City of Falls Church, Virginia

Total Maximum Daily Load (TMDL) Action Plan: Chesapeake TMDL for Nitrogen, Phosphorus and Sediment Phase II

October 8, 2019

Prepared for:

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Definitions

Existing Sources	Pervious and impervious urban land uses served by the MS4 as of June 30, 2009.
New Sources	Pervious and impervious urban land uses served by the MS4 developed or redeveloped on or after July 1, 2009.
Transitional Sources	Regulated land-disturbing activities that are temporary in nature and discharge through the MS4.

Acronyms

BMP	Best Management Practice
CBPA	Chesapeake Bay Preservation Act
City	City of Falls Church, Virginia
CWA	Clean Water Act
DEQ	Virginia Department of Environmental Quality
EPA	Environmental Protection Agency
ERU	Equivalent Residential Unit
Exchange	Virginia Nutrient Credit Exchange Association, Inc.
MGD	Million Gallons per Day
MS4 General Permit	VPDES General Permit for Discharges of Stormwater from Small MS4s, effective Nov. 1, 2018
L2	Chesapeake Bay Model 5.2 Level 2 Scoping Run
MS4	Municipal Separate Storm Sewer System
NFWF	National Fish and Wildlife Federation
NPO	Non-Profit Organization
NMP	Nutrient Management Plan
POC	Pollutants of Concern (Nitrogen, Phosphorus and Sediment)
SFR	Single-Family Residential
SLAF	Virginia Stormwater Local Assistance Fund
SWCD	Soil & Water Conservation District
SWM	Stormwater Management
TMDL	Total Maximum Daily Load
UA	Urbanized Area
VCAP	Virginia Conservation Assistance Program
VESCP	Virginia Erosion and Sediment Control Program
VRRM	Virginia Runoff Reduction Method
VSMP	Virginia Stormwater Management Program
VPDES	Virginia Pollutant Discharge Elimination System
WIP	Chesapeake Bay Watershed Improvement Plan
WPCP	Arlington Water Pollution Control Plant

Signatory Authorizations

The City's MS4 Program Plan contains authorization for the following positions to sign reports and other information requested by the State Water Control Board (SWCB) or the Department of Environmental Quality (DEQ):

- City Manager
- Director of Public Works
- DPW - Engineering Manager
- City Stormwater Engineer

Action Plan Certification

As required by the MS4 General Permit, Part III K 4.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Alan R. Dalton

Name: Alan R. Dalton, PE Signature: _____

Title: City Stormwater Engineer Date: 10/30/2019

1.0 Introduction

The Chesapeake Bay is a shallow estuary stretching approximately 200 miles from Havre de Grace, Maryland to Virginia Beach, Virginia. The Bay's approximately 64,000 square mile watershed covers parts of six (6) states – Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia – and the District of Columbia. Since the late 1990s, the Chesapeake Bay has been identified by surrounding states as impaired, or not meeting its designated water quality standards, due to excessive pollutants, (i.e., nitrogen, phosphorus, and sediment) causing algae blooms, creating dead zones, reducing sunlight penetration into the water and smothering wildlife. In 2010, the United States EPA published the Chesapeake Bay TMDL for Nitrogen, Phosphorus and Sediment, which established a "pollution diet" for each of the POC in order to address the impairments. To address the TMDL, Virginia has developed and continues to implement a multi-faceted plan to reduce the quantity of POCs discharged to the Bay from Virginia waters including four major rivers - James, Potomac, Rappahannock, and York. Virginia's plan includes the inclusion of POC reduction requirements in VDPES permits for operators of DEQ-regulated point-source discharges, including MS4s.

The City of Falls Church, Virginia is a 2.2 square mile independent municipality located within the United States Census Bureau's Washington DC-VA-MD UA. The City operates a small MS4 that discharges to the Chesapeake Bay via the Potomac River and whose discharges are regulated under the MS4 General Permit[1]. The current General Permit, which became effective November 1, 2018, is the second MS4 General Permit containing a Special Condition for the Chesapeake Bay TMDL. The Special Condition contains several specific requirements, including the development and implementation of a Chesapeake Bay Action Plan, that ensures:

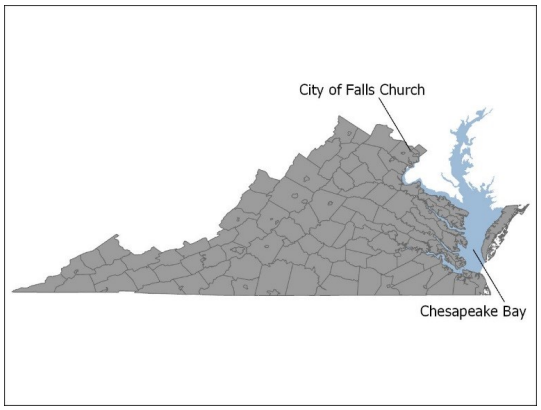

Figure 1: City of Falls Church Location Map

1. Development and implementation of NMPs on City-owned or operated lands where nutrients are applied to a contiguous area greater than one acre in size;
2. Minimization of POC loads from Transitional Sources;
3. Minimization of POC loads from New Sources;
4. Quantification of the number of impervious urban acres and pervious urban acres located served by the City's MS4 as of June 30, 2009 (Existing Sources);
5. Calculation of the total Existing Source load based on the number of urban acres, pervious and impervious, served by the MS4 and the Special Condition provided POC loading rates;
6. Calculation of the required load reduction necessary to meet 40% reduction of the overall MS4 Existing Sources reduction requirement[2] based on the following assumptions:
    a. Reduce the total discharge of nitrogen from Existing Sources as follows: 9% from impervious regulated lands, 6% pervious regulated lands;

[1] The official text of the VPDES General Permit for Discharges of Stormwater from Small MS4s can be obtained from Virginia's Legislative Information System at https://law.lis.virginia.gov/admincode/title9/agency25/chapter890/.
[2] POC load reductions from Existing Sources are based on having three (3) consecutive MS4 General Permit cycles to meet the required reductions and for which the cumulative POC reductions per permit cycle reductions are 5% (2013 MS4 General Permit), 40% (2018 MS4 General Permit), 100% (2023 MS4 General Permit).

b. Reduce the total discharge of phosphorus from Existing Sources as follows: 16% from impervious regulated lands, 7.25% pervious regulated lands;

c. Reduce the total discharge of sediment from Existing Sources as follows: 20% from impervious regulated lands, 8.75% pervious regulated lands; and

7. Development and implementation of means and methods to meet the calculated 40% POC reduction from Existing Sources by October 31, 2023.

The MS4 General Permit Special Condition states "The Commonwealth in its Phase I and Phase II Chesapeake Bay TMDL WIPs committed to a phased approach for MS4s, affording MS4 permittees up to three (3) full five-year permit cycles to implement necessary reductions. This permit is consistent with the Chesapeake Bay TMDL and the Virginia Phase I and Phase II WIPs to meet the Level 2 (L2) scoping run for existing developed lands [Existing Sources] as it represents an implementation of an additional 35% of L2 as specified in the 2010 Phase I and Phase II WIPs. In combination with the 5.0% reduction of L2 that has already been achieved [under the previous MS4 General Permit that expired on June 30, 2018], a total reduction at the end of this permit term of 40% of L2 will be achieved."

The Chesapeake Bay TMDL Action Plan is a tool used by the City of Falls Church to demonstrate compliance in meeting the POC reductions associated with the MS4 General Permit Chesapeake Bay Special Condition.

2.0 Legal Authority Status

The MS4 General Permit's Chesapeake Bay Special Condition requires the County to include "any new or modified legal authorities, such as ordinances, permits, policy, specific contract language, orders, and inter-jurisdictional agreements, implemented or needing to be implemented to meet the requirements of Parts II A 3, A 4, and A 5."

2.1 City of Falls Church Legal Authority Review

The City has evaluated its current regulatory authorities for their applicability and appropriateness in meeting the POC reductions required by Parts II A 3, 4 and 5 of the MS4 General Permit. The results of this evaluation are summarized in Table 1 and are further described in the paragraphs following the table.

Table 1: Summary of the City of Falls Church's Legal Authority Status Review

2018 MS4 General Permit Condition	Sufficient Existing Legal Authorities	Proposed New or Modified Legal Authorities	Comments
Part II A 3	Yes	None Proposed	The City believes that it can meet the required reductions identified in Part II A 3 utilizing its various existing legal authorities. These authorities allow for the City to enter into future legal agreements such as contracts and grant agreements that may arise during implementation.
Part II A 4	Yes	None Proposed	All plans approved by the City between July 1, 2009, and June 30, 2014, involved redevelopment and resulted in decreases in the POC load. As a result, the City is not responsible for addressing any increase in New Source loads based on a higher impervious cover design criterion.
Part II A 5	Yes	None Proposed	In the Phase I TMDL Action Plan, the City found that the grandfathering provision did not apply to any projects in the City. As such, there is not an increased load for the City to address.

2.1.1 Part II A 3 – Required Pollutant Load Reductions from Existing Sources

The City believes that it has sufficient legal authorities to meet the requirements contained in Part II A 3 and that changes to its existing ordinances will not be required. The City has adequate legal authority to accept grant awards, enter into contracts, obtain necessary permits, require the design and construction of stormwater management facilities to applicable standards, and require long-term inspection and maintenance of such facilities. The City is aware that project-specific legal authorities may be required (e.g., permits, contracts, maintenance agreements, conservation easements); however, the City cannot identify or evaluate these until the specific projects are implemented.

2.1.2 Part II A 4 – Required Pollutant Load Reductions of Increased Loads in New Sources with Water Quality Design >16% Impervious Cover

Prior to July 1, 2014, the City water quality design requirements for new projects that disturbed equal to or greater than one-acre were based on a rate greater than 16% impervious cover (50%). However, a review of 12 plans, which were approved between July 1, 2009, and June 20, 2014, found that the projects were considered redevelopment and required to reduce the existing pollutant load by 10%, rather than meet the water quality design requirements for new projects. As a result, the City does not need to address increased New Source loads based and additional legal authorities are not required.

2.1.3 Part II A 5 – Required Pollutant Load Reductions from Grandfathered New Sources with Water Quality Design >16% Impervious Cover

In its Phase I TMDL Action Plan, the City found the grandfathering provision found at 9VAC25-870-48 did not apply to any projects and that additional regulatory authorities were not required.

2.2 Commonwealth of Virginia Legal Authority Review

While the City believes that it has the legal authority to ensure the necessary pollutant load reductions as described above, the City has identified two (2) current Commonwealth of Virginia policies that prevent the City from successfully participating in Virginia stormwater financial assistance programs. First, SLAF guidelines establish a priority ranking criterion for individual projects in which one-third of the total score is based on the cost-effectiveness of the project. The guidelines allow the DEQ Director to set a maximum allowed cost per pound of total phosphorus removed based on the annual pool of received SLAF applications. While the City understands Virginia's desire to implement the most cost-effective BMPs across the State, the City is handicapped by its location and existing infrastructure in such a way as to prevent it from being able to effectively compete against other localities where available land is not as expensive, and the localities are not as completely developed. Secondly, VCAP, which allows property owners to apply for grant assistance in installing stormwater BMPs is managed through Virginia SWCDs. As a developed locality, the City does not belong to a SWCD and, as such, its citizens cannot apply for this funding assistance.

While current Virginia SLAF and VCAP policies will not prevent the City from meeting its POC reductions, the City is hopeful that the Commonwealth will reconsider its current funding policies to provide a greater opportunity to City of Falls Church property owners, who are already providing substantial financial support through the City's stormwater utility fee.

3.0 Existing Source POC Load and POC Reduction Calculations

The City's jurisdictional boundary is fully enveloped within the U.S. Census Washington DC-VA-MD UA (Figure 2). The City's Phase I Chesapeake Bay Action Plan calculated that the 1,296.4[3] acres for which the City provided separate storm sewer system service MS4 on June 30, 2009 (Existing Source) was comprised of:

- 591.1 acres of regulated urban impervious area
- 705.3 acres of regulated urban pervious area

The City's estimated annual POC loads from Existing Sources was calculated by multiplying the MS4 service areas for each land use with the appropriate Potomac River POC loading rates included in the L2 scoping run and combining (Table 2). As a result, the estimated annual loads from Existing Sources discharged from the City's MS4 service area as of June 30, 2018, were:

- 17,068 lbs. of Nitrogen
- 1,247 lbs. of Phosphorus
- 816,359 lbs. of Sediment

Figure 2: City of Falls Church, Virginia MS4 Service Area

Table 2: Land Use Assumptions Utilized to Determine Estimated POC Loads from the City of Falls Church MS4

Pollutant	SubLandUse	Loading Rates (lbs./acre)	Acres Served	Estimated Annual Load, (lbs.)[4]
Nitrogen	Impervious Urban	16.86	591.1	9,965.95
	Pervious Urban	10.07	705.3	7,102.27
Estimated Total Nitrogen Annual Load, lbs.				**17,068**
Phosphorus	Impervious Urban	1.62	591.1	957.58
	Pervious Urban	0.41	705.3	289.17
Estimated Total Phosphorus Annual Load, lbs.				**1,247**
Sediment	Impervious Urban	1,171.32	591.1	692,367.25
	Pervious Urban	175.80	705.3	123,991.74
Estimated Total Sediment Annual Load, lbs.				**816,359**

[3] This acreage includes approximately 42 acres, which was annexed by the City after June 30, 2009 as part of a negotiated settlement between Fairfax County and the City involving the City's water utility.
[4] Per MS4 General Permit Part II A 8. – "Loading and reduction values greater than or equal to 10 pounds calculated in accordance with Part II A 3, A 4, and A 5 shall be calculated and reported to the nearest pound without regard to mathematical rules of precision."

To meet the 40% reduction of the overall MS4 Existing Sources reduction requirement by October 31, 2023, the City's continuing efforts, which began on July 1, 2013, must result in the following reductions in annual POC loads from Existing Sources:

- 529 lbs. of Nitrogen, including 66 lbs. associated with the initial 5% reduction required under the 2013 MS4 General Permit Special Condition
- 69 lbs. of Phosphorus, including 8.7 lbs. associated with the initial 5% reduction required under the 2013 MS4 General Permit Special Condition
- 59,729 lbs. of Sediment, including 7,466 lbs. associated with the initial 5% reduction required under the 2013 MS4 General Permit Special Condition.

The assumptions used for calculating these POC reductions are found in Table 3.

Table 3: City of Falls Church Pollutant Load Reduction Calculations Associated with Chesapeake Bay TMDL Action Plan Phase II

Pollutant	SubLandUse	Estimated Annual Load (lbs.)	Total Reduction Required Over Three (3) MS4 Permit Cycles	Percentage of Total Reduction Required by 10/31/23	Total Reduction Required as of 10/31/23 (lbs.)[5]
Nitrogen	Impervious Urban	9,965.95	9%	40%	358.77
	Pervious Urban	7,102.37	6%	40%	170.46
Total Nitrogen Load Reduction Required as of 10/31/23, lbs.					**529**
Phosphorus	Impervious Urban	957.58	16%	40%	61.29
	Pervious Urban	289.17	7.25%	40%	8.39
Total Phosphorus Load Reduction Required as of 10/31/23, lbs.					**70**
Sediment	Impervious Urban	692,367.25	20%	40%	55,389.38
	Pervious Urban	123,991.74	8.75%	40%	4,339.71
Total Sediment Load Reduction Required as of 10/31/23, lbs.					**59,729**

[5] Per General Permit Part II A 8 – "Loading and reduction values greater than or equal to 10 pounds calculated in accordance with Part II A 3, A 4, and A 5 shall be calculated and reported to the nearest pound without regard to mathematical rules of precision."

4.0 Progress in Meeting POC Load Reductions as of July 1, 2018

The City has made significant progress towards minimizing POC contributions from nutrient application on City properties and New and Transitional Sources, as well as, meeting the required reductions from Existing Sources. As of July 1, 2018, the City's efforts have resulted in the following successes:

4.1 Nutrient Management

The City developed and has implemented a Nutrient Management Plan for 1.299 acres at Thomas Jefferson Elementary School located at 601 South Oak Street, Falls Church, VA (Figure 3).

4.2 Transitional Sources

The City operates a DEQ-approved local VESCP consistent with the Virginia Erosion and Sediment Control Law. As a CBPA locality, the City regulates land-disturbing activities that are 2,500 square feet and larger under Chapter 35 of the Falls Church Code of Ordinances.

4.3 New Sources

The City operates a DEQ-approved local VSMP authority consistent with the Virginia Stormwater Management Act. The City's legal authority to implement the VSMP is found in Chapter 35 of the Falls Church Code of Ordinances. As a CBPA locality, the City requires stormwater to be addressed for projects that are 2,500 square feet and larger under Chapter 35 of the Falls Church Code of Ordinances.

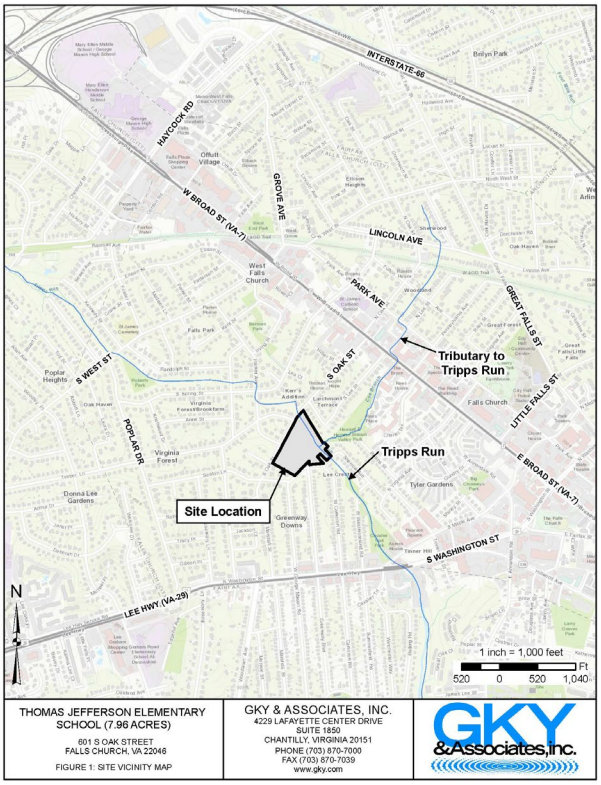

Figure 3: Vicinity Map Indicating Location of TJES Where a NMP is Implemented (Lat. 38°53'0.26"N; Long. 77°11'1.51"W)

4.4 Existing Sources

Implementation of the City's Phase I TMDL Action Plan has culminated in the installation of numerous SWM facilities and BMPs with creditable and verifiable POC reductions applicable to meeting Existing Source reduction requirements. Information specific to individual SWM facilities and BMPs including date of implementation and pollutant reductions achieved are available in Attachment 1.

As of July 1, 2018[6], these efforts have resulted in annual POC reductions totaling:

- 337 lbs. of Nitrogen
- 155 lbs. of Phosphorus
- 66,137 lbs. of Sediment

[6] As outlined in the City's Permit 4/Year 1 Annual Report, the City is continuing to research records and develop pollutant load reductions for SWM facilities and BMPs that were installed prior to July 1, 2014. As these records are identified, the pollutant loads will be included in the overall pollutant load reductions associated with existing sources.

These reductions include 109 purchases of nutrient credits from non-point source nutrient banks[7] by private developers engaged in small redevelopment projects within the City.

To ensure the concept of "no net increase" in pollutant load, the City applied the VSMP water quality criteria as follows:

1. Redevelopment projects associated with single family residential land uses were required to design to the new VSMP water quality design standard (0.41 lb./ac./yr.). By doing so, the design calculations accounted both for the pre-development and the post-development impervious cover. Thus, the entire pollutant load reduction from the installation of a SWM facility, BMP or non-point source nutrient credit purchase was applied towards meeting the existing source pollutant load reduction requirements.
2. Redevelopment projects associated with non-single-family residential land use were required to design to meet the VSMP phosphorous load reduction (10%, if the total land disturbance is less than 1 acre or 20%, if the total land disturbance is one-acre or greater).
    a. For projects that resulted in an increase in impervious cover, the pollutant load associated with the increased impervious cover was subtracted from the existing source pollutant load reduction by subtracting the pollutant load associated with Land Use Change - Increase in Impervious Cover in the calculations.
    b. For projects that resulted in a decrease in impervious cover, the pollutant load associated with the decrease in impervious cover was treated as a BMP with the pollutant load reduction associated with the reduction in impervious surface credited as a Land Use Change - Decrease in Impervious Cover in the calculations.

Reductions in the nitrogen load were acquired from the VRRM Compliance Spreadsheet, in the case of SWM facilities, or the retired nitrogen load, in the case of purchased nutrient credits. Unless provided as part of the design criteria, sediment load reductions for SWM facilities were calculated using the following equation - ((Impervious Area Treated, acres x 1,172.32 lbs./acre) + (Pervious Area Treated, acres x 175.8 lbs./acre)) x SWM facility efficiency (as provided by DEQ Guidance GM21-2015 Appendix V.C.).

The City's efforts have achieved sufficient annual POC reductions to have resulted in phosphorus and sediment reductions sufficient to meet their respective October 31, 2023 reduction requirements. In order to meet the October 31, 2023, required nitrogen reductions, the City must reduce nitrogen discharges from the MS4 by an additional 191 lbs. per year.

Table 4: City MS4 Remaining Pollutant Load Reductions Required by October 31, 2023

POC	Annual Existing Source POC Reductions Required by October 31, 2023 (lbs.)	Annual Credited Existing Source POC Reductions as of July 1, 2018 (lbs.)	Remaining Annual Existing Source POC Reductions Required by October 31, 2023 (lbs.)
Nitrogen	529	337	191
Phosphorus	70	155	2023 REQUIREMENT ACHIEVED
Sediment	59,729	66,137	2023 REQUIREMENT ACHIEVED

[7] Sediment load reductions attributable to nutrient credit purchases are currently not included in the City's total sediment load reduction as DEQ has not provided non-point nutrient bankers with a method for determining allowable sediment credits. The City will revisit these total load reductions and incorporate the associated sediment reductions when the methodology is finalized.

5.0 Plan of Action to Meet the Remaining Annual Nitrogen Load Reduction Requirements by October 31, 2023

The City will utilize the following plan of action to ensure that the remaining nitrogen reductions are met by October 31, 2023.

5.1 Strategy 1. Acquire Nitrogen Credits Via Private Exchange Pursuant to the Exchange Credit Exchange Policy

The Arlington WPCP (VPDES Permit #VA0025143), of which the City of Falls Church has 2% ownership, treats approximately 23 mgd of wastewater received from sanitary sewer systems serving Arlington County and the Cities Alexandria, Fairfax and Falls Church. The Chesapeake Bay TMDL allocated the WPCP an annual wasteload allocation (delivered) of 365,467 lbs. of nitrogen. The Exchange Compliance Plan's 2019 Annual Update forecasts that the WPCP will have 127,730 nitrogen credits available. The 2019 Annual Update indicates that MS4 operators other than the City intend to engage in a private exchange with the WPCP of 2,625 nitrogen credits to meet required MS4 nitrogen reductions (Attachment 2). The City will leverage its 2% ownership in WPCP to also enter into a private credit exchange with the WPCP to acquire the nitrogen credits necessary to meet its October 31, 2023 nitrogen reduction requirements.

While the City works with the WPCP in developing a private agreement, the City will continue to require pollutant reductions from redevelopment projects in a manner consistent with the VSMP regulations. Dependent upon the total land disturbance acreage, private redevelopment, apart from the redevelopment of SFR properties, will be required to reduce the phosphorus loading rate by up to 20% of the predevelopment rate. Redevelopment of single-family residential properties will be required to meet the stormwater quality design criteria for new development (0.41 lbs. P/acre/year). For redevelopment projects that occur during the current MS4 permit cycle, the City will credit nitrogen reductions from redevelopment projects towards meeting its remaining nitrogen reduction requirements. Associated reductions in phosphorus and sediment will be applied towards the required future pollutant load reductions discussed in the Future Planning section of this document. Unless provided contradictory guidance from DEQ, the City will use the following procedures for crediting pollutant load reductions from redevelopment towards meeting the City's Chesapeake Bay requirements:

- Nitrogen and phosphorus credits will be obtained from either:
  - The most current version of the VRRM Compliance Spreadsheets for redevelopment.
  - Documented purchases of phosphorus and associated nitrogen from DEQ-approved Nonpoint Source Nutrient Banks.

    Note: Required nitrogen and phosphorus reductions from SFR will be determined as follows:

    - For SFR where the predevelopment load is less than 0.41 lbs. P/acre/year and the redevelopment design meets the design criteria for new development, no pollutant load reductions shall be applied towards meeting the City's existing source pollutant reduction load requirements.
    - For SFR where the predevelopment load is greater than 0.41 lbs. P/acre/year and the redevelopment design meets the design criteria for new development, the difference between the predevelopment load and the final design load shall be applied towards meeting the City's existing source pollutant reduction load requirements.
- Sediment credits will be obtained from one of the following:
  - Calculations provided by a licensed professional as part of the City's plan review process.
  - Utilization of the Chesapeake Bay Program Runoff Curves/Equations for sediment.

- Application of the Chesapeake Bay Program Established Efficiencies for sediment.
- Documented quantities of associated sediment retired from DEQ-approved Nonpoint Source Nutrient Banks as a result of phosphorus credit purchases.

The use of the Exchange represents the most economically efficient method for the City to attain the nitrogen reductions necessary to meet its MS4 General Permit requirements within the allotted schedule. The City will continue to require long-term pollutant reductions as redevelopment occurs through the administration of the VSMP. Nitrogen reductions acquired through VSMP application on redevelopment projects will be subtracted from the Remaining Annual Existing Source (Nitrogen) Reductions in Table 4 to quantify the actual number of nitrogen credits that must be obtained from the Exchange.

5.2 Additional Strategies

The City retains the option to utilize the following pollutant reduction strategies should the City determine their utilization is in the best economic interest of the City.

5.2.1 Stormwater Retrofits

The City has completed initial retrofit evaluations on numerous City- and privately- owned properties and identified 37 potential retrofit opportunities at 14 separate locations. Given the high cost per pound of the pollutant removed (Table 5), the City has chosen not to commit to completing any of these projects during the current MS4 General Permit cycle. The City will continue to evaluate potential opportunities for stormwater retrofit and consider their implementation where appropriate.

Table 5: Estimated Average Cost Per Pound of Pollutant Removed for Stormwater Retrofit Projects at Evaluated City-Owned and Privately-Owned Locations

Property-Type	Nitrogen (Est. Cost/lb.)	Phosphorus (Est. Cost/lb.)	Sediment (Est. Cost/lb.)
City-Owned	$40,948	$271,398	$446
Privately-Owned	$55,479	$377,938	$666

5.2.2 Stream Restoration

As part of its future planning efforts, the City will continue to evaluate locations for potential stream restoration opportunities and consider their implementation where appropriate.

5.2.3 Purchase of Non-Point Source Credits from Registered Nutrient Credit-Generating Entities

The City will consider the purchase of non-point source credits from registered nutrient credit-generating entities provided it is in the best economic and environmental interest of the City.

Nitrogen reductions acquired through utilization of the additional strategies will be subtracted from the Remaining Annual Existing Source (Nitrogen) Reductions in Table 4 to quantify the actual number of nitrogen credits that must be obtained from the Exchange.

6.0 Future Planning

The current WIP provides the City three (3) MS4 General Permit cycles to implement sufficient pollutant reduction strategies to meet the reductions estimated in Table 6. This plan addresses the POC reductions required during the second permit cycle. It is anticipated that the third permit cycle will require the remaining reductions be implemented prior to its expiration. As such, the City will continue to credit POC load reductions that are accrued during this permit cycle towards meeting the overall final reduction requirements and will develop a plan to meet the remaining required reductions in accordance with the MS4 General Permit. addressing the remaining POC reductions.

Table 6: Estimated Total Pollutant Reductions Required from City MS4 Serviced Existing Sources

Pollutant	SubLandUse	Estimated Annual Load (lbs.)	Total Reduction Required Over Three (3) MS4 General Permit Cycles	Total Reduction Required Within Three (3) Permit Cycles (lbs.) [8]
Nitrogen	Impervious Urban	9,965.95	9%	896.94
	Pervious Urban	7,102.37	6%	426.14
			Estimated Total Nitrogen Annual Load, lbs.	**1,323**
Phosphorus	Impervious Urban	957.58	16%	153.21
	Pervious Urban	289.17	7.25%	20.97
			Estimated Total Phosphorus Annual Load, lbs.	**174**
Sediment	Impervious Urban	692,367.25	20%	138,473.45
	Pervious Urban	123,991.74	8.75%	10,849.28
			Estimated Total Sediment Annual Load, lbs.	**149,323**

[8] Per MS4 General Permit Part II A 8 – "Loading and reduction values greater than or equal to 10 pounds calculated in accordance with Part II A 3, A 4, and A 5 shall be calculated and reported to the nearest pound without regard to mathematical rules of precision."

7.0 Summary of Public Comments

No comments were received during the Public Comment Period from 10/11/2019 to 10/29/2019.

Attachment 1: List of Stormwater Management and Best Management Facilities Installed Prior to July 1, 2018

Attachment 1: List of Stormwater Management and Best Management Facilities Installed Prior to July 1, 2018

ID	BMP Type	Address	Latitude	Longitude	Date	Nitrogen Removed	Phosphorus Removed	Sediment Removed
NC0317	Purchased Nutrient Credits	100 W ROSEMARY LN	38.87938979	-77.18738416	2016-10-13	1.699	0.17	TBD
NC0235	Purchased Nutrient Credits	1000 RAILROAD AVE	38.89145253	-77.19093197	2017-04-12	1.71	0.23	TBD
IP0193	Infiltration Pratice	1001 N SYCAMORE ST	38.87859427	-77.15454823	2015-04-17	0.81	0.14	-
MT0287	Manufactured Treatment Device	1001 N SYCAMORE ST	38.87859738	-77.15452871	2015-04-17	-	-	10.66
NC0269	Purchased Nutrient Credits	1003 N SYCAMORE ST	38.87874318	-77.15486664	2016-07-02	1.26	0.17	TBD
NC0241	Purchased Nutrient Credits	1004 BROADMONT TER	38.87778774	-77.15662583	2017-09-21	1.72	0.11	TBD
DP0183	Rainwater Harvesting	1009 LINCOLN AVE	38.89284131	-77.18220849	2014-02-24	-	-	-
IP0201	Infiltration Pratice	101 S CHERRY ST	38.87809383	-77.16627702	2015-11-18	1.77	0.23	110.73
DP0184	Rainwater Harvesting	1011 LINCOLN AVE	38.89292743	-77.18227859	2014-02-24	-	-	-
NC0315	Purchased Nutrient Credits	1017 FOWLER ST	38.88997068	-77.19198414	2015-11-20	2.35	0.15	TBD
IP0318	Infiltration Practice	102 W ROSEMARY LN	38.87977445	-77.18696185	2017-05-24	-	0.01	5.01
NC0316	Purchased Nutrient Credits	102 W ROSEMARY LN	38.87960011	-77.18710227	2017-05-24	1.11	0.15	TBD
RD0319	Rooftop Disconnection	102 W ROSEMARY LN	38.87975493	-77.1871342	2017-05-24	0.57	0.08	-
NC0305	Purchased Nutrient Credits	1020 S WASHINGTON ST	38.8791216	-77.18422049	2015-08-26	1.47	0.11	TBD
NC0306	Purchased Nutrient Credits	1034 S WASHINGTON ST	38.87910352	-77.18441524	2015-08-26	0.4	0.03	TBD
NC0215	Purchased Nutrient Credits	108 N CHERRY ST	38.88004402	-77.16530665	2018-08-01	2.82	0.18	TBD
NC0312	Purchased Nutrient Credits	110 S LEE ST	38.886676	-77.18017665	2015-09-28	2.01	0.15	TBD
NC0243	Purchased Nutrient Credits	1105 JACKSON CT	38.88092629	-77.18560411	2017-10-02	1.26	0.17	TBD
NC0252	Purchased Nutrient Credits	1108 N SYCAMORE ST	38.87999404	-77.15558791	2017-11-14	1.56	0.1	TBD
NC0238	Purchased Nutrient Credits	1112 JACKSON CT	38.87982194	-77.18620694	2017-05-26	1.698	0.17	TBD
NC0227	Purchased Nutrient Credits	1116 N TUCKAHOE ST	38.88043126	-77.15667274	2018-08-30	-	0.12	TBD
NC0236	Purchased Nutrient Credits	114 E COLUMBIA ST	38.88386089	-77.16601406	2017-10-24	1.41	0.19	TBD
NC0244	Purchased Nutrient Credits	114 E JEFFERSON ST	38.8844806	-77.16418527	2017-09-21	2.895	0.185	TBD
NC0245	Purchased Nutrient Credits	116 E JEFFERSON ST	38.88428144	-77.16459714	2018-06-07	2.895	0.185	TBD
MT0343	Manufactured Treatment Device	1200 W BROAD ST	38.89404976	-77.18881707	2012-09-01	0.42	0.57	56.67
PP0344	Permeable Pavement	1200 W BROAD ST	38.89389378	-77.18851019	2012-09-01	0.69	0.07	58.61
RDV	Land Use Change	1200 W BROAD ST	38.89404976	-77.18881707	2012-09-01	0.55	0.08	37.21
NC0289	Purchased Nutrient Credits	1201 SEATON LN	38.88270542	-77.18710154	2016-03-21	0.59	0.08	TBD
RH0129	Rainwater Harvesting	1205A LINCOLN AVE	38.89406599	-77.18345017	2013-05-28	-	-	-
RH0130	Rainwater Harvesting	1205B LINCOLN AVE	38.89416007	-77.18352556	2013-05-28	-	-	-
NC0212	Purchased Nutrient Credits	1206 ELLISON ST	38.89145337	-77.18716046	2018-04-12	2.5	0.16	TBD
NC0246	Purchased Nutrient Credits	1216 ELLISON ST	38.89124175	-77.18855234	2017-10-02	2.298	0.23	TBD
RH0136	Rainwater Harvesting	1218 ELLISON ST	38.89149102	-77.18895903	2013-05-22	-	-	-
IP0194	Infiltration Practice	123 N FAIRFAX ST	38.88156348	-77.1665192	2014-10-13	3.5	0.41	206.43
PP0195	Permeable Pavement	123 N FAIRFAX ST	38.88182835	-77.16624957	2014-10-13	0.05	0.07	19.33
NC0260	Purchased Nutrient Credits	123 W GREENWAY BLVD	38.88099579	-77.18290287	2016-01-29	1.56	0.1	TBD
MISSING	-	124 W WESTMORELAND RD	-	-	2018-02-01	-	-	-
NC0272	Purchased Nutrient Credits	1268 S WASHINGTON ST	38.87900861	-77.18671057	2017-07-13	3.29	0.21	TBD
NC0328	Purchased Nutrient Credits	1300 ELLISON ST	38.89094825	-77.18976692	2015-01-13	2.83	0.21	TBD
NC0237	Purchased Nutrient Credits	1304 TRACY PL	38.88060236	-77.18854592	2017-06-22	-	0.07	TBD
NC0275	Purchased Nutrient Credits	140 SPRING CT	38.88656251	-77.18495932	2016-11-11	1.11	0.15	TBD
NC0324	Purchased Nutrient Credits	141 LEA CT	38.88635014	-77.18339284	2014-10-07	2.02	0.15	TBD
NC0257	Purchased Nutrient Credits	1502 CRANE ST	38.88937009	-77.19207717	2018-02-23	1.26	0.17	TBD
NC0221	Purchased Nutrient Credits	1504 CRANE ST	38.88925656	-77.19231329	2018-08-14	2.5	0.16	TBD
RH0124	Rainwater Harvesting	201 JACKSON ST	38.87989722	-77.18698374	2012-10-15	-	-	-
MT0163	Manufactured Treatment Device	201 N CHERRY ST	38.88071152	-77.16590188	Prior to 7/1/2016	0.2	2.95	30.46
RDV	Land Use Change	201 N CHERRY ST	38.8806473	-77.16553712	Prior to 7/1/2014	3.97	0.58	270.14
NC0310	Purchased Nutrient Credits	201 PATTERSON ST	38.89046959	-77.1867948	2015-11-03	3.34	0.16	TBD
BR0199	Bioretention	202 N CHERRY ST	38.8803685	-77.16508658	2015-06-12	0.06	0	3.98
BR0294	Bioretention	202 N CHERRY ST	38.88010209	-77.16492467	2015-06-12	0.22	0.02	139.39
BR0295	Bioretention	202 N CHERRY ST	38.88019894	-77.16517089	2015-06-12	0.33	0.02	209.08
IP0198	Infiltration Pratice	202 N CHERRY ST	38.88038934	-77.16528073	2015-06-12	0.98	0.13	63.99
NC0296	Purchased Nutrient Credits	202 N CHERRY ST	38.8803338	-77.16513032	2015-06-12	-	0.16	TBD
NC0308	Purchased Nutrient Credits	204 FOREST DR	38.87763841	-77.15965995	2016-12-23	-	0.08	TBD
MISSING	-	205 PARK AVE	-	-	2018-05-25	-	-	-

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NC0263	Purchased Nutrient Credits	205 PATTERSON ST	38.89026012	-77.18724597	2016-05-23	1.19	0.16	TBD
NC0210	Purchased Nutrient Credits	207 W CAMERON RD	38.88177476	-77.1817656	2018-03-13	1.56	0.1	TBD
NC0262	Purchased Nutrient Credits	209 MIDVALE ST	38.87957729	-77.16476971	2016-04-21	-	0.14	TBD
NC0277	Purchased Nutrient Credits	211 S WEST ST	38.88939923	-77.18670566	2017-12-07	1.56	0.21	TBD
NC0266	Purchased Nutrient Credits	213 TYSON DR	38.8794845	-77.1616767	2016-12-13	-	0.12	TBD
RD0267	Rooftop Disconnection	213 TYSON DR	38.87957855	-77.16185598	2016-12-13	-	0.07	-
NC0313	Purchased Nutrient Credits	217 W GREENWAY BLVD	38.88237706	-77.18304283	2015-12-01	1.56	0.1	TBD
NC0290	Purchased Nutrient Credits	2509 FOWLER ST	38.89075433	-77.19176592	2015-06-19	1.89	0.14	TBD
RD0197	Rooftop Disconnection	2509 FOWLER ST	38.89072925	-77.19166401	2015-06-19	0.23	0.03	-
IP0128	Infiltration Practice	300 HUNTON AVE	38.87788499	-77.17096341	2013-11-01	3.73	0.56	317.88
IP0177	Infiltration Practice	300 HUNTON AVE	38.87794908	-77.17140288	2013-11-01	1.57	0.17	133.45
PP0137	Permeable Pavement	300 HUNTON AVE	38.877865	-77.17105038	2013-11-01	4.27	0.61	358.99
RDV	Land Use Change	300 HUNTON AVE	38.87788499	-77.17096341	11/1/2013	-1.23	-0.16	-98.91
MISSING	-	300 PARK AVE	-	-	2014-06-01	0.79	12.84	120.48
NC0268	Purchased Nutrient Credits	301 N LEE ST	38.88951064	-77.17694701	2016-09-06	2.82	0.18	TBD
MT0346	Manufactured Treatment Device	301 W BROAD ST	38.8836732	-77.17382051	Prior to 7/1/2017	1.68	2.1	228.83
NC0251	Purchased Nutrient Credits	303 N VIRGINIA AVE	38.88764842	-77.1741465	2018-01-27	2.66	0.17	TBD
NC0348	Purchased Nutrient Credits	305 BUXTON RD	38.88022764	-77.16111997	2018-04-09	-	0.19	TBD
NC0281	Purchased Nutrient Credits	305 N LEE ST	38.88983288	-77.176622	2016-11-14	2.03	0.13	TBD
NC0326	Purchased Nutrient Credits	306 PENNSYLVANIA AVE	38.88888038	-77.17506157	2015-02-02	1.88	0.12	TBD
NC0249	Purchased Nutrient Credits	307 N VIRGINIA AVE	38.88798766	-77.17376898	2017-10-06	-	0.16	TBD
NC0214	Purchased Nutrient Credits	307 POPLAR DR	38.88084761	-77.19036687	2018-06-29	-	0.15	TBD
NC0283	Purchased Nutrient Credits	308 LAWTON ST	38.88320412	-77.16595608	2017-02-03	1.11	0.15	TBD
NC0284	Permeable Pavement	308 LAWTON ST	38.88324655	-77.16608143	2017-02-03	0.13	0.02	6.44
NC0301	Purchased Nutrient Credits	308 PENNSYLVANIA AVE	38.88900938	-77.17491817	2015-09-17	1.72	0.11	TBD
NC0248	Purchased Nutrient Credits	308 RILEY ST	38.88847393	-77.174069	2017-09-06	2.66	0.17	TBD
NC0255	Purchased Nutrient Credits	309 KENT ST	38.88749487	-77.18780057	2018-03-01	2.35	0.15	TBD
IT0206	Infiltration Practice	309 SYCAMORE ST	38.89495159	-77.18280299	2017-05-18	0	0.1173	56.02
PP0204	Permeable Pavement	309 SYCAMORE ST	38.89491874	-77.18285011	2017-05-18	0.16	0.0445	16.3
NC0242	Purchased Nutrient Credits	310 RILEY ST	38.88863465	-77.1738818	2017-08-21	1.19	0.16	TBD
NC0232	Purchased Nutrient Credits	310 ROLLINS ST	38.8820562	-77.17830811	2017-08-03	1.192	0.12	TBD
NC0335	Purchased Nutrient Credits	311B GROVE AVE	38.89379364	-77.18446604	2014-11-10	1.55	0.115	TBD
NC0334	Purchased Nutrient Credits	311C GROVE AVE	38.89391774	-77.18448607	2014-11-10	1.55	0.115	TBD
NC0300	Purchased Nutrient Credits	315 RILEY ST	38.8883037	-77.17485256	2015-07-14	1.72	0.11	TBD
PP0200	Permeable Pavement	315 RILEY ST	38.88830432	-77.17471351	2015-07-14	0.36	0.04	12.88
NC0293	Purchased Nutrient Credits	317 RILEY ST	38.88844517	-77.17472155	2015-11-16	1.34	0.1	TBD
NC0327	Purchased Nutrient Credits	319 RILEY ST	38.88857567	-77.17456397	2014-11-17	1.88	0.12	TBD
NC0282	Purchased Nutrient Credits	323 FOREST DR	38.88102739	-77.16007629	2016-12-12	1.19	0.16	TBD
NC0303	Purchased Nutrient Credits	333 RILEY ST	38.88949553	-77.17359974	2015-08-17	1.74	0.13	TBD
NC0311	Purchased Nutrient Credits	335 GROVE AVE	38.89524737	-77.18474536	2015-12-15	2.19	0.14	TBD
NC0254	Purchased Nutrient Credits	366 N WASHINGTON ST	38.88450058	-77.16718855	2018-05-18	-	0.15	TBD
NC0278	Purchased Nutrient Credits	402 PARKER AVE	38.88530701	-77.18548015	2017-01-27	-	0.08	TBD
NC0211	Purchased Nutrient Credits	402 S SPRING ST	38.88609964	-77.18577432	2018-01-30	2.5	0.16	TBD
NC0292	Purchased Nutrient Credits	404 S SPRING ST	38.88609446	-77.18605548	2015-04-09	2.14	0.16	TBD
NC0280	Purchased Nutrient Credits	409 ROLLINS ST	38.88299363	-77.1794312	2016-10-03	1.88	0.12	TBD
NC0256	Purchased Nutrient Credits	410 SHERROW AVE	38.88277291	-77.17997629	2017-12-11	0.89	0.12	TBD
IP0120	Infiltration Practice	416 E COLUMBIA ST	38.88166263	-77.16323326	2012-12-05	-	-	-
NC0286	Purchased Nutrient Credits	418 GREAT FALLS ST	38.88844451	-77.17206092	2015-04-13	2.94	0.22	TBD
NC0270	Purchased Nutrient Credits	421 E COLUMBIA ST	38.88209788	-77.16252751	2016-08-04	-	0.19	TBD
MISSING	-	430 S MAPLE AVE	-	-	2018-02-01	-	-	-
BR0140	Bioretention	450 N WASHINGTON ST	38.88537225	-77.16513093	2014-12-01	2.09	0.33	178.06
BR0345	Bioretention	450 N WASHINGTON ST	38.88521379	-77.16554822	2014-12-01	2.06	0.34	175.6
MT0141	Manufactured Treatment Device	450 N WASHINGTON ST	38.88519125	-77.16449715	2014-12-01	0.3	3.59	43.78
RDV	Land Use Change	450 N WASHINGTON ST	38.88521379	-77.16554822	2014-12-01	-11.16	-3.05	-962.18
VR0139	Vegetated Roof	450 N WASHINGTON ST	38.885242	-77.16521646	2014-12-01	16.83	1.55	1436.19

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NC0247	Purchased Nutrient Credits	501 TIMBER LN	38.88398054	-77.18641515	2017-11-20	1.299	0.13	TBD
NC0325	Purchased Nutrient Credits	503 & 505 N WEST ST	38.89343186	-77.17846098	2014-10-15	2.56	0.19	TBD
NC0309	Purchased Nutrient Credits	506 ANNE ST	38.88510858	-77.18755967	2015-12-15	1.88	0.12	TBD
NC0218	Purchased Nutrient Credits	507 ANNE ST	38.88476142	-77.1876682	2018-06-06	2.35	0.15	TBD
NC0279	Purchased Nutrient Credits	507 E COLUMBIA ST	38.88237679	-77.16027406	2016-11-18	5.13	0.69	TBD
NC0239	Purchased Nutrient Credits	507 S SPRING ST	38.88572491	-77.18757196	2017-09-21	1.88	0.12	TBD
NC0250	Purchased Nutrient Credits	508 ANNE ST	38.88510858	-77.18783891	2017-11-10	1.04	0.14	TBD
NC0320	Purchased Nutrient Credits	510 ANNE ST	38.88510755	-77.18801745	2014-11-25	0.78	0.05	TBD
NC0264	Purchased Nutrient Credits	510 LINCOLN AVE	38.89086716	-77.17326039	2016-06-23	1.41	0.19	TBD
NC0304	Purchased Nutrient Credits	511 GREENWICH ST	38.89196902	-77.17644562	2015-07-06	1.74	0.13	TBD
NC0274	Purchased Nutrient Credits	512 TIMBER LN	38.88392296	-77.18825454	2016-08-15	1.11	0.15	TBD
NC0299	Purchased Nutrient Credits	515 ANNE ST	38.88475293	-77.18854364	2015-09-15	1.34	0.18	TBD
NC0258	Purchased Nutrient Credits	517 MERIDIAN ST	38.89257016	-77.17218743	2018-02-21	2.5	0.16	TBD
DP0196	Rainwater Harvesting	527 GREENWICH ST	38.89287692	-77.17733642	2015-03-06	-	0.02	-
NC0332	Purchased Nutrient Credits	527 GREENWICH ST	38.89293446	-77.17704598	2015-03-06	1.88	0.12	TBD
MT0347	Manufactured Treatment Device	540 S WASHINGTON ST	38.87981177	-77.17681825	Prior to 7/1/2018	0.97	4.41	136.45
RDV	Land Use Change	540 S WASHINGTON ST	38.87981177	-77.17681825	Prior to 7/1/2015	-0.43	-1.99	-61.4
NC0331	Purchased Nutrient Credits	600B ABBOTT LN	38.88469662	-77.19344781	2015-02-09	1.19	0.16	TBD
BR0149	Bioretention	601 S OAK ST	38.8831571	-77.18311933	2013-09-01	-	-	-
BR0150	Bioretention	601 S OAK ST	38.88343123	-77.18418293	2013-09-01	-	-	-
BR0159	Bioretention	601 S OAK ST	38.88395783	-77.18320832	2013-09-01	18.22	2.87	1554.15
BR0160	Bioretention	601 S OAK ST	38.88356043	-77.18312016	2013-09-01	2.62	0.41	222.99
DP0148	Dry Pond	601 S OAK ST	38.8831887	-77.18432841	2013-09-01	-	-	-
IP0162	Infiltration Pratice	601 S OAK ST	38.88386743	-77.18311849	2013-09-01	-	-	-
PP0161	Porous Pavement	601 S OAK ST	38.88341473	-77.18275351	2013-09-01	5.26	0.51	448.73
RDV	Land Use Change	601 S OAK ST	38.88386743	-77.18311849	2013-09-01	-12.00	-1.74	-1022.88
BR0189	Bioretention	602 GREENWICH ST	38.8939594	-77.17738979	2014-11-06	0.03	0.03	-
GC0341	Grass Channel	602 GREENWICH ST	38.89381749	-77.17751558	2014-11-06	0.27	0.03	23.72
OT0342	Other	602 GREENWICH ST	38.89390052	-77.177353	2014-11-06	-	0	-
PP0190	Permeable Pavement	602 GREENWICH ST	38.89378486	-77.17772365	2014-11-06	0.9	0.01	6.44
BR0337	Bioretention	602 N OAK ST	38.89371178	-77.17852081	2014-11-06	0.1	0.02	-
GC0336	Grass Channel	602 N OAK ST	38.89359993	-77.17874889	2014-11-06	0.27	0.03	23.72
IP0185	Infiltration Practice	602 N OAK ST	38.89374111	-77.17860112	2014-11-06	0.1	0.02	-
PP0186	Permeable Pavement	602 N OAK ST	38.89357695	-77.17892594	2014-11-06	0.09	0.01	6.44
NC0276	Purchased Nutrient Credits	602 POPLAR DR	38.88383608	-77.19086942	2016-12-14	1.41	0.19	TBD
BR0191	Bioretention	604 GREENWICH ST	38.89399203	-77.17741222	2014-11-06	0.29	0.03	-
GC0339	Grass Channel	604 GREENWICH ST	38.89391457	-77.17758456	2014-11-06	0.26	0.03	22.84
OT0340	Other	604 GREENWICH ST	38.89403325	-77.17745548	2014-11-06	0.04	0.01	-
PP0192	Permeable Pavement	604 GREENWICH ST	38.89390156	-77.1778037	2014-11-06	0.09	0.01	6.44
GC0338	Grass Channel	604 N OAK ST	38.89370061	-77.17879919	2014-11-06	0.26	0.03	22.84
IP0187	Infiltration Pratice	604 N OAK ST	38.89378513	-77.178623	2014-11-06	0.26	0.04	-
PP0188	Permeable Pavement	604 N OAK ST	38.89368641	-77.17897986	2014-11-06	0.09	0.01	6.44
NC0231	Purchased Nutrient Credits	605 LANGSTON LN	38.89230794	-77.17331702	2017-02-24	1.18	0.16	TBD
NC0261	Purchased Nutrient Credits	608 KNOLLWOOD DR	38.88464088	-77.1896184	2016-08-15	1.34	0.18	TBD
PP0333	Permeable Pavement	608 TIMBER LN	38.88356132	-77.19052658	2013-06-06	-	-	57.92
NC0307	Purchased Nutrient Credits	609 KNOLLWOOD DR	38.88448156	-77.19029227	2015-09-16	2.14	0.16	TBD
NC0209	Purchased Nutrient Credits	609 OAK HAVEN DR	38.89267471	-77.17437262	2018-06-13	-	0.08	TBD
NC0288	Purchased Nutrient Credits	610 LINCOLN AVE	38.890647	-77.17507796	2015-12-02	1.74	0.13	TBD
NC0213	Purchased Nutrient Credits	611 N 11TH ST	38.87956679	-77.15773895	2018-03-29	1.499	0.15	TBD
NC0259	Purchased Nutrient Credits	612 POPLAR DR	38.88480204	-77.19122365	2015-12-07	1.97	0.18	TBD
NC0273	Purchased Nutrient Credits	613 KNOLLWOOD DR	38.88486021	-77.19045855	2016-08-07	1.86	0.25	TBD
NC0208	Purchased Nutrient Credits	615 LINCOLN AVE	38.89071323	-77.17541787	2018-02-19	1.11	0.15	TBD
NC0271	Purchased Nutrient Credits	617 LINCOLN AVE	38.89076139	-77.17557491	2016-08-11	1.04	0.14	TBD
NC0207	Purchased Nutrient Credits	622 LAURA DR	38.886367	-77.19308604	2018-03-26	1.41	0.19	TBD
MT0104	Manufactured Treatment Device	6607 WILSON BLVD	38.87455795	-77.15046996	2010-10-01	4.55	6.86	618.32

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DP0182	Manufactured Treatment Device	6751 WILSON BLVD	38.87402701	-77.15426328	2014-12-01	-	-	-
MT0133	Manufactured Treatment Device (Stormfilter)	6751 WILSON BLVD	38.87496522	-77.15363778	2014-12-01	0.43	3.92	58.81
MT0155	Manufactured Treatment Device (Filterra)	6751 WILSON BLVD	38.87402701	-77.15426328	2014-12-01	0.41	0.52	56.54
MT0178	Manufactured Treatment Device (Filterra)	6751 WILSON BLVD	38.87402701	-77.15426328	2014-12-01	0.42	0.52	56.54
MT0179	Manufactured Treatment Device (Filterra)	6751 WILSON BLVD	38.87402701	-77.15426328	2014-12-01	0.42	0.52	56.54
RDV	Land Use Change	6751 WILSON BLVD	38.87402701	-77.15426328	2014-12-01	0.03	0	2.14
NC0302	Purchased Nutrient Credits	6935 & 6936 N 26TH ST	38.88936157	-77.16756443	2015-08-04	3.88	0.29	TBD
MT0006	Manufactured Treatment Device	700 E BROAD ST	38.87647357	-77.16222907	2017-01-17	-	-	-
MISSING	-	700 W BROAD ST	-	-	2017-01-17	-	-	-
MISSING	-	700 W BROAD ST	-	-	2017-01-17	-	-	-
NC0321	Purchased Nutrient Credits	701 TIMBER LN	38.88310286	-77.19109824	2015-11-30	1.75	0.16	TBD
NC0253	Purchased Nutrient Credits	702 FULTON AVE	38.88959101	-77.17711809	2018-01-22	-	0.09	TBD
NC0330	Purchased Nutrient Credits	703 HIGHLAND AVE	38.89394061	-77.1807866	2015-01-13	2.29	0.17	TBD
NC0265	Purchased Nutrient Credits	705 POPLAR DR	38.88599081	-77.19230432	2016-05-03	1.49	0.2	TBD
DP0174	Manufactured Treatment Device	706 W BROAD ST	38.88826391	-77.1791291	2014-07-01	0.18	3.3	24.78
MT0135	Manufactured Treatment Device	706 W BROAD ST	38.8882005	-77.17934133	2014-07-01	0.18	3.3	24.78
RDV	Land Use Change	706 W BROAD ST	38.88826391	-77.1791291	2014-07-01	-0.12	-2.29	-17.21
NC0314	Purchased Nutrient Credits	707 RANDOLPH ST	38.88661842	-77.19017201	2015-10-12	1.87	0.14	TBD
NC0233	Purchased Nutrient Credits	802 PARKER AVE	38.88814604	-77.1859133	2017-08-13	1.41	0.19	TBD
NC0285	Purchased Nutrient Credits	804 RANDOLPH ST	38.88755832	-77.19083825	2016-10-25	-	0.17	TBD
NC0322	Purchased Nutrient Credits	808 VILLA RIDGE RD	38.87678323	-77.15889911	2014-12-28	1.04	0.14	TBD
PP0323	Permeable Pavement	808 VILLA RIDGE RD	38.8768843	-77.15885277	2014-12-28	0.22	0.03	1.69
NC0298	Purchased Nutrient Credits	816 PARK AVE	38.88987122	-77.18001271	2016-03-18	2.35	0.15	TBD
NC0240	Purchased Nutrient Credits	900 LINCOLN AVE	38.89203201	-77.17945236	2018-02-13	3.28	0.21	TBD
NC0329	Purchased Nutrient Credits	902 LINCOLN AVE	38.89209415	-77.17971881	2015-02-20	0.94	0.07	TBD
NC0234	Purchased Nutrient Credits	903 LANIER PL	38.88838548	-77.18904548	2017-12-04	1.19	0.16	TBD
NC0291	Purchased Nutrient Credits	905 HILLWOOD AVE	38.87536309	-77.16231212	2015-09-22	1.6	0.12	TBD
MT0154	Manufactured Treatment Device	917 W BROAD ST	38.88939089	-77.18335388	2013-06-01	0.42	0.55	56.81
RDV	Land Use Change	917 W BROAD ST	38.88939089	-77.18335388	2013-06-01	2.43	0.35	165.57
MT0131	Manufactured Treatment Device	935 W BROAD ST	38.89041855	-77.18495071	2014-07-01	2.63	0.29	356.6
RDV	Land Use Change	935 W BROAD ST	38.89041855	-77.18495071	2014-07-01	0.22	0.03	15.12
NC0219	Purchased Nutrient Credits	994 N SYCAMORE ST	38.87786758	-77.15494253	2018-06-29	-	0.16	TBD
BMP	Stream Restoration	COE BRANCH	38.885071	-77.180056	2016-06-30	71.4	64.74	42725.76
BMP	Stream Restoration	PEARSON BRANCH	38.887188	-77.184427	2016-06-20	28.8	26.11	17233.92
					Total	**336.57**	**154.95**	**66137.05**

Attachment 2: Summary Report of the 2019 Nutrient Credit Exchange for Potomac River Nitrogen

Exchange Compliance Plan
2019 Annual Update

Submitted to the
Virginia Department of Environmental Quality
February 1, 2019

EXHIBIT 2-2
2019 Nitrogen Trading Ledger: Potomac-Shenandoah River Basin

POTOMAC Basin: Nitrogen Credit Ledger

Compliance Year:	*2019*	Credit Forecasts		Preliminary Use of Credits				Credit Exchange (Pounds)			
Facility Name	**Delivered WLA**	**Expected Load**	**Expected Credits**	**In-Bubble Exchange**	**Private Exchange**	**WQIF-Held Credits**	**Expected Net Credits**		**Class A Sales**	**Class A* Purchases**	**Class B Sales****
								PRICE:	**$ 0.08**	**$ 3.82**	**$ 0.02**
The Exchange (group)	**2,612,604**	**1,932,970**	**679,634**	**-**	**(2,924)**	**(24,365)**	**652,345**		**496,157**	**(11,665)**	**167,853**
ACSA-Fishersville	4,873	1,900	2,973	(2,973)	-	-	-		-	-	-
ACSA-Greenville	1,424	512	912	(479)	-	-	433		433	-	-
ACSA-Harriston	1,025	209	816	(816)	-	-	-		-	-	-
ACSA-Middle River	8,284	3,877	4,407	-	-	-	4,407		4,407	-	-
ACSA-Mt. Sidney	854	1,346	(492)	492	-	-	-		-	-	-
ACSA-Stuarts Draft	2,436	606	1,830	-	-	-	1,830		1,830	-	-
ACSA-Vesper View	1,025	563	462	(462)	-	-	-		-	-	-
ACSA-Weyers Cave	1,462	5,700	(4,238)	4,238	-	-	-		-	-	-
Alexandria Renew Ent.	493,381	371,223	122,158	-	-	-	122,158		91,620	-	30,538
Arlington Co.	365,284	237,554	127,730	-	(2,625)	-	125,105		125,105	-	-
Berryville	5,373	3,377	1,996	-	-	-	1,996		1,900	-	96
Broadway Regional	5,601	4,719	882	-	-	-	882		-	-	882
Fairfax Co-Noman Cole	612,158	470,822	141,336	-	(25)	-	141,311		127,128	-	14,183
FCWSA-Vint Hill	579	244	335	-	-	-	335		-	-	335
Front Royal	29,725	25,359	4,366	-	-	-	4,366		4,000	-	366
FWSA-Opequon	31,681	17,183	14,498	-	-	-	14,498		-	-	14,498
FWSA-Parkins Mill	15,837	6,533	9,304	-	-	-	9,304		-	-	9,304
HRRSA-North River	55,746	38,191	17,555	-	-	-	17,555		15,000	-	2,555
KGCSA-Dahlgren S.D.	9,137	5,025	4,112	(427)	-	-	3,685		-	-	3,685
KGCSA-Fairview Beach	1,827	731	1,096	-	-	-	1,096		-	-	1,096
KGCSA-Purkins Corner	1,096	1,523	(427)	427	-	-	-		-	-	-
Leesburg	97,458	32,898	64,560	-	(274)	(24,365)	39,921		-	-	39,921
Loudoun Water- Broad Run	119,264	48,953	70,311	-	-	-	70,311		57,884	-	12,427
Luray	8,187	2,533	5,654	-	-	-	5,654		5,654	-	-
Massanutten PSC	6,030	2,975	3,055	-	-	-	3,055		-	-	3,055
Merck	4,824	14,473	(9,649)	-	-	-	(9,649)		-	(9,649)	-
MillerCoors LLC	18,091	18,091	-	-	-	-	-		-	-	-
Mt. Jackson	2,900	2,237	663	-	-	-	663		-	-	663
Purcellville	13,157	7,894	5,263	-	-	-	5,263		2,632	-	2,631
PWCSA-HL Mooney	219,280	178,165	41,115	-	-	-	41,115		28,781	-	12,334
Stafford Co-Aquia	73,093	67,063	6,030	-	-	-	6,030		4,462	-	1,568
Stoney Creek	2,891	2,814	77	-	-	-	77		-	-	77
Strasburg	5,134	6,548	(1,414)	-	-	-	(1,414)		-	(2,016)	602
UOSA	302,607	300,006	2,601	-	-	-	2,601		-	-	2,601
VA Am. Water PW Sec. 1	42,029	23,984	18,045	-	-	-	18,045		10,827	-	7,218
VA Am. Water PW Sec. 8	42,029	23,984	18,045	-	-	-	18,045		10,827	-	7,218
Waynesboro	6,822	3,155	3,667	-	-	-	3,667		3,667	-	-
Purchase by Eastern Shore	-	-	-	-	-	-	-		-	-	-

For this Compliance Year, 0% of all Class A Credit Purchases are expected to be satisfied using Class B Credits.

*** Class A and Class B Credit Sales are estimates only; actual Credits generated—and the resulting sales prices—may vary from estimates based on Delivered Loads in the Compliance Year.*

EXHIBIT 2-3
2020 Nitrogen Trading Ledger: Potomac-Shenandoah River Basin

POTOMAC Basin: Nitrogen Credit Ledger

Compliance Year:	2020	Credit Forecasts		Preliminary Use of Credits				Credit Exchange (Pounds)			
Facility Name	Delivered WLA	Expected Load	Expected Credits	In-Bubble Exchange	Private Exchange	WQIF-Held Credits	Expected Net Credits		Class A Sales	Class A* Purchases	Class B Sales**
								PRICE:	$ 0.09	$ 3.86	$ 0.02
The Exchange (group)	**2,612,604**	**1,937,473**	**675,131**	**-**	**(2,924)**	**(24,365)**	**647,842**		**435,531**	**(11,705)**	**224,016**
ACSA-Fishersville	4,873	1,957	2,916	(2,916)	-	-	-		-	-	-
ACSA-Greenville	1,424	527	897	(771)	-	-	126		126	-	-
ACSA-Harriston	1,025	216	809	(809)	-	-	-		-	-	-
ACSA-Middle River	8,284	3,994	4,290	-	-	-	4,290		4,290	-	-
ACSA-Mt. Sidney	854	1,386	(532)	532	-	-	-		-	-	-
ACSA-Stuarts Draft	2,436	624	1,812	-	-	-	1,812		1,812	-	-
ACSA-Vesper View	1,025	580	445	(445)	-	-	-		-	-	-
ACSA-Weyers Cave	1,462	5,871	(4,409)	4,409	-	-	-		-	-	-
Alexandria Renew Ent.	493,381	375,061	118,320	-	-	-	118,320		-	-	118,320
Arlington Co.	365,284	242,122	123,162	-	(2,625)	-	120,537		120,537	-	-
Berryville	5,373	3,223	2,150	-	-	-	2,150		2,100	-	50
Broadway Regional	5,601	4,780	821	-	-	-	821		-	-	821
Fairfax Co-Noman Cole	612,158	456,755	155,403	-	(25)	-	155,378		155,324	-	54
FCWSA-Vint Hill	579	256	323	-	-	-	323		-	-	323
Front Royal	29,725	25,415	4,310	-	-	-	4,310		4,000	-	310
FWSA-Opequon	31,681	17,959	13,722	-	-	-	13,722		-	-	13,722
FWSA-Parkins Mill	15,837	7,364	8,473	-	-	-	8,473		-	-	8,473
HRRSA-North River	55,746	38,191	17,555	-	-	-	17,555		15,000	-	2,555
KGCSA-Dahlgren S.D.	9,137	5,482	3,655	(427)	-	-	3,228		-	-	3,228
KGCSA-Fairview Beach	1,827	822	1,005	-	-	-	1,005		-	-	1,005
KGCSA-Purkins Corner	1,096	1,523	(427)	427	-	-	-		-	-	-
Leesburg	97,458	34,535	62,923	-	(274)	(24,365)	38,284		-	-	38,284
Loudoun Water- Broad Run	119,264	52,747	66,517	-	-	-	66,517		66,517	-	-
Luray	8,187	2,533	5,654	-	-	-	5,654		5,654	-	-
Massanutten PSC	6,030	3,055	2,975	-	-	-	2,975		-	-	2,975
Merck	4,824	14,473	(9,649)	-	-	-	(9,649)		-	(9,649)	-
MillerCoors LLC	18,091	18,091	-	-	-	-	-		-	-	-
Mt. Jackson	2,900	2,278	622	-	-	-	622		-	-	622
Purcellville	13,157	8,333	4,824	-	-	-	4,824		2,412	-	2,412
PWCSA-HL Mooney	219,280	180,449	38,831	-	-	-	38,831		27,182	-	11,649
Stafford Co-Aquia	73,093	67,063	6,030	-	-	-	6,030		5,427	-	603
Stoney Creek	2,891	2,814	77	-	-	-	77		-	-	77
Strasburg	5,134	6,613	(1,479)	-	-	-	(1,479)		-	(2,056)	577
UOSA	302,607	299,087	3,520	-	-	-	3,520		-	-	3,520
VA Am. Water PW Sec. 1	42,029	23,984	18,045	-	-	-	18,045		10,827	-	7,218
VA Am. Water PW Sec. 8	42,029	23,984	18,045	-	-	-	18,045		10,827	-	7,218
Waynesboro	6,822	3,326	3,496	-	-	-	3,496		3,496	-	-
Purchase by Eastern Shore	-	-	-	-	-	-	-		-	-	-

For this Compliance Year, 0% of all Class A Credit Purchases are expected to be satisfied using Class B Credits.

*** Class A and Class B Credit Sales are estimates only; actual Credits generated—and the resulting sales prices—may vary from estimates based on Delivered Loads in the Compliance Year.*

EXHIBIT 2-4
2021 Nitrogen Trading Ledger: Potomac-Shenandoah River Basin

POTOMAC Basin: Nitrogen Credit Ledger

Compliance Year:	2021	Credit Forecasts		Preliminary Use of Credits				Credit Exchange (Pounds)		
Facility Name	Delivered WLA	Expected Load	Expected Credits	In-Bubble Exchange	Private Exchange	WQIF-Held Credits	Expected Net Credits	Class A Sales	Class A* Purchases	Class B Sales**
								PRICE: $ 0.07	$ 3.87	$ 0.01
The Exchange (group)	**2,515,720**	**1,925,601**	**590,119**	**-**	**(2,924)**	**(19,492)**	**567,703**	**375,337**	**(7,654)**	**200,020**
ACSA-Fishersville	2,924	1,209	1,715	(1,715)	-	-	-	-	-	-
ACSA-Greenville	854	303	551	(425)	-	-	126	126	-	-
ACSA-Harriston	626	136	490	-	-	-	490	490	-	-
ACSA-Middle River	4,970	2,468	2,502	-	-	-	2,502	2,502	-	-
ACSA-Mt. Sidney	513	864	(351)	351	-	-	-	-	-	-
ACSA-Stuarts Draft	1,462	386	1,076	(1,076)	-	-	-	-	-	-
ACSA-Vesper View	626	338	288	-	-	-	288	288	-	-
ACSA-Weyers Cave	914	3,779	(2,865)	2,865	-	-	-	-	-	-
Alexandria Renew Ent.	493,381	375,061	118,320	-	-	-	118,320	-	-	118,320
Arlington Co.	365,284	246,690	118,594	-	(2,625)	-	115,969	115,969	-	-
Berryville	4,435	2,661	1,774	-	-	-	1,774	1,650	-	124
Broadway Regional	3,538	3,057	481	-	-	-	481	-	-	481
Fairfax Co-Noman Cole	612,158	488,547	123,611	-	(25)	-	123,586	123,528	-	58
FCWSA-Vint Hill	579	268	311	-	-	-	311	-	-	311
Front Royal	24,365	20,832	3,533	-	-	-	3,533	3,200	-	333
FWSA-Opequon	25,589	15,043	10,546	-	-	-	10,546	-	-	10,546
FWSA-Parkins Mill	12,791	6,428	6,363	-	-	-	6,363	-	-	6,363
HRRSA-North River	35,475	24,628	10,847	-	-	-	10,847	4,600	-	6,247
KGCSA-Dahlgren S.D.	9,137	4,568	4,569	(1,508)	-	-	3,061	2,800	-	261
KGCSA-Fairview Beach	1,827	1,462	365	-	-	-	365	300	-	65
KGCSA-Purkins Corner	1,096	2,604	(1,508)	1,508	-	-	-	-	-	-
Leesburg	77,966	29,541	48,425	-	(274)	(19,492)	28,659	-	-	28,659
Loudoun Water- Broad Run	109,884	53,231	56,653	-	-	-	56,653	56,653	-	-
Luray	6,432	1,990	4,442	-	-	-	4,442	4,442	-	-
Massanutten PSC	4,020	2,037	1,983	-	-	-	1,983	-	-	1,983
Merck	3,216	9,648	(6,432)	-	-	-	(6,432)	-	(6,432)	-
MillerCoors LLC	12,060	12,060	-	-	-	-	-	-	-	-
Mt. Jackson	2,132	1,675	457	-	-	-	457	-	-	457
Purcellville	8,406	6,164	2,242	-	-	-	2,242	1,121	-	1,121
PWCSA-HL Mooney	219,280	181,363	37,917	-	-	-	37,917	28,438	-	9,479
Stafford Co-Aquia	73,093	67,063	6,030	-	-	-	6,030	5,427	-	603
Stoney Creek	2,065	1,865	200	-	-	-	200	200	-	-
Strasburg	4,059	5,281	(1,222)	-	-	-	(1,222)	-	(1,222)	-
UOSA	302,607	302,434	173	-	-	-	173	-	-	173
VA Am. Water PW Sec. 1	42,029	23,984	18,045	-	-	-	18,045	10,827	-	7,218
VA Am. Water PW Sec. 8	42,029	23,984	18,045	-	-	-	18,045	10,827	-	7,218
Waynesboro	3,898	1,949	1,949	-	-	-	1,949	1,949	-	-
Purchase by Eastern Shore	-	-	-	-	-	-	-	-	-	-

For this Compliance Year, 0% of all Class A Credit Purchases are expected to be satisfied using Class B Credits.

*** Class A and Class B Credit Sales are estimates only; actual Credits generated—and the resulting sales prices—may vary from estimates based on Delivered Loads in the Compliance Year.*

EXHIBIT 2-5
2022 Nitrogen Trading Ledger: Potomac-Shenandoah River Basin

POTOMAC Basin: Nitrogen Credit Ledger

Compliance Year:	*2022*	Credit Forecasts		Preliminary Use of Credits				Credit Exchange (Pounds)			
Facility Name	**Delivered WLA**	**Expected Load**	**Expected Credits**	**In-Bubble Exchange**	**Private Exchange**	**WQIF-Held Credits**	**Expected Net Credits**		**Class A Sales**	**Class A* Purchases**	**Class B Sales****
								PRICE:	**$ 0.07**	**$ 3.94**	**$ 0.01**
The Exchange (group)	**2,515,720**	**1,930,908**	**584,812**	**-**	**(3,765)**	**(19,492)**	**561,555**		**371,226**	**(7,706)**	**198,035**
ACSA-Fishersville	2,924	1,169	1,755	(1,755)	-	-	-		-	-	-
ACSA-Greenville	854	337	517	(517)	-	-	-		-	-	-
ACSA-Harriston	626	151	475	(56)	-	-	419		419	-	-
ACSA-Middle River	4,970	2,577	2,393	-	-	-	2,393		2,393	-	-
ACSA-Mt. Sidney	513	895	(382)	382	-	-	-		-	-	-
ACSA-Stuarts Draft	1,462	389	1,073	(1,073)	-	-	-		-	-	-
ACSA-Vesper View	626	360	266	-	-	-	266		266	-	-
ACSA-Weyers Cave	914	3,933	(3,019)	3,019	-	-	-		-	-	-
Alexandria Renew Ent.	493,381	375,061	118,320	-	-	-	118,320		-	-	118,320
Arlington Co.	365,284	242,122	123,162	-	(2,625)	-	120,537		120,537	-	-
Berryville	4,435	2,597	1,838	-	-	-	1,838		1,300	-	538
Broadway Regional	3,538	3,096	442	-	-	-	442		-	-	442
Fairfax Co-Noman Cole	612,158	491,188	120,970	-	(25)	-	120,945		120,945	-	-
FCWSA-Vint Hill	579	280	299	-	-	-	299		-	-	299
Front Royal	24,365	20,832	3,533	-	-	-	3,533		3,200	-	333
FWSA-Opequon	25,589	13,911	11,678	-	-	-	11,678		-	-	11,678
FWSA-Parkins Mill	12,791	6,907	5,884	-	-	-	5,884		-	-	5,884
HRRSA-North River	35,475	24,628	10,847	-	(1,115)	-	9,732		4,600	-	5,132
KGCSA-Dahlgren S.D.	9,137	4,568	4,569	(1,508)	-	-	3,061		2,800	-	261
KGCSA-Fairview Beach	1,827	1,462	365	-	-	-	365		300	-	65
KGCSA-Purkins Corner	1,096	2,604	(1,508)	1,508	-	-	-		-	-	-
Leesburg	77,966	30,878	47,088	-	-	(19,492)	27,596		-	-	27,596
Loudoun Water- Broad Run	109,884	57,339	52,545	-	-	-	52,545		52,545	-	-
Luray	6,432	1,990	4,442	-	-	-	4,442		4,442	-	-
Massanutten PSC	4,020	2,037	1,983	-	-	-	1,983		-	-	1,983
Merck	3,216	9,648	(6,432)	-	-	-	(6,432)		-	(6,432)	-
MillerCoors LLC	12,060	12,060	-	-	-	-	-		-	-	-
Mt. Jackson	2,132	1,706	426	-	-	-	426		-	-	426
Purcellville	8,406	6,500	1,906	-	-	-	1,906		953	-	953
PWCSA-HL Mooney	219,280	182,277	37,003	-	-	-	37,003		27,752	-	9,251
Stafford Co-Aquia	73,093	67,063	6,030	-	-	-	6,030		5,427	-	603
Stoney Creek	2,065	1,865	200	-	-	-	200		200	-	-
Strasburg	4,059	5,333	(1,274)	-	-	-	(1,274)		-	(1,274)	-
UOSA	302,607	302,468	139	-	-	-	139		-	-	139
VA Am. Water PW Sec. 1	42,029	24,364	17,665	-	-	-	17,665		10,599	-	7,066
VA Am. Water PW Sec. 8	42,029	24,364	17,665	-	-	-	17,665		10,599	-	7,066
Waynesboro	3,898	1,949	1,949	-	-	-	1,949		1,949	-	-
Purchase by Eastern Shore	-	-	-	-	-	-	-		-	-	-

For this Compliance Year, 0% of all Class A Credit Purchases are expected to be satisfied using Class B Credits.

*** Class A and Class B Credit Sales are estimates only; actual Credits generated—and the resulting sales prices—may vary from estimates based on Delivered Loads in the Compliance Year.*

EXHIBIT 2-6
2023 Nitrogen Trading Ledger: Potomac-Shenandoah River Basin

POTOMAC Basin: Nitrogen Credit Ledger

Compliance Year:	2023	Credit Forecasts		Preliminary Use of Credits				Credit Exchange (Pounds)			
Facility Name	Delivered WLA	Expected Load	Expected Credits	In-Bubble Exchange	Private Exchange	WQIF-Held Credits	Expected Net Credits		Class A Sales	Class A* Purchases	Class B Sales**
								PRICE:	$ 0.06	$ 4.04	$ 0.01
The Exchange (group)	**2,515,720**	**1,848,712**	**667,008**	**-**	**(4,466)**	**(19,492)**	**643,050**		**451,986**	**(7,758)**	**198,822**
ACSA-Fishersville	2,924	1,177	1,747	(1,747)	-	-	-		-	-	-
ACSA-Greenville	854	351	503	-	-	-	503		503	-	-
ACSA-Harriston	626	104	522	-	-	-	522		522	-	-
ACSA-Middle River	4,970	2,478	2,492	-	-	-	2,492		2,492	-	-
ACSA-Mt. Sidney	513	716	(203)	203	-	-	-		-	-	-
ACSA-Stuarts Draft	1,462	370	1,092	(811)	-	-	281		281	-	-
ACSA-Vesper View	626	434	192	-	-	-	192		192	-	-
ACSA-Weyers Cave	914	3,269	(2,355)	2,355	-	-	-		-	-	-
Alexandria Renew Ent.	493,381	375,061	118,320	-	-	-	118,320		-	-	118,320
Arlington Co.	365,284	242,122	123,162	-	(3,326)	-	119,836		119,836	-	-
Berryville	4,435	2,661	1,774	-	-	-	1,774		1,250	-	524
Broadway Regional	3,538	3,134	404	-	-	-	404		-	-	404
Fairfax Co-Noman Cole	612,158	402,653	209,505	-	(25)	-	209,480		209,480	-	-
FCWSA-Vint Hill	579	292	287	-	-	-	287		-	-	287
Front Royal	24,365	20,832	3,533	-	-	-	3,533		3,200	-	333
FWSA-Opequon	25,589	14,390	11,199	-	-	-	11,199		-	-	11,199
FWSA-Parkins Mill	12,791	7,195	5,596	-	-	-	5,596		-	-	5,596
HRRSA-North River	35,475	25,276	10,199	-	(1,115)	-	9,084		4,500	-	4,584
KGCSA-Dahlgren S.D.	9,137	4,568	4,569	(1,797)	-	-	2,772		2,200	-	572
KGCSA-Fairview Beach	1,827	1,462	365	-	-	-	365		-	-	365
KGCSA-Purkins Corner	1,096	2,893	(1,797)	1,797	-	-	-		-	-	-
Leesburg	77,966	32,873	45,093	-	-	(19,492)	25,601		-	-	25,601
Loudoun Water- Broad Run	109,884	60,224	49,660	-	-	-	49,660		49,660	-	-
Luray	6,432	1,990	4,442	-	-	-	4,442		4,442	-	-
Massanutten PSC	4,020	2,037	1,983	-	-	-	1,983		-	-	1,983
Merck	3,216	9,648	(6,432)	-	-	-	(6,432)		-	(6,432)	-
MillerCoors LLC	12,060	12,060	-	-	-	-	-		-	-	-
Mt. Jackson	2,132	1,706	426	-	-	-	426		-	-	426
Purcellville	8,406	6,837	1,569	-	-	-	1,569		785	-	784
PWCSA-HL Mooney	219,280	183,190	36,090	-	-	-	36,090		24,363	-	11,727
Stafford Co-Aquia	73,093	68,160	4,933	-	-	-	4,933		4,933	-	-
Stoney Creek	2,065	1,865	200	-	-	-	200		200	-	-
Strasburg	4,059	5,385	(1,326)	-	-	-	(1,326)		-	(1,326)	-
UOSA	302,607	300,622	1,985	-	-	-	1,985		-	-	1,985
VA Am. Water PW Sec. 1	42,029	24,364	17,665	-	-	-	17,665		10,599	-	7,066
VA Am. Water PW Sec. 8	42,029	24,364	17,665	-	-	-	17,665		10,599	-	7,066
Waynesboro	3,898	1,949	1,949	-	-	-	1,949		1,949	-	-
Purchase by Eastern Shore	-	-	-	-	-	-	-		-	-	-

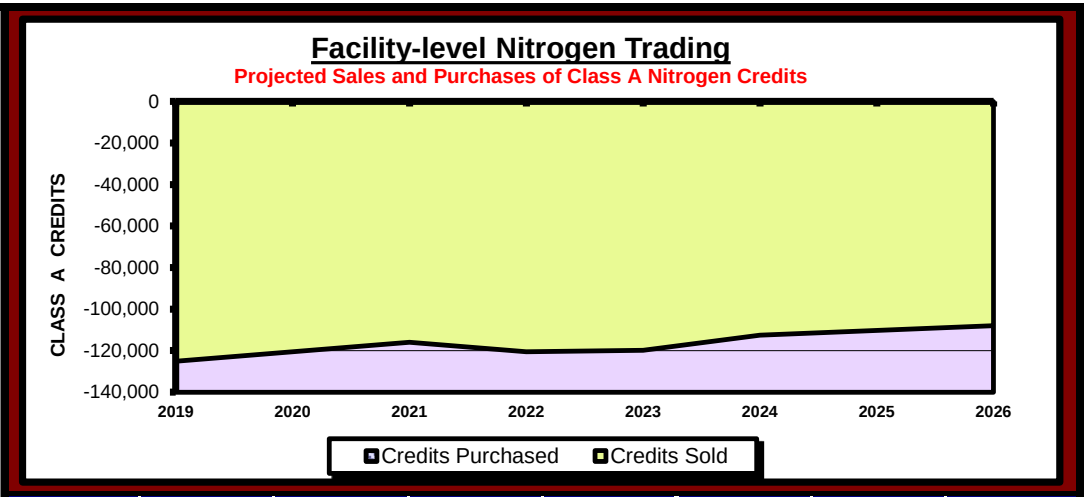
For this Compliance Year, 0% of all Class A Credit Purchases are expected to be satisfied using Class B Credits.

*** Class A and Class B Credit Sales are estimates only; actual Credits generated—and the resulting sales prices—may vary from estimates based on Delivered Loads in the Compliance Year.*

NITROGEN FACILITY SUMMARY

Arlington Co.

POTOMAC Trading Basin



Loading & Credit Summary	2019	2020	2021	2022	2023	2024	2025	2026
	Planning Period					*Future Estimates (non-binding)*		
Design Flow (mgd)	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
Projected Flow (mgd)	26.00	26.50	27.00	26.50	26.50	26.75	27.00	27.25
Projected Avg. Annual Concentration (mg/L)	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Discharged Load (end of pipe)	237,554	242,122	246,690	242,122	242,122	244,406	246,690	248,975
Delivery Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Expected Load	237,554	242,122	246,690	242,122	242,122	244,406	246,690	248,975
Delivered WLA*	365,284	365,284	365,284	365,284	365,284	365,284	365,284	365,284
Expected Credits (delivered)	127,730	123,162	118,594	123,162	123,162	120,878	118,594	116,309
Transfers In (Out) within Owner Bubble	0	0	0	0	0	0	0	0
Transfers In (Out) from Private Exchange**	(2,625)	(2,625)	(2,625)	(2,625)	(3,326)	(8,326)	(8,326)	(8,326)
WQIF-Held Credits	0	0	0	0	0	0	0	0
Expected Net Credits	**125,105**	**120,537**	**115,969**	**120,537**	**119,836**	**112,552**	**110,268**	**107,983**
Class A Credit Sales (Purchases)	**125,105**	**120,537**	**115,969**	**120,537**	**119,836**	**112,552**	**110,268**	**107,983**
Expected Class B Credits	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

** Reflects allocation transfer to George Mason University of 183 delivered pounds of TN (contract renewal beyond 2021 is pending)*

*** Reflects use of Credits for Arlington County and Arlington County Public Schools stormwater programs*

Attachment 3: List of Public Comments Received

(no comments were received)