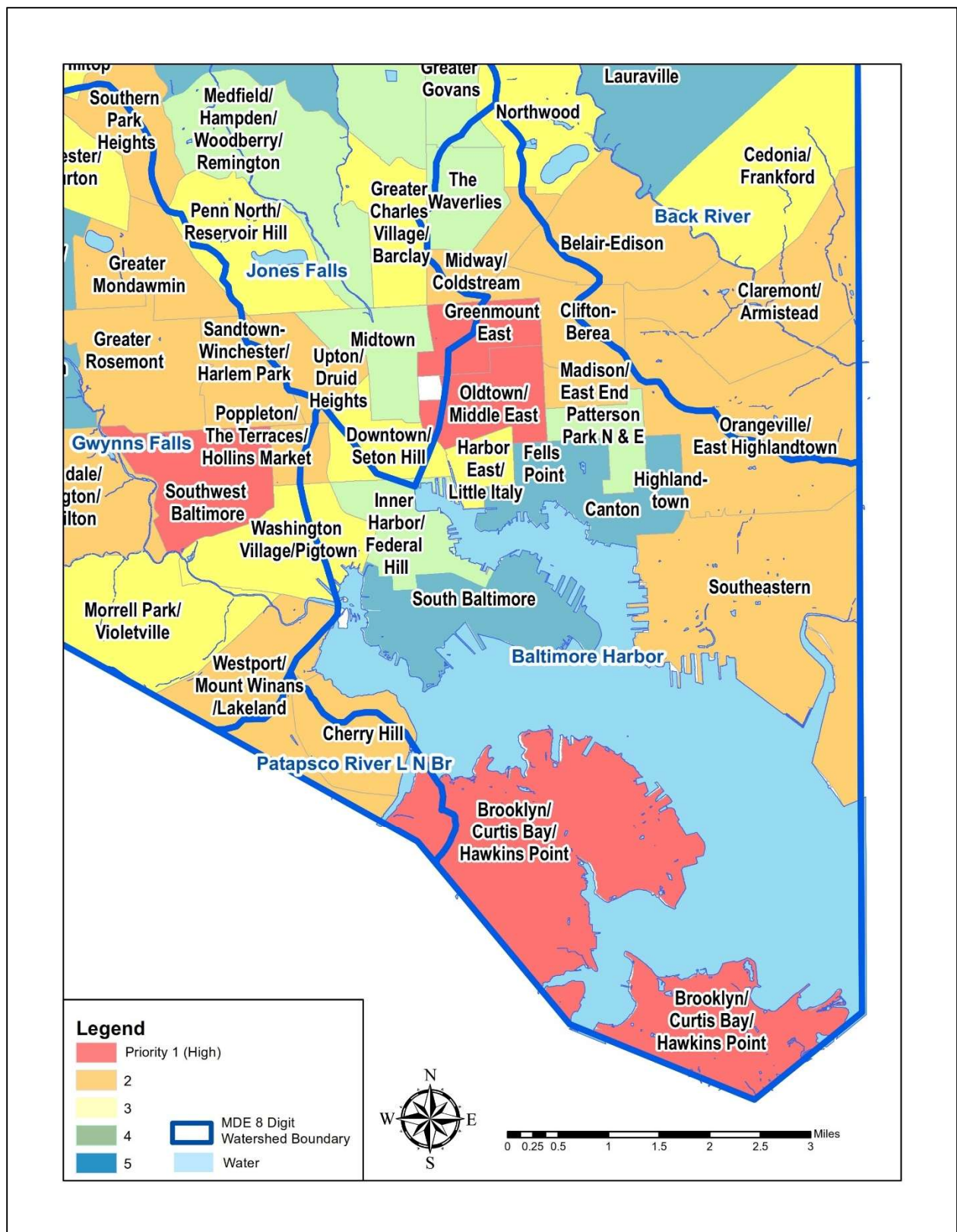


**Figure 7** Prioritization Map based on Health Supportive Community Factors



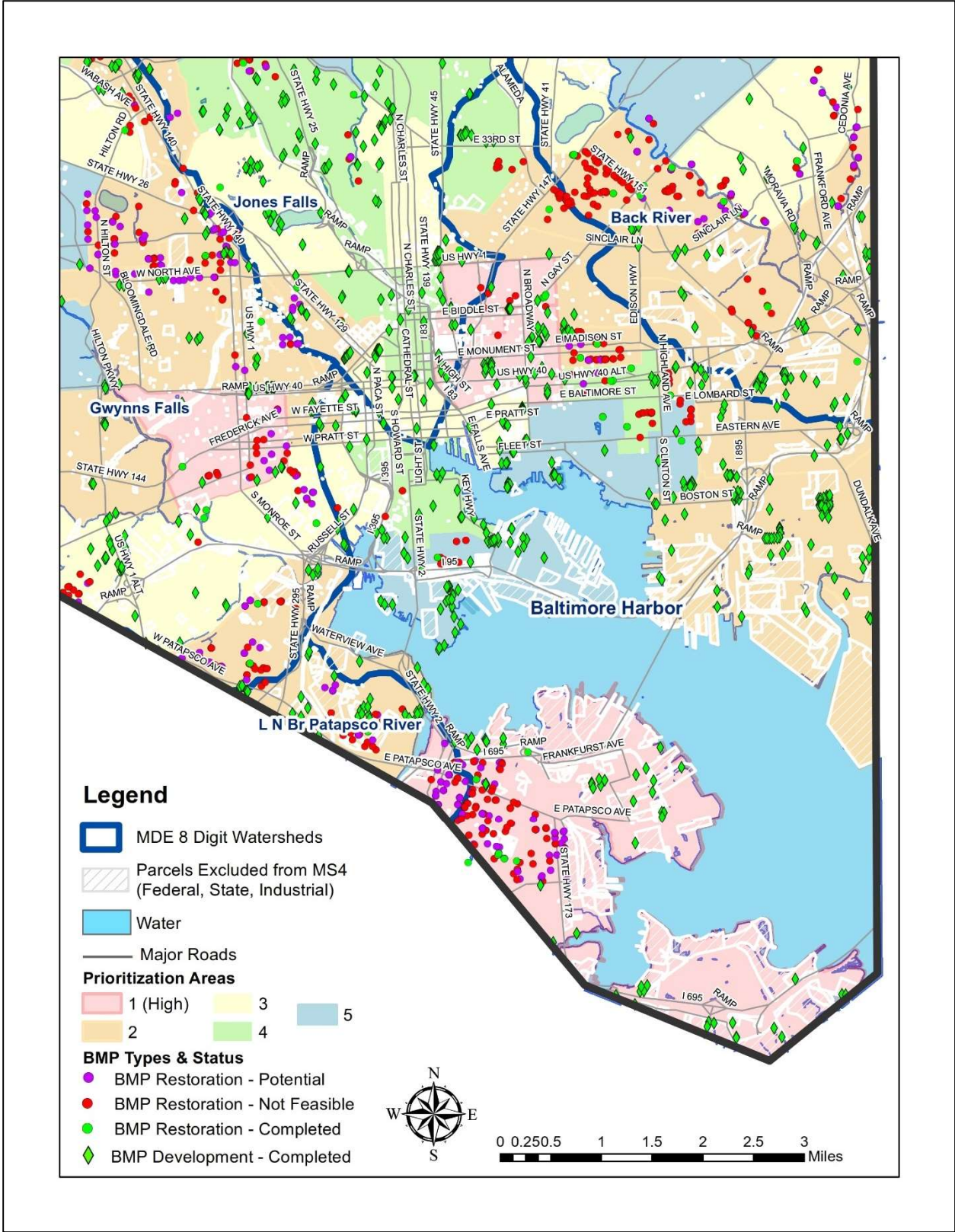


**Figure 8** Prioritization Map based on Physical Feasibility Factors for ESD Practices



**Figure 9: Composite Prioritization Map**





**Figure 10: Stormwater BMP Site Planning for DPW Capital Restoration Projects**

### 3.4 TIPP Results

Table 6 summarizes the TIPP results and confirms that Baltimore City will achieve the reduction goals established for the regulated stormwater area of the City’s Phase I MS4 permit by the end of the current permit (2026). Since the TMDL and the TIPP tool used different versions of the Bay Model, the estimated baseline loads were different. The TIPP baseline load was almost 35% more than the baseline load estimated in the TMDL report; however, the proposed practices in this Plan were still able to achieve the load reduction goal.

**Table 6- Summary of TIPP Results**

<b>Description</b>	<b>Sediment (lbs / year)</b>
TMDL Baseline Loads	4,218,000
% Reduction Goal	58%
TIPP Baseline Load	5,698,937
TIPP Progress Load	3,347,104
TIPP Milestone Load	2,191,473
TIPP Load Reduction	3,507,464
TIPP % Load Reduction	61.6%

## 4 Funding Strategy

Every two years, the City is required to submit to MDE a financial assurance plan (FAP) as part of the MS4 Annual Report. The last FAP was issued in 2022; it included all activities and anticipated costs to comply with the current MS4 permit, which includes this Plan. The City’s stormwater utility is the main funding source for the City’s stormwater operations, allowing for financing through utility bonds, state revolving loans, and the federal loan program under the Water Infrastructure Financing and Innovation Act. Since this Plan demonstrated that Baltimore City will achieve the load reduction goal of the TMDL by the end of the current permit by following the ISR strategy, the 2022 FAP may be referenced as the funding strategy for this Plan.

## 5 Accountability: Tracking and Reporting

Baltimore City is required to submit an MS4 Annual Report to MDE each December. Progress related to this Plan will be reported as follows:

- Main Report: Narrative of implementation progress and any proposed changes to the Plan to meet the WLA;
- Appendix: TIPP reports where the Progress section used for this Plan will become the conditions for the Permit Load section. The Current Progress section will then show actual cumulative implementation since the end of the last permit.
- MS4 geodatabase: BMP implementation details and local TMDL progress

Proposed changes to the Plan may be based on new data sets, modifications to the regulated stormwater areas, Bay Model updates, actual operations performance, development trends, or actual capital project implementation.

## **Appendix A: Comment Response Document**





## COMMENT RESPONSE DOCUMENT FOR **Baltimore Harbor Sediment TMDL Implementation Plan**

DPW BUREAU/OFFICE: Office of Research and Environmental Protection

Date: 7/21/2023

### Introduction

The Baltimore City Department of Public Works (DPW) conducted a public review of the draft Baltimore City Non-tidal Baltimore Harbor Sediment TMDL Implementation Plan. The public comment period was open from June 16, 2023 through July 16, 2023. DPW received written comments from 4 individuals. The following is a list of those individuals who provided public comment:

Affiliation	Author	Date Submitted
Citizen Comment	Louis Curran <a href="mailto:bmoreloulou@gmail.com">[bmoreloulou@gmail.com]</a>	06/16/2023
Citizen Comment	Drew palmer <a href="mailto:drew442w30@gmail.com">[drew442w30@gmail.com]</a>	06/16/2023
Citizen Comment	Toni Mackey <a href="mailto:mackeytoni31@gmail.com">[mackeytoni31@gmail.com]</a>	06/16/2023
Citizen Comment	Peter Baily <a href="mailto:pfbaily@gmail.com">pfbaily@gmail.com</a>	6/25/2023

One comment was a general complaint about government services and another was a question regarding water billing. These are not included in this document. Additionally, there were comments that had no relevance to the Implementation Plan or the MS4 Permit; they are listed under Miscellaneous Comments.

### Comments Specific to the TMDL Implementation Plan

1. I have reviewed the Proposed Plan to Reduce Non-Tidal Harbor Watershed Pollution and am submitting this comment. I applaud any effort to improve the quality of water and habitat in our region. Our water resources are distinctive features of our city, attracting wildlife, citizens (both residents and tourists), and, in some cases, providing alternate transportation strategies. Our streams, tidal estuaries, and harbor are essential assets for our city and for our quality of life.

I live in Baltimore, in the Dickeyville neighborhood in the western part of the city, on the banks of the Gwynns Falls. My neighbors and I are well aware of the benefits of living along this beautiful forested stream. We are also aware of the rapid flooding that occurs as a result of runoff from impermeable surfaces, and the enormous amounts of trash that are washed into the stream, some of which inevitably makes its way downstream to the harbor. Indeed, my neighborhood conducts monthly volunteer stream cleanup activities, but even with that, we are unable to stay ahead of the volume of trash that ends up in the stream and on its banks.

So, my message is, keep up the good work to do everything possible to preserve Baltimore's unique water resources, both tidal and non-tidal.

**Response:** Thank you for your volunteer clean-up efforts.

## Miscellaneous Comments

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1. **Comment:** If Baltimore goes the Pooled Monitoring Advisory Committee (PMAC) route, what public reporting requirements can we insist on to see that the PMAC is effectuating the MS4 goals? Quarterly user-friendly reports made available via links on the City water billing site?

**Response:** Thank you for your comment, which appears to be in regard Part IV.G (Assessment of Controls) of the current MS4 permit. In FY 2022, Baltimore City executed a five-year agreement to participate in the pooled monitoring advisory committee (PMAC) with the Chesapeake Bay Trust (CBT) to meet Part IV.G.1 (BMP Effectiveness Monitoring) of the current permit. Under this agreement, the City's is providing \$100,000 / year to CBT, which will be combined with other state and local funding to support hypothesis-driven research and answer several key questions related to the goals of the state's MS4 permit and TMDL programs. More details of this program and the funded research are provided on the CBT website: [Restoration Research - Chesapeake Bay Trust \(cbtrust.org\)](https://www.cbtrust.org/Restoration-Research-Chesapeake-Bay-Trust).

Ultimately, the goal of the NPDES permits (including the MS4 permit) and the Clean Water Act is to improve the quality of the City's waterways. As part of the federal Clean Water Act, MDE submits a biennial Integrated Report to the Environmental Protection Agency (EPA) that provides information on both impaired and non-impaired waters within the state of Maryland and guides future regulatory mandates related to stormwater and other potential pollution source sectors. The 2020-2022 Integrated Report is available on MDE's website: [Combined 2020 2022IR \(maryland.gov\)](https://www.maryland.gov/combined-2020-2022-IR).

Baltimore City will continue to perform the routine monitoring programs (Ammonia Screening and Stream Impact Sampling) described in Section 2.2 of this Plan, in addition to performing the other conditions of Part IV.G (Assessment of Controls) of the permit. The sampling results of the routine monitoring (including dissolved oxygen and total suspended solids measurements) are posted each quarter on the City's Open Baltimore web page [Surface Water Quality Data 1995 through Present | Open Baltimore \(baltimorecity.gov\)](https://www.baltimorecity.gov/surface-water-quality-data-1995-through-present). Evaluations of the results are provided in the City's MS4 Annual report, which are available on DPW's website.

2. **Comment:** Get more use out of the City water billing process and volunteer City residents who care with a targeted monthly or seasonal project for community associations, like clearing storm drains, labelling storm drains, inventorying neighborhood storm drains for deteriorating storm drain inlets, clogs and clog sources, etc.

**Response:** DPW recently initiated the Bmore LOVE Volunteer Network program <https://dpw-volunteer-initiative-baltimore.hub.arcgis.com/>. Volunteers can sign up for projects like stenciling storm drains, community clean-ups, and tree planting. Information about these projects and how people can get involved is on the Bmore LOVE web page.

3. **Comment:** Increase the number of HazMat Weekend Collections to at very least 2 weekends per month, year-round, instead of just 1 weekend per month in the 6-7 warmer months!! The current system is woefully inadequate. In Paris FR, you can take Hazmat to a central hazmat collection point, partly self-serve, 6 days / week. This is an enormous convenience that is appreciated by all residents and creates

peer pressure on residents not to be lazy with HazMat disposal since it is made so convenient. Why can't Baltimore do this at Sisson Street? Train up the staff and do HazMat collection any time Sisson Street transfer station is open! [and increase the collection of vehicle tires while we're at it!!]

**Response:** Thank you for your recommendations. These will be forwarded to the Bureau of Solid Waste. Suggestions like these can also be found in DPW's "Less Waste, Better Baltimore" Master Plan <https://publicworks.baltimorecity.gov/lesswaste>.

4. **Comment:** Introduce City Council ordinance to ban sale of Round-Up and other pesticides and herbicides containing neonicotinoids and other bee- and other pollinator-killing compounds in City limits. We can't expect County farmers to be more responsible with these chemicals if we don't double-down on the problem in the City. "We all live downstream!" - including our own food chain and food security system and drinking water supply!

**Response:** Thank you for your comment. We encourage you to work with your local councilperson on this effort. In the meantime, there are efforts that individuals can take to reduce pesticide use. Visit DPW's web page: Be Part of the Solution" <https://publicworks.baltimorecity.gov/be-part-solution>.

## **Appendix B: TMDL Implementation Progress and Planning (TIPP) Report**

# 1. SUMMARY

## BASIC PROJECT INFORMATION

Populate blue cells below with basic project information. **All blue cells in this section are required for the tool to return results.**

Name of Implementation Plan	TMDL of Sediment in the Baltimore Harbor Watershed Baltimore City
Watershed Code - MD 8digit or Chesapeake Bay Segment	02130903
Watershed Name	Baltimore Harbor
County	Baltimore City
Baseline Year	2009
Reduction %	58
Impairment	TSS

Are you using specific land use information? (i.e. Impervious Road and Impervious NonRoad data)	No
----------------------------------------------------------------------------------------------------	----

Specific land use information can be found using reclassified land cover data located on MDE's TMDL Stormwater Implementation Resource webpage

## BASELINE YEAR

Baseline Year Summary

Type	EOS Load (lbs/yr)			EOT Load (lbs/yr)		
	TN	TP	TSS	TN	TP	TSS
Land Use	107,950.26	9,366.59	14,906,739.22	107,950.26	9,366.59	14,906,739.22
<b>Load Reductions</b>						
Septic BMPs	-	-	-	-	-	-
Alternative BMPs	10,546.28	2,009.16	8,677,237.43	10,546.28	2,009.16	8,677,237.43
Land Use Conversion	3,513.28	148.67	519,586.52	3,513.28	148.67	519,586.52
SW Management BMPs	39.38	5.28	10,977.95	39.38	5.28	10,977.95
<b>TOTAL LOAD REDUCTION</b>	<b>14,098.94</b>	<b>2,163.12</b>	<b>9,207,801.90</b>	<b>14,098.94</b>	<b>2,163.12</b>	<b>9,207,801.90</b>

## PERMIT LOAD

Permit Load Summary

Type	EOS Load Reductions (lbs/yr)			EOT Load Reductions (lbs/yr)		
	TN	TP	TSS	TN	TP	TSS
Septic BMPs	-	-	-	-	-	-
Alternative BMPs	-	-	-	-	-	-
Land Use Conversion	-	-	-	-	-	-
SW Management BMPs	-	-	-	-	-	-
<b>TOTAL LOAD REDUCTION</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

# CURRENT PROGRESS

## Current Progress Summary

Type	EOS Load Reductions (lbs/yr)			EOT Load Reductions (lbs/yr)		
	TN	TP	TSS	TN	TP	TSS
Septic BMPs	-	-	-	-	-	-
Alternative BMPs	3,339.43	593.97	2,295,887.43	3,339.43	593.97	2,295,887.43
Land Use Conversion	78.61	7.73	9,034.98	78.61	7.73	9,034.98
SW Management BMPs	181.58	23.53	46,911.01	181.58	23.53	46,911.01
<b>TOTAL LOAD REDUCTIO</b>	<b>3,599.61</b>	<b>625.24</b>	<b>2,351,833.43</b>	<b>3,599.61</b>	<b>625.24</b>	<b>2,351,833.43</b>

# IMPLEMENTATION SCENARIO

## Implementation Scenario summary

Type	EOS Load Reductions (lbs/yr)			EOT Load Reductions (lbs/yr)		
	TN	TP	TSS	TN	TP	TSS
<b>Milestone 1</b>						
Septic BMPs	-	-	-	-	-	-
Alternative BMPs	1,771.79	358.76	958,191.67	1,771.79	358.76	958,191.67
Land Use Conversion	219.89	1.08	42,891.58	219.89	1.08	42,891.58
SW Management BMPs	463.51	76.87	154,547.28	463.51	76.87	154,547.28
<b>TOTAL LOAD REDUCTIO</b>	<b>2,455.18</b>	<b>436.72</b>	<b>1,155,630.53</b>	<b>2,455.18</b>	<b>436.72</b>	<b>1,155,630.53</b>
<b>Milestone 2</b>						
Septic BMPs	-	-	-	-	-	-
Alternative BMPs	-	-	-	-	-	-
Land Use Conversion	-	-	-	-	-	-
SW Management BMPs	-	-	-	-	-	-
<b>TOTAL LOAD REDUCTIO</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Planned</b>						
Septic BMPs	-	-	-	-	-	-
Alternative BMPs	-	-	-	-	-	-
Land Use Conversion	-	-	-	-	-	-
SW Management BMPs	-	-	-	-	-	-
<b>TOTAL LOAD REDUCTIO</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

## BMP Units

Summary of BMP units (#/acres/length)

Type	Baseline Year	Permit Load	Current Progress	Implementation	TOTAL	Units Treated
Septic BMPs	-	-	-	-	-	# of Systems
Shoreline Management	-	-	-	-	-	ft
Stream Restoration	-	-	-	175.00	175.00	ft
Street Sweeping	23,801.00	-	10,433.00	2,960.00	37,194.00	Lane Miles
Storm Drain Cleaning	-	-	374,080.00	560,671.00	934,751.00	lbs
Urban Nutrient Mgmt	-	-	-	-	-	Acres
Land Use Conversion	1,335.00	-	73.00	84.00	1,492.00	Acres
SW Management BMPs	10.10	-	43.70	167.10	220.90	Acres

## SUMMARY

Overall plan summary for specified pollutant

EOS or EOT	EOS	
<b>Baseline</b>		
Impairment Baseline Load	5,698,937.31	lbs/yr
Target Reduction %	58.00	%
Target Load	2,393,553.67	lbs/yr
Total Reduction Required	3,305,383.64	lbs/yr
<b>Permit</b>		
Total Permit Load	5,698,937.31	lbs/yr
Permit % Reduction	-	%
<b>Progress</b>		
Total Progress Load	3,347,103.89	lbs/yr
Progress % Reduction	41.27	%
<b>Implementation (Milestone 1)</b>		
Total Load after Implementation	2,191,473.36	lbs/yr
Implementation % Reduction	61.55	%
<b>Implementation (Milestone 1 + Milestone 2)</b>		
Total Load after Implementation	2,191,473.36	lbs/yr
Implementation % Reduction	61.55	%
<b>Implementation (Milestone 1 + Milestone 2 + Planned)</b>		
Total Load after Implementation	2,191,473.36	lbs/yr
Implementation % Reduction	61.55	%

## 2. BASELINE YEAR

### SUMMARY

Baseline EOS Load (lbs/yr)			Baseline EOT Load (lbs/yr)		
TN	TP	TSS	TN	TP	TSS
93,851.32	7,203.48	5,698,937.31	93,851.32	7,203.48	5,698,937.31

### LAND USE

Populate blue cells below with baseline year land use information. Enter Aggregate Impervious information OR Impervious Road and Impervious NonRoad information, but not both. Cells will be grayed out based on specific or general land use selection.

Land Use (acres)	Amount	EOS Load (lbs/yr)			EOT Load (lbs/yr)		
		TN	TP	TSS	TN	TP	TSS
Aggregate Impervious	7,244.00	88,250.80	6,327.51	13,343,004.14	88,250.80	6,327.51	13,343,004.14
Impervious Road		-	-	-	-	-	-
Impervious NonRoad		-	-	-	-	-	-
Turf	2,621.00	19,699.46	3,039.08	1,563,735.08	19,699.46	3,039.08	1,563,735.08
Septic Systems		-	-	-	-	-	-
<b>Total</b>		<b>107,950.26</b>	<b>9,366.59</b>	<b>14,906,739.22</b>	<b>107,950.26</b>	<b>9,366.59</b>	<b>14,906,739.22</b>

### SEPTIC BMPs

Populate blue cells below with baseline year septic BMP information. Please note that addition of septic loads is OPTIONAL.

BMP Short Name	BMP Description	# of Systems	EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
			TN	TP	TSS	TN	TP	TSS
			-	-	-	-	-	-
			-	-	-	-	-	-
			-	-	-	-	-	-
<b>Total</b>			-	-	-	-	-	-

### ALTERNATIVE BMPs

Populate blue cells below with proposed alternative BMP information. It is recommended that Shoreline Management and Stream Restoration load reductions be entered manually, however, default planning rates are available for planning purposes. Please use the protocol methods outlined in the expert panels approved by CBP to determine load reductions outside of this tool.

#### SHORELINE MANAGEMENT

Type	Total Feet	EOT Load Reduction (lbs/yr)		
		TN	TP	TSS
<b>Total</b>	-	-	-	-

#### STREAM RESTORATION

Type	Total Feet	EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
		TN	TP	TSS	TN	TP	TSS
					-	-	-
					-	-	-
<b>Total</b>	-	-	-	-	-	-	-

#### STREET SWEEPING

BMP Short Name	BMP Description	Lane Miles	EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
			TN	TP	TSS	TN	TP	TSS
SCP1	Advanced Sweeping Technology - 2 pass/week	7,556.00	4,508.37	839.91	3,649,162.96	4,508.37	839.91	3,649,162.96
SCP2	Advanced Sweeping Technology - 1 pass/week	7,988.00	3,574.60	710.34	2,939,273.86	3,574.60	710.34	2,939,273.86
SCP3	Advanced Sweeping Technology - 1 pass/2 weeks	8,257.00	2,463.31	458.91	2,088,800.60	2,463.31	458.91	2,088,800.60
			-	-	-	-	-	-
			-	-	-	-	-	-
<b>Total</b>		<b>23,801.00</b>	<b>10,546.28</b>	<b>2,009.16</b>	<b>8,677,237.43</b>	<b>10,546.28</b>	<b>2,009.16</b>	<b>8,677,237.43</b>



**STORM DRAIN CLEANING**

User must indicate whether using default enrichment factors. If yes, leave TN and TP input cells blank.

Material	Nutrient Enrichment Factor			lbs	EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
	Defaults?	TN	TP		TN	TP	TSS	TN	TP	TSS
					-	-	-	-	-	-
					-	-	-	-	-	-
<b>Total</b>				-	-	-	-	-	-	-

**URBAN NUTRIENT MANAGEMENT**

User must indicate whether or not the Fertilizer Act applies to the practice. In general, the Fertilizer Act applies to all practices implemented after 2014.

BMP Short Name	BMP Description	Fertilizer Act?	Treated Turf (acres)	EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
				TN	TP	TSS	TN	TP	TSS
				-	-	-	-	-	-
				-	-	-	-	-	-
				-	-	-	-	-	-
<b>Total</b>			-	-	-	-	-	-	-

**LAND USE CONVERSION BMPs**

Populate blue cells below with baseline year land use conversion information. Only approved MDE BMPs will be accepted.

Land Use Conversion			Acres	EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
Converting from	Converting to			TN	TP	TSS	TN	TP	TSS
Aggregate Impervious	Turf		391.00	1,824.64	(111.84)	486,920.51	1,824.64	(111.84)	486,920.51
Turf	Tree Canopy over Turf		944.00	1,688.64	260.51	32,666.01	1,688.64	260.51	32,666.01
				-	-	-	-	-	-
				-	-	-	-	-	-
<b>Total</b>			<b>1,335.00</b>	<b>3,513.28</b>	<b>148.67</b>	<b>519,586.52</b>	<b>3,513.28</b>	<b>148.67</b>	<b>519,586.52</b>

**STORMWATER MANAGEMENT BMPs**

Populate blue cells below with baseline year stormwater management BMP information. Enter Aggregate Impervious information OR Impervious Road and Impervious NonRoad information, but not both. Cells will be grayed out based on specific or non-specific land use selection. For RR/ST BMPs, users have two options: 1) Input applicable BMPs by type and use the BMP efficiency to determine the load reduction or 2) designate the BMP as an RR or ST practice and use the Pe treated to determine the load reduction. User must designate if a Floating Treatment Wetland is present.

BMP Short Name	BMP Description	Pe, if applicable	Floating Treatment Wetland?	Aggregate Impervious	Treated (acres)			EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
					Impervious Road	Impervious NonRoad	Turf	TN	TP	TSS	TN	TP	TSS
BioRetUdCD	Bioretention/raingardens - C/D soils, underdr	1.00	NO	1.85			1.12	7.74	1.31	2,241.69	7.74	1.31	2,241.69
Filter	Filtering Practices	1.00	NO	4.62			1.18	26.06	3.24	7,371.01	26.06	3.24	7,371.01
RR	Stormwater Performance Standard-Runoff Re	1.00	NO	0.20			-	1.46	0.12	275.96	1.46	0.12	275.96
ST	Stormwater Performance Standard-Stormwat	1.00	NO	0.71			0.42	4.13	0.61	1,089.29	4.13	0.61	1,089.29
								-	-	-	-	-	-
								-	-	-	-	-	-
								-	-	-	-	-	-
								-	-	-	-	-	-
								-	-	-	-	-	-
<b>Total</b>				<b>7.38</b>	-	-	<b>2.72</b>	<b>39.38</b>	<b>5.28</b>	<b>10,977.95</b>	<b>39.38</b>	<b>5.28</b>	<b>10,977.95</b>

## 4. CURRENT PROGRESS

Current Year: 2021

### SUMMARY

Total EOS Load Reduction (lbs/yr)			Total EOT Load Reduction (lbs/yr)		
TN	TP	TSS	TN	TP	TSS
3,599.61	625.24	2,351,833.43	3,599.61	625.24	2,351,833.43

### SEPTIC BMPs

Populate blue cells below with proposed septic BMP information. Please note that addition of septic loads is OPTIONAL.

BMP Short Name	BMP Description	# of Systems	EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
			TN	TP	TSS	TN	TP	TSS
			-	-	-	-	-	-
			-	-	-	-	-	-
			-	-	-	-	-	-
	<b>Total</b>		-	-	-	-	-	-

### ALTERNATIVE BMPs

Populate blue cells below with proposed alternative BMP information. It is recommended that Shoreline Management and Stream Restoration load reductions be entered manually, however, default planning rates are available for planning purposes. Please use the protocol methods outlined in the expert panels approved by CBP to determine load reductions outside of this tool.

### SHORELINE MANAGEMENT

Type	Total Feet	EOT Load Reduction (lbs/yr)		
		TN	TP	TSS
	<b>Total</b>	-	-	-

### STREAM RESTORATION

Default?	Total Feet	EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
		TN	TP	TSS	TN	TP	TSS
					-	-	-
					-	-	-
	<b>Total</b>	-	-	-	-	-	-

### STREET SWEEPING

BMP Short Name	BMP Description	Lane Miles	EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
			TN	TP	TSS	TN	TP	TSS
SCP3	Advanced Sweeping Technology - 1 pass/2 weeks	6,525.00	1,946.61	362.65	1,650,650.83	1,946.61	362.65	1,650,650.83
SCP4	Advanced Sweeping Technology - 1 pass/4 weeks	3,908.00	582.94	130.32	539,247.10	582.94	130.32	539,247.10
			-	-	-	-	-	-
			-	-	-	-	-	-
	<b>Total</b>	<b>10,433.00</b>	<b>2,529.54</b>	<b>492.97</b>	<b>2,189,897.93</b>	<b>2,529.54</b>	<b>492.97</b>	<b>2,189,897.93</b>

### STORM DRAIN CLEANING

User must indicate whether using default enrichment factors. If yes, leave TN and TP input cells blank.

Material	Defaults?	Nutrient Enrichment Factor		lbs	EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
		TN	TP		TN	TP	TSS	TN	TP	TSS
Organic	Yes			311,733.00	692.05	74.82	62,346.60	692.05	74.82	62,346.60
Inorganic	Yes			62,347.00	117.84	26.19	43,642.90	117.84	26.19	43,642.90
	<b>Total</b>			<b>374,080.00</b>	<b>809.88</b>	<b>101.00</b>	<b>105,989.50</b>	<b>809.88</b>	<b>101.00</b>	<b>105,989.50</b>

**URBAN NUTRIENT MANAGEMENT**

User must indicate whether or not the Fertilizer Act applies to the practice. In general, the Fertilizer Act applies to all practices implemented after 2014.

BMP Short Name	BMP Description	Fertilizer Act?	Treated Turf (acres)	EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
				TN	TP	TSS	TN	TP	TSS
				-	-	-	-	-	-
				-	-	-	-	-	-
				-	-	-	-	-	-
<b>Total</b>			-	-	-	-	-	-	-

**LAND USE CONVERSION BMPs**

Populate blue cells below with land use conversion information. Only approved MDE BMPs will be accepted.

Land Use Conversion		Acres	EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
Converting from	Converting to		TN	TP	TSS	TN	TP	TSS
Aggregate Impervious	Tree Canopy over Aggregate Impervious	69.00	71.45	6.63	8,896.56	71.45	6.63	8,896.56
Turf	Tree Canopy over Turf	4.00	7.16	1.10	138.42	7.16	1.10	138.42
			-	-	-	-	-	-
			-	-	-	-	-	-
			-	-	-	-	-	-
<b>Total</b>		<b>73.00</b>	<b>78.61</b>	<b>7.73</b>	<b>9,034.98</b>	<b>78.61</b>	<b>7.73</b>	<b>9,034.98</b>

**STORMWATER MANAGEMENT BMPs**

Populate blue cells below with stormwater management BMP information. Enter Aggregate Impervious information OR Impervious Road and Impervious NonRoad information, but not both. Cells will be grayed out based on specific or non-specific land use selection. For RR/ST BMPs, users have two options: 1) Input applicable BMPs by type and use the BMP efficiency to determine the load reduction or 2) designate the BMP as an RR or ST practice and use the Pe treated to determine the load reduction. User must designate if a Floating Treatment Wetland is present.

BMP Short Name	BMP Description	Pe, if applicable	Floating Treatment Wetland?	Treated (acres)				EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
				Aggregate Impervious	Impervious Road	Impervious NonRoad	Turf	TN	TP	TSS	TN	TP	TSS
BioRetUdCD	Bioretention/raingardens - C/D soils, underdrains		NO	9.67			3.84	36.67	5.80	11,056.41	36.67	5.80	11,056.41
Filter	Filtering Practices	1.00	NO	16.68			6.60	101.12	13.33	27,728.97	101.12	13.33	27,728.97
RR	Stormwater Performance Standard-Runoff Reduction	1.00	NO	4.64			1.43	40.21	3.99	7,044.12	40.21	3.99	7,044.12
ST	Stormwater Performance Standard-Stormwater Treatment	1.00	NO	0.84			-	3.58	0.40	1,081.51	3.58	0.40	1,081.51
								-	-	-	-	-	-
								-	-	-	-	-	-
								-	-	-	-	-	-
								-	-	-	-	-	-
								-	-	-	-	-	-
<b>Total</b>				<b>31.83</b>	-	-	<b>11.87</b>	<b>181.58</b>	<b>23.53</b>	<b>46,911.01</b>	<b>181.58</b>	<b>23.53</b>	<b>46,911.01</b>

## 5. IMPLEMENTATION SCENARIO

### SUMMARY

Scenario	BMP type	Total EOS Load Reduction (lbs/yr)			Total EOT Load Reduction (lbs/yr)		
		TN	TP	TSS	TN	TP	TSS
Milestone 1	Septic	-	-	-	-	-	-
	Alternative	1,771.79	358.76	958,191.67	1,771.79	358.76	958,191.67
	Land Use Conversion	219.89	1.08	42,891.58	219.89	1.08	42,891.58
	Stormwater Management	463.51	76.87	154,547.28	463.51	76.87	154,547.28
Milestone 2	Septic	-	-	-	-	-	-
	Alternative	-	-	-	-	-	-
	Land Use Conversion	-	-	-	-	-	-
	Stormwater Management	-	-	-	-	-	-
Planned	Septic	-	-	-	-	-	-
	Alternative	-	-	-	-	-	-
	Land Use Conversion	-	-	-	-	-	-
	Stormwater Management	-	-	-	-	-	-
<b>Total</b>		<b>2,455.18</b>	<b>436.72</b>	<b>1,155,630.53</b>	<b>2,455.18</b>	<b>436.72</b>	<b>1,155,630.53</b>

If applicable, define each milestone designation below:

Milestone 1:	2026
Milestone 2:	
Planned:	

### SEPTIC BMPs

Populate blue cells below with proposed septic BMP information. Record each BMP's proposed implementation period by indicating whether it is a Milestone 1, Milestone 2, or Planned BMP. Please note that addition of septic loads is OPTIONAL.

Scenario	BMP Short Name	BMP Description	# of Systems	EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
				TN	TP	TSS	TN	TP	TSS
				-	-	-	-	-	-
				-	-	-	-	-	-
				-	-	-	-	-	-
<b>Total</b>			-	-	-	-	-	-	-

### ALTERNATIVE BMPs

Populate blue cells below with proposed alternative BMP information. It is recommended that Shoreline Management and Stream Restoration load reductions be entered manually, however, default planning rates are available for planning purposes. Record each BMP's proposed implementation period by indicating whether it is a Milestone 1, Milestone 2, or Planned BMP. Levels of planned annual BMPs should only reflect increases above the Progress Scenario.

### SHORELINE MANAGEMENT

Scenario	Type	Total Feet	EOT Load Reduction (lbs/yr)		
			TN	TP	TSS
<b>Total</b>		-	-	-	-

### STREAM RESTORATION

Scenario	Type	Total Feet	EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
			TN	TP	TSS	TN	TP	TSS
Milestone 1	Default Planning	175.00	13.13	11.90	43,400.00	13.13	11.90	43,400.00
						-	-	-
						-	-	-
<b>Total</b>		<b>175.00</b>	<b>13.13</b>	<b>11.90</b>	<b>43,400.00</b>	<b>13.13</b>	<b>11.90</b>	<b>43,400.00</b>

### STREET SWEEPING

Scenario	BMP Short Name	BMP Description	Lane Miles	EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
				TN	TP	TSS	TN	TP	TSS
Milestone 1	SCP3	Advanced Sweeping Technology - 1 pass/2 weeks	1,478.00	440.93	82.15	373,894.55	440.93	82.15	373,894.55
Milestone 1	SCP4	Advanced Sweeping Technology - 1 pass/4 weeks	1,482.00	221.06	49.42	204,494.42	221.06	49.42	204,494.42
				-	-	-	-	-	-
				-	-	-	-	-	-
<b>Total</b>			<b>2,960.00</b>	<b>662.00</b>	<b>131.57</b>	<b>578,388.97</b>	<b>662.00</b>	<b>131.57</b>	<b>578,388.97</b>

**STORM DRAIN CLEANING**

User must indicate whether using default enrichment factors. If yes, leave TN and TP input cells blank.

Scenario	Material	Defaults?	Nutrient Enrichment Factor		lbs	EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
			TN	TP		TN	TP	TSS	TN	TP	TSS
Milestone 1	Organic	Yes			112,134.00	248.94	26.91	22,426.80	248.94	26.91	22,426.80
Milestone 1	Inorganic	Yes			448,537.00	847.73	188.39	313,975.90	847.73	188.39	313,975.90
					-	-	-	-	-	-	-
					-	-	-	-	-	-	-
<b>Total</b>					<b>560,671.00</b>	<b>1,096.67</b>	<b>215.30</b>	<b>336,402.70</b>	<b>1,096.67</b>	<b>215.30</b>	<b>336,402.70</b>

**URBAN NUTRIENT MANAGEMENT**

User must indicate whether or not the Fertilizer Act applies to the practice. In general, the Fertilizer Act applies to all practices implemented after 2014.

Scenario	BMP Short Name	BMP Description	Fertilizer Act?	Treated Turf (acres)	EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
					TN	TP	TSS	TN	TP	TSS
					-	-	-	-	-	-
					-	-	-	-	-	-
					-	-	-	-	-	-
<b>Total</b>				<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

**LAND USE CONVERSION BMPS**

Populate blue cells below with land use conversion information. Record each BMP's proposed impementation period by indicating whether it is a Milestone 1, Milestone 2, or Planned BMP. Only approved MDE BMPs will be accepted.

Scenario	Land Use Conversion		Acres	EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
	Converting from	Converting to		TN	TP	TSS	TN	TP	TSS
Milestone 1	Aggregate Impervious	Turf	31.00	144.66	(8.87)	38,604.95	144.66	(8.87)	38,604.95
Milestone 1	Aggregate Impervious	Tree Canopy over Aggregate Impervious	26.00	26.92	2.50	3,352.33	26.92	2.50	3,352.33
Milestone 1	Turf	Tree Canopy over Turf	27.00	48.30	7.45	934.30	48.30	7.45	934.30
			-	-	-	-	-	-	-
			-	-	-	-	-	-	-
			-	-	-	-	-	-	-
<b>Total</b>			<b>84.00</b>	<b>219.89</b>	<b>1.08</b>	<b>42,891.58</b>	<b>219.89</b>	<b>1.08</b>	<b>42,891.58</b>

**STORMWATER MANAGEMENT BMPS**

Populate blue cells below with stormwater management BMP information. Record each BMP's proposed impementation period by indicating whether it is a Milestone 1, Milestone 2, or Planned BMP. Cells will be grayed out based on specific or non-specific land use selection. For RR/ST BMPs, users have two options: 1) Input applicable BMPs by type and use the BMP efficiency to determine the load reduction or 2) designate the BMP as an RR or ST practice and use the Pe treated to determine the load reduction. User must designate if a Floating Treatment Wetland is present.

Scenario	BMP Short Name	BMP Description	Pe, if applicable	Floating Treatment Wetland?	Aggregate Impervious	Treated (acres)			EOS Load Reduction (lbs/yr)			EOT Load Reduction (lbs/yr)		
						Impervious Road	Impervious NonRoad	Turf	TN	TP	TSS	TN	TP	TSS
Milestone 1	BioRetUdCD	Bioretention/raingardens - C/D soils, underdrains	1.00	NO	36.00			19.00	145.34	24.06	42,705.04	145.34	24.06	42,705.04
Milestone 1	Filter	Filtering Practices	1.00	NO	21.90			12.40	144.00	20.10	38,189.21	144.00	20.10	38,189.21
Milestone 1	WetPondWetland	Wet Ponds and Wetlands	1.00	NO	61.30			16.50	174.16	32.70	73,653.02	174.16	32.70	73,653.02
									-	-	-	-	-	-
									-	-	-	-	-	-
									-	-	-	-	-	-
									-	-	-	-	-	-
									-	-	-	-	-	-
<b>Total</b>					<b>119.20</b>	<b>-</b>	<b>-</b>	<b>47.90</b>	<b>463.51</b>	<b>76.87</b>	<b>154,547.28</b>	<b>463.51</b>	<b>76.87</b>	<b>154,547.28</b>