



National Pollutant Discharge Elimination System (NPDES)
Municipal Separate Storm Sewer System (MS4)

Geodatabase Design and User's Guide

Maryland Department of the Environment
Water and Science Administration (WSA)
Office of Information Management and Technology (OIMT)
Maryland Environmental Service (MES)

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I. List of Acronyms and Abbreviations

BMP	Best Management Practice
EMC	Event Mean Concentration
EPA	US Environmental Protection Agency
ESRI	Environmental Systems Research Institute
FGDC	Federal Geographic Data Committee
GIS	Geographic Information System
GPS	Global Positioning System
HUC	Hydrologic Unit Code
IDDE	Illicit Discharge Detection and Elimination
MDE	Maryland Department of the Environment
MES	Maryland Environmental Service
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
QA/QC	Quality Assurance\Quality Control
SWM	Stormwater Management
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
WLA	Wasteload Allocation

II. Introduction

MDE's NPDES Stormwater Program Database

The Maryland Department of the Environment (Department) in collaboration with the Maryland Environmental Service (MES) released the *National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Geodatabase Design and User's Guide, Version 1.2* in May 2017. The geodatabase establishes a reporting structure for submitting local program data and showing compliance with MS4 individual permit requirements. The data allow the Department to assess progress toward statewide commitments to reach Chesapeake Bay and local water quality goals.

Since the development of the May 2017 Version 1.2 geodatabase, new information on best management practice (BMP) and modeling methods have been released. For example, the Chesapeake Bay Program (CBP) expert panels have approved new BMPs and updated efficiencies. The Maryland Phase III Watershed Implementation Plan has also been updated to estimate nutrient load reduction targets to address wasteload allocations (WLAs) for meeting the Chesapeake Bay total maximum daily load (TMDL). In addition, the Department released the 2021 *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated* (Accounting Guidance) to dovetail the latest modeling methods and BMP efficiencies into a consistent framework for determining MS4 restoration credits. To maintain consistency with the latest science described above, the Department recognized that the reporting structure in the May 2017, Version 1.2 of the geodatabase schema needed to be updated.

The process for developing geodatabase updates began in the spring of 2020 with a survey and follow up meetings with permittees to discuss a proposed framework for an improved data structure. Since that time, the Department released a draft data structure in November 2021. Permittees began testing the 2021 updates and provided numerous comments and suggestions. In September 2023, the Department provided further edits to the geodatabase to address comments and suggestions. After three years of permittee feedback and user testing, the Department released Version 2.0 of the Geodatabase and User's Guide in September 2024.

July 2025 Update (Version 2.1)

In the FY2024 MS4 annual reports, permittees provided comments for corrections, clarification, and consistency between the User's Guide, Excel Schema, and Geodatabase Shell. These minor edits are noted in Appendix G.

Migration of Permit Data into Version 2.1

Permittees must begin incorporating the Version 2.1 database schema as part of their geodatabase submittals in future MS4 annual reports. The Department will continue to work with permittees during this transition. However, given the significant time allowed for user testing and feedback, it is expected that future reports will be consistent with the current framework.

An Introduction to Database Terminology

The following is a brief overview of database terminology used throughout this document.

File Geodatabase

A **geodatabase** is a database designed to store both tables (non-spatial data) and spatial data.

Like most modern databases, the structure of a geodatabase is relational; therefore, information is stored in a number of data types with relations between them. This structure is used to eliminate redundancy, creating a faster and more compact database.

There are three major data entities in a geodatabase: feature classes, tables, and raster datasets. The NPDES geodatabase makes use of only feature classes and tables.

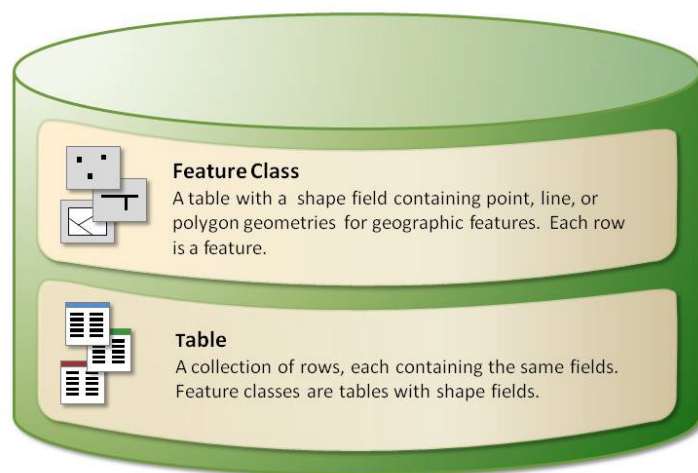


Figure I: Data elements used in a geodatabase; the MDE NPDES geodatabase uses tables and feature classes

A **feature class (FC)** within a geodatabase is used to store spatial data as well as tabular data about the feature. Tabular data is stored within the attribute table of a feature class. An attribute table may contain such information as collection date, geographic coordinates or inspection information.

A feature class can contain points, lines, polygons, or annotation; however, only one of these types is allowed in an individual feature class. A point feature class shows the location of items that are localized such as a septic system or a pipe outfall. A line feature class represents linear features such as streams or roads. A polygon feature class contains an area and is used for such things as property, watersheds and political areas. Annotation is text that is tied to a particular point on the surface of the earth.

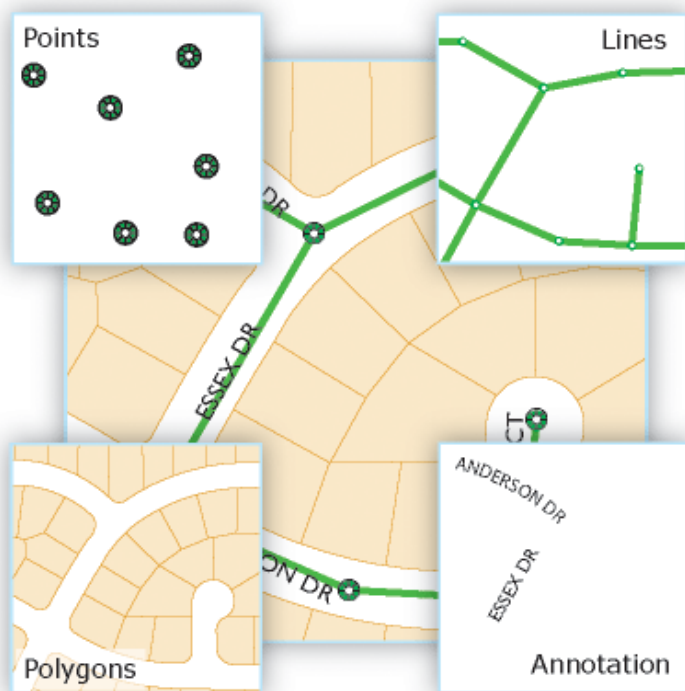


Figure II: Types of Feature Classes

In addition to feature classes, a geodatabase can contain standalone tables. **Tables** are non-spatial entities in a geodatabase that do not have any explicit spatial information.

Relationship classes are the elements that tie the feature classes and tables together. Each table or feature class can be related to multiple tables or feature classes. The relationship class references a field in a table or feature class to determine the relationship between them.

Database Keys

Primary Key, Foreign Key: A link must exist between two entities to create a relationship. This is accomplished through the use of keys. The primary key is a unique record number in the first, or origin, table or feature class. The foreign key is a record in the second destination table or feature class. There have to be matches between the contents of the foreign and primary keys; otherwise there can be no relationship between the tables/feature classes.

Cardinality: Once the relationship has been established by designating the foreign and primary keys, the cardinality must be established. Cardinality in the geodatabase takes the form of a one to one or one to many relationship.

A one-to-one relationship means that each record in the origin table/feature class will match only one record in the destination table/feature class.

A one-to-many relationship means that each record in the origin table/feature class will match one or more records in the destination table/feature class.

Domains: Data are often input in a variety of ways. To ensure consistency within a geodatabase and increase data integrity, using domains is a good practice when possible. The domain functions as a list of values from which to choose. Only legitimate values are shown, eliminating both duplicate values that are synonymous and values that are illegitimate.

Database Overview

The NPDES web intake tool (in progress) and file geodatabase are designed to work with data from multiple sources. These data will largely be submitted in geodatabase format; with supporting narrative files uploaded to the Department's NPDES web intake application.

Hardware and Software Requirements

Spatial: Technical requirements include:

1. ArcGIS Desktop 10.7.1 at a minimum (ArcGIS Desktop Standard/ArcEditor or Advanced/ArcInfo), ArcPro 3.3.x (Standard)
2. Internet access

Non-Spatial: The web intake application will allow non-spatial documents to be uploaded using the "upload attachment" function. A record of each uploaded document will be stored in the "Narrative File Table" within the geodatabase. More information regarding this workflow is provided later in this document.

Data Collection Standards

Data shall be entered to the highest accuracy that is reasonable. A number of methods are acceptable for data capture. Locations can be ascertained through the use of heads-up (on-screen) digitizing. In an effort to limit individual variance in judgment, all digitizing must be made at a scale of 1:1,200.

Locations can also be determined through use of GPS survey equipment. GPS accuracy must be sub-meter. Lastly, as-built plans can be used to identify feature locations. Accuracy in this case is limited by the accuracy of the reference as-builts and varies from user to user.

Metadata Standards

In order to maintain proper records of the data input into the database, metadata for the database will be compiled in Federal Geographic Data Committee (FGDC) format. Information on this format is available on the Committee's website: <http://www.fgdc.gov/>. Specific implementation of this standard in ArcGIS can be found in ESRI's online help site:

<https://desktop.arcgis.com/en/arcmap/latest/manage-data/metadata/creating-and-managing-fgdc-metadata.htm>

To comply with MD iMAP Submission Policies, please refer to the recommendations for minimum metadata: <https://imap.maryland.gov/pages/policies-and-procedures>.

Permittees should focus on data collection and maintenance procedures, important dates, contact information and accuracy/precision. It is also important that the permittee document how features were collected and at what scale.

Schema

The overall design of a geodatabase is commonly referred to as the schema. Section III of this User's Guide provides a detailed overview of this database and Table I provides details of the relationships within the geodatabase.

Database Elements Listing

The following is a list of each element of the database, including feature classes, tables, relationship classes, and domains. More detailed descriptions of each element can be found in later sections of this document.

Feature Classes

The following is a list of feature classes to be captured as part of this geodatabase:

- AltBMPLine (Line)
- AltBMPPoint (Point)
- AltBMPPoly (Polygon)
- BMPDrainageArea (Polygon)
- BMP (Point)
- MunicipalFacilities (Point)
- Outfall (Point)
- OutfallDrainageArea (Polygon)
- QuarterlyGradingPermits (Point)

Associated Tables

The following tables are to be populated as a part of this geodatabase:

- AltBMPInspections
- BMPInspections
- ChemicalApplication
- ChesapeakeBayProgress
- DischargesGreyInfrastructureProtocols
- ErosionSedimentControl
- FiscalAnalyses
- IDDEScreening
- ImperviousSurface
- LocalTMDLProgress
- NarrativeFiles
- PermitInfo
- ShorelineManagementPractices
- StreamRestorationProtocols
- SWM

Domains

The following is a list of data domains that are found within this database. Later sections identify which fields use which domains.

- dAltBMPLine
- dAltBMPPoint
- dAltBMPPoly
- dBayPollutant
- dBMPClass
- dBMPStatus
- dBMPType
- dBoolean
- dCBSegShed
- dChemCat
- dChemUnit
- dClarity
- dColor
- dConPurpose
- dDeposits
- dDesignType
- dDGIProtocol
- dDGIType
- dDocType
- dErosion
- dFacType
- dFloatables
- dFTWType
- dHUC12dig
- dIDDEStatus
- dJurisdiction
- dImpStatus
- dMD8Digit
- dOdor
- dPassFail
- dPollutant
- dQuantityManagement
- dQuarter
- dSDVType
- dSoilRestLvl
- dSource
- dState
- dStructCond
- dSweepingSchedule
- dSWPPPlan
- dVegCon

Relationship Classes

The table below illustrates the relationships that exist between features and tables within the database.

Relationship Name	Details	Type
rAltBMPLine_AltBMPInspections	AltBMPLine (F) to AltBMPInspections (T)	One to Many
rAltBMPLine_ShorelineManagementPractices	AltBMPLine (F) to ShorelineManagementPractices (T)	One to One
rAltBMPLine_StreamRestorationProtocols	AltBMPLine (F) to StreamRestorationProtocols (T)	One to One
rAltBMPPoint_AltBMPInspections	AltBMPPoint (F) to AltBMPInspections (T)	One to Many
rAltBMPPoint_DGIProtocols	AltBMPPoint (F) to DGIProtocols (T)	One to Many
rAltBMPPoly_AltBMPInspections	AltBMPPoly (F) to AltBMPInspections (T)	One to Many
rBMP_BMPInspections	BMP (F) to BMPInspections (T)	One to Many
rBMPDrainageArea_BMP	BMPDrainageArea (F) to BMP (F)	One to One
rOutfall_IDDEScreening	Outfall (F) to IDDEScreening (T)	One to Many
rOutfall_OutfallDrainageArea	Outfall (F) to OutfallDrainageArea (F)	One to One

Note: F= Feature Class, T=Associated Table

Attributes

Attributes are a part of all tables and feature classes. Common fields are shown in the table below:

Name	Type	Size	Mandatory	Domain	Description
OBJECTID	Text				Object Identifier
SHAPE	Text				Feature Geometry

Table II Common Attributes

- OBJECTID: Unique identifier automatically generated by the system.
- SHAPE: Geometry of the feature, whether point, line, or polygon.

Feature classes contain the OBJECTID and SHAPE fields; Tables will only contain the OBJECTID field.

Unique ID Field

Additionally, all tables and feature classes contain unique record fields to maintain data integrity.

These are populated using the method shown below:

2-digit jurisdiction code + 2-digit year + 3-digit identifying code + 6-digit sequential number.

Example: BMP Drainage Area

Jurisdiction: Anne Arundel County

AA

+

Year feature/record was captured: 2013

13

+

Identifying Code: BDA (BMP Drainage Area)

BDA

+

Record number: 1

000001

=AA13BDA000001

An identifying code for each table and feature class can be found in Section 4 of this document.

Spatial Reference

The spatial reference information is used to make all collected data conform to Maryland standards. In this way, data can be overlaid and compared to data from other sources or basemaps with minimal distortion. The geodatabase design will store feature coordinates WGS 1984 Web Mercator (Auxiliary Sphere).

Published specifications for the projection are as follows:

Horizontal Coordinate System

Projected Coordinate System Name: WGS 1984 Web Mercator (Auxiliary Sphere)

WKID: 3857 Authority: EPSG

Projection:	Mercator_Auxiliary_Sphere
False_Easting:	0.0
False_Northing:	0.0
Central_Meridian:	0.0
Standard Parallel:	1: 0.0
Auxiliary Sphere Type:	0.0
Linear Unit:	Meter (1.0)

Geographic Coordinate System Name:	GCS_WGS_1984
Angular Unit:	(0.0174532925199433)
Prime Meridian:	Greenwich (0.0)
Datum:	D_WGS_1984
Spheroid:	WGS_1984
Semimajor Axis:	6378137.0
Seminor Axis:	6356752.314245179
Inverse Flattening:	298.257222101

Tolerance

The standard for the XY Tolerance will be 0.001 meter. The XY Tolerance reflects the accuracy of the coordinate data. The tolerance value is the minimum distance between coordinates. In this case, if two coordinates are within 0.001 meter of each other, they are interpreted as being at the same location.

Resolution

The standard for the XY Resolution will be 0.0001 meters. The resolution represents the detail, or precision, in which a feature class depicts the location and shape of geographic features. It is the minimum distance that separates x-values and y-values.

III. Feature Classes and Tables

All tables and feature classes are listed in detail below. The tables and feature classes are listed in the order that is best suitable for populating the geodatabase. Each table listed below has a field that indicates whether it is mandatory. An “M” value indicates that the field is mandatory (and therefore must be populated in the geodatabase), an “O” value indicates that the field is optional (not required), and a “C” value indicates that the field is conditional, and it might not be applicable depending on another field value within the table. More information on conditional fields will be provided with each feature class description.

It is important to note, an OBJECTID field is present in all feature classes and tables; however, it is not shown in the tables below. The same applies to SHAPE, SHAPE_Length and SHAPE_Area. These fields are important to the geometry of the feature classes but warrant no detailed description.

Permit Info Table

The Permit information table contains specific information about the permit number, effective dates, and contacts involved with permit administration.

Identifying code: PER

Permit Information Associated Table					
Name	Type	Size	Mandatory	Domain	Description
PERMIT_NUM	Text	10	M		MDE permit number
FEDERAL_NUM	Text	9	M		9-character federal permit number
PERMITTEE	Text	5	M	dJurisdiction	Permittee
EFFECTIVE_DATE	Date	8	M		Permit effective date
EXPIRATION_DATE	Date	8	M		Permit expiration date
FIRST_NAME	Text	50	M		Contact name (First)
LAST_NAME	Text	50	M		Contact name (Last)
CONTACT_TITLE	Text	50	M		Contact title, job title (e.g., director, manager)
AGENCY_NAME	Text	50	M		Agency
ADDRESS	Text	75	M		Address
CITY	Text	50	M		City
STATE	Text	2	M	dState	State
ZIP	Text	5	M		Zip Code
PHONE	Text	10	M		Contact phone number 10 digits, no dashes (numbers only)
HOTLINE	Text	10	O		Hotline for reporting illicit discharge; Phone number 10 digits, no dashes (numbers only)
POOLED_MON	Text	1	M	dBoolean	Participating in pooled monitoring (i.e., Yes/No)
WEB_ADDRESS	Text	255	O		Web address where reports are posted
EMAIL	Text	50	M		Contact email address
GEN_COMMENTS	Text	255	O		General comments

BMPs

BMP data pertaining to new development, redevelopment, and restoration are captured in one BMP feature class. The treatment level for each BMP can be determined, which will allow more straightforward reporting to the Chesapeake Bay Program. See Appendices for data entry examples.

BMP FC

The BMP feature class includes records of a specific geographical point indicating a location associated with either one BMP or a system of ESD practices, as well as information on rainfall treated, drainage area, and BMP construction. It also contains specific information about all BMPs for new development, redevelopment, conversion, and restoration BMPs required by the MS4 permit. Typically, a BMP is a structural or non-structural device designed to capture or treat stormwater runoff to mitigate flooding, reduce pollution, and provide other amenities.

Data entry should be consistent with the following:

- All structural BMPs should be entered as one record, with one exception as noted below;
- A one-to-one relationship between the BMP Drainage Area and BMP feature classes exists when:
 - One BMP record relates to one BMP drainage area record;
 - Several ESD practices are entered as one record and the NUM_BMPS field indicates the total number of ESD practices in that system. This record will be linked to a single BMP_DRAIN_ID;
 - A coded value for BMP_CLASS using E+S is an option to classify a system of ESD practices that drain to one downstream structural practice. This allows data entry for attribute values to represent the entire system without having to parse out treatment from upstream practices. This record can represent the collective treatment level for many ESD practices draining to a single structural practice. The dominant water quality treatment practice shall be recorded for BMP_TYPE. This record will be linked to a single BMP_DRAIN_ID;
- Converted BMPs should be entered as a separate record from the original BMP. The BMP_STATUS field for the original BMP should use the domain, "Removed";
- Certain projects may address a combination of new development and redevelopment standards. In these cases, attribute fields for PE_REDE and IMP_ACRES_REDE shall be populated. Permittees must capture data for these fields when PRMT_ISSUANCE_YR_CREDIT is the current permit or after for all redevelopment projects. Data entry for these fields are as follows:
 - IMP_ACRES_REDE: This is the existing impervious acres that will be reconstructed as part of the project and treatment provided in accordance with redevelopment regulations;
 - PE_REDE: This is the P_E addressed for the reconstructed impervious acres for the project;

- Projects that will result in a net decrease in impervious area can be credited by using the impervious surface reduction (IMPP) data fields recorded in the AltBMP Poly feature class. This field will not be needed for projects that result in a net increase in impervious area;
- Data entry scenarios for redevelopment are provided in the Appendix.
- PRMT_ISSUANCE_YR_CREDIT is provided in the geodatabase. The purpose of this field is to clarify the specific permit that a given restoration BMP will be credited toward. For this field, the following should apply:
 - The field will generally be the issuance year (fiscal) of a specific permit under which the BMP was installed;
 - For an administratively continued permit: if a BMP is installed to receive credit under a future permit, the permit issuance year would be the fiscal year that the future permit is issued (or projected to be issued);
 - For a replacement BMP: if a BMP is installed to replace credits associated with a failed or removed BMP, the permit issuance year would be the fiscal year of the permit that the original BMP was credited. Note - this applies to alternative BMPs as well.

Identifying code: BMP- The code "RST" may be used for records reported in the previous permit term. Use BMP for all new BMP records.

BMP Feature Class					
Name	Type	Size	Mandatory	Domain	Description
BMP_ID	Text	13	M		MDE primary ID (Unique table ID)
LOCAL_BMP_ID	Text	25	O		Local BMP identifier
BMP_DRAIN_ID	Text	13	M		Foreign key linking to BMPDrainageArea Feature Class
LATITUDE	Double	12	O		WGS84 Auxiliary Sphere (Decimal Degrees)
LONGITUDE	Double	12	O		WGS84 Auxiliary Sphere (Decimal Degrees)
WATERSHED8DGT	Text	8	O	dMD8digit	Maryland 8-digit hydrologic unit code
WATERSHED12DGT	Text	12	O	dHUC12digit	USGS 12-digit hydrologic unit code
BMP_DRAIN_AREA	Double	6	M		Drainage area (acres) to a BMP or a cluster of ESD practices. This is the numeric sum of the design drainage area to a single BMP or cluster of ESD practices
BMP_NAME	Text	100	O		Name of BMP (e.g., Glendale Pond)
PROJECT_DESC	Text	150	C		Brief description of project. Conditional on CON_PURPOSE = REST, CONV, or REDE
PROJECT_NAME	Text	25	O		Name of project
CON_PURPOSE	Text	4	M	dConPurpose	New Development (NEWD), Redevelopment (REDE), Conversion (CONV), Restoration (REST), or Supplemental Environmental Project (SEP)
CONVERTED_FROM	Text	5	C	dBMPType	If conversion of existing BMP then prior BMP Type is required; Conditional if CON_PURPOSE = CONV
BMP_CLASS	Text	3	M	dBMPClass	BMP Class (E, S, or E+S)

BMP Feature Class					
Name	Type	Size	Mandatory	Domain	Description
NUM_BMPS	Short Integer	3	M		Number of BMPs present. If BMP CLASS = S, must be = 1; If BMP_CLASS = E or E+S can be 1 or greater.
BMP_TYPE	Text	5	M	dBMPType	Type of BMP. If NUM_BMPS >1, use BMP Type with greatest treatment volume.
QUAN_MGMT	Text	3	C	dQuantity Management	Quantity managed. e.g., Cpv, 2-yr, 10-yr; Conditional on CON_PURPOSE = NEWD, "Under Development" may be used if data is still being gathered.
PE_REQ	Double	8	C		P _E required; Conditional on CON_PURPOSE = NEWD
PE_ADR	Double	8	M		Rainfall treated for water quality (WQ _r)
PE_REDE	Double	8	C		P _E addressed for the reconstructed impervious area; Conditional on CON_PURPOSE = REDE and PERMIT_ISSUANCE_YR_CREDIT is current permit or later
IMP_ACRES	Double	6	M		Impervious acres associated with record
IMP_ACRES_REDE	Double	6	C		Reconstructed impervious acres treated; Conditional on CON_PURPOSE = REDE and PERMIT_ISSUANCE_YR_CREDIT is current permit or later.
PE_PRE_CONV	Double	8	C		P _E Treated prior to conversion; Conditional on CON_PURPOSE = CONV; and PERMIT_ISSUANCE_YR_CREDIT is current permit or later
PRE_CONV_IMP_ACR_CREDIT	Double	6	C		Total impervious acre credit prior to conversion; Conditional on CON_PURPOSE = CONV and PERMIT_ISSUANCE_YR_CREDIT is current permit or later
PE_TOTAL_STORAGE	Double	8	C		Total rainfall depth managed; Conditional on CON_PURPOSE = CONV, REST, or REDE and PERMIT_ISSUANCE_YR_CREDIT is current permit or later
WQT_IMP_ACR_CREDIT	Double	6	C		Credit associated with water quality treatment; Conditional on CON_PURPOSE = REST, CONV, or REDE and PERMIT_ISSUANCE_YR_CREDIT is current permit or later
WM_IMP_ACR_CREDIT	Double	6	C		Credit associated with the portion of the extended detention volume above WQT; Conditional on CON_PURPOSE = REST, CONV, or REDE, and PE_ADR>1 and PERMIT_ISSUANCE_YR_CREDIT is current permit or later
GSI_IMP_ACR_CREDIT	Double	6	C		Credit associated with the portion of GSI treatment above WQT; Conditional on CON_PURPOSE = REST, CONV, or REDE and PERMIT_ISSUANCE_YR_CREDIT is current permit or later

BMP Feature Class					
Name	Type	Size	Mandatory	Domain	Description
TOT_IMP_ACR_CREDIT	Double	6	C		Total impervious acre credit for restoration, conversion, or redevelopment project; Total credit includes any WQT, WM, and GSI credits; Conditional on CON_PURPOSE = REST, CONV, or REDE and PERMIT_ISSUANCE_YR_CREDIT is current permit or later
PRMT_ISSUANCE_YR_CREDIT	Text	4	C		Indicate fiscal year of permit issuance that the BMP is installed to address; Conditional on CON_PURPOSE = REST, CONV, or REDE
APPR_DATE	Date/Time	8	C		Permit approval date for structure. Conditional on CON_PURPOSE= NEWD and REDE.
BUILT_DATE	Date/Time	8	C		As-built completion date (MM/DD/YYYY); Conditional on BMP_STATUS = Active
TN_REDUCTION	Double	12	C		TN load reduction (pounds or lbs/year); limit to 2 significant digits; Conditional on CON_PURPOSE = REST, CONV, or REDE
TP_REDUCTION	Double	12	C		TP load reduction (lbs/year); limit to 2 significant digits; Conditional on CON_PURPOSE = REST, CONV, or REDE
TSS_REDUCTION	Double	12	C		TSS load reduction (lbs/year); limit to 2 significant digits; Conditional on CON_PURPOSE = REST, CONV, or REDE
IMPL_COST	Long Integer	12	C		Projected or actual cost as applicable. Conditional on CON_PURPOSE = REST or CONV
IMPL_STATUS	Text	2	C	dImpStatus	Project Status (Planning, Under Construction, Complete); Conditional on CON_PURPOSE = REST, CONV, or REDE
BMP_STATUS	Text	10	M	dBMPStatus	Select either Active, Removed, or Proposed for BMP status
IMPL_COMP_YR	Text	4	C		Projected or actual fiscal year of project (YYYY). Conditional on CON_PURPOSE = REST, REDE or CONV
GEN_COMMENTS	Text	255	O		General comments

BMP Drainage Area FC

The BMP Drainage Area feature class shows the area draining to a BMP record. This can represent the area draining to a single structural or ESD practice, or the downstream most point of a system of ESD practices, or the downstream point of an ESD system draining to one structural practice.

Identifying code: BDA

BMP Drainage Area Feature Class					
Name	Type	Size	Mandatory	Domain	Description
BMP_DRAIN_ID	Text	13	M		MDE primary ID (Unique table ID)
GEN_COMMENTS	Text	255	O		General comments

BMP Inspections Table

This table provides inspection records for each new development, redevelopment, conversion, or restoration BMP captured in the BMP feature class. Each record represents an individual inspection such as construction completion, first-year, or a triennial inspection. A description for classifying a BMP as passed or failed is also included in this table.

Identifying code: BIN- (RIN may be used for RestBMPs reported in previous permit term. Use BIN for all new BMP records).

BMP Inspections Associated Table					
Name	Type	Size	Mandatory	Domain	Description
BMP_INSP_ID	Text	13	M		MDE primary ID (Unique table ID)
BMP_ID	Text	13	M		Unique MDE BMP ID (foreign key linking to BMP feature class)
BMP_STATUS	Text	1	M	dPassFail	BMP status (i.e., Pass/Fail); A passed BMP might have minor maintenance issues that will not compromise water quality function
INSP_DATE	Date/Time	8	M		Inspection date (MM/DD/YYYY); includes construction completion, first-year, and triennial inspections
GEN_COMMENTS	Text	255	O		General comments

Alternative BMPs

Data reporting for alternative BMPs is captured in the AltBMPLine, AltBMPPoint, and AltBMPPoly feature classes. The CBP has released numerous expert panel reports that incorporate the scientific documentation related to pollution removal performances for these alternative practices. The CBP expert panel reports can be located here: www.chesapeakebay.net/who/group/bmp_expert_panels. This information summarizes the latest science related to BMP performance and includes revised recommendations for reporting load reductions for numerous alternative BMPs allowed in MS4 permits. These alternative BMPs include stream restoration, shoreline management, the elimination of discovered nutrient discharges from grey infrastructure, tree planting in riparian and urban areas, land cover conversions, floating treatment wetlands, and street sweeping. When using these alternative practices, the AltBMPLine, AltBMPPoly, and AltBMPPoint feature classes should be populated as outlined below.

AltBMPLine FC

This feature class maps a specific geographical line indicating the location of certain linear alternative BMPs, including stream restoration, outfall stabilization, and shoreline management practices. The AltBMPLine feature class will capture data related to total load reductions for stream restoration, outfall stabilization, and shoreline management projects. The protocol tables for stream restoration and shoreline management are used to itemize nutrient and sediment load reductions associated with individual protocols for a given project.

Identifying code: ALN

Alternative BMP Line Feature Class					
Name	Type	Size	Mandatory	Domain	Description
ALTBMP_LN_ID	Text	13	M		MDE primary ID (Unique table ID)
LOCAL_BMP_ID	Text	25	O		Local BMP identifier
WATERSHED8DGT	Text	8	O	dMD8digit	Maryland 8-digit hydrologic unit code
WATERSHED12DGT	Text	12	O	dHUC12digit	USGS 12-digit hydrologic unit code
WETLAND_AUTH_NUM	Text	10	C		MDE Wetlands and Waterways program authorization number for a stream restoration or shoreline management project. (i.e. 23-NT-0001 for stream restoration, 23-WL-0001 or 23-GL-0001 for shoreline management). Conditional on PRMT_ISSUANCE_YR_CREDIT = 2021 or later.
PROJECT_DESC	Text	150	M		Brief description of project
PROJECT_NAME	Text	25	O		Name of project
ALTBMP_TYPE	Text	5	M	dAltBMPLine	AltBMP Type i.e., Stream Restoration, Outfall Stabilization, and Shoreline Management
PRMT_ISSUANCE_YR_CREDIT	Text	4	M		Indicate fiscal year of permit issuance that the AltBMP is installed to address
EQU_IMP_ACR	Double	6	M		Equivalent impervious acres treated by project
LENGTH_REST	Double	8	M		Length of stream restoration, outfall stabilization, or shoreline management
TN_REDUCTION_TOTAL	Double	12	M		TN load reduction (lbs/year); limit to 2 significant digits; For STRE, Total TN load reduction (lbs/year) for completed projects using protocols 1, 2, 3, and/or 5; or use planning rate for proposed projects. If ALTBMP_TYPE = OUT, then TN_Reduction_Total = P5; For SHST, total reductions = default reductions or the total reductions for protocols 1, 2, and/or 4
TP_REDUCTION_TOTAL	Double	12	M		TP load reduction (lbs/year); limit to 2 significant digits; For STRE, Total TP load reduction (lbs/year) for completed projects using protocols 1, 3, and/or 5; or use planning rate for proposed projects. If ALTBMP_TYPE = OUT, then TP_Reduction_Total = P5; For SHST, total reductions = default reductions or the total reductions for protocols 1, 3, and/or 4

Alternative BMP Line Feature Class					
Name	Type	Size	Mandatory	Domain	Description
TSS_REDUCTION_TOTAL	Double	12	M		TSS load reduction (lbs/year); limit to 2 significant digits; For STRE, Total TSS load reduction (lbs/year) for completed projects using protocols 1, 3, and/or 5; or use planning rate for proposed projects. If ALTBMP_TYPE = OUT, then TSS_Reduction_Total = P5; For SHST, total reductions = default reductions or the total reductions for protocols 1, and/or 3
IMPL_COST	Long Integer	12	M		Projected or actual cost as applicable.
IMPL_STATUS	Text	2	M	dImpStatus	Project Status (Planning, Under Construction, Complete)
BMP_STATUS	Text	10	M	dBMPStatus	Select either Active, Removed, or Proposed for BMP status
IMPL_COMP_YR	Text	4	M		Projected or actual fiscal year of project (YYYY)
BUILT_DATE	Date/Time	8	C		Built date for alternative Line BMPS (MM/DD/YYYY); Conditional on IMPL_STATUS = Complete
GEN_COMMENTS	Text	255	O		General comments

Stream Restoration Protocols Table

This table contains information on the individual protocols used for a specific stream restoration project that has been completed. **Information in this table is only required for stream restoration projects that have been completed under permits issued in 2021 or after.**

The data reporting process will allow the Department to track the amount of impervious acre credit and nutrient load reductions generated by each protocol as follows:

- The Stream Restoration Protocols table will capture load reductions for each individual protocol. The total load reductions for that project will be reported in the AltBMPLine feature class;
- Each project will report one record in the AltBMPLine feature class that will be linked to one record in the Stream Restoration Protocol table using the ALTBMP_LN_ID;
- The Stream Restoration Protocols table will identify each protocol used by capturing data in the appropriate field associated with TN, TP, and TSS reductions;
- Projects using Protocol 4 will be reported as a separate record in the BMP feature class.

The CBP expert panels also recommend that additional information should be tracked and maintained when calculating site-specific load reductions related to individual protocols. This information is noted in Appendix C as recommendations to be maintained by local jurisdictions to verify credit calculations reported in the geodatabase.

Identifying code: SRP

Stream Restoration Protocols Associated Table					
Name	Type	Size	Mandatory	Domain	Description
SRP_ID	Text	13	M		MDE primary ID (Unique table ID)
ALTBMP_LN_ID	Text	13	M		Foreign key linking to AltBMPLine feature class (i.e., Stream Restoration project)
DESIGN_TYPE	Text	10	M	dDesignType	Stream restoration design technique, i.e. NCD, LSR, RSB, SPSC, OUT, Multiple, Others
SECONDARY_DESIGN_TYPE	Text	10	O	dDesignType	Secondary stream restoration design technique, i.e. NCD, LSR, RSB, SPSC, OUT, Multiple, Others
TN_REDUCTION_P1	Double	12	C		TN load reduction (lbs/year) for P1; Conditional when using P1; limit to two significant digits
TP_REDUCTION_P1	Double	12	C		TP load reduction (lbs/year) for P1; Conditional when using P1; limit to two significant digits
TSS_REDUCTION_P1	Double	12	C		TSS load reduction (lbs/year) for P1; Conditional when using P1; limit to two significant digits
TN_REDUCTION_P2	Double	12	C		TN load reduction (lbs/year) for P2; Conditional when using P2; limit to two significant digits
TN_REDUCTION_P3	Double	12	C		TN load reduction (lbs/year) for P3; Conditional when using P3; limit to two significant digits
TP_REDUCTION_P3	Double	12	C		TP load reduction (lbs/year) for P3; Conditional when using P3; limit to two significant digits
TSS_REDUCTION_P3	Double	12	C		TSS load reduction (lbs/year) for P3; Conditional when using P3; limit to two significant digits
TN_REDUCTION_P5	Double	12	C		TN load reduction (lbs/year) for P5; Conditional when using P5; limit to two significant digits
TP_REDUCTION_P5	Double	12	C		TP load reduction (lbs/year) for P5; Conditional when using P5; limit to two significant digits
TSS_REDUCTION_P5	Double	12	C		TS load reduction (lbs/year) for P5; Conditional when using P5; limit to two significant digits
GEN_COMMENTS	Text	255	O		General comments

Shoreline Management Practices Table

This table contains information on the individual protocols used for a completed shoreline management project that uses the protocols. **Information in this table is only required for shoreline management projects that have been completed under permits issued in 2021 or after.** This will allow the Department to track the amount of impervious acre credit and nutrient load reductions generated by each protocol as follows:

- The Shoreline Management Practices table will capture load reductions for each individual protocol. The total load reductions for that project will be reported in the AltBMPLine feature class;
- Each project will report one record in the AltBMPLine feature class that will be linked to one record in the Shoreline Management table using the ALTBMP_LN_ID;
- The PROTOCOL field has been removed because more than one protocol could be used for a specific project. Instead of creating a record for each protocol, the Shoreline Management Practices table will identify the protocol used by capturing data in the appropriate field associated with TN, TP, and TSS reductions;
- For non-conforming projects that use the default rate, the data in the Shoreline Management table is not required. The total load reductions will be recorded in the AltBMPLine feature class.

Identifying code: SHR

Shoreline Management Practices Associated Table					
Name	Type	Size	Mandatory	Domain	Description
SHR_ID	Text	13	M		MDE primary ID (Unique table ID)
ALTBMP_LN_ID	Text	13	M		Foreign key linking to AltBMPLine feature class (i.e., Shoreline Restoration project)
TN_REDUCTION_P1	Double	12	C		TN load reduction (lbs/year) for P1; Conditional when using P1; limit to two significant digits
TP_REDUCTION_P1	Double	12	C		TP load reduction (lbs/year) for P1; Conditional when using P1; limit to two significant digits
TSS_REDUCTION_P1	Double	12	C		TSS load reduction (lbs/year) for P1; Conditional when using P1; limit to two significant digits
TN_REDUCTION_P2	Double	12	C		TN load reduction (lbs/year) for P2; Conditional when using P2; limit to two significant digits
TP_REDUCTION_P3	Double	12	C		TP load reduction (lbs/year) for P3; Conditional when using P3; limit to two significant digits
TSS_REDUCTION_P3	Double	12	C		TSS load reduction (lbs/year) for P3; Conditional when using P3; limit to two significant digits
TN_REDUCTION_P4	Double	12	C		TN load reduction (lbs/year) for P4; Conditional when using P4; limit to two significant digits
TP_REDUCTION_P4	Double	12	C		TP load reduction (lbs/year) for P4; Conditional when using P4; limit to two significant digits
ACRES_REVEG	Double	6	C		Acres of revegetation are required when using P2, P3, or P4; limit to two significant digits
GEN_COMMENTS	Text	255	O		General comments

AltBMPPoint FC

This feature class maps a specific geographic point indicating the location of certain alternative BMPs including septic system improvements, the elimination of discovered nutrient discharges from grey infrastructure, and floating treatment wetland installations.

This feature class will allow permittees to report new BMPs included in the Accounting Guidance and consistent with recent CBP expert panel recommendations. Specifically, data related to grey infrastructure and floating treatment wetlands can be captured in this feature class.

In addition, when tracking operational practices with varied implementation schedules permittees may report the EIA credit each year (EIA_ANNUAL_CREDIT) and a running average credit over the permit term (EIA_AVERAGE_CREDIT). These two fields will also be used for any BMP whose credit is based on operational programs (e.g., septic pumpouts). An example of how to use these fields is provided in Appendix D for street sweeping. The annual credits and permit term average credits for septic system improvements will follow the same guidelines as those noted in the Appendix for street sweeping.

Identifying code: APT

Alternative BMP Point Feature Class					
Name	Type	Size	Mandatory	Domain	Description
ALTBMP_PT_ID	Text	13	M		MDE primary ID (Unique table ID)
LOCAL_BMP_ID	Text	25	O		Local BMP identifier
PROJECT_DESC	Text	150	M		Brief description of project
PROJECT_NAME	Text	25	O		Name of project
ALTBMP_TYPE	Text	5	M	dAltBMPPoint	Alternative BMP Type (i.e., Septic Pumping, Septic Denitrification, Septic Connections to Wastewater Treatment Plant (WWTP), Floating Treatment Wetlands, and DGI)
PRMT_ISSUANCE_YR_CREDIT	Text	4	M		Indicate fiscal year of permit issuance that the BMP is installed to address
EQU_IMP_ACR	Double	6	C		Equivalent impervious acres treated by project; Conditional if ALTBMP_TYPE = FTW, SEPD, DGI, and SEPC
EIA_ANNUAL_CREDIT	Double	6	C		Annual EIA for SEPP if a cumulative credit is not claimed; Conditional if ALTBMP_TYPE = SEPP and PRMT_ISSUANCE_YR_CREDIT is 2021 or later.
EIA_AVERAGE_CREDIT	Double	6	C		Annual EIA for SEPP if a cumulative credit is not claimed; Conditional if ALTBMP_TYPE = SEPP
FTW_TYPE	Text	2	C	dFTWType	Percent of pond surface area covered by FTW; Conditional if ALTBMP_TYPE = FTW
FTW_IA_DRAINAGE	Double	6	C		Impervious acres draining to pond; Conditional if ALTBMP_TYPE = FTW
TN_REDUCTION	Double	12	C		TN load reduction (lbs/year); limit to two significant digits. Conditional if ALTBMP_TYPE = FTW or DGI

Alternative BMP Point Feature Class					
Name	Type	Size	Mandatory	Domain	Description
TP_REDUCTION	Double	12	C		TP load reduction (lbs/year); limit to two significant digits. Conditional if ALTBMP_TYPE = FTW or DGI; limit to 2 significant digits
TSS_REDUCTION	Double	12	C		TSS load reduction (lbs/year); limit to two significant digits. Conditional if ALTBMP_TYPE = FTW
IMPL_COST	Long Integer	12	M		Projected or actual cost as applicable.
IMPL_STATUS	Text	2	M	dImpStatus	Project Status (Planning, Under Construction, Complete)
BMP_STATUS	Text	10	M	dBMPStatus	Select either Active, Removed, or Proposed for BMP status
IMPL_COMP_YR	Text	4	M		Projected or actual fiscal year of project (YYYY)
BUILT_DATE	Date/Time	8	C		Install date for alternative Point BMPS (MM/DD/YYYY); Conditional on IMPL_STATUS = Complete and on ALTBMP_TYPE = SEPP, SEPD, SEPC, or FTW
GEN_COMMENTS	Text	255	O		General comments

Discharges from Grey Infrastructure Protocols Table

This table contains information on the individual protocols used for the elimination of discovered nutrient discharges from grey infrastructure.

The Discharges from Grey Infrastructure Protocols table provides data consistent with reporting recommendations documented in the CBP final expert panel report to define removal rates for the elimination of discovered nutrient discharges from grey infrastructure. This table allows permittees to identify the protocol used to determine nutrient load reductions for detecting and eliminating illicit discharges and the associated impervious acre credit. A data entry example is provided in Appendix E to demonstrate proper reporting for these fields.

Identifying code: DGI

Discharges from Grey Infrastructure Protocols Associated Table					
Name	Type	Size	Mandatory	Domain	Description
DGI_ID	Text	13	M		MDE Primary ID (Unique table ID)
ALTBMP_PT_ID	Text	13	M		Foreign key linking to AltBMPPoint feature class (i.e., DGI)
DGI_TYPE	Text	2	M	dDGIType	DGI type N1 - N8
YEAR_ELIM	Text	4	M		Year illicit discharge was eliminated (YYYY)
DGI_PROTOCOL	Text	7	M	dDGIProtocol	Protocol used to estimate nutrient reduction credits for detecting and eliminating nutrient discharges from grey infrastructure
CB_SEG_SHED	Text	9	M	dCBSegShed	Chesapeake Bay river basin segment where the illicit discharge was eliminated
TN_CONC_PRE	Double	10	M		Total nitrogen concentration pre-elimination (mg/L)
TN_CONC_POST	Double	10	M		Total nitrogen concentration post-elimination (mg/L)
TP_CONC_PRE	Double	10	M		Total phosphorus concentration pre-elimination (mg/L)
TP_CONC_POST	Double	10	M		Total phosphorus concentration post-elimination (mg/L)
FLOW_RATE_PRE	Double	8	C		Flow rate of discharge in gallons per day pre-elimination; conditional on DGI_PROTOCOL = 1 or 2
FLOW_RATE_POST	Double	8	C		Flow rate of discharge in gallons per day post-elimination; conditional on DGI_PROTOCOL = 1 or 2
FLOW_DURATION	Double	8	C		Illicit discharge duration in days per year; Conditional if DGI_PROTOCOL = 1 or 2; Cannot be greater than 365
DISCOUNT_FACTOR	Text	2	C		Discount factor (%) based on distance from stream or lower elevation storm drain pipe (must be either 10 or 50). Conditional on DGI_PROTOCOL = 2
ANNUAL_VOL_PRE	Double	8	C		The annual volume (gallons per year) prior to the programmatic reduction of dry weather SSOs; Conditional on DGI_PROTOCOL = 3
ANNUAL_VOL_POST	Double	8	C		The annual volume (gallons per year) after the programmatic reduction of dry weather SSOs; Conditional on DGI_PROTOCOL = 3
DGI_VERIFICATION	Text	1	M	dBoolean	Have the verification requirements stated in Appendix A of the expert panel report (referenced below) been met?
GEN_COMMENTS	Text	255	O		General comments

AltBMPPoly FC

This feature class maps a specific geographic area indicating the location of certain alternative BMPs including street sweeping, storm drain vacuuming, tree planting, forest conservation, soil restoration, conservation landscaping, land cover conversions and impervious area removal. This feature class will allow permittees to report new BMPs included in the Accounting Guidance and consistent with recent CBP expert panel recommendations.

Reporting for this feature class will allow tracking of credits for street sweeping when implementation schedules are varied each year of the permit term. For this reason, it is likely that the equivalent impervious acre (EIA) credit for a given area will change each year of the permit term. The geodatabase allows tracking these varied schedules by determining the EIA credit each year (EIA_ANNUAL_CREDIT) and reporting a running average credit over the permit term (EIA_AVERAGE_CREDIT). These two fields will also be used for any BMP whose credit is based on operational programs such as storm drain vacuuming and septic system improvements. A data entry example for this scenario is provided in Appendix D.

Identifying code: APY

Alternative BMP Polygon Feature Class					
Name	Type	Size	Mandatory	Domain	Description
ALTBMP_PY_ID	Text	13	M		MDE primary ID (Unique table ID)
LOCAL_BMP_ID	Text	25	O		Local BMP identifier
PROJECT_DESC	Text	150	M		Brief description of project
PROJECT_NAME	Text	25	O		Name of project
ALTBMP_TYPE	Text	5	M	dAltBMPPoly	AltBMP Type
PRMT_ISSUANCE_YR_CREDIT	Text	4	M		Indicate fiscal year of permit issuance
EQU_IMP_ACR	Double	6	C		Equivalent impervious acres treated by project; required for non-annual BMPs; conditional if ALTBMP_TYPE = FPU, IMPF, IMPP, CLTM, RCL, RFP, STCI, UTC, USRP, USRI
EIA_ANNUAL_CREDIT	Double	6	C		Annual EIA for annual BMPs. Conditional if ALTBMP_TYPE = SDV, CBC, MSS, VSS and PRMT_ISSUANCE_YR_CREDIT is 2021 or later.
EIA_AVERAGE_CREDIT	Double	6	C		Average EIA for annual BMPs during the years of the permit term. This includes the years after the previous permit expired but prior to the issuance of the new permit. Conditional if ALTBMP_TYPE = SDV, CBC, MSS, VSS
MILES_SWEPT	Double	6	C		Miles swept for sweeping in lane miles; Conditional on ALTBMP TYPE = MSS or VSS
TIMES_SWEPT	Text	2	C	dSweeping Schedule	Number of times per year this area is swept; limit to two significant digits; Conditional on ALTBMP_TYPE = MSS or VSS
TONS_REMOVED	Double	12	C		Tons of material removed as a part of storm drain cleaning, catch basin cleaning, or inlet cleaning; Limit to two significant digits; Conditional on ALTBMP_TYPE = SDV or CBC

Alternative BMP Polygon Feature Class					
Name	Type	Size	Mandatory	Domain	Description
SDV_OR_CBC_MATERIAL	Text	5	C	dSDVType	Predominantly organic or inorganic material removed, visually estimated; Conditional on ALTBMP_TYPE = SDV or CBC
NUMBER_OF_TREES_PLANTED	Double	6	C		Number of trees planted for street trees or urban tree canopy; Conditional on ALTBMP_TYPE = STCI or UTC
LAND_COVER_CONV_ACRES	Double	6	C		Conditional on ALTBMP_TYPE = FPU, IMPF, IMPP, CLTM, RCL, or RFP
ACRES_CONSERVED	Double	6	C		Acres conserved for forest conservation; Conditional on ALTBMP_TYPE = FCO
SOIL_REST_LEVEL	Short Integer	2	C	dSoilRestLvl	Level 1 or Level 2; Conditional on ALTBMP_TYPE = USRP or USRI
SOIL_REST_ACRES	Double	6	C		Amount of acres restored; Conditional on ALTBMP_TYPE = USRP or USRI
TN_REDUCTION	Double	12	M		TN load reduction (lbs/year); limit to 2 significant digits
TP_REDUCTION	Double	12	M		TP load reduction (lbs/year); limit to 2 significant digits
TSS_REDUCTION	Double	12	M		TSS load reduction (lbs/year); limit to 2 significant digits
IMPL_COST	Long Integer	12	M		Projected or actual cost as applicable
IMPL_STATUS	Text	2	M	dImpStatus	Project Status (Planning, Under Construction, Complete)
BMP_STATUS	Text	10	M	dBMPStatus	Select either Active, Removed, or Proposed for BMP status
IMPL_COMP_YR	Text	4	M		Projected or actual fiscal year of project (YYYY)
GEN_COMMENTS	Text	255	O		General comments

AltBMP Inspections Table

Reporting for alternative BMP inspections are reported in the table below. The data may represent the date of construction or triennial inspection or the most recent date of annual BMP operations. Mandatory for AltBMPPoly and AltBMPLine. For AltBMPPoint, optional for SEPD and SEPC, mandatory for FTW and SEPP. Inspections are required for alternative BMPs in accordance with the Accounting Guidance:

BMP Inspection Frequencies	
BMP	Inspection Frequency
Efficiency BMPs	
Stormwater Treatment (ST)	Triennial
Runoff Reduction (RR)	
Urban Soil Restoration	
Street Sweeping	Annual
Floating Treatment Wetlands	Credit valid 3 years; inspections extend credit
Load Reduction BMPs	
Stream Restoration/Outfall Stabilization	Credit valid 5 years; inspections extend credit
Shoreline Management	
Storm Drain Cleaning	Annual
Land Cover Conversion BMPs	
Non-Riparian	Triennial
Riparian	
Septic BMPs	
Connections	N/A
Denitrification	Annual
Pumping	

Identifying code: AIN. (LIN, PIN, and YIN may be used for AltBMPs reported in previous permit term. Use AIN for all new AltBMP records).

Alternative BMP Inspections Associated Table					
Name	Type	Size	Mandatory	Domain	Description
ALTBMP_INSP_ID	Text	13	M		MDE primary ID (Unique table ID)
ALTBMP_ID	Text	13	M		Unique MDE BMP ID (foreign key linking to Alt BMP feature classes)
ALTBMP_STATUS	Text	1	M	dPassFail	BMP status (i.e., Pass/Fail); A passed BMP might have minor maintenance issues that will not compromise water quality function
INSP_DATE	Date/ Time	8	M		Inspection date (MM/DD/YYYY); construction completion, first-year, triennial inspections, or the most recent date the annual BMP was implemented.
GEN_COMMENTS	Text	255	O		General comments

TMDLs- Chesapeake Bay Progress Table

This table details pollutant load reductions associated with County-wide restoration implementation plans at the Chesapeake Bay segment and can be aggregated to show progress towards meeting Bay TMDL WLAs; percent reductions; and modeling information necessary for MS4 compliance. To determine TMDL_SHED_ID refer to the Department's TMDL Data Center web page at: <http://wlat.mde.state.md.us/>.

Identifying code: CSW

Chesapeake Bay Progress Associated Table					
Name	Type	Size	Mandatory	Domain	Description
CSW_ID	Text	13	M		MDE primary ID (Unique table ID)
WATERSHED8DGT	Text	8	O	dMD8digit	Maryland 8-digit hydrologic unit code
WATERSHED12DGT	Text	12	O	dHUC12digit	USGS 12-digit hydrologic unit code (if 12 digit is used by MS4 for modeling then specify watershed code)
TMDL_SHED_ID	Text	5	M		MDE unique identifier for the TMDL watershed (data source: MDE TMDL data center)
POLLUTANT	Text	7	M	dBayPollutant	TN, TP, or TSS
MODEL_SOURCE	Text	50	M		Model used by MS4 to determine pollutant loads
BASELINE_LOAD	Double	8	M		MS4 modeled pollutant load for Bay TMDL baseline year (MS4 Watershed Models); limit to two significant digits
TARGET_LOAD	Double	8	M		MS4 estimated target load calculated using baseline load and percent reduction (MS4 Watershed Models); limit to two significant digits
PERMIT_LOAD	Double	8	M		MS4 modeled pollutant load for the year the MS4 permit was made effective (MS4 Watershed Models); limit to two significant digits
CURRENT_LOAD	Double	8	M		MS4 modeled pollutant load for the current annual reporting year (MS4 Watershed Models); limit to two significant digits
TARGET_YEAR	Text	4	M		Fiscal year target load will be attained (YYYY)
GEN_COMMENTS	Text	255	O		General comments

TMDLs- Local TMDL Progress Table

This table details pollutant load reductions associated with EPA-approved local TMDLs, WLAs, percent reductions, and modeling information necessary for MS4 compliance. To determine TMDL_SHED_ID refer to the Department's TMDL Data Center webpage at <http://wlat.mde.state.md.us/>.

Identifying code: LSW

Local TMDL Progress Associated Table					
Name	Type	Size	Mandatory	Domain	Description
LSW_ID	Text	13	M		MDE primary ID (Unique table ID)
TMDL_SHED_ID	Text	5	M		MDE unique identifier for the TMDL watershed (data source: MDE TMDL data center - TMDL Maps)
POLLUTANT	Text	7	M	dPollutant	TMDL pollutant
PERCENT_REDUCTION	Double	6	M		Stormwater Wasteload Allocation (SW-WLA) required percent reduction for the TMDL (data source: MDE TMDL data center)
BASELINE_YEAR	Text	4	M		Fiscal year associated with modeled baseline load in the TMDL (data source: MDE TMDL data center), (YYYY)
MODEL_SOURCE	Text	50	M		Model used by MS4 to determine pollutant loads
BASELINE_LOAD	Double	10	M		MS4 modeled pollutant load for TMDL baseline year (MS4 Watershed Models); limit to two significant digits
TARGET_LOAD	Double	10	M		MS4 estimated target load calculated using baseline load and percent reduction (MS4 Watershed Models); limit to two significant digits
PERMIT_LOAD	Double	10	M		MS4 modeled pollutant load for the year the MS4 permit was made effective (MS4 Watershed Models); limit to two significant digits
CURRENT_LOAD	Double	10	M		MS4 modeled pollutant load for the current annual reporting year (MS4 Watershed Models); limit to two significant digits
TARGET_YEAR	Text	4	M		Fiscal year target load will be attained (YYYY)
GEN_COMMENTS	Text	255	O		General comments

Management Programs- Stormwater Management Table

This table details Stormwater Management Program information required under Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland and necessary for the State's triennial review of local program implementation.

Identifying code: SWM

SWM Associated Table					
Name	Type	Size	Mandatory	Domain	Description
SWM_ID	Text	13	M		MDE primary ID (Unique table ID)
PLAN_CON	Short Integer	3	M		Number of plan concepts approved
PLAN_DEV	Short Integer	3	M		Number of plan site development(s) approved
PLAN_FINAL	Short Integer	3	M		Number of plan final approved
PLAN_REDEV	Short Integer	3	M		Number of plan redevelopment approved
PLAN_EXPT	Short Integer	3	M		Number of plan exemptions issued
WAIV_REQ	Short Integer	3	M		Number of waiver quality requested
WAIV_GRT	Short Integer	3	M		Number of waiver quality granted
WAIV_REQ_QT	Short Integer	3	M		Number of waiver quantity requested
WAIV_GRT_QT	Short Integer	3	M		Number of waiver quantity granted
COMB_REQ	Short Integer	3	M		Number of combined waiver requests
COMB_GRT	Short Integer	3	M		Number of combined waivers granted
TOTAL_REQ	Short Integer	3	M		Number of total waivers requested
TOTAL_GRT	Short Integer	3	M		Number of total waivers granted
CON_INSPEC	Short Integer	5	M		Number of construction inspections
CON_VIOS	Short Integer	5	M		Number of construction violations
MAIN_INIT	Short Integer	5	M		Number of maintenance inspections performed during fiscal year (first-year and triennial)
MAIN_FLW	Short Integer	5	M		Number of maintenance follow-ups (follow-up or re-inspections for failing first-year or triennial)
MAIN_VIO	Short Integer	5	M		Number of maintenance violations issued for first-year or triennial inspections
MOD_ADMIN	Text	1	M	dBoolean	Were there modifications to permittee's administrative procedures. If "Y" is selected, narrative file must be submitted
GEN_COMMENTS	Text	255	O		General Comments

Management Programs- Erosion and Sediment Control Table

This table contains local erosion and sediment control program implementation information including data necessary for conducting the State's review of delegated enforcement authority.

Identifying code: ESC

Erosion Sediment Control Associated Table					
Name	Type	Size	Mandatory	Domain	Description
ESC_ID	Text	13	M		MDE primary ID (Unique table ID)
CONTACT	Text	50	M		Name of local contact for ESC program (first, last)
PHONE	Text	10	M		Phone number of individual, 10 digits, no dashes (numbers only)
FAX	Text	10	O		Fax number of individual, 10 digits, no dashes (numbers only)
EMAIL	Text	50	M		Email of individual
PERMITS_ISSUED	Short Integer	5	M		Total number of grading permits issued this permit year
PERMITS_ACTIVE	Short Integer	5	M		Estimate of active permits (overall)
DIST_ACTIVE	Short Integer	4	M		Disturbed area for active permits (acres)
OTHER_ISSUED	Short Integer	4	M		Total number of other approvals issued this year (e.g., Standard Plans)
OTHER_ACTIVE	Short Integer	4	M		Estimated number of active permits for other approvals
DIST_ACTIVE_OTH	Short Integer	4	M		Disturbed area for active permits other (acres)
NUM_INSPECTORS	Short Integer	2	M		Total number of sediment control inspectors
NUM_SUPERVISORS	Short Integer	2	M		Total number of supervisors
NUM_INSPECTIONS	Short Integer	5	M		Total number of sediment control inspections performed
STOP_WRK_ORDERS	Short Integer	5	M		Total number of stop work orders issued
NUM_FINES_COL	Short Integer	3	M		Total number of fines or securities collected
AMNT_FINES_COL	Double	10	M		Total amount of fines or securities collected
NUM_VIOS	Short Integer	5	M		Total number of violations
NUM_CRT_CASES	Short Integer	3	M		Total number of court cases
COMP_REC	Short Integer	3	M		Total number of sediment control complaints received
GEN_COMMENTS	Text	255	O		General Comments

Quarterly Grading Permits FC

This feature class maps a specific geographical point for each local government grading permit approval associated with construction sites greater than one acre.

Identifying code: QGP

Quarterly Grading Permit Feature Class					
Name	Type	Size	Mandatory	Domain	Description
QGP_ID	Text	13	M		MDE primary ID (Unique table ID);
LATITUDE	Double	12	O		WGS84 Auxiliary Sphere (Decimal Degrees)
LONGITUDE	Double	12	O		WGS84 Auxiliary Sphere (Decimal Degrees)
SITE_NAME	Text	100	M		Construction site name
SITE_OWNER	Text	100	M		Construction site owner (first, last) or company name
SITE_ADDRESS	Text	75	O		Site Street Address
SITE_CITY	Text	50	M		Site City
SITE_STATE	Text	2	M	dState	Site State
SITE_ZIP	Text	5	M		Site Zip Code
SITE_LOCATION	Text	50	O		Description of site location if no street address available
OWNER_ADDRESS	Text	75	M		Owner Street Address
OWNER_CITY	Text	50	M		Owner City
OWNER_STATE	Text	2	M	dState	Owner State
OWNER_ZIP	Text	5	M		Owner Zip Code
WATERSHED8DGT	Text	8	M	dMD8digit	Maryland 8-digit hydrologic unit Code
WATERSHED12DGT	Text	12	O	dHUC12digit	USGS 12-digit hydrologic unit Code
DIST_AREA	Double	8	M		Disturbed area of site (acres)
GRAD_PERMIT	Text	50	M		Local grading permit number
APPR_DATE	Date/Time	8	M		Grading permit approval date (MM/DD/YYYY)
QUARTER	Text	2	M	dQuarter	Reporting quarter, (i.e. first, second, third, fourth)
GEN_COMMENTS	Text	255	O		General comments

IDDE- Outfall FC

This feature class shows a specific geographical point for each stormwater outfall identified in accordance with the permit. An MDE_OUTFALL_ID should be created for all outfalls screened for IDDE. However, if the outfall happens to be a minor outfall that is also identified as a priority screened location, then the drainage area should be mapped to meet the intent of the IDDE Program.

Identifying code: OUT

Outfall Feature Class					
Name	Type	Size	Mandatory	Domain	Description
MDE_OUTFALL_ID	Text	13	M		MDE primary ID (Unique table ID)
LOCAL_OUTFALL_ID	Text	20	O		Alias if jurisdiction has outfall ID
LATITUDE	Double	12	O		WGS84 Auxiliary Sphere (Decimal Degrees)
LONGITUDE	Double	12	O		WGS84 Auxiliary Sphere (Decimal Degrees)
SIZE_OUTFALL	Double	8	M		Size of outfall (e.g., diameter of pipe in inches, or equivalent for non-circular pipe)
WATERSHED8DGT	Text	8	O	dMD8digit	Maryland 8-digit hydrologic unit code
WATERSHED12DGT	Text	12	O	dHUC12digit	USGS 12-digit hydrologic unit code
LU_COUNTY	Text	25	O		Permittee unique land use (predominant)
OUT_YEAR	Text	4	M		Fiscal year constructed (YYYY)
GEN_COMMENTS	Text	255	O		General comments

IDDE- Outfall Drainage Area FC

This feature class shows the area draining to a major outfall via overland flow, swale or underground storm drain pipe. In addition, minor outfalls that are identified as a priority screened location should be mapped to meet the intent of the IDDE Program.

Identifying code: ODA

Outfall Drainage Area Feature Class					
Name	Type	Size	Mandatory	Domain	Description
MDE_OUTFALL_DRAIN_ID	Text	13	M		MDE primary ID (Unique table ID)
MDE_OUTFALL_ID	Text	13	M		ID linking record to Outfall feature class (foreign key); must match MDE_OUTFALL_ID value in Outfall feature class
OUTFALL_DRAIN_AREA	Double	15	M		Drainage area (acres) to outfall; limit to two significant digits
GEN_COMMENTS	Text	255	O		General comments

IDDE- IDDE Screening Table

This table contains all data associated with screening outfalls as part of a jurisdiction's illicit discharge detection and elimination program. Data include outfall conditions, observed dry weather flows, and chemical testing of discharges for pollutant source indicators such as Chlorine, Detergents and Phenol. Additionally, inspection, follow-up, and resolution of illicit discharges are documented in this table. This table is not required when using an approved IDDE screening program.

Identifying code: IDD

IDDE Screening Associated Table					
Name	Type	Size	Mandatory	Domain	Description
IDDE_ID	Text	13	M		MDE primary ID (Unique table ID)
MDE_OUTFALL_ID	Text	13	M		MDE foreign key linking to outfall.
LOCAL_OUTFALL_ID	Text	20	O		Alias if permittee has a local ID number for Outfall
SCREEN_DATE	Date	8	M		Field screening date (MM/DD/YYYY)
TEST_NUM	Short Integer	2	M		Initial screening (1), follow-up test (2), 3rd test (3), etc. Used for reinspection of a problem. Test numbers continue within and across years.
LAST_RAIN	Date	8	M		Date of last rain > 0.10 inches (MM/DD/YYYY)
SCREEN_TIME	Text	8	M		Field screening time (HH:MM am/pm)
OBSERV_FLOW	Text	1	M	dBoolean	Was flow observed? (i.e., Yes/No)
CFS_FLOW	Double	10	C		Flow rate in cubic feet per second (CFS), limit to hundredths, Conditional if OBSERV_FLOW = "Yes" then CFS_FLOW should be > 0. If OBSERV_FLOW = "No", CFS Flow should be NULL; limit to 2 significant digits
WATER_TEMP	Double	3	C		Water temperature (Fahrenheit), Conditional if OBSERV_FLOW = "Yes"; limit to 2 significant digits
AIR_TEMP	Double	3	C		Air Temperature (Fahrenheit); Conditional if OBSERV_FLOW = "Yes"; limit to 2 significant digits
CHEM_TEST	Text	1	M	dBoolean	Was chemical test performed? (i.e., Yes/No)
pH	Double	4	C		pH meter reading, Conditional if OBSERV_FLOW = "Yes"; limit to 2 significant digits
PHENOL	Double	8	C		Phenol in milligrams per liter (mg/L), Conditional if OBSERV_FLOW = "Yes"; limit to 2 significant digits
CHLORINE	Double	8	C		Chlorine in milligrams per liter (mg/L), Conditional if OBSERV_FLOW = "Yes"; limit to 2 significant digits
DETERGENTS	Double	8	C		Detergents in milligrams per liter (mg/L), Conditional if OBSERV_FLOW = "Yes"; limit to 2 significant digits
COPPER	Double	8	C		Copper in milligrams per liter (mg/L), Conditional if OBSERV_FLOW = "Yes"; limit to 2 significant digits
ALGAEGROW	Text	1	M	dBoolean	Was algae growth observed? (i.e., Yes/No)
ODOR	Text	3	M	dOdor	Type of odor
COLOR	Text	3	C	dColor	Discharge color, Conditional if OBSERV_FLOW = "Yes"
CLARITY	Text	3	C	dClarity	Discharge clarity, Conditional if OBSERV_FLOW = "Yes"
FLOATABLES	Text	3	C	dFloatables	Floatables present in discharge, Conditional if OBSERV_FLOW = "Yes"
DEPOSITS	Text	3	M	dDeposits	Deposits in outfall area

IDDE Screening Associated Table					
Name	Type	Size	Mandatory	Domain	Description
VEG_COND	Text	3	M	dVegCond	Vegetative condition in outfall area
STRUCT_COND	Text	3	M	dStructCond	Structural condition of outfall
EROSION	Text	1	M	dErosion	Erosion in outfall area
COMPLA_NUM	Text	1	M	dBoolean	Is screening complaint driven? (i.e., Yes/No)
DISCHARGE_SOURCE	Text	3	C	dSource	What was the source of the discharge? Conditional if OBSERV_FLOW = "Yes", If dSource = "N", "U" or an explanation is required in general comments
ILLICIT_Q	Text	1	C	dBoolean	Was the discharge illicit? (i.e., yes/no); Conditional if OBSERV_FLOW = "Yes"; if "No", Explanation required in general comments
ILLICIT_ELIM	Text	1	C	dIDDE Status	What is the status of the illicit discharge? Conditional if ILLICIT_Q = "Yes"
GEN_COMMENTS	Text	255	O		General comments

Property Management- Municipal Facilities FC

This feature class maps a specific geographical point and contains information about public industrial facilities managed for stormwater.

Identifying code: MUN

Municipal Facilities Feature Class					
Name	Type	Size	Mandatory	Domain	Description
MUNI_FACILITIES_ID	Text	13	M		MDE primary ID (Unique table ID)
LATITUDE	Double	12	O		WGS84 Auxiliary Sphere (Decimal Degrees)
LONGITUDE	Double	12	O		WGS84 Auxiliary Sphere (Decimal Degrees)
FACILITY_NAME	Text	50	M		Name of facility
FACILITY_TYPE	Text	20	M	dFacType	Type of facility
NOI_NUM	Text	9	C		Unique NOI registration number, Conditional if FACILITY_TYPE is Category i - xi
LAST_INSP_DATE	Date/Time	8	O		This is the latest visual quarterly inspection date in the reporting period (MM/DD/YYYY) associated with SWPPP
SWPPP	Text	3	C	dSWPPPPlan	Stormwater Pollution Prevention Plan (SWPPP) present? (i.e., Yes/No/No Exposure Certification); Conditional if FACILITY_TYPE is Category i - xi
PROP_MGMT_TRAINING	Short Integer	3	M		Number of personnel trained in property management / good housekeeping topics or SWPPP
SALT_TRAINING	Short Integer	3	M		Number of personnel trained in salt management or application
GEN_COMMENTS	Text	255	O		General comments

Chemical Application Table

This table contains information about the types and quantities of chemicals a permittee uses in maintaining public right-of-way and property.

Identifying code: CAP

Chemical Application Associated Table					
Name	Type	Size	Mandatory	Domain	Description
CHEM_APPL_ID	Text	13	M		MDE primary ID (Unique table ID)
CHEM_CAT	Text	6	M	dChemCat	Category of chemical
CHEM_NAME	Text	50	M		Chemical applied (e.g., nitrogen, phosphorus, copper)
CHEM_AM_CUR	Double	8	C		Chemical amount current fiscal year (lbs, gallons, tons, or other). Conditional on whether the chemical was used in the current FY
CHEM_AM_PR	Double	8	C		Chemical amount prior fiscal year (lbs, gallons, tons, or other). Conditional on whether the chemical was used in the previous FY
CHEM_PER_CH	Double	7	C		Chemical percent change (may be positive or negative). Conditional whether the chemical was used in the previous FY
CHEM_AM_UNITS	Text	8	M	dChemUnit	Chemical amount units (i.e. lbs, gallons, tons, or other)
GEN_COMMENTS	Text	255	O		General comments

Fiscal Analyses Table

The fiscal analyses table documents calculations of costs (in millions) for each program.

Identifying code: FIS

Fiscal Analyses Associated Table					
Name	Type	Size	Mandatory	Domain	Description
FISCAL_ID	Text	13	M		MDE primary ID (Unique table ID)
OP_BUDGET	Double	8	M		Total operational budget for next fiscal year; limit to two significant digits
OP_COST	Double	8	M		Total operational cost for current fiscal year; limit to two significant digits
CAP_BUDGET	Double	8	M		Total capital budget for next fiscal year; limit to two significant digits
CAP_COST	Double	8	M		Total capital cost for current fiscal year; limit to two significant digits
WPR_FUNDS	Double	8	O		Total watershed protection and restoration funds generated for current fiscal year
SWM_COST	Double	8	O		Total annual cost for stormwater management program; limit to two significant digits
EROS_SED_CON	Double	8	O		Total annual cost for erosion and sediment control; limit to two significant digits
ILLICIT_DET_ELIM	Double	8	O		Total annual cost for illicit discharge detection/elimination; limit to two significant digits

Fiscal Analyses Associated Table					
Name	Type	Size	Mandatory	Domain	Description
TRASH_ELIM	Double	8	O		Total annual cost for trash elimination; limit to two significant digits
PROP_MANAGEMENT	Double	8	O		Total annual cost for property management; limit to two significant digits
INLET_CLEAN	Double	8	O		Total annual cost for inlet cleaning; limit to two significant digits
STRT_SWEEP	Double	8	O		Total annual cost for street sweeping; limit to two significant digits
RD_MAINT_OTHER	Double	8	O		Total annual cost for road maintenance – other; limit to two significant digits
PUB_EDUCATION	Double	8	O		Total annual cost for public education; limit to two significant digits
WATERSHED_ASSESS	Double	8	O		Total annual cost for watershed assessment; limit to two significant digits
WATERSHED_RESTOR	Double	8	O		Total annual cost for watershed restoration; limit to two significant digits
CHEM_MON_ASSESS	Double	8	O		Total annual cost for chemical monitoring and assessment; limit to two significant digits
BIO_MON_ASSESS	Double	8	O		Total annual cost for biological monitoring and assessment; limit to two significant digits
PHYS_STRM_ASSESS	Double	8	O		Total annual cost for physical assessment; limit to two significant digits
MANUAL_MON	Double	8	O		Total annual cost for design manual monitoring; limit to two significant digits
TMDL_ASSESS	Double	8	O		Total annual cost for TMDL assessment; limit to two significant digits
TOTAL_NPDES_COST	Double	8	O		Total annual costs for NPDES program; limit to two significant digits
GEN_COMMENTS	Text	255	O		General comments

Impervious Surface Table

This table summarizes the impervious surface area of the permittee. "Impervious area" means any surface that does not allow stormwater to infiltrate into the ground.

Identifying code: IM

Impervious Surface Associated Table					
Name	Type	Size	Mandatory	Domain	Description
IMPERV_ID	Text	13	M		MDE primary ID (Unique table ID)
IMP_ACRES	Double	8	M		Total impervious acres within the permittee
BASELINE_ACRES	Double	8	M		Uncontrolled baseline impervious acres established during previous permit term. Should remain constant throughout the life of the permit term
PLANNED_ACRES	Double	8	M		Total acres of impervious areas planned for restoration activities during the permit term
RESTORED_ACRES	Double	8	M		Total acres of restored impervious areas during current permit term
GEN_COMMENTS	Text	255	O		General comments

Narrative Files Table

The narrative files table contains documents, charts, and reports related to the MS4 annual reports that do not easily fit into a traditional database structure. Documents that are uploaded to the Department will be referenced in this table. Each document attached as a part of the submittal must have its own record added to this table.

Identifying code: NAR

Narrative Files Associated Table					
Name	Type	Size	Mandatory	Domain	Description
MDE_DOC_NAME_ID	Text	13	M		MDE primary ID (Unique table ID)
DOC_NAME	Text	255	M		Full document title
DOC_TYPE	Text	5	M	dDocType	Type of document/file being submitted
DOC_DESCRIPTION	Text	255	M		Description of document being submitted
GEN_COMMENTS	Text	255	O		General comments

IV. Appendices

Appendix A: Data Entry Examples, Redevelopment

Reporting Redevelopment Projects

Often, a BMP or system of BMPs is installed to address a combination of new development and redevelopment stormwater requirements. Typically, the BMP record will capture the total impervious area and total treatment amount. The portion of credit available for restoration can be tracked by using the fields that parse out the P_E and impervious area for the redeveloped portion of the project. These fields are noted below as PE_REDE and IMP_ACRES_REDE.

Permittees must capture data in these fields for all redevelopment projects receiving credit under permits issued after 2021.

Example 1 - One ESD Practice:

A project to renovate an existing parking lot will result in an increase in the total impervious area. The existing parking lot did not have any water quality treatment. The site data for the project includes the following:

- The site area is 2 acres.
- Existing impervious area = 1 acre.
- Net increase in impervious area = 0.5 acres
- Total impervious area = 1.5 acres
- Treatment requirements include the following:
 - Redevelopment requirements for water quality treatment ($P_E = 1''$) for 50% of the existing impervious area ($1.0 * 0.5 = 0.5$ acres)
 - New development requirements in accordance with the Manual for the net increase in impervious area:
 - The site is located on A soils and P_E required = 2.6 inches for 0.5 acres
 - One landscape infiltration practice is used to meet total storage requirements for redevelopment and new impervious area.

The BMP record will include the following:

- The BMP treatment of 2.6 inches for the total impervious area of 1.5 acres will be captured in the PE_ADR and IMP_ACRES fields respectively.
- The portion of credit available for the redevelopment project will be captured in the PE_REDE and IMP_ACRES_REDE fields (1.0 and 0.5 respectively).
- The WQT_IMP_ACR_CREDIT represents the restoration credit for 0.5 acres
- Additional GSI credit is available when using ESD; 35% of $0.5 = 0.175$ acres
- The TOT_IMP_ACR_CREDIT represents $0.5 + 0.175 = 0.675$ acres

Example data entry is as follows:

BMP Feature Class Excerpt	
Field Name	Input
BMP_ID	MDE21BMP00001
BMP_DRAIN_ID	MDE21BDA00001
BMP_DRAIN_AREA	2
CON_PURPOSE	REDE
NUM_BMPS	1
BMP_TYPE	MILS
PE_REQ	2.6
PE_ADR	2.6
PE_REDE	1
IMP_ACRES	1.5
IMP_ACRES_REDE	0.5
PE_PRE_CONV	
PRE_CONV_IMP_ACR_CREDIT	
PE_TOTAL_STORAGE	2.6
WQT_IMP_ACR_CREDIT	0.5
WM_IMP_ACR_CREDIT	
GSI_IMP_ACR_CREDIT	0.175
TOT_IMP_ACR_CREDIT	0.675

Example 2 - A System of ESD Practices:

A project to renovate an existing parking lot will also result in an increase in the total impervious area.

The existing parking lot did not have any water quality treatment. The site data for the project includes the following:

- The site is 2 acres.
- The existing impervious = 1.5 acres
- Net increase in impervious area = 0.5 acres
- Total impervious area = 2.0 acres
- Treatment requirements include the following:
 - Redevelopment requirements for water quality treatment ($P_E = 1"$) for 50% of the existing impervious area ($1.5 * 0.5 = 0.75$ acres)
 - New development requirements in the Manual for the net increase in impervious area:
 - The site is located on C soils and P_E required = 2.2 inches for 0.5 acres
 - The ESD_v is calculated
 - Two micro bioretention facilities and one grass swale are used to meet total storage requirements for redevelopment and the new impervious area

The system of practices can be captured in one BMP record for the scenario above as follows:

- The BMP treatment of 2.2 inches for the total impervious area of 2.0 acres will be captured in the PE_ADR and IMP_ACRES fields respectively.
- The portion of the credit available for the redevelopment project will be captured in the PE_REDE and IMP_ACRES_REDE fields (1.0 and 0.75 respectively).
- The WQT_IMP_ACR_CREDIT represents the restoration credit for 0.75 acres
- Additional GSI credit is available when using ESD; 35% of $0.75 = 0.263$
- The TOT_IMP_ACR_CREDIT represents $0.75 + 0.263 = 1.01$

Example data entry is as follows:

BMP Feature Class Excerpt	
Field Name	Input
BMP_ID	MDE21BMP00003
BMP_DRAIN_ID	MDE21BDA00003
BMP_DRAIN_AREA	2
CON_PURPOSE	REDE
NUM_BMPS	3
BMP_TYPE	MMBR
PE_REQ	2.2
PE_ADR	2.2
PE_REDE	1.0
IMP_ACRES	2.0
IMP_ACRES_REDE	0.75
PE_PRE_CONV	
PE_TOTAL_STORAGE	1
WQT_IMP_ACR_CREDIT	0.75
WM_IMP_ACR_CREDIT	
GSI_IMP_ACR_CREDIT	0.263
TOT_IMP_ACR_CREDIT	1.01

Example 3 - Reporting Credit when impervious acres are reduced to meet redevelopment regulations:

A project to renovate an existing parking lot will result in a decrease in the total impervious area. The information required for data entry includes:

- The site area is 2 acres.
- Existing impervious area = 1 acre.
- Total impervious area post construction = 0.8 acres
- Impervious area reduction post-construction = 0.2 acres
- Treatment requirements include the following:
 - Redevelopment provisions require that 50% of the existing impervious area will be removed or treated or a combination of both.
 - Existing impervious area removed = 0.2
 - Existing impervious area to be treated = 0.3 acres
- One bioretention practice is used to meet storage requirements for 0.3 acres

The impervious area to be treated for the bioretention can be entered into the database as follows:

- Because there is a net decrease in impervious area, the PE_ADR and the IMP_ACRES will have the same data values as the PE_REDE and IMP_ACRES_REDE.
- The credit available for the redevelopment will be based on treating 1.0 inches for 0.3 impervious acres.
- The WQT_IMP_ACR_CREDIT represents the restoration credit for 0.3 acres
- Additional GSI credit is available when using ESD; $35\% \text{ of } 0.3 = 0.105$
- The TOT_IMP_ACR_CREDIT represents $0.3 + 0.105 = 0.405$

Example data entry for the BMP Feature class is as follows:

BMP Feature Class Excerpt	
Field Name	Input
BMP_ID	MDE21BMP00004
BMP_DRAIN_ID	MDE21BDA00004
BMP_DRAIN_AREA	2
CON_PURPOSE	REDE
NUM_BMPS	3
BMP_TYPE	MMBR
PE_REQ	1
PE_ADR	1
PE_REDE	1.0
IMP_ACRES	0.3
IMP_ACRES_REDE	0.3
PE_PRE_CONV	
PE_TOTAL_STORAGE	1
WQT_IMP_ACR_CREDIT	0.3
WM_IMP_ACR_CREDIT	
GSI_IMP_ACR_CREDIT	0.105
TOT_IMP_ACR_CREDIT	0.405

When impervious surfaces are reduced to meet redevelopment requirements (0.2 acres in this scenario), the credit can be recorded using the AltBMPPoly feature class where the BMP_TYPE is impervious surface reduction (IMPP).

- EQU_IMP_ACR field is 0.2 acres removed * 0.71EIA_r= 0.142
- LAND_COVER_CONV_ACRES is the number of acres removed or converted to pervious surface, which in this case is 0.2.

Example data entry for the AltBMPPoly feature class is as follows:

AltBMPPoly Feature Class Excerpt	
Field Name	Input
ALTBMP_PY_ID	MDE21APY00004
PROJECT_DESC	Parking Lot impervious area reduction
ALTBMP_TYPE	IMPP
EQU_IMP_ACR	0.142
LAND_COVER_CONV_ACRES	0.2

Appendix B: Data Entry Examples, Co-Benefits

Reporting Co-Benefits in the Geodatabase

The Accounting Guidance includes opportunities for additional credit based on co-benefits related to additional water quality treatment volume (WQT), additional storage (watershed management (WM), and green stormwater infrastructure (GSI). The geodatabase now allows these crediting options to be reported. The table below provides a summary of the fields relevant to co-benefit credit reporting.

Co-Benefit Reporting Geodatabase Schema					
Name	Type	Size	Mandatory	Domain	Description
PE_ADR	Double	8	M		PE addressed (WQv)
PE_TOTAL_STORAGE	Double	8	C		Total rainfall depth managed; Conditional on CON_PURPOSE = CONV, REST, or REDE
IMP_ACRES	Double	6	M		BMP impervious drainage area (acres)
PE_PRE_CONV	Double	6	C		PE Treated prior to conversion; Conditional on CON_PURPOSE = CONV.
WQT_IMP_ACR_CREDIT	Double	6	C		Conditional on CON_PURPOSE = REST, CONV, or REDE, and PE_ADR>1
WM_IMP_ACR_CREDIT	Double	6	C		Conditional on CON_PURPOSE = REST, CONV, or REDE
GSI_IMP_ACR_CREDIT	Double	6	C		Conditional on CON_PURPOSE = REST, CONV, or REDE
TOT_IMP_ACR_CREDIT	Double	6	C		Equivalent impervious acres treated by BMP for restoration; Conditional on CON_PURPOSE = REST, CONV, or REDE

The following scenarios use the calculations from the Accounting Guidance and illustrates how that example would be reported in the geodatabase.

Example 1 - No Co-Benefit (Using Equation 1 from the Accounting Guidance):

Wet retention pond has a permanent pool water quality treatment volume for rainfall depth (PE_ADR) of 1 inch. Impervious acres (IA) in the drainage area to the pond is 10 acres.

Solution:

$$\text{IA Credit} = \text{IA in Drainage Area} \times \frac{\text{Rainfall Depth Treated}}{1 \text{ inch}} = \left(\frac{1 \text{ inch}}{1 \text{ inch}} \right) \times 10 \text{ acres} = 10 \text{ acres}$$

IA Credit is reported as WQT_IMP_ACR_CREDIT and TOTAL_IMP_ACR_CREDIT.

Data entry for Example 1:

BMP Feature Class Excerpt	
Field Name	Input
PE_ADR	1
PE_TOTAL_STORAGE	1
IMP_ACRES	10
PE_PRE_CONV	0
WQT_IMP_ACR_CREDIT	10
WM_IMP_ACR_CREDIT	0
GSI_IMP_ACR_CREDIT	0
TOT_IMP_ACR_CREDIT	10

As a general rule, PE_ADR and PE_TOTAL_STORAGE will be the same when WM credits are not available.

In addition, WQT_IMP_ACR_CREDIT and TOTAL_IMP_ACR_CREDIT will be the same when GSI and WM credits are not available.

Example 2 - WQ_T:

Wet retention pond has a permanent pool water quality treatment volume for rainfall depth of 2.6 inches. Impervious area in the drainage area to the pond is 10 acres.

Solution:

$$\begin{aligned} \text{WQT_IMP_ACR_CREDIT} &= \left[\frac{1 \text{ inch} + [(P_E - 1 \text{ inch}) \times 0.25]}{1 \text{ inch}} \right] \times \text{IA} \\ &= \left[\frac{1 \text{ inch} + [(2.6 \text{ inches} - 1 \text{ inch}) \times 0.25]}{1 \text{ inch}} \right] \times 10 \text{ acres} = 14 \text{ acres} \end{aligned}$$

WQT_IMP_ACR_CREDIT is also the TOTAL_IMP_ACR_CREDIT in this example.

Data entry for Example 2:

BMP Feature Class Excerpt	
Field Name	Input
PE_ADR	2.6
PE_TOTAL_STORAGE	2.6
IMP_ACRES	10
PE_PRE_CONV	0
WQT_IMP_ACR_CREDIT	14
WM_IMP_ACR_CREDIT	0
GSI_IMP_ACR_CREDIT	0
TOT_IMP_ACR_CREDIT	14

Example 3 - WQ_T and WM:

Wet extended detention pond has a permanent pool treatment volume for rainfall depth of 1 inch and an extended detention volume for an additional 2 inches. The rainfall depth for water quality (WQ_T) is equal to the 1-inch permanent pool plus 1 inch of ED storage. The total rainfall managed is 3 inches. Impervious area in the drainage area to the pond is 10 acres.

Solution:

$$\text{WQT_IMP_ACR_CREDIT} = \left[\frac{1 \text{ inch} + [(P_E - 1 \text{ inch}) \times 0.25]}{1 \text{ inch}} \right] \times \text{IA}$$

$$= \left[\frac{1 \text{ inch} + [(2 \text{ inches} - 1 \text{ inch}) \times 0.25]}{1 \text{ inch}} \right] \times 10 \text{ acres} = 12.5 \text{ acres}$$

$$\text{WM_IMP_ACR_CREDIT} =$$

$$\left[\frac{(\text{Total Rainfall Managed} - \text{Rainfall Depth Treated}) \times 0.25}{1 \text{ inch}} \right] \times \text{IA}$$

$$= \left[\frac{(3 \text{ inches} - 2 \text{ inches}) \times 0.25}{1 \text{ inch}} \right] \times 10 \text{ acres} = 2.5 \text{ acres}$$

$$\text{TOTAL_IMP_ACR_CREDIT} = \text{WQT_IMP_ACR_CREDIT} + \text{WM_IMP_ACR_CREDIT}$$

$$= 12.5 \text{ acres} + 2.5 \text{ acres} = 15 \text{ acres}$$

Data entry for Example 3:

BMP Feature Class Excerpt	
Field Name	Input
PE_ADR	2
PE_TOTAL_STORAGE	3
IMP_ACRES	10
PE_PRE_CONV	0
WQT_IMP_ACR_CREDIT	12.5
WM_IMP_ACR_CREDIT	2.5
GSI_IMP_ACR_CREDIT	0
TOT_IMP_ACR_CREDIT	15

The WM credit is based on additional storage above the PE_ADR. However, the PE_ADR must be greater than or equal to 1 inch in order to receive WM credits.

Example 4 - GSI:

Wet retention pond has a permanent pool water quality treatment volume for a rainfall depth of 1 inch. The impervious area in the drainage area to the pond is 10 acres. Green infrastructure features are added to meet GSI credit requirements.

Solution:

Since the rainfall depth treated in the permanent pool = 1 inch, the IA credit is:

$$\text{WQT_IMP_ACR_CREDIT} = \left(\frac{\text{Rainfall Depth Treated}}{1 \text{ inch}} \right) \times \text{IA} = \left(\frac{1 \text{ inch}}{1 \text{ inch}} \right) \times 10 \text{ acres} = 10 \text{ acres}$$

$$\text{GSI Credit} = 1.35 \times [10 \text{ Impervious Acre Credit}] = 13.5 \text{ acres}$$

The GSI_IMP_ACR_CREDIT is calculated by subtracting the WQT_IMP_ACR_CREDIT from the GSI Credit:

$$\begin{aligned} \text{GSI_IMP_ACR_CREDIT} &= \text{GSI Credit} - \text{WQT_IMP_ACR_CREDIT} \\ &= 13.5 - 10 = 3.5 \text{ acres} \end{aligned}$$

$$\begin{aligned} \text{TOTAL_IMP_ACR_CREDIT} &= \text{WQT_IMP_ACR_CREDIT} + \text{GSI_IMP_ACR_CREDIT} \\ &= 10 \text{ acres} + 3.5 \text{ acres} = 13.5 \text{ acres} \end{aligned}$$

Data entry for Example 4:

BMP Feature Class Excerpt	
Field Name	Input
PE_ADR	1
PE_TOTAL_STORAGE	1
IMP_ACRES	10
PE_PRE_CONV	0
WQT_IMP_ACR_CREDIT	10
WM_IMP_ACR_CREDIT	0
GSI_IMP_ACR_CREDIT	3.5
TOT_IMP_ACR_CREDIT	13.5

Example 5 - WQ_T and GSI:

Wet retention pond has a permanent pool treatment volume for a rainfall depth of 2.6 inches. The impervious area in the drainage area to the pond is 10 acres. Green infrastructure features are added to meet GSI credit requirements.

Solution:

$$\text{WQT_IMP_ACR_CREDIT} = \left[\frac{1 \text{ inch} + [(P_E - 1 \text{ inch}) \times 0.25]}{1 \text{ inch}} \right] \times \text{IA}$$
$$= \left[\frac{1 \text{ inch} + [(2.6 - 1 \text{ inch}) \times 0.25]}{1 \text{ inch}} \right] \times 10 \text{ acres} = 14 \text{ acres}$$

$$\text{GSI_IMP_ACR_CREDIT} = 1.35 \times [14 \text{ acres credit from WQ}_T] = 18.9 \text{ acres}$$

The GSI_IMP_ACR_CREDIT is calculated by subtracting the WQT_IMP_ACR_CREDIT from the GSI Credit:

$$\text{GSI_IMP_ACR_CREDIT} = \text{GSI Credit} - \text{WQT_IA_CREDIT} = 18.9 - 14 = 4.9 \text{ acres}$$

$$\text{TOTAL_IMP_ACR_CREDIT} = \text{WQT_IMP_ACR_CREDIT} + \text{GSI_IMP_ACR_CREDIT}$$
$$= 14 \text{ acres} + 4.9 \text{ acres} = 18.9 \text{ acres}$$

Data entry for Example 5:

BMP Feature Class Excerpt	
Field Name	Input
PE_ADR	2.6
PE_TOTAL_STORAGE	2.6
IMP_ACRES	10
PE_PRE_CONV	0
WQT_IMP_ACR_CREDIT	14
WM_IMP_ACR_CREDIT	0
GSI_IMP_ACR_CREDIT	4.9
TOT_IMP_ACR_CREDIT	18.9

Example 6 - WQ_T, WM, and GSI:

Wet extended detention pond has a permanent pool treatment volume for rainfall depth of 1 inch and extended detention volume for an additional rainfall depth of 2 inches. The rainfall depth for water quality is equal to the 1-inch permanent pool plus 1 inch of ED storage. Total rainfall depth managed is 3 inches. Impervious area in drainage area to pond is 10 acres. Green infrastructure features are added as required to meet GSI credit requirements.

Solution:

$$\text{WQT_IMP_ACR_CREDIT} = \left[\frac{1 \text{ inch} + [(P_E - 1 \text{ inch}) \times 0.25]}{1 \text{ inch}} \right] \times \text{IA}$$

$$= \left[\frac{1 \text{ inch} + [(2 - 1 \text{ inch}) \times 0.25]}{1 \text{ inch}} \right] \times 10 \text{ acres} = 12.5 \text{ acres}$$

$$\text{WM_IMP_ACR_CREDIT} = \left[\frac{(\text{Total Rainfall Managed} - \text{Rainfall Depth Treated}) \times 0.25}{1 \text{ inch}} \right] \times \text{IA}$$

$$= \left[\frac{(3 \text{ inches} \times 2 \text{ inches}) \times 0.25}{1 \text{ inch}} \right] \times 10 \text{ acres} = 2.5 \text{ acres}$$

$$\text{GSI Credit} = 1.35 \times [12.5 \text{ acres credit from WQ}_T] = 16.9 \text{ acres}$$

The GSI_IMP_ACR_CREDIT is calculated by subtracting the WQT_IMP_ACR_CREDIT from the GSI Credit:

$$\text{GSI_IMP_ACR_CREDIT} = \text{GSI Credit} - \text{WQT_IMP_ACR_CREDIT} = 16.9 - 12.5 = 4.4 \text{ acres}$$

$$\text{TOTAL_IMP_ACR_CREDIT} = \text{WQT_IMP_ACR_CREDIT} + \text{WM_IMP_ACR_CREDIT} + \text{GSI_IMP_ACR_CREDIT} = 12.5 \text{ acres} + 2.5 \text{ acres} + 4.4 = 19.4 \text{ acres}$$

Data entry for Example 6:

BMP Feature Class Excerpt	
Field Name	Input
PE_ADR	2
PE_TOTAL_STORAGE	3
IMP_ACRES	10
PE_PRE_CONV	0
WQT_IMP_ACR_CREDIT	12.5
WM_IMP_ACR_CREDIT	2.5
GSI_IMP_ACR_CREDIT	4.4
TOT_IMP_ACR_CREDIT	19.4

Example 7 - Conversion:

Wet retention pond with a permanent pool treatment volume for rainfall depth of 0.5 inches gets converted to provide 1 inch of water quality treatment. Impervious area in the drainage area to the pond is 10 acres.

Solution:

To determine the credit for converted facilities, the pre-conversion credit must be subtracted from the post-conversion credit. This calculation procedure would also apply to any of the other credit combinations described above if a conversion has taken place.

$$\text{Pre-Conversion Credit} = \left(\frac{P_E}{1 \text{ inch}} \right) \times \text{IA in Drainage Area} = \left(\frac{0.5 \text{ inch}}{1 \text{ inch}} \right) \times 10 \text{ acres} = 5 \text{ acres}$$

$$\text{Post-Conversion IA Credit} = \left(\frac{P_E}{1 \text{ inch}} \right) \times \text{IA in Drainage Area} = \left(\frac{1 \text{ inch}}{1 \text{ inch}} \right) \times 10 \text{ acres} = 10 \text{ acres}$$

$$\text{WQT_IMP_ACR_CREDIT} = \text{post-conversion credit} - \text{pre-conversion credit} = 10 - 5 = 5 \text{ acres}$$

WQT_IMP_ACR_CREDIT is also the TOTAL_IMP_ACR_CREDIT in this example.

Data entry for Example 7:

BMP Feature Class Excerpt	
Field Name	Input
PE_ADR	1
PE_TOTAL_STORAGE	1
IMP_ACRES	10
PE_PRE_CONV	0.5
WQT_IMP_ACR_CREDIT	5
WM_IMP_ACR_CREDIT	0
GSI_IMP_ACR_CREDIT	0
TOT_IMP_ACR_CREDIT	5

Example 8 - Conversion with WQ_T and WM :

Wet extended detention pond with a permanent pool treatment volume for rainfall depth of 0.5 inches gets converted to provide a permanent pool of 0.75 inches and an extended detention volume for an additional 2 inches. The rainfall (P_E) depth for water quality (WQ_T) is equal to the 0.75 inch permanent pool plus 0.75 inches of ED storage. However, the WQ_T credit is based on the difference between the pre-conversion credit and the post-conversion credit. The total rainfall managed is 2.75 inches. Impervious area in the drainage area to the pond is 10 acres.

Solution:

$$\text{Pre-Conversion Credit} = \left(\frac{P_E}{1 \text{ inch}} \right) \times \text{IA in Drainage Area} = \left(\frac{0.5 \text{ inch}}{1 \text{ inch}} \right) \times 10 \text{ acres} = 5 \text{ acres}$$

$$\text{Post-Conversion Credit} = \left[\frac{1 \text{ inch} + (P_E - 1 \text{ inch}) \times 0.25}{1 \text{ inch}} \right] \times \text{IA}$$

$$= \left[\frac{1 \text{ inch} + [(1.5 \text{ inches} - 1 \text{ inch}) \times 0.25]}{1 \text{ inch}} \right] \times 10 \text{ acres} = 11.25 \text{ acres}$$

$$WQT_IMP_ACR_CREDIT = 11.25 - 5 = 6.25$$

$$WM_IMP_ACR_CREDIT = \left[\frac{(\text{Total Rainfall Managed} - \text{Rainfall Depth Treated}) \times 0.25}{1 \text{ inch}} \right] \times \text{IA}$$

$$= \left[\frac{(2.75 \text{ inches} - 1.5 \text{ inches}) \times 0.25}{1 \text{ inch}} \right] \times 10 \text{ acres} = 3 \text{ acres}$$

$$\begin{aligned} \text{TOTAL_IMP_ACR_CREDIT} &= WQT_IMP_ACR_CREDIT + WM_IMP_ACR_CREDIT \\ &= 6.25 + 3 = 9.25 \text{ acres} \end{aligned}$$

Data entry for Example 8:

BMP Feature Class Excerpt	
Field Name	Input
PE_ADR	1.5
PE_TOTAL_STORAGE	2.75
IMP_ACRES	10
PE_PRE_CONV	0.5
WQT_IMP_ACR_CREDIT	6.25
WM_IMP_ACR_CREDIT	3
GSI_IMP_ACR_CREDIT	0
TOT_IMP_ACR_CREDIT	9.25

Appendix C: Data Entry Examples, Stream Restoration

Geodatabase Reporting for Stream Restoration

The Chesapeake Bay Program has published several expert panel reports updating the calculations and reporting requirements for the stream restoration protocols. The updated geodatabase requirements are based on the reporting recommendations in Frequently Asked Questions: Urban Stream Restoration BMP (Wood et al 2018). The updates will streamline the reporting process and allow the Department to track the amount of impervious acre credit and nutrient load reductions generated by each protocol as follows:

- The Stream Restoration Protocols table will capture load reductions for each individual protocol. The total load reductions for that project will be reported in the AltBMPLine feature class.
- Each project will report one record in the AltBMPLine feature class that will be linked to a record in the Stream Restoration Protocols table using the ALTBMP_LN_ID.
- Projects using Protocol 4 (i.e., crediting for dry channel regenerative stormwater conveyances) will be reported as a distinct record in the BMP feature class.
- The total pollutant load reductions from a stream restoration project are used to calculate the equivalent impervious acre (EIA) credit based on equation 5 in the Accounting Guidance.

The following scenarios may be used as a guide for reporting relevant data associated with a stream restoration project. The input values are for demonstration purposes only and are not meant to provide guidance on the credit calculations for stream restoration protocols.

Example 1 - Protocol 1:

A stream restoration project includes features that prevent stream bank erosion and improve channel stability. The information needed for data entry include the following:

- The project uses a natural channel design to restore 1,000 linear feet of stream.
- The load reductions associated with the protocols used are reported in the Stream Restoration Protocols table and include:
 - P1: 500 lbs of TN, 250 lbs of TP, and 200,000 lbs of TSS
- The total load reductions are reported in the AltBMPLine Feature Class and include:
 - 500 lbs for TN
 - 250 lbs for TP
 - 200,000 lbs for TSS
- Total load reductions are used to calculate an impervious acre credit of 55 acres.

The total nutrient and sediment reductions, as well as the impervious acre credit for the project are reported in the AltBMPLine Feature Class:

AltBMPLine Feature Class Excerpt	
Field Name	Input
ALTBMP_LN_ID	MDE21ALN00001
ALTBMP_TYPE	STRE
EQU_IMP_ACR	55
LENGTH_REST	1,000
TN_REDUCTION_TOTAL	500
TP_REDUCTION_TOTAL	250
TSS_REDUCTION_TOTAL	200,000

The Stream Restoration Protocols table is used to tabulate reductions for each protocol. Since only one protocol is used in this example, the load reduction information in the AltBMPLine Feature Class and the Stream Restoration Protocols table are the same:

Stream Restoration Protocols Table Excerpt	
Field Name	Input
SRP_ID	MDE21SRP00001
ALTBMP_LN_ID	MDE21ALN00001
PROTOCOL	P1
DESIGN_TYPE	NCD
SCNDRY_DESIGN_TYPE	
TN_REDUCTION_P1	500
TN_REDUCTION_P2	
TN_REDUCTION_P3	
TN_REDUCTION_P5	
TP_REDUCTION_P1	250
TP_REDUCTION_P3	
TP_REDUCTION_P5	
TSS_REDUCTION_P1	200,000
TSS_REDUCTION_P3	
TSS_REDUCTION_P5	

Example 2 - Protocol 5:

A project stabilizes an eroded gully where an outfall drains to a stream. The information needed for data entry include the following:

- The project uses an outfall stabilization design to restore 1,000 linear feet of eroded gully.
- The load reductions associated with the protocols used are reported in the Stream Restoration Protocols table and include:
 - P5: 200 lbs of TN, 100 lbs of TP, and 300,000 lbs of TSS
- The total load reductions are reported in the AltBMPLine Feature Class and include:
 - 200 lbs for TN
 - 100 lbs for TP
 - 300,000 lbs for TSS
- Total load reductions are used to calculate an impervious acre credit of 31 acres.

The total nutrient and sediment reductions, as well as the impervious acre credit for the project are reported in the AltBMPLine Feature Class:

AltBMPLine Feature Class Excerpt	
Field Name	Input
ALTBMP_LN_ID	MDE21ALN00002
ALTBMP_TYPE	OUT
EQU_IMP_ACR	31
LENGTH_REST	1,000
TN_REDUCTION_TOTAL	200
TP_REDUCTION_TOTAL	100
TSS_REDUCTION_TOTAL	300,000

The Stream Restoration Protocols table is used to tabulate reductions for each protocol. Since only one protocol is used in this example, the load reduction information in the AltBMPLine Feature Class and the Stream Restoration Protocols table are the same:

Stream Restoration Protocols Table Excerpt	
Field Name	Input
SRP_ID	MDE21SRP00002
ALTBMP_LN_ID	MDE21ALN00002
PROTOCOL	P5
DESIGN_TYPE	OUT
SCNDRY_DESIGN_TYPE	
TN_REDUCTION_P1	
TN_REDUCTION_P2	
TN_REDUCTION_P3	
TN_REDUCTION_P5	200
TP_REDUCTION_P1	
TP_REDUCTION_P3	
TP_REDUCTION_P5	100
TSS_REDUCTION_P1	
TSS_REDUCTION_P3	
TSS_REDUCTION_P5	300,000

Example 3 - Protocols 1, 2, and 3:

A stream restoration project includes features that prevent sediment erosion, increase hyporheic exchange, and increase access to the floodplain. The information needed for data entry include the following:

- This project uses a legacy sediment removal (LSR) design on 2,000 linear feet of stream.
- The load reductions associated with each protocol are reported in the Stream Restoration Protocols table and include:
 - P1: 500 lbs of TN, 100 lbs of TP, and 800,000 lbs of TSS
 - P2: 100 lbs of TN
 - P3: 400 lbs of TN, 80 lbs of TP, and 40,000 lbs of TSS
- The total load reductions are reported in the AltBMPLine Feature Class and include:
 - 1,000 lbs for TN
 - 180 lbs for TP
 - 840,000 lbs for TSS
- Total load reductions are used to calculate an impervious acre credit of 80.

The total nutrient and sediment reductions, as well as the impervious acre credit for the project are reported in the AltBMPLine Feature Class:

AltBMPLine Feature Class Excerpt	
Field Name	Input
ALTBMP_LN_ID	MDE21ALN00003
ALTBMP_TYPE	STRE
EQU_IMP_ACR	80
LENGTH_REST	2,000
TN_REDUCTION_TOTAL	1,000
TP_REDUCTION_TOTAL	180
TSS_REDUCTION_TOTAL	840,000

The Stream Restoration Protocols table is used to tabulate reductions for each protocol:

Stream Restoration Protocols Table Excerpt	
Field Name	Input
SRP_ID	MDE21SRP00003
ALTBMP_LN_ID	MDE21ALN00003
DESIGN_TYPE	LSR
SCNDRY_DESIGN_TYPE	
TN_REDUCTION_P1	500
TN_REDUCTION_P2	100
TN_REDUCTION_P3	400
TN_REDUCTION_P5	
TP_REDUCTION_P1	100
TP_REDUCTION_P3	80
TP_REDUCTION_P5	
TSS_REDUCTION_P1	800,000
TSS_REDUCTION_P3	40,000
TSS_REDUCTION_P5	

Example 4 - Protocols 1, 2, 3, 4, and 5:

A dry channel regenerative step pool stormwater conveyance system (SPSD - Protocol 4) is installed upland of a stream restoration project. The stream restoration project stabilizes an eroded gully below an outfall. The restoration project also includes features that prevent sediment erosion, increase hyporheic exchange, and increase access to the floodplain. The information needed for data entry includes the following:

- A dry channel regenerative step pool stormwater conveyance system (SPSD) will generate credits under Protocol 4, which provides 1" of treatment for a drainage area containing 10 impervious acres.

SPSD (Protocol 4) practices are not implemented in regulated stream channels and therefore are considered upland BMPs. Therefore, these practices are reported as separate records in the BMP Feature Class:

BMP Feature Class Excerpt	
Field Name	Input
BMP_ID	MDE21BMP00004
NUM_BMPS	1
BMP_TYPE	SPSD
PE_REQ	1
PE_ADR	1
IMP_ACRES	10
PE_PRE_CONV	
PE_TOTAL_STORAGE	1
WQT_IMP_ACR_CREDIT	10
WM_IMP_ACR_CREDIT	0
GSI_IMP_ACR_CREDIT	3.5
TOT_IMP_ACR_CREDIT	13.5
TN_REDUCTION	181
TP_REDUCTION	22
TSS_REDUCTION	80,460

- The total length of the project is 2,000 linear feet.
- The outfall stabilization portion will restore 100 linear feet of eroded gully. The load reductions associated with Protocol 5 include:
 - P5: 100 lbs of TN, 25 lbs of TP, and 100,000 lbs of TSS
 - Note - when P5 is used, P1 cannot be used within the same reach
 - Jurisdictions have the option to report the 100-foot gully project as an individual record similar to example 2 above
- The stream restoration uses a raised stream bed (RSB) design approach on the remaining 1,900 linear feet of the project. The load reductions associated with each protocol used are reported in the Stream Restoration Protocols table and include:
 - P1: 1,000 lbs of TN, 100 lbs of TP, and 40,000 lbs of TSS
 - P2: 200 lbs of TN
 - P3: 300 lbs of TN, 200 lbs of TP, and 60,000 lbs of TSS

- The total load reductions are reported in the AltBMPLine Feature Class and include:
 - 1,600 lbs for TN
 - 325 lbs for TP
 - 200,000 lbs for TSS
- Total load reductions are used to calculate an impervious acre credit of 86.

Information for the RSB and the outfall stabilization designs may be combined in one record and the total reductions are reported in the AltBMPLine Feature Class:

AltBMPLine Feature Class Excerpt	
Field Name	Input
ALTBMP_LN_ID	MDE21ALN00005
ALTBMP_TYPE	STRE
EQU_IMP_ACR	86
LENGTH_REST	2,00
TN_REDUCTION_TOTAL	1,600
TP_REDUCTION_TOTAL	325
TSS_REDUCTION_TOTAL	200,000

The Stream Restoration Protocols table is used to tabulate reductions for each protocol:

Stream Restoration Protocols Table Excerpt	
Field Name	Input
SRP_ID	MDE21SRP00005
ALTBMP_LN_ID	MDE21ALN00005
DESIGN_TYPE	RSB
SCNDRY_DESIGN_TYPE	OUT
TN_REDUCTION_P1	1,000
TN_REDUCTION_P2	200
TN_REDUCTION_P3	300
TN_REDUCTION_P5	100
TP_REDUCTION_P1	100
TP_REDUCTION_P3	200
TP_REDUCTION_P5	25
TSS_REDUCTION_P1	40,000
TSS_REDUCTION_P3	60,000
TSS_REDUCTION_P5	100,000

Additional Recordkeeping Recommendations for Stream Restoration Projects

The updated geodatabase structure streamlines reporting of nutrient and sediment load reductions, impervious acre credit generated by stream restoration projects, and includes the information necessary for Chesapeake Bay Program reporting. In addition to reporting in the geodatabase, the CBP expert panels recommend that the installing agency maintain an extensive project file for each stream restoration project installed. This information is necessary for project verification.

The expert panel recommends that the project file should include construction drawings, as-built survey, credit calculations, photos, post-construction monitoring, inspection records, and maintenance agreement. Additionally, projects using Protocols 2 or 3 should maintain documentation on the EHZ and FTZ dimensions, site conditions used to determine Protocol 2 adjustment factors (baseflow, soil saturation, soil texture), flow characteristics used for Protocol 3 calculations (flow duration curve used, baseflow, channel flow, flow at the 1 ft floodplain elevation), and justification for the selected wetland type in Protocol 3. The file should retain calculations to verify the credits reported and should be maintained onsite for the lifetime the credits are claimed.

The Department also recommends that a summary of the project including site conditions, project design, and calculations used should be included in the MS4 annual progress report for the year the project is first reported in the geodatabase. This information will allow the Department to verify that stream restoration protocols are applied appropriately. Documenting projects in the geodatabase, MS4 annual report, and project file onsite will improve tracking of stream restoration implementation across the State.

Appendix D: Data Entry Examples, Street Sweeping

Reporting Street Sweeping Operations

The updated reporting procedures follow the guidelines in the Chesapeake Bay Program (CBP) report, "Recommendations of the Expert Panel to Define Removal Rates for Street and Storm Drain Cleaning Practices (2016)." This document provides guidance when miles swept and frequency of operations are varied during the permit term. For this reason, it is likely that the equivalent impervious acre (EIA) credit for a given area will change each year of the permit term. The geodatabase updates allow tracking these varied schedules by determining the EIA credit each year (EIA_ANNUAL_CREDIT) and reporting a running average credit over the permit term (EIA_AVERAGE_CREDIT). These fields are also to be used by the other operational BMPs such as stormdrain cleaning and septic pumping. Examples showing how to use those fields are provided below.

The EIA_f (equivalent impervious area factor) for street sweeping is based on the number of miles swept during a single pass of the street sweeper. The miles of road swept should not be multiplied by the number of times they are swept. To calculate the annual credit, the miles swept is multiplied by EIA_f . The EIA_f is determined by the sweeping schedule. To report the sweeping schedule implemented, the domain dSweepingSchedule will be used to populate the TIMES_SWEPT field. Sweeping schedules and the corresponding EIA_f and dSweepingSchedule domain values are shown in the table below based on CBP expert panel reports and the Accounting Guidance.

Sweeping Schedule	EIA_f per Lane Mile Swept	TIMES_SWEPT dSweepingSchedule
Advanced Sweeping (BMP Code: VSS)		
1 pass/12 weeks	0.027	A1
1 pass/8 weeks	0.059	A2
1 pass/4 weeks	0.087	A3
Spring and Fall 1 pass/1-2 weeks else monthly	0.106	A7
Spring 1 pass/1-2 weeks else monthly	0.148	A8
1 pass/2 weeks	0.156	A4
1 pass/week	0.235	A5
2 passes/week	0.304	A6
Mechanical Broom (BMP Code: MSS)		
1 pass/4 weeks	0.001	M1
1 pass/week	0.004	M2
2 passes/week	0.008	M3

Reporting Example:

A jurisdiction performs vacuum-assisted street-sweeping operations in three different regions. Information for data reporting includes:

- Each region sweeps a different number of miles.
- Each region will be reported as a separate record in the AltBMPPoly Feature Class.

The street sweeping data for the jurisdiction for Year 1 are shown below:

Region	A			B			C		
	Miles Swept	Frequency	Credit	Miles Swept	Frequency	Credit	Miles Swept	Frequency	Credit
Year 1	100	1 pass/ week	23.5	200	1 pass/ week	47	300	1 pass/ week	70.5
Average			23.5			47			70.5

Data entry for Year 1 street sweeping in Region A:

Alternative BMP Polygon Feature Class Excerpt	
Field Name	Year 1 Input
ALTBMP_PY_ID	MDE21APY00001
ALTBMP_TYPE	VSS
EIA_ANNUAL_CREDIT	23.5
EIA_AVERAGE_CREDIT	23.5
MILES_SWEPT	100
TIMES_SWEPT	A5
BMP_STATUS	ACTIVE

Data entry for Year 1 street sweeping in Region B:

Alternative BMP Polygon Feature Class Excerpt	
Field Name	Year 1 Input
ALTBMP_PY_ID	MDE21APY00002
ALTBMP_TYPE	VSS
EIA_ANNUAL_CREDIT	47
EIA_AVERAGE_CREDIT	47
MILES_SWEPT	200
TIMES_SWEPT	A5
BMP_STATUS	ACTIVE

Data entry for Year 1 street sweeping in Region C:

Alternative BMP Polygon Feature Class Excerpt	
Field Name	Year 1 Input
ALTBMP_PY_ID	MDE21APY00003
ALTBMP_TYPE	VSS
EIA_ANNUAL_CREDIT	70.5
EIA_AVERAGE_CREDIT	70.5
MILES_SWEPT	300
TIMES_SWEPT	A5
BMP_STATUS	ACTIVE

In Year 2, the miles swept changes for each region. The street sweeping data for the jurisdiction for Years 1 and 2 are shown below:

- The BMP_ID must be updated each year. Additionally, the BMP_STATUS for the previous year(s) should be noted as "Removed", with the BMP_STATUS for the current year BMP_ID recorded as "Active".

Region	A			B			C		
	Miles Swept	Frequency	Credit	Miles Swept	Frequency	Credit	Miles Swept	Frequency	Credit
Year 1	100	1 pass/week	23.5	200	1 pass/week	47	300	1 pass/week	70.5
Year 2	50	1 pass/week	11.8	100	1 pass/week	23.5	150	1 pass/week	35.3
Average			17.6			35.3			52.9

Data entry for Year 2 street sweeping in Region A:

Alternative BMP Polygon Feature Class Excerpt		
Field Name	Year 1 Input	Year 2 Input
ALTBMP_PY_ID	MDE21APY00001	MDE22APY00001
ALTBMP_TYPE	VSS	VSS
EIA_ANNUAL_CREDIT	23.5	11.8
EIA_AVERAGE_CREDIT	23.5	17.6
MILES_SWEPT	100	50
TIMES_SWEPT	A5	A5
BMP_STATUS	REMOVED	ACTIVE

Data entry for Year 2 street sweeping in Region B:

Alternative BMP Polygon Feature Class Excerpt		
Field Name	Year 1 Input	Year 2 Input
ALTBMP_PY_ID	MDE21APY00002	MDE22APY00002
ALTBMP_TYPE	VSS	VSS
EIA_ANNUAL_CREDIT	47	23.5
EIA_AVERAGE_CREDIT	47	35.3
MILES_SWEPT	200	100
TIMES_SWEPT	A5	A5
BMP_STATUS	REMOVED	ACTIVE

Data entry for Year 2 street sweeping in Region C:

Alternative BMP Polygon Feature Class Excerpt		
Field Name	Year 1 Input	Year 2 Input
ALTBMP_PY_ID	MDE21APY00003	MDE22APY00003
ALTBMP_TYPE	VSS	VSS
EIA_ANNUAL_CREDIT	70.5	35.3
EIA_AVERAGE_CREDIT	70.5	52.9
MILES_SWEPT	300	150
TIMES_SWEPT	A5	A5
BMP_STATUS	REMOVED	ACTIVE

In Year 3, the number of miles swept returns to the Year 1 level, however, regions B and C change the sweeping schedule. The street sweeping data for the jurisdiction for Years 1, 2 and 3 are shown below:

Region	A			B			C		
	Miles Swept	Frequency	Credit	Miles Swept	Frequency	Credit	Miles Swept	Frequency	Credit
Year 1	100	1 pass/ week	23.5	200	1 pass/ week	47	300	1 pass/ week	70.5
Year 2	50	1 pass/ week	11.8	100	1 pass/ week	23.5	150	1 pass/ week	35.3
Year 3	100	1 pass/ week	23.5	200	1 pass/ 4 weeks	17.4	300	1 pass/ 2 weeks	46.8
Average			19.6			29.3			50.9

Data entry for Year 3 street sweeping in Region A:

- The BMP_ID must be updated each year. Additionally, the BMP_STATUS for the previous year(s) should be noted as "Removed", with the BMP_STATUS for the current year BMP_ID recorded as "Active".

Alternative BMP Polygon Feature Class Excerpt			
Field Name	Year 1 Input	Year 2 Input	Year 3 Input
ALTBMP_PY_ID	MDE21APY00001	MDE22APY00001	MDE23APY00001
ALTBMP_TYPE	VSS	VSS	VSS
EIA_ANNUAL_CREDIT	23.5	11.8	23.5
EIA_AVERAGE_CREDIT	23.5	17.6	19.6
MILES_SWEPT	100	50	100
TIMES_SWEPT	A5	A5	A5
BMP_STATUS	REMOVED	REMOVED	ACTIVE

Data entry for Year 3 street sweeping in Region B:

Alternative BMP Polygon Feature Class Excerpt			
Field Name	Year 1 Input	Year 2 Input	Year 3 Input
ALTBMP_PY_ID	MDE21APY00002	MDE22APY00002	MDE23APY00002
ALTBMP_TYPE	VSS	VSS	VSS
EIA_ANNUAL_CREDIT	47	23.5	17.4
EIA_AVERAGE_CREDIT	47	35.3	29.3
MILES_SWEPT	200	100	200
TIMES_SWEPT	A5	A5	A3
BMP_STATUS	REMOVED	REMOVED	ACTIVE

Data entry for Year 3 street sweeping in Region C:

Alternative BMP Polygon Feature Class Excerpt			
Field Name	Year 1 Input	Year 2 Input	Year 3 Input
ALTBMP_PY_ID	MDE21APY00003	MDE22APY00003	MDE23APY00003
ALTBMP_TYPE	VSS	VSS	VSS
EIA_ANNUAL_CREDIT	70.5	35.3	46.8
EIA_AVERAGE_CREDIT	70.5	52.9	50.9
MILES_SWEPT	300	150	300
TIMES_SWEPT	A5	A5	A4
BMP_STATUS	REMOVED	REMOVED	ACTIVE

In Year 3, the jurisdiction begins street sweeping in a new region. This operation will be added as a new record with a new ALT_BMP_PY_ID in the AltBMPPoly Feature Class. The street sweeping data for the new region are shown below:

Region	New Region		
	Miles Swept	Frequency	Credit
Year 1	0	--	0
Year 2	0	--	0
Year 3	100	1 pass/week	23.5
Average			7.8

Data entry for Year 3 street sweeping in the new region:

Alternative BMP Polygon Feature Class Excerpt	
Field Name	Input
ALTBMP_PY_ID	MDE23APY00004
ALTBMP_TYPE	VSS
EIA_ANNUAL_CREDIT	23.5
EIA_AVERAGE_CREDIT	7.8
MILES_SWEPT	100
TIMES_SWEPT	A5
BMP_STATUS	ACTIVE

Appendix E: Data Entry Examples, Discharges from Grey Infrastructure

Geodatabase Reporting for Elimination of Discovered Nutrient Discharges from Grey Infrastructure

The Geodatabase provides a new reporting structure to report the credits achieved by eliminating nutrient discharges from grey infrastructure. Example calculations and Geodatabase reporting are provided for each of the three protocols. The examples are based on the nutrient discharge profile sheets found in Appendix A of the Expert Panel Report (https://chesapeakestormwater.net/wp-content/uploads/2022/07/GREY-INFRASTRUCTURE-Expert-Panel-Report_FINAL_SHORT.pdf).

Load reduction calculations rely on values for TN concentration, TP concentration, and flow rate before and after a nutrient discharge has been eliminated, a leaking pipe has been repaired, or a program has been implemented. The following equations are used to solve for loads and load reductions for each protocol.

Protocol 1 Load Calculation (pre- and post-elimination of nutrient discharge)

$$\begin{aligned} \text{TN or TP Load } \frac{\text{lbs}}{\text{yr}} &= \text{TN or TP Concentration } \frac{\text{mg}}{\text{L}} \times \text{Flow Rate } \frac{\text{gal}}{\text{day}} \times \left(8.345 \times 10^{-6} \frac{\text{lbs/gal}}{\text{mg/L}} \right) \\ &\times \text{Duration in days per year} \end{aligned}$$

Protocol 2 Load Calculation (before and after repair of leaking pipes)

The equation for Protocol 2 includes a discount factor based on distance from a stream.

$$\begin{aligned} \text{TN or TP Load } \frac{\text{lbs}}{\text{yr}} &= \text{TN or TP Concentration } \frac{\text{mg}}{\text{L}} \times \text{Flow Rate } \frac{\text{gal}}{\text{day}} \times \left(8.345 \times 10^{-6} \frac{\text{lbs/gal}}{\text{mg/L}} \right) \\ &\times \text{Duration in days per year} \times \text{Discount Factor} \end{aligned}$$

Protocol 3 Load Calculations (pre- and post-program implementation)

Protocol 3 represents a systematic reduction and elimination of dry weather sanitary sewer overflows in a sewershed resulting from program implementation (e.g., fats, oils, and grease program). This calculation is based on annual volume (gallons per year).

$$\text{TN or TP Load } \frac{\text{lbs}}{\text{yr}} = \text{TN or TP Concentration } \frac{\text{mg}}{\text{L}} \times \text{Annual Volume } \frac{\text{gal}}{\text{yr}} \times \left(8.345 \times 10^{-6} \frac{\text{lbs/gal}}{\text{mg/L}} \right)$$

Load Reduction Calculations

$$\text{TN or TP Load Reduction } \frac{\text{lbs}}{\text{yr}} = \text{Pre TN or TP Load } \frac{\text{lbs}}{\text{yr}} - \text{Post TN or TP Load } \frac{\text{lbs}}{\text{yr}}$$

The following examples demonstrate the data reporting structure for each protocol.

Protocol 1 Example - Discharge Type N-1: Laundry Washwater:

In 2019, an apartment building plumbing system discharging laundry washwater into the storm drain system was corrected by connecting the system to the sanitary sewer system. The information needed for data entry includes the following:

- Direct sampling of the laundry washwater discharge measured nutrient concentrations of 2.05 mg/L TN and 0.395 mg/L TP, and a flow rate of 3,878 gallons per day.
- The duration was estimated to be 91.25 days per year.
- After the correction, TN and TP concentration and flow rate values were 0.
- Using the Protocol 1 equation and the load reduction equation, the loads reduced were calculated to be 6.05 lbs/year TN and 1.17 lbs/year TP.
- Using the EIA conversion equation in the Accounting Guidance, the EIA credit was calculated to be 0.3 acre.
- An outfall screening a year later confirmed the discharge was corrected (i.e., DGI verification is Y).

The total nutrient and sediment reductions, as well as the equivalent impervious acre credit for the project are reported in the AltBMPPoint Feature Class:

AltBMPPoint Feature Class Excerpt	
Field Name	Input
ALTBMP_PT_ID	MDE21APT00001
ALTBMP_TYPE	DGI
EQU_IMP_ACR	0.3
TN_REDUCTION	6.05
TP_REDUCTION	1.17

The data used to calculate reductions are reported in the Discharges from Grey Infrastructure Protocols table:

Discharges from Grey Infrastructure Protocols Table	
Field Name	Input
DGI_ID	MDE21DGI00001
ALTBMP_PT_ID	MDE21APT00001
DGI_TYPE	N1
YEAR_ELIM	2019
DGI_PROTOCOL	DGIP1
CB_SEG_SHED	BACOH
TN_CONC_PRE	2.05
TN_CONC_POST	0
TP_CONC_PRE	0.395
TP_CONC_POST	0
FLOW_RATE_PRE	3,878
FLOW_RATE_POST	0
FLOW_DURATION	91.25
DGI_VERIFICATION	Y

Protocol 2 Example - Discharge Type N-6: Sewer Pipe Exfiltration:

A municipality discovered a leaking sewer pipe. The pipe is assumed to be continuously leaking, so the flow duration is 365 days. Protocol 2 is used because it measures the flow before and after pipe repair and requires a discount factor based on the distance the pipe is from a stream. The information needed for data entry include the following:

- Based on flow metering, the municipality calculated a loss of 1,500 gallons per day due to exfiltration. After slip-lining the pipe in 2017, the loss dropped to 375 gallons per day.
- The default concentrations provided in the expert panel report are used (i.e., 33.0 mg/L TN and 6.0 mg/L TP).
- Because the pipe is within 50 feet of a stream, a discount factor of 50% is applied. Using the Protocol 2 equation and the load reduction equation, the final loads reduced were calculated to be 56.54 lbs/year TN and 10.28 lbs/year TP.
- The EIA credit was calculated to be 2.6 acres.
- The municipality subsequently measured the flow for 6 months to verify the reduction (i.e., DGI_Verification is Y).

The total nutrient and sediment reductions, as well as the equivalent impervious acre credit for the project are reported in the AltBMPPoint Feature Class:

AltBMPPoint Feature Class Excerpt	
Field Name	Input
ALTBMP_PT_ID	MDE21APT00004
ALTBMP_TYPE	DGI
EQU_IMP_ACR	2.6
TN_REDUCTION	56.54
TP_REDUCTION	10.28

The data used to calculate reductions are reported in the Discharges from Grey Infrastructure Protocols table:

Discharges from Grey Infrastructure Protocols Table	
Field Name	Input
DGI_ID	MDE21DGI00004
ALTBMP_PT_ID	MDE21APT00004
DGI_TYPE	N6
YEAR_ELIM	2017
DGI_PROTOCOL	DGIP2
CB_SEG_SHED	PAXTF
TN_CONC_PRE	33.0
TN_CONC_POST	33.0
TP_CONC_PRE	6.0
TP_CONC_POST	6.0
FLOW_RATE_PRE	1,500
FLOW_RATE_POST	375
FLOW_DURATION	365
DISCOUNT_FACTOR	50
DGI_VERIFICATION	Y

Protocol 3 Example - Discharge Type N-8: Dry Weather Sanitary Sewer Overflows:

Protocol 3 is used to calculate reductions achieved by implementing a program to reduce the number of dry weather sanitary sewer overflows within a jurisdiction. The information needed for data entry include the following:

- Monitoring is required for 2 years before and after program implementation to determine the reduction in the volume of sanitary overflows achieved by the program. A fats, oils, and grease (FOG) program was implemented and resulted in a decrease in the frequency of dry weather sanitary overflows and a decrease in volume from 125,000 gallons/year to 25,000 gallons/year.
- The default concentrations for sanitary sewer overflow discharges provided in the expert panel report are used (i.e., 33.0 mg/L TN and 6.0 mg/L TP).
- The protocol is a volume-based annual load, therefore, the Protocol 3 equation does not include a duration in days. Using the Protocol 3 equation and the load reduction equation, the final loads reduced were calculated to be 27.54 lb/year TN and 5.01 lbs/year TP.
- The EIA credit was calculated to be 1.3 acres.
- The municipality subsequently measured the flow for 6 months to verify the reduction (i.e., DGI_Verification is Y).

The total nutrient and sediment reductions, as well as the equivalent impervious acre credit for the project are reported in the AltBMPPoint Feature Class:

AltBMPPoint Feature Class Excerpt	
Field Name	Input
ALTBMP_PT_ID	MDE21APT00005
ALTBMP_TYPE	DGI
EQU_IMP_ACR	1.3
TN_REDUCTION	27.54
TP_REDUCTION	5.01

The data used to calculate reductions are reported in the Discharges from Grey Infrastructure Protocols table:

Discharges from Grey Infrastructure Protocols Table	
Field Name	Input
DGI_ID	MDE21DGI00005
ALTBMP_PT_ID	MDE21APT00005
DGI_TYPE	N6
YEAR_ELIM	2018
DGI_PROTOCOL	DGIP3
CB_SEG_SHED	GUNOH
TN_CONC_PRE	33.0
TN_CONC_POST	33.0
TP_CONC_PRE	6.0
TP_CONC_POST	6.0
ANNUAL_VOL_PRE	125,000
ANNUAL_VOL_POST	25,000
DGI_VERIFICATION	Y

Appendix F: List of Domains

dAltBMPLine

Domain Description	Code	Code Description
Alternative BMP Type	OUT	Outfall Stabilization
	SHST	Shoreline Management
	STRE	Stream Restoration

dAltBMPPoint

Domain Description	Code	Code Description
Alternative BMP Type	SEPC	Septic Connections to WWTP
	SEPD	Septic Denitrification
	SEPP	Septic Pumping
	DGI	Elimination of Discovered Nutrient Discharges from Grey Infrastructure
	FTW	Floating Treatment Wetlands

dAltBMPPoly

Domain Description	Code	Code Description
Alternative BMP Type	CBC	Catch Basin Cleaning
	SDV	Storm Drain Vacuuming (i.e., Storm Drain Cleaning)
	IMPF	Impervious Surface to Forest (i.e., IMPP + FPU)
	IMPP	Impervious Surface Reduction (i.e., impervious to pervious)
	CLTM	Conservation Landscaping
	FCO	Forest Conservation
	RCL	Riparian Conservation Landscaping
	RFP	Riparian Forest Planting
	STCI	Street Trees
	USRP	Urban Soil Restoration (Compacted Pervious Surfaces)
	USRI	Urban Soil Restoration (Removed Impervious Surfaces)
	UTC	Urban Tree Canopy (i.e., Pervious Turf to Tree Canopy over Turf)
	FPU	Forestation on Pervious Urban (i.e., Forest Planting)
	MSS	Mechanical Street Sweeping
	VSS	Regenerative/Vacuum Street Sweeping (i.e., Advanced Street Sweeping)

dBayPollutant

Domain Description	Code	Code Description
Bay Pollutant	TN	Total Nitrogen
	TP	Total Phosphorus
	TSS	Total Suspended Solids

dBMPClass

Domain Description	Code	Code Description
Class of BMP	A	Alternative BMP
	E	ESD practice or system
	S	Structural BMP
	E+S	ESD + One Structural Practice

dBMPStatus

Domain Description	Code	Code Description
Status of BMP	ACT	Active
	REM	Removed
	PROP	Proposed

dBMPType

Domain Description	Code	Code Description
Type of BMP	AGRE	Green Roof - Extensive
	AGRI	Green Roof - Intensive
	APRP	Permeable Pavement
	ARTF	Reinforced Turf
	FBIO	Bioretention
	FORG	Organic Filter
	FPER	Perimeter Filter
	FSND	Surface Sand Filter
	FPKT	Pocket Filter
	FUND	Underground Filter
	IBAS	Infiltration Basin
	ITRN	Infiltration Trench
	MENF	Enhanced Filter
	MIBR	Infiltration Berm
	MIDW	Dry Well
	MILS	Landscape Infiltration
	MMBR	Micro-Bioretention
	MRNG	Rain Garden
	MRWH	Rainwater Harvesting
	MSGW	Submerged Gravel Wetland
	MSWB	Bio-Swale
	MSWG	Grass Swale
	MSWW	Wet Swale
	NDNR	Non-Rooftop Disconnect
	NDRR	Rooftop Disconnect
	NSCA	Sheetflow to Conservation Area
	ODSW	Dry Swale
	OWSW	Wet Swale
	PMED	Micro-Pool Extended Detention Pond
	PMPS	Multiple Pond
	PPKT	Pocket Pond
	PWED	Wet Extended Detention Pond
	PWET	Wet Pond

	SPSD	Dry Channel Regenerative Step Pool Stormwater Conveyance System
	WEDW	Extended Detention Shallow Wetland
	WPKT	Pocket Wetland
	WPWS	Pond Wetland System
	WSHW	Shallow Marsh
	XDED	Dry Extended Detention Structure
	XDPD	Dry Pond
	XFLD	Flood Management Area
	XOGS	Oil Grit separator
	OTH	Other

dBoolean

Domain Description	Code	Code Description
Yes or No	N	No
	Y	Yes

dCBSegShed

Domain Description	Code	Code Description
Chesapeake Bay Segment Shed	ANATF_DC	Anacostia River Tidal Fresh DC
	ANATF_MD	Anacostia River Tidal Fresh Maryland
	BACOH	Back River Oligohaline
	BIGMH	Big Annemessex River Mesohaline
	BOHOH	Bohemia River Oligohaline
	BSHOH	Bush River Oligohaline
	C&DOH_DE	C&D Canal Oligohaline Delaware
	C&DOH_MD	C&D Canal Oligohaline Maryland
	CB1TF	Northern Chesapeake Bay Tidal Fresh
	CB2OH	Northern Chesapeake Bay Oligohaline
	CB3MH	Upper Chesapeake Bay Mesohaline
	CB4MH	Middle Chesapeake Bay Mesohaline
	CB5MH_MD	Lower Chesapeake Bay Mesohaline Maryland
	CHOMH1	Choptank River Mesohaline mouth 1
	CHOMH2	Choptank River Mesohaline 2
	CHOOH	Choptank River Oligohaline
	CHOTF	Upper Choptank River Tidal Fresh
	CHSMH	Lower Chester River Mesohaline
	CHSOH	Middle Chester River Oligohaline
	CHSTF	Upper Chester River Tidal Fresh
	EASMH	Eastern Bay Mesohaline
	ELKOH	Elk River Oligohaline
	FSBMH	Fishing Bay Mesohaline
	GUNOH	Gunpowder River Oligohaline
	HNGMH	Honga River Mesohaline
	LCHMH	Little Choptank River Mesohaline
	MAGMH	Magothy River Mesohaline
	MANMH	Manokin River Mesohaline
	MATTF	Mattawoman Creek Tidal Fresh

	MIDOH	Middle River Oligohaline
	NANMH	Lower Nanticoke River Mesohaline
	NANOH	Upper Nanticoke River Oligohaline
	NANTF_MD	Upper Nanticoke River Tidal Fresh Maryland
	NANTF_DE	Upper Nanticoke River Tidal Fresh Delaware
	NORTF	North East River Tidal Fresh
	PATMH	Patapsco River Mesohaline
	PAXMH	Lower Patuxent River Mesohaline
	PAXOH	Middle Patuxent River Oligohaline
	PAXTF	Upper Patuxent River Tidal Fresh
	PISTF	Piscataway Creek tidal Fresh
	POCMH_MD	Lower Pocomoke River Mesohaline Maryland
	POCOH_MD	Middle Pocomoke River Oligohaline Maryland
	POCOH_VA	Middle Pocomoke River Oligohaline Virginia
	POCTF	Upper Pocomoke River Tidal Fresh
	POTMH_MD	Lower Potomac River Mesohaline Maryland
	POTOH1_MD	Lower Potomac River Oligohaline Maryland
	POTOH2_MD	Port Tobacco River Oligohaline Maryland
	POTOH3_MD	Nanjemoy Creek Oligohaline Maryland
	POTTF_DC	Upper Potomac River Tidal Fresh DC
	POTTF_MD	Upper Potomac River Tidal Fresh Maryland
	RHDMH	Rhode River Mesohaline
	SASOH	Sassafras River Oligohaline
	SEVMH	Severn River Mesohaline
	SOUTMH	South River Mesohaline
	TANMH_MD	Tangier Sound Mesohaline Maryland
	WBRTF	Western Branch Patuxent River Tidal Fresh
	WICMH	Wicomico River Mesohaline
	WSTMH	West River Mesohaline

dChemCat

Domain Description	Code	Code Description
Chemical Category	DEICE	Deicing
	FERT	Fertilizer
	HERB	Herbicide
	PEST	Pesticide
	ANTICE	Antiicing

dChemUnit

Domain Description	Code	Code Description
Chemical Amount Units	LBS	Pounds
	GAL	Gallons
	OTH	Other
	TON	Tons

dClarity

Domain Description	Code	Code Description
Discharge Clarity	C	Clear
	CD	Cloudy
	OP	Opaque
	OTH	Other

dColor

Domain Description	Code	Code Description
Color of Discharge	B	Brown
	C	Clear
	G	Gray
	GR	Green
	R	Red
	Y	Yellow
	OTH	Other

dConPurpose

Domain Description	Code	Code Description
Purpose of Construction	CONV	Conversion of Existing BMP
	NEWD	New Development Project
	REDE	Redevelopment Project
	REST	New Restoration Project
	SEP	Supplemental Environmental Project

dDeposits

Domain Description	Code	Code Description
Deposits in Outfall Area	OL	Oil
	N	None
	S	Sediment
	OTH	Other

dDesignType

Domain Description	Code	Code Description
Stream restoration design technique	LSR	Legacy Sediment Removal
	RSB	Raising the Stream Bed
	NCD	Natural Channel Design
	SPSC	Step Pool Storm Conveyance
	OUT	Outfall Stabilization
	OTH	Other
	MULT	Multiple

dDGIPProtocol

Domain Description	Code	Code Description
IDDE Protocol	DGIP1	DGI Protocol 1
	DGIP2	DGI Protocol 2
	DGIP3	DGI Protocol 3

dDGIType

Domain Description	Code	Code Description
Source of the Illicit Discharge	N1	Laundry Washwater (residential or commercial)
	N2	Commercial Vehicle Washing
	N3	Floor Drains
	N4	Miscellaneous High Nutrient Discharge
	N5	Sanitary Direct Connection
	N6	Sewage Pipe Exfiltration
	N7	Drinking Water Transmission Loss
	N8	Dry Weather Sanitary Sewer Overflows

dDocType

Domain Description	Code	Code Description
Type of Documents and Files that Have Been Submitted	AOC	Assessment of Controls e.g., stream assessment reports, hydrologic and or hydraulic analysis, monitoring modification, stream restoration analysis
	LEG	Legal Authority
	LFR	Litter and Floatables Report
	MP	Management Programs e.g., SWM plan modification details, report on problems and modifications in implementing ESD to the MEP
	ORG	Permit Administration e.g., Organizational chart
	PED	Public Education e.g., public education efforts summary
	PMM	Property Management and Maintenance e.g., pollution prevention plan report, street sweeping description, catch basin cleaning description, alternate maintenance program narrative.
	REAPP	Reapplication for NPDES Permit
	RESTP	Restoration Plans and TMDL e.g., watershed assessments, restoration plans, restoration plan public comments, impervious surface area assessment, TMDL assessment report with tables
	SID	Source Identification e.g., documents for source identification requirements.
	TLR	Trash and Litter Report
	OTH	Other Document

dErosion

Domain Description	Code	Code Description
Erosion in Outfall Area	L	Light
	M	Moderate
	N	None
	S	Severe

dFacType

Domain Description	Code	Code Description
Type of Facility	Category i	Category i - Industry subject to Federal effluent standards
	Category ii	Category ii - Heavy Manufacturing
	Category iii	Category iii - Mineral Industry
	Category iv	Category iv - Hazardous Waste
	Category v	Category v - Landfills
	Category vi	Category vi - Recycling/Salvage
	Category vii	Category vii - Steam Electric Plants
	Category viii	Category viii - Transportation
	Category ix	Category ix - Treatment Works
	Category x	Category x - Construction
	Category xi	Category xi - Light Industry

dFloatables

Domain Description	Code	Code Description
Type of Floatable	N	None
	OS	Oil Sheen
	SE	Sewage
	T	Trash
	OTH	Other

dFTWType

Domain Description	Code	Code Description
Types of FTWs	1	10%
	2	11-20%
	3	21-30%
	4	31-40%
	5	41-50%

dHUC12digit

Domain Description	Code	Code Description
USGS 12 Digit Hydrologic Unit Code		Please see geodatabase for full list of 12 digit watersheds

dIDDEStatus

Domain Description	Code	Code Description
Status of the Illicit Discharge	E	Eliminated
	C	In process of correction
	I	Source under investigation

dImpStatus

Domain Description	Code	Code Description
Project Status	C	Complete
	P	Planning
	UC	Under Construction

dJurisdiction

Domain Description	Code	Code Description
Jurisdiction	AA	Anne Arundel County
	AL	Allegany County
	BA	Baltimore County
	BC	Baltimore City
	CA	Caroline County
	CE	Cecil County
	CH	Charles County
	CR	Carroll County
	CV	Calvert County
	DO	Dorchester County
	FR	Frederick County
	GA	Garrett County
	HA	Harford County
	HO	Howard County
	KE	Kent County
	SH	Maryland State Highway Administration
	MO	Montgomery County
	PG	Prince George's County
	QA	Queen Anne's County
	SM	St. Mary's County
	SO	Somerset County
	TA	Talbot County
	WA	Washington County
	WI	Wicomico County
	WO	Worcester County

dMD8Digit

Domain Description	Code	Code Description
Maryland 8 Digit Hydrologic Unit Code	2130705	Aberdeen Proving Ground
	2140205	Anacostia River
	2140502	Antietam Creek
	2130102	Assawoman Bay
	2130703	Atkisson Reservoir
	2130101	Atlantic Ocean
	2130604	Back Creek
	2130901	Back River
	2130903	Baltimore Harbor
	2130207	Big Annemessex River
	2130606	Big Elk Creek
	2130803	Bird River
	2130902	Bodkin Creek
	2130602	Bohemia River
	2140104	Breton Bay
	2131108	Brighton Dam
	2120205	Broad Creek
	2130701	Bush River

	2130704	Bynum Run
	2140207	Cabin John Creek
	5020204	Casselman River
	2140305	Catoctin Creek
	2130106	Chincoteague Bay
	2130607	Christina River
	2050301	Conewago Creek
	2140504	Conococheague Creek
	2120204	Conowingo Dam Susq R
	2130507	Corsica River
	5020203	Deep Creek Lake
	2120202	Deer Creek
	2130204	Dividing Creek
	2140304	Double Pipe Creek
	2130501	Eastern Bay
	2141002	Evitts Creek
	2140511	Fifteen Mile Creek
	2130307	Fishing Bay
	2130609	Furnace Bay
	2141004	Georges Creek
	2140107	Gilbert Swamp
	2130801	Gunpowder River
	2130905	Gwynns Falls
	2130401	Honga River
	2130103	Isle of Wight Bay
	2130904	Jones Falls
	2130511	Kent Island Bay
	2130504	Kent Narrows
	2120201	L Susquehanna River
	2130506	Langford Creek
	2130907	Liberty Reservoir
	2140506	Licking Creek
	2130402	Little Choptank
	2140505	Little Conococheague
	2130605	Little Elk Creek
	2130804	Little Gunpowder Falls
	2131105	Little Patuxent River
	2140509	Little Tonoloway Creek
	5020202	Little Youghiogheny R
	2130805	Loch Raven Reservoir
	2139998	Lower Chesapeake Bay
	2130505	Lower Chester River
	2130403	Lower Choptank
	2130601	Lower Elk River
	2130804	Little Gunpowder Falls
	2131105	Little Patuxent River
	2140509	Little Tonoloway Creek
	5020202	Little Youghiogheny R

	2130805	Loch Raven Reservoir
	2139998	Lower Chesapeake Bay
	2130505	Lower Chester River
	2130403	Lower Choptank
	2130601	Lower Elk River
	2130802	Lower Gunpowder Falls
	2140302	Lower Monocacy River
	2130202	Lower Pocomoke River
	2130301	Lower Wicomico River
	2130702	Lower Winters Run
	2131001	Magothy River
	2130208	Manokin River
	2140503	Marsh Run
	2130306	Marshyhope Creek
	2140111	Mattawoman Creek
	2139997	Middle Chesapeake Bay
	2130509	Middle Chester River
	2131106	Middle Patuxent River
	2130807	Middle River - Browns
	2130502	Miles River
	2130302	Monie Bay
	2140110	Nanjemoy Creek
	2130305	Nanticoke River
	2130205	Nassawango Creek
	2130105	Newport Bay
	2130608	Northeast River
	2120203	Octoraro Creek
	2140204	Oxon Creek
	2130906	Patapsco River L N Br
	2131101	Patuxent River lower
	2131102	Patuxent River middle
	2131104	Patuxent River upper
	2140203	Piscataway Creek
	2130201	Pocomoke Sound
	2140109	Port Tobacco River
	2140508	Potomac River AL Cnty
	2140301	Potomac River FR Cnty
	2141001	Potomac River L N Branch
	2140101	Potomac River L tidal
	2140102	Potomac River M tidal
	2140202	Potomac River MO Cnty
	2141005	Potomac River U N Branch
	2140201	Potomac River U tidal
	2140501	Potomac River WA Cnty
	2130806	Prettyboy Reservoir
	2140206	Rock Creek
	2131107	Rocky Gorge Dam
	2130908	S Branch Patapsco

	2130610	Sassafras River
	2141006	Savage River
	2140208	Seneca Creek
	2131002	Severn River
	2140510	Sideling Hill Creek
	2130104	Sinepuxent Bay
	2131003	South River
	2130508	Southeast Creek
	2140105	St. Clements Bay
	2140103	St. Mary's River
	2130611	Stillpond-Fairlee
	2130706	Swan Creek
	2130206	Tangier Sound
	2140507	Tonoloway Creek
	2140512	Town Creek
	2130308	Transquaking River
	2130405	Tuckahoe Creek
	2139996	Upper Chesapeake Bay
	2130510	Upper Chester River
	2130404	Upper Choptank
	2130603	Upper Elk River
	2140303	Upper Monocacy River
	2130203	Upper Pocomoke River
	2131005	West Chesapeake Bay
	2131004	West River
	2131103	Western Branch
	2130303	Wicomico Creek
	2140106	Wicomico River
	2130304	Wicomico River Head
	2141003	Wills Creek
	2130503	Wye River
	5020201	Youghiogheny River
	2140108	Zekiah Swamp

dOdor

Domain Description	Code	Code Description
Type of Odor	G	Gas
	N	None
	OL	Oil
	RS	Rancid-Sour
	SE	Sewage
	S	Sulfur
	OTH	Other

dPassFail

Domain Description	Code	Code Description
BMP Status	F	Fail
	P	Pass

dPollutant

Domain Description	Code	Code Description
TMDL Pollutant	AL	Aluminum – lbs/yr
	Alp	Aluminum (pH surrogate) - lbs/yr
	NH3	Ammonia (pH surrogate) - lbs/yr
	BOD	Biochemical Oxygen Demand – lbs/yr
	BODG	Biochemical Oxygen Demand; growing season – lbs/growing season
	BODL	Biochemical Oxygen Demand; low flow – lbs/month
	BODM	Biochemical Oxygen Demand; monthly – lbs/month
	CaCO3	Calcium Carbonate Equivalents- hg/yr
	CBOD	Carbonaceous Biochemical Oxygen Demand; low flow - lb/yr
	CHDN	Chlordane Concentration –µg/L
	E	Enterococci – Billion MPN/Day
	ECOLID	Escherichia coli - Billion MPN/Day
	ECOLIY	Escherichia coli - Billion MPN/Year
	FC	Fecal Coliform – Billion Counts/Day
	FE	Iron (pH surrogate) – lbs/yr
	HG	Mercury – grams/yr
	NO2	Nitrate (pH Surrogate) - lbs/yr
	N	Nitrogen (Total) – lbs/yr
	NG	Nitrogen; growing season – lbs/growing season
	NL	Nitrogen; low flow – lbs/month
	NBOD	Nitrogenous Biochemical Oxygen Demand - lbs/month
	PCB-g	Polychlorinated Biphenyls – grams/yr
	pH	pH
	P	Phosphorus (Total) - lbs/yr
	PG	Phosphorus; growing season – lbs/growing season
	PL	Phosphorus; low flow – lbs/month
	PCB-lbs	Polychlorinated Biphenyls – lbs/yr
	SO42-	Sulfate (pH surrogate) – lbs/yr
	TSS	Total Suspended Solids (TSS) – tons/yr
	TSSG	Total Suspended Solids (TSS); growing season – tons/growing season
	TSSM	Total Suspended Solids (TSS); monthly – tons/month
	T	Trash
	NA	Not Applicable
	OTH	Other
	UNK	Cause Unknown

dQuantityManagement

Domain Description	Code	Code Description
Levels of treatment	V01	Cpv
	V02	2-yr
	V03	10-yr
	V04	100-yr
	V05	Cpv & 10-yr
	V06	Cpv & 100-yr
	V07	Cpv, 2-yr, & 10-yr
	V08	Cpv, 2-yr, & 100-yr
	V09	Cpv, 2-yr, 10-yr, & 100-yr
	V10	2-yr & 10-yr
	V11	2-yr & 100-yr
	V12	2-yr, 10-yr, & 100-yr
	V13	Quantity Not Provided
	V14	Other Local Requirement
	V15	Cpv, 10-yr, & 100-yr
	Dev	Under Development

dQuarter

Domain Description	Code	Code Description
Quarter of the Year	Q1	Quarter 1
	Q2	Quarter 2
	Q3	Quarter 3
	Q4	Quarter 4

dSDVType

Domain Description	Code	Code Description
Types of Storm Drain Cleaning	ORG	Organic
	INORG	Inorganic

dSoilRestLvl

Domain Description	Code	Code Description
Level of Urban Soil Restoration	1	Level 1
	2	Level 2

dSource

Domain Description	Code	Code Description
Source of the Illicit Discharge	L	Laundry Washwater (residential or commercial)
	V	Commercial and Mobile Vehicle Washing
	F	Floor Drains
	C	Sanitary Direct Connection
	E	Sewer Pipe Exfiltration
	D	Drinking Water Transmission Loss
	S	Dry Weather Sanitary Sewer Overflows
	O	Other Illicit Discharge – Explanation required in general comments

	N	Non-illicit Discharge (e.g., firefighting activities) – Explanation required in general comments
	U	Unknown – Explanation required in general comments

dState

Domain Description	Code	Code Description
State	AL	Alabama
	AK	Alaska
	AZ	Arizona
	AR	Arkansas
	CA	California
	CO	Colorado
	CT	Connecticut
	DE	Delaware
	FL	Florida
	GA	Georgia
	HI	Hawaii
	ID	Idaho
	IL	Illinois
	IN	Indiana
	IA	Iowa
	KS	Kansas
	KY	Kentucky
	LA	Louisiana
	ME	Maine
	MD	Maryland
	MA	Massachusetts
	MI	Michigan
	MN	Minnesota
	MS	Mississippi
	MO	Missouri
	MT	Montana
	NE	Nebraska
	NV	Nevada
	NH	New Hampshire
	NJ	New Jersey
	NM	New Mexico
	NY	New York
	NC	North Carolina
	ND	North Dakota
	OH	Ohio
	OK	Oklahoma
	OR	Oregon
	PA	Pennsylvania
	RI	Rhode Island
	SC	South Carolina

	SD	South Dakota
	TN	Tennessee
	TX	Texas
	UT	Utah
	VT	Vermont
	VA	Virginia
	WA	Washington
	WV	West Virginia
	WI	Wisconsin
	WY	Wyoming
	DC	Washington DC

dStructCond

Domain Description	Code	Code Description
Structural Condition of Outfall	CC	Concrete Cracking
	SP	Concrete Spalling
	N	Normal
	OTH	Other

dSweepingSchedule

Domain Description	Code	Code Description
Types of sweeping frequencies	A1	Advanced Street Sweeping - 1 pass/12 weeks
	A2	Advanced Street Sweeping - 1 pass/8 weeks
	A3	Advanced Street Sweeping - 1 pass/4 weeks
	A4	Advanced Street Sweeping - 1 pass/2 weeks
	A5	Advanced Street Sweeping - 1 pass/week
	A6	Advanced Street Sweeping - 2 passes/week
	A7	Advanced Street Sweeping - Spring and Fall 1 pass/1-2 weeks else monthly
	A8	Advanced Street Sweeping - Spring 1 pass/1-2 weeks else monthly
	M1	Mechanical Broom - 1 pass/4 weeks
	M2	Mechanical Broom - 1 pass/week
	M3	Mechanical Broom - 2 passes/week

dSWPPPlan

Domain Description	Code	Code Description
Stormwater Pollution Prevention Plan	N	No
	NEC	No Exposure Certification
	Y	Yes

dVegCond

Domain Description	Code	Code Description
Vegetative Condition of Outfall	EG	Excessive Growth
	IG	Inhibited Growth
	N	Normal
	OTH	Other

Appendix G: MDE Response to Geodatabase Comments July 2025 Update

The Maryland Department of the Environment (MDE) distributed Version 2.0 of the Geodatabase in October 2024. Permittees submitted comments on this version in the FY2024 Annual Reports. The comments, responses and direction are provided in the table below. All revisions have been updated in Version 2.1 of the User's Guide, Excel Schema, and Geodatabase Shell (GDB).

Key:

CR= Carroll County

CH= Charles County

HO= Howard County

Geodatabase Item	Summary of Comments	MDE Response and Direction
BMP Feature Class		
BMP_CLASS Field	CR noted the field size in the User's Guide and Excel should be 3 characters for consistency with the GDB and Schema.	The field size has been updated in the User's Guide.
Alternative BMPs- Discharges from Grey Infrastructure Protocols Table		
CB_SEG_SHED	CH and CR indicated that the field size in the User's Guide and Excel should be 9 characters for consistency with the GDB.	The User's Guide and Schema have been updated.
Alternative BMPs- AltBMPPoly Feature Class		
Annual Practices	CR recommended changing the BMP_STATUS field to "Removed" when reporting previous years of annual practices, and requested MDE's example represent this guidance.	The data entry example in Appendix D of the User's Guide has been updated to reflect the suggested changes for the BMP_STATUS field.
NUMBER_OF_TREES_PLANTED	CR and CH noted the field type in the User's Guide should be a Double field instead of Short Integer to be consistent with the GDB and Schema.	The field type has been changed.
SOIL_REST_LEVEL	CR and CH requested the field type in the User's Guide and Excel be changed to Short Integer for consistency with the GDB.	The field type has been changed.

Management Programs- Erosion and Sediment Control- Quarterly Grading Permit FC		
LATITUDE and LONGITUDE	CR indicated the fields in the User's Guide should be optional to be consistent with the GDB and Schema.	Fields changed to optional.
Management Programs- Property Management- Municipal Facilities Feature Class		
SALT_TRAINING	CR noted the placeholder, - 9999, was used for older records that did not have information for the mandatory field.	This is acceptable.
Narrative Files		
MON_STATION_ID	CR noted this field should be removed because the monitoring site feature class has been removed.	The field has been removed from the User's Guide, Schema, and GDB.
PERMIT_YEAR	CR indicated this field should be removed or the validation check should be updated.	The field has been removed from the User's Guide, Excel Schema, and GDB.
Domains		
dFacType	CR noted "OTH GHP Req" should be removed because GHP data is no longer reported in the feature class.	The "OTH GHP Req" has been removed from the domain in the schema, User's Guide, Schema, and GDB.
dQuantityManagement	CR noted that the coded values in the User's Guide and Excel should be changed from "V1-V9" to "V01-V09" for consistency with the GDB.	The coded values have been updated.
dSweepingSchedule	CR noted "Advanced Street Sweeping" and "Mechanical Broom" should be included in the code descriptions in the User's Guide and Schema for consistency with the GDB.	The code descriptions have been updated. Also, the coded values for M1-M3 were corrected in the GDB.
dFlowValue dIDDEProtocol dOn_OffSite dOutfallMaterial dOutfalType dQuality dShrProtocol dStrProtocol	CR indicated there are a number of domains that are no longer used.	These domains are not required and have been removed.
Relationship Classes		
rBMP_BMPInspections	HO noted there should be a relationship class between the BMP feature class and BMPInspections table called rBMP_BMPInspections, as noted in the User's Guide.	Thank you. The relationship class was added to the GDB.