



FINAL
Chesapeake Bay Phase III
Total Maximum Daily Load Action Plan

JBLE-Langley Virginia

Permit Year 1: 1 July 2023 - 30 June 2024



JBLE-Langley
633 CES/CEIE
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September 2024

TABLE OF CONTENTS

1.0	INTRODUCTION	1-1
2.0	LEGAL AUTHORITY	2-1
3.0	MS4 SERVICE AREA	3-1
4.0	LOAD AND REDUCTION CALCULATIONS	4-1
4.1	Existing Source Loads	4-1
4.2	New Source Loads	4-1
4.3	Grandfathered Project Loads	4-4
4.4	Summary of Load Reduction Requirements	4-4
5.0	BMP CREDIT CALCULATIONS (MEANS AND METHODS)	5-1
5.1	Structural BMPs	5-1
5.2	Street Sweeping	5-4
5.3	Land Use Change	5-6
5.4	Shoreline Management	5-7
5.5	Storm Drain Cleaning	5-10
5.6	Future BMPs	5-10
5.7	BMP Costs	5-10
6.0	PROGRESS SUMMARY	6-1
7.0	PUBLIC COMMENTS	7-1
8.0	REFERENCES	8-1

LIST OF APPENDICES

- Appendix A BMPs Implemented Prior to 01 July 2023
- Appendix B BMPs to be Implemented After 01 July 2024

LIST OF TABLES

Table 1-1. Pollutant Percent Reduction Requirements by Permit Cycle	1-1
Table 3-1. Description of Land Cover Types within JBLE–Langley	3-1
Table 3-2. Land Cover Summary for the 2009 and 2023 Timeframes	3-2
Table 4-1. Existing Source Loads and Reduction Requirements [Table 3d].....	4-2
Table 4-2. New Source Loads.....	4-3
Table 4-3. Summary of the Third Permit Cycle Required Load Reductions.....	4-4
Table 5-1. Summary of Existing Post-Construction BMP Types.....	5-2
Table 5-2. Summary of Credits from Existing Post-Construction BMPs.....	5-2
Table 5-3. Summary of Annual Street Sweeping Credits.....	5-4
Table 5-4. Summary of Land Use Change Credits	5-7
Table 5-5. Summary of Shoreline Management Credits	5-9
Table 5-6. Summary of Annual Storm Drain Cleaning Credits.....	5-10
Table 5-7. Summary of estimated BMP Costs to Meet 100% Reduction Requirements	5-11
Table 6-1. Summary of Reduction Requirements and Credits by Strategy	6-1

LIST OF FIGURES

Figure 3-1. JBLE–Langley Industrial and MS4 Permitted Service Areas.....	3-3
Figure 3-2. JBLE–Langley 2010 vs. 2020 Census Urban Area Comparison	3-4
Figure 3-3. JBLE–Langley Previous vs. Current Industrial Permit (VAR1052285) Comparison	3-5
Figure 3-4. JBLE–Langley 2009 Land Cover.....	3-6
Figure 3-5. JBLE–Langley 2023 Land Cover.....	3-7
Figure 5-1. JBLE–Langley Existing Post-Construction BMPs	5-3
Figure 5-2. MS4 Area Serviced by Street Sweeping During 01 July 2022 through 30 June 2023.....	5-5
Figure 5-3. Land Use Change BMPs.....	5-6
Figure 5-4. Areas of Shoreline Management.....	5-8

LIST OF ABBREVIATIONS AND ACRONYMS

ac	Acre
BMP	Best management practice
CUA	Census Urbanized Area
DBH	Diameter at breast height
EOS	Edge of Stream
EPA	Environmental Protection Agency
ESRI	Environmental Systems Research Institute
ft	Feet
ft/yr	Feet per year
GIS	Geographic information system
JBLE–Langley	Joint Base Langley-Eustis – Langley
L2	Level 2
lbs	Pounds
lbs/ac/yr	Pounds per acre per year
lbs/yr	Pounds per year
lbs/ft/yr	Pounds per foot per year
MS4	Municipal Separate Storm Sewer System
NASA	National Aeronautics and Space Administration
NPDES	National Pollutant Discharge Elimination System
POC	Pollutant of concern
SMF	Stormwater management facility
TMDL	Total Maximum Daily Load
TN	Total nitrogen
TP	Total phosphorous
TSS	Total suspended solids
USGS	United States Geological Survey
VAC	Virginia Administrative Code
VDEQ	Virginia Department of Environmental Quality
VGIN	Virginia Geographic Information Network
VIMS	Virginia Institute of Marine Science
VPDES	Virginia Pollutant Discharge Elimination System
VSMP	Virginia Stormwater Management Program
WIP	Watershed Implementation Plan

Chesapeake Bay TMDL Action Plan Requirements Cross-Reference Table			
Guidance Memo 20-2003 (Rev. 06 FEB 2021) Chesapeake Bay TMDL Special Condition Guidance Part V – Chesapeake Bay TMDL Action Plan Elements		MS4 Permit 9VAC25-890- 40 Part II.A.	JBLE–Langley TMDL Action Plan Section
1	Existing, new or modified legal authority	12.b.(1)	2.0
2	Load and cumulative reduction calculations for each river basin	12.b.(2)	4.0
2a	The total pollutant load reductions necessary to reduce the annual POC loads from existing sources	3	4.1
2b	“New Sources” initiated between 01 July 2009 – 31 October 2023	4	4.2
2c	Offset the increased loads from projects grandfathered in accordance with 9VAC25-870-48	5	4.3
3	The total reductions achieved as of 01 November 2023 for each pollutant of concern in each river basin	12.b.(3)	5.7
4	BMPs implemented prior to 01 November 2023 to achieve reductions for the Chesapeake Bay TMDL	12.b.(4)	Appendix A
5	BMPs implemented by the permittee prior to the expiration of this permit to meet cumulative reductions	12.b.(5)	5.0, Appendix A
6	Public comments on draft Chesapeake Bay TMDL Action Plan	12.b.(6)	7.0

1.0 INTRODUCTION

In 2010, the United States Environmental Protection Agency (EPA) established the Chesapeake Bay Total Maximum Daily Load (TMDL) to address excess nitrogen, phosphorus, and total suspended solids, known as pollutants of concern (POCs) in the Chesapeake Bay (EPA, 2010). A TMDL is the maximum amount of a pollutant that a water body can assimilate and still support its designated use. The Chesapeake Bay watershed encompasses over 64,000 square miles across the District of Columbia and large sections of Delaware, Maryland, New York, Pennsylvania, West Virginia, and Virginia.

In the Phase I, Phase II, and Phase III Chesapeake Bay Watershed Implementation Plan (WIP), the Commonwealth of Virginia committed to a phased approach to reducing nutrients and suspended solids discharging from Municipal Separate Storm Sewer Systems (MS4s). Part II.A of the Joint Base Langley Eustis – Langley Air Force Base (JBLE–Langley) MS4 permit (Permit No. VAR040140, effective 01 November 2023) requires the base to prepare a Chesapeake Bay TMDL Action Plan that demonstrates plans to meet the required reductions of the POCs. The plan must be submitted to the Virginia Department of Environmental Quality (VDEQ) for review and approval.

The Action Plan is an annual report on the progress made by the base in meeting the Chesapeake Bay TMDL pollutant reduction requirements, specifically the Level 2 (L2) scoping run as specified in the 2010 Phase I WIP (VDEQ, 2021a). The L2 reductions are to be met in phases corresponding to the permit cycles, as outlined in Table 1-1.

Table 1-1. Pollutant Percent Reduction Requirements by Permit Cycle

Permit Cycle	Timeframe	Cycle Percent Reduction	Cumulative Percent Reduction
1	2013-2018	5%	5%
2	2018-2023	35%	40%
3*	2023-2028	60%	100%

* Denotes current permit cycle

This Action Plan presents the JBLE–Langley estimated load contribution, required load reductions, and pollutant reduction credits. The plan also reports current exceedance of the 100% pollutant reduction requirement. The methodology used to calculate the pollutant loads and credits is based on VDEQ Guidance Memo No. 20-2003 (Guidance Document) (VDEQ, 2021a).

2.0 LEGAL AUTHORITY

JBLE–Langley is authorized to discharge stormwater from the installation in accordance with two permits issued by VDEQ under the Virginia Pollutant Discharge Elimination System (VPDES): the Industrial Stormwater Permit (Permit No. VAR052285, effective 01 July 2019) and the MS4 Permit (Permit No. VAR040140). The MS4 Permit is in its third permit cycle and is currently effective 01 November 2023 through 31 October 2028.

The Industrial stormwater VPDES permit includes specific stormwater management requirements for the following sectors: 1) air transportation, 2) scrap and waste recycling facilities, material recovery facilities, and 3) transportation and warehousing. The areas of the base covered by the Industrial Stormwater Permit are excluded from the MS4 permit area, as permitted by the Guidance Document.

The MS4 permit requires JBLE–Langley to develop, implement, and enforce an MS4 Program designed to reduce the discharge of pollutants from the MS4 (excluding the area covered by the Industrial Permit) to the maximum extent practicable to protect water quality. Part II of the MS4 Permit requires JBLE–Langley to prepare a Chesapeake Bay TMDL Action Plan that demonstrates plans to meet the required reductions of the POCs.

All construction and maintenance work performed at JBLE–Langley must comply with the JBLE–Langley Environmental Special Conditions document, which identifies Federal, State, and local environmental regulations and procedures pertaining to common construction, renovation, repair, and demolition activities on the base (JBLE–Langley, 2021).

3.0 MS4 SERVICE AREA

A determination of the base pollutant load requires an estimate of the permittee’s MS4 service area as of 30 June 2009. The MS4 service area was delineated based on land coverage derived from 2009 aerial imagery obtained from the Virginia GIS Clearinghouse (Virginia Geographic Information Network [VGIN], 2009). A summary of land cover types delineated across the entire base is provided in Table 3-1.

Table 3-1. Description of Land Cover Types within JBLE–Langley

Land Cover Type	Description
Impervious	Buildings, roads, parking lots, sidewalks, railroads, and airfield runways
Pervious	Turf and landscaped areas
Forest	Wooded areas with a minimum contiguous area of 30 meters x 30 meters ¹
Agriculture	Pastureland for horses
Natural Areas	Tidal wetlands and marshes
Open Water	Lakes and streams

Note:

¹ Forest classification is also subject to a minimum diameter at breast height (DBH) (varying by tree population density) as described in Appendix V.H of the Guidance Document (VDEQ, 2021a).

The MS4 service area consists of impervious (regulated urban impervious) and pervious (regulated urban pervious) areas within the MS4 boundary that are not already covered under the industrial permit VAR052285. Adjustments to the MS4 service area were necessary given that there was a decrease between the 2010 and 2020 decennial census data for urban areas. A desktop review of the base topography revealed no receiving/exporting sheet flow runoff from/to adjacent permittees. The final MS4 service area boundary was used to calculate existing source loads and load reduction requirements, as detailed in Section 4.1.

The land cover delineation process outlined above was repeated using the 2023 base map imagery available from ArcGIS (Environmental Systems Research Institute [ESRI], 2023), the most recent data available. The final 2023 land cover layer was used to calculate loads due to New Sources (see Section 4.2) and BMP credits (see Section 5.0). A summary of the base’s land cover for 2009, 2022, and the current data for 2023 is presented in Table 3-2.

Table 3-2. Land Cover Summary for the 2009 and 2023 Timeframes

Land Use ^{1, 2, 3}	Acres (2009)	Acres (2022)	Acres (2023)
MS4 Regulated Urban Impervious	566.7	595.8	498.6
MS4 Regulated Urban Pervious	1,214.6	1,187.9	866.6
Industrial Permitted Impervious	313.0	298.6	368.6
Industrial Permitted Pervious	406.2	420.6	608.5
Unregulated Impervious	N/A	N/A	27.7
Unregulated Pervious	N/A	N/A	130.7
Unpermitted Forest Area	317.8	292.9	295.2
Unpermitted Pasture Area	12.5	12.9	12.9
Unpermitted Natural Area	562.3	584.4	584.4
Unpermitted Water Area	247.5	247.4	247.4
Total⁴	3,640.6	3,640.6	3,640.6

Notes:

¹ *MS4 Regulated* refers to areas within the MS4 Permit area. *Industrial Permitted* refers to areas within the Industrial Permit area.

² *Unregulated* refers to areas previously considered a part of the MS4 Service Area using the 2010 Urban Census Data in accordance with the previous permit. Now, the areas are outside of the 2020 Census area and no longer considered a part of the MS4 Service Area; however, they are located within the installation boundary and must be considered in calculations.

³ *Unpermitted* refers to areas within the 2020 Census Urban Area boundary but considered undeveloped (e.g., forests, pastures, natural areas, open water). The stormwater system would not impact these areas.

⁴ Minor calculation discrepancies are accounted for in rounding.

It should be noted that the decrease in MS4 service area between 2022 and 2023 is accounted for in the decrease between the 2010 and 2020 decennial census urban areas (see Figure 3-2), as well as an increase in the amount of permitted lands covered under the industrial permit VAR1052285 (see Figure 3-3).

Additionally, the area shown in Figure 3-1 which does not have a hatch, consists of the Langley National Aeronautics and Space Administration (NASA) Research Center, which is covered under a separate MS4 Permit No. VAR040092 and for which area was excluded from Table 3-2 calculations.

Maps of the industrial permitted and MS4 service areas, 2010 to 2020 census urban area comparison, previous to current industrial permit comparison, 2009 land cover, and 2023 land cover are presented as Figures 3-1 through 3-5, respectively.

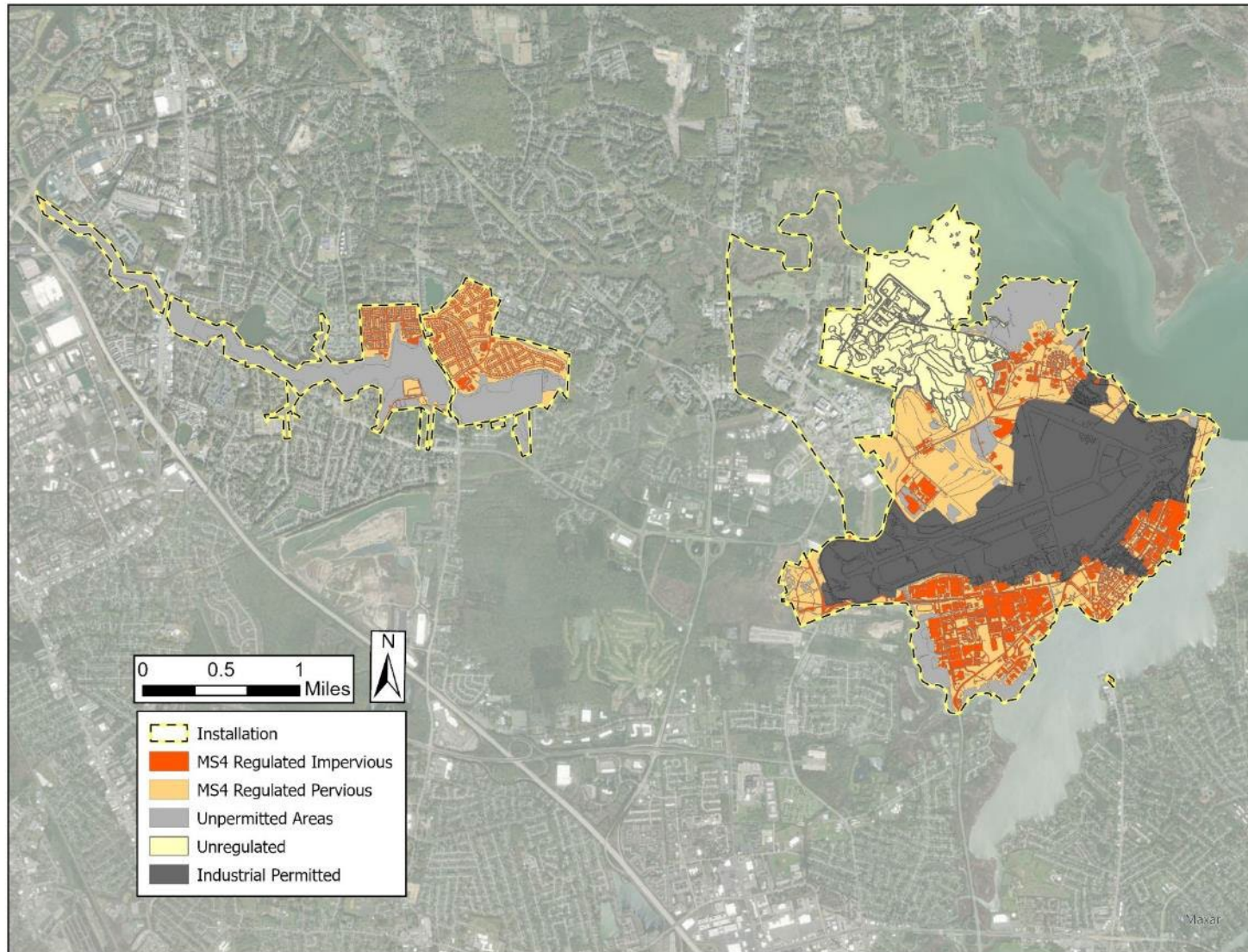


Figure 3-1. JBLE–Langley Industrial and MS4 Permitted Service Areas

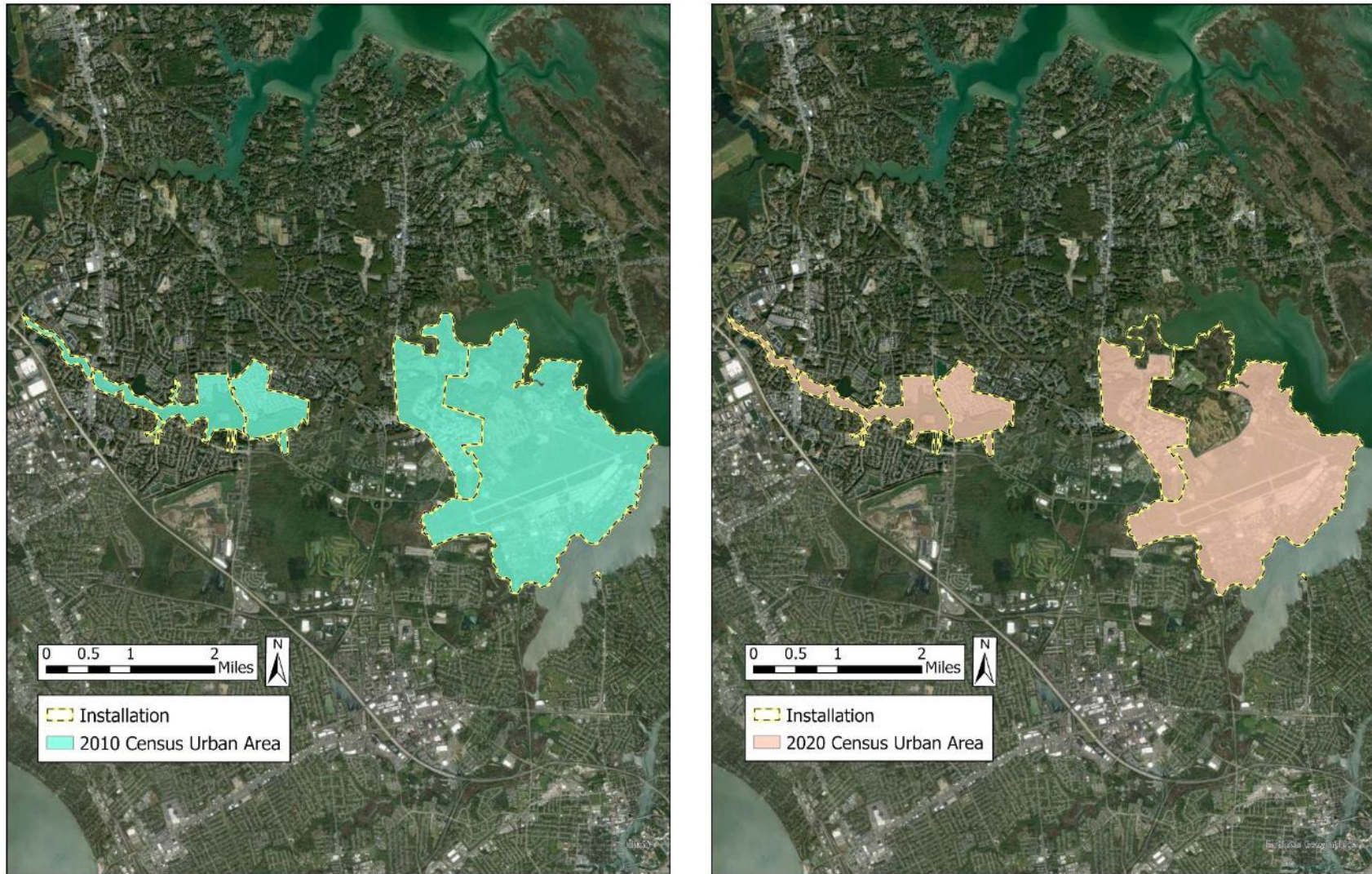


Figure 3-2. JBLE–Langley 2010 vs. 2020 Census Urban Area Comparison

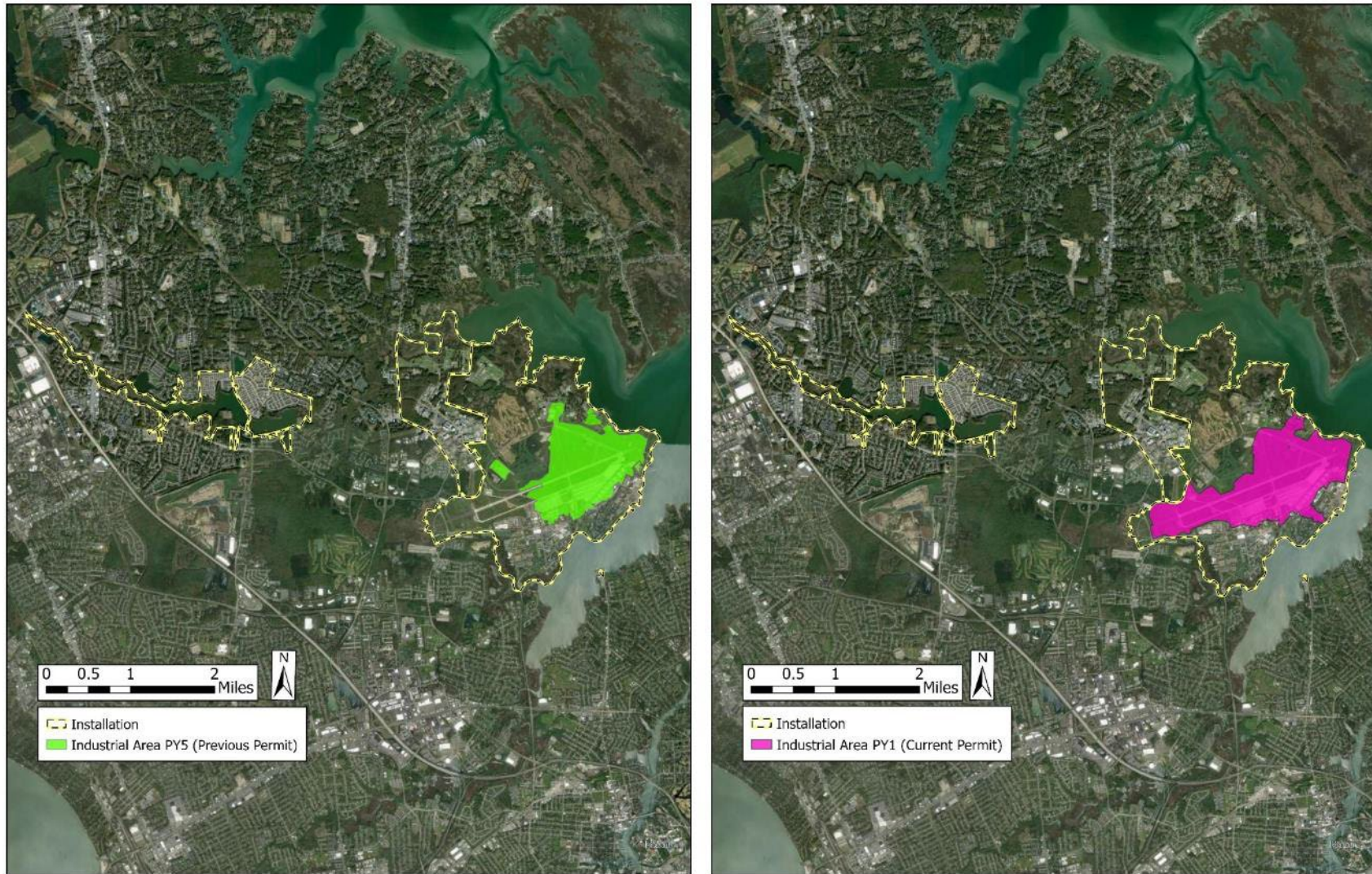


Figure 3-3. JBLE–Langley Previous vs. Current Industrial Permit (VAR1052285) Comparison

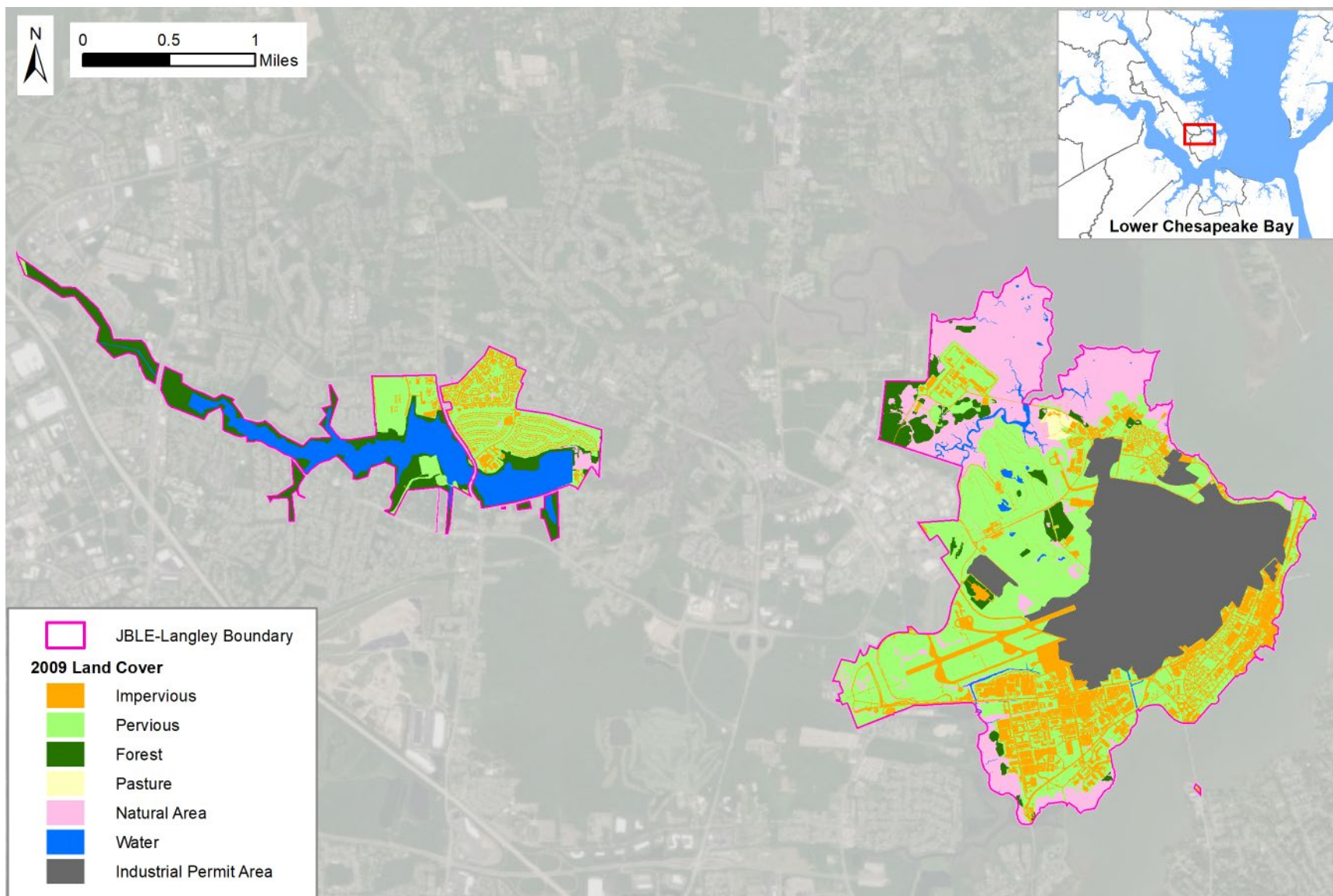


Figure 3-4. JBLE-Langley 2009 Land Cover

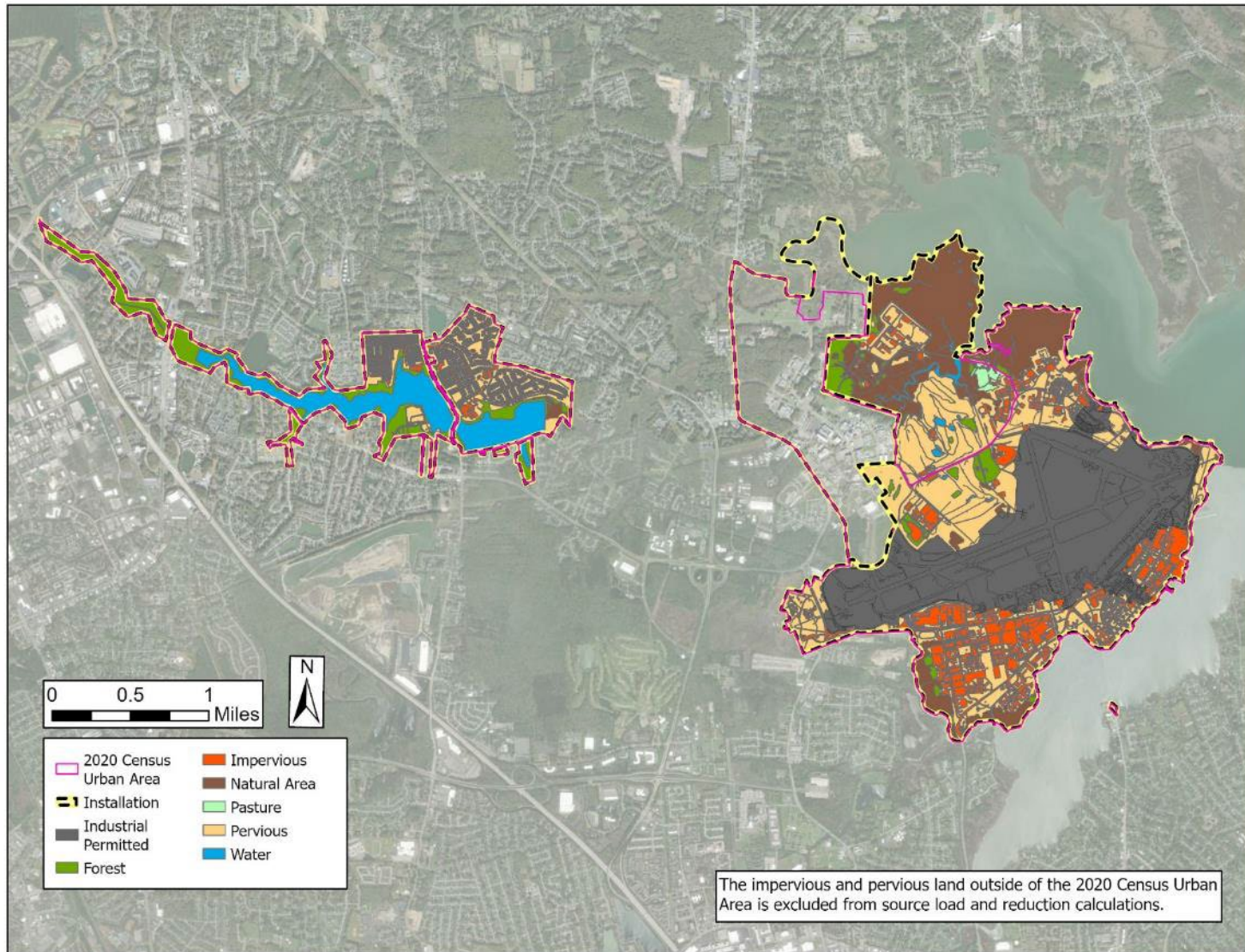


Figure 3-5. JBLE–Langley 2023 Land Cover

4.0 LOAD AND REDUCTION CALCULATIONS

The source load and reduction values for total nitrogen, total phosphorus, and total suspended solids from existing developed lands (served by the MS4 as of 30 June 2009) and newly developed or redeveloped lands (contributed by the base after 01 July 2009) were calculated using the means and methods described in the Guidance Document (VDEQ, 2021a). It should be noted that the requirement for total suspended solids reduction has been removed from MS4 Permit requirements under this current and third permit cycle. Calculations regarding total suspended solids removal are kept in this plan for informational purposes only.

The base is required to reduce 100% of the existing and new source loads by the end of this third permit cycle (31 October 2028). New source loads have been offset by eligible BMPs to meet the current reduction requirement. Remaining reductions from existing source loads are discussed in Section 5.0.

4.1 Existing Source Loads

The Existing Source Loads and required reductions were calculated using a modified version of the Table 3d (York River Basin) template of the Guidance Document (VDEQ, 2021a), as presented in Table 4-1.

4.2 New Source Loads

New Source Loads and offsets were calculated using the aggregate accounting method described in the Guidance Document (VDEQ, 2021a) and cover increased loads from new sources initiating construction between 01 July 2009 and 31 October 2023. Total load changes since 01 July 2009 were calculated based on changes in land cover, as shown in Table 4-2.

Table 4-1. Existing Source Loads and Reduction Requirements [Table 3d]

Pollutant	Land Cover (Subsource)	A	B	C	D	E	F
		Loading Rate (lbs/ac/yr) ¹	Existing Regulated Lands as of 30 June 2009 (acres)	Estimated Loads (lbs/yr) ²	Total L2 Loading Reduction	100% Cumulative Reduction Required by 31 October 2028 (lbs/yr) ³	Sum of 100% Cumulative Reduction Required by 31 October 2028 (lbs/yr) ⁴
Nitrogen	Regulated Urban Impervious	7.31	566.7	4,143	9%	373	930
	Regulated Urban Pervious	7.65	1,214.6	9,292	6%	558	
Phosphorus	Regulated Urban Impervious	1.51	566.7	856	16%	137	182
	Regulated Urban Pervious	0.51	1,214.6	619	7.25%	45	
Total Suspended Solids	Regulated Urban Impervious	456.68	566.7	258,801	20%	51,760	59,495
	Regulated Urban Pervious	72.78	1,214.6	88,399	8.75%	7,735	

Notes:

¹ Edge of stream loading rate based on the Chesapeake Bay Watershed Model Progress Run 5.3.2.

² Column C = Column A x Column B.

³ Column E = Column C x Column D.

⁴ Column F = The sum of the subsource cumulative reduction required by 6/30/2028 (lbs/yr) as calculated in Column E.

Minor calculation discrepancies are accounted for in rounding.

lbs/ac/yr – pounds per acre per year

lbs/yr – pounds per year

Table 4-2. New Source Loads

Pollutant	Regulated Urban Land Cover	A	B	C	D	E	F
		Loading Rate (lbs/ac/yr) ¹	Regulated Lands as of 31 October 2023 (ac)	Estimated Loads as of 31 October 2023 (lbs/yr) ²	Estimated Loads as of 30 June 2009 (lbs/yr) ³	Total Load Change (lbs/yr) ⁴	Sum of Total Load Change (lbs/yr) ⁵
Nitrogen	Impervious	7.31	498.6	3,645	4,143	-498	-3,160
	Pervious	7.65	866.6	6,629	9,292	-2,662	
Phosphorus	Impervious	1.51	498.6	753	856	-103	-280
	Pervious	0.51	866.6	442	619	-177	
Total Suspended Solids	Impervious	456.68	498.6	227,701	258,801	-31,100	-56,427
	Pervious	72.78	866.6	63,071	88,399	-25,327	

Notes:

¹ Edge of stream loading rate based on the Chesapeake Bay Watershed Model Progress Run 5.3.2.

² Column C = Column A x Column B.

³ Estimated Loads as of 30 June 2009 are calculated in Table 4-1.

⁴ Column E = Column C - Column D.

⁵ Column F = The sum of the subsource total load change as calculated in Column E.

Minor calculation discrepancies are accounted for in rounding.

ac – acres

4.3 Grandfathered Project Loads

Grandfathered projects are those in accordance with 9VAC25-870-48 (previously numbered 4VAC50-60-48) with an approved site plan prior to 01 July 2012, a state permit issued after 01 July 2014, land disturbance activities commencing after 01 July 2014 that disturb one (1) acre or greater, and where the project utilizes an average land cover condition greater than 16% impervious cover in the design of post-development stormwater management facilities and results in an increased pollutant load (VAC, 2014). The base is required to offset any additional pollutant loads due to grandfathered projects. No grandfathered projects were identified.

4.4 Summary of Load Reduction Requirements

A summary of the JBLE–Langley required load reductions is presented in Table 4-3. The values presented in this table represent the 100% reduction requirements to be achieved by 31 October 2028.

Table 4-3. Summary of the Third Permit Cycle Required Load Reductions

Pollutant of Concern	Subsource	Loading Rate ¹ (lbs/ac/yr)	Existing Regulated Lands ² (ac)	Existing Loads ³ (lbs/yr)	Total L2 Reduction	L2 Reduction Required by 2028	Reduction by Land Cover ⁴ (lbs/yr)	3 rd Permit Cycle Required Reduction ⁵ (lbs/yr)
Total Nitrogen (TN)	Urban Impervious	7.31	595.8	4,355	9%	100%	328	726
	Urban Pervious	7.65	1,187.9	9,087	6%		398	
Total Phosphorous (TP)	Urban Impervious	1.51	595.8	900	16%		120	153
	Urban Pervious	0.51	1,187.9	606	7.25%		32	
Total Suspended Solids (TSS) ⁶	Urban Impervious	456.68	595.8	272,090	20%		45,540	51,059
	Urban Pervious	72.78	1,187.9	86,455	8.75%		5,519	

Notes:

¹ Edge of stream loading rate based on the Chesapeake Bay Watershed Model Progress Run 5.3.2.

² To determine the existing developed acres required in Column B, permittees should first determine the extent of their regulated service area based on the 2020 Census Urbanized Area (CUA). Next, permittees will need to delineate the lands within the 2020 CUA served by the MS4 as pervious or impervious as of the baseline date of 30 June 2009.

³ Existing Loads = Loading Rate x Existing Regulated Lands

⁴ Reduction of Land Cover = Existing Loads based on 2020 CUA and current land use x (Total L2 Reduction by 2028 ÷ 100)

⁵ 3rd Permit Cycle Required Reduction = The sum of the subsource cumulative reduction required by 31 October 2028 (lbs/yr) as calculated in Reduction by Land Cover.

⁶ Although formerly required under the 2018-2023 permit cycle, sediment load reductions are no longer a requirement of the current 2023-2028 permit cycle but have been kept in this plan as a courtesy.

Minor calculation discrepancies are accounted for in rounding.

5.0 BMP CREDIT CALCULATIONS (MEANS AND METHODS)

Individual BMP calculations follow means and methods as described in Part III of the Guidance Document (VDEQ, 2021a) using either the Virginia Stormwater BMP Clearinghouse (Guidance Document Appendix V.A) or approved by the Chesapeake Bay Program (“Bay Program”) (Guidance Document Appendices V.B-V.K). Calculations are based on the most up-to-date efficiencies and baseline requirements when first submitted in the Action Plan.

BMP drainage areas were delineated using a one-meter elevation layer from the United States Geological Survey’s National Elevation Dataset (United States Geological Survey [USGS], 2018). Pollutant loads within the BMP drainage areas were calculated using the 2023 land cover layer and the land cover loading rates provided in Table 3d (for impervious and pervious lands) and Table III.1 (for forested lands) of the Guidance Document (VDEQ, 2021a).

5.1 Structural BMPs

Structural BMPs installed since 01 January 2006 and implemented under conditions of redevelopment, stricter development requirements, or oversizing are eligible for credits as described in Appendix V.E of the Guidance Document (VDEQ, 2021a). BMPs implemented to meet the minimum Virginia Stormwater Management Program (VSMP) technical criteria phosphorous removal requirement for new development or other minimum regulatory requirements are not eligible for credit. Reductions from BMPs implemented after 01 July 2009 are accounted for as offsets to New Source Loads (see Section 4.2) and are not claimed as BMP credits. A summary of the existing post-construction BMPs included in this Action Plan is presented in Table 5-1. A more detailed list of the BMPs and their associated reductions is provided in Appendix A.

It should be noted that several BMPs were excluded from crediting this year due to receiving a failing grade from the most recent inspection, to include BMP 1 (dry extended detention ponds) as well as BMPs 58, 59, 60, 76, and 78 (dry detention ponds). Credits may be re-obtained for these structures once repaired and brought back to functional status. Figure 5-1 shows the location of post-construction BMPs.

Table 5-1. Summary of Existing Post-Construction BMP Types

BMP Type	Timeframe Implemented				Total
	01 Jan 2006 to 30 Jun 2009	01 Jul 2009 to 30 Jun 2018	01 Jul 2018 to 31 Oct 2023	01 Nov 2023 to 31 Oct 2028	
Dry Detention Pond	0	8	1	0	9
Dry Extended Detention Pond	3	2	0	0	5
Vegetated Open Channel – Urban	1	12	5	0	18
Wet Pond or Wetland	1	0	0	0	1
Filtterra Bioretention Systems	0	8	0	0	8
Urban Filtering Practices	0	0	1	0	1
Bioretentions/Raingardens	0	0	3	0	3
Totals	5	30	10	0	45

The pollutant reduction credits for all POCs were determined using the BMP efficiencies provided in Table V.C.1 of the Guidance Document (VDEQ, 2021a), except for the Filtterra Bioretention Systems, whose phosphorous removal efficiency was derived from the Virginia Stormwater BMP Clearinghouse (VDEQ, 2021b). A summary of credits from existing post-construction BMPs is presented in Table 5-2.

Table 5-2. Summary of Credits from Existing Post-Construction BMPs

BMP Timeframe	Number of BMPs	Credits (lbs/yr)		
		Nitrogen	Phosphorus	Total Suspended Solids
2006–2009	5	13.0	2.1	1,138.6
2009–2018 ¹	30	191.6	26.6	10,938.8
2018–2023 ¹	10	18.6	3.3	1,227.4
2023–2028 ¹	0	0.0	0.0	0.0
Totals	45	223	32	13,305

Notes:

¹ Reductions from BMPs installed after 01 July 2009 are accounted for as offsets to New Source Loads (see Section 4.2) rather than BMP credits.

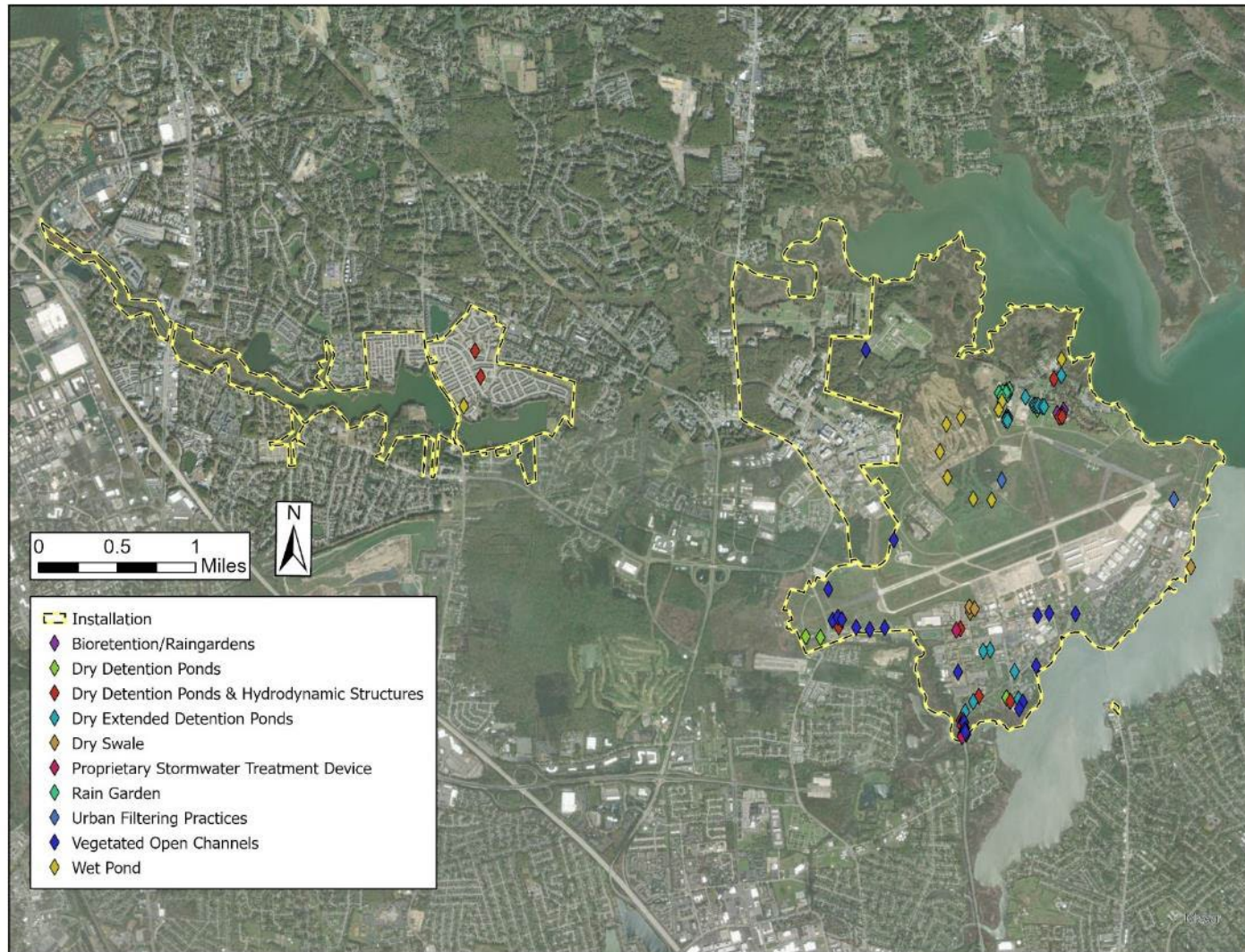


Figure 5-1. JBLE–Langley Existing Post-Construction BMPs

5.2 Street Sweeping

The base performs vacuum powered street sweeping using a regenerative vacuum street sweeper on the airfield, primary roads, secondary roads, and parking lots on a regular basis. Street sweeping credits are calculated based on the methodology described in Appendix V.G of the Guidance Document (VDEQ, 2021a). Four street sweeper trucks are utilized, which include a Schwartz A7000, Tymco 4700 4X2, Tymco 600, and a Tymco 4300 SBA 4X2. Data on frequency and linear miles of roads swept was provided by the base and used to calculate load reduction credits. A summary of annual street sweeping miles swept during 01 July 2022 through 30 June 2023, along with associated credits, is presented in Table 5-3. A map of the streets serviced as part of the base’s street sweeping program is presented in Figure 5-2.

Table 5-3. Summary of Annual Street Sweeping Credits

Acres Swept	Credits (lbs/yr)		
	Nitrogen	Phosphorus	Total Suspended Solids
279.6	4.6	6.4	3,909

Note:

Street sweeping credits are calculated based on the methodology described in Appendix V.G. of the Guidance Document (VDEQ, 2021a).



Figure 5-2. MS4 Area Serviced by Street Sweeping During 01 July 2022 through 30 June 2023

5.3 Land Use Change

Nine land use change BMP opportunities were identified on the base for crediting. Four of these locations occur at Eaglewood Golf Course as illustrated in Figure 5-3. At these locations, brush and trees are growing in place of managed turf, with land use change credited as turf to mixed open land use. Four additional, mostly demolition, projects were identified resulting in land use change credited as impervious to turf, and one demolition project of a physical therapy building resulted in land use change credited as impervious to mixed open. All credit reductions were calculated per Appendix V.H of the Guidance Document (VDEQ, 2021a). A summary of land use change credits is presented in Table 5-4.

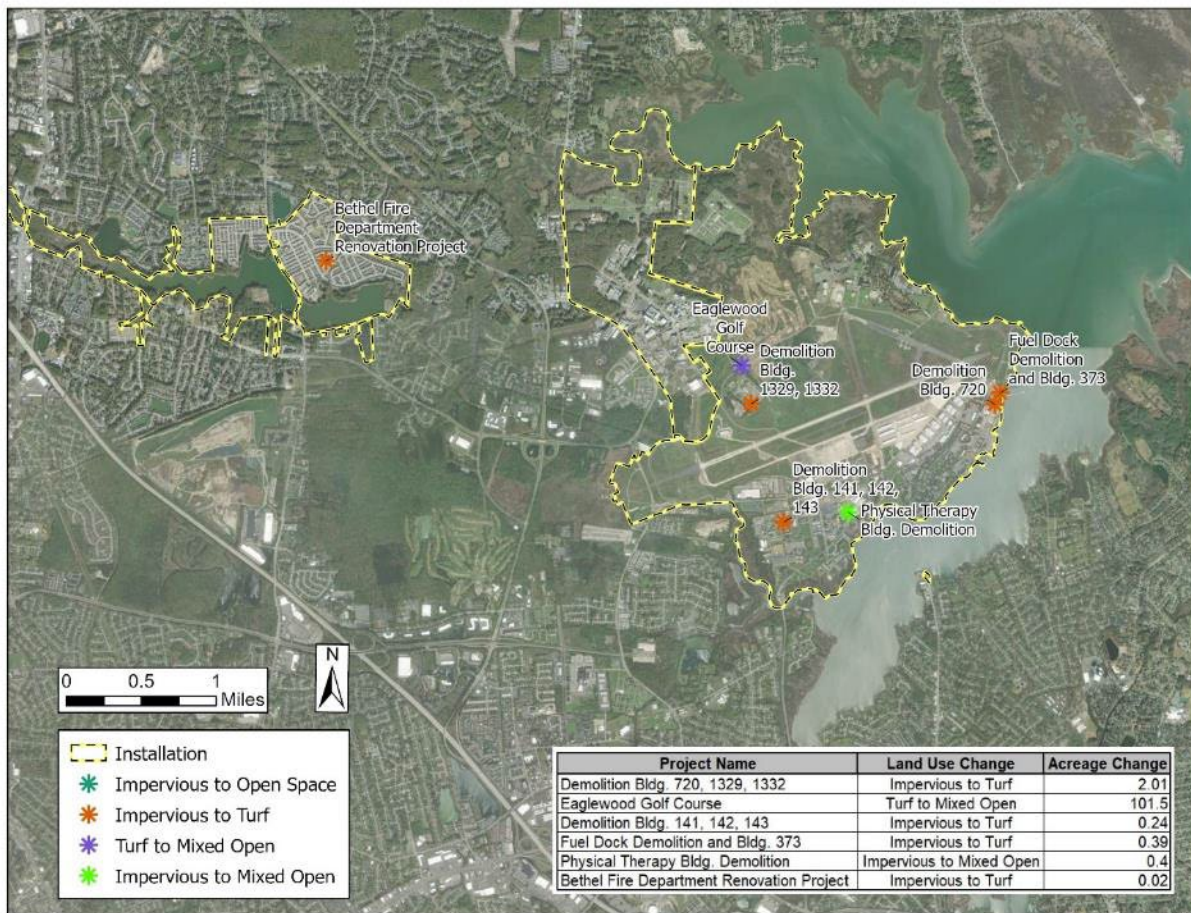


Figure 5-3. Land Use Change BMPs

Table 5-4. Summary of Land Use Change Credits

Original Land Use	Post Conversion Land Use	Total Acres Converted	Credits TN (lbs/yr)	Credits TP (lbs/yr)	Credits TSS (lbs/yr)
Impervious	Forest	0.00	0.00	0.00	0.00
Impervious	Mixed Open	0.40	4.73	0.22	123.2
Impervious	Turf	2.66	14.95	0.00	1,215.62
Turf	Forest	0.00	0.00	0.00	0.00
Turf	Mixed Open	101.50	630.32	114.70	0.00
Mixed Open	Forest	0.00	0.00	0.00	0.00
Totals			650	115	1,339

5.4 Shoreline Management

Pollutant load reductions from shoreline restoration activities were calculated using the procedure outlined in *Recommendations of the Expert Panel to Define Removal Rates for Shoreline Management Projects* (Forand et al., 2017). A total of four shoreline management projects have been implemented prior to 01 July 2023; two of which included marsh grass plantings (Figure 5-4). Shoreline erosion rates were estimated by calculating the average distance between historic shoreline GIS data ranging from 1980 to 2009, obtained from the Virginia Institute of Marine Science (VIMS, 2021).

Shoreline management pollutant load reduction credits have a duration of five years from the project completion, but can be re-evaluated using local inspection, verification, and reporting protocols to extend an additional five years (Forand et al., 2017). A summary of shoreline management credits assigned to restoration projects is presented below in Table 5-5.

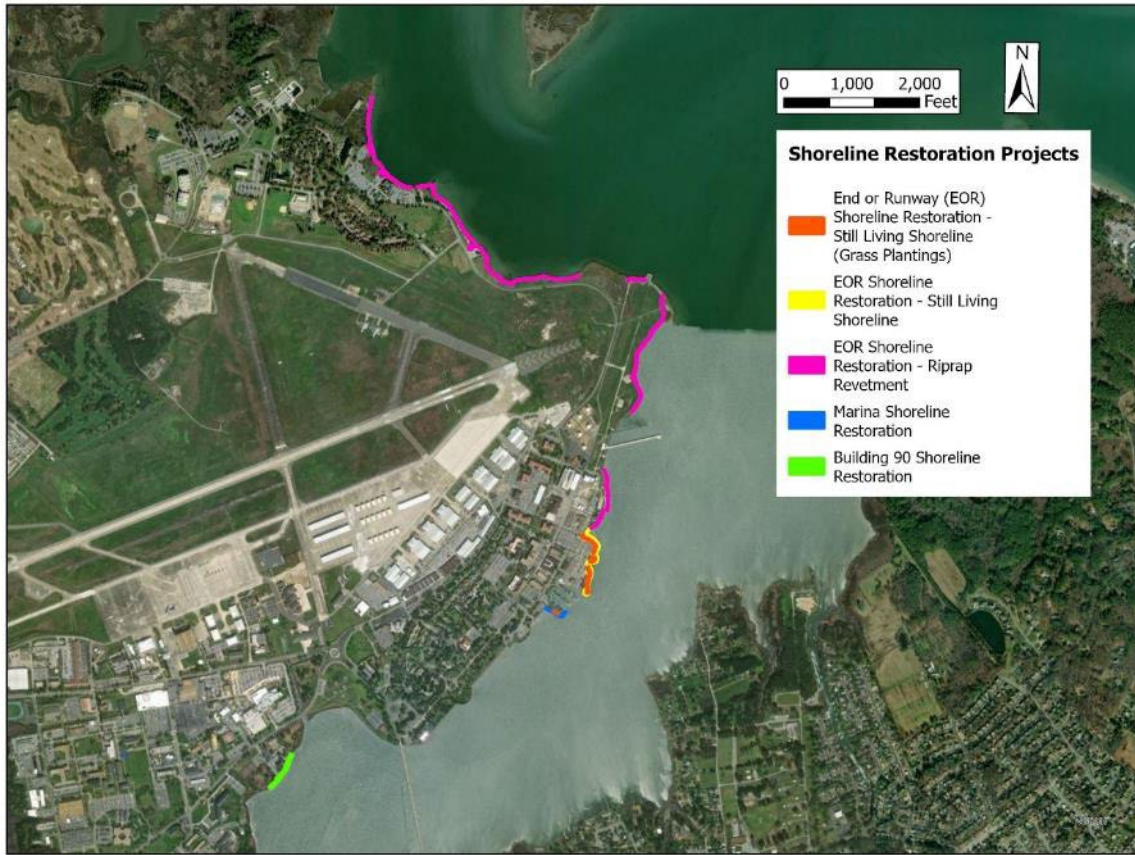


Figure 5-4. Areas of Shoreline Management

Table 5-5. Summary of Shoreline Management Credits

Project Name	Project Completion Date	Re-Verification Date	Shoreline Restoration (ft)	Average Bank Height (ft)	Marsh Plantings (ac)	Erosion Rate¹ (ft/yr)	Nitrogen Credits (lbs/yr)	Phosphorous Credits (lbs/yr)	Total Suspended Solids Credits (lbs/yr)
EOR Shoreline Restoration - rip-rap revetment	6/27/2012	7/29/2015	5,417.00	4	0.000	0.6	No credits, project over five years since last re-verification efforts		
EOR Shoreline Restoration - gapped still living shoreline	6/27/2012	7/29/2015	3,128.00	4	0.000	0.3	No credits, project over five years since last re-verification efforts		
Building 90 Shoreline Restoration	9/16/2021	9/16/2021	592.00	5	0.015	0.015	1.8	0.4	1,506
Marina Shoreline Restoration	6/24/2020	6/24/2020	1,566.00	10	0.622	0.3	100	34	152,521
Totals							102	34	154,027

Notes:

¹ Source: Virginia Institute of Marine Science (personal communication, 21 May 2021).

Minor calculation discrepancies are accounted for in rounding.

ft – feet

ft/yr – feet per year

5.5 Storm Drain Cleaning

The base performs vacuum powered storm drain cleaning using a regenerative vacuum truck to remove wet sediments and organic matter from storm drains in various locations throughout the installation. While this occurs on a weekly basis and is performed by military personnel or civilians, there is not currently any methodology in place to measure the weight of any collected sediments or organic matter, and therefore credits are not currently claimed for this practice.

Once a standard operating procedure for measuring has been identified and initiated, data on values of wet sediments and wet organic matter removed will be provided by the base and used to calculate load reduction credits, with credits calculated based on the methodology described in Appendix V.G of the Guidance Document (VDEQ, 2021a). A summary of storm drain cleaning, along with associated credits, will be presented in Table 5-6.

Table 5-6. Summary of Annual Storm Drain Cleaning Credits

Total Weight Wet Sediments (lbs)	Total Weight Dry Sediments (lbs)	Total Weight Wet Organic Matter (lbs)	Total Weight Dry Organic Matter (lbs)	Phosphorous Reduction (lbs/yr)	Nitrogen Reduction (lbs/yr)
-	-	-	-	-	-

Note:

lbs - pounds

5.6 Future BMPs

JBLE–Langley plans on building seawalls at various locations around the base to prevent shoreline erosion. The base is also planning on expanding the area converted from turf into native species grass lands. As these projects have not yet been implemented, no credit is currently being claimed. Future BMPs with their potential associated reductions are listed in Appendix B.

The base additionally plans to perform re-verification efforts for the shoreline management projects which have lost credits due to being over five years old. Costs for this aspect are included in the next Section 5.7.

The base will continue to investigate the applicability and feasibility of additional BMPs and BMP types to meet the pollutant load reduction requirements of the Chesapeake Bay TMDL. Opportunities for effective retrofit options will be explored and prioritized to make the best use of available resources.

5.7 BMP Costs

Estimated implementation costs for projects needed to meet the 100% reduction requirements include street sweeping, storm drain cleaning, and shoreline management. Costs for street sweeping and storm drain cleaning are annually spent to ensure these programs remain in place, while costs for the shoreline

management projects are estimated costs to perform a re-assessment of segments which have lost credits due to being over five years old. The base uses a third-party contractor to sweep identified streets and parking lots on a regular basis, while storm drain cleaning is conducted by military personnel or civilians. A summary of estimated BMP costs to meet 100% reduction requirements is presented in Table 5-7.

Table 5-7. Summary of estimated BMP Costs to Meet 100% Reduction Requirements

BMP Strategy	Implementation Costs
Street Sweeping	~\$17,490 per year
Storm Drain Cleaning	~\$12,490 per year
Shoreline Management	~\$200,000 for re-verification efforts

6.0 PROGRESS SUMMARY

Part II (TMDL Special Conditions) of the MS4 Permit requires the base to meet the Chesapeake Bay TMDL requirements by reducing total nitrogen, total phosphorus, and total suspended solids loads by 100% of the Chesapeake Bay L2 scoping reductions by 31 October 2028. The base’s load contribution, required load reductions, and pollutant credits outlined in this Action Plan were calculated using the methodology described in VDEQ’s Guidance Document (VDEQ, 2021a). A summary of the required load reductions and credits by BMP strategy is presented in Table 6-1, as outlined and defined in Section 5. This assessment adjusts for changes in crediting from land cover modification, new structural BMPs, street sweeping schedules, land use changes, shoreline management projects, and storm drain cleaning values through 31 October 2023.

Table 6-1. Summary of Reduction Requirements and Credits by Strategy

Pollutant of Concern	BMP	Reduction Required (lbs/yr)	Reductions Achieved (lbs/yr)
Nitrogen (TN)	Post Construction BMPs	726	223
	Street Sweeping		4.6
	Land Use Change		650
	Shoreline Management		102
	Storm Drain Cleaning		-
Total Nitrogen Reduction Achieved			980
Percent of Goal			135.0%
Phosphorous (TP)	Post Construction BMPs	153	32
	Street Sweeping		6.4
	Land Use Change		115
	Shoreline Management		34
	Storm Drain Cleaning		-
Total Phosphorous Reduction Achieved			188
Percent of Goal			123.1%
Total Suspended Solids (TSS) ¹	Post Construction BMPs	51,059	13,305
	Street Sweeping		3,909
	Land Use Change		1,339
	Shoreline Management		154,027
	Storm Drain Cleaning		-
Total Suspended Solids Reduction Achieved			172,580
Percent of Goal			338.0%

Notes:

¹ Although formerly required under the 2018-2023 permit cycle, sediment load reductions are no longer a requirement of the current 2023-2028 permit cycle but have been kept in this plan as a courtesy.

Minor calculation discrepancies are accounted for in rounding.

7.0 PUBLIC COMMENTS

The base encourages the public’s participation in the development and implementation of this Chesapeake Bay TMDL Action Plan. In keeping with this objective, the base has uploaded this Action Plan to its website, <https://www.jble.af.mil/About-Us/Units/Langley-AFB/Langley-Environmental/> which is also linked to on the base’s Facebook page, <https://www.facebook.com/jblelangleyenvironmental>. Prior to submittal of this Action Plan to VDEQ, it was posted for public comment for no fewer than 15 days in accordance with Permit Part II.A.13. No public comments were received.

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Appendix A
BMPs Implemented Prior to 31 October 2023

Appendix A
BMPs Implemented Prior to 31 October 2023

BMP ID	BMP Type	Date Installed	Area Treated (ac)		Removal Efficiency			Reductions within MS4 Service Area (lbs/yr)		
			Pervious	Impervious	TN	TP	TSS	TN	TP	TSS
1	Dry Extended Detention Ponds	1/2/2007	6.04	1.88	No credit taken, inspection failed					
2	Dry Extended Detention Ponds	10/2/2007	0.04	0.33	No credit taken, new development					
3	Dry Extended Detention Ponds	10/2/2007	0.03	0.23	No credit taken, new development					
4	Dry Extended Detention Ponds	10/2/2007	0.03	0.22	No credit taken, new development					
5	Dry Extended Detention Ponds	10/2/2007	0.03	0.23	No credit taken, new development					
6	Dry Extended Detention Ponds	10/2/2007	0.03	0.21	No credit taken, new development					
7	Dry Extended Detention Ponds	10/2/2007	0.02	0.21	20%	20%	60%	0.34	0.06	57.59
8	Dry Extended Detention Ponds	10/2/2007	0.07	0.12	20%	20%	60%	0.28	0.04	35.09
9	Dry Extended Detention Ponds	10/2/2007	2.89	0.60	No credit taken, new development					
10	Dry Extended Detention Ponds	6/23/2008	0.19	0.27	No credit taken, new development					
11	Dry Extended Detention Ponds	6/23/2008	0.20	0.22	No credit taken, new development					
12	Dry Extended Detention Ponds	6/23/2008	0.04	0.14	No credit taken, new development					
13	Dry Extended Detention Ponds	6/23/2008	0.01	0.14	No credit taken, new development					
14	Dry Extended Detention Ponds	6/23/2008	0.06	0.16	No credit taken, new development					
15	Dry Extended Detention Ponds	6/23/2008	0.07	0.10	No credit taken, new development					
16	Rain Garden	6/23/2008	0.03	0.18	No credit taken, new development					
17	Rain Garden	6/23/2008	0.02	0.17	No credit taken, new development					
18	Rain Garden	6/23/2008	0.04	0.26	No credit taken, new development					
19	Rain Garden	6/23/2008	0.01	0.23	No credit taken, new development					
20	Rain Garden	6/23/2008	0.24	0.74	No credit taken, new development					
21	Rain Garden	6/23/2008	0.09	0.36	No credit taken, new development					
22	Dry Extended Detention Ponds	6/23/2008	0.11	0.50	No credit taken, new development					
23	Wet Pond	6/23/2008	1.36	1.16	No credit taken, new development					
24	Wet Pond	6/23/2008	2.68	1.70	No credit taken, new development					
25	Vegetated Open Channels	3/13/2008	0.92	0.66	No credit taken, new development					
26	Wet Pond	6/9/1977	8.91	0.36	No credit taken, pre-2006					
27	Wet Pond	6/9/1977	16.94	0.71	No credit taken, pre-2006					
28	Wet Pond	6/9/1977	13.57	0.74	No credit taken, pre-2006					

BMP ID	BMP Type	Date Installed	Area Treated (ac)		Removal Efficiency			Reductions within MS4 Service Area (lbs/yr)		
			Pervious	Impervious	TN	TP	TSS	TN	TP	TSS
29	Wet Pond	6/9/1977	11.60	1.51	No credit taken, pre-2006					
30	Wet Pond	6/9/1977	8.17	0.09	No credit taken, pre-2006					
31	Wet Pond	6/9/1977	7.21	0.02	No credit taken, pre-2006					
32	Vegetated Open Channels	9/19/2016	2.22	0.20	45%	45%	70%	8.29	0.64	176.7
33	Dry Detention Ponds & Hydrodynamic Structures	9/19/2016	5.34	0.61	5%	10%	10%	2.26	0.36	66.80
34	Vegetated Open Channels	9/19/2016	0.78	0.45	45%	45%	70%	4.19	0.49	185.12
35	Vegetated Open Channels	9/19/2016	0.52	0.12	45%	45%	70%	2.18	0.20	63.75
36	Vegetated Open Channels	9/19/2016	4.97	0.19	45%	45%	70%	17.73	1.27	314.38
37	Vegetated Open Channels	9/19/2016	2.60	0.69	45%	45%	70%	11.22	1.07	353.92
38	Vegetated Open Channels	5/30/2000	2.08	1.07	No credit taken, pre-2006					
39	Dry Detention Ponds & Hydrodynamic Structures	3/20/2012	0.96	1.75	5%	10%	10%	1.01	0.31	86.96
40	Dry Extended Detention Ponds	9/12/2005	0.46	0.66	No credit taken, pre-2006					
41	Vegetated Open Channels	9/12/2005	0.29	0.08	No credit taken, pre-2006					
42	Dry Detention Ponds & Hydrodynamic Structures	9/12/2005	0.29	0.18	No credit taken, pre-2006					
43	Vegetated Open Channels	9/12/2005	0.71	0.42	No credit taken, pre-2006					
44	Vegetated Open Channels	9/20/2011	10.88	20.64	45%	45%	70%	105.32	16.52	7,150.72
45	Dry Extended Detention Ponds	8/14/2007	0.70	1.46	20%	20%	60%	3.21	0.51	431.12
46	Dry Extended Detention Ponds	6/19/2013	2.21	1.50	20%	20%	60%	5.57	0.68	506.79
47	Dry Extended Detention Ponds	6/30/2006	2.02	1.29	No credit taken, pre-2006					
48	Dry Detention Ponds & Hydrodynamic Structures	6/19/2013	2.23	1.25	20%	20%	60%	5.23	0.60	438.88
49	Dry Extended Detention Ponds	12/28/2000	0.59	0.68	No credit taken, pre-2006					
50	Dry Extended Detention Ponds	12/28/2000	0.69	0.66	No credit taken, pre-2006					
51	Vegetated Open Channels	4/14/2015	1.51	0.05	45%	45%	70%	5.36	0.38	93.66
52	Wet Pond	2/15/2009	0.95	0.00	20%	45%	60%	1.46	0.22	42.16
53	Dry Detention Ponds & Hydrodynamic Structures	6/11/2010	0.42	0.25	5%	10%	10%	0.25	0.06	14.57

BMP ID	BMP Type	Date Installed	Area Treated (ac)		Removal Efficiency			Reductions within MS4 Service Area (lbs/yr)		
			Pervious	Impervious	TN	TP	TSS	TN	TP	TSS
54	N/A	N/A	N/A	N/A	No credit taken, BMP removed					
55	Vegetated Open Channels	6/19/2013	0.48	1.44	45%	45%	70%	6.40	1.09	485.96
56	Dry Detention Ponds & Hydrodynamic Structures	6/19/2013	0.33	0.18	5%	10%	10%	0.19	0.04	10.72
57	Wet Pond	6/30/2006	0.60	1.16	No credit taken, pre-2006					
58	Dry Detention Ponds & Hydrodynamic Structures	2/1/2010	5.15	3.49	No credit taken, inspection failed					
59	Dry Detention Ponds & Hydrodynamic Structures	2/1/2010	5.29	2.21	No credit taken, inspection failed					
60	Dry Detention Ponds	12/9/2009	2.08	1.01	No credit taken, inspection failed					
61	Proprietary Stormwater Treatment Device	1/23/2010	0.10	0.15	70%	75%	80%	1.32	0.21	60.26
62	Vegetated Open Channels	1/23/2010	0.15	0.02	45%	45%	70%	0.58	0.05	14.04
63	Proprietary Stormwater Treatment Device	1/23/2010	0.13	0.23	70%	75%	80%	1.86	0.31	91.33
64	Proprietary Stormwater Treatment Device	1/23/2010	0.10	0.26	70%	75%	80%	1.87	0.33	101.14
65	Vegetated Open Channels	1/23/2010	0.04	0.13	45%	45%	70%	0.59	0.10	45.22
66	Vegetated Open Channels	1/23/2010	0.04	0.14	45%	45%	70%	0.59	0.10	46.63
67	Proprietary Stormwater Treatment Device	1/23/2010	0.09	0.23	70%	75%	80%	1.68	0.30	89.81
68	Proprietary Stormwater Treatment Device	1/23/2010	0.07	0.24	70%	75%	80%	1.56	0.29	90.29
69	Proprietary Stormwater Treatment Device	1/23/2010	0.00	0.16	70%	75%	80%	0.81	0.18	57.54
70	Proprietary Stormwater Treatment Device	1/23/2010	0.00	0.15	70%	75%	80%	0.79	0.17	55.14
71	Proprietary Stormwater Treatment Device	1/23/2010	0.01	0.06	70%	75%	80%	0.33	0.07	21.44
72	Dry Detention Ponds	1/23/2010	0.16	0.40	5%	10%	10%	0.21	0.07	19.41
73	Dry Detention Ponds	1/23/2010	0.10	0.26	5%	10%	10%	0.13	0.04	12.65
74	Dry Detention Ponds	1/23/2010	0.09	0.23	5%	10%	10%	0.12	0.04	11.23

BMP ID	BMP Type	Date Installed	Area Treated (ac)		Removal Efficiency			Reductions within MS4 Service Area (lbs/yr)		
			Pervious	Impervious	TN	TP	TSS	TN	TP	TSS
75	Vegetated Open Channels	2/4/2009	0.61	1.69	45%	45%	70%	7.66	1.29	577.65
76	Dry Detention Ponds	8/4/2009	0.57	0.52	No credit taken, inspection failed					
77	Proprietary Stormwater Treatment Device	4/26/2004	0.04	0.15	No credit taken, pre-2006					
78	Dry Detention Ponds	10/2/2007	0.98	1.81	No credit taken, inspection failed					
79	Vegetated Open Channels	1/23/2010	0.37	0.75	45%	45%	70%	3.72	0.59	258.39
80	Vegetated Open Channels	7/17/2002	0.72	1.59	No credit taken, pre-2006					
81	Dry Detention Ponds	12/9/2009	0.22	0.30	5%	10%	10%	0.19	0.06	15.34
82	Dry Swale	4/5/2021	0.01	0.14	45%	45%	70%	0.49	0.10	45.26
83	Dry Swale	4/5/2021	0.38	0.23	45%	45%	70%	2.06	0.24	92.88
84	Dry Swale	4/5/2021	0.41	0.27	45%	45%	70%	2.30	0.28	107.20
85	Dry Swale	4/5/2021	0.02	0.27	45%	45%	70%	0.96	0.19	86.83
86	Urban Filtering Practices	10/8/2021	0.00	0.76	40%	60%	80%	2.22	0.69	277.66
87	Bioretention/Raingardens	1/1/2021	0.12	0.11	70%	75%	80%	1.21	0.17	47.17
88	Bioretention/Raingardens	1/1/2021	0.07	0.42	70%	75%	80%	2.52	0.50	157.52
89	Bioretention/Raingardens	1/1/2021	0.09	0.47	70%	75%	80%	2.89	0.57	176.95
90	Dry Detention Ponds & Hydrodynamic Structures	1/1/2021	0.00	0.00	No credit taken, water quantity design only					
91	Dry Detention Ponds & Hydrodynamic Structures	1/1/2021	0.20	0.71	5%	10%	10%	0.34	0.12	33.88
92	Vegetated Open Channels	1/1/2021	0.52	0.55	45%	45%	70%	3.60	0.49	202.31
93	Urban Filtering Practices	1/1/2021	0.40	0.70	No credit taken, new development					

Appendix B
Future Planned BMPs

Appendix B
Future Planned BMPs

BMP Type	Planned Installation Date	Project Name / Location	POC Removal Rate (lbs/ft/yr)			POC Reductions (lbs/yr)		
			TN	TP	TSS	TN	TP	TSS
None								