



**NPDES ANNUAL REPORT
JULY 2013 - JUNE 2014**

Charles County Government
Department of Planning and Growth Management

CHARLES COUNTY, MARYLAND
MUNICIPAL SEPARATE STORM SEWER DISCHARGE PERMIT

02-DP-3322 (MD0068365)

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DIGITAL DATA (ATTACHED CD)

GIS Data

Stormwater

swOutfall	swVirtualDrainline1
swStructures	PGM_INDEX
Streams_HydroJunctions	swBMP
swMonitoringLocations	swDrainAreas
Streams	swEasements
swCulvert	swCasing
swEasementCOGO	swESD_Parcels
swPipes	swFCDrainAreas_InProcess

Impervious

temp_lines	Patios
Sidewalks	Parking Areas
Roads	Buildings
Pools	Athletic_Fields

FederalStateOwnedLand

Chemical Monitoring Data

2013 – 2014 Sampling and Event Mean Concentration (EMC) Update (Excel)

Urban BMPs

SWM Inventory and Triennial Inspections (Access)

Illicit Discharge Data

Illicit Discharge Detection and Elimination Database (Access)

Illicit Findings Matrix 2014 (Excel)

Photos from Annual Inspections (JPG)

Other Data (PDF)

Final Report

Appendices

I. Introduction

Charles County, Maryland received its second, five-year National Pollutant Discharge Elimination System permit on July 31, 2002 for Municipal Separate Storm Sewer System Discharge Permit No. 01-DP-3322. This permit covers stormwater discharges from the municipal separate storm sewer system within the Development District. As part of this comprehensive water quality control permit, the County is required to report to the Maryland Department of the Environment, Water Management Administration (MDE/WMA) annually regarding the status and progress of the permit conditions.

On April 11, 2014, the MDE/WMA sent a letter acknowledging receipt of Charles County's 2013 Annual Report for the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4 or Stormwater) Permit Program. The letter commended the County for working towards an impervious area assessment, continuing to complete impervious area restoration, and for showing increased financial commitment to the NPDES Stormwater Permit Program.

Charles County's NPDES permit is for the five year period ending July 31, 2007. MDE/WMA has been delayed reissuing permits statewide. In June 2014 MDE/WMA published tentative determination to issue Charles County a new permit. The public comment period for this tentative determination went through September 26, 2014. Because the Charles County permit is not yet reissued operation continues under the current permit.

In preparation for the anticipated increase in permit requirements and the expansion of permit coverage from the Development District to the entire county, three large contracts were initiated in Fiscal Year 2012, and began implementation in Fiscal Year 2013. These include: Geographical Information Systems (GIS)-related work to expand source-identification county-wide; planning tasks to evaluate strategies for meeting the Chesapeake Bay Total Maximum Daily Loads (TMDLs); and evaluation of the stormwater level of treatment for all developed parcels.

This report summarizes the actions taken by the County to fulfill the requirements for the twelfth year of the NPDES permit. Following each permit condition is a description of the work completed during the reporting year. The sections of the report are numbered to correspond with the permit numbering.

A summary of the County's accomplishments and initiatives this year include:

- completing restoration project providing treatment of polluted stormwater runoff for 19 impervious acres;
- adopting a Fiscal Year 2015 Watershed Protection and Restoration Fund budget of \$2,168,000, without raising the Stormwater Remediation Fee charged to property owners;

- issuing 69 Stormwater Remediation Fee reductions to property owners in Fiscal Year 2014 for on-site stormwater systems, facilities, services, or activities that reduce the quantity or improve the quality of runoff discharged from the property;
- completing the first year of the Monitoring and Inspections Services Contract 13-08 with KCI Technologies, Inc. of Sparks, MD;
- issuing three change orders with KCI Technologies, Inc. for the following tasks:
 - adding total nitrogen and total phosphorus sampling to the Watershed Assessments
 - providing technical support for development of 2-Year milestones for Bay TMDL
 - reviewing County's illicit discharge and elimination program to recommend improvements and provide training
- initiating the second phase of the expanding the County's GIS stormwater features from the Development District to the entire county, with Spatial Systems Associates, Inc. of Columbia, MD;
- contracting with Versar, Inc. of Columbia, MD and sub-consultants, LMD Agency of Laurel, MD to administer research and discovery for the purposes of establishing the current baseline knowledge of stormwater runoff and septic maintenance in the County;
- initiating a Septic Pump-Out Reimbursement Program for County residents;
- contracting with Maryland State Archives to retrieve 679 permit files for purposes of scanning residential building permits for micro-bmps;
- scanning a total of 3,725 residential building permits from Fiscal Years 2005 - 2014 for purposes of locating micro-bmps;
- submitting the final progress of the Watershed Implementation Plan 2-Year milestones for 2012-2013, and the 2-Year programmatic and best management practice milestones for 2014-2015 to MDE, and receiving MDE's evaluation on the final 2013 progress;
- supporting the award of a National Fish & Wildlife Foundation grant to LimnoTech, Inc. of Washington, D.C. for engineering & permitting of the Port Tobacco stream restoration;
- hiring three NPDES watershed restoration task consultants: Bayland Consultants and Designers, Inc. of Hanover, MD; George, Miles and Buhr, LLC of Salisbury, MD; and Vista Consulting, Inc. of Showell, MD to be on-call for watershed restoration projects;
- completing initial projects under the dedicated Drainage Improvement budget for neighborhoods with flooding and severe stream erosion and starting additional projects;
- continuing work with Vista Consulting, Inc. of Showell, MD to evaluate the Era of Stormwater Management for the 48,000 parcels located in the county;
- continuing design, engineering, and permitting of ongoing watershed restoration projects by Vista Consulting, Inc.; and
- issuing "Request for Proposals 15- 16: Waldorf Urban Redevelopment Corridor Infrastructure Improvements Study" for design of the County's first "green street."

Ongoing activities include: NPDES working group meetings to inform and coordinate personnel responsible for permit conditions; updating the County's NPDES Stormwater Permit information webpage; and partnering with the USGS to maintain a long-term monitoring station on the Mattawoman Creek.

II. Definitions

Terms used in this permit are defined in relevant chapter of the Code of federal Regulations (CFR) or the Code of Maryland Regulations (COMAR). Terms not defined in CFR or COMAR shall have the meanings attributed by common use unless the context in which they are used clearly requires a different meaning.

III.A. Permit Administration

Overview of Permit Conditions

- 1. By 7/31/2003, Charles County shall provide MDE with the names, titles, addresses, phone numbers, and functions of all primary administrative and technical personnel responsible for compliance with this permit.*

2014 Status

Permit requirements are managed by staff within the Departments of Planning and Growth Management and Public Works as shown on the following table.

NPDES Annual Report, Charles County, MD

Table 1: Charles County Personnel Responsible for Permit Compliance

<i>Personnel</i>	<i>Responsibilities</i>
DEPARTMENT OF PLANNING AND GROWTH MANAGEMENT (301-870-3935)	
Mr. Peter Aluotto, Director Charles County Department of Planning & Growth Management aluotop@charlescountymd.gov	Oversees NPDES MS4 programs implemented by the Department of Planning and Growth Management.
Mr. Steven Ball, Planning Director Planning Division ballst@charlescountymd.gov	Manages water quality monitoring programs; operating budget, annual permit reports, permit reapplication, and special programmatic tasks.
Mr. Frank Ward, Chief Construction Permits and Inspection Services wardf@charlescountymd.gov	Manages stormwater, drainage, and sediment and erosion control, permitting, inspection, and enforcement programs.
Mr. John Stevens, Chief Capital Services stevensj@charlescountymd.gov	Manages impervious area evaluation, and identification and implementation of Watershed Restoration capital projects.
Mr. Jason Groth, Chief Resource Infrastructure Management grothj@charlescountymd.gov	Manages Geographical Information Systems and water conservation education.
DEPARTMENT OF PUBLIC WORKS (301-870-2778)	
Mr. Bill Shreve, Director Charles County Department of Public Works shreveb@charlescountymd.gov	Oversees NPDES MS4 programs implemented by the Department of Public Works.
Mr. Dennis Fleming, Chief Environmental Resources Facilities Division flemingd@charlescountymd.gov	Manages industrial stormwater permits for County properties managed by the Division, and trash, litter and recycling programs.
Mr. Stephen Staples, Chief County Roads Facilities Division stapless@charlescountymd.gov	Manages maintenance of roads, drainage, and stormwater facilities owned by the County.
Mr. Thomas Roland, Chief Parks and Grounds Facilities Division rolandt@charlescountymd.gov	Manages maintenance of parks and grounds owned by the County or part of the recreational system.
Mr. Semyon Simanovsky, Chief Maintenance and Operations Division simanovs@charlescountymd.gov	Manages industrial stormwater permits for County wastewater treatment plants.

III.B. Legal Authority

Overview of Permit Conditions

1. *By 7/31/2003, Charles County shall provide MDE with recertification from the County Attorney that it possesses the authority to directly perform the activities described in 40 CFR 122.26 (d)(2)(I), and this permit.*
2. *Charles County shall maintain adequate legal authority, in accordance with NPDES regulations 40 CFR 122.26(d)(2)(I), throughout the term of this permit. In the event that any provision of its legal authority is found to be invalid, the County shall make the necessary changes to maintain adequate legal authority.*

2014 Status

Recertification was provided by the County Attorney via a letter forwarded to Mr. Brian Clevenger of the Maryland Department of the Environment, Water Management Administration, dated June 19, 2003. A copy of this letter was included in the 2003 NPDES Annual Report.

The County will maintain adequate legal authority throughout the term of this permit, and in the event that any provision of its legal authority is found to be invalid, the County will make the necessary changes to maintain adequate legal authority.

III.C. Source Identification

Overview of Permit Conditions

1. *By 7/31/2003, Charles County shall submit an example of its Geographic Information System (GIS) capabilities that includes the identification of all data layers available, the stage of development, metadata, and a description of how data are stored, accessed, and used. The example shall include the following information:*
 - a. *Geologic features: topography, soils, steep slopes, etc.*
 - b. *Land use: existing and planned based on present zoning or current master plans, public and private ownership, and population density.*
 - c. *Resources: streams, stream buffer areas, floodplains, wetlands, forests, forest conservation areas, areas of special concern*
 - d. *Infrastructure: storm drain systems, including major outfalls, inlets, appurtenant conveyances, and associated drainage areas; stormwater*

management facilities; sanitary sewer systems within the resource areas identified in Part III.C.1.c above; and chemical, physical, and biological monitoring sites.

- e. Significant discharges: sewage treatment plants, industrial operations, hazardous waste sites, landfills, NPDES permitted sites (both point source and stormwater permittees), impervious areas (e.g. roads, parking lots, and rooftops), known as problem areas (e.g. flood prone of water quality impaired areas), and estimated pollutant loads; and*
- f. Schedule: time-frame for completing GIS development within the Development District.*

2014 Status

As required by this condition, the County submitted an example of its GIS capabilities in 2003. All coverages were in ArcView shapefile format, projected to Maryland State Plane coordinates in NAD83 datum in meters. Metadata was also included for these coverages.

- 2. By 7/31/2003, Charles County shall submit its database identifying major outfalls. Data shall be submitted on CD-ROM(s) and include all major outfalls, associated inlets, appurtenant conveyances, drainage areas, and private storm drain systems.*

2014 Status

This information was included in the County's June 2002 to July 2003 annual report as required.

- 3. Charles County shall compile any new source identification information on a continual basis and summarize the data collection in its annual reports.*

2014 Status

Since 2003, the County has annually submitted updated GIS data and summarized the data collection in its annual reports. All coverages are in ArcView shapefile format, and projected to Maryland State Plane coordinates in NAD83 datum in meters.

In Fiscal Years 2012 - 2015 the County has contracted with Spatial Systems Associates to expand and improve the County's stormwater GIS coverage countywide. This project includes stormwater infrastructure and impervious surfaces. The geodatabase for this project includes the fields specified in Attachment A of MDE's April 11, 2014 review letter to the County, and is included on CD.

Training

The Department of Planning and Growth Management staff was provided training by Spatial Systems Associates on how to use the new features provided on the County's Stormwater GIS website. This training was held on May 22, 2014 and 25 staff attended. The purpose of the training was to demonstrate the capabilities of the stormwater website, increase number of users, and gain feedback on tool modifications to better meet user needs. The primary purpose of the website is for maintenance and inspection of the County's stormwater bmps and outfalls, however is also useful in review of new projects. Website capabilities include:

- trace tool used to trace flow in a drainage system upstream for identifying potential sources of illicit discharges;
- project locator tool used to locate bmps by permit number;
- easement identifiers, used to view easements of record;
- micro-bmp tool used to view approved permits for micro-bmps;
- inspection tool used to identify status of stormwater bmp inspections; and
- bmp features tool, used to link bmps in GIS to information in the urban bmp database.

Impervious Surface Mapping

Prior to 2013, the County's impervious surface data was created using Feature Analyst, which is sophisticated computer software that can extract impervious surfaces from high quality digital aerial orthophotography. Because the image radiometry of the pixels varies due to shadows, reflections, and different pavement materials, "training" the software to accurately classify impervious surfaces, requires extensive interaction with the operator.

In 2013, as part of the current Spatial Systems Associates project, the County has moved from Feature Analyst to actual impervious surface. This was done by updating the County's 2007 planimetric line data to 2011 aerial photographs. The updated line data for roads, buildings, and paved areas were then converted to polygon data. From the 2011 polygon data, actual impervious surface area was calculated.

4. *Annually, Charles County shall submit stormwater management facility construction completion data for MDE's Urban Best Management Practice database.*

2014 Status

The Fiscal Year 2014 database of BMP information is included in Appendix A and on the attached CD. It shows a total of 1,514 BMPs, an increase of 255 from the 1,259 shown in the records for Fiscal Year 2013. Of the total, 1,463 are active. Several of the BMPs added to the database this year have been identified by Spatial Systems Associates, Inc. during the first phase of expanding the source identification from the Development District to the entire county. Updated Maryland grid coordinates have been provided in NAD 83 meters.

III.D. Discharge Characterization

Overview of Permit Conditions

1. *Annually, Charles County shall perform long-term discharge characterization monitoring of an outfall and an associated in-stream monitoring station using the following minimum requirements for chemical, biological, and physical monitoring:*
 - a. *For Chemical Monitoring:*
 - i. *Monitoring shall be performed in the Zekiah Swamp watershed at the outfall and its associated in-stream station in the St. Charles area to characterize runoff from commercial land use;*
 - ii. *Continuous flow measurements shall be recorded at the in-stream monitoring station. These data shall be used to facilitate annual and seasonal pollutant load estimates;*
 - iii. *Twelve (12) storm events shall be monitored per year at the outfall and in-stream monitoring locations with at least three (3) occurring per quarter. Quarters shall be based on calendar year. If extended dry weather periods occur, base flow samples shall be taken at least once per month at the in-stream monitoring station, and if flow is observed, at the outfall;*
 - iv. *Discrete samples of stormwater flow shall be collected at the outfall and in-stream monitoring stations using automated or manual sampling methods. Measurements of pH and water temperature shall be taken; and*
 - v. *At least (3) samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to the methods listed under 40 CFR, Part 136 and event mean concentrations (EMCs) shall be developed for the following parameters;*

<i>Biochemical Oxygen Demand (BOD₅)</i>	<i>Total Cadmium</i>
<i>Total Kjeldahl Nitrogen (TKN)</i>	<i>Nitrate plus Nitrite</i>
<i>Total Petroleum Hydrocarbons (TPH)</i>	<i>Total Phosphorus</i>
<i>Total Copper</i>	<i>Total Phenols</i>
<i>Total Zinc</i>	<i>Fecal Coliform</i>
<i>Total Suspended Solids (TSS)</i>	<i>Total Lead</i>
<i>Oil and Grease (Optional)</i>	

- b. *For Biological Monitoring*
- i. *Monitoring shall commence with the chemical monitoring; and*
 - ii. *The stream reach between the outfall and the in-stream monitoring station shall be monitored each Spring and Fall using the U.S. Environmental Protection Agency's (EPA) Rapid Bioassessment Protocol III or other method approved by MDE.*
- c. *For Physical Stream Assessment:*
- i. *A geomorphologic stream assessment shall be conducted in the stream reach between the outfall and in-stream monitoring station. This assessment shall include, at a minimum, an annual comparison of permanently monumented stream channel cross-sections, an annual comparison of the stream profile, and a stream habitat assessment using techniques as defined by the EPA's "Rapid Bioassessment Protocol for use in Wadeable Streams and Rivers," or other similar method approved by MDE; and*
 - ii. *Annually, a hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-RAS, HSPF, SWMM, etc.) to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.*

2014 Status

Chemical Monitoring

Charles County continued the long-term chemical monitoring program at the Arthur Middleton Elementary School during the 2013-2014 reporting year. The monitoring period for this reporting year extended from June 2013 through June 2014. In the fall and winter of 2013, Charles County began the process of selecting a new chemical monitoring site located in the Acton-Hamilton watershed of the Development District. The proposed site will be located downstream of several water quality retrofits and enhancement projects to be built over the next several years. In March 2014, MDE met with the County at the proposed chemical monitoring station. MDE proposed that the County wait on moving the Arthur Middleton Elementary School site to the Acton-

Hamilton site until further study could be performed to ensure the magnitude of the proposed water quality projects would be large enough to show a water quality difference. Based on guidance from MDE to delay the relocation of the sampling stations, sampling resumed at Arthur Middleton School in July 2014.

In order to meet the requirements of the Watershed Restoration section of the NPDES Stormwater Permit, Charles County had identified the Arthur Middleton Elementary School as a suitable site for the installation of a stormwater management wetland, designed to treat the flow passing through the existing storm drain prior to its discharge into the stream channel.

The chemical monitoring program was established at the Arthur Middleton Elementary School in December 2005. The sampling stations were located within an inlet upstream of the proposed wetland and at an instream station below the storm drain outfall. The sites were established prior to the construction of the wetland to develop a pre-retrofit baseline for pollutant inflow to the receiving channel. The inlet was established as Site 002, and the instream station was established as Site 001.

Sampling began at these sites on January 18, 2006, and continued until April 2, 2007, when the sampling array was removed as construction of the wetland began. Construction of the wetland was completed in April, 2008.

In August, 2008, sampling resumed at the Arthur Middleton Elementary School. The inlet was reestablished as the outfall site, and the concrete weir overflow was established as the instream monitoring station.

Flow data for the instream station was calculated by measuring the flow depth at the weir control structure for the wetland and computing the discharge from a rating table. As such, flow data is only available for the instream station for sampled events.

Two storms were sampled during the 2013-2014 reporting year. Storm event samples were collected on August 1, 2013 and October 7, 2013.

Table 2: Number of Chemical Monitoring Samples - Middleton Elementary School Stations

Year	Month	Wet Weather Sample		Baseflow Sample	
		Outfall	Instream	Outfall	Instream
2006	January	1	1		
	February	1	1		
	March				
	April	1	1		
	May	1	1		
	June	1	1		
	July	1	1		
	August	1	1		
	September	1	1		

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Year	Month	Wet Weather Sample		Baseflow Sample	
		Outfall	Instream	Outfall	Instream
	October	1	1		
	November	1	1		
	December				
2007	January	1	1		
	February	1	1		
	March	1	1		
	April			1	1
2008	August	1	1		
	September	1	1		
	October	1	1		
	November	1	1		
	December	1	1		
2009	January				
	February	1	1	1	1
	March	1	1		
	April	1	1		
	July			1	1
	August			1	1
2010	January	2	2		
	February	1	1		
	March	1	1		
	April	1	1		
	May	1	1		
	June	1	1		
	August	1	1		
2011	December	2	2	1	1
2013	April	2	2		
	May	1	1		
	June	1	1		
	August	1	1		
	October	1	1		

The monitoring protocol consisted of three discrete samples, representative of the rising limb, peak, and falling limb of the storm hydrograph for each storm event, collected at each monitoring station. All samples were collected manually so that fecal coliform and TPH could also be analyzed. Based on the County's draft NPDES permit, collected samples during this reporting year were not analyzed for Cadmium, Phenols, Oil and Grease, and Fecal Coliform. Hardness and E-coli were added to the list of parameters analyzed due to the County's draft NPDES permit. QC Laboratories in Pennsylvania and Environmental Testing Lab, Inc. in Maryland performed laboratory analyses.

The combined results from the chemical monitoring for the current reporting year are contained in Appendix B and included in the NPDES database on CD.

Event Mean Concentrations

Using the available flow data and laboratory results for each discrete sample collected at the sites, event mean concentrations (EMCs) were computed for each constituent. EMCs were weighted based on the depth of flow for each limb of the storm. Depth was recorded continuously at the outfall station, and during sampling events for the instream station. The chemical concentrations were multiplied by the flow depth, summed and divided by the total flow depth to compute a weighted average for each storm event.

If the parameter was not detected in the laboratory analysis, a value of zero was used for the low end of the possible range, and the detection limit was used for the high end of the range. The flow-weighted EMCs for each storm were then averaged to determine the average EMC for each parameter at each site. Average flow-weighted EMCs by calendar year for the Arthur Middleton Elementary School (Sites 001 and 002) are provided in Tables 3 and 4.

Table 3: Annual Average Flow-Weighted EMC and Number of Events Sampled, Site 002 – Arthur Middleton Elementary School

Year	TKN	NOx	TP	TSS	BOD	Pb	Cd	Cu	Zn	TPH	Phenols	O&G	Fecal Col.	E-coli	Hardness
	mg/L	mg/L	MPN	MPN	mg/L										
	Events	Events	Events	Events	Events										
2006	1.73	0.67	0.29	24	16	0.011	0.001	0.007	0.062	2.7	0.03	3.50	4885	N/A	N/A
	10	10	10	10	10	10	10	10	10	10	10	10	10		
2007	0.95	1.17	0.13	72	5	0.022	0.001	0.011	0.049	3.3	0.03	3.27	157	N/A	N/A
	4	4	4	4	4	4	4	4	4	4	4	4	4		
2008	2.17	0.40	0.16	11	9	0.071	0.002	0.011	0.284	3.9	0.04	5.59	34402	N/A	N/A
	5	5	5	5	5	5	5	5	5	5	5	5	5		
2009	1.14	0.28	0.15	17	4	0.021	0.001	0.005	0.112	1.9	0.03	2.87	685	N/A	N/A
	4	4	4	4	4	4	4	4	4	4	4	4	4		
2010	1.73	0.71	0.27	68	10	0.006	0.001	0.009	0.057	2.6	0.04	3.15	18794	N/A	N/A
	8	8	8	8	8	8	8	8	8	8	8	8	8		
2011	1.10	0.42	0.24	59	3	0.007	0.0003	0.006	0.051	3	0.01	3	94	N/A	N/A
	3	3	3	3	3	3	3	3	3	3	3	3	3		
2012	1.62	0.31	0.28	31	21	0.002	N/A	0.005	0.036	2.5	N/A	N/A	N/A	2550	20.5
	4	4	4	4	4	4		4	4	4				4	4
2013	1.50	0.02	0.28	44	8	0.009	N/A	0.006	0.051	2.5	N/A	N/A	N/A	2146	22.1
	2	2	2	2	2	2		2	2	2				2	2
NURP	2.35	0.960	0.47	140.0	11.0	0.180		0.050	0.180						

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Table 4: Annual Average Flow-Weighted EMC and Number of Events Sampled, Site 001 – Arthur Middleton Elementary School

Year	TKN mg/L Events	NO _x mg/L Events	TP mg/L Events	TSS mg/L Events	BOD mg/L Events	Pb mg/L Events	Cd mg/L Events	Cu mg/L Events	Zn Mg/L Events	TPH mg/L Events	Phenols mg/L Events	O&G mg/L Events	Fecal Col. MPN Events	E-coli MPN Events	Hardness mg/L Events
2006	1.05 10	0.61 10	0.14 10	19 10	4 10	0.008 10	0.001 10	0.005 10	0.055 10	2.5 10	0.03 10	2.85 10	3564 10	N/A	N/A
2007	0.52 4	1.11 4	0.06 4	27 4	3 4	0.007 4	0.001 4	0.004 4	0.080 4	2.5 4	0.03 4	2.5 4	58 4	N/A	N/A
2008	0.46 5	0.05 5	0.06 5	7 5	2 5	0.003 5	0.001 5	0.002 5	0.018 5	2.4 5	0.02 5	2.6 5	3524 5	N/A	N/A
2009	0.95 4	0.06 4	0.08 4	9 4	15 4	0.004 4	0.001 4	0.004 4	0.019 4	1.9 4	0.02 4	2.1 4	109 4	N/A	N/A
2010	0.53 8	0.44 8	0.06 8	13 8	2 8	0.006 8	0.001 8	0.003 8	0.015 8	3.0 8	0.03 8	3.0 8	4543 8	N/A	N/A
2011	0.3 3	0.39 3	0.04 3	9 3	3 3	0.001 3	0.0003 3	0.001 3	0.022 3	3 3	0.01 3	3 3	17 3	N/A	N/A
2012	0.59 4	0.08 4	0.05 4	7 4	6 4	0.001 4	N/A	0.003 4	0.014 4	2.5 4	N/A	N/A	N/A	903 4	48.5 4
2013	0.85 2	0.25 2	0.12 2	23 2	8 2	0.003 2	N/A	0.003 2	0.022 2	2.5 2	N/A	N/A	N/A	1196 2	47.7 2
NURP	2.35	0.960	0.47	140.0	11.0	0.180		0.050	0.180						

Discussion

The results of the laboratory analysis (both individual samples and EMCs) were reviewed for the storm and base flow events during the permit period. Findings are summarized below:

Inlet Site (002)

- A first flush effect was not observed for the sampling station. Concentrations were typically higher for rising limb samples than for peak.
- All samples collected for TPH had concentrations below the detection limit. All but one sample collected for NO_x had a concentration below the detection limit. The other contaminants were detected fairly regularly.
- The October 7, 2013 storm event had elevated concentrations of BOD, TKN, Total Phosphorus, TSS, Lead, Copper, Zinc, and E-coli.

Instream Site (001)

- A first flush effect was not observed for the sampling station. Concentrations were typically higher for peak samples than for rising limb.
- All samples collected had concentrations below the detection limit for NO_x, Copper, and TPH. The other contaminants were detected fairly regularly.

State and Federal acute and chronic criteria are presented in Table 5 below. The laboratory data are compared, where possible, to these criteria to assess the extent of possible pollution within this watershed. Criteria are used to protect against both short-term and long-term effects. Numeric criteria are important where the cause of toxicity is known or for protection against pollutants with potential human health impacts or bioaccumulation potential. Narrative criteria can be the basis for limiting toxicity in discharges where a specific pollutant can be identified as contributing to the toxicity.

Criteria do not exist for all parameters measured at the monitoring stations. In addition, a clear cause and effect relationship between water quality and ecological condition is difficult to determine. However, these comparisons can be used as general indicators of water quality impairment. Both State and Federal criteria are based on ambient stream conditions. Chronic criteria consider the maximum levels at which aquatic life can survive if continuously subjected to a pollutant concentration. Acute criteria reflect the maximum level at which an aquatic organism can survive if periodically subjected to a pollutant concentration. Since storm events represent a periodic condition, wet-weather samples are compared only to acute criterion.

Table 5: State and Federal Water Quality Criteria Available for Parameters Sampled at Arthur Middleton Elementary School

Parameter (mg/L ,except as noted)	Chronic	Acute	Reference
Metals (µg/L):			
Lead	2.5	65	COMAR 26.08.02.03-2
Copper	9	13	COMAR 26.08.02.03-2
Zinc	120	120	COMAR 26.08.02.03-2
Total P	0.10	1972 305(a) Report to Congress (EPA 440/9-74-001)	
BOD5	7	Quality Criteria for Water, EPA 1986	
Nitrate	10	Quality Criteria for Water, EPA 1986	
TSS	500	1972 305(a) Report to Congress (EPA 440/9-74-001)	
TKN	None	---	
TPH	None	---	
E. Coli(1) (MPN/100ml)	235	COMAR 26.08.02.03-3	
Hardness	None	---	

(1): Used most restrictive standard as a conservative approach: frequent full body contact recreation criterion.

The results of the laboratory analysis (both individual samples and EMCs) for the 2013-2014 reporting year were compared to the values reported in Table 5 as well as the Nationwide Urban Runoff Project (NURP) values reported in Table 3 and 4. Findings are summarized below:

Inlet Site (002)

- All individual samples and average EMC's for Lead, NOx, and TSS were below reported criteria values.
- Copper and Zinc average annual EMC values were both below reported criteria values; however, acute criteria was exceeded for the October 7, 2013 rising limb storm sample for Copper.
- The average annual EMC and a majority of individual samples for Total Phosphorus and BOD were above reported criteria values. The average annual EMC and all individual samples for E-coli were above reported criteria values.
- All the average EMCs for the sampling period were below literature values from the Nationwide Urban Runoff Project (NURP) taken in the early 1980s.

Instream Site (001)

- All individual samples and average EMC's for Copper, Zinc, NO_x, and TSS were below reported criteria values.
- The average annual EMC and a majority of individual samples for Lead, Total Phosphorus and BOD were above reported criteria values. The average annual EMC and half of the individual samples for E-coli were above reported criteria values.
- All the average EMCs for the sampling period were below literature values from the Nationwide Urban Runoff Project (NURP) taken in the early 1980s.

Comparison Between Sites 002 and 001

The upstream monitoring site (002) is located upstream of the wetland. Since there have not been significant changes to the watershed over the course of the monitoring program, the event mean concentrations would be expected to be comparable with data obtained prior to the wetland construction.

In fact, the EMCs are variable, but these continue to be fairly consistent for this sampling station. No significant increasing or decreasing trends are apparent.

The stormwater wetland was constructed with the intent of reducing the discharge of pollutants to receiving waters. Therefore, it is expected that the event mean concentrations present at the downstream monitoring site (001) would be reduced from previous years. Additionally, a reduction from the event mean concentrations present at the upstream station (002) would be expected for each event.

During the reporting year, EMCs at the instream station were significantly lower than those found at the outfall station, with the exception of oil and grease. This continues the trend observed in 2009 thru 2012, and indicates that the wetland is functioning to improve water quality.

Table 6 below identifies the pollutant removal efficiencies observed for each reporting year, based on the yearly average EMCs. Efficiencies published by MDE in the draft *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated: Guidance for National Pollutant Discharge Elimination System Stormwater Permits, June 2011* are provided for NO_x, TP, and TSS. Monitoring results for all reporting years since the wetland was constructed have suggested removal efficiencies for the wetland that exceed published values. Removal efficiencies for TP exceeded published values for all years. Removal efficiencies for NO_x exceeded published values for all years except 2011. Removal efficiencies for TSS exceeded published values in 2010, 2011, and 2012.

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Table 6: Observed Pollutant Removal Efficiencies: 2013-2014 Reporting Year

Year	TKN	NOx	TP	TSS	BOD	Pb	Cd	Cu	Zn	TPH	Phenols	O&G	Fecal Col.	E-coli	Hardness
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
2008	78.8	87.5	62.5	36.4	77.8	95.8	50.0	81.8	93.7	38.5	50.0	53.5	89.8	N/A	N/A
2009	16.7	78.6	46.7	47.1	-275.0	81.0	0.0	20.0	83.0	0.0	33.3	26.8	84.1	N/A	N/A
2010	69.4	38.0	77.8	80.9	80.0	0.0	0.0	66.7	73.7	-15.4	25.0	4.8	75.8	N/A	N/A
2011	72.7	7.1	83.3	84.7	0.0	85.7	0.0	83.3	56.9	0.0	0.0	0.0	81.9	N/A	N/A
2012	63.3	75.7	82.3	77.0	71.7	100.0	N/A	100.0	62.0	0.0	N/A	N/A	N/A	64.6	-136.0
2013	43.3	100.0	57.9	48.1	10.5	69	N/A	100.0	56.7	0.0	N/A	N/A	N/A	44.3	-115.6
MDE (2011)		20.0	45.0	60.0											
MDE (2014)		33.0	52.0	85.0											

Biological and Physical Stream Assessments

Beginning in the Fall of 2005, a study site has been monitored for biological and physical condition on a tributary to Mattawoman Creek. This section summarizes data collected by KCI and Coastal Resources in the Spring of 2014. The study site is located in northern Charles County between Berry Road and Acton Lane just off Timberbrook Lane. This site was previously identified as part of Charles County’s Watershed Restoration Plan and was termed Acton-Hamilton based on the two major roads in the area. The Acton-Hamilton site was ranked as the fifth highest priority for restoration and was therefore one of seven study areas selected for further investigation. The Acton-Hamilton long-term site was monitored to establish baseline values in the Fall of 2005 (geomorphic assessment) and the Spring of 2006 (bioassessment). Table 7 lists the field assessment dates including the baseline assessments.

Table 7: Field Assessment Dates

Year	Geomorphic Assessment	Biological Assessment
2005-2006	December 14, 2005	April 17, 2006
2006-2007	January 11, 2007	May 4, 2007
2007-2008	December 12, 2007	April 17, 2008
2008-2009	December 15, 2008	April 29, 2009
2009-2010	December 1, 2009	March 08, 2010
2011	April 26, 2011	April 26, 2011
2012	-	April 27, 2012
2013	March 8, 2013	March 8, 2013
2014	April 16, 2014	April 16, 2014

The geomorphic assessment includes cross-sections, longitudinal profiles, and particle size analysis. Spring bioassessment monitoring involves the collection of water quality data, sampling, and analysis of the benthic macroinvertebrate community, assessment of physical and habitat features and photo-documentation of site conditions at monitoring stations on the study reach.

Geomorphic Assessment

The channel substrate along the assessment reach is dominated by medium and coarse gravels. There are two cross-sections located within the 360-foot profile. Cross-section 1 has been slowly increasing in area between the baseline and the 2014 (year 10) assessments, but did not change between 2013 and 2014. Cross-section 2 shows that erosion and about a half foot of downcutting

has occurred between 2011 and 2013, with slight scour evident along the right side of the channel in 2014. Tables 8 and 9 below summarize the cross-section, profile, and pebble count data for baseline and subsequent monitoring efforts. Changes in bankfull areas for the two cross-sections are primarily due to erosion and aggradation associated with typical stream processes. Full results, including graphical depictions of the profile and cross-sections and pebble count data, are included in Appendix C. In general, the substrate is highly mobile with point bar formations, areas of channel aggradation and some finer sedimentation in the pools. The channel geometry remains consistent with previous years, with the exception of a lowered grade downstream of station 1+77 that was first evident in 2013. The stream appears to experience overbank flow in the flood-prone zone regularly.

Instream Water Quality and Bioassessment

Table 10 summarizes the water quality, habitat, and bioassessment data. Instream water quality was measured during the bioassessment conducted in the Spring of 2014. All regulated parameters fell within acceptable *COMAR* ranges. The physical habitat assessment rated the habitat for both fish and benthic macroinvertebrates at the midrange of sub-optimal. The banks were stable with optimal vegetative protection. The left bank had sub-optimal riparian vegetative zone width while the width of the right bank was marginal. The PHI rating has consistently remained “Partially Degraded” since the baseline monitoring, but the IBI continued to decrease until 2014, when it was slightly improved to 2.7 with a rating of “Poor.” Excessive algae was noted during the 2007-2010 monitoring events, but remained absent in 2014.

These ratings are typical with high flashy flows often found in suburban streams, such as this located in central Waldorf. The tributary receives flow from several residential neighborhoods as well as commercial developments, parking areas, and Maryland State Highway Route 301. A large portion of the drainage area does not have stormwater management facilities.

As mentioned in the introduction for biological and physical assessments section, this site is proposed for restoration. The restoration plans are currently under review for permitting approval. Once the project is completed, continued monitoring will be implemented to evaluate the impacts of the restoration.

Table 8: Bankfull Channel Dimensions – Cross Section 1

Parameter	2005	2006	2007	2008	2009	2011	2013	2014
	0+48.5	0+49.7	0+49.0	0+50	0+51	0+46	0+46	0+47
Top of Bank Cross section Area (ft ²)	49.2	53.1	54.0	55.1	53.9	54.5	52.3	52.2
Bankfull Cross section Area (ft ²)	24.1	23.5	24.3	23.8	26.2	28.1	28.4	28.4
Top of Bank Width (ft)	32.3	34.7	34.8	34.9	32.4	33.5	30.5	28.3
Bankfull Width (ft)	20.9	22.3	21.6	19.7	20.8	20.1	22.1	22.2
Mean Depth (ft)	1.2	1.1	1.1	1.2	1.3	1.4	1.3	1.3
Width-depth Ratio	18.2	21.1	19.2	16.3	16.5	14.3	17.1	17.4
Velocity (ft/s) at Bankfull	3.8	3.5	3.0	3.2	3.3	3.8	3.8	3.8
Discharge Rate (cfs) at Bankfull	92.5	82.9	73.0	76.1	85.9	107.2	106.9	107.4
Entrenchment Ratio	2.4	1.8	2.3	2.5	2.6	2.5	2.3	2.2
D50 Particle Size (mm)	14	16	18	19	23	20	17	19
D84 Particle Size (mm)	28	33	29	30	39	44	25	40
Threshold Grain Size at Bankfull (mm)	15	15	10	12	14	18	17	19
Channel Slope (%)	0.49	0.49	0.31	0.34	0.4	0.47	0.48	0.54

Table 9: Bankfull Channel Dimensions – Cross Section 2

Parameter	2005 3+14	2006 3+12	2007 3+14	2008 3+21	2009 3+15	2011 3+09	2013 3+09	2014 3+05
Top of Bank Cross section Area (ft ²)	28.6	27.1	27.6	29.6	29.8	32.5	32.6	35.5
Bankfull Cross section Area (ft ²)	18.5	17.0	18.1	18.2	18.1	18.9	23.1	23.9
Top of Bank Width (ft)	19.5	19.6	19.5	19.7	19.9	21.8	19.4	19.2
Bankfull Width (ft)	15.0	14.7	14.8	14.3	15	14.9	14.3	14.5
Mean Depth (ft)	1.2	1.2	1.2	1.3	1.2	1.3	1.6	1.7
Width-depth Ratio	12.2	12.6	12.0	11.3	12.5	11.8	8.9	8.8
Velocity (ft/s) at Bankfull	4.0	3.6	3.1	3.3	3.1	3.3	4.2	4.0
Discharge Rate (cfs) at Bankfull	73.3	61.4	57.1	59.2	55.2	61.8	97.0	96.8
Entrenchment Ratio	2.7	2.4	3.0	3.1	2.2	2.3	2.5	2.5
D50 Particle Size (mm)	14	16	18	19	23	20	17	19
D84 Particle Size (mm)	28	33	29	30	39	44	25	40
Threshold Grain Size at Bankfull (mm)	17	16	11	11	13	17	20	21
Channel Slope (%)	0.49	0.49	0.31	0.50	0.4	0.47	0.47	0.47

Table 10: Acton-Hamilton Instream Water Quality and Habitat Assessment Data

Year/Time	Instream Water Quality						Habitat and Biological Assessment	
	pH	DO (mg/L)	Temp (°C)	Conductivity µS/cm	TDS (mg/L)	Turbidity (NTUs)	PHI	BIBI
Spring 2006 11:00AM	7.04	9.09	13.19	214.2	137.0	14.9	74 (partially degraded)	3.6 (Fair)
Spring 2007 8:30AM	7.13	3.62	13.20	214.0	139.0	4.3	74 (partially degraded)	2.7 (Poor)
Spring 2008 7:00PM	6.85	11.17	15.79	186.0	121.3	2.6	71 (partially degraded)	3.0 (Fair)
Spring 2009 11:00AM	6.73	6.97	16.33	236.9	n/a	3.49	78 (partially degraded)	2.7 (Poor)
Spring 2010 8:30AM	7.76	13.52	4.50	395.7	n/a	4.16	72 (partially degraded)	2.7 (Poor)
Spring 2011 8:30AM	6.19	8.82	18.27	174.3	n/a	8.62	73 (partially degraded)	2.4 (Poor)
Spring 2012 8:30AM	6.23	8.75	12.17	171.5	n/a	6.62	74 (partially degraded)	2.1 (Poor)
Spring 2013 8:00AM	6.57	13.13	4.17	185.3	n/a	12.70	77 (partially degraded)	1.9 (Very Poor)
Spring 2014 7:00AM	7.19	10.52	8.50	304.5	n/a	22.40	77 (partially degraded)	2.7 (Poor)
COMAR Limits	6.5 - 8.5	> 5.0	< 32.0	n/a	n/a	< 150	n/a	n/a

2. *Charles County shall evaluate the effectiveness of a stormwater management system constructed in accordance with the 2000 Maryland Stormwater Design Manual for stream channel protection effectiveness. The assessment shall include:*
 - a. *By 7/31/2003, a small watershed shall be selected to adequately assess the best management practice (BMP) design criteria found in the 2000 Maryland Stormwater Design Manual. The watershed selected shall be either an area where future development is to occur, where existing BMPs control a majority of the drainage area and can be retrofitted to reflect the design manual design criteria, or a combination of both. The selection of the small watershed to be monitored shall be made in consultation with MDE.*
 - b. *Within six months of MDE's approval of the selected watershed to be monitored, Charles County shall survey the stream for the purposes of evaluating channel stability in conjunction with ensuing development or significant retrofitting. Permanently monumented cross-sections shall be established at areas where stream geometry changes and at critical areas in the flow path (e.g., restrictions, etc.). A baseline stream profile shall also be established to assess aggradation and degradation.*
 - c. *In each annual report, Charles County shall provide MDE with a comparison survey for each established cross-section and a comparison survey of the stream profile*
 - d. *A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-RAS, HSPF, SWMM, etc.) to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.*

2014 Status

Maryland Stormwater Manual Effectiveness Study

Since 2003, the County has been conducting stream monitoring on the tributary to Piney Branch to evaluate the effectiveness of stormwater management designed under the *2000 Maryland Stormwater Design Manual* regulations to adequately provide channel protection. This section summarizes the results of this monitoring. The full report can be found in Appendix D.

The tributary to Piney Branch study area lies between Berry Road and Middletown Road and is part of watershed 021401110785. The drainage area was historically in agricultural and forest use. The study area is located within the County's Development District and has been developing over the course of the project with the addition of North Point High School, William A Diggs Elementary School, and the residential developments of Windsor Mill and Avalon.

In the fall of 2003, at the time of the first site visits and survey, the North Point site construction was well underway with full clearing and installation of temporary storm water management (SWM) facilities. By spring of 2004 clearing and grading were complete at the Windsor Mill site and all four temporary SWM facilities were in place, three of which were in the study area. In fall of 2004, the Windsor Mill site had roadways in place and the ponds had risers installed. At the Avalon site temporary SWM ponds were in place and functioning properly. By the spring of 2005, little had changed at the Windsor Mill site and homes were beginning to be built at the Avalon site. Construction of North Point High School was complete in 2005. By 2006, the William A Diggs Elementary School was also complete. Site visits in late 2006 and early 2007 did not show major changes in the study area from the previous year. In 2008 and 2009 houses continue to be added to the western portion of the Avalon development. By 2013, more homes were added to Phase II of the Avalon. Just outside of the study area, construction has continued at the Avalon West community with many new homes built since 2009. In 2014 additional homes were under construction on existing lots. Frankfurt Drive and Hapsburg Street have been extended towards the southwestern corner of the community. Some new homes have been built with many lots still available.

The most recent assessment was conducted on April 16, 2014. The assessment includes survey of a longitudinal profile of the stream thalweg. The profile is conducted to locate and quantify the length and sequence of various instream features such as riffles, pools and glides. The profile surveyed in the fall of 2003 represents the baseline conditions. The 2003 survey was conducted before stormwater runoff from upstream sites was generated and is considered pre-construction. The survey is repeated yearly and is compared to previous assessments for changes in stream morphology such as thalweg degradation or aggradation. Visual inspection and site photographs are also compared for changes in stability, planform, dominant substrate particle size and signs of excessive sedimentation.

There are two separate sections of longitudinal profile surveyed which include cross-sections surveyed at locations along each profile. Repeat cross-section surveys are compared to 2003 baseline conditions for changes in channel morphology. A permanent stream gauge which was installed in May of 2004 at the Transducer cross-section, but was found vandalized in 2013 and no gauge data had been recorded since March 2010.

Profile 1 – Station 0+00 to 25+34

Profile 1, between station 0+00 and the confluence with Profile 2 is in a confined stream valley with relatively steep valley walls. The valley has a well-developed floodplain that varies from approximately 100 to 150 feet wide while the channel meanders within the valley. Two active beaver dams and their associated ponds were located between station 0+00 and 25+34 in 2014. This portion of Profile 1 now receives stormwater runoff from both Windsor Mill and Avalon. Based on current site designs the majority of Avalon runoff flow into the segment with Profile 2 and then into Profile 1 at the confluence at station 25+34.

Cross-section 1

Cross-section 1 is located at station 5+08 with the channel adjacent to the valley wall. In 2008 and 2009 the cross-sectional area decreased due to aggradation across most of the channel bed. However in 2009 the thalweg appears to be shifting slightly away from the right side of the channel. In 2013 the survey showed more aggradation, particularly on the left side of the channel. The increase in aggradation may be due to the increased beaver activity in the vicinity of cross-section 1. A beaver dam had been built through the cross-section in 2014, significantly decreasing the cross-sectional area and diverting some of the stream flow around the left end pin and flooding a wider portion of the valley.

Cross-section 2

Cross-section 2 is located on a generally stable reach with very good floodplain connectivity. By the fall of 2009 the cross-sectional area increased by 40% over baseline conditions, following an increasing trend since the initial survey. In 2013 and 2014, the area decreased and slight aggradation occurred on the right side of the channel.

Cross-section gauge

The section is located at station 16+15 on Profile 1, just upstream of cross-section 2. In February 2009 the cross-sectional area increased from that measured in 2007 due to degradation in the channel. The banks had undercutting that was not observed in previous years. Overall, the cross-sectional area has been increasing slowly since the baseline survey, with the exception of 2014, when the area decreased slightly. A series of rating curves was developed for the stream gauge section to determine the discharge per a given height as measured by the stream gauge. In 2010, the discharge at the gauge for the time period between February 2009 and March 2010 was calculated. No gauge data was collected after March 2010.

Profile 1 – Station 25+34 to 45+08

Profile 1 between the confluence with Profile 2 and approximate station 37+00 is characterized by steep side slopes to the southwest but little relief on the northeast terrace. The reach from station 37+00 to the upstream end at station 45+08 is not in a confined valley and the topography levels out even further upstream of the profile where a forested wetland currently exists. This reach includes a Maryland State Highway Administration (MSHA) right-of-way (ROW) and areas already cleared for sewer line and general access. The 2014 survey data show the slope has remained consistent with the slopes from the 2006-2009 and 2013 surveys. In 2014, no active beaver dams were observed, but many relic dams remain. This portion of Profile 1 receives flow from Windsor Mill and flow from the eastern half of Avalon.

Cross-section 4

Cross-section 4 is located at station 38+65, within the MSHA property, but downstream of the utility ROW. This reach is stable and surrounded by dense riparian vegetation dominated by shrubs in all surveys. In 2014 the cross-section showed little change from the previous year. The cross-sectional areas for 2013 and 2014 were lower than previous years, possibly due to the

debris jam located downstream of the cross-section, contributing to aggradation of the stream channel. Cross-section 4 receives flow from two of the three Windsor Mill ponds.

Cross-section 5

Cross-section 5 is located at station 44+20 upstream of the ROW crossing. The water depth and the cross-sectional area in 2014 have remained consistent with previous years. Cross-section 5 receives flow from the one most upstream pond.

Profile 2 – station 0+00 to 4+50

The channel on Profile 2 is in a valley with 100-foot wide floodplain. The area upstream of Profile 2 is a very densely vegetated forested wetland. No beaver dams were located on this reach, however debris blockages were observed throughout the reach in 2014. Profile 2 receives the majority of flow from the Avalon development although it did not appear that any had been received prior to the 2005 survey. The reach also receives flow from the elementary school.

Cross-section 3

Cross-section 3 is located at station 2+35 on Profile 2, approximately halfway up the measured reach. This section had a large tree uproot on the right bank between 2010 and 2013, causing the cross-sectional area to increase substantially, and the wetted width to increase from 3.8 feet to 10.7 feet and the water depth to decrease from 1.4 feet to 0.84 feet. There was some accumulation of sediment on the channel bed in the 2014 survey.

SUBWATERSHED ANALYSIS

Subwatersheds were delineated within the study area watershed to analyze the changes in impervious areas and land use condition that have occurred during the study period that are potentially affecting the receiving channels and the main stream channel. Impervious area in all of the subwatersheds has increased since 2004 due to the development that has occurred throughout the headwaters of the watershed. The largest increases were observed in subshed 1 and 2. Subshed 1 had 0.7% impervious in 2004 and 14.8% in 2014. Subshed 2 had no impervious surface in 2004 but now has 20.9% impervious in 2014. Overall, the entire watershed drainage area, which is represented by subshed 4, saw a marked increase in imperviousness since 2004 jumping from 1.1% to 11.8% in 2014. Land use within the study area subwatersheds currently consists of forest, residential, and institutional. Land use has not changed since the 2009 analysis.

NORTH POINT HIGH SCHOOL POND OUTFALL

In 2011, KCI was directed to conduct a survey of an eroded outfall channel draining a stormwater management pond at the North Point High School within the Tributary to Piney Branch watershed. Monuments were established and the initial survey was completed April 26, 2011 and surveyed for a second time on March 18, 2013. The most recent survey was completed on April 16, 2014.

Profile – North Point High School Pond Outfall

The geomorphic survey begins at the pond outfall and extends just over 400 linear feet downstream. Riprap covers the channel and banks until station 0+34 and the engineered trapezoidal channel extends to approximately station 2+80 where the flow enters the forest and transitions to a natural channel. The channel profile from station 0+00 to about 2+80 is very stable and the slope has remained relatively unchanged from 2011 to 2014. The slope steepens significantly after the engineered channel ends at station 2+80, where a series of headcuts have formed and extend for approximately 40 feet. Downstream from the final headcut at station 3+19, the stream becomes more stable and less incised, and meets the main channel approximately 75 feet downstream from the end of the survey at station 4+11. From station 2+80 to the end of the survey at station 4+11 the slope was 7.8% in 2011 and 7.2% in 2014. Four cross-sections were surveyed at representative locations along the profile and rebar monuments were installed on both banks of each cross-section.

Cross Section 1 – North Point High School Pond Outfall

Cross section 1, station 0+11, characterizes the reach from the outfall to approximately station 0+40. This section has steep (45% side slopes), 12-foot high banks with rip rap on the banks and channel bottom. Willows (*Salix* sp.) are dense in the channel. This segment of the channel is very stable.

Cross Section 2 – North Point High School Pond Outfall

Cross section 2, station 1+18, characterizes the reach from station 0+40 to approximately 2+00. This section has dense willows in the channel as well, but the banks are slightly less steep (35% side slopes) with shallower 9-foot banks. This segment of the channel is also very stable.

Cross Section 3 – North Point High School Pond Outfall

Cross section 3, station 2+36, characterizes the reach from station 2+00 to the end of the engineered channel at station 2+80. Willows are much less dense in this section, allowing cattails to be the dominant vegetation. Both banks are much lower (3.5 feet) and had a more gradual slope (22% side slope) than the two upstream cross sections. This cross section is also very stable. Minor deposition of sediment has formed an inset floodplain for the narrow (approximately one foot wide) low-flow channel that was observed in 2014.

Cross Section 4 – North Point High School Pond Outfall

Cross section 4 characterizes the reach from station 2+80 to the end of the survey at 4+11. This section begins at the edge of a canopied forest below the engineered channel and then transitions into a low gradient wetland. This section has a series of about one foot headcuts. In 2011, a 2.5 foot headcut with moderately severe bank erosion was located just upstream of cross-section 4. The headcut had migrated upstream by approximately 50 feet by 2013. This cross section is much less stable and will be monitored closely in future surveys for further erosion.

SUMMARY

The tributary to Piney Branch channel cross-sections and profiles indicate a relatively stable channel, with minor changes in cross-sectional area from 2003 to 2014. The greatest changes in cross-section were noted at cross-section 1, which experienced a 97% decrease in area due to a beaver dam built directly through the cross-section between the 2013 and 2014 surveys. The cross-sectional area for cross-section 3 increased by 3.8 square feet or 68% since 2003, but this is associated with the uprooted tree on the right bank between 2009 and 2013. Cross-section 2 and the gauge cross-section also had increases in area (26 and 32 percent, respectively) when compared to 2003 measurements, but did not change significantly from 2013-2014. These sections are located on a relatively confined channel, the most likely position in the watershed for incision to occur and they receive flow from most all of the upstream development. Cross-sections 4 and 5 have not changed significantly since the initial survey in 2003.

The North Point High School pond outfall channel remains very stable until station 2+80 where a series of headcuts have formed. In 2011, a 2.5 foot headcut had formed at station 3+68. Just two years later, the headcut had migrated 51 feet upstream. Downstream from this headcut the stream becomes more stable and less incised, and meets the main channel approximately 75 feet downstream from the end of the survey at station 4+11. Cross section 1 and 2 remain very stable and no changes were visible. Cross section 3 had minor accumulation of sediment due to vegetation in the channel. Cross section 4 is located below a series of headcuts and has experienced severe bank erosion and some downcutting between the initial survey in 2011 and the second survey in 2013. Some additional erosion was observed on the right bank in the 2014 survey. This cross-section will be monitored closely in future surveys.

It is recommended that remedial action is taken to stabilize the outfall channel. Due to the sudden slope change at the end of the engineered channel and start of the natural channel, the severe headcut will likely continue to migrate upstream, degrading the channel, and causing sedimentation downstream.

3. *Annually, Charles County shall describe in detail its monitoring activities for the previous year and include the following:*
 - a. *A detailed description of weather conditions and any equipment failures;*
 - b. *A detailed description of field data collection methods and documentation of any variations to the minimum requirements for chemical, biological, or physical monitoring;*
 - c. *Chemical, biological, and physical monitoring results recorded on MDE's long-term monitoring databases;*
 - d. *An analysis of monitoring data integrating the field results from the chemical, biological, and physical monitoring;*
 - e. *Annual and seasonal pollutant load estimates using the long-term monitoring data;*

- f. *A comparison survey for each established cross-section and a comparison survey of the stream profile for the monitoring conducted to assess the stream channel protection effectiveness of a stormwater management system constructed in accordance with the 2000 Maryland Stormwater Design Manual; and*
- g. *Any requests and accompanying justifications for proposed modifications to the monitoring program.*

2014 Status

The County has completed nine years of pre and post chemical monitoring at the Arthur Middleton Elementary School site, which has documented water quality improvements gained from the shallow wetland. At this time the County would like to select a new location to document the cumulative impacts from several best management practices concentrated in a watershed.

In Fall and Winter of 2013, Charles County began the process of selecting a new chemical monitoring site, and opted for a location in the Acton-Hamilton sub-watershed of the Mattawoman Creek watershed in the Development District. The proposed site will be located downstream of several water quality retrofits and enhancement projects to be built over the next ten years. This is also the current location of the biological and physical stream monitoring. The County believes it will be beneficial to combine the three monitoring parameters at one study location in anticipation of documenting water quality improvements in the watershed.

In March 2014, the County submitted the draft relocation plan titled, “Assessment of Controls – Study Design,” to MDE and then met with MDE at the proposed chemical monitoring station to review and discuss. The draft relocation plan is included in Appendix B. MDE responded in April, recommending that the County wait on moving the Arthur Middleton Elementary School site to the Acton-Hamilton site until further study could be performed to ensure the magnitude of the proposed water quality projects would be large enough to show a water quality difference. Based on guidance from MDE to delay the relocation of the sampling stations, sampling resumed at Arthur Middleton School in July 2014.

Based on MDE’s recommendation, the County hired Vista Consultants, Inc. to evaluate the current level of treatment for the parcels within the watershed and potential restoration projects, for the purpose of determining what percentage of the watershed could be restored to meet current stormwater management standards. This study was sent to MDE in September 2014.

Information addressing items III.D.3.a-f, above, is found under Section III.D.1 and 2. Pollutant loading information is provided in Section III.H.

III.E. Management Programs

Overview of Permit Conditions

1. *Charles County shall maintain an acceptable stormwater management program in accordance with the Environmental Article, Title 4, Subtitle 2, Annotated Code of Maryland. At a minimum, Charles County shall:*
 - a. *Conduct preventative maintenance inspections of all stormwater management facilities at least on a triennial basis. Documentation identifying the facilities inspected, the number of maintenance inspections, follow-up inspections, and enforcement actions(s) used to facilitate inspection order compliance, maintenance inspection schedules, and any other relevant information shall be submitted in the County's annual reports;*
 - b. *Implement the stormwater management design policies, principles, methods, and practices found in the 2000 Maryland Stormwater Design Manual and COMAR;*
 - c. *Track the progress toward satisfying Part III.E.1.b. above; and*
 - d. *Report annually the modifications needed to address problems associated with implementing the 2000 Maryland Stormwater Design Manual in Charles County.*

2014 Status

Stormwater Management Maintenance Inspections

The County continues to conduct preventative maintenance inspections of all stormwater management (SWM) devices on a triennial basis. During Calendar Year 2013 the inspections were comprised of 154 first and third year inspections, 207 compliance inspections, and 59 enforcement inspections. Detailed inspection reports of each inspection are maintained within the project file folder. Two types of certified letters are typically sent to initiate compliance. No major structural problems were found.

During Calendar Year 2013, 132 devices identified as unacceptable in 2013 and previous years were brought into compliance. A copy of the County's database showing inspections during Calendar Year 2013 is included in Appendix E. The entire digital inspection database is included in the Urban Best Management Practice Access database.

Since 1990 the SWM Maintenance Inspections Inventory designates "S" for satisfactorily maintained SWM devices and "U" for unsatisfactorily maintained devices. We believe that the vast majority of the issues pertaining to a "U" rating of a SWM device do not affect the function of the SWM device.

Beginning in Calendar Year 2012 a “Pass” has been entered in the BMP Status column to indicate that the device is “performing”, as a more descriptive designation so that one can easily determine if the function of the device is compromised by simply reviewing the database.

SWM devices that receive a "U" or "unsatisfactory" designation during a triennial maintenance inspection, primarily fall into this category due to the lack of maintenance of the devices. The types of maintenance that is required usually includes, but not limited to the following: mowing, fence repair, removal of woody vegetation, in-flow & out-flow protection repair and minor erosion/stabilization. While these types of maintenance issues still require the structure(s) to be classified as "unsatisfactory" it is the opinion of the Department of Planning and Growth Management (Department) that the pond or other SWM device performance is not substantially degraded in most cases.

A major obstacle of the Department to consistently bring "unsatisfactory" devices into compliance in a timely manner is related to the required delegation of maintenance of swm devices to Homeowners' Associations (HOAs) and private businesses that have little to no experience with the long term maintenance of these facilities. The Department has observed a continued lack of understanding of the responsible parties on how and why they should maintain these facilities. The Department has been conducting annual seminars for the public, specifically on how to properly maintain these facilities and will meet in the field when requested to assist the public to bring the facilities into compliance. However, a major hurdle the responsible parties continue to encounter is they have failed to fiscally plan for the costs of maintenance. The lack of funds requires an extended period of time for a HOA or business to bring a facility into "satisfactory" condition, where the Department works more as a facilitator to assist the HOA or business in lieu of an enforcement authority. The Department is examining additional enforcement measures, including legal action when necessary, to improve the overall maintenance of stormwater management devices.

Beginning July 1, 2013, the County moved the source of the stormwater program funding from the Environmental Service Fund to the Watershed Protection and Restoration Fund, and implemented a Stormwater Remediation Fee as required under recent State of Maryland legislation passed by the General Assembly. As part of the increased Stormwater Remediation Fee, the County initiated improvements to the enforcement program to encourage better compliance regarding facility maintenance. Additional discussion will be needed to consider fees be imposed on property owners within the unacceptable communities to assist the County in maintaining the SWM sites, with special emphasis on stormwater control structures and secondary emphasis placed on site beautification.

The following table summarizes the information found in the Stormwater Inspection database. Facilities found acceptable and unacceptable are reported based on their status at end of the calendar year.

Table 11: Summary of Stormwater Management Device Inspections

	2007	2008	2009	2010	2011	2012	2013
Total projects inspected	287	212	131	121	178	150	144
Total SWM devices inspected	516	363	268	275	330	274	310
Total inspections performed including re-inspections*	761	501	378	427	477	343	420
Acceptable SWM devices	253 (49%)	214 (59%)	140 (52%)	120 (44%)	176 (53%)	90 (33%)	147 (47%)
Unacceptable SWM devices	263 (51%)	149 (41%)	128 (48%)	155 (56%)	154 (47%)	184 (67%)	163 (53%)

*Each project may contain more than one device. The number of inspections is higher than the number of devices, due to repeat inspections of the same device.

Implementing the 2000 Maryland Stormwater Design Manual and Tracking Implementation Progress of the 2000 Stormwater Design Manual and Modifications Needed to Improve Deficiencies

The County continues to implement the stormwater management design policies, principles, methods, and practices found in the 2000 Maryland Stormwater Design Manual and COMAR.

In April 2006, and October 2014 MDE found the County’s stormwater program acceptable. A copy of the approval letter is in Appendix E.

Per the Maryland Stormwater Management Act of 2007, which requires use of environmental site design to the maximum extent practicable, the County adopted new stormwater regulations on July 13, 2010. These regulations went into effect on August 1, 2010. The Notice on the adoption of the Stormwater Management and Storm Drainage Ordinances, including Procedures on Requesting an Administrative Waiver, was included in the 2011 NPDES Annual Report.

In 2013, no projects were issued permits that had a stormwater management waiver, with the exception of those projects that qualified for the SWM Administrative Waiver to utilize the 2000 SWM regulations.

In Fiscal Year 2014, the SWM Waiver Review Fee remained at \$419 + \$84/study point over two. Additionally, in Fiscal Year 2014 the Stormwater Fee-in-lieu remained at \$1.35/square foot disturbed.

The following is a list of the 112 SWM Administrative Waivers requested through Fiscal Year 2014. Not all requests were approved and not all projects have applied for or been issued permits.

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Table 12: Stormwater Management Waiver Requests

9B Applewood Center	Harvest Ridge Lots 6 & 7	Pleasant Acres Lots 4-8
Abberly Square Apartments	Henry Ford Circle Lot 2	Potomac Metal Storage
Adams Crossing	High Pointe	Quicktree Farm
Albion	Highgrove Sections 7 & 8	Richland's Crossing
Aqualand Marina	Holly Hall	Ridge Grove Estates
Aspenleigh	Hollybrook Farm	Rose Hill Plantation
Autumn Hills	Homefield (Fieldside)	Saddle Ridge
Autumn Woods	Hope Park	Sailor's Retreat Entrance Plan
BB&T White Plains Corporate Plaza Unit "H"	Hunter Springs	Scotland Heights
Beaver Creek	Hunter's Brooke	Shad Crossing (Formerly Earnshaw)
Belmont	Intersection of Rosewick & La Plata Parkway	Shops @ Waldorf Center
Benedict Plantation Kingsbrook Pl.	Kadan Route 227	SMECO – Phase B Temporary Construction Access
Bensville Acres	Keswick	Southwinds Phases 2 & 3
Boroughs Hall	Key Point Woods	St. Charles Pumping Station 3B
Bowie Office Building	Khan's (Fadul's) Addition to Pinefield	Staples Addition - Festival Way
Brentwood	Kingsview 6B	Stoltzfus
Brookwood Estates II	Kleen Wave Autowash	Stonebridge
Bryans Green	Knotting Hill	Stonewell
Bryan's Road Market Place	Langley Estates	Summit Ridge Sections 1 & 2
Bryans Village	Linden Grove Section I	Swan Point, The Villages of
Chandlerstown	Linden Grove section II	The Heritage @ St. Charles
Chelsea Manor	Lord's Creek	The Meadows @ Forgotten Farm
Coachman's Path & Woodville Road	Matin Property Mosque	The Willows Subdivision
CPV St. Charles Gough - Parcel D	McCormick	Timber Ridge
CPV St. Charles Parcel B	Middle Business Park	Town Center South
Davenleigh	Middletown South	Turtle Creek
Deer Park Estates	Mill Spring Estates	US 301 Park and Ride
Dominion TL-552/532 Pipeline Improvement	Millseat Subdivision	Waldorf Retail & Commercial Center
Dorchester Landing II	Mimosa Addition to Mt. Carmel Woods	Waldorf Tech Park
Eagle Ridge	Mona Property	Waldorf Town Center
Fair Fountain Farm	Mt. Carmel Woods WW Pumping Station	Waldorf West
Falcon Ridge Subdivision	Myers Estates	Westlake Square
Fischer's Grant	North Pointe Phase 3	Westside Estates 2&3
Gleneagles Neighborhood Parcel Q	Oliver's Crossing	White Plains Corporate Plaza
Gleneagles Neighborhood South	Pinecrest Subdivision	Windsor Manor
Gleneagles North	Piney Brae	Windsor Mill
Groves @ Piney Church	Piney Church Road South Realignment	
Hamilton Heights	Piney Grove Estates	

The following Administrative Waivers were granted since last year’s report:

Mt. Carmel Woods Wastewater Pumping Station

The following table summarizes the stormwater management credits applied to single family lots for Fiscal Year 2014. Rooftop runoff disconnection continues to be the most used credit, as has been demonstrated in previous years.

Table 13: Summary of Fiscal Years 2013 & 2014 SWM Credits for Residential Single Family Building Permits

	Fiscal Year 2013	Fiscal Year 2014
Number of approved Residential Building Permits:	476	498
SWM Credits Approved:		
Rooftop Runoff Disconnection	1,015	1,023
Rooftop Runoff Disconnection – Compensating Drywells	140	127
Non Rooftop Runoff Disconnection	49	2,583
Grass Channel	11	17
Sheet Flow to Buffer	14	25
Environmental Site Design	0	24
Standard Plan	0	0
Stormwater Management Facility	0	327
Natural Area of Conservation	1	8
Rain Garden	15	43
Rain Barrels	8	0

Since the County’s adoption of the stormwater management regulations (August 1, 2010) requiring environmental site design (ESD) to the maximum extent practicable (MEP), through Fiscal Year 2014, a total of 133 projects have submitted Concept SWM Plans, which is Step 1 of the regulation. During that same time period, 89 projects have also submitted Site SWM Plans, which is Step 2 of the regulation.

	Fiscal Year 2011	Fiscal Year 2012	Fiscal Year 2013	Fiscal Year 2014
VSC (Step 1)	35	27	38	33
VSS (Step 2)	16	27	21	25

Since the last report, 33 additional projects have submitted Concept SWM Plans and there have been 25 Site SWM Plans submitted for review.

2. *Charles County shall maintain its illicit detection and elimination program. At a minimum, Charles County shall:*
 - a. *Ensure that all discharges to the municipal separate storm sewer that are not composed entirely of stormwater are either permitted by MDE or eliminated;*
 - b. *Annually, field screen at least 100 outfalls. Each outfall having a discharge or suspected of having an illicit discharge shall be sampled using a chemical test kit;*
 - c. *Report annually the results of field screening activities on MDE's illicit connection detection database. The following narrative shall also be included: the number of illegal storm drain connections, the results of investigations made, any enforcement used, the disposition of all illegal storm drain system connections found as a result of this portion of Charles County's stormwater management program, and an updated list of targeted outfalls and an inspection schedule; and*
 - d. *Identify all County-owned facilities requiring an NPDES discharge permit and submit documentation that a permit has been obtained for each. The implementation status of pollution prevention plans for these County-owned facilities shall also be submitted with the County's annual reports.*

2014 Status

Illicit Connection Detection

During the fiscal year 2014 screening, 100 sites were sampled. This includes 14 draining industrial areas, 40 draining commercial areas, and 46 draining residential areas.

Outfalls that were not sampled during the 2013 reporting year were selected for screening in 2014.

The screening was conducted in late May and early June of 2014. A two-person field crew visited each site following 72-hours of dry weather. The physical condition of each site was recorded on field sheets. If a dry-weather flow was present, a sample was taken and tested with a Hach chemical test kit. Tests were conducted for pH, detergents, chlorine, copper, phenols, temperature, ammonia nitrogen and nitrate nitrogen. When a chemical test was conducted, and the results showed a high concentration for any contaminant, the site was retested after 4 hours but within 24 hours to verify the results.

The results of the chemical test performed were compared with the accepted statewide averages described in *Dry Weather Flow and Illicit Discharges in Maryland Storm Drain Systems* (MDE, 1997). Using the statewide averages, the 1997 study provides a threshold for each constituent, based on watershed land use. The results from the chemical tests performed during the 2014-reporting year were compared with this threshold to determine which results are considered abnormal for each constituent, and to make recommendations as to which storm drain systems should be investigated further as having possible illicit connections. The thresholds listed were 0.4 ppm for chlorine, and 0.5 ppm for detergents. No state-approved threshold limits exist for nitrate and ammonia. Based on EPA and USGS documentation, values of 2.0 ppm for both constituents appear reasonable. This is consistent with the high outlying values found in previous screening efforts. Review of past data shows that typical pH values in Charles County fall outside the standard threshold range of 6.5 to 8.5. Therefore, for the 2013 reporting year, the following thresholds were used to determine if an upstream investigation was necessary:

- pH outside the range 5.5-8.5
- >0.5 ppm Detergents
- >0.4 ppm Chlorine
- >0.17 ppm Phenols
- >0.21 ppm Copper
- >2.0 ppm Nitrate
- >2.0 ppm Ammonia

When a confirmed high concentration of a contaminant was found, field crews followed the stormdrain system upstream attempting to locate the source of the contamination. Additional tests at upstream structures were conducted as needed in an effort to track the contamination upstream to the source, especially where two systems converged.

All data collected during the illicit discharge screening was recorded in a database conforming to the MDE formatting requirements.

The results show that, of the 100 sites, 28 had observed flow. Of these, 9 had observed flow that was too small for a sample to be collected. Of the remaining 19 sites where flow was able to be collected, 3 had chlorine present. None of the chlorine concentrations were above the threshold limit during the first inspection. One site had detergents present, in which Outfall #159 was found to contain very high concentrations for the first test. The potential source of the detergents at this outfall was determined to be Waldorf Volkswagen, Subaru, and Mazda washing cars in their parking lot to the storm drain system.

No concentrations of phenols or copper were detected at the sites where flow was able to be collected. Varying concentrations of ammonia were found at most of the sites where flow was tested; however, concentrations were not above the threshold limit during each first inspection. Varying concentrations of nitrate were found at most of the sites where flow was able to be collected with Outfall #161 exceeding the threshold concentration for the first and second tests. A specific source of nitrate was not located for this outfall; however, groundwater laden with nitrate appears to be a contributing source.

On March 24, 2014, the commercial area upstream of BMP 880038_1 was reported to Charles County for poor housekeeping practices. On March 27, 2014 an inspection of the BMP and contributing drainage area occurred, in which the BMP was found to be exhibiting normal conditions. Within the contributing drainage area, detergent-laden washwater was observed flowing off of Eternal Trendz Customs parking lot onto Holly Auto Center Lane. Tires, trash, mufflers, and oil drums were found adjacent to and in a drainage channel behind the Meineke Car Care Center off of Holly Auto Center Lane. Exposed containers of Petroleum Hydrocarbon Solvent were found in the Cottman Total Auto Care and Transmission parking lot and exposed oil drums were found behind the D & D Auto Repair building.

On April 2, 2014, Outfall #26 was reported to Charles County as having a potential illicit discharge. On April 18, 2014 an inspection of the outfall and contributing drainage area occurred, in which the outfall was found to be 80% submerged by stagnant water. Within the contributing drainage area, detergent-laden wash water was observed flowing into nearby storm drain inlets in the Speedy Clean Car Wash parking lot off of Smallwood Drive. These inlet are directly connected to the storm drain system that outfalls at this site. Even though a sample was not able to be collected due to submerged outfall conditions, this outfall is discharging elevated levels of detergent. A large amount of Styrofoam and trash were found at this outfall as well as behind a Value City Furniture store. Poor housekeeping of waste kitchen grease was also found in a parking lot behind Champion Seafood, Joe's Noodle House, and Hibachi Sushi and Supreme Buffet House.

On April 2, 2014, Outfall #30 was reported to Charles County due to the formation of sinkholes above the outfall pipe. On April 18, 2014 an inspection of the outfall and contributing drainage area occurred, in which the outfall was found to be 50% submerged by stagnant water. Within the contributing drainage area, detergent-laden washwater was observed flowing into a nearby storm drain inlet from Heavenly Shine Hand Car Wash and Detailing Center.

Metal corrosion was present at 8 outfalls and 1 outfall had cracking concrete. Moderate erosion was occurring at Outfalls #2, #85, and #161. Algae were found at 46 outfalls, which indicate excessive nutrients in the water. Except for Outfall #207, which had a cloudy discharge and opaque color, all other sites inspected had acceptable clarity and color. Except for Outfall #159, which had an oil and gas odor, all other sites inspected had acceptable odor.

Oil sheen and trash along with sediment and iron flocculent deposits were found at many sites.

The priority outfalls are listed below in Table 14. Detailed reports for the above inspections can be found in Appendix F.

Table 14: 2014 Field Screening Results for Priority Outfalls

Outfall	Problem
# 26	High levels of detergent
#30	Sinkholes forming above the outfall pipe
#159	High concentration of detergent on 1 st inspection
#161	High concentration of nitrate on 1 st and 2 nd inspection

Commercial and Industrial Visual Surveys

During the fiscal year 2014 screening, portions of the Development District containing large amounts of commercial and industrial land uses were selected for visual surveys. These areas included commercial and industrial land in Bryan’s Road, White Plains, and St. Charles. The visual surveys were conducted in late May and early June of 2014.

Within the above areas, five businesses were documented as having practices or conditions that would produce pollution to nearby stormdrain inlets or watersheds. Capitol Elevator Services, Inc. had exposed containers of compressor oil, elevator oil, hydraulic fluid, and paint in their parking lot. G & R Collision Center and Auto City were both found to be washing cars in parking lots to stormdrain systems. Wood & Tompkins Cores, Inc. had used oil containers and other assorted debris/waste strewn across the property. Y.H.S. Best Construction, Inc. had exposed painting material containers in their parking lot that appeared to be leaking onto the pavement. Detailed reports can be found in Appendix F.

Sites identified as contributing potential pollution during the visual commercial and industrial property survey in 2014 are listed below in Table 15.

Table 15: 2014 Visual Survey of Commercial/Industrial Results

Site Name	Problem
Capitol Elevator Services, Inc.	Exposed materials in parking lot
G & R Collision Center	Washing cars in parking lot to stormdrain
Auto City	Washing cars in parking lot to stormdrain
Wood & Tompkins Cores, Inc.	Trash/debris strewn across property
Y.H.S. Best Construction, Inc.	Exposed paint materials in parking lot

Enforcement Activities

The first step in remedying potential illicit discharges is determining responsibility. This includes whether corrective action is needed on public or private property. If it is determined to be on public property the appropriate agency is notified. If it is determined to be a private responsibility, notification is sent to the property owner. Each case that is determined private responsibility is issued a number, in the County’s inspection tracking system. Following is a table of tracking numbers and status for cases that were active in Fiscal Year 2014.

Table 16: Discharges into the Storm Drain System

Outfall #	Description of Issue(s)	County Tracking #	Status
2	Turbid discharge from upstream SWM pond due to berm failure	RFA 130480	Compliance Letter sent; SWM pond repair complete 9/2013
26	High levels of detergent, discharge of carwash to stormdrain	RFA 130643	Compliance Letter sent 9/11/2013; Repair completed 6/4/2014.
31	Metal corrosion	RFA 130648	Investigation on ownership of facility.
41	High concentration of detergent, discharge of carwash to stormdrain	RFA 130644	Property owner has changed wash procedures to wash bays only - 10/14/2013.
56	Excessive algae and white residue in stormdrain pipe	RFA 130484	Worked with restaurant regarding grease dumping, and replacing leaky dumpster
74	Turbid and basic discharge	RFA 130479	Discharge information forwarded to MDE Enforcement Division – 6/19/2013. Stormwater facility repaired – 12/5/2013.
Upland	Overland car wash flow into BMP (2300 Old Washington Road)	RFA 130645	Property owner modified car wash to ensure all drains enter the sanitary sewer system. Permit issued on 10/28/2013.
Upland	Exposed Oil Drums behind building (11785 Holly Auto Center Lane)	RFA 140188	Compliance Letter sent 10/21/2014
Upland	Large quantities of tires, oil drums, mufflers & trash, uncovered and in drainage channel (11770 Holly Auto Center Lane)	RFA 140189	Compliance Letter sent 10/21/2014
Upland	Exposed containers of Petroleum Hydrocarbon Solvent in parking lot (11780 Holly Auto Center Lane)	RFA 140190	Compliance Letter sent 10/21/2014
Upland	Overland car wash flow into BMP (11760 Holly Auto Center Lane)	RFA 140191	Compliance Letter sent 10/21/2014
159	Discharge of carwash to stormdrain (2282 Crain Highway)	RFA 140595	Compliance Letter sent 10/22/2014
Upland	Storage of hazardous materials, outside and uncovered (70 Industrial Park, Suite 3J)	RFA 140596	Compliance Letter sent 10/22/2014
Upland	Discharge of car wash to stormdrain (3JP Morgan Court)	RFA 140650	Compliance Letter sent 10/22/2014
Upland	Discharge of grease to stormdrain (11100 Billingsley Road)	RFA 140657	Compliance Letter sent 8/27/2014; Grease interceptor connected to sanitary sewer - 9/28/2014.
Upland	Discharge of carwash to stormdrain (4610 Crain Highway)	RFA 140867	Compliance Letter sent 12/12/2014
Upland	Trash/debris strewn across property (26 Irongate Drive)	RFA 140868	Compliance Letter sent 12/12/2014
Upland	Exposed paint materials in parking area (18 Irongate Drive, Ste.K)	RFA 140871	Compliance Letter sent 12/12/2014

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Repairs to several of the outfalls identified as having erosion in the previous inspections have been repaired as listed in Tables 17 and 18. Table 19 lists a stormwater pond repair and stream restoration projects done by the County. See Appendix N for the Drainage Systems Improvement Program budget, and Appendix J for a description of the Meadowland stormwater pond repair.

Table 17: Private Outfall, Culvert, and Inlet Repair Projects

Outfall #	Location	Description	County Tracking #	Year Identified	Date Completed	Acres Treated
23	Mall Circle	Outfall Repair	N/A	2008	2010	TBD
112	Mall Circle	Outfall Repair	RFA 130483	2013	2014	TBD
33	Days Court	Culvert Repair	RFA 130647	2013	2014	TBD
Upland	Mall Circle	Outfall Repair	RFA 140103	2014	2014	TBD
30	M & T Bank	Culvert Repair	RFA 140150	2014	2014	TBD

Table 18: County Outfall, Culvert, and Inlet Repair Projects

Outfall #	Location	Description	Cost	Date Completed	Acres Treated
179	Beechwood Drive	Outfall Repair	15,000	1-Jul-07	TBD
157	Briarwood	Outfall Repair	4,000	9-Jun-09	TBD
96	St. Charles	Outfall Repair	2,600	16-Jun-09	TBD
54	Kipling Drive	Trash Removal	2,000	9-Jun-09	TBD
139	Shiloh Church Road	Outfall Repair	1,520	1-Jul-10	TBD
14	Theodore Green Blvd.	Erosion Stabilized	1,800	1-Jul-10	TBD
212	Duckhorn Court	Inlet Repair	475	3-Jun-10	TBD
121	Holly Ave./Dogwood Dr.	Pipe & Outfall Repair	TBD	30-Jun-12	TBD
6	Hampshire Circle	Outfall Repair	4,000	30-Jun-12	TBD
18	Temi Drive	Outfall Repair	4,000	30-Jun-12	TBD
Not Devt Dist	Duval Drive	Outfall Repair	4,000	30-Jun-12	TBD
14	Theodore Green Blvd.	Bank Erosion Stabilized and Culvert Repaired	10,485	11-Sep-13	TBD
18	Temi Drive	Outfall Repair	43,000	11-Oct-13	TBD
178	Valley Drive	Metal corrosion & Erosion	TBD	TBD	TBD
78	Red Oak Lane (RFA 130646)	Metal Corrosion	TBD	TBD	TBD
31	Plaza Drive (RFA 130648)	Metal Corrosion	TBD	TBD	TBD
Upland	Lisa Drive (VCI 130013)	Metal Corrosion	TBD	TBD	TBD
Upland	Spruce Street (VCI 130013)	Metal Corrosion	TBD	TBD	TBD
Upland	Dennis Road (VCI 130013)	Metal Corrosion	TBD	TBD	TBD

Table 19: County Stream Restoration and Stormwater Management Pond Repairs

Outfall #	Location	Description	Cost	Date Completed	Acres Treated
106	Tanglewood Drive Pond VCI 080068 (a.k.a. Tawny Road)	Outfall Repair & 400 lf Stream Restoration	TBD	TBD	4
207	Holly Tree Lane VCI 130058 (Previously VCI 080067)	1,200 lf Stream Restoration (Regenerative Step Pool Conveyance)	TBD	TBD	48
Upland	Meadowlands Subdivision	Pond Rehabilitation	TBD	TBD	TBD

Proposed Program Improvements

The County’s Tentative Determination permit, issued June 2014, Section E.3, requires expansion of the program County-wide, as well as routine surveys of commercial and industrial areas to identify and eliminate pollutant sources from upland areas. The IDDE program under the new permit has two primary focuses: field screening of storm drain outfalls, and routine visual survey of commercial and industrial watersheds. The overall goal of the program is to identify illegal activities, including dumping and illicit connections to storm drains, and unpermitted activities such as poor housekeeping, poor onsite controls, unauthorized storage of material, and unpermitted activities.

As discussed in Section III.C of this Annual Report, the County is currently expanding its storm drain infrastructure mapping County-wide which allow expansion of future IDDE efforts.

The County is currently in the process of reviewing its IDDE program for programmatic updates, revisions, and improvements. Key aspects include updating County Code applicable to Illicit Discharge with provisions for enforcement, updates to County SOP’s, update a County responsible personnel organizational chart, and make recommendations for a consolidated data management/reporting system. Proposed enhancements also include development of new education and outreach materials to facilitate compliance, as well as a more in depth staff training program.

County Owned Facilities Requiring a NPDES Discharge Permit

To date, the following County owned facilities requiring a NPDES discharge permit and the status of their pollution prevention plans have been identified in the following table.

Table 20: County Facilities with NPDES Industrial Stormwater Permits

County Owned Facilities	NPDES Discharge Permit #	Pollution Prevention Plan
Charles County Municipal Landfill #2	02SW0182 (Last Issued: March 11, 2003)	Yes
Charles County Department of Public Works Maintenance Yard	02SW2160 (Last Issued: Dec 23, 2009)	Yes
Charles County - Mattawoman WWTP	10SW1214 (Last Issued: Feb 13, 2003)	Yes

3. *Charles County shall maintain the implementation of its existing program to respond to illegal dumping and spills including procedures for public reporting and citizen complaints.*

2014 Status

On July 1, 2001 the County adopted Water Quality Control Regulations which provides the Department of Planning and Growth Management (PGM) the authority to find and stop illicit discharges into the County’s storm drainage and stream system. Subsequently, PGM adopted an implementation method entitled, “Policy/Procedure: Water Quality Violation Notification, Remediation, Case Documentation and Annual Review for Program Effectiveness and Reporting,” as attached in the appendix of the 2003 Charles County NPDES Annual Report. However both of these have since been replaced as follows.

On July 13, 2010 the County adopted separate Stormwater Management and Storm Drainage Ordinances, to replace the previously combined Stormwater Management and Drainage Ordinance. At this time Water Quality Regulations were adopted in the *Storm Drainage Ordinance, Section 19.2 Illicit Discharge*.

On March 25, 2013 the Department of PGM authorized a new Illicit Discharge Standard Operating Procedure (SOP) to replace the above Policy/Procedure. The new SOP describes five steps: (1) Receiving reports of suspected illicit discharges; (2) Performing an inspection; (3) Determining the severity of the suspected illicit discharge; (4) Control of Illicit Discharge; and (5) Tracking and Reporting. A copy of this SOP is included in Appendix F.

Discharges to the Storm Drain System - The County received three citizen reports of suspected pollutant discharges in Fiscal Year 2014. These are listed in the table below.

Table 21: Citizen Reports of Suspected Illicit Discharge in Fiscal Year 2014

Date Received	Description	County Tracking #	Action
2-15-2014	Oil leaking from vehicle into stormdrain	RFA 140119	Inspector noted oil on street. No specific source was identifiable.
3-18-2014	Dumping of trash around houses and in waterway	RFA 140158	Inspector notified property owner, and trash was removed on 4-1-2014.
3-24-2014	Discharge of Freon into stormdrain	RFA 140172	Inspector noted white stain. No specific source was identifiable.

4. *Charles County shall consider applying to MDE for delegation of erosion and sediment control enforcement authority. Erosion and sediment control activities in Charles County currently are the responsibility of MDE’s Compliance Program. In addition, erosion and sediment control education activities, specifically “responsible personnel” certification classes, are currently conducted by MDE.*

- a. *By 7/15/04, Charles County shall complete a report evaluating the potential for implementing an erosion and sediment control program. This report shall be submitted to MDE and include feasibility of applying to MDE for delegation of erosion and sediment control enforcement authority in accordance with Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland, benefits, and local support.*
- b. *Beginning 7/15/03, report quarterly, information regarding earth disturbances exceeding one acre or more. Data submitted as a result of this permit condition shall include site, name, site owner and address, disturbed area, local grading permit number*

2014 Status

- a) The County's NPDES annual report for June 2003 through July 2004 includes the report evaluating the potential for implementing an erosion and sediment control program. Final delegation by MDE occurred in June 2006.

In October and November 2007, MDE performed field reviews of active construction sites to evaluate the program. Significant improvements and the progress made toward addressing violations were noted at that time. Every two years since, MDE has evaluated Charles County's program. MDE's reviews include recommendations for continued improvements related to proper installation of controls and on-site stabilization. Overall, the reviews show continued progress by Charles County and the erosion and sediment control program continues to be acceptable. In February 2012, MDE granted continued sediment and erosion control enforcement authority for the period July 1, 2012 through June 30, 2014.

- b) For the period July 1, 2013 through June 30, 2014 the County issued 109 Development Services permits, of which 30 were revisions and 30 were blanket permits. Additionally, 460 Single Family Dwelling Building permits and 107 Residential Addition permits were issued. Of the permits issued, 51 Development Services permits and 9 Single Family permits propose to disturb greater than one acre. Appendix G includes the Fiscal Year 2014 data for earth disturbances greater than one acre.
- 5) *Charles County shall implement and maintain a public education and outreach program to reduce stormwater pollutants. Public outreach and education efforts are to be integrated with the discharge characterization monitoring, watershed restoration, illicit connection detection, erosion and sediment control, and stormwater management program implementation requirements of this permit. These efforts are to be documented and summarized in the County's annual reports. At a minimum, Charles County shall:*

- a. *Provide information regarding the following water quality issues to the general public:*
 - i. *Water conservation;*
 - ii. *Stormwater management facility maintenance;*
 - iii. *Erosion and sediment control;*
 - iv. *Lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice and snow control, cash for clippers, etc.);*
 - v. *Household hazardous waste;*
 - vi. *Litter control, recycling, and composting;*
 - vii. *Car care, mass transit, and alternative transportation;*
 - viii. *Private well and septic system management;*
 - ix. *Pet waste management;*
 - x. *Procedures for public identification and reporting of illicit discharges.*

- b. *Provide information when requested regarding the following water quality issues to the regulated community:*
 - i. *NPDES permitting requirements;*
 - ii. *Pollution prevention plan development;*
 - iii. *Proper housekeeping; and*
 - iv. *Spill prevention and response.*

2014 Status

- a) The County provides information regarding water quality issues to the general public in various ways, including the website, brochures, news media, and one-on-one. Many of these public outreach programs are spearheaded by Charles County's Recycling & Litter Control Superintendent and the University of Maryland Extension Agent.

Website:

In July 2013, the County began the thirteenth year of a water quality monitoring project for the Mattawoman Creek with the U.S. Geological Survey. This project funds an existing monitoring station previously funded by the Maryland Department of the Environment. The purpose of this station is to develop a long term record of water quality data for determining trends in the watershed. The station is part of the Chesapeake Bay Programs' Long Term Status and Trends Network.

The County posts information on the NPDES MS4 permit program under the Department of Planning and Growth Management's webpage. Included are a summary of the program, Annual Reports, and numbers to call for suspected pollutant discharges. The link to the new webpage is:

www.charlescountymd.gov/pgm/planning/npdes-municipal-separate-storm-sewer-system-permit

The Charles County Government website also provides information on the local VanGo which provides public transit service within the County: www.charlescountymd.gov/cs/vango/vango

Southern Maryland has very high ridership rates on the commuter express bus into Washington, D.C., and citizens access the Maryland Mass Transit Authority (MTA) for route schedules via the Tri-County Council for Southern Maryland website for available Commuter and Regional Ridesharing Programs: <http://tccsmd.org/transportation/ridesharing-program/>

Or link directly to MTA's website for bus schedules: <http://mta.maryland.gov/commuter-bus>

Updated information is posted on county website regularly detailing recycling opportunities, oil/antifreeze collection sites, volume based tag-a-bag sticker locations, etc. Residents can also request recycling bin delivery and other type information through this website: www.charlescountymd.gov/pw/recycling/recycling

The County operates a dog park and subsequently provides etiquette rules for using the park including scooping and disposing of pet waste appropriately www.charlescountyparks.com/parks/turkey-hill-white-plains-dog-parks

Water conservation and other natural resource conservation topics are on the University of Maryland Cooperative Extension Service website: <http://extension.umd.edu/topics/environment>

County environmental planning initiatives including the Mattawoman Creek Watershed Management Plan and the Port Tobacco River Watershed Restoration Action Strategy: www.charlescountymd.gov/pgm/planning/watershed-planning

One-on-one:

University of Maryland Extension in Charles County promotes environmental stewardship by providing information and educational programs on environmental horticulture, water quality, appropriate and safe fertilizer and pesticide use, and other issues directly to the public, often face-to-face with our citizens, and through mass media.

Extension staff members and trained volunteers answer questions from homeowners and farm operators visiting the Extension office in Charles County, answer telephone inquiries from the public, as well as analyze plant and insect samples submitted by county residents and provide fact sheets and other educational materials as needed.

The Agriculture and Natural Resources Extension Agent promotes water conservation, storm water management, and wise use of pesticides and fertilizers through personal appearances on the county cable station. Recent topics have included proper lawn care.

The Extension faculty and staff provide training to commercial landscapers, and farm operators on proper use of fertilizers and pesticides. This training includes managing storm water and farm ponds, pest control, maintaining good turf to prevent erosion, and an array of other natural resource conservation issues. Extension faculty also train volunteers to become part of the Charles County Master Gardeners, a University of Maryland outreach program providing educational information on environmental horticulture to the public.

Master Gardeners encourage maintaining the quality of our landscapes and environment through the Maryland Bay Wise Yardstick certification program, as well as through field visits throughout the County to assist citizens with their gardening problems. The volunteers also create timely educational displays and hold plant clinics at public events, such as the Charles County Fair. They continue to investigate new environmental education opportunities with local schools.

In 2009 through 2013, Extension faculty worked via a public/private partnership with County Government and a local lawn service business, to provide eight 2-hour community workshops on environmentally sound lawn care.

Brochures, Signage, and news media:

In addition to internet, information is provided by handouts and news media outlets. Educational literature on recycling and composting is periodically mailed to residents, placed in local papers and homeowner's associations' newsletters, and made available in frequently visited locations such as libraries, government building, etc.

The University of Maryland Cooperative Extension Service in Charles County distributes handouts on septic maintenance, lawn care and other topics.

Each year at the County Fair the County distributes information on recycling as well as natural resources and low impact development techniques. As part of the Charles County Commissioners' Environmental Program, several brochures are distributed by the Department of Public Facilities. These include, "Reduce Reuse Recycle Directory" and "It is Easy Being Green." In addition, coloring and activity books titled, "Learn About Water Conservation" and "Keep Our Environment Clean" are provided for children.

In 2014 the County installed educational signage at the Bryans Road Village Green Park. Following is the sign layout, and in Section III.F. under the Bryans Road watershed restoration project description is a photo of the installed sign.



What makes Bryans Road Village Green so special?

Cleaning polluted rainwater runoff from urban or developed areas is a mandate of the federal Clean Water Act. To meet the mandate, Charles County Government is installing facilities and implementing practices that will reduce the pollution caused by rainwater runoff from impervious surfaces such as compacted soil, paved areas, and rooftops.

You are now standing on an underground facility built by Charles County Government, for the purpose of cleaning polluted rainwater before it flows into a small stream leading to the Mattawoman Creek estuary.

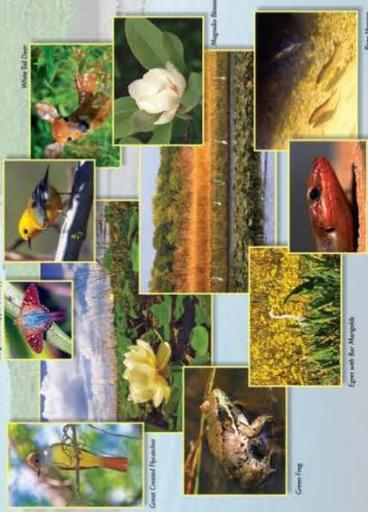
When it rains, the water flows across 10 acres of impervious surface in this parking area, washing off dirt, oil, gasoline drippings, and other pollutants. The rainwater then flows into grates, which you can see in the parking area. The pipes below the grates lead to the underground arched chambers. These chambers (shown in the photos below) store the water to mimic natural hydrology and filter out the pollutants. Finally, clean water comes out of the pipe across the street and continues its journey to the estuary. Just as important as the underground facility is this above ground beautification of Bryans Road Village Green!



Underground arched chambers
Bryans Road Village Green

Mattawoman Creek, it's hopping with wildlife!

From extremely rare and sensitive Magnolia Bogs along small forested streams to the wild population of American Lotus in the expansive tidal wetlands, the Mattawoman Creek Watershed is home to one of the most biodiverse ecosystems in Maryland.



The Creek's estuary, streams and wetlands are among the most productive fin-fish spawning and nursery areas in the entire Chesapeake Bay. In addition to over 50 species of fish identified here by the Maryland Department of Natural Resources, there are nearly 230 species of birds that can be found in the extensive forests. At a single site, 18 species of reptiles and amphibians were observed.

Wildlife Photo Credits: Mattawoman Watershed Society and George Jett

What can YOU do to help Mattawoman Creek?

Pet Waste:

- When walking your pet, remember to pick up the waste and dispose of it properly in the trash.

Lawn Care Tips:

- Use pesticides and fertilizers sparingly.
- Carefully read all labels and follow application directions.
- Test the soil to be sure the amount of fertilizer needed.
- Consider using organic fertilizers, which release nutrients more slowly.
- Use Integrated Pest Management (IPM) methods to reduce dependence on pesticides.
- Use native Maryland plant species in your landscape.

Beneficial Landscaping Options:



Permeable Pavement
Rain Gardens
Rain Barrels
Grassy Swales

Auto Care:



Use a commercial car wash that treats or recycles its wastewater.
Or, wash your car on your grass so the water infiltrates into the ground.
Maintain your car and always recycle used motor oil.
Check your car for drips and oil leaks regularly and fix them promptly.

Potomac River Watershed Cleanup

Over 6,000 volunteers have collected tons of debris from Charles County's waterways over the past 15 years. Held annually, on the first Saturday of April from 9:00 a.m. to 12:00 noon, items collected over the years have included cans, bottles, appliances, furniture, toys, boats, and cars! See Appendix P for data on the 2014 cleanup.

Waldorf Beautification Project

In Spring 2014, the Waldorf Beautification project was established by the Charles County Commissioners to guide and direct the beautification effort. The project utilizes partnerships with entities established in the Waldorf area to promote clean-up of common areas and roadways, encouraging environmentally-friendly neighborhoods with landscaping, emphasizing conservation of natural resources, and support for programs in schools to educate youth in the earth sciences.



Next steps for improving water quality education

In FY 2014 Charles County Government began work with LMD, Inc., a Marketing and Promotions consultant, to assist the County in the development of a more robust public education and outreach program. In FY 2014 the County completed an initial research campaign that consisted of an online survey distributed to the County's interested parties groups and email list serves as well as one-on-one interviews to gain an understanding of the base knowledge the County's public has when it comes to the importance of water resources, stormwater management, and septic maintenance. The research results will be used in the development of education and outreach tools and materials to reach residents and hopefully change attitudes to achieve changed behavior. A presentation of the research findings is included as Appendix H. In FY 2015 the County aims to develop a stormwater management program identification logo and brand, as well as program webpage improvements.

The County will continue working to publicize methods to report illicit discharges, and water conservation techniques, as well as improving distribution of other water quality information as needed.

- b) The County provides the following information when requested regarding NPDES permitting requirements, pollution prevention plan development, proper housekeeping and spill prevention response:
- 1) Maryland Department of the Environment websites:
www.mde.state.md.us/Programs/Permits/Pages/index.aspx
www.mde.state.md.us/programs/Permits/Documents/2008permitguide/WMA/3.23.pdf
www.mde.state.md.us/programs/Permits/WaterManagementPermits/Pages/Permits/WaterManagementPermits/index.aspx
 - 2) Maryland Center for Environmental Training located at the College of Southern Maryland, La Plata branch: www.mcet.org/
- (6) *Charles County shall develop and implement a plan to reduce pollutants associated with road maintenance activities. At a minimum, an annual progress report shall be submitted that documents the following activities:*
- a. *Cleaning storm drain inlets;*
 - b. *Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with roadside vegetative management practices through the use of integrated pest management; and*
 - c. *Controlling the overuse of winter weather deicing materials through continual testing and improvement of materials and effective decision-making.*

2014 Status

The Road Division receives several dozen complaints annually, and will clean out silt/trash when the drain is not operating properly. In Fiscal Year 2014, storm drains and catch basins in were cleaned using a vacuum truck. The vacuum truck removed 124.9 tons of debris at a cost of approximately \$50,000. Approximately 48.2 miles were swept one time in Fiscal Year 2014, removing 157 tons of debris at a cost of \$50,000. The lists of storm drains and catch basins, and streets swept are in Appendix I.

III.F. Watershed Restoration

Overview of Permit Conditions

1. *Within 12 months of the issuance of this permit, data gathered as a result of prior NPDES activities shall be used to prioritize all watersheds within Charles County in the context of water quality. The methods and scale used to prioritize watersheds shall be determined by Charles County but must include, at minimum, documented water quality problems and the ability to address them. In Charles County's first annual report, the results of this prioritization shall be provided and shall include the methods and scale used as well as the watershed rankings for all land area in the County.*

2014 Status

This task was completed in the June 2002 to July 2003 NPDES Annual Report.

2. *Within 12 months of the issuance of this permit, Charles County shall select a watershed, or a combination of watersheds, to be restored. The selection of the watershed to be restored shall be based upon Charles County's ability to monitor the progress of all those activities identified in PART III.F.3 below to improve water quality. At least one of the following options for watershed selections shall be used:*
 - a. *A combination of the drainage area above the in-stream monitoring station identified in PART III.D. above and additional contiguous areas equaling ten percent of Charles County's untreated impervious area;*
 - b. *A watershed or combination of watersheds equaling ten percent of Charles County's untreated impervious area where surrogate parameters can be used to determine progress toward watershed restoration; or*
 - c. *A combination of PART III.F.2.a. and PART III.F.2.b. above equaling ten percent of Charles County's untreated impervious area.*

2014 Status

In an October 2003 Addendum to the June 2002 - July 2003 NPDES Annual Report, the procedure for identifying the study areas and determining imperviousness was described and is summarized here. County staff and consultants determined that the best method for selecting restoration areas was (b) above.

The 12-digit subwatershed prioritization conducted in 2003 identified part or all of the top nine lowest quality/highest priority for restoration subwatersheds within the Development District. Thus, the Development District was used as the study area for which untreated impervious calculations were made and where specific study areas for potential restoration/retrofits were identified.

For the preparation of the watershed restoration studies in 2004, 2007 and 2011, the method for calculating impervious surface was updated to use the latest available data and technology. In 2004, impervious percentages were calculated for the treated and untreated areas using the 1997 Maryland Department of Planning Land Use/Land Cover GIS data and the recommended imperviousness conversion factors.

In 2007, the impervious coverage was digitized from 2004 aerial photographs using Feature Analyst, a software package that uses ArcGIS and iterative methods to identify color differences on aerial photographs associated with impervious versus open space areas. This method provided a much more accurate measurement of impervious area within the County than was calculated for the 2004 study. In 2010, the impervious area was calculated again using the same ArcGIS software package, and the most recent 2007 aerial photography.

Treated and untreated impervious areas were calculated for the Development District using the following procedure.

- BMP drainage areas were delineated using existing locations of outfalls and their associated drainage areas where data was available. Where data was not available, the remaining BMP drainage areas were delineated using topography and storm drain mapping.
- Areas draining to BMPs were tagged as „treated.“ Areas that did not drain to a BMP were tagged as „untreated.“

In 2013, Spatial Systems Associates, Inc. completed the impervious surface GIS polygon data layer for the County based on 2011 aerial photography. To further develop the necessary data for the anticipated expansion of the restoration requirement from the current permit area (Development District) to the entire County, Vista Design, Inc. was contracted to complete an Impervious Area Assessment by Era of the entire County, as described below.

Earlier studies estimate the County’s impervious areas within the Development District, but Vista’s work will seek to establish the limits of the County’s entire impervious areas, and determine the level of existing water quality treatment currently provided to those areas. In the performance of their work, Vista will utilize current County and State GIS mapping data, as well as limited field observations, to review each developed area, and categorize it as having occurred within one of three Stormwater Management Eras: 1) Prior to 1985 (no water quality provided), 2) between 1985 & 2002 (partial water quality provided), or 3) after 2002 (water quality treatment per current required levels). After all parcels are properly categorized, Vista Design will prepare the Impervious Surface Area Assessment in accordance with MDE guidelines.

As part of the Impervious Surface Area Assessment, Vista Design, Inc. and County staff will seek to identify areas which appear feasible for retrofit water quality restoration areas for use in satisfying the County’s anticipated requirement to treat 20% of the County’s currently untreated

impervious areas. Potential restoration areas will be rated based upon the amount of currently untreated impervious areas which the facility could treat and assessed for possible impacts a new/enlarged facility would have on surrounding land owners. Highly rated areas will then progress to conceptual design, and potentially final engineering design and construction.

3. *Within 24 months of the issuance of this permit, Charles County shall complete and submit for MDE approval a detailed assessment of the watershed or combination of watersheds selected in PART III.F.2.above. At a minimum, the assessment shall:*
 - a. *Determine current water quality conditions;*
 - b. *Identify and rank water quality problems;*
 - c. *Identify all structural and non-structural water quality improvement opportunities;*
 - d. *Include the results of a visual watershed inspection;*
 - e. *Specify how the restoration efforts will be monitored; and*
 - f. *Provide an estimated cost and a detailed implementation schedule for those improvement opportunities identified in PART III.F.3.c. above.*

After completing the assessment of its selected watershed, Charles County shall submit a detailed watershed assessment for an additional watershed equaling ten percent of the County's untreated impervious area to MDE by the end of this permit term.

2014 Status

Three watershed restoration studies, dated 2004, 2007, and 2011, have been prepared each to address 10% of the untreated impervious area. In 2013, the County initiated a five-year schedule to perform detailed watershed assessments in anticipation of the expanding permit coverage to the entire County. Brief summaries of these work efforts are summarized below. In 2014, KCI has begun field work for the first of the five watershed assessments.

2004 Watershed Restoration Study

Per the 2004 Watershed Restoration Study, the total treated and untreated impervious acres for the entire Development District, were 2,250.12 acres and 3,456.96 acres respectively. Ten percent of the Development District's untreated impervious surface was 345.70 acres.

To ensure that an adequate number of sites and untreated impervious acres would be selected that would be eventual candidates for restoration/retrofit design, the study areas were selected to be much larger than the 345.70 acre goal. Seven study areas were ultimately selected that together equal 645.45 acres of untreated impervious area, as shown below.

Study Area Name	Total Study Area (acres)	Area Untreated (acres)	Area of Untreated Impervious Cover (acres)
Acton/Hamilton	865.40	577.43	131.42
Briarwood	51.88	51.86	13.30
Bryans Road	16.24	16.24	11.84
Carrington	1,388.95	1,276.45	212.93
Marbella Delight	103.64	101.95	61.13
Pinefield	687.49	686.62	192.75
Pinefield South	95.23	89.21	22.08
Total	3,208.83	2,799.76	645.45

The complete Watershed Restoration Study was provided in the June 2003-July 2004 NPDES Annual Report. The Study found potential improvements that could be applied to restore watershed hydrology and water quality were identified from literature review and prior experience. The improvement alternatives fall into the following six categories, in the preferred order of implementation.

- Source Control Pollution prevention and non-stormwater discharge control programs
- Land Use Land conservation and site design measures. Low Impact Development (LID) site planning measures are included here.
- BMP Retrofits Conversion of existing quantity controls to water quality BMPs
- Multi-site BMPs End-of-pipe structures, such as ponds, wetlands, and outfall treatments
- Onsite BMPs Systems designed to reduce stormwater impact at the lot level. LID structural BMPs are included here.
- Stream Restoration In-stream projects, such as channel stabilization or riparian buffer restoration.

Capital cost estimates were developed for structural BMPs in the form of unit costs, so that an estimate of the cost of retrofitting a large area can be derived from the size of the systems needed to provide treatment. The costs include design, permitting, and construction, but not land or right-of-way acquisition. Annualized costs for BMP maintenance or outreach programs were not included in the costs, either, due to their highly variable nature.

Finally, the approach to developing restoration alternatives for each study area was as follows:

1. Identify the primary impairment in the drainage area.
2. Identify constraints
3. Select potential improvements which address the impairment within the constraints, in the order listed above in Section 3.0
4. Develop cost estimates
5. Prioritize projects based on cost-effectiveness

Feasible alternatives were developed for the seven restoration areas. When combined, they provided treatment for 418.7 acres of impervious area. The prioritization goal was to treat the amount of area required by the permit with the most cost-effective means, measured by the cost to treat one impervious acre. With this measure, the most expensive options were deleted first.

The following table shows a summary of the remaining prioritized management practices to meet the permit goal. The total cost estimate from the 2004 Watershed Restoration Study is approximately \$6,277,440 at about \$18,173 per treated impervious acre.

Table 22: Prioritized Management Practices for Watershed Restoration from 2004 Watershed Restoration Study

Management Practice	Treated Area (ac)	Impervious Area (ac)	Unit of Measure	No. Of Units	Unit Cost	Total Cost	Cost/ Impervious Acre
Lawn Care Education	270.6	81.2	House	687	Varies	Unknown	Unknown
Pet Waste Education	270.6	81.2	House	687	Varies	Unknown	Unknown
Rain Barrels	270.6	81.2	House	687	\$250	\$171,750	\$2,116
Easements	31.0	1.6	Acre	7	\$2,000	\$13,800	\$8,903
Pond Retrofit	59.2	17.8	CF	163,860	NA	\$132,518	\$7,445
Wet Pond	168.3	59.9	CF	226,077	NA	\$192,373	\$3,212
Wetland 1	96.1	31.1	CF	118,883	NA	\$132,004	\$4,244
Wetland 2	67.1	30.3	CF	111,136	NA	\$125,879	\$4,154
Dry Swale- Filtration	117.7	35.6	SY	13,800	\$68	\$938,400	\$26,360
Dry Swale- Infiltration	35.0	10.5	SY	4,066	\$39	\$158,574	\$15,102
Wet Swale	0.0	0.0	SY	0	\$51	\$0	
Grasspave/Infiltration	23.2	7.0	SY	342	\$83	\$28,386	\$4,055
Grasspave/Filtration	0.0	0.0	SY	0	\$146	\$0	
Filtterra Bioretention	146	44.0	Each	176	\$6,000	\$1,056,000	\$24,000
Sidewalk Bioretention	0.0	0.0	SY	0	\$194	\$0	
Median Bioretention	0.0	0.0	SY	0	\$174	\$0	
Parking Lot Bioretention	75.3	57.6	SY	18,694	\$174	\$3,252,756	\$56,471
Green Roofs	0.0	0.0	SY	0	\$135	\$0	
Stream Restoration	0.0	0.0	LF	300	\$250	\$75,000	
TOTAL	993.9	345.4				\$6,277,440	\$18,173

NOTE: Wetland 1 treats some of the same area in Carrington as a wet pond, so this area was removed from the total area treated. Similarly, education and rain barrels treat the same area, so this area was included only once in the total.

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The Watershed Restoration Study was presented to the Charles County Commissioners in November 2004, and was approved for implementation. To further refine the proposed projects and the implementation schedule the County separated capital improvements projects (CIP) and outreach projects. See Part III.G. below for further information on the CIP budget.

The following prioritization list includes the three study areas with the greatest amount of impervious surface for restoration: Carrington, Pinefield, and Acton-Hamilton. In addition, Bryans Road is included as a county initiative under the Bryans Road Sub-Area Plan.

The prioritization is based on meeting the 10% restoration goal with the fewest areas of impact, which will enable the County to focus outreach, land acquisition, and management efforts, minimize time and cost of construction, and to completely address water quality in the areas of concentration.

The estimated costs and areas treated have been refined since 2004 and the following table has been updated to reflect this. The updated total areas treated have decreased significantly from original estimates and the average cost per impervious acre treated is now estimated at \$51,350.

Estimated Cost and Implementation Schedule for the 2004 Watershed Restoration Plan:*

		Description	Design	Right-of-Way & Construction	Impervious Treated (acres)
FY06-FY09	Carrington	Shallow Marsh	\$126,675		
	Carrington	Shallow Marsh		\$ 1,502,277	45
FY10-FY11	Bryans Road	Underground Storage	\$64,110		
	Pinefield	Wetpond 1 and Filterras**	\$214,490		
	Acton-Hamilton	Bio-Swales (not feasible)	\$96,860		
FY12-FY13	Bryans Road	Underground Storage		\$ 1,302,005	9
	Pinefield	Wetpond 1		\$ 632,269	23
	Pinefield	Wetpond 2	\$50,000		
	Pinefield – Temi Dr.	Submerged Gravel Wetland	\$52,200		
	Acton-Hamilton	Submerged Gravel Wetland	\$86,000		
FY14-FY15	Pinefield	Wetpond 2		\$500,000	13
	Pinefield – Temi Dr.	Submerged Gravel Wetland		\$650,000	13
	Acton-Hamilton	Submerged Gravel Wetland		\$ 2,000,000	40
		TOTALS	\$640,335	\$6,086,551	131

**Updated in 2012. ** The Pinefield filterras have been designed to treat 13 impervious acres at a cost of \$1,187,731, but have been put on hold. Additional explanation is under item 4 below.*

2007 Watershed Restoration Study

For the 2007 study, impervious coverage was digitized from 2004 aerial photographs using Feature Analyst, a software package that uses ArcGIS and iterative methods to identify color differences associated with impervious versus open space areas. This method provided a much more accurate measurement of impervious area within the County.

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Since the goal of the 2004 and 2007 studies was to provide restoration alternatives for a combined total of twenty percent of the untreated impervious area in the Development District, it was important to analyze existing untreated impervious area and impervious area within the study areas using the same methodology. Therefore, the impervious area within the seven study areas discussed in the 2004 Watershed Restoration Study were recalculated using the delineated impervious area values. The results are as follows:

Study Area Name	Total Study Area (acres)	Area Untreated (acres)	Untreated Impervious Cover (acres)
Acton/Hamilton	865.40	577.43	90.07
Briarwood	51.88	51.86	9.93
Bryans Road	16.24	16.24	11.57
Carrington	1388.95	1276.45	151.66
Marbella Delight	103.64	101.95	41.02
Pinefield	687.49	686.62	165.78
Pinefield South	95.23	89.21	18.32
Total	3208.83	2799.76	488.35

The total impervious area within the Development District was approximately 4,581 acres, based on the digitized impervious boundaries. Of that amount, 2,607 acres is currently untreated. The improvement recommendations outlined in the 2004 study addressed the treatment of 402.58 acres of untreated impervious area, as recalculated with the new impervious coverage. This is approximately 15% of the total untreated area in the Development District. Meeting the 20% restoration goal would require an additional 119 acres treated.

For the 2007 Watershed Restoration Study, ten study areas were identified that contained a large percentage of untreated impervious area within an impaired stream system. To ensure that an adequate number of sites and untreated impervious acres would be selected that would be eventual candidates for restoration/retrofit design, the study areas were selected to be much larger than the 119 acre goal. The ten study areas that were ultimately selected equal 276.16 acres of untreated impervious area, as shown below.

Study Area Name	Total Study Area (acres)	Area Untreated (acres)	Untreated Impervious Cover (acres)
Fox Run	33.82	33.82	9.40
Lancaster	42.90	40.84	13.06
West Lake Village	267.59	261.45	63.81
Ryon Woods	140.39	136.80	27.08
White Plains	327.97	231.04	31.21
St. Charles	1609.18	409.67	77.21
Wakefield	49.20	49.20	12.94
Bannister	28.33	28.33	6.30
Hunt Club Estates	135.61	131.55	15.39
Northwood	107.72	61.11	19.76
Total	2742.71	1383.81	276.16

These study areas include impervious area from state highways, which are subject to Maryland State Highway Administration’s (MSHA) Statewide NPDES permit and not part of the County's responsibility. As highway projects are constructed, there may be an opportunity to share funding for BMP construction, along with credit for pollutant removal from runoff subject to both MSHA and County permits.

Of the nine selected areas, three were selected for stream walks (West Lake Village, White Plains, and St. Charles). The inspection consisted of a walk-through of approximately 7,400 linear feet of perennial/ephemeral streams. The inspection included physical and habitat assessment and documentation of problem areas, including:

- Storm drain outfalls
- Stream channel lateral and vertical erosion
- Channel blockages and/or fish obstructions
- Dumping
- Failing septic or sewer systems
- Buffer impairments or encroachments
- Exposed utilities

Study Area	Type of Monitoring
Fox Run	Habitat, geomorphic assessment
Lancaster	Habitat, geomorphic assessment
West Lake Village	Biomonitoring, physical water quality, habitat, water quality grab
Ryon Woods	Geomorphic assessment
White Plains	Biomonitoring, physical water quality, habitat, water quality grab
St. Charles	Physical water quality, habitat, water quality grab, geomorphic assessment
Wakefield	Physical water quality, habitat, water quality grab
Hunt Club Estates	Habitat, geomorphic assessment
Northwood	Physical water quality, habitat, geomorphic assessment

POTENTIAL MANAGEMENT ALTERNATIVES

The improvement alternatives identified to address some of the issues described above fall into the following six categories:

- Source Control: Pollution prevention and non-stormwater discharge control programs
- Land Use: Land conservation and site design measures. Low Impact Development (LID) site planning measures are included here.
- BMP Retrofits: Conversion of existing quantity controls to water quality BMPs
- Multi-site BMPs: End-of-pipe structures, such as ponds, wetlands, and outfall treatments

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- Onsite BMPs: Systems designed to reduce stormwater impact at the lot level. LID structural BMPs are included here.
- Stream Restoration: In-stream projects, such as channel stabilization or riparian buffer restoration

Several categories of restoration measures have already been put in place through the County's NPDES permit. These are municipal pollution prevention measures, some residential source controls, and reduction of non-stormwater discharges.

Currently, forty-two restoration opportunities have been identified within the study areas, which combined would treat approximately 142 untreated impervious acres. These include construction of bioretention areas, small wet ponds, water quality swales, and performing stream restoration or stabilization of failing outfalls. Site-specific discussions and concept plans are included in the 2007 Watershed Restoration Study Report for the priority projects. Prioritization was based on the level of impairment within the receiving waters, amount of impervious drainage to the project limits, and estimated cost of the project. This Study is included with the 2007 NPDES Annual Report.

The estimated costs and areas treated have been refined since 2007 and the following table has been updated to reflect this. The updated total areas treated have decreased from original estimates, some projects were not feasible, and the estimated cost per acre treated is \$57,418.

Estimated Cost and Implementation Schedule for the 2007 Watershed Restoration Plan:*

		Description	Design	Right-of-Way & Construction	Impervious Treated (acres)
FY12-FY13	Bannister	Retention Pond (not feasible)	\$281,860		
	Fox Run	Regenerative Step Pool Conveyance			
	Lancaster	Stream Restoration (not feasible)			
	Northwood	Regenerative Step Pool Conveyance			
	Ryon Woods	Grass Channel			
	White Plains	Gravel Wetland			
	St. Charles	Retention Pond & Stream Restoration	\$100,000		
FY14-FY15	Fox Run	Regenerative Step Pool Conveyance		\$600,000	10
	Northwood	Regenerative Step Pool Conveyance		\$800,000	23
	Ryon Woods	Grass Channel		\$50,000	1
	White Plains	Gravel Wetland		\$530,000	6
	St. Charles	Retention Pond & Stream Restoration		\$1,600,000	29
		TOTALS	\$381,860	\$3,580,000	69

*Updated in 2012.

2011 Watershed Restoration Study

In January 2010 the County contracted with KCI Technologies, Inc. to prepare a third watershed restoration study for an additional 10% untreated impervious surface. It was determined that the total impervious area within the Development District, based on the 2007 data, was 5,508 acres. Of this 2,863 acres have been identified as untreated. Therefore, the restoration goal for the 2011 study was 286.3 acres, which represents 10% of the untreated impervious area.

A variety of study areas were identified for retrofit. These areas were identified based primarily on the amount of untreated area in the development draining to the sites. The study areas include impervious area from state highways, which are subject to Maryland State Highway Administration's (MSHA's) Statewide NPDES permit and not part of the County's responsibility. As highway projects are constructed there may be an opportunity to share funding for BMP construction, along with credit for pollutant removal from runoff subject to both MSHA and County permits.

The potential project areas were identified in ArcGIS using the treated area polygon and aerial photography. These areas were printed on maps and compared against known proposed development to narrow down the areas most likely for retrofits. 75 individual retrofit sites were identified within the 28 study areas. The proposed impervious area to be treated was approximately 50% of the 286 acre goal. Design and construction of such a large number of sites would be prohibitively expensive. Therefore the majority of sites, with modest to minimal treatment benefits, were eliminated from consideration.

Concept plans were developed for a final list of 17 proposed projects within 9 study areas treating approximately 37 acres of impervious surface. The study estimates the average restoration cost is \$129,000 per impervious acre. See the following table for the list of projects.

Study Area	Number of Proposed Projects
Marbella Delight	3 (Dry Swales, Bioretention)
Northwood	2 (Bioretention, Filterra)
Jenifer Elementary School	1 (Shallow Marsh)
Berry Road North	2 (Bioretention, Dry Swales)
Briarwood	1 (Step Pool Stormwater Conveyance)
Leonardtown Road	2 (Pond Retrofit, Dry Swales)
Pinefield Center	1 (Retention Pond/ Improved Drainage System)
Potomac Branch Library	1 (Bioretention)
MD-301 Commercial Corridor	4 (Bioretention, Pavement Removal)

The estimated costs and impervious areas treated have been refined since 2011 per the following table.

Estimated Cost and Implementation Schedule for the 2011 Watershed Restoration Plan:*

		Description	Design	Construction	Impervious Treated (acres)
FY12-FY13	Northwood (a.k.a. Holly Station)	Retention Pond, Bioretention & Swale	\$50,000		
FY14-FY15	Northwood (a.k.a. Holly Station)	Retention Pond, Bioretention & Swale		\$450,000	9
TOTALS			\$50,000	\$450,000	9

*Updated in 2012.

2013 – 2018 Detailed Watershed Assessments

In April 2013 the County contracted with KCI Technologies, Inc. to prepare detailed watershed assessments for the 10 major watersheds in the County. Following is the watershed assessment completion schedule.

Contract Year	MD 8-digit Watersheds	Number of 12-digit Subsheds	Area (sq mi)	Stream Length (mi)	Synoptic Sampling Sites
1	Port Tobacco River	5	43.9	104.5	51
2	Potomac River Upper Tidal	1	3.2	4.6	2
2	Potomac River Middle Tidal	3	30.1	59.2	22
2	Potomac River Lower Tidal	5	44.3	65.9	24
2	Wicomico River	5	27.3	49.3	18
3	Mattawoman Creek	9	69.9	140.1	51
3	Nanjemoy Creek	5	73.0	134.0	49
4	Gilbert Swamp	10	39.0	93.2	34
4	Patuxent River Lower	4	28.2	37.9	14
4	Zekiah Swamp	16	102.0	195.5	72

As described in section III.F.2. above, in 2014-2015 the limits of the County’s entire impervious surface based on polygons will be calculated, and the level of existing water quality treatment currently provided to those areas will be calculated to determine the best approach to achieve the watershed restoration goal.

4. *Within 30 months of the issuance of this permit, Charles County shall begin to implement restoration efforts according to the schedule outlined in PART III.F.3.f. above. Annual reports shall document:*
 - a. *The progress toward meeting the schedule identified in PART III.F.3.f. above;*
 - b. *The estimated cost and the actual expenditures for program implementation; and*
 1. *The monitoring data or surrogate parameter analyses used to determine water quality improvements.*

2014 Status

Carrington - Wetland Projects

In fiscal year 2005 the County began the first three CIP watershed restoration projects in Carrington Neighborhood. Two of these are wetland habitat projects on elementary school sites and the third is a water quality feature on neighborhood association property. Success of the proposed Carrington watershed restoration projects depended on support and interest from the community and the schools.

Charles County issued a request for proposals in the Fall of 2005 to have the three Carrington projects designed. Two bids were received, and A. Morton Thomas, Inc. was selected to design and engineer the projects. Design began January 2006, and was completed in the Fall of 2006. Construction of the project was bid in November 2006 and awarded to Environmental Quality Resources, LLC in February 2007.

A ribbon-cutting event for both wetland projects was held on April 16, 2008. The event was titled, "Connecting Children to Nature – Schoolyard Habitat Celebration and Fishing Derby." This event was videotaped for running on the County's and the School's cable channels and was aired in 2008. The Charles County Department of Planning and Growth Management received the *2010 Grand Award* and the *2010 Outstanding Project Award in Environmental* for the projects by the American Council of Engineering Companies of Maryland.

See permit Section III.D.3 for chemical monitoring of the restoration project at Middleton Elementary School.

Pinefield – Pond Retrofit

Request for Proposals (RFP) 08-36 for the design and engineering of Pinefield and Acton-Hamilton projects was released in April 2008. The RFP was for full concept and engineering, which was determined to be too open-ended and causing inflated bid pricing. To address the inflated bid pricing, Addendum #1 was issued in May 2008, postponing bids, until the County could have 25% design completed and remove the uncertainty in project scope. In July 2009, RFP 09-40 was released which included concepts. Bids were received in August 2009, and Vista Design, Inc. was awarded the contract to begin work November 2009.

Improvements in Pinefield included expanding a wet pond, adding filter-ras, as well as pipe repair and outfall replacement of the pipe on Dogwood Drive that daylighted behind Holly Avenue and an outfall pipe on Temi Drive. The County's permit for Pinefield is VCI 090111.

In 2012, Dogwood Drive Drainage Improvements were bid for construction under RFP 12-04 and completed. This consisted of partially replacing and rehabbing a major drainage pipe that was failing in several locations. In 2013 the Temi Drive outfall pipe repair was complete.

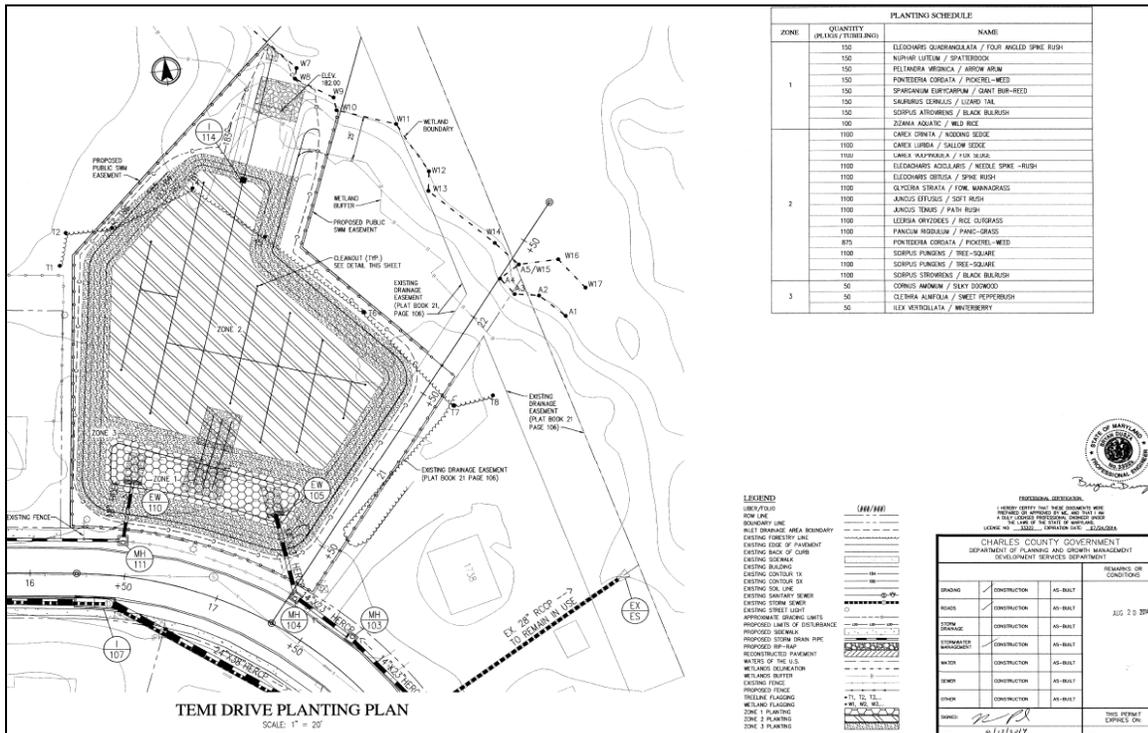
Due to the completion of the U.S. Army Corps of Engineers' *Stormwater Improvement Plan for Pinefield*, July 2011, the filterras that had been previously designed and issued construction permits, were put on hold to be potentially superseded or done in conjunction with the U.S. Army Corps of Engineers stormwater drainage improvements. The U.S. Army Corps of Engineers' plan included treating much of the drainage area to the filterras via a less costly retention pond. However designing the retention pond was dependent upon the County obtaining access to the property. Permission to access project sites and property acquisition continue to be a significant time consuming part of the watershed restoration process.

Construction to enlarge the pond to treat an additional 22 acres of untreated impervious area began under RFP 12-18 in August 2012 and completed in May 2013 by Sandy Excavating, Inc. Photos of the pond construction and Temi Drive outfall repair can be found in the 2013 NPDES Annual Report.

Pinefield at Temi Drive - Submerged Gravel Wetland

In 2012, Vista Design, Inc. completed a watershed restoration concept for an additional portion of Pinefield called Temi Drive that will reroute drainage from a corroded steel pipe and eroded outfall, to a gravel wetland that will provide water quality treatment for approximately 18 acres of untreated impervious area. In 2013 engineering of the gravel wetland began under County permit VCI 130063. In 2013 the engineering plans are currently at 90% completion of design.

In 2014 the Temi Drive project received bids under Instruction to Bidders (ITB) 15-10 for construction and should begin construction by the Spring 2015. The facility has been proposed in the Pinefield Civic Association open space along Temi Drive at the lowest elevation. A graphic of the approved plans follow.



NPDES Temi Drive Concept

Acton-Hamilton – Submerged Gravel Wetland

Request for Proposals (RFP) 08-36 for the design and engineering of Pinefield and Acton-Hamilton projects was released in April 2008. The RFP was for full concept and engineering, which was determined to be too open-ended and causing inflated bid pricing. To address the inflated bid pricing, Addendum #1 was issued in May 2008, postponing bids, until the County could have 25% design completed and remove the uncertainty in project scope. In July 2009, RFP 09-40 was released which included completed concepts. Bids were received in August 2009. Vista Design, Inc. was awarded the contract and began work November 2009. The County’s original permit for Acton-Hamilton is VCI 090112.

See permit Section III.D.3 for biological and physical monitoring of the restoration project at Acton-Hamilton.

Improvements in Acton-Hamilton were subject to re-evaluation in 2010. This included issuing change orders to (1) delete proposed bioretention facilities and replace with filtertanks, (2) delete dry swales and replace with bioretention, and (3) preliminary surveying, engineering and permitting services in support of a regional stormwater concept. Due to the complete revamp of the project, the regional stormwater facility was initiated under permit VCI 120088.

Bryans Road – Underground Storage and Dry Swale

In June 2007, the County hired Johnson, Mirmiran and Thompson (JMT) to develop a preliminary design study report for the Bryans Road Town Common to incorporate stormwater management for the site. On June 11, 2008 JMT presented the final concept to the County Commissioners who agreed to take the project to the Bryans Road Improvement Committee for discussion and proceed with land acquisition and engineering. The project proposes to treat approximately 9+ acres of untreated impervious surface and also serve as a Bryans Road Town Square to help revitalize the town center and attract new mixed use development. In July 2009 the engineering of the Bryans Road Town Common was awarded to Vista Design, Inc. The owner of the property did not allow soil borings during the County's acquisition process, which delayed the engineering until June 2010, when the property was finally acquired. The engineering under permit VCI 090078 was completed in late 2011.

The Bryans Road Town Common includes underground detention pond for treating runoff from the shopping center parking area, and a dry swale along Matthews Road that treats the roadway and a portion of the rooftop of the shopping center. Additional features include landscape islands to delineate traffic lanes through the parking area, pedestrian linkages (including a bridge) from senior housing to nearby restaurants, and new underground drainage infrastructure to the facility. In June 2012 the construction of Bryans Road NPDES project was bid under RFP 12-15 and in August 2012 was awarded to Sandy Excavating, Inc. Construction began in the fall of 2012 and completed in October 2013. Photos of the construction can be found in the 2012 NPDES Annual Report. Photos of the completed project are in the 2013 NPDES Annual Report. In August 2014 educational signage about how the project functions to clean the stormwater was installed at the park entrance. A full layout of the sign can be found in Section III.E.5 of this report.



Bryans Road Educational Sign

Potomac Heights Community – Dry Swales, Check Dams, and Wet Pond

Potomac Heights is a 126 acre site in the County's Development District along the Potomac River just north of the Town of Indian Head. The community is owned by the Potomac Heights Mutual Homeowner's Association (HOA) with no individual home lots. The community was constructed long before codes regulating stormwater were in place. The existing stormwater treatment and drainage system includes improperly placed and non-standard structures, under-sized pipes, lack of appropriate cover, flat or negligible slopes and no means for treating stormwater runoff for quality. In many areas stormwater runoff from the roadways is directed towards homes causing flooding and property damage.

The project includes road improvements, swales, pipes and stormwater facilities to address the flooding problems and water quality management for 26.7 acres of untreated impervious surface. The HOA is primarily interested in drainage improvements, however the County offered to fund any water quality improvements that could be achieved through the proposed drainage improvements.

The project was submitted to the County for permit review in August 2009 under VR 090077. The project has recently received all applicable permits and is scheduled for construction under permit VR 090077. The County's proposed cost share for water quality improvements is \$720,645. This is proposed to be funded through the NPDES program at an average of \$26,990 per treated acre. In December 2013 the County agreed to cost share the stormwater restoration improvements to ensure impervious surface credit towards the NPDES permit requirements. This agreement is recorded in Liber 8432 Folio 314. A copy of this is in Appendix J.

In 2012 the applicant applied for a new permit for the improvements under VR 120095. The project was issued a permit on August 19, 2014.

Bannister, Fox Run, Lancaster, Northwood, Ryon Woods and White Plains

The RFP 11-09 for design and engineering of watershed restoration projects was issued for response in January 2011. The County received 17 bids and selected Vista Design, Inc. The project consists of field and research reconnaissance of site-specific data, conceptual, preliminary, semi-final, and final design phases. Public information meetings with stakeholders and coordination with property owners of the four affected neighborhoods and or locations to solicit input and address concerns took place during Fiscal Year 2013. The conceptual projects for each community proposed to address 54.6 acres of untreated impervious area, however as described below the acreage has been revised based on engineering plans.

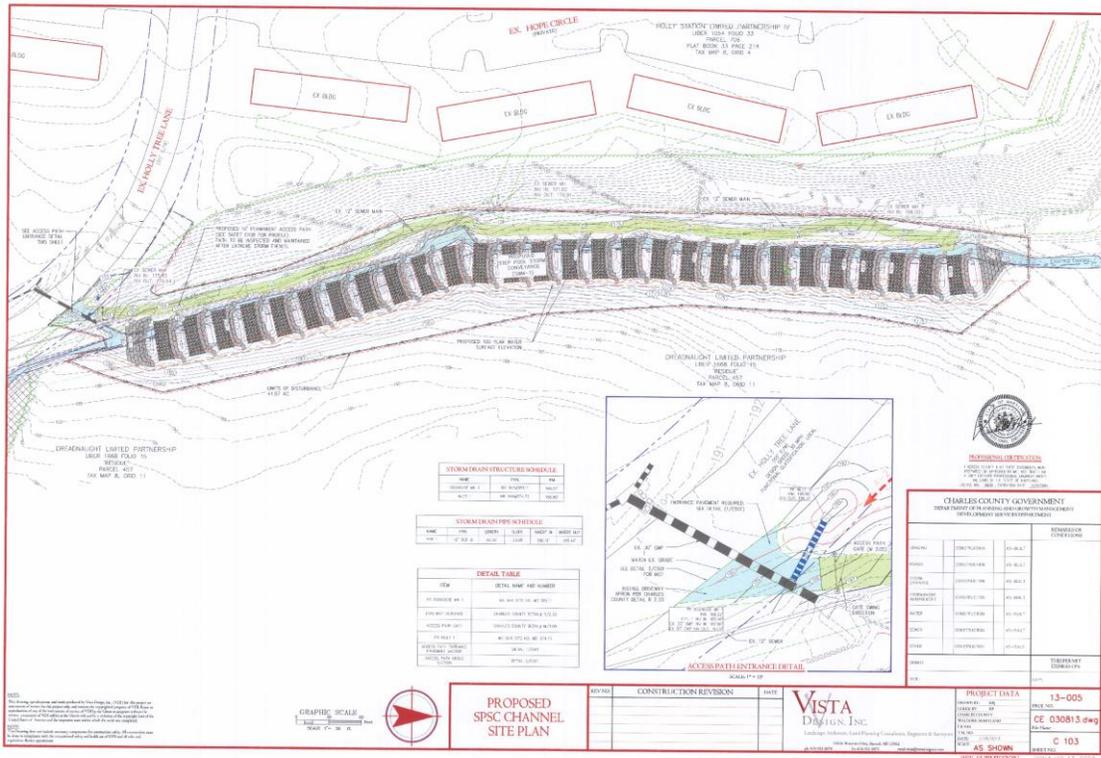
Projects included in RFP 11-09:

Community	Project Type	Treated Impervious Area
Bannister	Retention Pond	6.3(On hold, not currently feasible)
Fox Run	Outfall Stabilization, Channel Restoration	9.5
Lancaster	Channel Restoration	12.5(On hold, not currently feasible)
Holly Tree Lane (a.k.a. Northwood)	Channel Restoration portion only (Retention Pond, Infiltration, Bioretention on hold)	48 (Revised from 12.3 acres)
Ryon Woods	Channel Restoration, Infiltration	1 (Revised from 4.7 acres)
White Plains	Infiltration/Shallow Wetland	5 (Revised from 9.4 acres)

As design began, it was determined Bannister and Lancaster were not currently feasible and put on hold. The other projects began the design process under the following permits: Fox Run VCI 110102; Ryon Woods VCI 110099; and White Plains VCI 120067. Northwood had previously been a stream restoration project designed and permitted under VCI 080068 by AB Consulting, Inc. associated with a County road project. However it was determined that redesigning this project into a regenerative step pool storm conveyance system would provide additional acres of water quality treatment, thus the project evolved into two separate projects: the redesign of the stream restoration permitted under Holly Tree Lane VCI 130058, with a separate design for stormwater retention pond, bioretention, and water quality swale. Two bids were received in November 2012 for the Holly Tree Lane regenerative step pool storm conveyance, which was awarded to Vista Design, Inc. early in 2013. Proposals for the additional best management practices will be sought at a later date.

Holly Tree Lane (a.k.a. Northwood) - Regenerative Step Pool Conveyance System

The NPDES project, permitted under VCI 130058, is designed to treat over 48 acres of untreated impervious area from Route 301 to Holly Tree Lane, via step pool storm conveyance stream restoration. In 2013 the drawings were 95% complete, with Charles Soil Conservation District approval and an MDE permit. There is a small list of easements required before this project can be constructed, and the County is working with the Homeowner’s Association. Following is a graphic of the project.



Holly Tree Lane Step Pool Storm Conveyance System

Fox Run – Step Pool Storm Conveyance System

Fox Run NPDES project was issued a construction permit under VCI 110102 on April 24, 2014. The project was designed to treat over 9 acres of untreated impervious area in the neighborhood of Fox Run. This project also improves issues with the outfall pipe and severe erosion at the outfall channel. The project has been designed as a step pool storm conveyance system. No right-of-way is needed, since the County owns the property. In April 2013 the Charles County Commissioners recorded a 15.68 acre Forest Conservation easement over the existing forest on the property to establish a Forest Conservation Bank.

The step pool project was publicized under Invitation to Bidders (ITB) 13-24 in May 2013. A contract was awarded to Reliable Contracting in the amount of \$823,015. Notice to Proceed was issued on September 10, 2013 and by October 2014 the project is near completion pending installation of the landscape items. A graphic of the step pool storm conveyance system is in the 2013 NPDES Annual Report. Following are photos of the project when it was first identified, after temporary restoration, and after final step pool implementation in 2014.



Fox Run (Outfall #179) in 2007, prior to repair



Fox Run (Outfall #179) in 2007 looking downstream, prior to repair



Fox Run (Outfall #179) after temporary repair in 2007



Fox Run (Outfall #179) Step Pool Conveyance System, before Landscaping in 2014



Fox Run (Outfall #179) Step Pool Conveyance System before Landscaping in 2014

Ryon Woods – Grass Swales, Level Spreader, and Check Dams

Ryon Woods NPDES project VCI 110099 was designed to treat over 1 acre of untreated impervious area and also correct serious drainage issues for the neighborhood of Ryon Woods. The project consists of two separate grass swales with check dams designed for water quality. In addition, drainage was redirected from homeowners' yards. Right of way acquisitions were completed early in 2013. In September 2013, a purchase order was awarded to Macia Construction in the amount of \$23,550 to construct the project. The project was completed in Fall 2013. Below are photos of the completed project in 2014.



Ryon Woods Outfall and Level Spreader at Start of Grass Swale in 2014



Ryon Woods Grass Swale with Check Dam in 2014

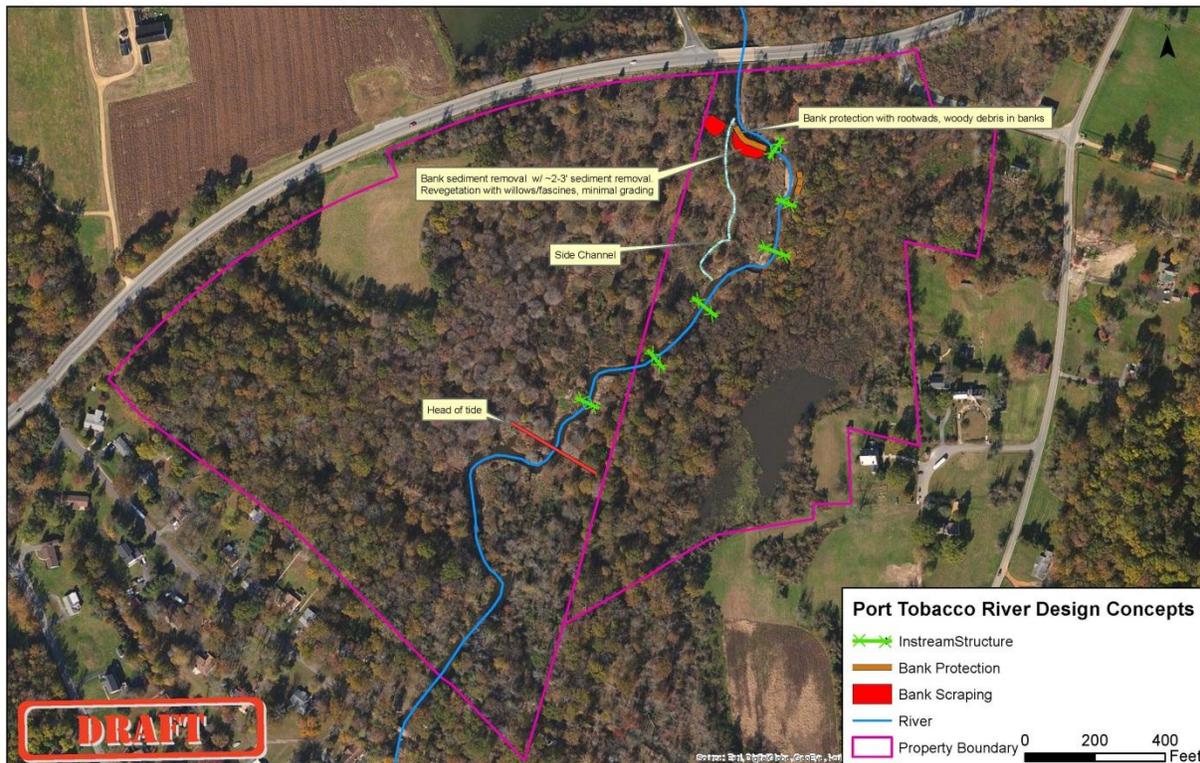


Ryon Woods Outfall and Level Spreader at Start of Grass Swale in 2014

and causes of stream instability causing property loss; (2) determine the causes of flooding and the extent and depth, and; (3) develop alternatives and an improvement plan to correct stream instability and eliminate flooding during the 10-year storm event. In July 2011, the County issued RFP 12-13 for construction of the project under permit VCI 100093. During this process it was determined that the cause of flooding could not be corrected, and the Maryland Department of the Environment would not permit any disturbance in the stream corridor. The final project consists of outfall improvements, inlet improvements, and additional culverts, with minimal disturbance to the stream. Staff continues to pursue this project in terms of a potential stormwater quality project downstream, below an existing stormwater pond.

Port Tobacco - Stream Restoration

In 2014 Charles County partnered with the Port Tobacco River Conservancy to have LimnoTech apply for a National Fish and Wildlife Foundation Chesapeake Bay Stewardship Technical Assistance grant for the design, engineering and permitting of restoration of the Port Tobacco River just below the Port Tobacco Road bridge. This grant was awarded in June 2014, and surveying began in August 2014. A full description of the project is part of the grant application which is in Appendix P.



Port Tobacco Stream Restoration Design Concepts – 2014

Tenth District Fire Department – Redevelopment Exceeding the Stormwater Regulations

This project is permitted under VC 140006, and is a redevelopment project requiring management of 50% of the stormwater runoff, however management of the full 100% was provided. This additional non-regulatory stormwater management is counted towards the restoration goals of the County.

Benedict Point – Shoreline Erosion Control, Tree Planting, and Bioretention

In 2014, the County began evaluating stormwater restoration for the Benedict Point property to determine the needs and cost effective restoration opportunities.

County Road Projects

Acton Lane - As the County improves or expands existing roads there is the opportunity to treat existing untreated impervious surface. In Fall 2014 the Acton Lane Phase 3 sediment basin, located at the end of Tred Avon Court, was successfully converted to a stormwater management facility under permit VCI 040021, effectively treating 8 impervious acres. A picture of the completed pond follows.



Acton Lane Wet Pond in 2014

Stavors Road - In November 2012, engineering of Stavors Road is at 100% completion under permit VCI 110060. The proposed facilities are estimated to cost of \$200,000 and provide stormwater management for 4 acres of untreated impervious area. However, this project requires extensive easements to proceed to construction.

Billingsley Road - The County is pursuing a concept on Billingsley Road south of Carrington.

Old Washington Road - In Fall of 2014 the County issued a request for proposals (RFP) for the design of the County’s first green street. RFP 15-16 is titled, “Waldorf Urban Redevelopment Corridor Infrastructure Improvements Study,” and is for the upgrade of the Old Washington Road corridor. This area was rezoned in recent years to accommodate a transit oriented, mixed-use, walkable urban center in Waldorf. As part of this 300 acre redevelopment, the study will include a Stormwater Master Plan to determine the feasibility of incorporating and maximizing stormwater management from the study area in the design of Old Washington Road as a green street. For more details on the Stormwater Master Plan, see the Special Provisions of the Scope of Work in Appendix J.

Following is a graphic of the study area:

Waldorf Urban Redevelopment Corridor Infrastructure Improvements Study

RFP#15-16

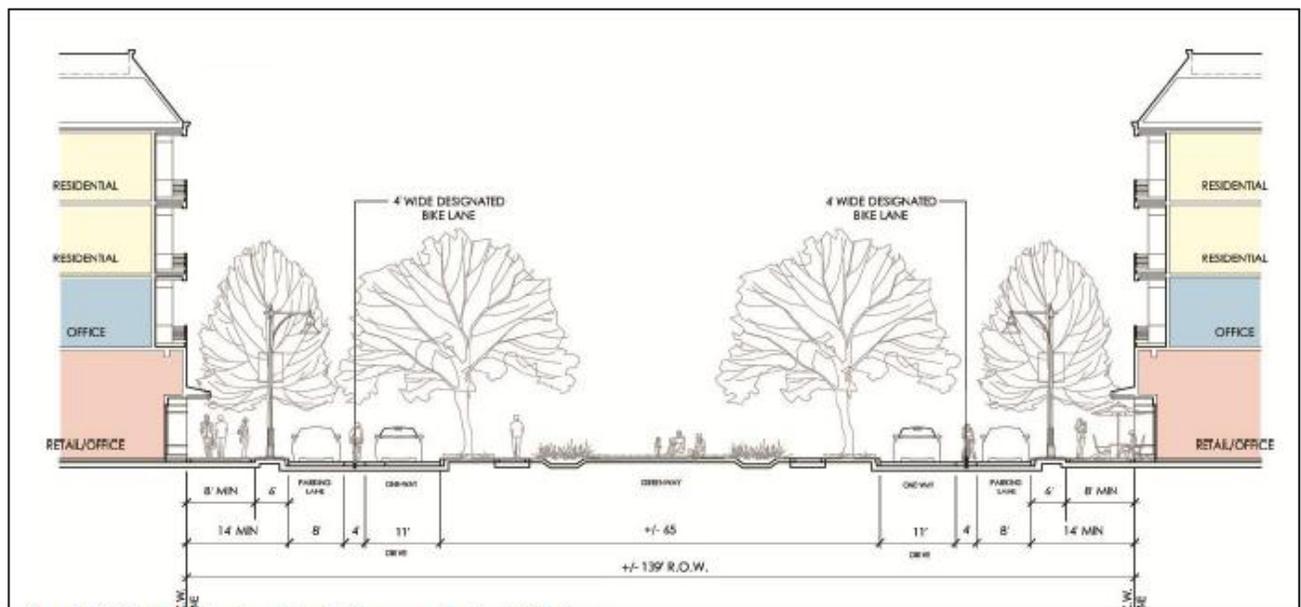


Figure 7.1. Waldorf Urban Local Road: One-way road along Civic Green.

Source: Downtown Waldorf Vision Plan & Design Guidelines, 2010.

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Table 23: Watershed Restoration Projects in Development District (Bold indicates final numbers, and italics indicate estimates.)

	Description	Design	Right-of-Way & Construction	Acres Treated (proposed)	Acres Treated (complete)	Balance (acres)
10% of Untreated Impervious Surface						286
FY06-FY07	Carrington	126,675				
FY08-FY09	Carrington		1,502,277		45	241
FY10-FY11	Bryans Road	64,110				
	Pinefield	214,490				
	Acton-Hamilton Bioswales (not feasible)	96,860				
FY12-FY13	Bannister (not feasible)	281,860				
	Fox Run					
	Lancaster (not feasible)					
	Holly Tree Lane					
	Ryon Woods					
	White Plains					
	Bryans Road		1,302,005		10.22	230.78
	Pinefield – Pond Retrofit		632,269		22.3	208.48
	Pinefield – Temi Drive	52,200				
	Acton-Hamilton – Submerged Gravel Wetland	86,000				
	Stavors Road Improvements	5,000				
FY14-FY15	Fox Run		823,015		9.5	198.98
	Ryon Woods		30,000		1.5	197.48
	Acton Lane Roadway		250,000		8	189.48
	Potomac Heights		720,645	26		<i>163.48</i>
	Holly Tree Lane		<i>1,800,000</i>	48		<i>115.48</i>
	White Plains		<i>450,000</i>	6		<i>109.48</i>
	Stavors Road Improvements		<i>200,000</i>	4		<i>105.48</i>
	Pinefield – Temi Drive		<i>510,000</i>	18		<i>87.48</i>
	Acton-Hamilton – Submerged Gravel Wetland		<i>1,200,000</i>	40		<i>47.48</i>
	Tanglewood	<i>80,000</i>	<i>1,200,000</i>	21		<i>26.48</i>
	Charles County Plaza	<i>32,150</i>				
	Post Office Lake	<i>6,250</i>				
	Wakefield Lake	<i>6,000</i>				
	Melwood	<i>10,300</i>				
Old Washington Road	<i>160,000</i>					
FY16-FY17	Charles County Plaza		<i>850,000</i>	2		<i>24.48</i>
	Post Office Lake		<i>200,000</i>	155		<i>-130.52</i>
	Wakefield Lake		<i>400,000</i>	89		<i>-219.52</i>
	Melwood		<i>200,000</i>	4		<i>-223.52</i>

*Table 24: Watershed Restoration Projects Outside of Development District
(Bold indicates final numbers, and italics indicate estimates.)*

	Description	Design	Right-of-Way & Construction	Acres Treated (proposed)	Acres Treated (complete)	Total
FY14-FY15	Port Tobacco Stream Restoration	55,000*				
	Benedict Point Shoreline Erosion Control	8,515				
	Department of Public Works Campus Stormwater Retrofit	19,980				
	Tenth District Fire Dept.		<i>86,000</i>	<i>2.8</i>		<i>TBD</i>
FY16-FY17	Port Tobacco Stream Restoration		<i>TBD</i>	<i>TBD</i>		<i>TBD</i>
	Benedict Point Shoreline Erosion Control		<i>3,000,000</i>	<i>123</i>		<i>TBD</i>
	Department of Public Works Campus Stormwater Retrofit		<i>735,000</i>	<i>29.5</i>		<i>TBD</i>

*Grant funding of \$40,000 from National Fish and Wildlife Foundation Chesapeake Bay Stewardship Fund and \$15,000 County funds for Design services.

Table 25: Watershed Restoration Projects In Permitting and Construction Phases

Project	Type of BMP	Drainage Area	Impervious Area	Impervious Area Treated (%)	Impervious Area Treated (ac.)
Pinefield – Temi Drive VCI 130063	Submerged Gravel Wetland	47.82	18.17	75	13.62
Holly Tree Lane (a.k.a. Northwood) VCI 130058	Regenerative Step Pool Conveyance	106.6	49.22	100 (However, 20.92 ac. already treated)	49.22 (28.3 new)
Acton-Hamilton VCI 120088	Submerged Gravel Wetland	393	91.34	40	36.8
White Plains VCI 120067	Submerged Gravel Wetland	192.5	45.4	12.8	5.8
Stavors Roads Improvements VCI 110060	Infiltration Pond	11.6	3.9	100	3.9
Tanglewood Drive VCI 080068	Regenerative Step Pool Conveyance	51.4	31	14	4
Potomac Heights VR 120095	Dry Swales, Check Dams and Wet Pond	77	26	100	26
Tenth District Fire Dept. VC 140006	Submerged Gravel Wetland, Grass Channel	5	2.62	107	2.8

Table 26: Completed Watershed Restoration Projects in Development District through 2014

Project	Type of BMP	Drainage Area (ac.)	Impervious Area (ac.)	Impervious Area Treated (%)	Impervious Area Treated (ac.)
Gustavus Brown Elementary School Wetland VCI 060034	Shallow Marsh	75.5	25.33	100	25
Arthur Middleton Elementary School Wetland VCI 060035	Shallow Marsh	36.4	13.1	92	12
Arthur Middleton Elementary School Weir VCI 060035	Existing Channel	60.5	18.1	24	5
Fillmore Road Weir VCI 060036	Existing Channel	33.7	10.1	27.8	3
Bryans Road VCI 090078	Storm Filter, Filterra, Dry Swales	18.6	10.22	100	10.22
Pinefield VCI 090111	Wetpond Expansion	51	22.3	100	22.3
Ryon Woods VCI 110099	Grass Swale and Level Spreader	4.7	1.5	100	1.5
Acton Lane Roadway VCI 040021	Wet Pond	32.51	17.39	46	8
Fox Run VCI 110102	Regenerative Step Pool Conveyance	23.1	9.5	100	9.5
Total					96.52

III.G. Program Funding

Overview of Permit Conditions

1. *Annually, Charles County shall submit a fiscal analysis of the capital, operation, and maintenance expenditures necessary to comply with all conditions of this permit.*
2. *Charles County shall maintain adequate program funding to comply with all conditions of this permit.*

2014 Status

Funding Sources

In June 2013, Charles County adopted legislation (Bill 2013-11), establishing the County’s Watershed Protection and Restoration Program and associated Stormwater Remediation Fee. This program is now Chapter 275 of the Charles County Code. The Stormwater Remediation Fee replaces the portion of the Environmental Service Fee, which was previously allocated to the NPDES Stormwater Permit Program. As detailed below, the Stormwater Remediation Fee continues to be part of a two-pronged funding approach in order to ensure that adequate funds are available for carrying out permit program conditions.

1. Charles County Environmental Service Fund (ESF) and Watershed Protection and Restoration Fund (WPRF): In 1997 the County adopted a \$2.00 increase to its existing annual ESF fee for all improved properties county-wide, including in the towns, and allocated the increase to the NPDES Stormwater Permit budget. The chart below shows the increase in this allocation from 1998 through 2013. In Fiscal Year 2014, the NPDES Stormwater allocation from the ESF fund was stopped, and replaced by the WPRF, which charges a flat Stormwater Remediation Fee to all improved properties county-wide, except towns which assess their own fees, and otherwise exempt properties.

Fiscal Year	1998-2007	2008	2009	2010	2011	2012	2013	2014
ESF NPDES Allocation	\$2	\$4	\$5	\$6	\$8	\$12	\$14	\$0

Fiscal Year	2014	2015
WPRF Stormwater Remediation Fee	\$43	\$43

2. Recordation Fee: In 1997 the County also implemented a NPDES per lot recordation fee of \$81.25 per lot, for all new lots recorded in the Development District. Due to the variation in the number of lots recorded per year the amount collected fluctuates annually.

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Fiscal Year	1998-2000	2001-2004	2005-2008	2009-2012	2013-2014	2015
NPDES Lot Recordation Fee (RF)	\$81.25	\$84.50	\$87	\$117	\$121	\$127

Fiscal Year 2013

Table 27 below contains a description of the revenue and expenses to the Environmental Service Fund, NPDES Stormwater permit dedicated program.

Table 27: Dedicated NPDES Stormwater Permit Program Funding- Fiscal Years 2007 to 2013

Fiscal Year	2007	2008	2009	2010	2011	2012	2013
Adopted Budget:	163,800	263,600	305,400	361,500	458,300	698,400	998,200
Revenue:							
Collected ESF	88,989	181,787	230,212	278,528	375,789	613,290	727,671
Collected RF	84,748	54,246	33,705	35,928	80,847	83,187	76,956
Total	173,738	236,033	263,917	314,456	456,636	696,477	804,627
Expenditures:							
Salary & Fringe	0	0	0	0*	49,560	102,358	267,352
Operating	149,906	109,246	184,198	180,315	167,183	143,604	291,817
Debt Service	25,666	109,463	120,633	182,855	217,865	262,258	327,851
Adjustment						(109)	
Total	175,571	218,709	304,831	363,170	434,608	508,112	887,019
Operating Inc/Loss	(1,834)	17,324	(40,914)	(48,714)	22,028	188,366	(82,393)
Fund Balance:							
Beginning:	155,765	153,932	171,255	130,341	205,752	227,781	416,146
Ending:	153,932	171,255	130,341	81,627	227,781	416,146	333,754

*Salary & Fringe from general ESF. (ESF-Environmental Service Fee, RF-Recordation Fee)

Consultant expenses from the operating budget include KCI Technologies, Inc.(NPDES consultant), LimnoTech (Watershed Implementation Plan consultant), AquaLaw (legal consultant), Spatial Systems Associates, Inc. (GIS consultant), and the County's partnership agreement with USGS to perform water quality monitoring of the Mattawoman Creek.

For Fiscal Years 2010 and 2011, 50% of one planner salary and fringe was funded by the Environmental Service Fund. In Fiscal Year 2012, 50% of one resource manager salary and fringe was added. Beginning in Fiscal Year 2013, the Department of Planning and Growth Management funded: 80% of one planner, 50% of two stormwater engineers, 30% of one administrative stormwater staff, and 50% of a resource manager by the dedicated funding. This is reflected in Table 27 above.

Fiscal Years 2014 and 2015

As discussed above the NPDES program is funded by the Watershed Protection and Restoration Fund. The Charles County Commissioners adopted the fund to begin in Fiscal Year 2014. A full discussion of the adoption process and the adopted legislation is included in the 2013 NPDES Annual Report.

The Watershed Protection and Restoration Fund supports applicable programs from two County Departments: Planning and Growth Management, and Public Works. In Table 28 below, is an overview of the total fund. The adopted legislation is included in the 2013 NPDES Annual Report. The full FY15 WPRF operating budget is included in Appendix K, and the FY15 ESF operating budget reflected in Table 29 is in Appendix L.

Table 28: WPRF Budget - Fiscal Years 2014 and 2015

	FY 2014 Unaudited	FY 2015 Estimated
Budget:	2,133,000	2,168,800
Revenue:		
Stormwater Remediation Fee	2,097,368	2,116,100
Lot Recordation Fee	53,272	50,000
Miscellaneous	7,282	2,700
Total Operating Revenues	2,158,061	2,168,800
Expenditures:		
Salary & Fringe	186,641	316,800
Operating	690,947	1,165,800
Capital Project Transfer	182,000	60,000
Debt Service	531,066	626,200
Balance:	567,406	0
Reserve carryover from ESF Fund	335,484	0
Ending Fund Balance	902,890	902,890

Table 29: ESF Adopted Budget Carryover – Fiscal Years 2014 through 2015

	FY 2014	FY 2015
Septic Pump-Out Reimbursement Budget:	100,000	50,000
Mid-Year Amendments	0	
Expenditures:	2,895*	

*This funding was used for research & discovery in establishing baseline knowledge of septic maintenance within the County.

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Several full time and contractual positions are funded by the WPRF as shown on the table below.

Table 30: Positions Funded by the WPRF

Department-Division	Position	Fiscal Year 2014	Fiscal Year 2015
PGM- CPIS	Engineer I-IV	0.5	0.5
PGM- CPIS	Contractual Inspector	1.0	1.5
PGM- Planning	Planner IV	0.0	0.3
PGM- Planning	Planner I-III	1.8	1.8
DPW- Environmental	Environmental Compliance Officer	1.0	1.0

Capital Improvement Projects Budgets

Funding necessary to implement the Watershed Restoration requirement of the permit is provided through the County’s Capital Improvements Program (CIP) budget. This funding was originally approved to begin in Fiscal Year 2003 at the rate of \$200,000 per year for a five year period totaling \$1 million, and was to cover permit retrofit requirements of the County’s first NPDES MS4 permit. Shortly after this approval, the County was issued a new NPDES MS4 permit which increased the retrofit requirements and identified the requirements as Watershed Restoration. In November 2004 the County Commissioners reviewed and supported the Charles County Watershed Restoration Study and the projects needed to meet the new permit requirements. Subsequently, the County Commissioners increased the Fiscal Years 2006 - 2011 CIP budget to \$7.69 and the Fiscal Years 2010 – 2014 budget to \$12.04 million to implement the proposed projects.

In February 2004 the County began issuing bonds for the NPDES Retrofits Projects (CIP) budget. In March 2007 construction was initiated on the County's first watershed restoration projects, which is reflected by the increased expenditures shown in the table below. In Fiscal Year 2011 the County funded a \$25,000 watershed restoration study from the NPDES CIP budget. This study is to identify additional watershed restoration projects for construction. In Fiscal Year 2012, the County funded \$455,540 to expand GIS mapping of the County’s stormwater infrastructure. All of the projects are listed in Table 32 below. See Appendix M for FY15 WPRF capital budget.

Table 31: NPDES Capital Improvements Program Expenditures through Fiscal Year 2014

BONDS ISSUED TO DATE	Issued	Spent	Balance
2004 Public Improvement Bond	40,000	40,000	0
2006 Public Improvement Bond	100,000	100,000	0
2007 Public Improvement Bond	1,000,000	1,000,000	0
2008 Public Improvement Bond	400,000	400,000	0
2009 Public Improvement Bond	471,800	471,800	0
2010 Public Improvement Bond	500,000	500,000	0
2011 Public Improvement Bond	1,400,000	1,400,000	0
2012 Public Improvement Bond	700,000	696,744	3,256
2013 Public Improvement Bond	1,700,000	1,585,627	114,373
TOTAL	6,311,800	6,194,171	117,629

Table 32: Fiscal Year 2014 Capital Improvement Program for NPDES Retrofits

CIP for NPDES Retrofits	Budget	Spent	Balance
Carrington (8014)	1,867,230	1,867,219	complete
Pinefield (8023)	1,219,630	1,046,325	173,305
Acton/Hamilton (8024)	325,720	310,288	15,432
Bryan's Road (8025)	2,009,810	1,851,954	157,856
NPDES Study (8028)	24,740	24,738	complete
Fox Run (8030)	1,091,710	573,281	518,429
Lancaster (8031)	85,360	72,697	12,663
Northwood (8032)	28,830	28,830	complete
Ryon Woods (8033)	122,540	120,129	2,411
White Plains Retrofits (8034)	152,050	149,485	2,565
NPDES Mapping (8035)	513,800	336,398	177,402
GIS Mapping (8036)	455,540	454,678	862
Pinefield Temi Drive (8037)	641,800	95,487	546,313
Holly Tree Lane Stream Restoration (8038)	59,300	57,432	1,868
Stavors Road (8039)	292,500	50	292,450
Acton Lane (8040)	318,300	1,715	316,585
Cobb Island Drainage Study (8043)	60,000	0	60,000
White Plains Improvements (8045)	536,700	0	536,700
Potomac Heights (8046)	839,550	0	839,550
Master Drainage Plan (8047)	182,000	20,583	161,417
Feasibility & Concept Design (8048)	237,000	13,050	223,950
TBD (8019)	14,427,890	11,553	14,416,337
TOTAL	25,492,000	7,035,893	18,456,093

Table 33: Capital Improvements Program Appropriation per Fiscal Year

CIP Appropriation per Year		CIP Appropriation per Year	
FY03	214,000	FY10	2,409,000
FY04	220,000	FY11	2,409,000
FY05	224,000	FY12	1,505,000
FY06	72,000	FY13	5,657,000
FY07	778,000	FY14	5,290,000
FY08	1,452,000	FY15	3,135,000
FY09	2,127,000		

III.H. Assessment of Controls

Overview of Permit Conditions

1. *Annually, Charles County shall submit estimates of expected pollutant load reductions as a result of its proposed management programs.*

2014 Status

One key component of Charles County’s pollution reduction program is the identification of current pollution loads. This enables the County to identify current trends in water quality within receiving waters and evaluate the success of the overall NPDES Stormwater Permit Program. The pollutant loading estimate is prepared annually and is determined based on two factors: loads produced from current land uses within the County and reductions from existing stormwater controls.

Beginning late in 2011 through 2012, the County began work on a local evaluation of the Chesapeake Bay Phase II Watershed Implementation Plan (WIP), for the purposes of determining the necessary stormwater controls, also known as urban best management practices (bmps), to achieve the target loads. Part of this work involved using Maryland’s Assessment Scenario Tool (MAST). More discussion of this project is included under Section IV. Special Programmatic Conditions.

It was determined urban nutrient loading rates from MAST were lower than the County’s previous estimates, and the urban sediment loading rates from MAST were higher than the County’s previous estimates. Loads were calculated to edge of stream (EOS), not delivered to the Bay.

	Nitrogen, EOS Lbs/yr	Phosphorus, EOS Lbs/yr	Sediment, EOS Lbs/yr
MAST (urban regulated and non-regulated, impervious and pervious)	246,166.30	25,958.40	6,677,150.30

Because of the work related to the County’s Phase II WIP, the pollutant loading rates were not updated using previous years’ methods, and instead efforts focused on coordinating the County’s Phase II WIP and NPDES Stormwater permit data to develop a single baseline for nutrients and sediment.

Some of the pollutant loading calculations will still be based on assumptions, until final mapping of urban bmps and their drainage areas is completed. This will allow land use and bmp types to be verified. Additionally, compilation of additional bmps not previously counted is occurring. This includes Environmental Site Design (ESD) bmps, single family dwelling bmps, and alternative bmps, such as street sweeping and inlet vacuuming. Following is a discussion of how pollutant loading estimates have been done in previously, however these estimates are being revised to be consistent with the Phase II WIP.

Pollutant Load Calculations in 2011

In the County's 2011 NPDES Annual Report, the pollutant loading rates were updated from the 2010 calculations based off of several methods and sources. Loading rates for residential and institutional land uses continued to be based off of chemical monitoring results from the Arthur Middleton Elementary School sampling stations. Loading rates for total nitrogen, total phosphorus, and total suspended solids were taken from Chesapeake Bay Program literature in lbs/acre/year, for all other land use categories, except "extractive" and "agricultural buildings", which were developed from the PLOAD manual. Loading rates for biological oxygen demand and lead for commercial, industrial, and transportation land uses were unchanged from 2010, and were taken from the Maryland Department of the Environment's published monitoring results from 1997. Loading rates for the remaining constituents were taken from the National Stormwater Quality Database (2004).

Loading rates for residential and institutional land uses were calculated from sampling event mean concentrations (EMCs) using the Simple Method, which integrates drainage areas, land use, pollutant concentrations, and types of BMPs to determine annual loading and load reductions for each watershed or drainage area. It uses the following parameters:

- Rainfall, P, is the average long-term annual rainfall amount of 39 inches
- Land use coverage for the 2011 estimate was determined from the 2007 Maryland Department of Planning coverage
- Drainage area, A, is based on the coverage of each land use coverage within the County boundary
- Event mean concentrations (EMCs)

Pollutant loads are calculated using A, R_v, and the pollutant concentration, C, which is the Event Mean Concentration (EMC) for a particular pollutant. Because removal efficiencies for nitrogen removal are only reported for TN, the loads have been reported similarly, using the relationship TN = TKN + NO_x. EMCs are shown in Table 34.

The expected pollutant load computations use chemical monitoring data developed by Charles County as part of the monitoring component of the NPDES MS4 permit. The watershed currently being chemically monitored consists primarily of residential and institutional drainage. Therefore, the event mean concentrations (EMCs) developed as part of the monitoring program are used as pollutant loading rates for the residential and institutional land uses throughout the County.

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Table 34: EMC Data (mg/l)

Land Use	LU Code	TN	TKN	NO3+ NO2	TP	TSS	BOD	Cu	Zn	Pb
Low Density Residential	11	4.21	2.46	1.75	0.42	79.26	25.6	0.02	0.12	0.02
Medium Density Res'l	12	4.21	2.46	1.75	0.42	79.26	25.6	0.02	0.12	0.02
High Density Residential	13	4.21	2.46	1.75	0.42	79.26	25.6	0.02	0.12	0.02
Institutional	16	4.21	2.46	1.75	0.42	79.26	25.6	0.02	0.12	0.02

Spreadsheets showing the pollutant load results are attached as Appendix K of the 2011 NPDES Annual Report, and a summary is shown in Table 35 below.

Table 35: Estimates of Pollutant Loading (lb/yr)

	TN	TP	TSS	BOD	Cu	Zn	Pb
Entire County FY 2011***	2,708,902	1,817,089	22,707	1,817,089	2,639	31,151	3,731
Entire County FY 2010**	487,937	73,413	11,712,911	2,115,516	1,705	15,278	2,204
Entire County FY 2009	427,474	71,437	10,344,933	1,770,138	1,395	12,718	1,821
Entire County FY 2008*	429,412	72,216	10,694,197	1,876,824	1,396	11,437	1,206
Entire County FY 2007	429,412	72,216	10,694,197	1,876,824	1,396	11,437	1,206
Entire County FY 2006	429,205	72,376	11,009,554	1,954,360	1,401	11,414	884
Entire County FY 2005	423,309	72,137	10,893,776	2,061,298	1,338	11,233	908
Entire County FY 2004	398,653	72,963	10,159,796	853,772	1,161	10,769	1,001

*Pollutant loads unchanged from previous reporting year due to no chemical monitoring being performed, and land use data input being unchanged.

**Updated 2007 land use data, generated by the Maryland Department of Planning, was used in FY10 and subsequent years.

***Significant changes to loads result from updates to loading rates in FY11.

As can be seen from Table 35 above, the pollutant loads have increased significantly from the 2010 results. This is a result of the updated loading rates that were used in the model. The pollutant load calculations will continue to be updated as land use information is updated.

The loads presented in Table 35 are those that occur in the storm runoff itself. No attempt was made to estimate pollutants from baseflow or stream erosion outside of what was taken into account by developing the rates. Similarly, the load reductions were not estimated for the volume of runoff which flows to natural wetlands. Wetlands would effectively reduce the pollutants to receiving waters, particularly the Potomac River and the Chesapeake Bay.

Pollutant Load Reductions

Pollutant load reductions resulting from installation of best management practices (BMPs) were calculated by applying the loading rate discussed above to the drainage area to the facility, and multiplying by the pollutant removal efficiency. The pollutant removal efficiencies were developed for BMPs in each category contained in the draft MS4 permits, including: dry detention ponds, hydrodynamic structures, dry extended detention ponds, wet ponds and wetlands, infiltration practices, filtering practices, vegetated open channels, and erosion and sediment control practices.

The pollutant removal efficiencies for each of these categories was taken from the recent MDE publication *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated: Guidance for National Pollutant Discharge Elimination System Stormwater Permits, June 2011* for total nitrogen, total phosphorus, and total suspended solids. Pollutant removal efficiencies for other contaminants were developed from the Center for Watershed Protection (2000) or the International Stormwater BMP Database (2008). Pollutant removal efficiencies used for each BMP category are included in the spreadsheet computations in Appendix K of the 2011 Annual Report.

The BMPs used for the reduction modeling were taken from Charles County's 2011 Urban BMP Database. There were 1,183 BMPs recorded in the database, an increase of 102 facilities over what was used in the calculations in 2010. Not all of the BMPs contained in the database had enough information to be included in the model, such as land use, drainage area, and BMP type. The County is continually refining its data, and as such, the pollutant load reduction computations are improved as more data is available.

Pollutant load reductions were summed for each BMP that had the required data. The total reductions for each contaminant are provided in Appendix K of the 2011 Annual Report and summarized in Table 36 below.

Table 36: County-Wide Pollutant Loading Reductions (Lb/Yr)

		TN	TP	TSS	BOD	Cu	Zn	Pb
		lbs/yr	lbs/yr	tons/yr	lbs/yr	lbs/yr	lbs/yr	lbs/yr
FY 2011	Total Load	2,708,902	284,403	22,707	1,817,089	2,639	31,151	3,731
	Reductions	9,014	2,508	590	0.00	76	814	150
	Percent Reduced	0.3%	0.9%	2.6%	0.0%	2.9%	2.6%	4.0%
FY 2010	Total Load	487,937	73,413	11,712,911	2,115,516	1,705	15,278	2,204
	Reductions	19,881	2,594	1,096,399	0	154	1,598	0
	Percent Reduced	4.1%	3.5%	9.4%	0.0%	9.0%	10.5%	0.0%
FY 2009	Total Load	427,474	71,437	10,344,933	1,770,138	1,395	12,718	1,821
	Reductions	17,982	2,475	992,584	0	152	1,516	0
	Percent Reduced	4.2%	3.5%	9.6%	0.0%	10.9%	11.9%	0.0%
FY 2008	Total Load	429,412	72,216	10,694,197	1,876,824	1,396	11,437	1,206
	Reductions	18,479	2,543	1,039,673	0	151	1,413	0
	Percent Reduced	4.3%	3.5%	9.7%	0.0%	10.8%	12.4%	0.0%
FY 2007	Total Load	429,412	72,216	10,694,197	1,876,824	1,396	11,437	1,206
	Reductions	17,009	2,384	967,809	0	145	1,352	0
	Percent Reduced	4.0%	3.3%	9.0%	0.0%	10.4%	11.8%	0.0%
FY 2006	Total Load	429,205	72,376	11,009,554	1,954,360	1,401	11,414	884
	Reductions	14,286	1,946	817,645	0	126	1,189	0
	Percent Reduced	3.3%	2.7%	7.4%	0.0%	9.0%	10.4%	0.0%
FY 2005	Total Load	423,309	72,137	10,893,776	2,061,298	1,338	11,233	908
	Reductions	3,438	579	190,951	113	20	207	0
	Percent Reduced	0.8%	0.8%	1.8%	0.0%	1.5%	1.8%	0.0%
FY 2004	Total Load	436,758	77,826	10,477,051	1,019,049	1,187	11,290	929
	Reductions	1,682	314	97,703	54	11	114	0
	Percent Reduced	0.4%	0.4%	1.0%	0.0%	1.0%	1.1%	0.0%

IV. Special Programmatic Conditions

Overview of Permit Conditions

...this NPDES permit requires Charles County to assist with the implementation of the strategy designed to meet the nutrient reduction goals of the Lower Potomac River basin. Coordination between and among other jurisdictions is a major requirements and the identification of those appropriate jurisdictions will occur jointly with MDE. Additionally, deadlines, priorities, and scheduling to satisfy specific conditions will be determined in conjunction with MDE. In any case, progress toward meeting these conditions shall be reported to MDE.

2014 Status

NPDES MS4 Permitted Jurisdiction Meetings

The Maryland Department of the Environment hosted quarterly meetings for the NPDES MS4 permitted jurisdictions to provide a network for communication that solves permit issues. These meetings were held through Fiscal Year 2005. During Fiscal Year 2011 a monthly meeting schedule was held in preparation for the Department's guidance document titled, "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated." The first draft came out in June 2011, followed by a final version in August 2014.

In Fiscal Year 2013, MDE hosted a GIS meeting to review a proposed geodatabase design. The phases to improve NPDES reporting and associated data submission process include: new database design, new database intake application and an internal MDE data management application. MDE accepted comments on the draft database design through Fiscal Year 2013. The 2013 NDPEs Annual Report contains a copy of the presentation and the draft NPDES Geodatabase Design VI.2.

State Water Quality Advisory Committee (SWQAC)

The County continues to maintain membership on this committee and the Watershed Restoration subcommittee. The committee continued to focus on the Chesapeake Bay TMDL, and sediment trapped at Conowingo Dam, among other issues.

Maryland Municipal Stormwater Association (MAMSA)

The County Joined MAMSA in Fiscal Year 2014. The committee is a collection of MS4 jurisdictions and private consultants that collaborate on current issues. Reissuing of MS4 permits was a topic of concern as well as TMDL planning, WIP milestones, stormwater program funding among others.

Patuxent River Commission (PRC)

County staff attended PRC meetings to gain insight on how fellow jurisdictions are coping with permit changes. This year the commission developed a new Patuxent Policy Plan. The commission also revised the Annual Action Plan to coincide with the new Policy Plan with increased tangible actions and accountability. The commission is looking forward to addressing major river polluters from wastewater overflows and formed a workgroup to make recommendations on what local jurisdictions can do to reduce risk and enhance communication.

In July 2014 the Charles County Commissioners adopted Resolution 2014-23 in support of the 2015 Patuxent River Policy Plan. A copy of the County's resolution and the Plan is in Appendix P.

US Army Corps of Engineers 2003 Mattawoman Creek Watershed Management Plan

A partnership agreement between the County and the U.S. Army Corps of Engineers was signed in 1998 to calibrate a computer model that would evaluate several "what-if" scenarios analyzing management options to reduce nitrogen, phosphorus, and sediment to the Mattawoman Creek.

In February 2004 the U.S. Army Corps of Engineers presented the Plan to the County Commissioners. Three recommendations were included in the plan: (1) Stream Valley Protection; (2) Best Management Practices for Future Development; and (3) Best Management Practices for Existing Development. In summary the Plan states, "planned development in the Mattawoman Creek watershed should include local and regional efforts for the purpose of creating an economically developed and environmentally protected area. Balancing these seemingly opposing measures was considered when developing the management scenarios."

The Planning Division received a Coastal Community Initiative (CCI) Grant through the Maryland Department of Natural Resources to draft ordinance amendments to implement best management practices for future development. Bill 2008-1 addresses reduced parking, use of pervious parking, conservation landscaping and increased shading over parking areas, and became effective May 17, 2008. In 2008, 2009 and 2010 County staff continued to work on draft zoning text to implement the refined Mattawoman Creek Stream Valley delineation prepared by the Maryland Department of Natural Resources under a Coastal Community Initiative (CCI) Grant.

Port Tobacco River Watershed Restoration Action Strategy Grant (WRAS)

The Charles County Commissioners applied for a Port Tobacco River Watershed Restoration Action Strategy (WRAS) Grant through the Maryland Department of the Environment (MDE), which was approved in the Fall of 2004 and continued through 2006. The main focus of the WRAS is to identify and prioritize water quality improvement opportunities to meet the Port Tobacco River

Watershed nutrient TMDL and reduce bacteria levels to ranges that are safe for recreational uses in the River.

In the first year of the WRAS grant, the State agencies provided water quality analysis, a stream corridor assessment, a biological stream survey and a watershed characterization report.

Stakeholders which participated on the WRAS Steering Committee, include the Town of LaPlata, the College of Southern Maryland, the Charles County Chamber of Commerce, the Port Tobacco River Conservancy, the Charles County Health Department, the Charles Soil Conservation District, the Maryland Extension Service, and the Southern Maryland Resource Conservation and Development Office.

On June 20, 2006 the County Commissioners adopted the WRAS for implementation. In August 2008, the La Plata Town Council adopted the WRAS for implementation. The full WRAS can be linked to from the County's new watershed planning webpage at:

<http://www.charlescountymd.gov/pgm/planning/watershed-planning>

To implement the WRAS, Charles County has been working under five grants/partnerships. These include: (1) The Bay Restoration Fund to install nitrogen removal septic targeted in the watershed FY2007-present; (2) DNR Coastal Communities Initiative grant to develop a commercial component to the County's existing residential transfer of development rights program in FY2009; (3) National Fish and Wildlife Foundation Chesapeake Small Watershed grant to revise the County's stormwater management code and to better implement best management practices on new development in FY2008-FY2010; (4) USGS partnership agreement titled, "Surface-Water and Pore-Water Sampling in Port Tobacco River Watershed, Charles County, MD," for the purpose of better identifying the contaminant source using wastewater compounds in FY2009. The USGS abstract for this project and Open File Report are on <http://pubs.usgs.gov/of/2010/1071/>; and (5) National Fish and Wildlife Foundation Chesapeake Bay Stewardship Fund grant to engineer and permit the Port Tobacco Stream Restoration project in FY 2014-FY2015. A discussion of this project is included in Section III F of this report, and the grant application is included in Appendix P.

In August 2008, Charles County Government partnered with the Town of La Plata, the Charles Soil Conservation District and the Port Tobacco River Conservancy to apply for a \$3.7 million Local Implementation Grant (LIG) through the Maryland Department of Natural Resources. This proposal is to restore water quality in the La Plata Subwatershed using stormwater retrofits, septic connections, stream restoration, and agricultural best management practices. The project was not awarded funding.

The Fiscal Year 2013 County approved CIP projects include a project from the Port Tobacco River Watershed Restoration Action Strategy: (1) Upper Port Tobacco River Watershed Sewer Connection Study to be funded in Fiscal Year 2014. See Appendix P for the approved capital budget.

Mattawoman Creek Monitoring Station

In July 2014, the County began its twelfth year of a water quality monitoring project for the Mattawoman Creek with the U.S. Geological Survey.

This project funds a monitoring station that was previously initiated and funded by the Maryland Department of the Environment in 2000. The purpose of this station is to develop a long term record of water quality data for determining trends in the watershed. The station is part of the Chesapeake Bay Programs' Long Term Status and Trends Network. An advantage of this station is that USGS posts the data on their website for public access: <http://md.waterdata.usgs.gov>

In summer/fall of 2010 the USGS prepared a draft Scientific Investigations Report (SIR) to document the ten years of data. **USGS Scientific Investigations Report 2012–5265: Summary and Interpretation of Discrete and Continuous Water-Quality Monitoring Data, Mattawoman Creek, Charles County, Maryland, 2000–11**, was finalized in November 2012 and can be accessed at: <http://pubs.usgs.gov/sir/2012/5265/>.

Beginning in the Summer/Fall of 2012 monitoring continues in the same location, but with an emphasis on collecting integrated samples from the full cross-section of the creek. The purpose is to minimize the dominant influence of Old Woman's Run over the Mattawoman Creek mainstem in the samples.

Bay Restoration Fund Grant (BRF)

In 2008 the County completed installation of the first 32 nitrogen-reducing septic system technology under the \$604,000 grant from Maryland Department of the Environment, received in December 2006. In July 2009 The Charles County Department of Health received an additional grant of \$900,000 from MDE to install an additional 65 nitrogen reducing units, of which 23 have been installed prior to May 2010. As of May 2011, a total of 91 nitrogen units are installed. In fiscal year 2013 the Charles County Health Department received a grant in the amount of \$485,000. In Fiscal Year 2014 an additional grant in the amount of \$517,000 was awarded. As of the close of Fiscal Year 2014, 128 systems have been installed at a cost of \$1,666,609.

Septic System Pump-out Reimbursement Program (Initiated in Fiscal Year 2015)

While an individual septic pump-out receives a relatively low load reduction credit (5% of the load per pump-out), the County has the potential to gain credit for a large number of pump-outs. The Phase II WIP recommended the County study the feasibility of an ordinance requiring pump-outs. The County has decided instead of pursuing an ordinance requiring these pump-outs; rather implement a reimbursement program to encourage homeowners to pump-out their systems every 3 to 5 years.

There are 17,067 septic systems in Charles County. The WIP goal is to implement a septic pump-out program to pump-out 20% of the County's septic systems per year which amounts to 3,413 systems. When applying the 5.0 % load reduction credit on 20% of the County's total septic load of 161,746 lbs TN (delivered) annually would achieve a load reduction of 1,542 lbs TN (delivered) annually, or approximately 3% of the 51,759 lbs TN (delivered) load reduction target set for 2025.

This program not only is a recommendation to meet part of the nutrient load reduction target, it also encourages public participation. The program was launched at the beginning of FY15 to aid in WIP goal attainment as well as impervious treatment credit toward the NPDES permit requirement. The estimate is an average of 12 acres of impervious treatment per year according to the 0.03 acre credit per pump-out and current allocated funding. A copy of the newspaper announcement is included in Appendix P.

Water Resources Element

Charles County began work on the Water Resource Element, which is a part of the County's Comprehensive Plan, with the assistance of a consultant, Environmental Resources Management, Inc. A draft of the Water Resources Element was completed early in 2009. The Water Resources Element began the public adoption process in the Fall/Winter of 2010, and was adopted by the Charles County Commissioners on May 24, 2011. The full plan may be viewed on-line at:

<http://www.charlescounty.org/webdocs/pgm/publications/resourceinfrastructure/wre2006.pdf>

In fiscal year 2012 the County began an extensive public process to update the Comprehensive Plan, including the Water Resources Element. This effort is ongoing through July 2014.

Watershed Resources Registry (WRR)

The Watershed Resources Registry (WRR) is a tool developed as part of a collaborative effort between Maryland state agencies (Environment, Natural Resources and Highways) and federal agencies (EPA, Fish and Wildlife Service, Army Corps of Engineers, National Marine Fisheries Service, Natural Resources Conservation Service, Federal Highway Administration). The goal in developing the WRR is to identify suitable sites that meet multiple agency priorities and sites that meet multiple environmental goals (i.e. habitat protection and stormwater management). The development of the WRR signals a shift from issuing permits that limit impacts, to proactive preservation and restoration of our most valuable and threatened natural resources. It also serves as a publicly accessible tool in map format that shares the same data between permit applicants that the agency evaluating the application. Currently, the tool has been expanded from Prince George's and Charles County to the entire state of Maryland. The WRR is web-based and can be accessed at <http://watershedresourcesregistry.com/>

Phase II Watershed Implementation Plan (WIP)

In February 2011, the Maryland state agencies held a Lower Western Shore Maryland Phase II Watershed Implementation Plan (WIP II) workshop. At this meeting the State designated liaison for the Charles County WIP II met with County representatives and a Team Leader for each County was identified. The purpose of the local WIP II team, is to develop local strategies to meet the local pollution targets for addressing the Chesapeake Bay Total Maximum Daily Load (TMDL) for nutrients. The local pollution targets were assigned to each jurisdiction by the State.

March 8, 2011, Dr. Rich Eskin, Maryland Department of the Environment, presented the background and process for the Phase II Watershed Implementation Plan to the Charles County Commissioners. The Charles County Commissioners supported staff in proceeding with an open meeting process to develop the County's Phase II WIP. The open meetings with County staff, environmental organizations, developer organizations, attorneys, state agencies, federal land holders, and the State liaison began in March 2011 and continued monthly through November 2011, which was the original deadline for localities to submit their Phase II WIPs to the State. Charles County submitted its Phase II WIP by the November 18, 2011 due date. This can be found in Appendix M of the County's 2012 NPDES Annual Report.

In August 2011 the County began work with LimnoTech, Inc. to analyze the County's currently planned projects to determine how far these projects advanced the County toward target loads. LimnoTech presented their findings to the County's Phase II WIP workgroup. During the analysis of the pipeline projects and further work on the development of alternate scenarios to bridge the remaining gap to reach the target, LimnoTech coordinated several staff meetings. In November 2012 LimnoTech is continuing their work towards identifying the lowest cost scenarios for the County to achieve the target loads. By February 2012, Charles County's Phase II Watershed Implementation Plan (WIP) Strategy was completed.

February 28, 2013 the Charles County Phase II workgroup was reconvened for a briefing on the proposed WIP Strategy and to solicit the workgroup's comments. April 30, 2013 the proposed WIP Strategy and 2-year milestones for 2014-2015 were presented to the County Commissioners, who adopted the 2-year milestones for implementation. On May 14 and September 23, 2013 the WIP Strategy and 2-year milestones were presented as educational briefings for the Charles County Board of Appeals and Planning Commission, respectively. County staff presented an update on the WIP progress with emphasis on planned Capital projects to the Planning Commission on July 21, 2014.

The final 2012 – 2013 report and the initial 2014-2015 milestones which included both programmatic and BMP 2- year milestones were both submitted January 2014. MDE's evaluation for the 2014-2015 milestones was received by the County in April 2014. These items are included in Appendix O.

WIP Ongoing Educational and Coordination Meetings

County staff continued to participate in the State's WIP coordination webinars and meetings during the permit period. Following is a list of these meetings:

Quarterly Local Engagement Sessions:

Kick-off Webinar on November 28, 2013

Winter Webinar on February 26, 2013

Chesapeake Bay Program BMP Verification Framework on September 25, 2014

Local WIP Technical Meeting Webinars:

Series #1 - January 25, 2013 (Bay Program Workgroups & Midpoint Assessment)

Series #2 - April 8, 2013 (Model Scales, Allocation Methods & BMP Verification)

Series #3 - July 8, 2013 (Chesapeake Bay Modeling)

Series #4 - June 11, 2014 (MDE's new TMDL Data Center)

WIP Regional Workshops:

College of Southern MD – May 7, 2013

College of Southern MD – November 4, 2013

College of Southern MD – November 5, 2014

WIP Funding Workshops and Meetings

Additionally County planning and fiscal staff participated in the following meetings regarding how to fund stormwater projects to achieve WIP pollution reduction targets:

June 5, 2012 – “Stormwater Utility Workshop - What HB 987 Means for MS4 Permit Holders” held in Laurel, Maryland, by AECOM and Water Resource Associates, Inc.

November 2, 2012 – “Stormwater Financing Strategies” workshop in Annapolis, Maryland, sponsored by Maryland Association of Counties, Chesapeake Bay Foundation, and Restore Capital.

December 14, 2012 – “MS4 Phase I Forum on Funding” held in Landover, Maryland and sponsored by the Environmental Finance Center of the University of Maryland.

August 1, 2013 – Met with representatives from the NatLab Team on *Crediting Conservation - Accounting for the Water Quality Value of Conserved Lands Under the Chesapeake Bay TMDL* by the Chesapeake Bay Commission, June 2013

September 26, 2013 – “Green Infrastructure Driven Urban Stormwater Retrofits Workshop - Community Based Public Private Partnerships” in Annapolis, Maryland, sponsored by the U.S. Environmental Protection Agency, the Maryland Department of the Environment, and Maryland Environmental Service.

Accounting for Growth

County planning staff also participated in the following Accounting for Growth local workshops. Accounting for Growth is a component of Maryland’s strategy to continue to meet the goals of the Chesapeake Bay nutrient TMDL as new development occurs.

September 13, 2012 – Growth Offset Meeting – presentation and panel discussion, La Plata, Maryland sponsored by the Maryland Departments of Environment and Agriculture, and the Harry R. Hughes Center for Agro-Ecology.

August 29, 2013 – Maryland’s Proposed Accounting for Growth Progress Report webcast to review the recommendations of the Accounting for Growth Workgroup. Satellite location in La Plata, Maryland. Sponsored by the Maryland Departments of Environment and Agriculture, and the Harry R. Hughes Center for Agro-Ecology.

Additional Local Activities Related to Water Quality Improvement Coordination by the Charles County Department of Planning and Growth Management:

- January 13, 2014, staff participated in webcast titled, “Building Green Infrastructure, Jobs, and Wealth: The Prince George’s County, Maryland Stormwater Retrofit Public Private Partnership (P3).” This is the first webinar in the EPA 2014 Green Infrastructure Webcast Series.
- February 20, 2014, the Department of Planning Growth Management held a Continuing Education Seminar titled, “Stormwater Management Maintenance Responsibilities for HOA’s.”
- February 20, 2014, staff attended Maryland Biological Stream Survey Spring Training offered by the Maryland Department of Natural Resources to maintain certification in stream sampling protocols.
- February 25, 2014, staff attended the Stream Restoration Technical Session in Washington D.C. and sponsored by the Metropolitan Washington Council of Governments.

- May 6, 2014, staff participated in webcast titled: “More Bang for the Buck: Integrating Green Infrastructure into Existing Public Works Projects” webinar. Case studies were provided. This is part of the EPA 2014 Green Infrastructure Webcast Series.
- June 4, 2014, staff attended the Stormwater Spring Seminar in Linthicum, MD, sponsored by the Chesapeake Water Environment Association. The Seminar focused on Success Stories: proven effective stormwater compliance strategies.
- June 13, 2014, staff attended the TMDL Restoration Plan Development workshop in Washington D.C, sponsored by the Metropolitan Washington Council of Governments.
- July 22, 2014, staff participated in webcast: “Building Climate Resiliency with Green Infrastructure,” which highlighted Climate Interactive’s new Green Infrastructure Decision Support Tool, followed by a presentation on the New York City Green Infrastructure Program’s efforts to incorporate climate resiliency into system planning. This is part of the EPA 2014 Green Infrastructure Webcast Series.
- September 3, 2014, staff participated in webinar titled, “Green Infrastructure and Smart Growth” by the EPA 2014 Green Infrastructure Webcast Series.
- September 24, 2014, staff attended the Maryland Groundwater Symposium in Baltimore, MD sponsored by the Maryland Center for Environmental Training, College of Southern Maryland.