

## Appendix D

### Federal Facility Contributions to Maryland's Phase II WIP

**This appendix contains:**

- 1. "Draft Federal Water Quality Programmatic Milestones" for January 2012 through December 2013, which presents EPA and other federal agencies' programmatic (non-facility) milestones for the Executive Order 13508 Restore Clean Water goal area.**
- 2. A compilation of Department of Defense Phase II WIP narrative reports from the U.S. Air Force, U.S. Navy, U.S. Army, and U.S. Army National Guard, in that order, for numerous federal facilities across the State, submitted to MDE in support of Maryland's Phase II WIP**
- 3. A Phase II WIP narrative report from the U.S.DA. Beltsville Agricultural Research Center (BARC) in Prince George's County, submitted to MDE in support of Maryland's Phase II WIP**

**DRAFT September 29, 2011**

**Federal Water Quality Two-Year Milestones** – The [Executive Order 13508 Strategy](#) calls upon federal agencies to join the Chesapeake Bay watershed jurisdictions in establishing two-year milestones, many of which are designed to support the Bay watershed jurisdictions in meeting their water quality milestones (EO Strategy p. 121). This first set of federal two-year milestones covers calendar years 2012 and 2013. The list below presents EPA and other federal agencies’ programmatic (non-facility) milestones for the EO 13508 Restore Clean Water goal area. The milestones below were selected to represent the activities that have the potential to have significant environmental outcomes, that require significant resources, or that directly support the jurisdictions in meeting Watershed Implementation Plan commitments. These milestones will be tracked through the Chesapeake Bay Program’s tracking and accountability system.

**Draft Federal Water Quality Programmatic Milestones  
January 2012 through December 2013**

<b>Target Date</b> 2012/2013 progress	<b>Draft Federal Milestones</b> (EO Strategy page reference where applicable; EPA is the lead agency unless otherwise indicated)
<b>TMDL/Watershed Implementation Plans (WIPs)</b>	
January 2012 – February 2012	Evaluate and announce federal and jurisdiction <b>2012-2013 two-year milestones</b> . (p. 24)
January 2012 – June 2012	Evaluate Draft and <b>Final Phase 2 WIP</b> ’s (p. 24)
June 2012	Assessment of progress made to implement the <b>May 2009 – December 2011 two-year milestones</b> (p. 24)
October 2012	<b>Technical Amendments to the 2010 Bay TMDL</b> as needed
May 2013	Provide mid-term evaluation of <b>2012 milestones progress to jurisdictions</b>
<b>Stormwater</b>	
November 2012	Final action on revisions to the national <b>stormwater rule</b> (p. 27)
<b>Agriculture</b>	
June 2012	Propose revisions to the national <b>CAFO rule</b> . (p. 27)
July 2012	Develop and implement <b>tracking, reporting, and verification mechanisms for voluntary conservation practices</b> and other best management practices installed on agricultural lands. (p. 37)

**DRAFT** September 29, 2011

Target Date 2012/2013 progress	Draft Federal Milestones (EO Strategy page reference where applicable; EPA is the lead agency unless otherwise indicated)
December 2013	EPA/USDA Co-lead  Apply 540,000 <b>acres of conservation practices</b> in priority watersheds by the end of 2013 (p. 34) USDA
<b>Onsite (Septic) Systems</b>	
June 2013	Develop a <b>model state program</b> with general recommendations for activities to reduce pollution from onsite (septic) systems (p. 29)
<b>Atmospheric – Rules, Deposition, Allocations</b>	
January 2012	Significantly reduce nitrogen deposition to the Bay and watershed by 2020 (p. 29) <ul style="list-style-type: none"> <li>• <b>Cross State Air Pollution Rule</b> - Annual NOx control requirements begin</li> </ul>
May 2012	<ul style="list-style-type: none"> <li>• <b>Cross State Air Pollution Rule</b> - Seasonal NOx control requirements begin</li> </ul>
March 2012	<ul style="list-style-type: none"> <li>• <b>NAAQS finalized</b> <span style="float: right;"><b>NOxSOx Secondary</b></span></li> </ul>
2012	<ul style="list-style-type: none"> <li>• <b>EPA/DOT 2017–2025 Model Year Light-Duty Vehicle GHG Emissions and CAFÉ Standards</b> final rule</li> </ul>
2012	<ul style="list-style-type: none"> <li>• <b>Tier 3 Light-Duty Vehicle Emission and Fuel Standards</b> final rule (criteria and toxic pollutants)</li> </ul>
March 2012	<ul style="list-style-type: none"> <li>• New <b>air deposition modeling</b> for the Chesapeake watershed incorporating the most recent finalized rules with significant NOx reductions</li> </ul>
December 2013	<ul style="list-style-type: none"> <li>• <b>Air deposition load reduction</b> to tidal surface waters of 316,000 pounds of nitrogen. (18 percent of the required load reductions from 2009 to achieve the 15.7 million pound air deposition load allocation to tidal waters based on interpolation of 2009 and 2020 CMAQ scenarios)</li> </ul>
<b>Toxic Contaminants</b>	

**DRAFT** September 29, 2011

Target Date 2012/2013 progress	Draft Federal Milestones (EO Strategy page reference where applicable; EPA is the lead agency unless otherwise indicated)
November 2012  November 2012  December 2013	<p><b>Issue a report</b> after examining monitoring information, and comparing existing toxicity benchmarks (p. 37) DOI/EPA co-lead</p> <p>Conduct and report on <b>assessment of progress</b> on the Chesapeake Bay Basinwide Toxins Reduction and Prevention Strategy. (p. 37)</p> <p>Work with DOI, the Bay states, the District and stakeholders to <b>develop toxic contaminant reduction goals.</b> (p. 38)</p>
<b>Oversight and Enforcement</b>	
December 2012  December 2012 and 2013 December 2012 and 2013	<p><b>Permit and Enforcement Oversight</b> – Stormwater, Wastewater, Agriculture, Trading/Offsets, Air</p> <ul style="list-style-type: none"> <li>• <b>Review Chesapeake Bay states’ technical standards</b> for nutrient management to ensure that they meet <b>CAFO regulations</b> (p. 26)</li> <li>• <b>NPDES Permit Reviews</b> – Report annually on number of permits reviewed and objections</li> <li>• <b>Inspections and Case Development</b> – Report annually on results and/or status</li> </ul>
<b>Monitoring and Science Support</b>	
December 2012  December 2012  December 2012	<p>Implement year-2 <b>expansion (20 sites) of the non-tidal monitoring network</b> to support TMDL (p. 40) EPA/USGS co-lead</p> <p><b>Evaluate water-quality changes and progress</b> to adjust management actions in support of the TMDL/WIPs and milestone progress evaluation. (p. 41) EPA/USGS/ NOAA co-lead</p> <ul style="list-style-type: none"> <li>• USGS issue an <b>annual update of trends</b> based on CBP <b>non-tidal</b> monitoring network to assess progress toward reductions</li> <li>• EPA and NOAA will provide an <b>annual update of trends</b> in <b>estuary</b> monitoring data to assess progress toward water-quality standards including using NOAA CBIBS data.</li> </ul>
<b>EPA Grant Support to States and the District</b>	
FY 2012 FY 2013	Provide <b>financial support to the jurisdictions</b> by maintaining funding, as authorized, through EPA’s assistance programs including CWA S 319, SRF, CBIG, and CBRAP

**Joint Base Andrews Input to Prince George's County, Maryland and  
Maryland Department of Environment Watershed Implementation Plan Phase II  
As of 15 November 2011**

**I. Joint Base Andrews**

The mission of the 11th Wing, the host wing at JBA, is to defend national leaders, deploy combat ready Airmen, showcase the United States Air Force (USAF), provide presidential support to Airmen and their families, and to foster joint teamwork within and around the wing. The 11th Wing oversees the operations of the Air Force Band, Honor Guard, and Chaplaincy and is host to more than 60 separate organizations, including the 89th Airlift Wing (responsible for providing safe, reliable, worldwide airlift and logistical support for the president of the United States, vice president, Cabinet members and other high-ranking U.S. and foreign government officials), and units for the Army, Navy, Marine Corps, Air Force Reserve, and National Guard. It also performs high priority airlift and emergency medical evacuation in the Washington, D.C. area.

JBA controls three distinct parcels of land: the main base and two geographically separated units (GSUs). The main base is located within Prince George's County, Maryland, and five miles southeast of Washington, D.C. Nearby Maryland communities include Camp Springs, Clinton, and Morningside. Primary access to the main base is via Interstate 95/495 (the Capital Beltway) with additional access via Maryland Route 4 and Maryland Route 5. More than 18,000 people live and work at JBA. The annual payroll is approximately \$295 million. Nearly 6,000 dependents live off base, and 4,400 are housed on base. More than 25,000 military retirees live in the area and use base services.

The main base at JBA is 4,062 acres and divided into western and eastern sections, separated by the airfield that runs north-south. The western portion of the main base contains the majority of land area and includes a large outdoor recreation/golf course facility, most of the community facilities, all accompanied and unaccompanied housing, and the Malcolm Grow Medical Center. The majority of the industrial activities are located in the eastern portion of the main base. Both sections house mission and administrative facilities.

On-base stormwater drains both east and west to the Patuxent River Area (Sub-basin 02-13-11) and to the Washington Metropolitan Area (Sub-basin 02-14-02), respectively, as defined by the MDE in COMAR 26.08.02.08. The use designation for both of the drainage areas for these sub-basins is I-P. Use designation I-P is for water contact recreation, protection of aquatic life and public water supply.

Tributaries to several major waterways originate on JBA, including Piscataway Creek, Meetinghouse Creek, Tinker's Creek, Payne's Branch, Henson Creek, and Cabin and Western Branches. The base is divided into 8 drainage areas; five of those areas drain 3,671 acres to the Potomac River segment-shed (POTTf), while the remaining three drain 391 acres to the Patuxent River segment-shed (PAXTF).

JBA controls two remote communications sites. The Davidsonville Transmitter Station (Davidsonville) is an 836-acre parcel of land located in Anne Arundel County, approximately 12 miles northeast of JBA, just northwest of the intersection of U.S. Route 50 and Maryland Route 424 and adjacent to the Patuxent River. Davidsonville drains to the west to Ropers Branch and southward to an unnamed, intermittent stream to the Patuxent River segment-shed (PAXTF). The Brandywine Receiver Station (Brandywine) is a 1,592-acre site located in Prince George's County, approximately 6 miles south of JBA, east of U.S. Route 5, and north of the town of Mattawoman. It is bounded by railroad tracks to the west and northeast, and Cedarville Road to the South. The site is located entirely in the Mattawoman Creek Watershed. Stormwater runoff exits the property via four natural drainage pathways. All outfalls discharge water into tributaries of the Mattawoman Creek segment-shed (MATTF).

**Joint Base Andrews Input to Prince George's County, Maryland and  
Maryland Department of Environment Watershed Implementation Plan Phase II  
As of 15 November 2011**

**JBA Baseline Loadings November 2011\*:**

**Municipality: JBA**  
**County: Prince George's**  
**Total Urban Acres identified by MDE: 4,031**

Initial Loads (lbs)				
2010 No Action Urban Land use acres	2010 No Action Total Nitrogen Load EOS	2010 No Action Total Phosphorus Load EOS	2010 No Action Total Nitrogen Load DEL	2010 No Action Total Phosphorus Load DEL
4,031	25,597	2,726	23,253	2,608
After Implementation (lbs)				
Urban Land use acres	Total Nitrogen Load EOS	Total Phosphorus Load EOS	Total Nitrogen Load DEL	Total Phosphorus Load DEL
3,628	18,533	1,826	16,836	1,747
Urban Reduction Required		Urban Reduction Achieved		
2020 Total Nitrogen Load Allocation (DEL)	2020 Total Phosphorus Load Allocation (DEL)		2020 Total Nitrogen Load Allocation	2020 Total Phosphorus Load Allocation
16,405	1,383		16,836	1,747
Percent Reduction from Baseline (%)		Percent reduction Achieved (%)		
Nitrogen	Phosphorus		Nitrogen	Phosphorus
29	47	<b>Percent Urban Area Treated</b>	28	33
<b>URBAN BMP IMPLEMENTATION</b>				
Tree Planting		**		
Urban Nutrient Management		**		
Filtering Practices		**		
Infiltration Practices		**		
Wet Ponds		**		
Dry Extended Detention Ponds		**		
Dry Ponds		**		
"Retrofit BMP"		**		

*\*Although there was a TSS allocation in the spreadsheet, since phosphorus tends to bind to sediments, no calculator was provided to DoD for meeting the TSS allocations. We are operating under the assumption that the TSS allocations will be achieved via the required reductions for phosphorus and subsequent BMP implementation (MDE response).*

*\*\* Data currently unavailable, Spreadsheet and WIP will be updated once calculations are performed and data become available*

**Joint Base Andrews Input to Prince George's County, Maryland and  
Maryland Department of Environment Watershed Implementation Plan Phase II  
As of 15 November 2011**

**Municipality: Davidsonville Transmitter Site (JBA GSU)**

**County: Anne Arundel**

**Total Urban Acres identified by MDE: 9**

Initial Loads (lbs)				
2010 No Action Urban Land use acres	2010 No Action Total Nitrogen Load EOS	2010 No Action Total Phosphorus Load EOS	2010 No Action Total Nitrogen Load DEL	2010 No Action Total Phosphorus Load DEL
9	130	10	125	7
After Implementation (lbs)				
Urban Land use acres	Total Nitrogen Load EOS	Total Phosphorus Load EOS	Total Nitrogen Load DEL	Total Phosphorus Load DEL
8	94	7	90	5
Urban Reduction Required		Urban Reduction Achieved		
2020 Total Nitrogen Load Allocation (DEL)	2020 Total Phosphorus Load Allocation (DEL)		2020 Total Nitrogen Load Allocation	2020 Total Phosphorus Load Allocation
97	5		90	5
Percent Reduction from Baseline (%)		Percent reduction Achieved (%)		
Nitrogen	Phosphorus		Nitrogen	Phosphorus
22	29	<b>Percent Urban Area Treated</b>	28	33
<b>URBAN BMP IMPLEMENTATION</b>				
Tree Planting		**		
Urban Nutrient Management		**		
Filtering Practices		**		
Infiltration Practices		**		
Wet Ponds		**		
Dry Extended Detention Ponds		**		
Dry Ponds		**		
"Retrofit BMP"		**		

. \*Although there was a TSS allocation in the spreadsheet, since phosphorus tends to bind to sediments, no calculator was provided to DoD for meeting the TSS allocations. We are operating under the assumption that the TSS allocations will be achieved via the required reductions for phosphorus and subsequent BMP implementation (MDE response).

\*\* Data currently unavailable, Spreadsheet and WIP will be updated once calculations are performed and data become available

**Joint Base Andrews Input to Prince George's County, Maryland and  
Maryland Department of Environment Watershed Implementation Plan Phase II  
As of 15 November 2011**

**Municipality: Brandywine Receiver Site (JBA GSU)**

**County: Prince George's**

**Total Urban Acres identified by MDE: 11**

Initial Loads (lbs)				
2010 No Action Urban Land use acres	2010 No Action Total Nitrogen Load EOS	2010 No Action Total Phosphorus Load EOS	2010 No Action Total Nitrogen Load DEL	2010 No Action Total Phosphorus Load DEL
11	85	8	34	6
After Implementation (lbs)				
Urban Land use acres	Total Nitrogen Load EOS	Total Phosphorus Load EOS	Total Nitrogen Load DEL	Total Phosphorus Load DEL
9	61	5	25	4
Urban Reduction Required		Urban Reduction Achieved		
2020 Total Nitrogen Load Allocation (DEL)	2020 Total Phosphorus Load Allocation (DEL)		2020 Total Nitrogen Load Allocation	2020 Total Phosphorus Load Allocation
28	4		25	4
Percent Reduction from Baseline (%)		Percent reduction Achieved (%)		
Nitrogen	Phosphorus		Nitrogen	Phosphorus
17	39	<b>Percent Urban Area Treated</b>	28	33
<b>URBAN BMP IMPLEMENTATION</b>				
Tree Planting		**		
Urban Nutrient Management		**		
Filtering Practices		**		
Infiltration Practices		**		
Wet Ponds		**		
Dry Extended Detention Ponds		**		
Dry Ponds		**		
"Retrofit BMP"		**		

*.\*Although there was a TSS allocation in the spreadsheet, since phosphorus tends to bind to sediments, no calculator was provided to DoD for meeting the TSS allocations. We are operating under the assumption that the TSS allocations will be achieved via the required reductions for phosphorus and subsequent BMP implementation (MDE response).*

*\*\* Data currently unavailable, Spreadsheet and WIP will be updated once calculations are performed and data become available*



**Joint Base Andrews Input to Prince George's County, Maryland and  
Maryland Department of Environment Watershed Implementation Plan Phase II  
As of 15 November 2011**

**Municipality: Brandywine DRMO (JBA GSU)**

**County: Prince George's**

**Total Urban Acres identified by MDE: 4**

Initial Loads (lbs)				
2010 No Action Urban Land use acres	2010 No Action Total Nitrogen Load EOS	2010 No Action Total Phosphorus Load EOS	2010 No Action Total Nitrogen Load DEL	2010 No Action Total Phosphorus Load DEL
4	32	3	13	2
After Implementation (lbs)				
Urban Land use acres	Total Nitrogen Load EOS	Total Phosphorus Load EOS	Total Nitrogen Load DEL	Total Phosphorus Load DEL
4	23	2	9	1
Urban Reduction Required		Urban Reduction Achieved		
2020 Total Nitrogen Load Allocation (DEL)	2020 Total Phosphorus Load Allocation (DEL)		2020 Total Nitrogen Load Allocation	2020 Total Phosphorus Load Allocation
11	1		9	1
Percent Reduction from Baseline (%)		Percent reduction Achieved (%)		
Nitrogen	Phosphorus		Nitrogen	Phosphorus
17	39	<b>Percent Urban Area Treated</b>	28	33
<b>URBAN BMP IMPLEMENTATION</b>				
Tree Planting		**		
Urban Nutrient Management		**		
Filtering Practices		**		
Infiltration Practices		**		
Wet Ponds		**		
Dry Extended Detention Ponds		**		
Dry Ponds		**		
"Retrofit BMP"		**		

*.\*Although there was a TSS allocation in the spreadsheet, since phosphorus tends to bind to sediments, no calculator was provided to DoD for meeting the TSS allocations. We are operating under the assumption that the TSS allocations will be achieved via the required reductions for phosphorus and subsequent BMP implementation (MDE response).*

*\*\* Data currently unavailable, Spreadsheet and WIP will be updated once calculations are performed and data become available*

**Joint Base Andrews Input to Prince George's County, Maryland and  
Maryland Department of Environment Watershed Implementation Plan Phase II  
As of 15 November 2011**

**II. JBA Programmatic Two Year Milestones 2012-2013:**

**AGRICULTURAL**

JBA does not have agricultural land use although MDE has stated that JBA has been assigned agricultural acreage in EPA's current model run using the Version 5.3.2 Model. JBA will work with MDE to validate and correct the land use in 2017 progress runs.

**URBAN STORMWATER MANAGEMENT RETROFITS**

- JBA working with the United States Corps of Engineers (USACE) recently completed an installation-wide BMP inventory and assessment. USACE is developing a BMP Inventory database for reporting tracking and accountability. JBA will provide a copy of the inventory to capture BMPs not already accounted for
- JBA, in conjunction with the Air Force Center for Engineering and the Environment (AFCEE), conducted a comprehensive Storm Water Pollution Prevention Opportunity Assessment (SWPPOA). The SWPPOA identified stormwater pollution prevention opportunities and evaluated potential storm water retrofits for 363 facilities. Based on the results of the SWPPOA, JBA planned improvements to management of stormwater runoff from existing buildings, parking lots, hangars, and other site features. These improvements will be implemented as funding becomes available.
- Implement environmental site design to the maximum extent practicable
- Implement Section 438 of the Energy Independence and Security Act (EISA) of 2007 to the maximum extent technically feasible
- Construct qualifying new facilities to a minimum LEED Silver standard
- The JBA General Plan, similar in use to a county or state master plan, has been updated to include the possibility of numerous storm water retrofits

**SEPTIC SYSTEM UPGRADES**

JBA has no septic systems on the main base or at either of the GSUs.

**WASTEWATER TREATMENT PLANT DATA**

JBA does not own or operate any wastewater treatment plants at any of its facilities. The main base discharges both industrial and domestic wastewater and is connected to the Washington Suburban Sanitary Commission (WSSC) sewage collection system. The sewage is treated at two publicly-owned treatment works (POTWs) owned and operated by WSSC. The main base is considered a significant industrial user (SIU) and operates under a discharge authorization permit (DAP) issued by WSSC. Davidsonville sewage is collected in a holding tank and pumped as needed by an authorized wastewater hauler. Brandywine discharges only domestic sewage and is connected to the WSSC sewage collection systems and treated at a POTW. No DAP is required for Brandywine.

**Joint Base Andrews Input to Prince George's County, Maryland and  
Maryland Department of Environment Watershed Implementation Plan Phase II  
As of 15 November 2011**

**PROGRAMMATIC 2-YEAR MILESTONES**

- JBA is working with the U.S. Army Regional Environmental Coordinator (REC) and the National Defense Center for Energy and the Environment (NDCEE) on an extensive assessment project that will help JBA identify applicable Chesapeake Bay TMDL requirements and prepare JBA to meet them.
- USACE to finalize numerous management projects aimed at improving the storm water management program at JBA, including (1) a programmatic environmental assessment of eight major storm water retrofit projects; (2) preparation of a storm water infrastructure and maintenance program;
- Continue to support applicable watershed jurisdictions Phase II WIP processes in 2012 and 2013.
- Implement Air Force Policy for Sustainable Design and Development (SDD), LEED certification and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage storm water for all construction and maintenance projects.
- Advocate for funding in order to implement water program projects in fiscal years 2012 and 2013
- Continue to integrate storm water management features into all facility construction projects on JBA

**III. Successes:**

In order to better identify, assess, prioritize, fund, and sustain infrastructure needs and requirements, the U.S. Air Force reconfigured its Civil Engineering Squadrons to focus on Asset Management. Under this new mindset, storm water infrastructure is viewed as a utility, in the same way it views water, sewer, electricity, and natural gas systems. Programmatic planning is now used for storm water compliance instead of reactionary compliance.

In preparation of the impending implementation of the Chesapeake Bay TMDL, JBA has teamed up with the USACE, AFCEE and several contractors to execute several projects over the last three years in order to obtain data, determine its compliance standing, and develop potential retrofit and compliance projects. These projects include the following efforts:

- a. Stormwater Assessment for GSUs
  - Developed comprehensive stormwater system mapping for JBA GSUs
  - Completed existing-conditions hydrologic modeling to establish baseline hydrologic conditions for stormwater flow exiting GSUs
  - Conducted a watercourse characterization to identify the types of watercourses (perennial, intermittent, or ephemeral)
  - Determined the compliance status of these locations as it pertains to the Maryland Department of the Environment (MDE) stormwater discharge general permit

**Joint Base Andrews Input to Prince George's County, Maryland and  
Maryland Department of Environment Watershed Implementation Plan Phase II  
As of 15 November 2011**

- b. Wetland Delineation for GSUs
  - Created planning level composite mapping of potentially regulated wetlands and waters at JBA geographically separated units (GSUs)
  - Surveyed Brandywine Receiver and Davidsonville Transmitter Stations
  - Collected and synthesized existing wetland and waters information
  - Field verified preliminary wetland mapping based on collected data
  - Prepared wetland maps for each GSU based on findings in the field
  - Consulted the U.S. Army Corps of Engineers (USACE) Regulatory Division
  
- c. Floodplain Analysis
  - Determined impacts of West Runway Rehabilitation on the 1-percent annual chance floodplain (Referred to as 100-year floodplain)
  - Completed hydrologic and hydraulic modeling for existing and proposed conditions
  - Mapped floodplain areas and areas of increased flooding as a result of the project
  - Prepared report
  
- d. Storm Water Pollution Prevention Plan
  - Updated JBA Stormwater Pollution Prevention Plan (SWPPP) on a regular basis
  - Included the Davidsonville and Brandywine GSUs
  - Merge various regulatory requirements into single guidance document; complies with requirements from both MDE Industrial Multi-Sector General Permit (MSGP) and Municipal Separate Storm Sewer System (MS4) General Permit
  - Included information concerning potential pollution sources within stormwater drainage areas
  - Described BMPs to be implemented to reduce or eliminate pollutants in stormwater runoff
  
- e. Institutional Management Plan
  - Storm water master planning; address all likely future stormwater management compliance requirements for future development (Short-Term 5-Years and Long-Term 25-Years)
  - Multi-phased project with various sub-tasks reviewing various aspects of storm water management
  - Phase 2 focused on JBA Watershed #3
    - Developed a hydrologic model to determine peak discharges for existing and future land use conditions for Watershed 3
    - Estimated the required storage volumes to meet the MDE regulations
    - Recommended stormwater management devices to meet the storage volume requirements
    - Developed conceptual design cost estimates for each proposed regional stormwater management device
  
- f. Best Management Plan (BMP) Inventory
  - Compiled data on existing stormwater BMPs
  - Created a BMP database and GIS layer
  - Collected of existing information and field survey preparation,
  - Conducted field survey and visual condition assessment,
  - Developed database and digital mapping layer,

**Joint Base Andrews Input to Prince George's County, Maryland and  
Maryland Department of Environment Watershed Implementation Plan Phase II  
As of 15 November 2011**

- Developed detailed statements of work and costs estimates to restore 8 BMPS, and
  - Data collected has assisted JBA in meeting measurable goals outlined in NPDES permits and has provided a foundation for operation, maintenance, and management of stormwater BMPs
  - Documented findings and data
- g. Storm Water System Survey
- Conducted a survey and assessment of the stormwater collection system on JBA
  - Produced Geographic Information System (GIS) database and connectivity layer
  - Included stormwater features such as inlets, manholes, and pipes in the final GIS database
  - Documented findings and data
- h. Storm Water Programmatic Planning
- Further developed information and data derived from previous stormwater studies
  - Compared the results of those studies with JBA regulatory and permit requirements
  - Identified projects to renovate/restore storm water infrastructure to operational condition that complies with regulatory mandates
  - Developed durable recurring maintenance program for stormwater infrastructure
  - Conducted a Programmatic Environmental Assessment to renovate and restore stormwater infrastructure
  - Prepared Stormwater Planning and Programming Documentation for up to 12 environmental sustainment, restoration, and modernization (SRM) projects
  - Will establish storm water, stream restoration, and wetlands mitigation banking systems
- i. Developed or updated and implemented the following wastewater management plans:
- Fats, Oils & Grease (FOG) Management Plan: brought base into compliance with WSSC FOG regulations and implemented FOG BMPs
  - Toxic Organic Management Plan (TOMP): allowed JBA to obtain a total toxic organic (TTO) monitoring exemption from WSSC
  - Oil-Water Separator Management Plan: tied OWS to processes; identified OWS for repair, renovation or removal
  - Spill Prevention, Contingency, and Countermeasures (SPCC) Plan and Facility Response Plan (FRP): combined two plans into Integrated Facility Response Plan
- j. Stream and BMP restoration designs for the following streams
- Meetinghouse Creek; 1,000 ft segment in and around Malcolm Grow medical complex
  - Combat Arms Training & Maintenance (CATM) Range storm water pond
- k. Established active Natural Resources Management Program
- Set up programs to monitor rare, threatened and endangered (RTE) and invasive species
  - Set aside nature and biodiversity trails and sites
  - Established numerous public outreach, education, and participation programs

**Joint Base Andrews Input to Prince George's County, Maryland and  
Maryland Department of Environment Watershed Implementation Plan Phase II  
As of 15 November 2011**

- I. Upgraded Installation Restoration Program
  - Signed Federal facilities Agreement (FFA). Established framework for management and restoration of CERCLA sites on base
  - Executed \$28M, 9-year Performance-Based Contract to manage all IRP sites on base; better, more focused, cost-effective management and closure of these sites
  
- m. Firmed up leadership, management and accountability programs
  - Implemented Base Environmental Management Plan (EMS) to include wastewater and storm water environmental management plans (EMPs)
  - Established Water Subcommittee: Led by the base Mission Support Group Deputy Commander, meets to discuss & act on water, wastewater, & stormwater issues; it helps to inform and coordinate various activities with the many base agencies that affect or have responsibilities with these media; reports to the base's Environmental, Safety, and Occupational Health (ESOH) Committee, which is chaired by the base vice wing commander.
  - Instituted new environmental audit program; established three-tiered assessment process, from quarterly shop-level review, to annual installation review, to external review every three years

JBA has briefed its storm water projects at various DoD conferences and training sessions, and portions of it have been adopted by other military facilities.

#### **IV. Challenges:**

- The successful execution of the projects identified herein is contingent upon authorization and appropriation of funds in accordance with appropriate statutes. This includes the U.S. Congress, Department of Defense, Department of the Air Force and Air Force District of Washington validating and funding each project in the applicable fiscal year. While JBA will make every effort to complete these projects, failure of funding to be provided due to changes in priorities or budget constraints would mean a project or projects may not be executed as planned. Funding is expected to be exceptionally lean in fiscal years 2012 and 2013.
- Need to acquire JBA BMP data in order to provide it to MDE so that they can properly update their model. The current model does not contain all required information; but JBA data is not centrally located or readily available. It will take a great deal of time and effort to acquire this data in time for it to be useful for the MDE model. Contract resources may be needed to collect and collate the data into a useful form, but FY 2012 funding is extremely limited.
- Coordination with the Prince George's County Phase II WIP authority has been difficult to non-existent. The County made it clear that it wanted JBA participation in its WIP development, but JBA has not heard for the PG County representative since February 2011. This lack of coordination may complicate efforts to meet difficult to determine whether TMDL goals have been met across the watershed.

**Joint Base Andrews Input to Prince George's County, Maryland and  
Maryland Department of Environment Watershed Implementation Plan Phase II  
As of 15 November 2011**

- MDE provided DoD with a spreadsheet to input its BMPs and calculate load reductions. The spreadsheet is somewhat complicated, and is limited to urban land use and urban BMPs only. JBA is most concerned with the location of the urban acres relative to the BMPs. JBA has implemented BMPs outside of the urban area, which is also contributing to load reductions that are currently not being captured.
- The architecture of the GIS systems used by EPA and DoD are different and may be incompatible with each other. JBA attempted to overlay its GIS data onto the GIS data provided by MDE, but the two systems showed different land uses and metadata. The various systems and data must be reconciled with each other in order to accurately portray land use, BMP effects, and pollutant discharge rates.
- The MAST tool that calculates total percentage area treated using the total federal land use was not a viable option for DoD facilities to use. Recommendations contained in the lessons learned from the JBA pilot may assist MDE in making improvements to the MAST tool for future use.
- Military facilities, such as JBA, do not use the same zoning restrictions used by municipalities and counties. Therefore, various types of land uses may be packed close together. The low resolution (10,000 sq ft grid cell size) may diminish the effects of BMPs used on the mostly small construction projects done on JBA
- The Brandywine DRMO Annex is an Installation Restoration site covered under the Comprehensive Environmental Restoration and Liability Act (CERCLA). This site is on the National Priorities List (NPL), therefore storm water reduction opportunities for the purposes of this effort will be limited.

**V. Inaccuracies:**

- The WIP Phase II Federal Information and reductions calculator contain no information or data for BMPs constructed on JBA from January 1, 2006 to present. While the exact treated acreage is not known at this time, JBA estimates BMPs treating about 100 - 125 acres are not included in the database and model run.
- The WIP Phase II Federal Information and Reductions Calculator does not take into account demolition projects that has restored formerly impervious area to pervious condition on JBA since January 1, 2006 to present. While the exact treated acreage is not known at this time, JBA estimates the surface area in question to be about 25 - 50 acres that was not included in the database and model run.
- During this JBA pilot facility urban acreages were used, but a substantial amount of understanding about GIS, land use data and modeling was needed to be able to validate urban areas, number of urban acres treated, load per acre of reduction, etc. There was no manual for how to use the spreadsheet, and therefore inaccuracies may result in how this information is calculated and entered into the spreadsheet.

**Joint Base Andrews Input to Prince George's County, Maryland and  
Maryland Department of Environment Watershed Implementation Plan Phase II  
As of 15 November 2011**

- The GIS grid cell used by the EPA model to classify land use is 100 ft x 100 ft or 10,000 square feet. The resolution of the spatial reference is not fine enough to accurately depict proper land use classification on JBA. Due to mission requirements and noise restrictions, JBA often groups various land uses very close together. Since a grid cell is assigned an overall land use based on which detailed land use is the largest component, other land uses may be hidden by the model. A comparison of the GIS data provided by MDE with GIS data used by JBA shows numerous land use mismatches.
- Most construction projects on JBA are small-scale, usually less than one acre. The low GIS resolution mentioned above may hide the effect of the BMPs installed on these small sites, especially if the land use is classified differently as noted above. While individual BMPs may have small effect on pollutant discharge rates, collectively they could have a greater impact. However, the low grid cell resolution could cause the effects of the BMPs to be minimized or hidden – dropped off as a calculation rounding error. JBA suggests that grid cell resolution be increased to 10 ft x 10 ft, or 100 square feet, grid size.
- There are land use inequalities between the different federal facilities. For example, the National Park Service's (NPS) Suitland Parkway, a limited access expressway consisting of four traffic lanes and paved shoulders, is depicted as Low Density. On the other hand, residential cul-de-sacs on JBA, whose residential units were demolished over 5 years ago, are shown as High Density, even though these areas are less-developed than the Suitland Parkway. The problem lies with the large grid cell size and the way in which the Parkway transects these grids as compared to the housing areas on JBA.
- Areas of the airfield on JBA are depicted as areas of high and low density development, although these areas are actually mowed grass, seven inches in height.
- Areas of Brandywine are depicted as areas of high and low density development, while they are actually areas covered by scrub pine.
- Satellite imagery used by the EPA model is pre-2007. It indicates paved areas and structures on JBA that no longer exist, including whole housing areas on the east side of base that were demolished prior to 2006.
- No BMP data exists for Joint Base Andrews, even though many new BMPs were installed on JBA after the MDE cutoff date of January 1, 2006. At least a dozen large new office buildings were constructed or renovated after that date as a part of significant Base Realignment and Closure (BRAC) actions. JBA is also in the process of renovating its west runway to ESD standards, which may not have been captured in the model.
- The acreage assigned JBA and its GSUs by MDE does not match JBA's GIS data. JBA will work with MDE to update/correct acreages for the future use.



# **NSF Carderock Submission to Maryland Department of Environment Watershed Implementation Plan Phase II**

## **Site Description**

NSF Carderock is a 184 acre research facility located near Bethesda, Maryland. The facility is dedicated to the research, development and engineering of hull, mechanical and electrical systems for Navy vessels. NSF Carderock includes research facilities, laboratories, machine shops, a maintenance garage, supply warehouses and other support facilities.

## **Implementation Action and Programmatic Milestones for 2012 - 2013**

### **AGRICULTURAL**

- N/A. NSF Carderock does not have agricultural land use.

### **STORMWATER MANAGEMENT RETROFITS**

- NSF Carderock will pursue funding for an installation-wide improvement plan for stormwater management. NSF Carderock will provide a copy of the inventory to capture BMPs not already accounted for since the 2006 Baseline.
- Implement Dept of Navy Low Impact Development (LID) Policy for Storm Water Management.

### **SEPTIC SYSTEM UPGRADES**

- N/A. NSF Carderock has no septic systems.

### **WASTEWATER TREATMENT PLANT DATA**

- N/A. NSF Carderock does not have a waste water treatment plant.

### **PROGRAMMATIC 2-YEAR MILESTONES**

- NSF Carderock is working with NAVFAC/Department of Navy to identify opportunities for stormwater retrofits (2013).
- Continue to support applicable watershed jurisdictions Phase II WIP processes in 2012 and 2013.
- Continue to implement Dept of Navy Low Impact Development (LID) Policy for Storm Water Management and the Energy Independence and Security Act of 2007 (EISA) as a means to manage storm water for all construction and maintenance projects in 2012 and 2013.

## Site Challenges

- Funding – To comply with the Chesapeake Bay TMDL, stormwater funding budget requests regionally have increased substantially over the last two years without significant appropriation increases making it difficult for the Dept of Navy to financially support the TMDL compliance efforts.
- High uncertainty – State and federal rules and procedures are still developing for the Chesapeake Bay TMDL making it difficult to plan for expenditures and staffing needs as well as establish the facility procedures and projects needed to initiate and report our efforts to comply with the regulations.
- Low model resolution – The low resolution of the watershed model and the resulting ambiguity of the load allocations, hampers our ability to coordinate reductions on a site specific basis. All federal lands are aggregated together at a county level in both the planning tools and models supplied by Maryland.
- Lack of clear design standards/criteria for structural BMPs makes it difficult to insure that BMPs being designed will be accepted by regulators, increasing the risk that funds spent on designing the BMPs will be wasted. Since cost of construction is based on design, planning for the estimated cost of construction is equally difficult.
- MDE provided DOD with a spreadsheet to input its BMPs and calculate load reductions. The spreadsheet is somewhat complicated, and is limited to urban land use and a subset of urban BMPs only. There is not a way to evaluate the total load reduction at a site for all sectors/BMPs with this spreadsheet. In order to evaluate our actions and the subsequent reductions, we will need to develop a tracking tool which is not a trivial undertaking. The installation has implemented BMPs over several decades in multiple sectors which reduce loads but are not currently being captured in the tool.
- The MAST tool that calculates total percentage area treated using the total federal land use was not a viable option for DOD facilities due to the aggregation of federal facility lands at a county level.
- In the reduction calculator provided by Maryland, urban acreages were used, but a substantial amount of understanding about GIS, land use data and modeling will be needed to be able to validate urban areas, # urban acres treated, load per acre of reduction, etc. There was no manual for how to use the spreadsheet, and therefore inaccuracies may result in how this information is calculated and entered into the spreadsheet.

# **NAS Patuxent River Submission to Maryland Department of Environment Watershed Implementation Plan Phase II**

## **Site Description**

Naval Air Station Patuxent River located in southern Maryland at the mouth of the Patuxent River. Naval Air Station Patuxent River occupies approximately 7,400 acres, including its Webster Field Annex and Solomons Recreation Center and is the host of more than 50 tenant activities, including the Naval Air Systems Command and the Naval Air Warfare Center Aircraft Division. NAS Patuxent River is home to the full spectrum of research, development, acquisition, test & evaluation (RDAT&E) for all of naval aviation.

## **Implementation Action and Programmatic Milestones for 2012 - 2013**

### **AGRICULTURAL**

The Maryland Department of the Agriculture (MDA) will submit the information to the Maryland Department of the Environment (MDE) on behalf of NAS Patuxent River.

### **STORMWATER MANAGEMENT RETROFITS**

- NAS Patuxent River is working with the Navy Region to complete an installation-wide Stormwater BMP inventory and assessment.
- Continue to execute Coastal Zone consistency program.
- Continue to implement environmental site design.
- Perform Shoreline stabilization (pending funding).
- Retrofit traditional asphalt parking lot pavement with pervious pavements.

### **SEPTIC SYSTEM UPGRADES**

- Perform a Septic system investigation to confirm the location of septic systems, confirm the systems were properly abandoned, and propose solutions (removal or nutrient removal) and cost estimates for any remaining systems on the base property.

### **WASTEWATER TREATMENT PLANT DATA**

- The Webster Field Sewer plant upgrade was completed. The system is equipped with additional nitrogen and phosphorus treatment.

## PROGRAMMATIC 2-YEAR MILESTONES

- NAS Patuxent River is currently working to develop a Stormwater Management Implementation Plan (SWIP) for the entire NAS Patuxent River Complex. This plan will identify retrofit locations, additional best management practices (bmps) and the associated construction and maintenance costs.
- Continue to support applicable watershed jurisdictions Phase II WIP processes in 2012 and 2013.
- Continue to implement Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage storm water for all construction and maintenance projects (2012).
- Continue to follow Navy LID Policy implemented in 2007.
- Continue to carry out and track the Facilities Reduction Program (20 buildings to be demolished in upcoming FY returning footprints to pervious areas)

### Site Challenges

- Funding – To comply with the Chesapeake Bay TMDL, stormwater funding budget requests regionally have increased substantially over the last two years without significant appropriation increases making it difficult for the Dept of Navy to financially support the TMDL compliance efforts.
- High uncertainty – State and federal rules and procedures are still developing for the Chesapeake Bay TMDL making it difficult to plan for expenditures and staffing needs as well as establish the facility procedures and projects needed to initiate and report our efforts to comply with the regulations.
- Low model resolution – The low resolution of the watershed model and the resulting ambiguity of the load allocations, hampers our ability to coordinate reductions on a site specific basis. All federal lands are aggregated together at a county level in both the planning tools and models supplied by Maryland.
- Lack of clear design standards/criteria for structural BMPs makes it difficult to insure that BMPs being designed will be accepted by regulators, increasing the risk that funds spent on designing the BMPs will be wasted. Since cost of construction is based on design, planning for the estimated cost of construction is equally difficult.
- MDE provided DOD with a spreadsheet to input its BMPs and calculate load reductions. The spreadsheet is somewhat complicated, and is limited to urban land use and a subset of urban BMPs only. There is not a way to evaluate the total load reduction at a site for all sectors/BMPs with this spreadsheet. In order to evaluate our actions and the subsequent reductions, we will need to develop a tracking tool which is not a trivial undertaking. The installation has implemented BMPs over several decades in multiple sectors which reduce loads but are not currently being captured in the tool.
- The MAST tool that calculates total percentage area treated using the total federal land use was not a viable option for DOD facilities due to the aggregation of federal facility lands at a county level.

- In the reduction calculator provided by Maryland, urban acreages were used, but a substantial amount of understanding about GIS, land use data and modeling will be needed to be able to validate urban areas, # urban acres treated, load per acre of reduction, etc. There was no manual for how to use the spreadsheet, and therefore inaccuracies may result in how this information is calculated and entered into the spreadsheet.

# **NSA Annapolis Submission to Maryland Department of Environment Watershed Implementation Plan Phase II**

## **Site Description**

NSA Annapolis is comprised of the US Naval Academy and the North Severn Complex. The US Naval Academy is approximately 320 acres in size. It houses the Brigade of Midshipmen, the campus, public works and maintenance facilities. North Severn Complex is approximately 900 acres in size, and lies directly across the Severn River from the Naval Academy. North Severn complex includes: a small craft repair shop, docks for Yard Patrol boats, two marinas, supply warehouse, rifle ranges, housing units, recreational facilities, wastewater treatment plant, Navy exchange, a school and day care, administrative buildings, public services, and small businesses.

## **Implementation Action and Programmatic Milestones for 2012 - 2013**

### **AGRICULTURAL**

- N/A. NSA Annapolis does not have agricultural land use.

### **STORMWATER MANAGEMENT RETROFITS**

- NSA Annapolis is in the process of completing an installation-wide BMP inventory and assessment including an improvement plan for storm water management. NSA Annapolis will provide a copy of the inventory to capture BMPs not already accounted for since the 2006 Baseline.
- NSA Annapolis will continue to follow MDE Stormwater Management Act of 2007.
- NSA Annapolis will continue to implement Energy Independence & Security Act (EISA) Section 438 stormwater requirements for projects with footprints over 5000 sf.
- NSA Annapolis will continue to implement Dept of Navy Low Impact Development (LID) Policy for Storm Water Management.

### **SEPTIC SYSTEM UPGRADES**

- NSA Annapolis has 1 septic system. The septic system is located at the campground on North Severn Complex. NSA Annapolis is considering future options including potential upgrades to the septic system.

## WASTEWATER TREATMENT PLANT DATA

The NSA Annapolis wastewater treatment facility is scheduled to receive a denitrification upgraded in 2015 and will likely receive major upgrades in 2018 or 2020.

### PROGRAMMATIC 2-YEAR MILESTONES

- NSA Annapolis is working with NAVFAC/Department of Navy to develop an Opportunity Assessment (2012).
- Continue to support applicable watershed jurisdictions Phase II WIP processes in 2012 and 2013.
- Continue to implement Dept of Navy Low Impact Development (LID) Policy for Storm Water Management and the Energy Independence and Security Act of 2007 (EISA) as a means to manage storm water for all construction and maintenance projects in 2012 and 2013.
- NSA Annapolis will continue to follow MDE Stormwater Management Act of 2007.

### Site Challenges

- Funding – To comply with the Chesapeake Bay TMDL, stormwater funding budget requests regionally have increased substantially over the last two years without significant appropriation increases making it difficult for the Dept of Navy to financially support the compliance efforts.
- High uncertainty – State and federal rules and procedures are still developing for the Chesapeake Bay TMDL making it difficult to plan for expenditures and staffing needs as well as establish the facility procedures and projects needed to initiate and report our efforts to comply with the regulations.
- Low model resolution – The low resolution of the watershed model and the resulting ambiguity of the wasteload allocations, makes it difficult to plan and coordinate reductions on a site basis. All federal lands are aggregated together at a county level in both the planning tools and models supplied by Maryland.
- Lack of clear design standards/criteria for structural BMPs makes it difficult to ensure that BMPs being designed will be accepted by regulators, increasing the risk that funds spent on designing the BMPs will be wasted. Since cost of construction is based on design, planning for the estimated cost of construction is equally difficult.
- MDE provided DOD with a spreadsheet to input its BMPs and calculate load reductions. The spreadsheet is somewhat complicated, and is limited to urban land use and a subset of urban BMPs only. There is not a way to evaluate the total load reduction at a site for all sectors/BMPs with this spreadsheet. In order to evaluate our actions and the subsequent reductions, we will need to develop a tracking tool which is not a trivial undertaking. The installation has implemented BMPs over several decades in multiple sectors which reduce loads but are not currently being captured in the tool.

- The MAST tool that calculates total percentage area treated using the total federal land use was not a viable option for DOD facilities due to the aggregation of federal facility lands at a county level.
- In the reduction calculator provided by Maryland, urban acreages were used, but a substantial amount of understanding about GIS, land use data and modeling will be needed to be able to validate urban areas, # urban acres treated, load per acre of reduction, etc. There was no manual for how to use the spreadsheet, and therefore inaccuracies may result in how this information is calculated and entered into the spreadsheet.
- USNA is a densely occupied area which faces many site restriction, highly limiting the ability to implement stormwater BMPs on that portion of the site:
  - It is densely occupied, meaning there is limited land for potential BMP use.
  - It is a registered historic district, meaning use and aesthetics are limited.
  - It is an active military training site, so many open spaces are often required for training/marching and can not be converted to BMPs or forested.
  - The water table is very high. Most MDE approved in-ground treatment facilities require more clearance than is available between facility and groundwater. Structures (such as concrete) have to be built to withstand upheaval due to the water table, creating large, expensive facilities.
  - A good portion of the USNA soil is dredge material from the Severn River in the mid 1950's. This soil is poorly drained, and limits the feasibility of in-ground BMP use.
- North Severn all ready has a somewhat large forested area. However, many invasives are present. Planting natives after a large invasives removal is generally considered "self mitigation".
  - North Severn is an active military site, so many open spaces are often required for training/marching or other military uses and cannot be converted to BMPs or forested.
  - The calculators provide BMPs only in terms of percentage of land. We are lucky to plant forest as mitigation requirements at increments of 0.5 to 1.5 acres. If this is to be put into the calculators as percentages, rather than as acres, we are going to be dealing with small numbers (0.0004%).



# **NSF Suitland Submission to Maryland Department of Environment Watershed Implementation Plan Phase II**

## **Site Description**

NSF Suitland is a 41 acre site located in Suitland, Maryland. The facility is involved in the collection, storage and security of data related to naval operations. NSF Suitland has two stormwater outfalls that discharge to an on-site stormwater retention pond.

## **AGRICULTURAL**

- N/A. NSF Suitland does not have agricultural land use.

## **STORMWATER MANAGEMENT RETROFITS**

- NSF Suitland will complete an installation-wide BMP inventory and assessment including an improvement plan for storm water management. NSF Suitland will provide a copy of the inventory to capture BMPs not already accounted for since the 2006 Baseline.
- Implement Dept of Navy Low Impact Development (LID) Policy for Storm Water Management

## **SEPTIC SYSTEM UPGRADES**

- N/A. NSF Suitland has no septic systems.

## **WASTEWATER TREATMENT PLANT DATA**

- N/A. NSF Suitland does not have a waste water treatment plant.

## **PROGRAMMATIC 2-YEAR MILESTONES**

- NSF Suitland is working with NAVFAC/DON to develop an Opportunity Assessment (2012)
- Continue to support applicable watershed jurisdictions Phase II WIP processes in 2012 and 2013.
- Continue to implement Dept of Navy Low Impact Development (LID) Policy for Storm Water Management and the Energy Independence and Security Act of 2007 (EISA) as a means to manage storm water for all construction and maintenance projects in 2012 and 2013.

# **Naval Research Laboratory - Chesapeake Bay Detachment Submission to Maryland Department of Environment Watershed Implementation Plan Phase II**

## **Site Description**

The Naval Research Laboratory (NRL) – Chesapeake Bay Detachment (CBD) occupies a 158-acre site in Calvert County, Maryland on the Chesapeake Bay. This site provides facilities and support services for research in radar, electronic warfare, optical devices, materials, communications, and fire research. Because of its location high above the Chesapeake Bay on the western shore, unique experiments can be performed in conjunction with the Tilghman Island site 16 km across the bay from CBD. Basic research is also conducted in radar antenna properties, testing of radar remote sensing concepts, use of radar to sensor ocean waves, and laser propagation. CBD also hosts facilities of the Navy Technology Center for Safety and Survivability, which conducts fire research on simulated carrier, surface, and submarine platforms.

## **Implementation Action and Programmatic Milestones for 2012 – 2013**

### AGRICULTURAL

- N/A. NRL-CBD does not have agricultural land use.

### STORMWATER MANAGEMENT

- NRL-CBD completed an installation-wide storm water system survey in 2009. From this survey CBD's Storm Water Pollution Prevention Plan was updated and improved. NRL Environmental Staff do monthly facility inspections on the storm water system and check on the implementation of all BMPs. NRL-CBD Facilities and Security Staff do daily inspections of CBD's industrial areas.
- NRL CBD also works under the requirements of a Spill Prevention and Countermeasures Plan and Emergency Action Plan for potential spills. CBD staff is well trained in spill response.
- NRL CBD manages two storm water ponds to slow flow of storm water into the Bay and to enhance storm water quality. NRL Staff have enhanced the riparian forested buffers around these ponds and at additional areas of the facility by over 100 trees in the last year.
- NRL also implements Dept of the Navy Low Impact Development (LID) Policy for Storm Water Management.

## SEPTIC SYSTEM UPGRADES

- N/A. NRL-CBD has no septic systems.

## WASTEWATER TREATMENT PLANT DATA

- NRL-CBD operates an MDE permitted wastewater treatment plant. The plant is a tertiary treatment facility, with added unit processes for effluent polishing. Design capacity is 60,000 gallons per day (GPD). The treatment plant facility processes include a comminutor with bar screen bypass; primary clarifier; diverting well; dosing tank; trickling filter; secondary clarifier; filter lift pump; multimedia filter with clear well and backwash holding tank; ultraviolet radiation disinfection unit with contacted tank; and effluent flow meter. Solids removed for the wastewater are treated in an anaerobic digester to reduce their volume and objectionable character. Solids from the digester are dewatered on a drying bed and ultimately disposed of by burial at the county landfill. The treated wastewater discharges to a small stream which empties into the Chesapeake Bay.

## PROGRAMMATIC 2-YEAR MILESTONES

- Continue to implement Dept of the Navy Low Impact Development (LID) Policy for Storm Water Management and the Energy Independence and Security Act of 2007 (EISA) as a means to manage storm water for all construction and maintenance projects in 2012 and 2013.
- Dredge and repair smaller Storm water pond and dam.
- Continue to enhance the riparian forested buffers on NRL-CBD.
- Continue to participate in the MD Department of Natural Resources “Marylanders Grow Oysters” program. NRL-CBD currently has ten (10) cages of oyster spats at our dock.

## SITE CHALLENGES

- High uncertainty – State and federal rules and procedures are still developing for the Chesapeake Bay TMDL making it difficult to plan for expenditures and staffing needs as well as establish the facility procedures and projects needed to initiate and report our efforts to comply with the regulations.
- Low model resolution – The low resolution of the watershed model and the resulting ambiguity of the load allocations, hampers the Navy’s ability to coordinate reductions on a site specific basis. All federal lands are aggregated together at a county level in both the planning tools and models supplied by Maryland.
- Lack of clear design standards/criteria for structural BMPs makes it difficult to insure that BMPs being designed will be accepted by regulators, increasing the risk that funds spent on designing the BMPs will be wasted. Since cost of construction is based on design, planning for the estimated cost of construction is equally difficult.

- MDE provided DOD with a spreadsheet to input its BMPs and calculate load reductions. The spreadsheet is somewhat complicated, and is limited to urban land use and a subset of urban BMPs only. There is not a way to evaluate the total load reduction at a site for all sectors/BMPs with this spreadsheet. In order to evaluate our actions and the subsequent reductions, we will need to develop a tracking tool which is not a trivial undertaking. The installation has implemented BMPs over several decades in multiple sectors which reduce loads but are not currently being captured in the tool.
- The MAST tool that calculates total percentage area treated using the total federal land use was not a viable option for DOD facilities due to the aggregation of federal facility lands at a county level.
- In the reduction calculator provided by Maryland, urban acreages were used, but a substantial amount of understanding about GIS, land use data and modeling will be needed to be able to validate urban areas, # urban acres treated, load per acre of reduction, etc. There was no manual for how to use the spreadsheet, and therefore inaccuracies may result in how this information is calculated and entered into the spreadsheet.

# **Naval Support Activity Bethesda Submission to Maryland Department of Environment Watershed Implementation Plan Phase II**

## **Site Description**

Naval Support Activity Bethesda (NSAB) is located in Bethesda, Maryland, about three miles north of Washington, DC. The site lies on the east side of Rockville Pike and is bound by Interstate Route 495, Jones Bridge Road and the School of the Sacred Heart. Located adjacent to the site are residential housing areas, a golf course, and the National Institutes of Health. Primary tenants at the facility include: Walter Reed National Military Medical Center, Uniformed Services University Health Services (USUHS), National Naval Dental Center (NNDC), Naval School of Health Sciences (NSHS), and the Navy Exchange. NSAB primarily hosts medical and research institutions. It is one of many major federal research and development installations in Montgomery County, Maryland. Major goods and services provided at the NNMC include housing for on-site military personnel, public works functions, commissary, officer/enlisted clubs, gym/pool, vehicle maintenance, and a bowling alley.

## **Implementation Action and Programmatic Milestones for 2012 - 2013**

### **AGRICULTURAL**

- N/A. Naval Support Activity Bethesda does not have agricultural land use.

### **STORMWATER MANAGEMENT RETROFITS**

- Naval Support Activity Bethesda will complete an installation-wide BMP inventory and assessment including an improvement plan for storm water management. Naval Support Activity Bethesda will provide a copy of the inventory to capture BMPs not already accounted for since the 2006 Baseline.
- Implement Dept of Navy Low Impact Development (LID) Policy for Storm Water Management.

### **SEPTIC SYSTEM UPGRADES**

- N/A. Naval Support Activity Bethesda has no septic systems.

### **WASTEWATER TREATMENT PLANT DATA**

- N/A. Naval Support Activity Bethesda does not have a waste water treatment plant.

## PROGRAMMATIC 2-YEAR MILESTONES

- Naval Support Activity Bethesda is working with NAVFAC/Department of Navy to develop an Opportunity Assessment (2012).
- Continue to support applicable watershed jurisdictions Phase II WIP processes in 2012 and 2013.
- Continue to implement Dept of Navy Low Impact Development (LID) Policy for Storm Water Management and the Energy Independence and Security Act of 2007 (EISA) as a means to manage storm water for all construction and maintenance projects in 2012 and 2013.

### Site Challenges

- Funding – To comply with the Chesapeake Bay TMDL, stormwater funding budget requests regionally have increased substantially over the last two years without significant appropriation increases making it difficult for the Dept of Navy to financially support the TMDL compliance efforts.
- High uncertainty – State and federal rules and procedures are still developing for the Chesapeake Bay TMDL making it difficult to plan for expenditures and staffing needs as well as establish the facility procedures and projects needed to initiate and report our efforts to comply with the regulations.
- Low model resolution – The low resolution of the watershed model and the resulting ambiguity of the load allocations, hampers our ability to coordinate reductions on a site specific basis. All federal lands are aggregated together at a county level in both the planning tools and models supplied by Maryland.
- Lack of clear design standards/criteria for structural BMPs makes it difficult to insure that BMPs being designed will be accepted by regulators, increasing the risk that funds spent on designing the BMPs will be wasted. Since cost of construction is based on design, planning for the estimated cost of construction is equally difficult.
- MDE provided DOD with a spreadsheet to input its BMPs and calculate load reductions. The spreadsheet is somewhat complicated, and is limited to urban land use and a subset of urban BMPs only. There is not a way to evaluate the total load reduction at a site for all sectors/BMPs with this spreadsheet. In order to evaluate our actions and the subsequent reductions, we will need to develop a tracking tool which is not a trivial undertaking. The installation has implemented BMPs over several decades in multiple sectors which reduce loads but are not currently being captured in the tool.
- The MAST tool that calculates total percentage area treated using the total federal land use was not a viable option for DOD facilities due to the aggregation of federal facility lands at a county level.
- In the reduction calculator provided by Maryland, urban acreages were used, but a substantial amount of understanding about GIS, land use data and modeling will be needed to be able to validate urban areas, # urban acres treated, load per acre of

reduction, etc. There was no manual for how to use the spreadsheet, and therefore inaccuracies may result in how this information is calculated and entered into the spreadsheet.

# **Naval Support Activity South Potomac, Naval Support Facility Indian Head, MD Submission to Maryland Department of Environment Watershed Implementation Plan Phase II**

## **Site Description**

NSFIH's mission is to provide shore installation management to support various commands located on site. The largest supported command is the Naval Surface Warfare Center Indian Head Division (NSWCIHD). NSWCIHD's mission is the research & development, test & evaluation, manufacturing technology, and manufacture of energetic chemicals, explosives, pyrotechnics, warheads, propellants and other ordnance devices. Founded in 1890, NSFIH is the oldest continuously running ordnance facility in the United States.

Over 3,300 people work at NSFIH, including roughly 1,950 civilians and military personnel, 300 contractors, and 900 military and civilian tenants. The 3,148-acre facility is located 25 miles south of Washington, DC, in Charles County, Maryland. The facility covers three peninsulas including Cornwallis Neck (main site), Stump Neck Annex, and Bullitt Neck, as well as three undeveloped islands. The sites are bordered by the Potomac River, Mattawoman Creek and Chicamuxen Creek.

## **Implementation Action and Programmatic Milestones for 2012 - 2013**

### **AGRICULTURAL**

- N/A. NSF Indian Head does not have agricultural land use.

### **STORMWATER MANAGEMENT RETROFITS**

- NSF Indian Head will complete an installation-wide BMP inventory and assessment including an improvement plan for storm water management. NSF Indian Head will provide a copy of the inventory to capture BMPs not already accounted for since the 2006 Baseline.
- Implement Dept of Navy Low Impact Development (LID) Policy for Storm Water Management.
- Perform Shoreline Stabilization
- Continue to execute Coastal Zone consistency program.

### **SEPTIC SYSTEM UPGRADES**

- NSFIH has 4 septic systems, 1 at Stump Neck Annex, 2 at Rum Point and 1 at Bullitt Neck. Two of these are still in use (infrequently) including the Environmental Education Center at Bullitt Neck and the ESD Facility at Rum



Point. The septic systems at Stump Neck (Bldg 2000) and at Rum Point (skept Range) are inactive.

#### WASTEWATER TREATMENT PLANT DATA

- The NSF Indian Head WWTP was upgraded in 2011 to Enhanced Nutrient Removal (ENR).

#### PROGRAMMATIC 2-YEAR MILESTONES

- NSF Indian Head is working with NAVFACWASH to develop an Opportunity Assessment (2012).
- Continue to support applicable watershed jurisdictions Phase II WIP processes in 2012 and 2013.
- Continue to implement Dept of Navy Low Impact Development (LID) Policy for Storm Water Management and the Energy Independence and Security Act of 2007 (EISA) as a means to manage storm water for all construction and maintenance projects in 2012 and 2013.
- Continue with Urban Nutrient Management practices facility wide.
- Continue to carry out and track the Facilities Reduction Program, demolition of buildings returning their footprint to pervious area where mission permits.

#### Site Challenges

- Funding – To the most reasonable extent within existing resource constraints, comply with the Chesapeake Bay TMDL. Stormwater requirements regionally are projected to increase substantially over the next several years without significant appropriation increases making it difficult for the Dept. of Navy to financially support the TMDL compliance efforts.
- High uncertainty – State and federal rules and procedures are still developing the Chesapeake Bay TMDL making it difficult to plan for expenditures and staffing needs as well as establish the facility procedures and projects needed to initiate and report efforts to comply with the regulations.
- Low model resolution – The low resolution of the watershed model and the resulting ambiguity of the load allocations hampers our ability to coordinate reductions on a site specific basis. All federal lands are aggregated together at a county level in both the planning tools and models supplied by Maryland.
- Lack of clear design standards/criteria for structural BMPs makes it difficult to ensure that BMPs being designed will be accepted by regulators, increasing the risk that funds spent on designing the BMPs will not be valued. Since cost of construction is based on design, planning for the estimated cost of construction is equally difficult.
- MDE provided DOD with a spreadsheet to input its BMPs and calculate load reductions. The spreadsheet is somewhat complicated, and is limited to urban land

use and a subset of urban BMPs only. There is not a way to evaluate the total load reduction at a site for all sectors/BMPs with this spreadsheet. In order to evaluate our actions and the subsequent reductions, NSFIIH will need to develop a tracking tool, which is a significant undertaking. The installation has implemented BMPs over several decades in multiple sectors that reduce loads but are not currently being captured in the Federal Information and Reduction Calculator supplied by MDE.

- The MAST tool that calculates total percentage area treated using the total federal land use was not a viable option for DOD facilities due to the aggregation of federal facility lands at a county level.
- In the reduction calculator provided by Maryland, urban acreages were used, but a substantial amount of understanding about GIS, land use data and modeling will be needed to be able to validate urban areas, # urban acres treated, load per acre of reduction, etc. There was no information on how the existing loads for federal lands were calculated, what land uses were used, or what existing BMP's/LID features (if any) were considered. It is therefore difficult to determine the accuracy of the State's input data and resulting calculations. Also, a manual explaining how to use the spreadsheet was not provided. Therefore, information entered into the calculator tool as well as the resulting calculations may be inaccurate.
- NSFIIH has a significant amount of historic, cultural and installation restoration areas which limit the ability to use or add BMPs.

**US ARMY**

# Maryland WIP Phase II: A Summary of Army Successes, Challenges and Inaccuracies

## **Successes:**

The Army recognizes several key successes derived from the WIP Phase II process:

- Fort Meade and the Army National Guard were active participants in the Anne Arundel Pilot Program for the WIP Process. Their participation in the program provided lessons learned that were used to assist other Army Installations within the Watershed.
- The Watershed Implementation Plan (WIP) Phase II process required collaborative involvement from Maryland, the Army, Installations, the National Defense Center for Energy and Environment (NDCEE) and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP II timelines, two year milestones and critical progress milestones in 2017 and 2020, Army garrisons and facilities conducted comprehensive assessments of BMPs to ensure the data listed below was accurate.
  - Accurate latitude and longitude locations for each BMP
  - Number of acres treated for each BMP
  - Date of BMP installation
  - Condition of BMP
- Additionally, in October the Services and MDE selected APG as a pilot submission to MDE, which resulted in a summary of lessons learned that can ultimately be used to assist other Installations, Services and Federal agencies in completing the Maryland urban BMP input deck for each facility. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense, a Federal agency leading by example.

## **Challenges:**

The Army experienced several major challenges throughout the WIP Phase II process:

- Funding for projects needed to reduce loading from the garrison is contingent upon authorization and appropriation of funds in accordance with appropriate statutes. This includes the U.S. Congress, Department of Defense, Department of the Army, the Army National Guard, the Army Reserve Command and the Installation Management Command. These requirements will be competing for funding against all of the Army's other requirements and there is no guarantee that funding will be available. The Army will make every effort to obtain necessary funding, but changes in priorities or budget

# Maryland WIP Phase II: A Summary of Army Successes, Challenges and Inaccuracies

constraints would mean a project or projects may not be executed as planned. Funding is expected to be exceptionally lean in fiscal years 2012 and 2013.

- The Army used the load reduction calculation spreadsheet provided by MDE to address effectiveness calculations for urban BMPs on urban land use. In order to use the spreadsheet garrisons needed to calculate load per acre. This required a substantial amount of understanding about GIS, land use data and modeling in order to validate urban areas, # urban acres treated, load per acre of reduction, etc. There was no manual for how to use the spreadsheet, and therefore inaccuracies or inconsistencies may result in how this information is calculated and entered into the spreadsheet. A step by step user manual may be helpful going forward.
- The Army is concerned with the location of the urban acres relative to the BMPs. Our installations have implemented BMPs outside of the urban area, which also contribute to load reductions that are currently not being captured. Limiting our BMP inventory to urban acres treated does not represent the full scope and scale of load reductions achieved at Army installations and facilities.
- For each installation, the Army used a spreadsheet model (exported coefficients from the CB model) to validate base loadings. All loads were within a range of acceptable limits to the loads provided by MDE. However, specifically at Aberdeen Proving Ground (APG) a number of complexities arose as a result of the installation's geographical location and drainage area; that is extending over a number of CB model segments. This required a separate model export coefficients be applied to differing areas to apply our model in order to run the CB model approach. It was challenging to show these model runs in a simple, summary spreadsheet. Transferability of how to perform this function seems at best difficult for other Federal agencies.
- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed. The MAST tool that calculates total percentage area treated using the total federal land use was not a viable option for DoD facilities to use. Recommendations contained in the lessons learned from the APG pilot may assist MDE in making improvements to the MAST tool for future use.

# Maryland WIP Phase II: A Summary of Army Successes, Challenges and Inaccuracies

## Inaccuracies:

The Army reported several issues that may result in various quantitative inaccuracies throughout the WIP Phase II process:

- MDE land use (USGS) and the AA County land use in GIS and the AA County land use is more refined and accurate while the MDE land use (USGS) is general. For the purposes of this exercise, when you overlay the MDE and AA County the MDE appears to be similar and accurate enough as far as urbanized area (pervious and impervious), however this may result in some inaccuracies with urban land use acres. This may be due to the architecture of the GIS systems used by EPA and Army facilities. Attempts to overlay its GIS data onto the GIS data provided by MDE, but the two systems showed different land uses and metadata. The various systems and data must be reconciled with each other in order to accurately portray land use, BMP effects, and pollutant discharge rates. Army coordination with EPA, USGS and MDE is essential before the next model run in 2017 to ensure that reported installation and facility changes to land use land cover layers, BMP effectiveness, etc. are incorporated into EPA's CB model.
- APG does not have agricultural land use although MDE informed APG that 661 acres were assigned as agricultural in EPA's current model run of the 5.3.2 Model. Agricultural land is also incorporated into Forest Glen Annex, when in reality there is no agricultural land use at the facility. The Army will work with MDE to validate and correct the land use in 2017 progress runs.
- The boundary data used by MDE does not reflect the recent annex's from the General Services Administration GSA to Adelphi Laboratory Center (ALC), which increased ALC acreage from approx 68 acres to 155 acres. Montgomery County went from 15 acres to 75 acres and Prince George's County went from 26 acres to 79 acres. These inaccuracies may result in changes to the expected load reductions.
- Army installations and facilities do not use the same zoning restrictions used by municipalities and counties. Therefore, various types of land uses are packed close together. The low resolution (10,000 sq ft grid cell size) may diminish the effects of BMPs and cause inaccuracies mostly on small construction projects.
- Maryland does not have a current list of BMPs for Army installations and facilities. The Army will provide information on BMPs not already accounted for since the 2006 Baseline.

# **Aberdeen Proving Ground Input to Harford County and Maryland Department of Environment Watershed Implementation Plan Phase II**

## **I. Aberdeen Proving Ground**

Aberdeen Proving Ground (APG) is a U.S. Army Garrison managed by the U.S. Army Installation Management Command. It is located in Maryland, at the northern end of the Chesapeake Bay, and occupies approximately 72,500 acres of land and water. The majority of the Installation is located within Harford County, while two small sections, Graces Quarters and Carroll Island, are located in Baltimore County. APG is divided by the Bush River into two non-contiguous land areas: the Aberdeen Area (APG-AA) to the northeast and the Edgewood Area (APG-EA) to the southwest. APG drains to five subwatersheds in four counties within the Chesapeake Bay. Subwatershed CB1TF is in Harford and Cecil County, subwatershed BSOH is in Harford County, subwatershed GUNOH is in Harford and Baltimore County, subwatershed MIDOH is in Baltimore County, and CB2OH is in Harford and Kent County. Together, the APG-AA and APG-EA make up approximately 37,450 acres of the total land area. The remaining acreage is comprised mostly of surface water. Kent County lies across the Bay to the east and Cecil County is across the Bay to the north.

APG is home to nine major commands and over 100 garrison supported organizations. The Installation provides facilities for performing research, development, testing and evaluation of Army materiel. Facilities include laboratories for research investigations, state-of-the-art ranges and engineering test courses for wheeled and tracked vehicles. The Installation also supports a wide variety of training associated with mechanical maintenance, health promotion and preventive medicine, and chemical and biological defense and chemical casualty care.

On-base stormwater in the northeast portion of the Aberdeen portion of APG drains east to Chesapeake Bay Proper (Sub-basin 02-13-99). The remainder of the Aberdeen site of APG drains to the southwest to the Bush River (Sub-basin 02-13-07). The stormwater on the Edgewood site of APG is split between the Bush River and the Gunpowder River (Sub-basin 02-13-08). The Baltimore County portion of APG drains into the Gunpowder River (Sub-basin 02-13-08). The use designation for both of the drainage areas for these sub-basins is I-P. Use designation I-P is for water contact recreation, protection of aquatic life and public water supply.

**Aberdeen Proving Ground Input to Harford County  
and Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**II. APG Baseline Loadings November 2011\*:**

**Municipality: APG**

**County: Harford and Baltimore Counties**

**Total Urban Acres identified by MDE are only located in Harford County: 6,284**

Initial Loads (lbs)				
2010 No Action Urban Land use acres	2010 No Action Total Nitrogen Load EOS	2010 No Action Total Phosphorus Load EOS	2010 No Action Total Nitrogen Load DEL	2010 No Action Total Phosphorus Load DEL
6,284	60,100	4,803	60,088	4,802
After Implementation (lbs)				
Urban Land use acres	Total Nitrogen Load EOS	Total Phosphorus Load EOS	Total Nitrogen Load DEL	Total Phosphorus Load DEL
6,284	57,926	4,517	57,915	4,516
Urban Reduction Required		Urban Reduction Achieved		
2020 Total Nitrogen Load Allocation (DEL)	2020 Total Phosphorus Load Allocation (DEL)		2020 Total Nitrogen Load Allocation	2020 Total Phosphorus Load Allocation
34,359	1,995		57,915	4,516
Percent Reduction from Baseline (%)		Percent reduction Achieved (%)		
Nitrogen	Phosphorus		Nitrogen	Phosphorus
43	58	<b>Percent Urban Area Treated</b>	4	6
<b>URBAN BMP IMPLEMENTATION</b>				
<b>Tree Planting</b>		<b>0</b>		
<b>Urban Nutrient Management</b>		<b>0</b>		
<b>Filtering Practices</b>		<b>3</b>		
<b>Infiltration Practices</b>		<b>1</b>		
<b>Wet Ponds</b>		<b>6</b>		
<b>Dry Extended Detention Ponds</b>		<b>1</b>		
<b>Dry Ponds</b>		<b>5</b>		
<b>"Retrofit BMP"</b>		<b>0</b>		

*\*Although there was a TSS allocation in the spreadsheet, since phosphorus tends to bind to sediments, no calculator was provided to DoD for meeting the TSS allocations. We are operating under the assumption that the TSS allocations will be achieved via the required reductions for phosphorus and subsequent BMP implementation (MDE response).*



**Aberdeen Proving Ground Input to Harford County  
and Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**III. APG Programmatic Two Year Milestones 2012-2013:**

**AGRICULTURAL**

APG does not have agricultural land use although Maryland Department of the Environment (MDE) informed APG that 661 acres were assigned in EPA's current model run of the 5.3.2 Model. APG will work with MDE to validate and correct the land use.

**URBAN STORMWATER MANAGEMENT RETROFITS**

- APG working with the United States Corps of Engineers (USACE) recently completed an installation-wide BMP inventory and assessment. USACE is developing a BMP Inventory database for reporting tracking and accountability. APG will provide a copy of the inventory to capture BMPs not already accounted for.
- Execute Coastal Zone consistency program
- Execute Coastal Zone afforestation projects
- Implement environmental site design
- Perform Shoreline stabilization (pending funding)

**SEPTIC SYSTEM UPGRADES**

N/A. APG has no septic systems. Remote site holding tanks are pumped on a regular weekly, bi-weekly, monthly, bi-monthly, annual and as needed.

**WASTEWATER TREATMENT PLANT DATA**

The Army is conducting a Feasibility Study to determine the most efficient and cost effective treatment upgrade for the Edgewood Area Wastewater Treatment Plant. The Army is pursuing funding for upgrading the facility in 2012 or 2013.

**PROGRAMMATIC 2-YEAR MILESTONES**

- APG is working with USACE to develop an Opportunity Assessment outlining APG plan by two year increments toward 2020 (2012)
- Continue to support applicable watershed jurisdictions Phase II WIP processes in 2012 and 2013.
- Implement Army Policy for Sustainable Design and Development (SDD) and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage storm water for all construction and maintenance projects. (2012).
- Implement APG Specific LID Policy signed by Garrison Commander on 7 June 2011.
- Carry out Facilities Reduction Program (56 buildings scheduled for demolition in FY12 returning footprints to pervious areas)

## **Aberdeen Proving Ground Input to Harford County and Maryland Department of Environment Watershed Implementation Plan Phase II**

### **IV. Successes:**

The Watershed Implementation Plan (WIP) Phase II process required collaborative involvement from MDE, APG and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP II timelines, two year milestones and critical progress milestones in 2017 and 2020, APG successfully conducted a comprehensive assessment of each BMP on the Installation to ensure the data listed below was accurate.

- Accurate latitude and longitude locations for each BMP
- Number of acres treated for each BMP
- Date of BMP installation
- Condition of BMP

Additionally, in October the Services and MDE selected APG as a pilot, which resulted in a summary of lessons learned that can ultimately be used to assist other Installations, Services and Federal agencies in completing the Maryland urban BMP input deck for each facility. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense, a Federal agency leading by example.

### **V. Challenges:**

- Funding for projects needed to reduce loading from the garrison is contingent upon authorization and appropriation of funds in accordance with appropriate statutes. This includes the U.S. Congress, Department of Defense, Department of the Army and the Army's Installation Management Command. APG will be competing for funding against all of the Army's other requirements and there is no guarantee that funding will be available. APG will make every effort to obtain necessary funding, but changes in priorities or budget constraints would mean a project or projects may not be executed as planned. Funding is expected to be exceptionally lean in fiscal years 2012 and 2013.
- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- MDE provided DoD with a spreadsheet to input its BMPs and calculate load reductions. The spreadsheet is somewhat complicated, and is limited to urban land use and urban BMPs only. APG is most concerned with the location of the urban acres relative to the BMPs. APG has implemented BMPs outside of the urban area, which is also contributing to load reductions that are currently not being captured.
- The MAST tool that calculates total percentage area treated using the total federal land use was not a viable option for DoD facilities to use. Recommendations contained in the lessons learned from the APG pilot may assist MDE in making improvements to the MAST tool for future use.

**Aberdeen Proving Ground Input to Harford County  
and Maryland Department of Environment  
Watershed Implementation Plan Phase II**

- APG extends over a number of CB model segments and this requires separate model export coefficients be applied to differing areas to apply our model runs using the CB model approach. It was difficult to show these model runs in a simple, summary spreadsheet.

**VI. Inaccuracies:**

- During this APG pilot facility urban acreages were used, but a substantial amount of understanding about GIS, land use data and modeling was needed to be able to validate urban areas, # urban acres treated, load per acre of reduction, etc. There was no manual for how to use the spreadsheet, and therefore inaccuracies may result in how this information is calculated and entered into the spreadsheet.
- APG does not have agricultural land use although MDE informed APG that 661 acres were assigned as agricultural in EPA's current model run of the 5.3.2 Model. APG will work with MDE to validate and correct the land use in 2017 progress runs.

**Adelphi Laboratory Center Input to  
Prince George's and Montgomery Counties  
and Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Adelphi Laboratory Center**

The Adelphi Laboratory Center (ALC) is a U.S. Army Garrison managed by the U.S. Army Installation Management Command. The Installation is located approximately 12 miles northeast of downtown Washington D.C. The northern boundary of ALC is shared with the General Services Administration (GSA), formerly the Naval Surface Warfare Center. The southern boundaries include Powder Mill Road, a former Naval Reserve Training Center, and the Paint Branch. The Installation is bounded to the east and west by both residential and institutional properties. ALC is bisected by two Maryland counties and occupies approximately 110 acres in Prince George's County and approximately 97 acres in Montgomery County. The Garrison is also responsible for the Blossom Point Research Facility, which is located in Charles County. A separate summary will be provided for that facility.

On-base stormwater drains to Anacostia River Area (Sub-basin 02-14-02), as defined by the MDE in COMAR 26.08.02.08. The use designation for both of the drainage areas for these sub-basins is I-P. Use designation I-P is for water contact recreation, protection of aquatic life and public water supply.

**Adelphi Laboratory Center Input to  
Prince George's and Montgomery Counties  
and Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**II. Adelphi Laboratory Center Baseline Loadings November 2011\*:**

Municipality: Adelphi Laboratory Center

County: Prince George's County

Total Urban Acres identified by MDE in Prince George's County: 27 acres

Initial Loads (lbs)				
2010 No Action Urban Land use acres	2010 No Action Total Nitrogen Load EOS	2010 No Action Total Phosphorus Load EOS	2010 No Action Total Nitrogen Load DEL	2010 No Action Total Phosphorus Load DEL
27	281	16	255	12
After Implementation (lbs)				
Urban Land use acres	Total Nitrogen Load EOS	Total Phosphorus Load EOS	Total Nitrogen Load DEL	Total Phosphorus Load DEL
27	252	14	229	11
Urban Reduction Required		Urban Reduction Achieved		
2020 Total Nitrogen Load Allocation (DEL)	2020 Total Phosphorus Load Allocation (DEL)		2020 Total Nitrogen Load Allocation	2020 Total Phosphorus Load Allocation
179	6		229	11
Percent Reduction from Baseline (%)		Percent reduction Achieved (%)		
Nitrogen	Phosphorus		Nitrogen	Phosphorus
30	49	Percent Urban Area Treated	10	16
<u>URBAN BMP IMPLEMENTATION</u>				
Tree Planting		0		
Urban Nutrient Management		0		
Filtering Practices		24		
Infiltration Practices		0		
Wet Ponds		0		
Dry Extended Detention Ponds		0		
Dry Ponds		17		
"Retrofit BMP"		0		

\*Although there was a TSS allocation in the spreadsheet, since phosphorus tends to bind to sediments, no calculator was provided to DoD for meeting the TSS allocations. We are operating under the assumption that the TSS allocations will be achieved via the required reductions for phosphorus and subsequent BMP implementation (MDE response).

## Adelphi Laboratory Center Input to Prince George's and Montgomery Counties and Maryland Department of Environment Watershed Implementation Plan Phase II

**Municipality: Adelphi Laboratory Center**

**County: Montgomery County**

**Total Urban Acres identified by MDE in Montgomery County: 15 acres**

Initial Loads (lbs)				
2010 No Action Urban Land use acres	2010 No Action Total Nitrogen Load EOS	2010 No Action Total Phosphorus Load EOS	2010 No Action Total Nitrogen Load DEL	2010 No Action Total Phosphorus Load DEL
15	164	8	149	6
After Implementation (lbs)				
Urban Land use acres	Total Nitrogen Load EOS	Total Phosphorus Load EOS	Total Nitrogen Load DEL	Total Phosphorus Load DEL
15	114	3	103	2
Urban Reduction Required		Urban Reduction Achieved		
2020 Total Nitrogen Load Allocation (DEL)	2020 Total Phosphorus Load Allocation (DEL)		2020 Total Nitrogen Load Allocation	2020 Total Phosphorus Load Allocation
103	3		103	2
Percent Reduction from Baseline (%)		Percent reduction Achieved (%)		
Nitrogen	Phosphorus		Nitrogen	Phosphorus
31	47	<b>Percent Urban Area Treated</b>	31	64
<b>URBAN BMP IMPLEMENTATION</b>				
Tree Planting		0		
Urban Nutrient Management		0		
Filtering Practices		12		
Infiltration Practices		0		
Wet Ponds		133		
Dry Extended Detention Ponds		0		
Dry Ponds		12		
"Retrofit BMP"		0		

. \*Although there was a TSS allocation in the spreadsheet, since phosphorus tends to bind to sediments, no calculator was provided to DoD for meeting the TSS allocations. We are operating under the assumption that the TSS allocations will be achieved via the required reductions for phosphorus and subsequent BMP implementation (MDE response).

**Adelphi Laboratory Center Input to  
Prince George's and Montgomery Counties  
and Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**III. Adelphi Laboratory Center Programmatic Two Year Milestones 2012-2013:**

**AGRICULTURAL**

ALC does not have agricultural land use. However, for purposes of wildlife management, there are designated (posted) buffer areas along Floral Drive, predominantly in Prince George's County, that are not mowed.

**STORMWATER MANAGEMENT RETROFITS**

- The Garrison, working with the United States Corps of Engineers (USACE), recently completed an installation-wide BMP inventory and assessment. USACE is developing a BMP Inventory database for reporting tracking and accountability. ALC will provide a copy of the inventory to capture BMPs not already accounted for.
- Implement environmental site design
- The Garrison completed Phase III of a sanitary sewer retrofit project, whereby approximately 200' of televised 8" sewer line breaks were repaired and two sanitary manholes were rebuilt.

**SEPTIC SYSTEM UPGRADES**

N/A. ALC has no septic systems.

**WASTEWATER TREATMENT PLANT DATA**

ALC purchases all water and wastewater services directly from the Washington Suburban Sanitary Commission (WSSC). All wastewater is treated by the Blue Plains Wastewater Treatment Facility, which is owned and operated by the District of Columbia Water and Sewer Authority. The Installation's Industrial Wastewater Discharge Permit is with the WSSC, and ALC wastewater must meet stringent pretreatment standards.

ALC operates several pH neutralization pretreatment systems and one batch metals pretreatment system. The facility has maintained an excellent record of wastewater pretreatment compliance for more than 15 years.

**PROGRAMMATIC 2-YEAR MILESTONES**

- ALC is working with USACE to develop an Opportunity Assessment outlining their plan by two year increments toward 2020 (2012)
- Continue to support applicable watershed jurisdictions Phase II WIP processes in 2012 and 2013.
- Implement Army Policy for Sustainable Design and Development (SDD) and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage storm water for all construction and maintenance projects. (2012).

**Adelphi Laboratory Center Input to  
Prince George's and Montgomery Counties  
and Maryland Department of Environment  
Watershed Implementation Plan Phase II**

#### **IV. Successes:**

The Watershed Implementation Plan (WIP) Phase II process required collaborative involvement from MDE, the Army and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP II timelines, two year milestones and critical progress milestones in 2017 and 2020, Adelphi Laboratory Center successfully conducted a comprehensive assessment of each BMP on the Installation to ensure the data listed below was accurate.

- Accurate latitude and longitude locations for each BMP
- Number of acres treated for each BMP
- Date of BMP installation
- Condition of BMP

#### **V. Challenges:**

- Funding for projects needed to reduce loading from the garrison is contingent upon authorization and appropriation of funds in accordance with appropriate statutes. This includes the U.S. Congress, Department of Defense, Department of the Army and the Army's Installation Management Command. ALC will be competing for funding against all of the Army's other requirements and there is no guarantee that funding will be available. ALC will make every effort to obtain necessary funding, but changes in priorities or budget constraints would mean a project or projects may not be executed as planned. Funding is expected to be exceptionally lean in fiscal years 2012 and 2013.
- ALC used the load reduction calculation spreadsheet provided by MDE to address effectiveness calculations for urban BMPs on urban land use. In order to use the spreadsheet the Garrison needed to calculate load per acre. This required a substantial amount of understanding about GIS, land use data and modeling in order to validate urban areas, # urban acres treated, load per acre of reduction, etc.
- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed. The MAST tool that calculates total percentage area treated using the total federal land use was not a viable option for DoD facilities to use.

#### **VI. Inaccuracies:**

The boundary data used by MDE does not reflect the recent annex's from GSA to ALC, which increased ALC acreage from approx 68 acres to 155 acres. Montgomery County went from 15 acres to 75 acres and Prince George's County went from 26 acres to 79 acres. These inaccuracies may result in changes to the expected load reductions.



**Blossom Point Research Facility Input to Charles County  
and Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Blossom Point Research Facility:**

Blossom Point Research Facility (BPRF) is a satellite facility under the leadership of the U.S. Army Garrison, Adelphi Laboratory Center. Located in Cedar Point Neck in southern Charles County, Maryland, BPRF is bounded on three sides by bodies of water, including Nanjemoy Creek on the west side, the Potomac River to the south, and Port Tobacco River on the east side. BPRF occupies approximately 1,600 acres of land. It is classified as a range and is closed to the public. The primary mission of BPRF is to “field test fuze, explosives, and pyrotechnic devices and electronic telemetry systems. Also present at BPRF is a facility run by the Naval Research Laboratory for research and activities related to satellites.

**II. Blossom Point Research Facility Baseline Loadings November 2011\*:**

**Municipality: Blossom Point Research Facility**

**County: Charles County**

**Total Urban Acres identified by MDE in Charles County: 5 acres**

Initial Loads (lbs)				
2010 No Action Urban Land use acres	2010 No Action Total Nitrogen Load EOS	2010 No Action Total Phosphorus Load EOS	2010 No Action Total Nitrogen Load DEL	2010 No Action Total Phosphorus Load DEL
5	41	7	41	7
After Implementation (lbs)				
Urban Land use acres	Total Nitrogen Load EOS	Total Phosphorus Load EOS	Total Nitrogen Load DEL	Total Phosphorus Load DEL
5	39	7	39	7
Urban Reduction Required		Urban Reduction Achieved		
2020 Total Nitrogen Load Allocation (DEL)	2020 Total Phosphorus Load Allocation (DEL)		2020 Total Nitrogen Load Allocation	2020 Total Phosphorus Load Allocation
30	4		39	7
Percent Reduction from Baseline (%)		Percent reduction Achieved (%)		
Nitrogen	Phosphorus		Nitrogen	Phosphorus
27	42	Percent Urban Area Treated	4	4

**Blossom Point Research Facility Input to Charles County  
and Maryland Department of Environment  
Watershed Implementation Plan Phase II**

<b>URBAN BMP IMPLEMENTATION</b>	
Tree Planting	4
Urban Nutrient Management	
Filtering Practices	
Infiltration Practices	
Wet Ponds	
Dry Extended Detention Ponds	
Dry Ponds	
"Retrofit BMP"	

*.\*Although there was a TSS allocation in the spreadsheet, since phosphorus tends to bind to sediments, no calculator was provided to DoD for meeting the TSS allocations. We are operating under the assumption that the TSS allocations will be achieved via the required reductions for phosphorus and subsequent BMP implementation (MDE response).*

### **III. BPRF Programmatic Two Year Milestones 2012-2013:**

#### **AGRICULTURAL**

Several acres are planted annually to provide food for the local deer herd. The herd is thinned annually through managed deer hunts.

#### **STORMWATER MANAGEMENT RETROFITS**

- BPRF installed 600' revetment along the Nanjemoy Creek shoreline to prevent bluff erosion.
- BPRF planted 8,500 square feet of trees as Critical Area mitigation.

#### **SEPTIC SYSTEM**

- BPRF has two septic tanks with sand mounds.
- The tenant, Naval Research Labs, has two septic tank systems with tile fields.

#### **WASTEWATER TREATMENT PLANT DATA**

NA

#### **PROGRAMMATIC 2-YEAR MILESTONES**

- BPRF is working with USACE to develop an Opportunity Assessment outlining their plan by two year increments toward 2020 (2012)
- Continue to support applicable watershed jurisdictions Phase II WIP processes in 2012 and 2013.

## **Blossom Point Research Facility Input to Charles County and Maryland Department of Environment Watershed Implementation Plan Phase II**

- Implement Army Policy for Sustainable Design and Development (SDD) and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage storm water for all construction and maintenance projects. (2012).

### **IV. Challenges:**

- Funding for projects needed to reduce loading from the garrison is contingent upon authorization and appropriation of funds in accordance with appropriate statutes. This includes the U.S. Congress, Department of Defense, Department of the Army and the Army's Installation Management Command. BPRF and US Army Garrison Adelphi Laboratory Center will be competing for funding against all of the Army's other requirements and there is no guarantee that funding will be available. BPRF will make every effort to obtain necessary funding, but changes in priorities or budget constraints would mean a project or projects may not be executed as planned. Funding is expected to be exceptionally lean in fiscal years 2012 and 2013.
- BPRF used the load reduction calculation spreadsheet provided by MDE to address effectiveness calculations for urban BMPs on urban land use. In order to use the spreadsheet the Garrison needed to calculate load per acre. This required a substantial amount of understanding about GIS, land use data and modeling in order to validate urban areas, # urban acres treated, load per acre of reduction, etc.
- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed. The MAST tool that calculates total percentage area treated using the total federal land use was not a viable option for DoD facilities to use.

# **Forest Glen Annex Input to Montgomery County and Maryland Department of Environment Watershed Implementation Plan Phase II**

## **I. Forest Glen Annex**

The Walter Reed Hospital Annex is now referred to as Forest Glen Annex. U.S. Army installation Forest Glen Annex is located in Silver Spring, Montgomery County, Maryland. The Forest Glen Annex (132 acres) was transferred to Fort Detrick on 1 October 2008 from the Walter Reed Army Medical Center (WRAMC) campus. The Forest Glen Annex is home to the Medical Biological Defense Research Program of Walter Reed Army Institute of Research (WRAIR), and the Naval Medical Research Center. U.S. Army Garrison (USAG) Fort Detrick is responsible for stormwater compliance for Army operations and for tenants located at Forest Glen Annex. Fort Detrick also has command and control of Glen Haven Housing Area (20 acres) in Montgomery County, Maryland. No urban acreage was identified at the Glen Haven Housing Area.

Forest Glen Annex is located within the Rock Creek sub-basin, a sub-basin of the Potomac River basin. In the Phase 5.3 model, Forest Glen is located in the POTTF\_DC basin, and A24031PL1\_4460\_4780 land-river segment. Runoff from the Forest Glen Annex discharges to unnamed tributaries to Rock Creek, which flows into the Potomac River and ultimately the Chesapeake Bay. Rock Creek is 33 miles long with the last 9.3 miles running through the District of Columbia (DC). Only the last quarter mile of the Creek is tidally influenced. Rock Creek discharges into the Potomac River in DC, approximately 108 miles upstream of the Chesapeake Bay.

**Forest Glen Annex Input to Montgomery County  
and Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**II. Forest Glen Baseline Loadings November 2011\*:**

**Municipality: Forest Glen Annex**

**County: Montgomery County**

**Total Urban Acres identified by MDE located in Montgomery County: 123**

Initial Loads (lbs)				
2010 No Action Urban Land use acres	2010 No Action Total Nitrogen Load EOS	2010 No Action Total Phosphorus Load EOS	2010 No Action Total Nitrogen Load DEL	2010 No Action Total Phosphorus Load DEL
123	1,617	86	592	43
After Implementation (lbs)				
Urban Land use acres	Total Nitrogen Load EOS	Total Phosphorus Load EOS	Total Nitrogen Load DEL	Total Phosphorus Load DEL
123	1,502	78	550	39
Urban Reduction Required		Urban Reduction Achieved		
2020 Total Nitrogen Load Allocation (DEL)	2020 Total Phosphorus Load Allocation (DEL)		2020 Total Nitrogen Load Allocation	2020 Total Phosphorus Load Allocation
487	27		550	39
Percent Reduction from Baseline (%)		Percent reduction Achieved (%)		
Nitrogen	Phosphorus		Nitrogen	Phosphorus
18	37	<b>Percent Urban Area Treated</b>	7	10
<u>URBAN BMP IMPLEMENTATION</u>				
Tree Planting		0		
Urban Nutrient Management		37		
Filtering Practices		1		
Infiltration Practices		0		
Wet Ponds		0		
Dry Extended Detention Ponds		0		
Dry Ponds		10		
"Retrofit BMP"		0		

## **Forest Glen Annex Input to Montgomery County and Maryland Department of Environment Watershed Implementation Plan Phase II**

*.\*Although there was a TSS allocation in the spreadsheet, since phosphorus tends to bind to sediments, no calculator was provided to DoD for meeting the TSS allocations. We are operating under the assumption that the TSS allocations will be achieved via the required reductions for phosphorus and subsequent BMP implementation (MDE response).*

### **III. Forest Glen Annex Programmatic Two Year Milestones 2012-2013:**

#### **AGRICULTURAL**

Not applicable - Forest Glen Annex does not have agricultural land use.

#### **URBAN STORMWATER MANAGEMENT RETROFITS**

Forest Glen Annex participated in the "Army Chesapeake Bay Total Maximum Daily Load Pilots" which was completed under the National Defense Center for Energy and Environment (NDCEE). Under this Task, a TMDL Baseline Assessment was completed for Forest Glen Annex. This Baseline Assessment documented/confirmed land use categories and activities that would be relevant to the TMDL. The results of this assessment are documented in the "Final TMDL Baseline Assessment Report for Fort Detrick" (August 19, 2011). In addition, this Task created an inventory of current Best Management Practices (BMPs) in place at Forest Glen, which included their geographical locations, the treatment areas for the BMPs, and detailed descriptions for type of BMP. The results of this BMP inventory and assessment are documented in the "Final Watershed Implementation Plan Model and TMDL Monitoring Strategy for Fort Detrick" (August 23, 2011).

The treatment area acreage associated with identified BMPs, including three dry detention ponds, a filtering practice, and urban nutrient management practices, was determined using geographical information system (GIS) data. A total of 46 pervious urban acres are subjected to urban nutrient management. The three dry detention ponds combined treat a total of six pervious urban acres, and seven impervious urban acres. The filtering practice treats approximately an acre of urban land. This data yield 37% treated urban area by urban nutrient management, 10% treated urban area by dry detention ponds, and 1% treated area by a filtering practice.

#### **SEPTIC SYSTEM UPGRADES**

Not applicable - Forest Glen Annex does not have any septic systems.

#### **WASTEWATER TREATMENT PLANT DATA**

Not applicable - Forest Glen Annex does not have a waste water treatment plant.

#### **PROGRAMMATIC 2-YEAR MILESTONES**

Fort Detrick, who is responsible for Forest Glen, has funded the following two projects:

- Identification of potential stormwater BMPs at Fort Detrick and Forest Glen to improve water quality
- Preparation of Federal Facility Opportunity Assessments for Fort Detrick and Forest Glen

## **Forest Glen Annex Input to Montgomery County and Maryland Department of Environment Watershed Implementation Plan Phase II**

The first project will expand on the BMP assessment already completed at Forest Glenn, by providing a Concept Plan that will evaluate the feasibility of implementing water quality improvements, in the form of BMPs, to minimize pollutants discharged in stormwater runoff. The Plan will include concept designs of the BMPs with costs and maintenance schedules. The Concept Plan completion date is March 10, 2012.

The second listed project is to develop a Federal Facility Opportunity Assessment for Forest Glen Annex. This document will be prepared in accordance with the April 2011 "Guide for Federal Lands and Facilities' Role in Chesapeake Bay Jurisdictions' Phase II Watershed Implementation Plans". The project completion date is September 30, 2012.

### **IV. Successes:**

- Forest Glen Annex has developed an inventory of the existing BMPs, and has collected the necessary information to determine the current loads as required for the Chesapeake Bay TMDL. Funding has already been committed to two TMDL-related projects, which will expand on the previous TMDL efforts completed at Forest Glen Annex, in order to provide conceptual designs for future BMPs; and to develop a Federal Facility Opportunity Assessment which will be used to communicate TMDL-related information to the regulatory community.

### **V. Challenges:**

- The land use data provided by the Phase 5.3 Model is of a broad nature and does not contain the detail that is included in the land use data available for Forest Glen Annex. The broad resolution of Phase 5.3 Model land use designations often results in inaccurate land use data, especially for smaller facilities.
- The MDE Reduction Calculator does not account for a street sweeping BMP and simplifies reduction efficiencies. Reduction efficiencies vary with parameter, soil type, and underdrain presence and this is not captured by the Reduction Calculator.
- Funding for projects needed to reduce loading from the garrison is contingent upon authorization and appropriation of funds in accordance with appropriate statutes. This includes the U.S. Congress, Department of Defense, Department of the Army and the Army's Installation Management Command. Fort Detrick will be competing for funding against all of the Army's other requirements and there is no guarantee that funding will be available. Fort Detrick will make every effort to obtain necessary funding, but changes in priorities or budget constraints would mean a project or projects may not be executed as planned. Funding is expected to be exceptionally lean in fiscal years 2012 and 2013.

### **VI. Inaccuracies:**

- This Forest Glen Annex site, referred to as Walter Reed Hospital Annex in the USEPA GIS layer and corresponding Federal target loads calculator, should now be referred to as Forest Glen Annex.
- In calculation of the BMP treatment area land use, the facility specific GIS landuse information was used instead of the Phase 5.3 Model land use which cannot be geospatially analyzed.
- Several BMPs entered in the Urban\_Summary\_Sheet of the Reduction Calculator also treat some non-urban acreage. Therefore the total treated acreage and reductions are higher than shown in the Reduction Calculator, which only considers urban acreage.

## **Forest Glen Annex Input to Montgomery County and Maryland Department of Environment Watershed Implementation Plan Phase II**

- The property boundary for the Forest Glen Annex from the Phase 5.3 Chesapeake Bay Watershed Model (Phase 5.3 Model) federal facility segmentation is not consistent with the actual property boundary.
- Agricultural land is incorporated into Forest Glen Annex, when in reality there is no agricultural land use at the facility.
- Work recently completed at Forest Glen Annex created an inventory of current BMPs, and categorized the existing BMPs into those installed in 2005 to 2011 and those installed in 1985 to 2004. Urban acres treated for both BMPs installed in 2005 to 2011 and BMPs installed in 1985 to 2004 were added to the “Percentage Applied” section of the Urban\_Summary\_Sheet of the MDE Reduction Calculator. No BMPs were included on the “Current BMP Acres” tab in the MDE Reduction Calculator. Only treated urban acreage was included in the Urban\_Summary\_Sheet even though several of these BMPs treat non-urban acreage as well.



# **Fort Detrick Input to Frederick County and Maryland Department of Environment Watershed Implementation Plan Phase II**

## **I. Fort Detrick**

Fort Detrick is a U.S. Army Garrison (USAG) managed by the U.S. Army Installation Management Command. Fort Detrick includes non-contiguous land parcels designated as Areas A, B and C. Area A is approximately 730 acres in area and is the most developed portion of Fort Detrick. Area A includes the U.S. Army Garrison offices, most of the infrastructure and support facilities, housing areas, and a majority of the tenant or mission partners' offices and facilities. Area B is situated west-southwest of Area A and west of Rosemont Avenue. Area B is approximately 400 acres in area and contains most of the installation's unimproved or semi-improved land. Pastures and forest blocks are the predominant features in Area B, although it also includes a limited number of tenant facilities. Area B is primarily utilized for agricultural research and animal grazing and maintenance. This area is primarily surrounded by tract development. Area B also contains the Fort Detrick Municipal Landfill. Area C is classified as industrial and consists of two small parcels located along the west bank of the Monocacy River, approximately 1 mile east of Area A. The northern tract of Area C is approximately 7 acres in area and contains the Fort Detrick water treatment plant (WTP). The southern tract lies one quarter mile downstream from the WTP, is approximately 9 acres in area, and contains the Fort Detrick wastewater treatment plant (WWTP). Areas A, B, and C, are located within Frederick County, Maryland. Within Frederick County, Fort Detrick-Frederick encompasses approximately 1,212 acres. The USAG, Fort Detrick, has command and control of approximately 1,143, and the National Cancer Institute at Frederick (NCI-Frederick) has command and control of approximately 69 acres. The NCI-Frederick is "on" Fort Detrick, yet it is not on Army-controlled land. USAG also has command and control of the Forest Glen Annex (132 acres) and Glen Haven Housing Area (20 acres) in Montgomery County, Maryland. Forest Glen Annex (Walter Reed Hospital Annex) provided input in a separate document because it is identified as a separate entity by the U.S. EPA and it is located in a different county. No urban acreage was identified at the Glen Haven Housing Area.

Fort Detrick is located within the Monocacy River drainage basin, a sub-basin of the Middle River Potomac basin and is within the subwatershed POTTF\_MD. The Monocacy River basin covers approximately 800 square miles within the 14,000 square mile Potomac River watershed. The Monocacy River originates at the Maryland-Pennsylvania border and flows southerly to the east of Fort Detrick, and is the largest tributary of the Potomac River, which in turn is the second largest tributary of the Chesapeake Bay. Several major streams (Carroll Creek, Tuscarora Creek) are located in the vicinity of Fort Detrick and flow to the Monocacy River. Fort Detrick's subwatersheds include Carroll Creek and the Monocacy River.

The USAG, Fort Detrick provides sustainable base operations support, quality of life programs, and environmental stewardship to facilitate the sustainment of vital national interests. The USAG, Fort Detrick supports five cabinet-level agencies: The Department of Defense, Department of Veteran Affairs, Department of Agriculture, Department of Homeland Security and Department of Health and Human Services. Within the DoD, Fort Detrick supports elements of all four military services. The primary missions of Fort Detrick-Frederick include biomedical research and development, medical logistics and materiel management, and global DoD telecommunications. Fort Detrick-Frederick is home to the U.S. Army Medical Research and Materiel Command (USAMRMC), the National Interagency Confederation for Biological Research (NICBR), the NCI-Frederick, and 37 other mission partners.

**Fort Detrick Input to Frederick County  
and Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**II. Fort Detrick Baseline Loadings November 2011\*:**

Municipality: Fort Detrick

County: Frederick County

Total Urban Acres identified by MDE located in Frederick County: 396

Table 1. Urban Land Initial and Current Loads and Urban Reductions Required and Achieved from MDE Reduction Calculator

Initial Loads (lbs)				
2010 No Action Urban Land use acres	2010 No Action Total Nitrogen Load EOS	2010 No Action Total Phosphorus Load EOS	2010 No Action Total Nitrogen Load DEL	2010 No Action Total Phosphorus Load DEL
396	8,570	481	5,038	225
After Implementation (lbs)				
Urban Land use acres	Total Nitrogen Load EOS	Total Phosphorus Load EOS	Total Nitrogen Load DEL	Total Phosphorus Load DEL
396	7,016	349	4,125	164
Urban Reduction Required		Urban Reduction Achieved		
2020 Total Nitrogen Load Allocation (DEL)	2020 Total Phosphorus Load Allocation (DEL)		2020 Total Nitrogen Load Allocation	2020 Total Phosphorus Load Allocation
4,031	154		4,125	164
Percent Reduction from Baseline (%)		Percent reduction Achieved (%)		
Nitrogen	Phosphorus		Nitrogen	Phosphorus
20	32	<b>Percent Urban Area Treated</b>	18	27
<u>URBAN BMP IMPLEMENTATION</u>				
Tree Planting		0		
Urban Nutrient Management		76		
Filtering Practices		2		
Infiltration Practices		0		
Wet Ponds		25		
Dry Extended Detention Ponds		0		
Dry Ponds		4		
"Retrofit BMP"		0		

## **Fort Detrick Input to Frederick County and Maryland Department of Environment Watershed Implementation Plan Phase II**

*\*Although there was a TSS allocation in the spreadsheet, since phosphorus tends to bind to sediments, no calculator was provided to DoD for meeting the TSS allocations. We are operating under the assumption that the TSS allocations will be achieved via the required reductions for phosphorus and subsequent BMP implementation (MDE response).*

### **III. Fort Detrick Programmatic Two Year Milestones 2012-2013:**

#### **AGRICULTURAL**

Fort Detrick has experimental agricultural lands and lands dedicated to boarding of animals. Fort Detrick contains several areas used for animal boarding. Animal litter and bedding (approximately 5% manure, 95% bedding) is the only fertilizer used on these fields, which is applied about three times per year. Fort Detrick boards a variety of grazing animals, including goats, horses, and alpaca. For all of these boarded animals, agricultural pasture land use is considered a nonpoint source.

#### **URBAN STORMWATER MANAGEMENT RETROFITS**

Fort Detrick participated in the “Army Chesapeake Bay Total Maximum Daily Load Pilots”, which was completed under the National Defense Center for Energy and Environment (NDCEE). Under this Task, a TMDL Baseline Assessment was completed for Fort Detrick to identify and document all TMDL-relevant data. This Baseline Assessment documented/confirmed land use categories and activities that would be relevant to the TMDL. The results of this assessment are documented in the “Final TMDL Baseline Assessment Report for Fort Detrick” (August 19, 2011). In addition, this Task created an inventory of current Best Management Practices (BMPs) in place at Fort Detrick, which includes their geographical locations, the treatment areas for the BMPs, and detailed descriptions for type of BMP. The results of this BMP inventory and assessment are documented in the “Final Watershed Implementation Plan Model and TMDL Monitoring Strategy for Fort Detrick” (August 23, 2011).

#### **SEPTIC SYSTEM UPGRADES**

Fort Detrick has a major wastewater treatment plant (WWTP) which services a majority of the installation. There are six septic systems that contain either holding tanks or leach fields at Fort Detrick. Most of these septic tanks are pumped on an on-call or as needed basis, although the Area B tanks are used and pumped less often.

#### **WASTEWATER TREATMENT PLANT DATA**

The Fort Detrick WWTP (NPDES permit MD0020877) is located on a 9-acre tract of Area C, on the west bank of the Monocacy River. As part of the NPDES permit, monitoring (Outfall 001) is required for various TMDL-relevant parameters, including total suspended solids (TSS), total Kjeldahl nitrogen (TKN), and TP twice per week, as well as TN, ammonia, nitrite plus nitrate, organic nitrogen, and ortho-phosphorus twice per month. The monitoring results are documented in Discharge Monitoring Reports (DMRs), which are submitted monthly to MDE. The WWTP is one of 68 significant WWTPs in Maryland based on capacity and as such, is subject to the Enhanced Nutrient Removal (ENR) goals of the 2000 Chesapeake Bay Agreement. The WWTP was upgraded (July 2011) to include Enhanced Nutrient Reduction and is discharging IAW with the permit limits.

#### **PROGRAMMATIC 2-YEAR MILESTONES**

Fort Detrick has funded the following three projects:

## **Fort Detrick Input to Frederick County and Maryland Department of Environment Watershed Implementation Plan Phase II**

- Identification of potential stormwater BMPs at Fort Detrick and Forest Glen to improve water quality
  - This project will expand on the BMP assessment already completed at Fort Detrick, by providing a Concept Plan that will evaluate the feasibility of implementing water quality improvements, in the form of BMPs, to minimize pollutants discharged in stormwater runoff. The Plan will include concept designs of the BMPs with costs and maintenance schedules. The Concept Plan completion date is March 10, 2012.
- Preparation of Federal Facility Opportunity Assessments for Fort Detrick and Forest Glen
  - This project is to develop a Federal Facility Opportunity Assessment for Fort Detrick and Forest Glen Annex. This document will be prepared in accordance with the April 2011 "Guide for Federal Lands and Facilities' Role in Chesapeake Bay Jurisdictions' Phase II Watershed Implementation Plans". The project completion date is September 30, 2012.
- Preparation of a Storm Water Master Plan for Areas A and B at Fort Detrick.
  - This project is to develop a Storm Water Master Plan that covers Areas A and B at Fort Detrick to establish a revised baseline for stormwater management planning and to streamline compliance with MDE stormwater regulations, as well as the ongoing TMDL efforts.

### **IV. Successes:**

- Fort Detrick has developed an inventory of its existing BMPs, and has collected the necessary information to determine the current loads as required for the Chesapeake Bay TMDL. Funding has already been committed to three TMDL-related projects, which will expand on the previous TMDL efforts completed at Fort Detrick, in order to provide conceptual designs for future BMPs; to develop a document which communicates TMDL-related information to the regulatory community; and, to develop a Storm Water Master Plan which will maintain all stormwater data in one central location, which will assist Fort Detrick in achieving compliance with the recent Chesapeake Bay TMDL regulations.

### **V. Challenges:**

- The land use data provided by the Phase 5.3 Model is of a broad nature and does not contain the detail that is representative of the actual land use data available for Fort Detrick. The broad resolution of Phase 5.3 Model land use designations often results in inaccurate land use data.
- The MDE Reduction Calculator does not account for a street sweeping BMP and simplifies reduction efficiencies. Reduction efficiencies vary with parameter, soil type, and underdrain presence and this is not captured by the Reduction Calculator.
- Funding for projects needed to reduce loading from the garrison is contingent upon authorization and appropriation of funds in accordance with appropriate statutes. This includes the U.S. Congress, Department of Defense, Department of the Army and the Army's Installation Management Command. Fort Detrick will be competing for funding against all of the Army's other requirements and there is no guarantee that funding will be available. Fort Detrick will make every effort to obtain necessary funding, but changes in priorities or budget constraints would mean a project or projects may not be executed as planned. Funding is expected to be exceptionally lean in fiscal years 2012 and 2013.

### **VI. Inaccuracies:**

## Fort Detrick Input to Frederick County and Maryland Department of Environment Watershed Implementation Plan Phase II

- In calculation of the BMP treatment area land use, the facility specific GIS landuse information was used instead of the Phase 5.3 Model land use which cannot be geospatially analyzed. However, in the case of urban nutrient management, a ratio of pervious urban land treated using the facility specific GIS landuse information was used to represent treated acreage.
- Several BMPs entered in the Urban\_Summary\_Sheet of the Reduction Calculator also treat some non-urban acreage. Therefore the total treated acreage and reductions are higher than shown in the Reduction Calculator, which only considers urban acreage.
- Work recently completed at Fort Detrick to complete an inventory of current BMPs categorized the existing BMPs into those installed in 2005 to 2011 and those installed in 1985 to 2004. Only the urban acres treated for BMPs installed in 2005 to 2011 were added to the “Percentage Applied” section of the Urban\_Summary Sheet of the MDE Reduction Calculator. It was assumed that the “Current BMP Acres” tab in the MDE Reduction Calculator was meant to capture the BMPs installed in 1985 to 2004, however the 53.1 acres of wet pond and wetland is not accurate. For the BMPs installed in 1985 to 2004, Fort Detrick actually installed and maintains the BMP types listed in the table below. Total treated urban acreage only is shown even though several of these BMPs treat non-urban acreage as well.

BMP Type	Pervious Urban Acres Treated	Impervious Urban Acres Treated
Dry Ponds/Stormceptors	26.97	47.63
Filtering	32.8	137.2
Wet Pond/Wetland	28.7	55.5

- The reduction calculator includes 53.1 acres of Wet Ponds and Wetland acres. Per guidance from MDE, the 53.1 acres were subtracted from Wet Ponds acres identified for the period of 2005 to 2011. The lack of resources to identify the BMPs inputs used in the model calibration leads to inaccuracies in the reduction calculations.

**Fort Meade Input to Anne Arundel County  
and Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Fort George G. Meade**

Fort George G. Meade is a U.S. Army Garrison managed by the U.S. Army Installation Management Command. Fort Meade located entirely in Anne Arundel County, Maryland. The 5,315-acre post is situated halfway between two metropolitan areas, 17 miles southwest of Baltimore and 24 miles northeast of Washington, D.C. Approximately 412 acres in the northeast portion of Fort Meade drains to the Severn River Watershed, while the remaining acres drain to the Little Patuxent River Watershed. The Architect of the Capital, located at Fort Meade, is a landowner with about 100 acres.

Fort Meade provides a wide range of services to 95 partner organizations from the Army, Navy, Air Force, Marines and Coast Guard, as well as to several federal agencies including the National Security Agency, the U.S. Army Recruiting Command, the Defense Information School, the Defense Courier Service, the U.S. Army Field Band, the U.S. Cyber Command, and the Architect of the Capital.

On-base stormwater drains both northeast to the Severn River (Sub-basin 02-13-10) and south to the Little Patuxent River Area (Sub-basin 02-13-11), as defined by the MDE in COMAR 26.08.02.08. Approximately 85% of the base drains into the Little Patuxent while the rest drains into the Severn. The use designation for both of the drainage areas for these sub-basins is I-P. Use designation I-P is for water contact recreation, protection of aquatic life and public water supply.

**II. Fort Meade Baseline Loadings November 2011\*:**

**Municipality: Fort Meade**

**County: Anne Arundel County (AA County)**

**Total Urban Acres identified by MDE are only located in Anne Arundel County: 3,748 acres**

Initial Loads (lbs)				
2010 No Action Urban Land use acres	2010 No Action Total Nitrogen Load EOS	2010 No Action Total Phosphorus Load EOS	2010 No Action Total Nitrogen Load DEL	2010 No Action Total Phosphorus Load DEL
3,748	50,895	3,365	41,100	2,523
After Implementation (lbs)				
Urban Land use acres	Total Nitrogen Load EOS	Total Phosphorus Load EOS	Total Nitrogen Load DEL	Total Phosphorus Load DEL
3,748	47,041	2,835	37,988	2,126
Urban Reduction Required			Urban Reduction Achieved	

**Fort Meade Input to Anne Arundel County  
and Maryland Department of Environment  
Watershed Implementation Plan Phase II**

2020 Total Nitrogen Load Allocation (DEL)	2020 Total Phosphorus Load Allocation (DEL)		2020 Total Nitrogen Load Allocation	2020 Total Phosphorus Load Allocation
33,258	1,716		37,988	2,126
Percent Reduction from Baseline (%)			Percent reduction Achieved (%)	
Nitrogen	Phosphorus		Nitrogen	Phosphorus
19	32	<b>Percent Urban Area Treated</b>	8	16
<b>URBAN BMP IMPLEMENTATION</b>				
Tree Planting		0		
Urban Nutrient Management		0		
Filtering Practices		1		
Infiltration Practices		1		
Wet Ponds		32		
Dry Extended Detention Ponds		0		
Dry Ponds		1		
"Retrofit BMP"		0		

*\*Although there was a TSS allocation in the spreadsheet, since phosphorus tends to bind to sediments, no calculator was provided to DoD for meeting the TSS allocations. We are operating under the assumption that the TSS allocations will be achieved via the required reductions for phosphorus and subsequent BMP implementation (MDE response).*

### **III. Fort Meade Programmatic Two Year Milestones 2012-2013:**

#### **AGRICULTURAL**

Fort Meade does not have agricultural land use.

#### **URBAN STORMWATER MANAGEMENT RETROFITS**

- Fort Meade, working with the United States Corps of Engineers (USACE), recently completed an installation-wide BMP inventory and assessment. USACE is developing a BMP Inventory database for reporting tracking and accountability. Fort Meade will provide a copy of the inventory to capture BMPs not already accounted for.
- Implement environmental site design requirements for new construction.
- Fort Meade completed a design to daylight a stream at the golf course. The plan is to divert existing stream flow, remove elliptical corrugated pipe, remove two concrete head walls, regrade/reconstruct stream channel and plant native plants.

# **Fort Meade Input to Anne Arundel County and Maryland Department of Environment Watershed Implementation Plan Phase II**

## **SEPTIC SYSTEM UPGRADES**

N/A. Fort Meade has no septic systems.

## **WASTEWATER TREATMENT PLANT DATA**

Fort Meade's wastewater treatment plant is privatized; the permit was transferred in August of 2010 to American Water Operations and Maintenance, Inc.

## **PROGRAMMATIC 2-YEAR MILESTONES**

- Fort Meade is working with USACE to develop an Opportunity Assessment outlining Fort Meade plan by two year increments toward 2020 (2012) that will aim to meet the expected complete load reduction over time.
- Continue to support applicable watershed jurisdictions Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
- Implement Army Policy for Sustainable Design and Development (SDD) and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage storm water for all future construction and maintenance projects. (2012).

## **IV. Successes:**

The WIP Phase II process required collaborative involvement from Maryland Department of Environment (MDE), Fort Meade and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP II timelines, two year milestones and critical progress milestones in 2017 and 2020, Fort Meade successfully conducted a comprehensive assessment of each BMP on the Installation to ensure the data listed below was accurate.

- Accurate latitude and longitude locations for each BMP
- Number of acres treated for each BMP
- Date of BMP installation
- Condition of BMP

Additionally, Fort Meade was an active participant in the Anne Arundel Pilot Program for the WIP Process. Their participation in the program provided lessons learned that were used to assist other Army Installations within the Watershed. Going forward with this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense, a Federal agency leading by example.



## **Fort Meade Input to Anne Arundel County and Maryland Department of Environment Watershed Implementation Plan Phase II**

Approximately 1,052 acres of Fort Meade's property drains to Burba Lake, 66-acre feet or 21.4 million gallons of water storage. In 2007, Fort Meade recently added 12 aerators in the lake to improve water quality.

### **V. Challenges:**

- Funding for projects needed to reduce loading from the garrison is contingent upon authorization and appropriation of funds in accordance with appropriate statutes. This includes the U.S. Congress, Department of Defense, Department of the Army and the Army's Installation Management Command. Fort Meade will be competing for funding against all of the Army's other requirements and there is no guarantee that funding will be available. Fort Meade will make every effort to obtain necessary funding, but changes in priorities or budget constraints would mean a project or projects may not be executed as planned. Funding is expected to be exceptionally lean in fiscal years 2012 and 2013.
- Fort Meade used the load reduction calculation spreadsheet provided by MDE to address effectiveness calculations for urban BMPs on urban land use. In order to use the spreadsheet Fort Meade needed to calculate load per acre. This required a substantial amount of understanding about GIS, land use data and modeling in order to validate urban areas, # urban acres treated, load per acre of reduction, etc. There was no manual for how to use the spreadsheet, and therefore inaccuracies or inconsistencies may result in how this information is calculated and entered into the spreadsheet. A step by step user manual may be helpful going forward.

### **VI. Inaccuracies:**

- MDE land use (USGS) and the AA County land use in GIS and the AA County land use is more refined and accurate while the MDE land use (USGS) is general. For the purposes of this exercise, when you overlay the MDE and AA County the MDE appears to be similar and accurate enough as far as urbanized area (pervious and impervious), however this may result in some inaccuracies with urban land use acres.
- The Architect of the Capital isn't a tenant but a landowner with about 100 acres. This could result in inaccuracies or changes to urban land use acres for Fort Meade.

**US ARMY RESERVE  
COMMAND**

# 99<sup>th</sup> Reserve Command to Maryland Department of Environment Watershed Implementation Plan Phase II

## I. 99<sup>th</sup> Reserve Command Center (RSC)

The Maryland Department of Environment (MDE) requested that each federal facility input loading and BMP information into a load reduction calculator (an excel spreadsheet) for urban land use to calculate required load reductions needed to meet local area targets. The Army did not receive boundary data or land cover data for the Reserve properties.

The following Sections provide a summary of the Reserve property information, base loading data for Nitrogen, Phosphorous, Sediment and the revised calculations after crediting the facilities for BMPs using the Chesapeake Bay BMP efficiency table. The 99<sup>th</sup> Reserve Command has 13 facilities (one combined) in the State of Maryland. Some Army Reserve facilities serve as tenant activities and their contribution will be represented by the host installation.

## II. Baseline Loadings

Facility Information			
Facility	Acres	County	City
1SG Adam S Brandt Memorial USARC/AMSA #83 (M) (Curtis Bay)	42.06	Anne Arundel	Baltimore, MD
Annapolis USARC	6.85	Anne Arundel	Annapolis, MD
Prince George's County Memorial USARC	5.95	Prince George	Riverdale Park, MD
Southern Maryland USARC	5.12	Prince George	Upper Marlboro, MD
Sheridan USARC	3.45	Baltimore	Baltimore, MD
Jecelin USARC #1	5.68	Baltimore City	Baltimore, MD
MG BL Hunton Memorial USARC	19.99	Montgomery	Gaithersburg, MD
Jachman USARC	10.56	Baltimore City	Baltimore, MD
Carroll County Memorial USARC	4.50	Carroll	Westminster, MD
Maus-Warfield USARC	2.69	Montgomery	Rockville, MD
Allegany Co. Soldiers Memorial USARC	4.89	Allegany	Cumberland, MD
Abingdon USAR Center	7.58	Harford	Abingdon, MD
Facility Baseline Loads			
Facility	N(lbs)	P(lbs)	S(tons)
1SG Adam S Brandt Memorial USARC/AMSA #83 (M) (Curtis Bay)	242.22	28.46	3.15
Annapolis USARC	26.45	2.2	0.36
Prince George's County Memorial USARC	77.16	8.81	1.18
Southern Maryland USARC	41.89	4.41	0.621
Sheridan USARC	19.84	2.2	0.283
Jecelin USARC #1	37.48	4.41	0.56
MG BL Hunton Memorial USARC	35.27	4.41	0.44
Jachman USARC	57.32	6.61	0.085

**99<sup>th</sup> Reserve Command to  
Maryland Department of Environment  
Watershed Implementation Plan Phase II**

Carroll County Memorial USARC	22.05	2.2	0.31
Maus-Warfield USARC	19.84	2.2	0.3
Allegany Co. Soldiers Memorial USARC	37.48	4.41	0.57
Abingdon USAR Center	63.93	6.61	0.97
<b>*Reduction Goals (Baseline Loads with BMPs)</b>			
Baseline Loadings	N(lbs)	P(lbs)	S(tons)
1SG Adam S Brandt Memorial USARC/AMSA #83 (M) (Curtis Bay)	236.17	27.58	3.04
Prince George's County Memorial USARC	77.15	8.81	1.18
Jachman USARC	37.47	4.41	0.56
*only included facilities that have BMPs			

### **III. 99<sup>th</sup> RSC Programmatic Milestones (2012-2013)**

#### **AGRICULTURAL**

Not Applicable.

#### **STORMWATER MANAGEMENT RETROFITS**

The following list of stormwater retrofits resulted in efficiencies (and therefore credits) for the following facilities:

- AMSA 83W - Infiltration Practice - 1 acre treated
- Brandt - Wet Pond - 2 acres treated
- Jachman - Dry Pond - .002 acres treated
- Prince George County Memorial - Filtering Practice - .002 acres treated

#### **SEPTIC SYSTEM UPGRADES**

Not Applicable.

#### **WASTEWATER TREATMENT PLANT DATA**

Not Applicable.

### **IV. Successes:**

The Watershed Implementation Plan (WIP) Phase II process required collaborative involvement from MDE and the Army. MDE's direct involvement with the Army and the Services played a critical role in assisting the Army with delivering accurate property information and timely loading and programmatic information as part of this WIP Phase

## **99<sup>th</sup> Reserve Command to Maryland Department of Environment Watershed Implementation Plan Phase II**

II process. Going forward this federal-state partnership example will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay demonstrating future benchmarks for progress in 2017 and 2025.

### **V. Challenges:**

- Funding for projects needed to reduce loading from the facilities is contingent upon authorization and appropriation of funds in accordance with appropriate statutes. This includes the U.S. Congress, Department of Defense and Department of the Army.
- MDE did not provide any facility loading information to the Army for these facilities which made it difficult to calculate future actions.

### **VI. Inaccuracies:**

The Army Reserve sites are very small in comparison to other Federal properties. Submittal of Reserve properties should further assist MDE in establishing a complete federal inventory for the Chesapeake Bay watershed and may alter current loadings for other federal agencies.

**US ARMY NATIONAL GUARD**

ID	Facility	Official Name (per Website)	County	Address	Acreage	No. of BMPs
24401	Olney Military Reservation	COL Henry A. Cole Reservation	Montgomery	5115 Riggs Road Gaithersburg, Maryland 20882-8455	8.06	2
24503	Adelphi Armory	Adelphi Armory	Montgomery	2600 Powder Mill Road Adelphi, Maryland 20783-1197	3.81	0
24890	Fort Ritchie	MG Boyd M. Cook Armory	Washington	13817 Ritchie Road Cascade, Maryland 21719	19.39	1
24891	Laurel Armory	PVT Henry Costin Armory	Prince Georges	8601 Odell Road Laurel, Maryland 20708-3531	23.45	1
24A05	MD Freestate Challenge Academy	MD Freestate Challenge Academy	Harford	Aberdeen Maryland 21005-5001	0.32	0
24A10	Annapolis Armory	LTC (MD) E. Leslie Medford Armory	Anne Arundel	18 Willow Street Annapolis, Maryland 21401-3113	4.94	0
24A15	Fifth Regiment	Fifth Regiment Armory	Baltimore City	29th Division Street Baltimore, Maryland 21201-2288	4.52	0
24A20	Cade Armory	LTC Melvin H. Cade Armory	Baltimore City	2620 Winchester Street Baltimore, Maryland 21216-4499	5.05	0
24A35	SFRO-Bel Air	SFRO-Bel Air	Harford	5 S Bel Air South Parkway Bel Air, Maryland 21015	0.06	0
24A40	Catonsville Armory	MG William J. Witte Armory	Baltimore	130 Mellor Avenue Catonsville, Maryland 21228-5142	3.58	0
24A45	Cheltenham Armory	Congressman Steny Hoyer Armory	Prince Georges	9900 Surratts Road Cheltenham, Maryland 20623	10.19	2
24A50	Chestertown Armory	SFC John H. Newman Armory	Kent	509 Cross Street Chestertown, Maryland 21620-9510	3.18	0
24A55	Crisfield Armory	MG (MD) Maurice D. Tawes	Somerset	8 E MAIN ST Crisfield Maryland 21817-0551	1.58	0
24A60	Cumberland Armory	CPT Thomas Price Armory	Allegany	1100 Brown Avenue Cumberland, Maryland 21502-3499	8.22	0
24A70	Dundalk Armory	CSM Gerome M. Grollman Armory	Baltimore	2101 North Point Boulevard Dundalk, Maryland 21222-1621	7.83	0
24A75	Easton Armory	BG Louis G. Smith Armory	Talbot	7111 Ocean Gateway Easton, Maryland 21601-9471	12.01	0
24A83	Phillips Army Airfield (APG)	Phillips Army Airfield	Harford	Aberdeen Maryland 21005-5001	0.82	0
24A85	Edgewood Armory	Edgewood Armory	Harford	Aberdeen Proving Ground (EA), Bldng. E4305 Aberdeen, Maryland 21012-5420	112.73	0
24A87	Lauderick Creek Training Site	Lauderick Creek Training Site	Harford	2624 Fairview Point Road Edgewood, Maryland 21040	1176.6	2
24A90	Elkton Armory	LTC James Victor McCool Armory	Cecil	101 Railroad Avenue Elkton, Maryland 21921-5535	1.17	0
24A95	Ellicott City Armory	BG Thomas B. Baker Armory	Howard	4244 Montgomery Road Ellicott City, Maryland 21043-6096	5.57	0
24A99	Frederick Armory	CPT Michael Cresap Armory	Frederick	8501 Baltimore Road Frederick, Maryland 21701-6758	13.98	0
24B15	Gunpowder Military Reservation (and Purnell Armory)	Gunpowder Military Reservation (and Purnell Armory)	Baltimore	10901 Notchcliff Road Glen Arm, Maryland 21057-9998	253.97	2
24B20	Glen Burnie Armory	First Regiment Armory	Anne Arundel	14 Dorsey Road Glen Burnie, Maryland 21061-3203	3.92	0

ID	Facility	Official Name (per Website)	County	Address	Acreage	No. of BMPs
24B25	Greenbelt Armory	MG (Brevet) John R. Kenly Armory	Prince Georges	7100 Greenbelt Road Greenbelt, Maryland 20770-3398	8.03	0
24B31	Hagerstown Armory	BG (MD) Randolph Millholland & CW4 Lloyd May Arm.	Washington	18500 Roxbury Road Hagerstown, Maryland 21740-9538	17.31	1
24B33	Lil-Aaron Straus Wilderness Area	BG Thomas B. Baker Training Site	Allegany	11110 Ziegler Road Hancock, Maryland 21750-9999	913.5	0
24B35	Havre de Grace Military Reservation	Havre de Grace Military Reservation	Harford	301 Old Bay Lane Have de Grace, Maryland 21078-4094	75.88	2
24B55	La Plata Armory	BG William Smallwood Armory	Charles	14 West Hawthorne Drive La Plata, Maryland 20646-9801	3.27	0
24B65	Fort Geo G Meade	Fort Geo G Meade**	Anne Arundel	2253 Huber Road RD Fort Meade Maryland 20755-5101	0.46	0
24B80	Parkville Armory	CW4 Melvin Sherr Armory	Baltimore	3727 Putty Hill Avenue Baltimore, Maryland 21236-3509	13.86	0
24B85	PAX River Armory	Patuxent River Readiness Center	St. Mary's	48000 Pine Hill Run Road Lexington Park, Maryland 20653	12.43	1
24B90	Pikesville Military Reservation	110th Reg./BG (MD) John S. Edwards Admin. Bldg.	Baltimore	610 Reisterstown Road Baltimore, Maryland 21208-5197	14.13	0
24C00	Prince Frederick Armory	Comptroller Louis L. Goldstein Armory	Calvert	Box 6, Old State Road Prince Frederick, MD 20678-0006	3.92	0
24C03	Camp Fretterd Training Site	Camp Fretterd Training Site	Baltimore	5526 Rue Saint Lo Drive Reisterstown, Maryland 21136	587.33	9
24C04	SFRO-Reisterstown, MD	SFRO-Reisterstown, MD**	Baltimore	10 N FRANKLIN BOULEVARD Reisterstown Maryland 21136	0.04	0
24C05	Queen Anne Armory	COL Victor P. Gillespe Armory	Queen Annes	3011 Starr Road Queen Anne, Maryland 21657-0188	14.7	0
24C10	Salisbury Armory	CSM Blair Lee Crocket Armory	Wicomico	28722 Ocean Gateway Salisbury, Maryland 21801-8904	10.24	4
24C11	Salisbury Swing Space	Salisbury Swing Space	Wicomico	Unknown	13.69	1
24C20	Ruhl Armory	MG (MD) Harry C. Ruhl & CSM James Peacock Armory	Baltimore	1035 York Road Towson, Maryland 21204-2517	6.2	1
24C21	Towson (Old) Armory	Towson (Old) Armory	Baltimore	307 Washington Avenue Towson, Maryland 21204-4765	0.64	0
24C31	Westminster Armory	MG Henry C. Evans Armory	Carroll	350 Hahn Road Westminster, Maryland 21157-4699	10.03	2
24C33	Webster Field	Webster Field	St. Marys	Bldg. 3315 Lexington Park, Maryland 20653	3.56	0
24C35	White Oak Armory	MG George M. Gelston Armory	Montgomery	12200 Cherry Hill Road Silver Spring, Maryland 20904-1690	13.14	0

PENDING DISPOSAL

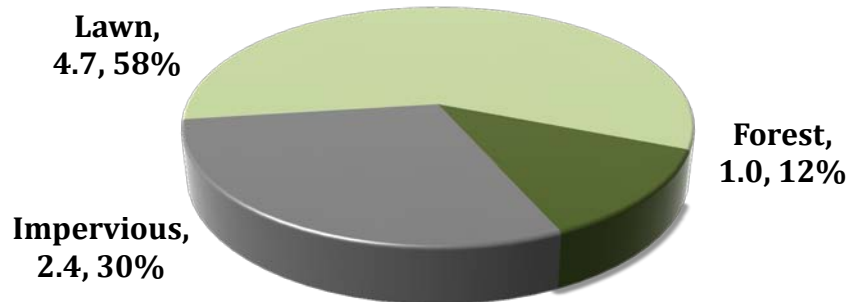


**Olney Military Reservation (24401, COL Henry A. Cole Reservation)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Olney Military Reservation**

The Olney Military Reservation is located in the unincorporated areas of Montgomery County, near the intersection of Riggs Road and Ripplemead Drive. The 8.1 acre facility was redeveloped in 2010, with the construction of a new building and new stormwater infrastructure.

The Olney Military Reservation is located in a rural portion of the mostly urbanized Montgomery County. 30-percent of the 8.1 acre site (2.4 acres) is categorized as low intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 58-percent of the site (4.7 acres) is categorized as low intensity pervious urban land cover, or lawns. The remaining 12-percent (1.0 acre) is forested.



**II. Olney Military Reservation Baseline Loadings March 2012:**

**Facility Size: 8.1 acres**

**Local Watershed: Hawlings River**

**Regional Watershed: Patuxent River**

The Olney Military Reservation contains a stormwater system consisting of 8 stormwater inlets, two stormwater manholes, and approximately 1,400 linear feet of corrugated metal, HDPE, and concrete piping and open drainage channels. The majority of this infrastructure was constructed in 2010. The stormwater system conveys runoff into two bioretention cells that also function as stormwater ponds.

Figure 1 shows the two stormwater BMPs on the Olney Military Reservation treat 3.0 acres of the 8.1 acre facility (37-percent). Both BMPs, which were recently constructed, are in excellent condition and functioning properly at the time of this study. The BMPs collectively reduce TN loads by 31-percent and TP loads by 26-percent.

**Olney Military Reservation (24401, COL Henry A. Cole Reservation)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Figure 1: Existing BMP Reductions at 24001**

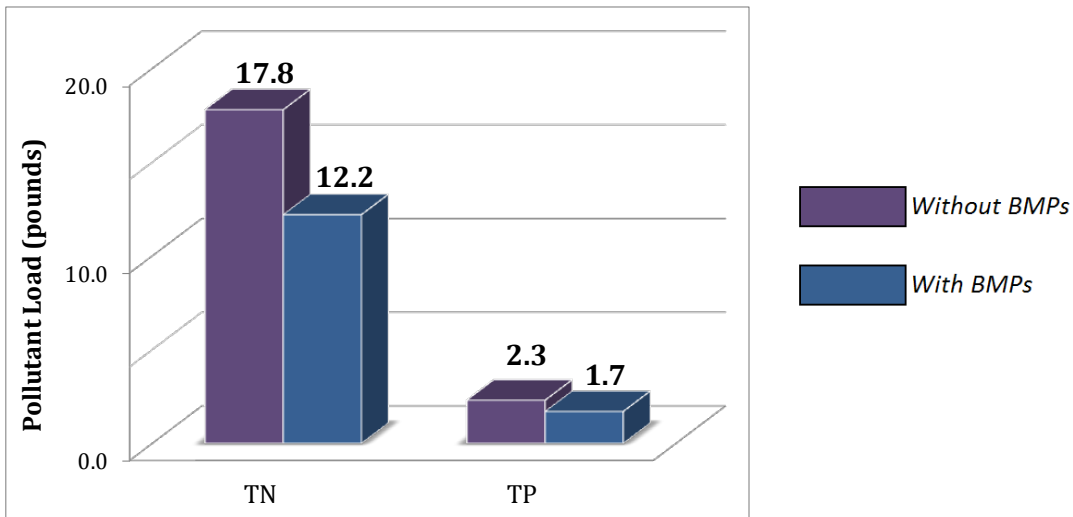


Table 1 shows the existing baseline pollutant loads for the Olney Military Reservation, which includes the reduction of pollutants associated with the existing stormwater BMPs.

**Table 1: Baseline Pollutant Loads for 24001 (including BMP reduction)**

<b>Site: 24001-Olney Military Reservation (COL Henry A. Cole Reservation)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	12.2
TP	1.7

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Olney Military Reservation will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Olney Military Reservation will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and

**Olney Military Reservation (24401, COL Henry A. Cole Reservation)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Olney Military Reservation and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, Olney Military Reservation conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

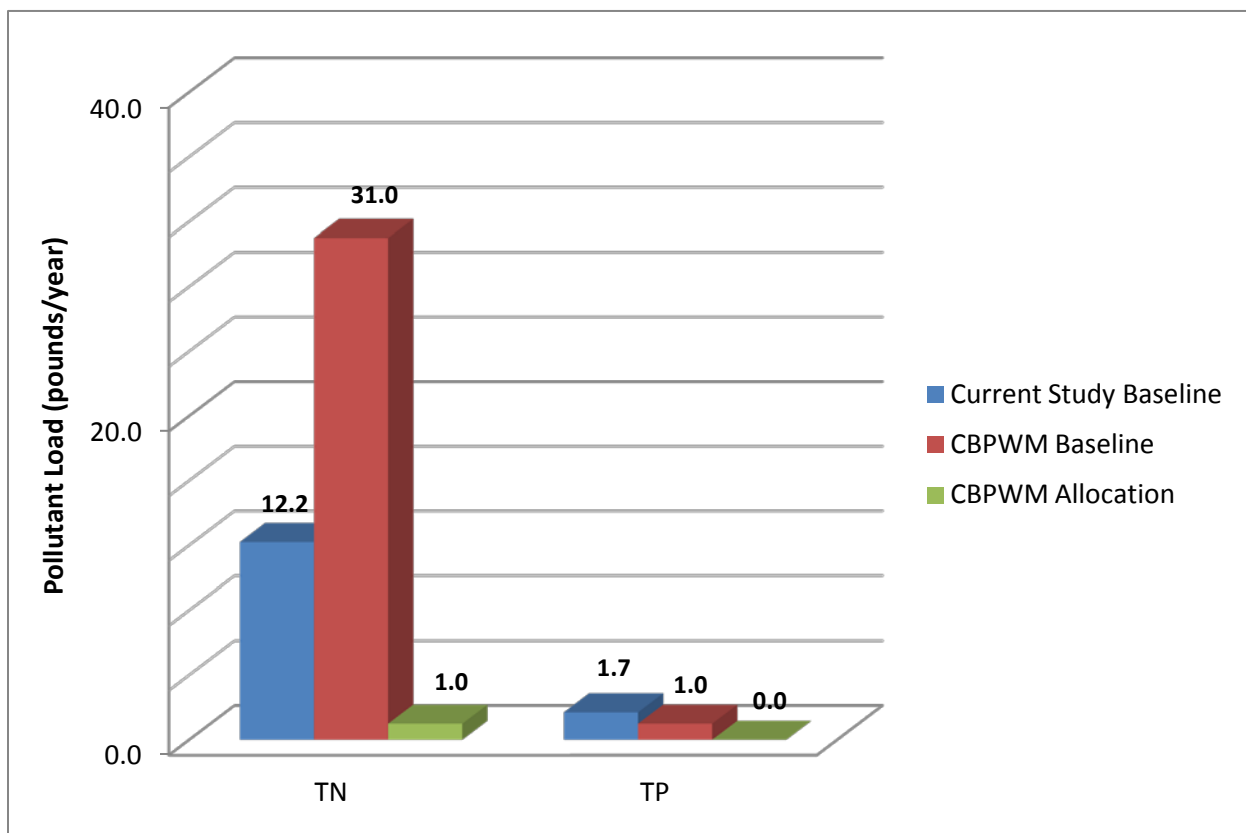
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- BMPs identified on this site are not included in the load calculations. These inaccuracies may result in changes to the expected load reduction for this facility.
- Table 2 and Figure 2 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Olney Military Reservation (24401, COL Henry A. Cole Reservation)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24401**

<b>Site: 24401- Olney Military Reservation (COL Henry A. Cole Reservation)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	12.2	31.0	1.0
TP	1.7	1.0	0.0

**Figure 2: Difference Between Facility Baseline Load Estimates**

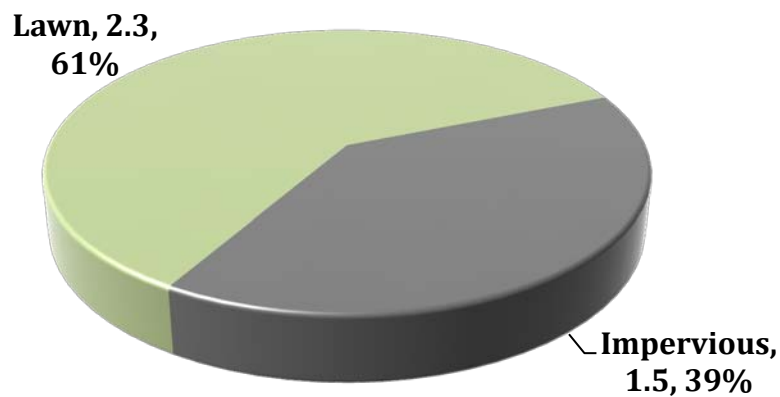


**Adelphi Armory (24503, Adelphi Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Adelphi Army National Guard Armory**

Adelphi Armory (24503, Adelphi Armory) is located along Powder Mill Road in Montgomery County, Maryland, just outside of College Park, Maryland. It is a component of Adelphi Laboratory.

The Adelphi Armory is located in a highly urbanized portion of Montgomery County. 39-percent of the 3.8 acre site (1.5 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 61-percent of the site (2.3 acres) is categorized as high intensity pervious urban land cover, or lawns.



**II. Adelphi Armory Baseline Loadings March 2012:**

**Facility Size: 3.8 acres**

**Local Watershed: Paint Branch**

**Regional Watershed: Northeast Branch, Anacostia River**

The eastern portion of the Adelphi Armory drains to an on-site stormwater system consisting of two stormwater inlets, one stormwater manhole, and approximately 240 linear feet of corrugated metal piping. This stormwater system, along with overland flow from the western portion of the site, flows into the Montgomery County stormwater system. There are no existing stormwater BMPs at this location.

Per Maryland Department of the Environment, Adelphi Armory is not considered an independent entity and is included as a component of Adelphi Laboratory. Table 1 shows the baseline loadings for Adelphi Armory.

**Adelphi Armory (24503, Adelphi Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 1: Baseline Loadings for 24503**

<b>Site: 24503-Adelphia Armory</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	22.5
TP	2.7

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Adelphi Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Adelphi Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Adelphi Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, Adelphi Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**Adelphi Armory (24503, Adelphi Armory)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

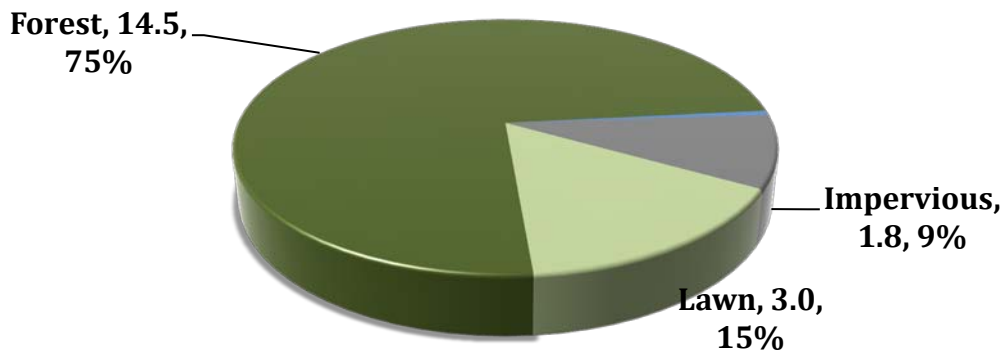
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- The Adelphi Armory is combined with other non-agricultural Federal lands in Land-River Segment F24033 PL1\_4540\_0001 of the CBPWM. Therefore specific baseline loads and allocations for this facility are not available.

**Fort Ritchie (24890, MG Boyd M. Cook Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Fort Ritchie Army National Guard Armory**

Fort Ritchie is located in Washington County, Maryland. The 19.4 acre facility is on Ritchie Road approximately 5 miles northeast of Smithsburg, Maryland. Stormwater from the developed portions of the steep terrain on this site flows westerly into a stormwater system that outfalls into a stormwater wet pond in the southwestern portion of the property.

Fort Ritchie is located in a heavily forested, mountainous region of Washington County. 9-percent of the 19.4 acre site (1.8 acres) is categorized as low intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. Fifteen percent of the site (3.0 acres) is categorized as low intensity pervious urban land cover, or lawns. The remaining 76-percent (14.7 acres) is forested or open water.



**II. Fort Ritchie Armory Baseline Loadings March 2012:**

**Facility Size: 19.4 acres**

**Local Watershed: Falls Creek/Red Run**

**Regional Watershed: Antietam Creek**

Fort Ritchie contains a stormwater system consisting of 8 stormwater inlets, 2 stormwater manholes, 1 weir, and approximately 950 linear feet of corrugated metal, cast iron, HDPE, and concrete piping and open drainage channels. The stormwater system conveys runoff into a stormwater pond in the southwest corner of the property.

Figure 1 shows the stormwater BMP on Fort Ritchie treats 6.2 acres of the 19.4 acre facility (32-percent). The majority of the remaining 68-percent of the facility is forested. The stormwater pond was in good condition and functioning properly at the time of this study. The BMP reduces TN loads from the facility by 17-percent and TP loads by 37-percent.



**Fort Ritchie (24890, MG Boyd M. Cook Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Figure 1: Existing BMP Reductions at 24890**

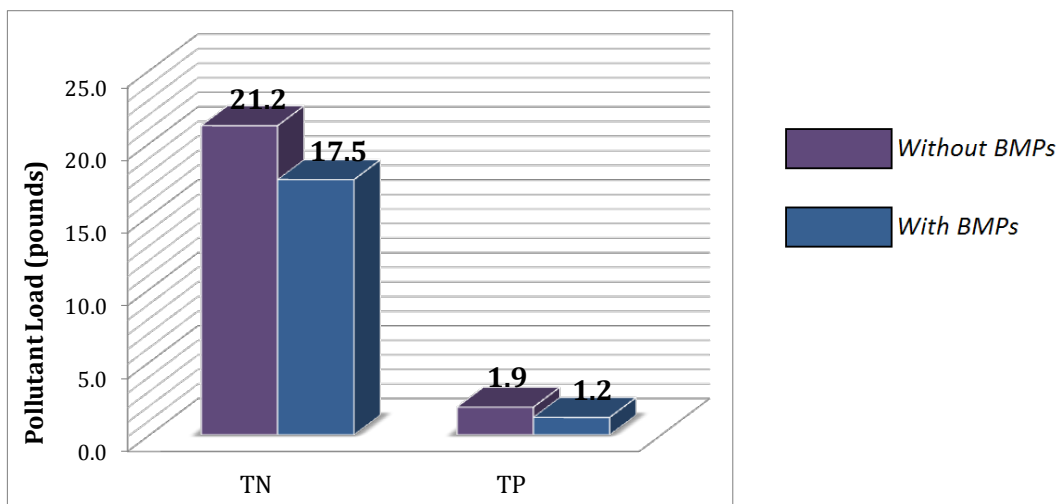


Table 1 shows the existing baseline pollutant loads for Fort Ritchie which includes the reduction of pollutants associated with the existing stormwater BMP.

**Table 1: Baseline Pollutant Loads for 24890 (including BMP reduction)**

Site: 24890- Fort Ritchie (24890, MG Boyd M. Cook Armory)	
Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)	
Pollutant	Load (Pounds per Year)
TN	17.5
TP	1.2

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Fort Ritchie will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Fort Ritchie will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**Fort Ritchie (24890, MG Boyd M. Cook Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Fort Ritchie and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, Fort Ritchie conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

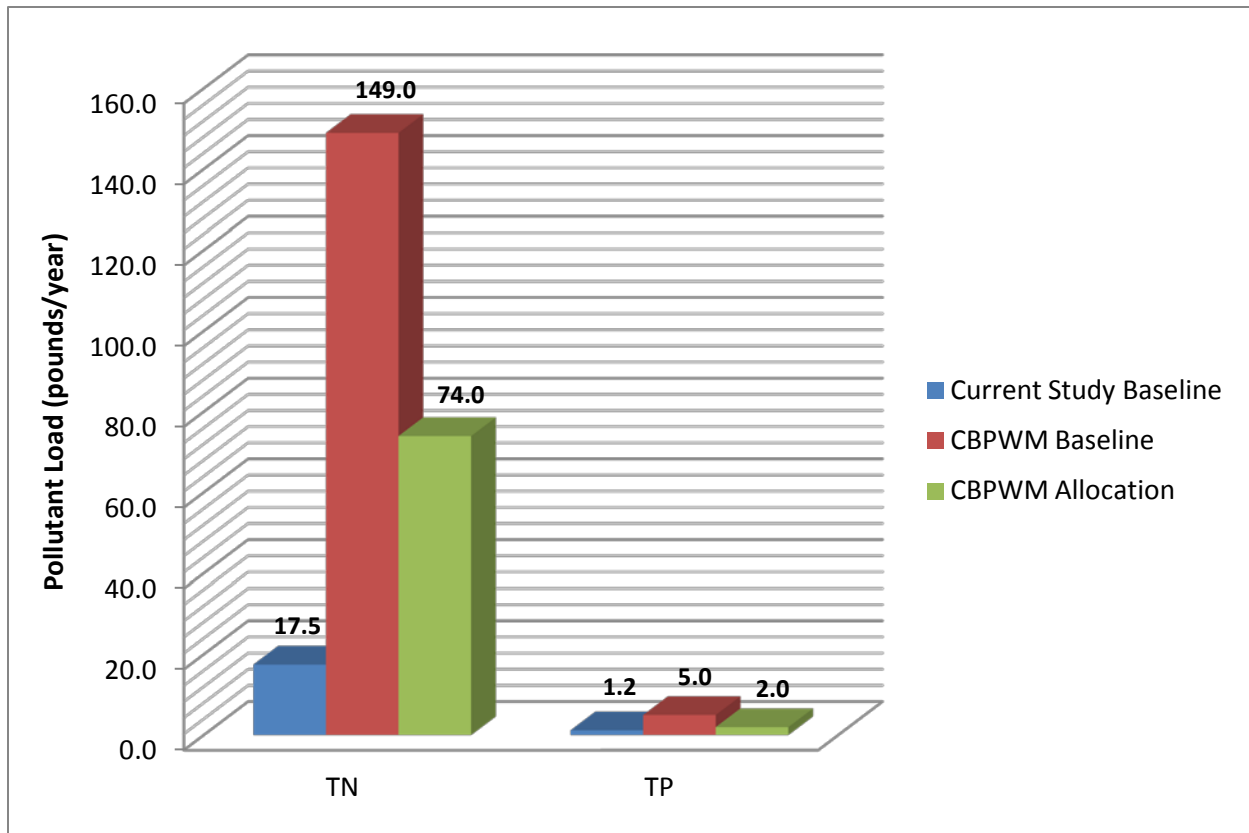
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- BMPs identified on this site are not included in the CBPWM load calculations. These inaccuracies may result in changes to the expected load reduction for this facility.
- Table 2 and Figure 2 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates and facility allocations. These inconsistencies have resulted from the inaccuracies listed above.

**Fort Ritchie (24890, MG Boyd M. Cook Armory)  
 Input to Maryland Department of Environment  
 Watershed Implementation Plan Phase II**

**Table 2: Baseline Pollutant Loads Comparisons with CBWM for Site 24890**

<b>Site: 24890 Fort Ritchie (24890, MG Boyd M. Cook Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	17.5	149.0	74.0
TP	1.2	5.0	2.0

**Figure 2: Difference Between Facility Baseline Load Estimates**

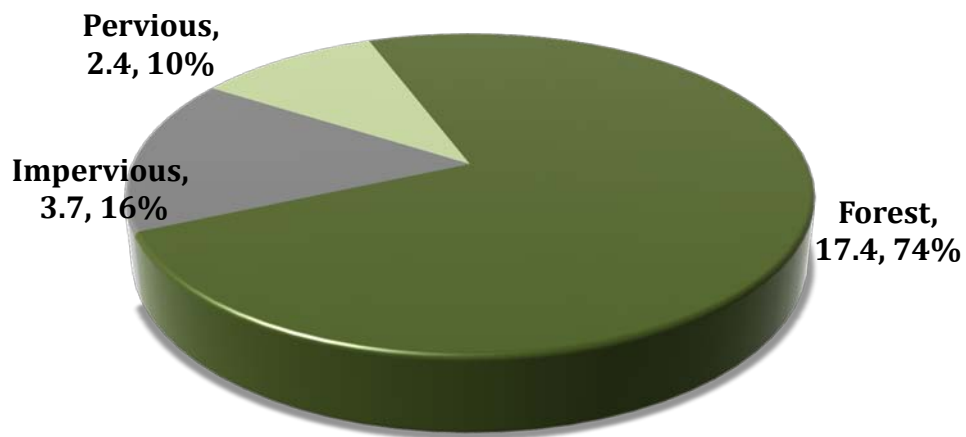


**Laurel Armory (24891, PVT Henry Costin Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Laurel Army National Guard Armory**

The Laurel Armory is located in South Laurel, Prince George’s County, Maryland. The 23.5 acre facility is located southeast of the intersection of Odell Road and Muirkirk Road, near Bedford Park.

The Laurel Armory is located in a suburban setting in South Laurel. 16-percent of the 23.5 acre site (3.7 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 10-percent of the site (2.4 acres) is categorized as high intensity pervious urban land cover, or lawns and brush. The remaining 74-percent (17.4 acres) is forested.



**II. Laurel Armory Baseline Loadings March 2012:**

**Facility Size: 23.5 acres**

**Local Watershed: Beaverdam Creek**

**Regional Watershed: Northeast Branch, Anacostia River**

The Laurel Armory contains a stormwater system consisting of two stormwater inlets, one weir, and approximately 350 linear feet of corrugated metal, HDPE, and PVC piping, and open drainage channels. The stormwater system conveys runoff to a stormwater wet pond in the southeastern portion of the facility.

Figure 1 shows the stormwater BMP on Laurel Armory treats 6.4 acres of the 19.4 acre facility (33-percent). The majority of the remaining 67-percent of the facility is forested. The stormwater pond is functioning properly (in regards to pollutant removal efficiency) at the time of this study. Issues were noted during the field inspection that requires maintenance to improve the physical condition of the BMP. The BMP reduces TN loads from the facility by 24-percent and TP loads by 50-percent.

**Laurel Armory (24891, PVT Henry Costin Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Figure 1: Existing BMP Reductions at 24891**

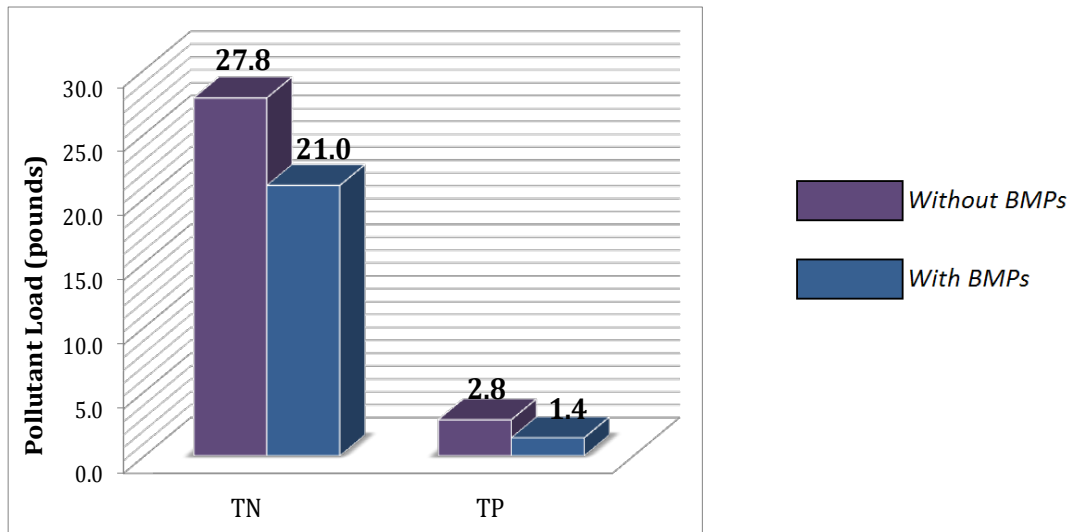


Table 1 shows the existing baseline pollutant loads for the Laurel Armory which includes the reduction of pollutants associated with the existing stormwater BMP.

**Table 1: Baseline Pollutant Loads for 24891 (including BMP reduction)**

<b>Site: 24891: Laurel Armory (PVT Henry Costin Armory)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	21.0
TP	1.4

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Laurel Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Laurel Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018

**Laurel Armory (24891, PVT Henry Costin Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Laurel Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, Laurel Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

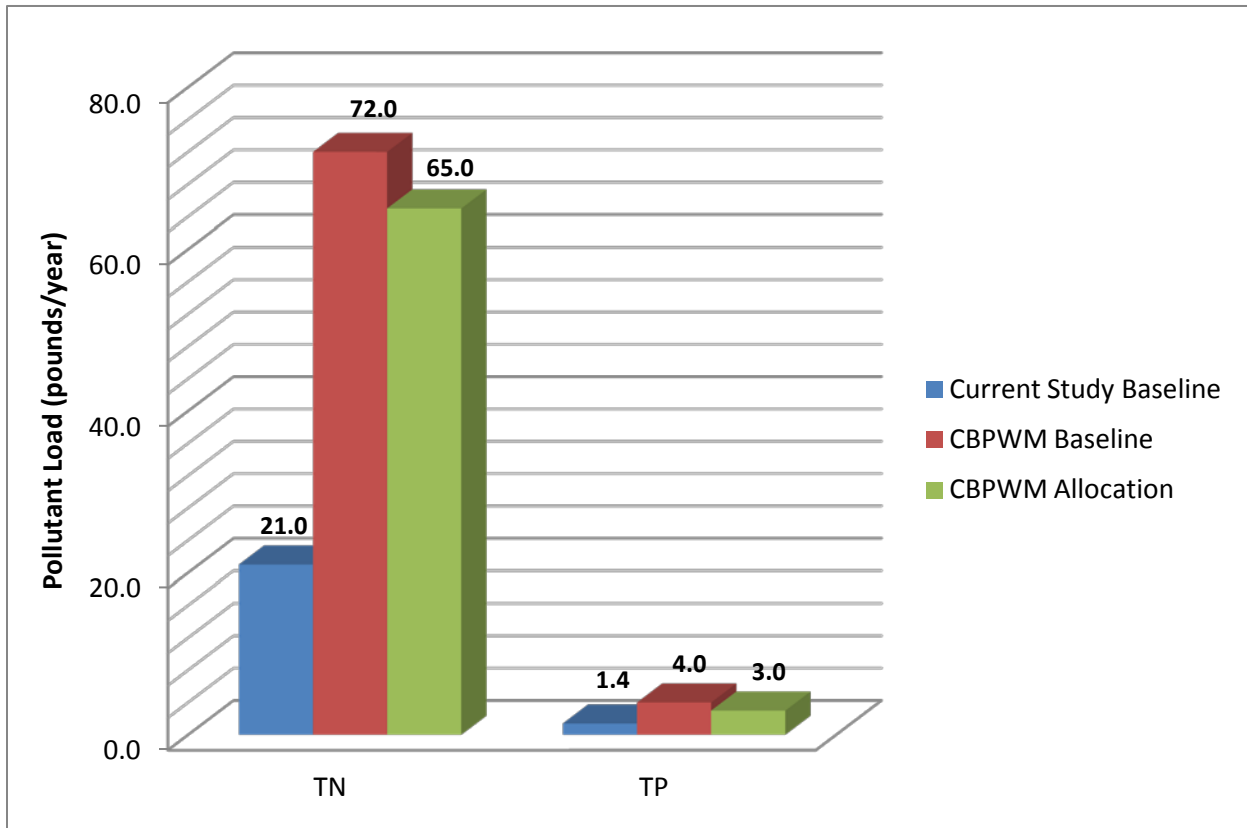
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Programs Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- The BMP identified on this site is not included in the CBPWM load calculations. These inaccuracies may result in changes to the expected load reduction for this facility.
- Table 2 and Figure 2 shows the differences between facility baseline load estimates and the CBPWM baseline load and allocation estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Laurel Armory (24891, PVT Henry Costin Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 2: Baseline Pollutant Loads Comparisons with CPBWM for Site 24891**

<b>Site: 24891- Laurel Armory (PVT Henry Costin Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	21.0	72.0	65.0
TP	1.4	4.0	3.0

**Figure 2: Difference Between Facility Baseline Load Estimates**



**Maryland Freestate Challenge Academy (24A05)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**I. Maryland Freestate Challenge Academy**

The MD Freestate Challenge Academy is a single building located on Aberdeen Proving Ground in Harford County, Maryland. The footprint of the building is 0.32 acres in size and is located northeast of the intersection of Boothby Hill Avenue and Frankfort Street. All drainage from the building flows from the rooftop to the Aberdeen Proving Ground stormwater system.

MD Freestate Challenge Academy is located at the moderately urbanized area on Aberdeen Proving Ground. The entire 0.32 acre site, which is all building rooftop, is considered high intensity impervious land cover.

**II. Maryland Freestate Challenge Academy Baseline Loadings March 2012:**

**Facility Size: 0.32 acres**

**Local Watershed: Swan Creek**

**Regional Watershed: Swan Creek**

There are no existing stormwater BMPs or stormwater infrastructure located at MD Freestate Challenge Academy. All runoff from the building rooftop enters the Aberdeen Proving Ground stormwater system. Per Maryland Department of the Environment, the MD Freestate Challenge Academy is not considered an independent entity and is included as a component of Aberdeen Proving Ground; however, Table 1 shows the existing baseline pollutant loads for the MD Freestate Challenge Academy.

**Table 1: Baseline Pollutant Loads for 24A05**

<b>Site: 24A05- MD Freestate Challenge Academy</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	3.9
TP	0.4

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The MD Freestate Challenge Academy will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.



**Maryland Freestate Challenge Academy (24A05)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

- The MD Freestate Challenge Academy will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the MD Freestate Challenge Academy and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, Olney Military Reservation conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

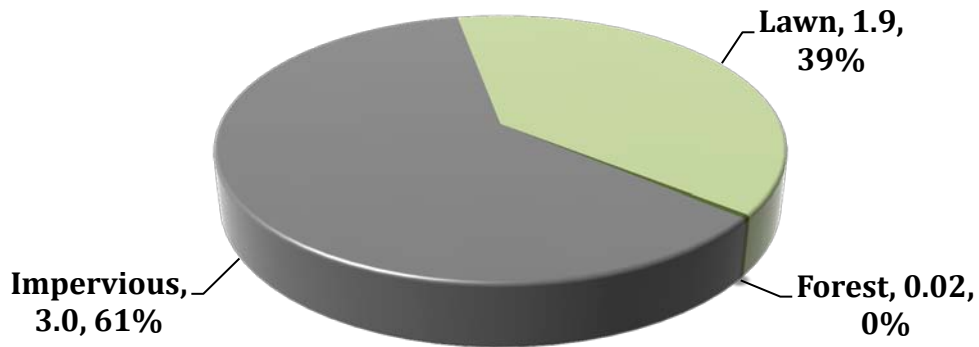
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- The MD Freestate Challenge Academy is not considered an independent entity and is included as a component of Aberdeen Proving Ground. Therefore specific baseline loads and allocations for this facility are not available.

**Annapolis Armory (24A10, LTC (MD) E. Leslie Medford Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Annapolis National Guard Armory**

The Annapolis Armory is located in the unincorporated areas of Anne Arundel County, Maryland, just outside the City of Annapolis corporate boundary. The facility is bordered by U.S. Route 50 to the north and Hudson Street and Even Lane to the south and west. Stormwater is conveyed to the Anne Arundel County stormwater system via an on-site stormwater system.

The Annapolis Armory is located in the urbanized U.S. Route 50 corridor. 61-percent of the 4.9 acre site (3.0 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 39-percent of the site (1.9 acres) is categorized as high intensity pervious urban land cover, or lawns. Less than 1-percent of the site is forested.



**II. Annapolis Armory Baseline Loadings March 2012:**

**Facility Size: 4.9 acres**  
**Local Watershed: Weems Creek**  
**Regional Watershed: Severn River**

Runoff from the Annapolis Armory drains to an on-site stormwater system consisting of 7 stormwater inlets and approximately 1,100 linear feet of corrugated metal, concrete, and PVC piping. This stormwater system flows, along with overland flow from portions of the site, into the Anne Arundel County stormwater system. There are no existing stormwater BMPs at this location. Table 1 shows the baseline pollutant loading for Annapolis Armory.

**Annapolis Armory (24A10, LTC (MD) E. Leslie Medford Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 1: Baseline Pollutant Loads for 24A10**

<b>Site: 24A10-Annapolis Armory (LTC (MD) E. Leslie Medford Armory)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	38.5
TP	4.5

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Annapolis Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Annapolis Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Annapolis Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, Annapolis Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**Annapolis Armory (24A10, LTC (MD) E. Leslie Medford Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction’s expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

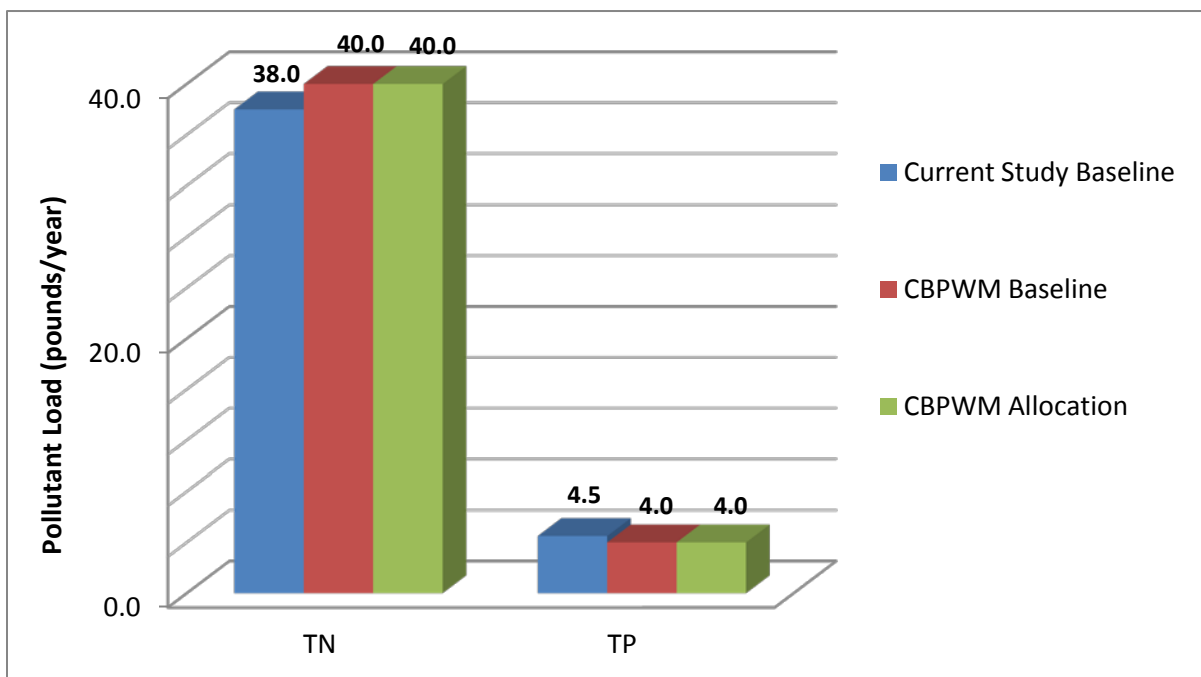
**VI. Inaccuracies:**

- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load and allocation estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24A10**

<b>Site: 24A10- Annapolis Armory (LTC (MD) E. Leslie Medford Armory) CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	38.5	40.0	40.0
TP	4.5	4.0	4.0

**Figure 1: Difference Between Facility Baseline Load Estimates**

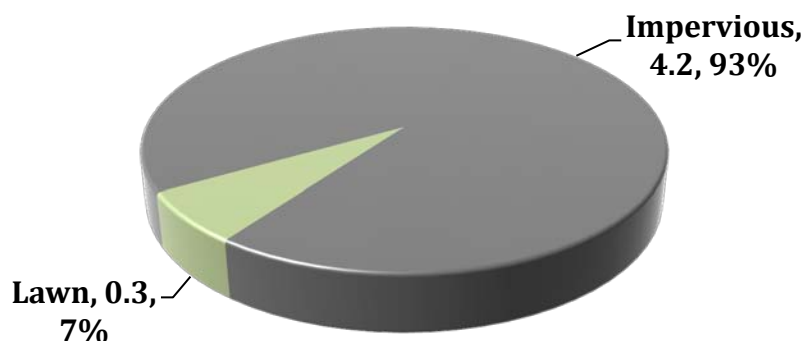


**Fifth Regiment Armory (24A15)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Fifth Regiment National Guard Armory**

The Fifth Regiment Armory is located in the City of Baltimore, at the southwest corner of Dolphin Street and North Howard Street. The building was constructed in 1904, with an on-site stormwater system that conveys runoff into the City of Baltimore stormwater system.

The Fifth Regiment Armory is located in a highly urbanized portion of the City of Baltimore. 93-percent of the 4.5 acre site (4.2 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. Seven percent of the site (0.3 acres) is categorized as high intensity pervious urban land cover or lawns and landscaping.



**II. Fifth Regiment Armory Baseline Loadings March 2012:**

**Facility Size: 4.5 acres**

**Local Watershed: Jones Falls**

**Regional Watershed: Patapsco River**

Runoff from the Fifth Regiment Armory drains to an on-site stormwater system consisting of 8 stormwater inlets, 4 stormwater manholes, and approximately 500 linear feet of stormwater concrete, cast iron, and terra cotta piping. The stormwater system, along with overland flow from portions of the site, drains into the City of Baltimore stormwater system. There are no existing stormwater BMPs at this location. Table 1 shows the baseline loadings for Fifth Regiment Armory.

**Fifth Regiment Armory (24A15)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**Table 1: Baseline Pollutant Loads for 24A15**

<b>Site: 24A15-Fifth Regiment Armory</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	50.7
TP	5.9

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Fifth Regiment Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Fifth Regiment Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Fifth Regiment Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, Fifth Regiment Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**Fifth Regiment Armory (24A15)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction’s expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

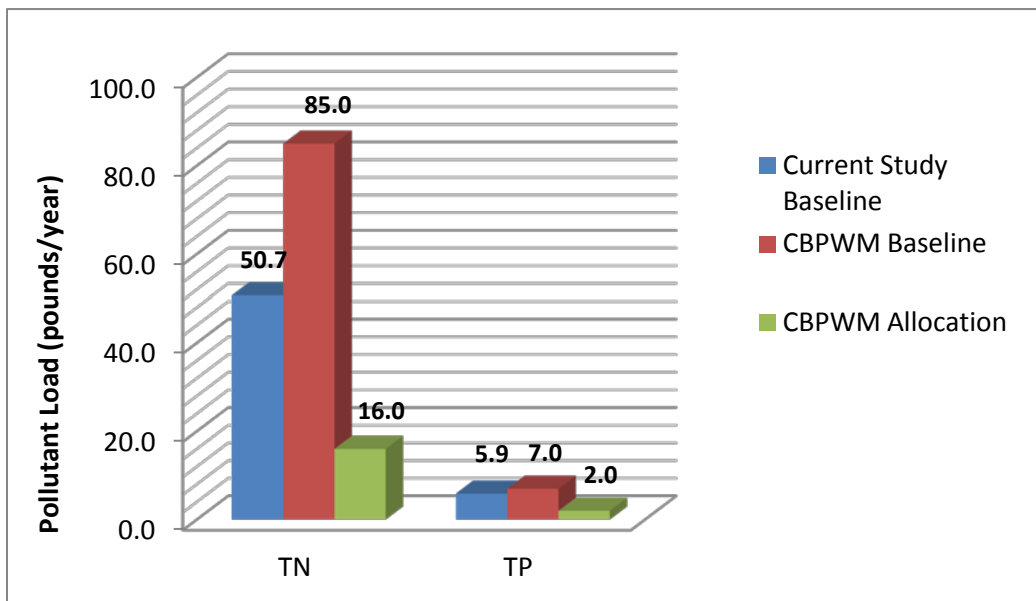
**VI. Inaccuracies:**

- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Table 2 and Figure 2 shows the differences between facility baseline load estimates and the CBPWM baseline load and allocation estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24A15**

Site: 24C10-Fifth Regiment Armory CBPWM Comparisons (Urban Areas Only)			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	50.7	85.0	16.0
TP	5.9	7.0	2.0

**Figure 1: Difference Between Facility Baseline Load Estimates**

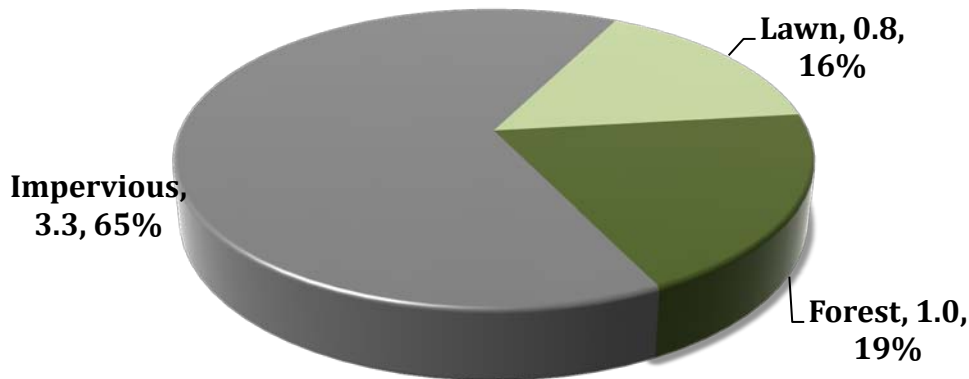


**Cade Armory (24A20, LTC Melvin H. Cade Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Cade National Guard Armory**

The Cade Armory is located in the City of Baltimore, northeast of the intersection of Winchester Street and Braddish Avenue. Stormwater is conveyed to the City of Baltimore stormwater system via an on-site stormwater system.

The Cade Armory is located in an urbanized portion of the City of Baltimore. 65-percent of the 5.1 acre site (3.3 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 16-percent of the site (0.8 acres) is categorized as high intensity pervious urban land cover, or lawns. The remaining 19-percent of the site (1.0 acre) is forested.



**II. Cade Armory Baseline Loadings March 2012:**

**Facility Size: 5.1 acres**

**Local Watershed: Gwynns Falls**

**Regional Watershed: Patapsco River**

Runoff from the Cade Armory drains to an on-site stormwater system consisting of 7 stormwater inlets, 2 stormwater manholes, and approximately 650 linear feet of corrugated metal, concrete, terra cotta, and PVC piping. This stormwater system flows, along with overland flow from portions of the site, into the City of Baltimore stormwater system. There are no existing stormwater BMPs at this location. Table 1 shows the baseline loadings for Cade Armory.



**Cade Armory (24A20, LTC Melvin H. Cade Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 1: Baseline Pollutant Loads for 24A20**

<b>Site: 24A20-Cade Armory (LTC Melvin H. Cade Armory) Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	40.3
TP	4.7

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Cade Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Cade Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Cade Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, Cade Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.

**Cade Armory (24A20, LTC Melvin H. Cade Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

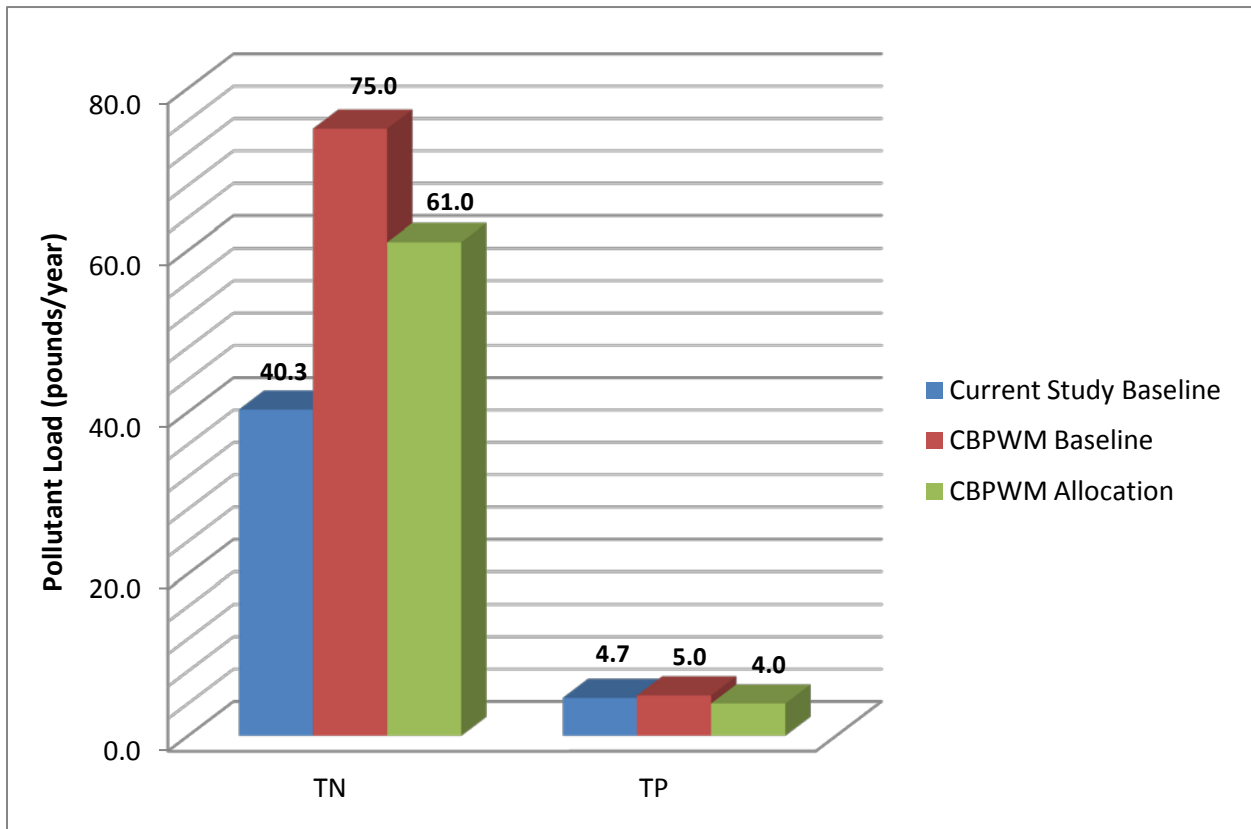
**VI. Inaccuracies:**

- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Table 2 and Figure 1 show the differences between facility baseline load estimates and the CBPWM baseline load and allocation estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24A20**

<b>Site: 24A20- Cade Armory (LTC Melvin H. Cade Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	40.3	75.5	61.0
TP	4.7	5.0	4.0

**Figure 1: Difference Between Facility Baseline Load Estimates**



**SFRO-Bel Air (24A35)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**I. SFRO- Bel Air**

SFRO-Bel Air consists of a single “store-front” building located at the intersection of Bel Air South Parkway and Vietnam Veterans Memorial Highway in Harford County, Maryland. The footprint of the building is 0.06 acres in size. All drainage from the building flows into the Harford County stormwater system.

SFRO-Bel Air is located in a highly urbanized area. The entire 0.06 acre site, which is all building rooftop, is considered high intensity impervious land cover.

**II. SFRO-Bel Air Baseline Loadings March 2012:**

**Facility Size: 0.06 acres**

**Local Watershed: Winters Run**

**Regional Watershed: Bush River**

There are no existing stormwater BMPs or stormwater infrastructure located at SFRO-Bel Air. All runoff from the building rooftop enters the Harford County stormwater system. Table 1 shows the baseline loadings for SFRO-Bel Air.

**Table 1: Baseline Pollutant Loads for 24A35**

<b>Site: 24A35-SFRO-Bel Air</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	0.7
TP	0.1

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The SFRO-Bel Air will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The SFRO-Bel Air will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**SFRO-Bel Air (24A35)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the SFRO-Bel Air and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, SFRO-Bel Air conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

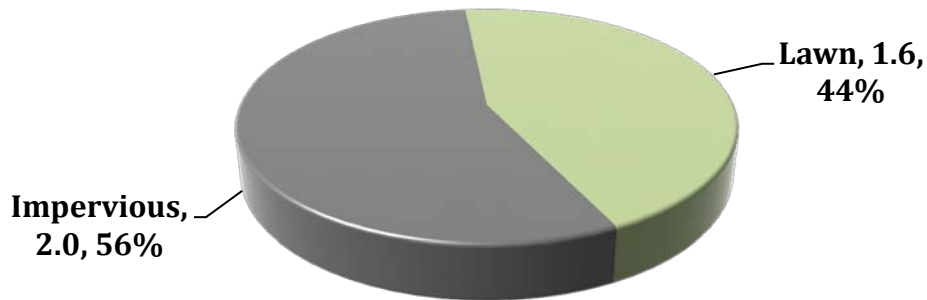
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Per Maryland Department of the Environment, SFRO-Bel Air is not considered an independent entity and is included as a component of Harford County. Therefore specific baseline loads and allocations for this facility are not available.

**Catonsville Armory (24A40, MG William J. Witte Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Catonsville National Guard Armory**

Catonsville Armory (24A40, MG William J. Witte Armory) is located in Baltimore County, Maryland at the intersection of Muller Avenue and Pullen Avenue. Stormwater is conveyed to the City of Baltimore stormwater system via an on-site stormwater system.

The Catonsville Armory is located in a suburban/ urban portion of Baltimore County. 56-percent of the 3.6 acre site (2.0 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 44-percent of the site (1.6 acres) is categorized as high intensity pervious urban land cover, or lawns.



**II. Catonsville Armory Baseline Loadings March 2012:**

**Facility Size: 3.6 acres**  
**Local Watershed: Soapstone Branch**  
**Regional Watershed: Patapsco River**

The Catonsville Armory contains an on-site stormwater system. This stormwater system, along with overland flow from a portion of the site, drains into the Baltimore County stormwater system. There are no existing stormwater BMPs at this location. Table 1 shows the baseline loadings for the Catonsville Armory.

**Table 1: Baseline Pollutant Loads for 24A40**

<b>Site: 24A40-Catonsville Armory (CSM Blair Lee Crocket Armory)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
<b>Pollutant</b>	<b>Load (Pounds per Year)</b>
TN	26.3
TP	3.1

**Catonsville Armory (24A40, MG William J. Witte Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Catonsville Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Catonsville Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Catonsville Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, Catonsville Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- The CBPWM uses a facility size of 2.2 acres, when the actual facility size is 3.6 acres.

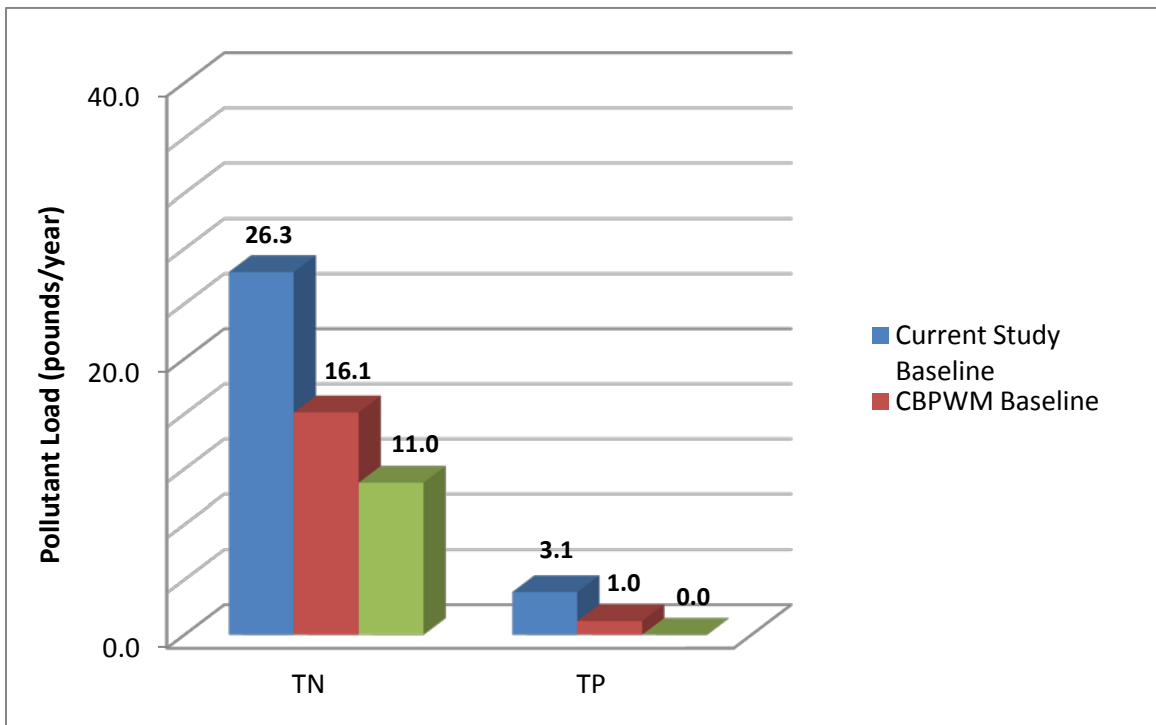
**Catonsville Armory (24A40, MG William J. Witte Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

- Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24A40**

<b>Site: 24A40- Catonsville Armory (24A40, MG William J. Witte Armory) CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	26.3	16.1	11.0
TP	3.1	1.0	0.0

**Figure 1: Difference Between Facility Baseline Load Estimates**

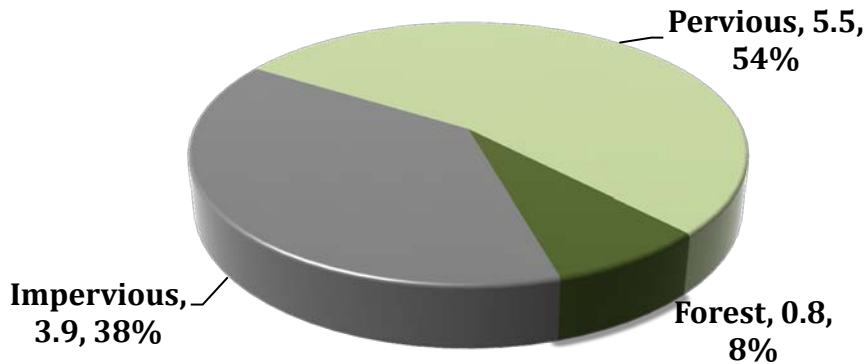


**Cheltenham Armory (24A45, Congressman Steny Hoyer Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Cheltenham National Guard Armory**

The Cheltenham Armory is located in the unincorporated areas of Prince George’s County, Maryland. The 10.2 acre facility is west of the intersection of Surratts Road and Frank Tippett Road. Stormwater is conveyed to Piscataway Creek via an on-site stormwater system.

The Cheltenham Armory is located in a rural/suburban setting in Prince George’s County 38-percent of the 10.2 acre site (3.9 acres) is categorized as low intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 54-percent of the site (5.5 acres) is categorized as low intensity pervious urban land cover, or lawns and brush. The remaining 8-percent of the site (0.8 acres) is forested.



**II. Cheltenham Armory Baseline Loadings March 2012:**

**Facility Size: 10.2 acres**  
**Local Watershed: Piscataway Creek**  
**Regional Watershed: Potomac River**

The Cheltenham Armory contains a stormwater system consisting of 14 stormwater inlets and approximately 1,500 linear feet of corrugated HDPE, and cast iron piping. The stormwater system conveys runoff to two stormwater wet ponds on the facility.

Figure 1 shows the stormwater BMPs on the Cheltenham Armory, both wet ponds, treat 9.6 acres of the 10.2 acre facility (94-percent). The stormwater ponds are functioning properly (in regards to pollutant removal efficiency) at the time of this study. Minor issues were noted at both ponds during the field inspection that requires maintenance to improve the physical condition of the BMPs. The BMPs reduce TN loads from the facility by 29-percent and TP loads by 48-percent.



**Cheltenham Armory (24A45, Congressman Steny Hoyer Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Figure 1: Existing BMP Reductions at 24A45**

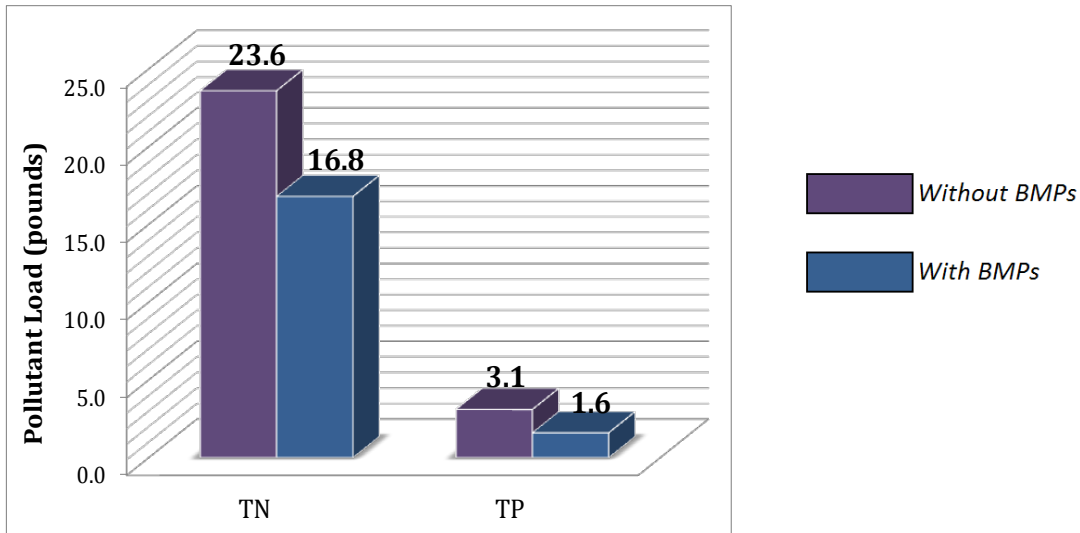


Table 1 shows the existing baseline pollutant loads for the Cheltenham Armory which includes the reduction of pollutants associated with the existing stormwater BMPs.

**Table 1: Baseline Pollutant Loads for 24A45 (including BMP reduction)**

<b>Site: 24C10- Cheltenham Armory (Congressman Steny Hoyer Armory)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
<b>Pollutant</b>	<b>Load (Pounds per Year)</b>
TN	16.8
TP	1.6

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Cheltenham Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Cheltenham Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**Cheltenham Armory (24A45, Congressman Steny Hoyer Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Cheltenham Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, Cheltenham Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

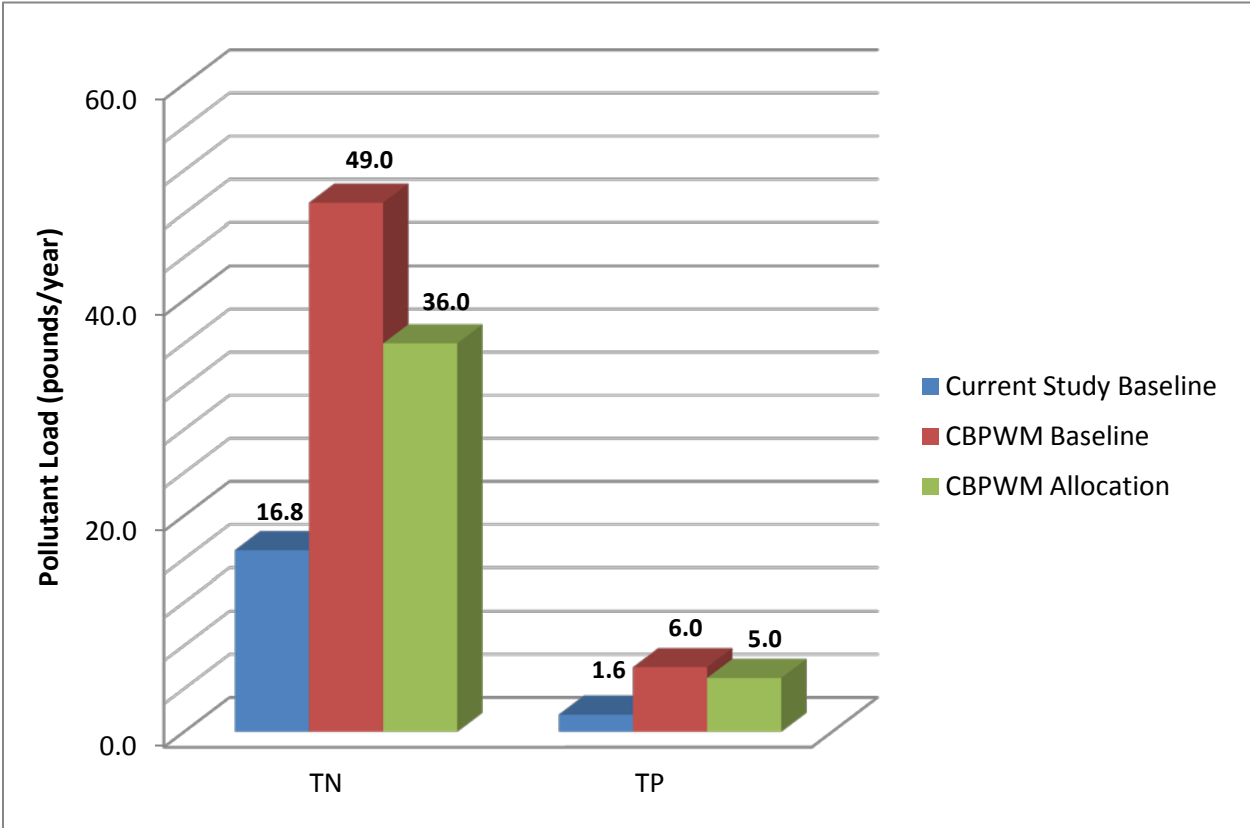
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- The BMPs identified on this site are not included in the CBPWM load calculations. These inaccuracies may result in changes to the expected load reduction for this facility.
- Table 2 and Figure 2 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Cheltenham Armory (24A45, Congressman Steny Hoyer Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24A45**

<b>Site: 24C10- Cheltenham Armory (Congressman Steny Hoyer Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	16.8	49.0	36.0
TP	1.6	6.0	5.0

**Figure 2: Difference Between Facility Baseline Load Estimates**

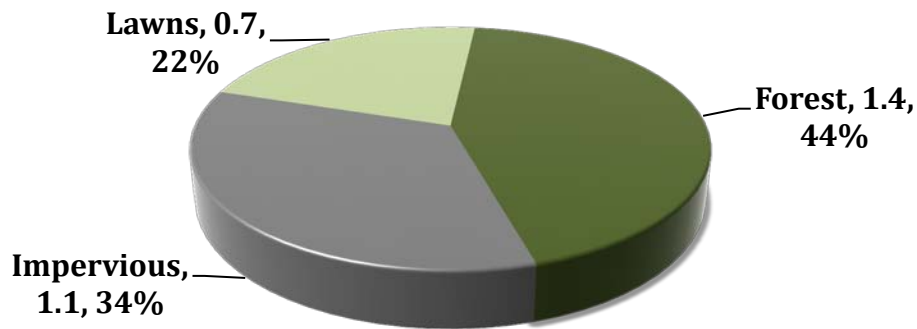


**Chestertown Armory (24A50, SFC John H. Newman Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Chestertown National Guard Armory**

The Chestertown Armory is located within the corporate limits of the Town of Chestertown, Kent County, Maryland. The 3.8 acre facility is on Cross Street (MD Route 289) at the southern end of Town, bordered by the Chester River on the east. At the time of this study, this facility was “pending disposal”. The property will no longer be owned by Maryland Army National Guard in the future.

The Chestertown Armory is located in a suburban setting. 34-percent of the 3.2 acre site (1.1 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 22-percent of the site (0.7 acres) is categorized as high intensity pervious urban land cover, or lawns. The remaining 44-percent of the site (1.4 acres) is forested.



**II. Chestertown Armory Baseline Loadings March 2012:**

**Facility Size: 3.2 acres**  
**Local Watershed: Chester River**  
**Regional Watershed: Chester River**

There is no existing stormwater infrastructure or stormwater BMPs at the Chestertown Armory. Runoff from the facility drains directly to the Chester River or into the Town of Chestertown stormwater system. Table 1 shows the baseline loadings for Chestertown Armory.

**Table 1: Baseline Pollutant Loads for 24A50**

Site: 24A50- Chestertown Armory (SFC John H. Newman Armory)	
Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)	
Pollutant	Load (Pounds per Year)
TN	5.6
TP	0.7

**Chestertown Armory (24A50, SFC John H. Newman Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Chestertown Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Chestertown Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Chestertown Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, Chestertown Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

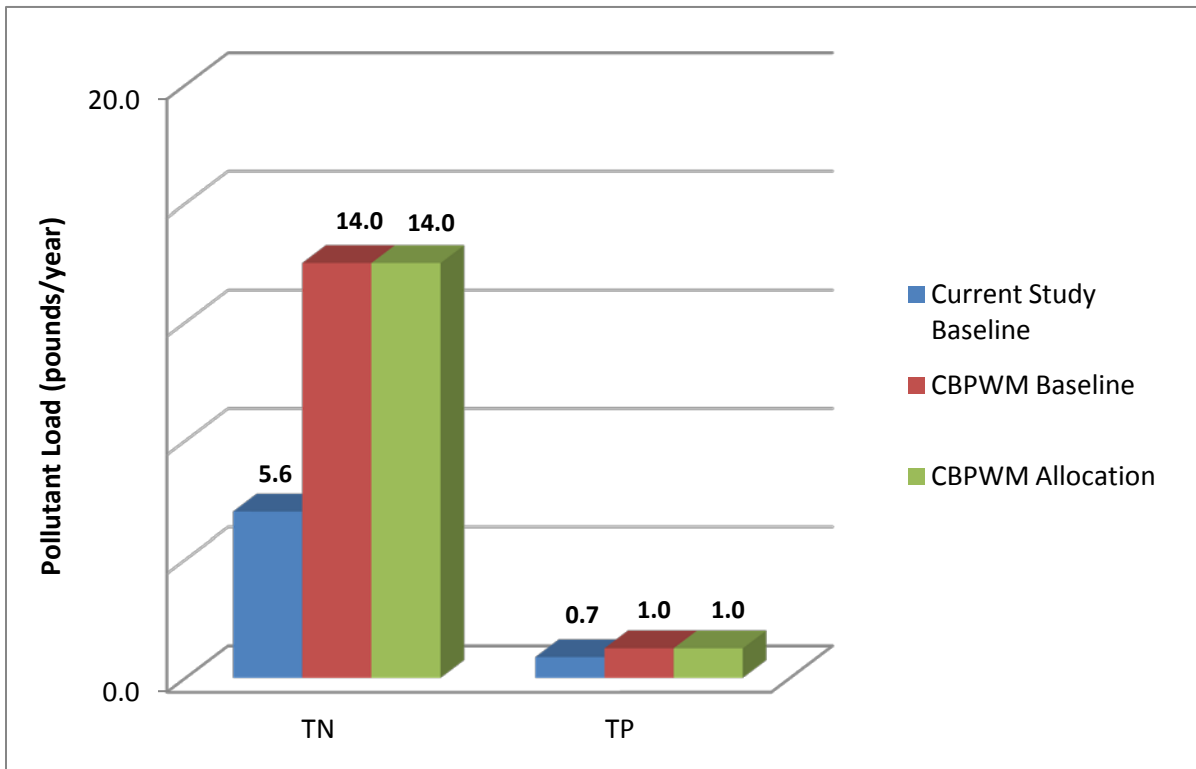
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Chestertown Armory (24A50, SFC John H. Newman Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24A50**

<b>Site: 24A50- Chestertown Armory (SFC John H. Newman Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	5.6	14.0	14.0
TP	0.7	1.0	1.0

**Figure 1: Difference Between Facility Baseline Load Estimates**

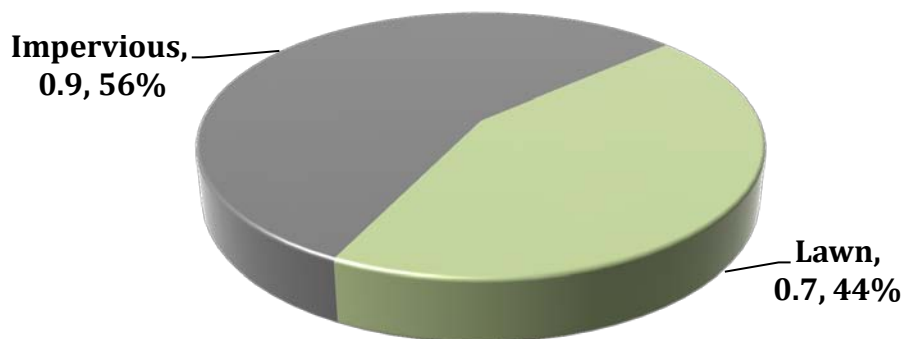


**Crisfield Armory (24A55, MG (MD) Maurice D. Tawes Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Crisfield National Guard Armory**

The Crisfield Armory is located within the corporate limits of the City of Crisfield, Somerset County, Maryland. The 1.6 acre facility is on East Main Street (MD Route 380) east of Somerset Avenue. At the time of this study, this facility was “pending disposal”. The property will no longer be owned by the Maryland Army National Guard in the future.

The Crisfield Armory is located in a suburban setting. 56-percent of the 1.6 acre site (0.9 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 44-percent of the site (0.7 acres) is categorized as high intensity pervious urban land cover, or lawns.



**II. Crisfield Armory Baseline Loadings March 2012:**

**Facility Size: 1.6 acres**

**Local Watershed: Jenkins Creek**

**Regional Watershed: Little Annemessex River**

There is no existing stormwater infrastructure or stormwater BMPs at the Crisfield Armory. Runoff from the facility drains off the site to surrounding ditches and directly into to the City of Crisfield or Somerset County stormwater system. Table 1 shows the baseline loadings for the Crisfield Armory.

**Table 1: Baseline Pollutant Loads for 24A55**

<b>Site: 24A55- Crisfield Armory (MG (MD) Maurice D. Tawes Armory)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	4.5
TP	0.6

**Crisfield Armory (24A55, MG (MD) Maurice D. Tawes Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Crisfield Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Crisfield Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Crisfield Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, Crisfield Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.



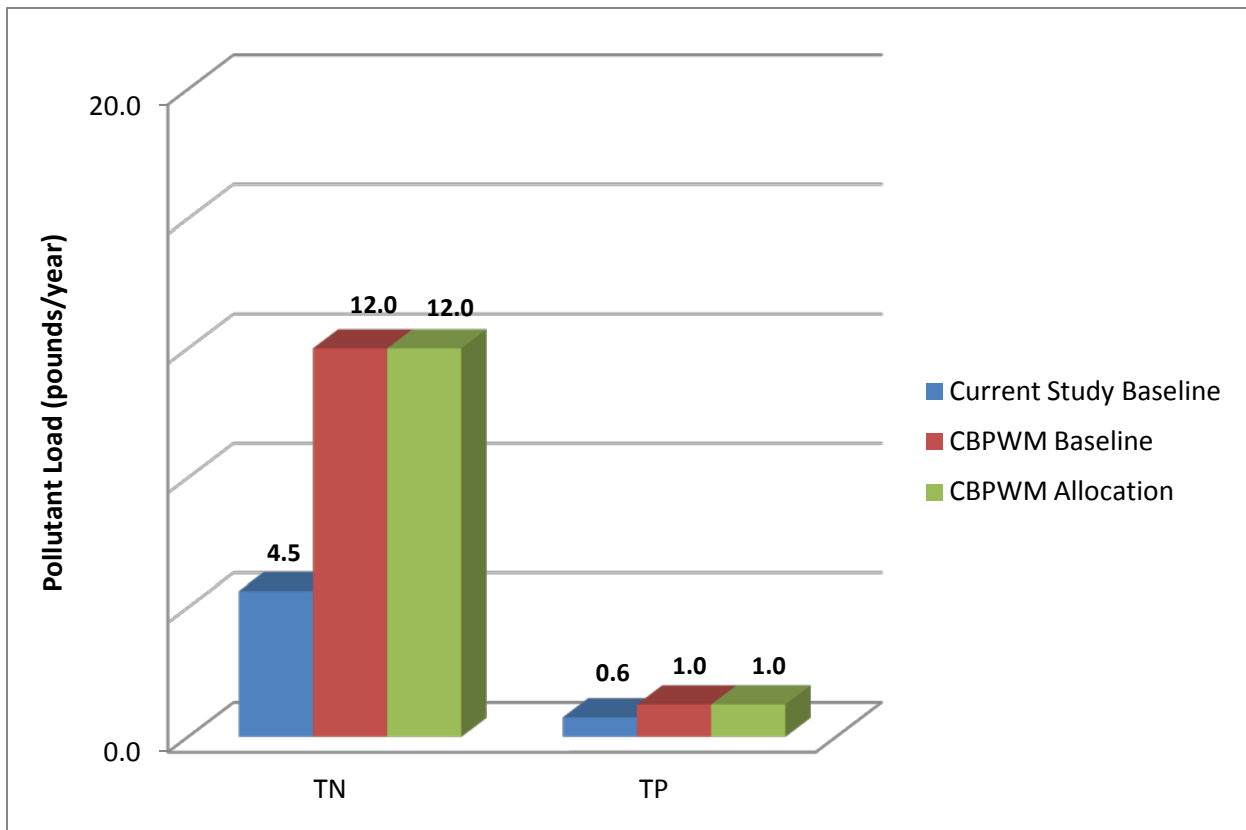
**Crisfield Armory (24A55, MG (MD) Maurice D. Tawes Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

- Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24C35**

<b>Site: 24A55- Crisfield Armory (MG (MD) Maurice D. Tawes Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	4.5	12.0	12.0
TP	0.6	1.0	1.0

**Figure 1: Difference Between Facility Baseline Load Estimates**

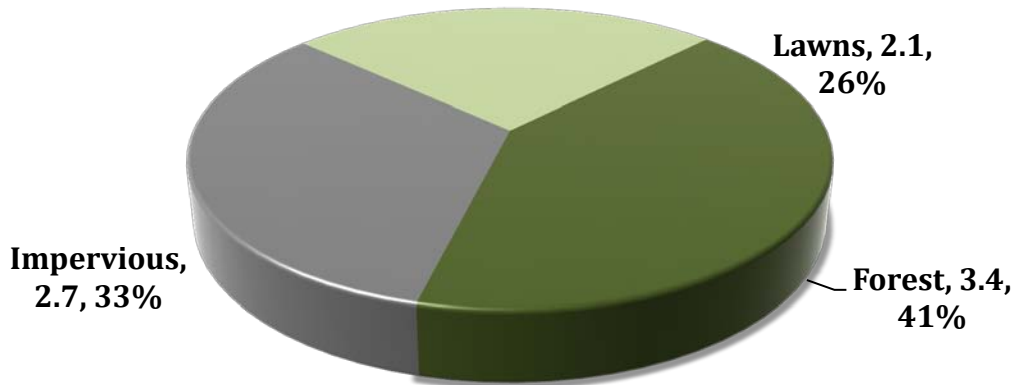


**Cumberland Armory (24A60, CPT Thomas Price Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Cumberland National Guard Armory**

The Cumberland Armory is located on Brown Avenue just south of the U.S. Route 220 and U.S. Route 68 interchange. The 8.2 acre facility is located within the corporate limits of the City of Cumberland, Allegany County, Maryland, and is on the banks of the North Branch Potomac River.

The Cumberland Armory is located in a suburban and forested portion of the City of Cumberland. 33-percent of the 8.2 acre site (2.7 acres) is categorized as low intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 26-percent of the site (2.1 acres) is categorized as low intensity pervious urban land cover, or lawns. The remaining 41-percent of the site (3.4 acres) is forested.



**II. Cumberland Armory Baseline Loadings March 2012:**

**Facility Size: 8.2 acres**

**Local Watershed: North Branch Potomac River**

**Regional Watershed: North Branch Potomac River**

The Cumberland Armory contains an on-site stormwater system. This stormwater system, along with overland flow from a portion of the site, drains into the Allegany County or City of Cumberland stormwater system. There are no existing stormwater BMPs at this location. Table 1 shows the baseline loadings for the Cumberland Armory.

**Table 1: Baseline Pollutant Loads for 24A60**

<b>Site: 24A60- Cumberland Armory (CPT Thomas Price Armory)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
<b>Pollutant</b>	<b>Load (Pounds per Year)</b>
TN	11.7
TP	1.6

**Cumberland Armory (24A60, CPT Thomas Price Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Cumberland Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Cumberland Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Cumberland Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Cumberland Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Programs Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.

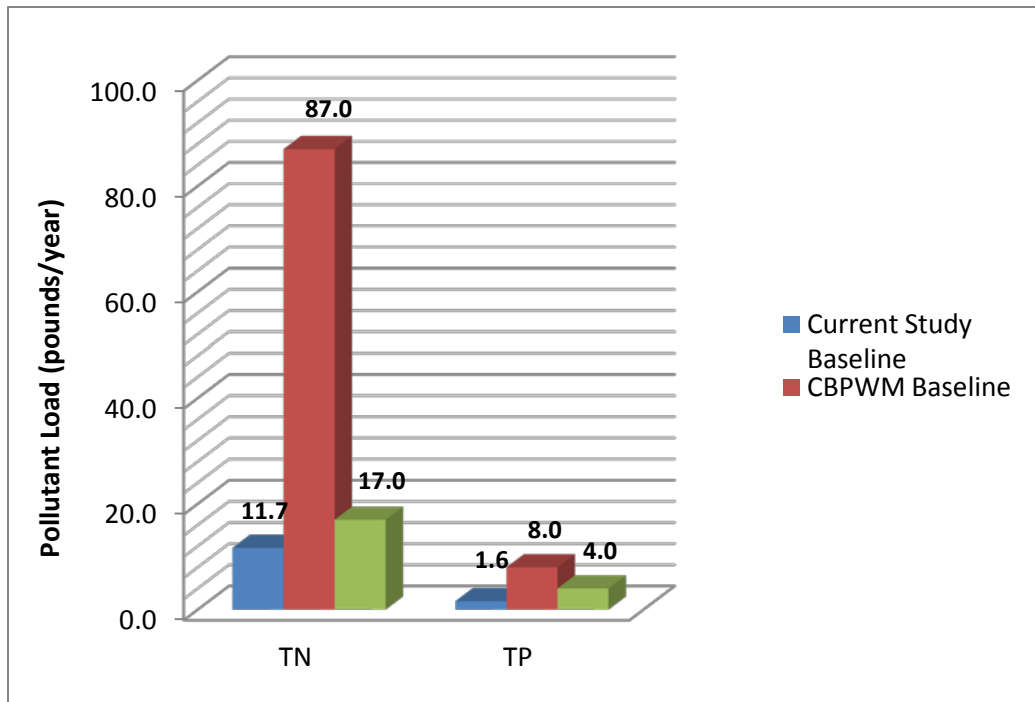
**Cumberland Armory (24A60, CPT Thomas Price Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

➤ Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24C35**

<b>Site: 24A60- Cumberland Armory (CPT Thomas Price Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	11.7	87.0	17.4
TP	1.6	8.0	4.0

**Figure 1: Difference Between Facility Baseline Load Estimates**

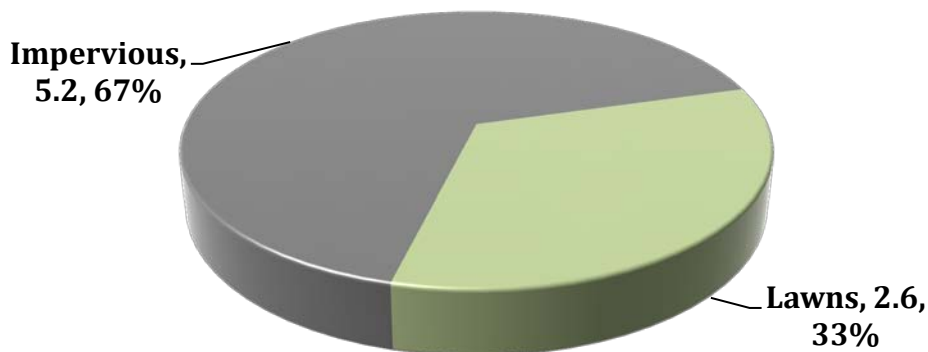


**Dundalk Armory (24A70, CSM Gerome M. Grollman Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Dundalk National Guard Armory**

The Dundalk Armory is located along the U.S. Route 695 (Baltimore Beltway) corridor, between North Point Boulevard and North Point Road, east of Merritt Boulevard (MD Route 157). The 7.8 acre facility is in the unincorporated areas of Baltimore County. The majority of the stormwater system at this location is associated with the Field Maintenance Shop that has recently been constructed.

The Dundalk Armory is located in an urban portion of Baltimore County. 67-percent of the 7.8 acre site (5.2 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 33-percent of the site (2.6 acres) is categorized as high intensity pervious urban land cover, or lawns.



**II. Dundalk Armory Baseline Loadings March 2012:**

**Facility Size: 7.8 acres**  
**Local Watershed: Bread and Cheese Creek**  
**Regional Watershed: Back River**

This stormwater system, along with overland flow from portions of the site, drains into the Baltimore County stormwater system. There are no existing stormwater BMPs at this location. Table 1 shows the baseline loadings for Dundalk Armory.

**Table 1: Baseline Pollutant Loads for 24A70**

<b>Site: 24A70- Dundalk Armory (CSM Gerome M. Grollman Armory)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
<b>Pollutant</b>	<b>Load (Pounds per Year)</b>
TN	65.3
TP	7.6

**Dundalk Armory (24A70, CSM Gerome M. Grollman Armory)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Dundalk Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Dundalk Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Dundalk Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Dundalk Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

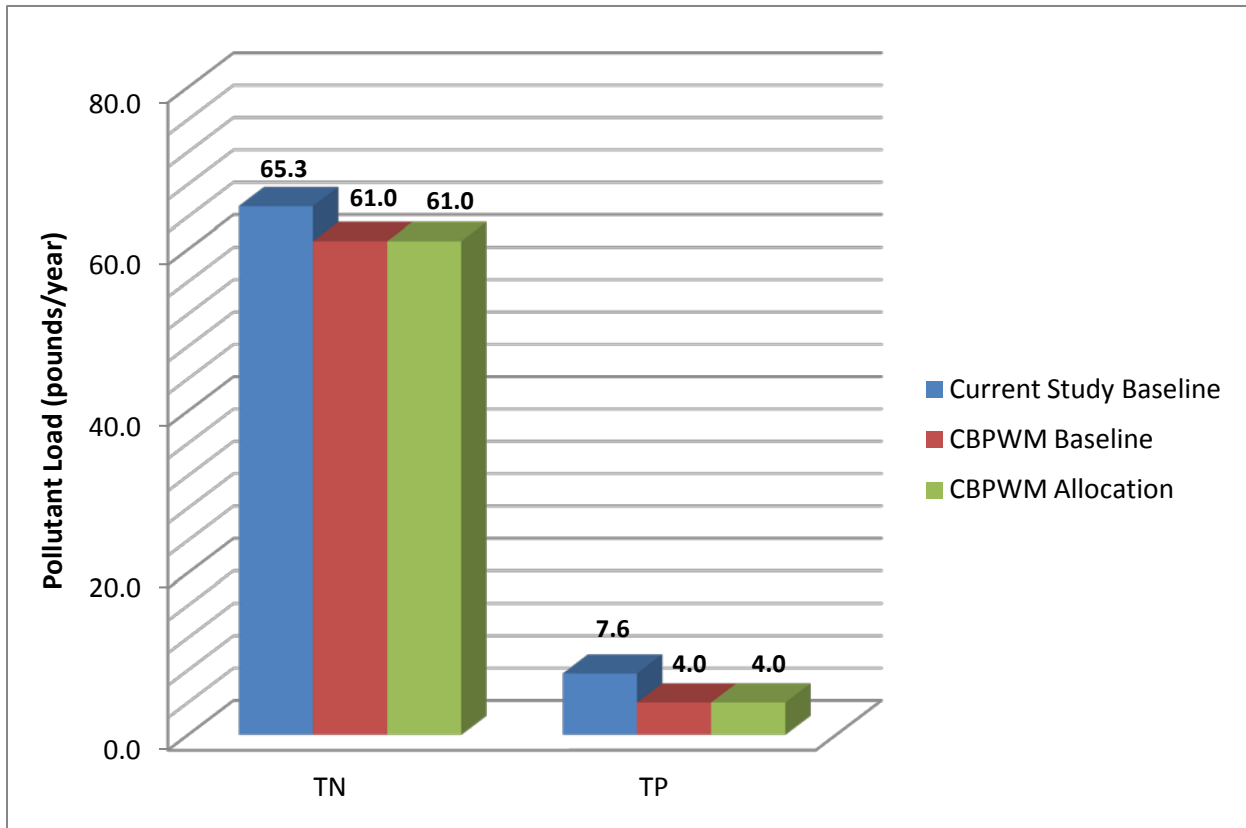
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Programs Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Dundalk Armory (24A70, CSM Gerome M. Grollman Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24A70**

<b>Site: 24A70- Dundalk Armory (CSM Gerome M. Grollman Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	65.3	61.0	61.0
TP	7.6	4.0	4.0

**Figure 1: Difference Between Facility Baseline Load Estimates**

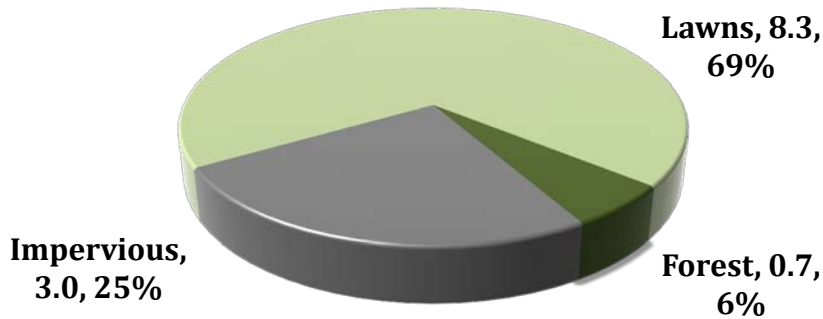


**Easton Armory (24A75, BG Louis G. Smith Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Easton National Guard Armory**

The Easton Armory is located along U.S. Route 50 (Ocean Gateway) between Holly Road and the Maryland State Police Barracks. The 12.0 acre facility is within the Town of Easton corporate limits, Talbot County, Maryland.

The Easton Armory is located in a relatively urban setting along the U.S. Route 50 corridor. 25-percent of the 12.0 acre site (3.0 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 69-percent of the site (8.3 acres) is categorized as high intensity pervious urban land cover, or lawns. The remaining 6-percent of the site (0.7 acres) is forested.



**II. Easton Armory Baseline Loadings March 2012:**

**Facility Size: 12.0 acres**  
**Local Watershed: Papermill Pond**  
**Regional Watershed: Tred Avon River**

The Easton Armory contains an on-site stormwater system. This stormwater system, along with overland flow from portions of the site, drains into the Town of Easton or Talbot County stormwater system. There are no existing stormwater BMPs at this location. Table 1 shows the baseline loadings for Easton Armory.

**Table 1: Baseline Pollutant Loads for 24A75**

<b>Site: 24A75- Easton Armory (BG Louis G. Smith Armory)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	23.6
TP	3.1



**Easton Armory (24A75, BG Louis G. Smith Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Easton Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Easton Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Easton Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Easton Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

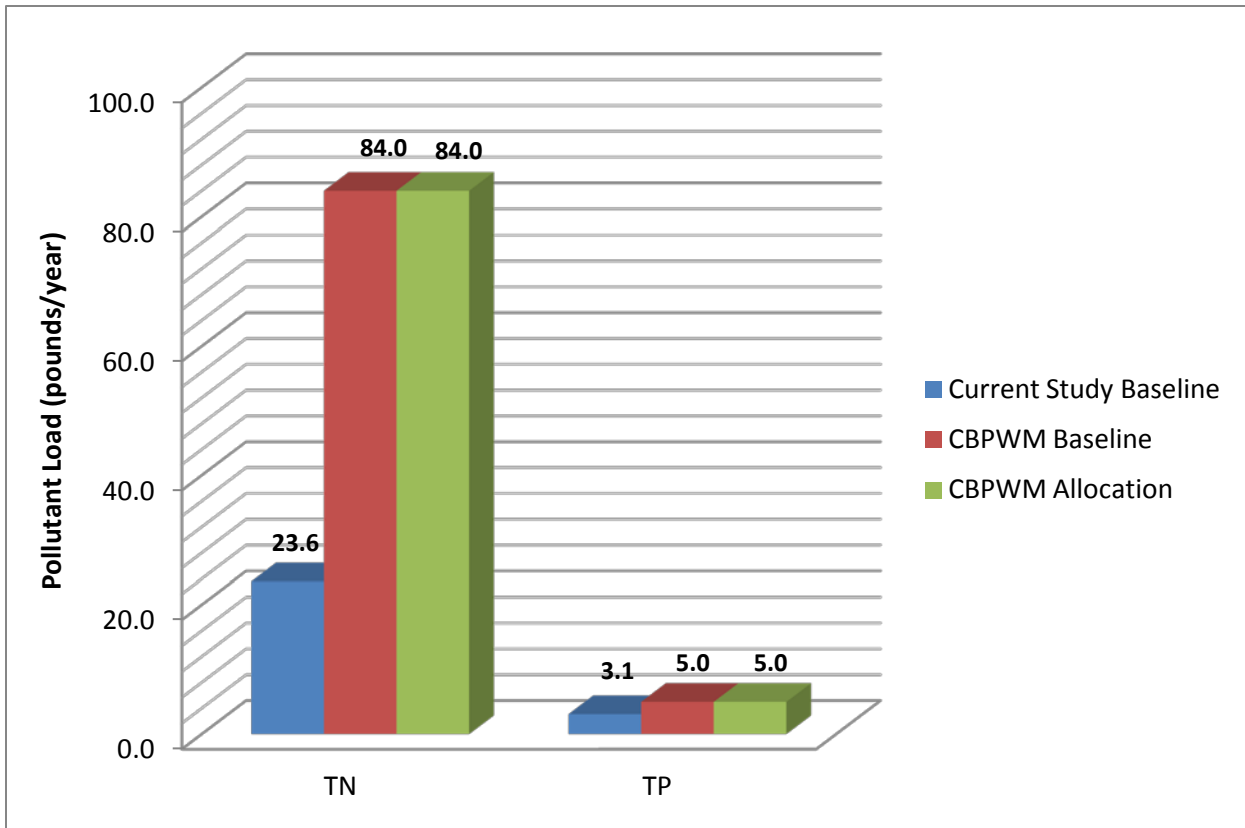
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Easton Armory (24A75, BG Louis G. Smith Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24A75**

<b>Site: 24A75- Easton Armory (BG Louis G. Smith Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	23.6	84.0	84.0
TP	3.1	5.0	5.0

**Figure 1: Difference Between Facility Baseline Load Estimates**



**Phillips Army Airfield (24A83)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**I. Phillips Army Airfield**

The Phillips Army Airfield is a single building located on Aberdeen Proving Ground in Harford County, Maryland. The footprint of the building is 0.82 acres in size and is located on Phillips Field Road at the Phillips Airfield. All drainage from the building flows from the rooftop to the Aberdeen Proving Ground stormwater system.

The Phillips Army Airfield is located at the moderately urbanized area on Aberdeen Proving Ground. The entire 0.82 acre site, which is all building rooftop, is considered high intensity impervious land cover.

**II. Phillips Army Airfield Baseline Loadings March 2012:**

**Facility Size: 0.82 acres**

**Local Watershed: Romney Creek**

**Regional Watershed: Chesapeake Bay**

There are no existing stormwater BMPs or stormwater infrastructure located at the Phillips Army Airfield. All runoff from the building rooftop enters the Aberdeen Proving Ground stormwater system. Table 1 shows the baseline loadings for Phillips Army Airfield.

**Table 1: Baseline Pollutant Loads for 24A83**

<b>Site: 24A83- Phillips Army Airfield</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	9.8
TP	1.1

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Phillips Army Airfield will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Phillips Army Airfield will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**Phillips Army Airfield (24A83)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Phillips Army Airfield and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, Phillips Army Airfield conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

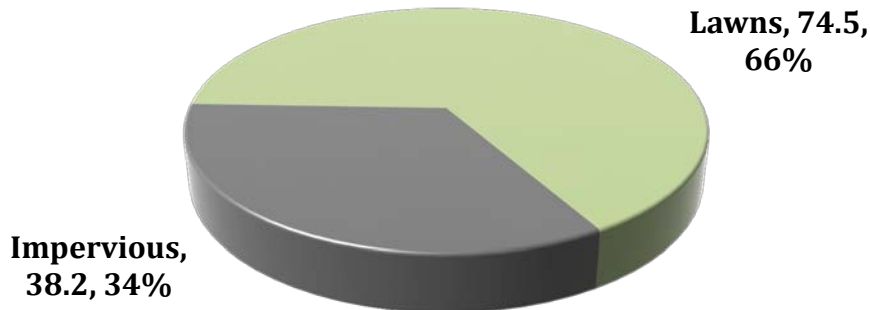
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 CBPWM runs to avoid or reduce inaccuracies.
- Per Maryland Department of the Environment, the Phillips Army Airfield is not considered an independent entity and is included as a component of Aberdeen Proving Ground. Therefore specific baseline loads and allocations for this facility are not available.

**Edgewood Armory (24A85)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**I. Edgewood Army National Guard Armory**

The Edgewood Armory is located on Aberdeen Proving Ground in Harford County, Maryland. The 112.7 acre facility contains the Weide Army Heliport and administrative buildings just southeast of the heliport. Both portions of the Edgewood Armory are on a peninsula sandwiched between the Gunpowder River and Bush River.

The Edgewood Armory is located in an urbanized setting on Aberdeen Proving Ground. 34-percent of the 112.7 acre site (38.2 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, sidewalks, and runway. 66-percent of the site (74.5 acres) is categorized as high intensity pervious urban land cover, or lawns.



**II. Edgewood Armory Baseline Loadings March 2012:**

**Facility Size: 112.7 acres**

**Local Watershed: Canal Creek and Kings Creek**

**Regional Watershed: Gunpowder River and Bush River**

The Edgewood Armory drains to an on-site stormwater system consisting of stormwater inlets, piping and open drainage channels. There are no existing stormwater BMPs at this location, although a portion of the eastern end of the site drains into a stormwater dry pond on Aberdeen Proving Ground. Table 1 shows the baseline loadings for Edgewood Armory.

**Table 1: Baseline Pollutant Loads for 24A85**

<b>Site: 24A85- Edgewood Armory</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	566.3
TP	67.3

**Edgewood Armory (24A85)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Edgewood Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Edgewood Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Edgewood Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Edgewood Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Programs Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.

**Edgewood Armory (24A85)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

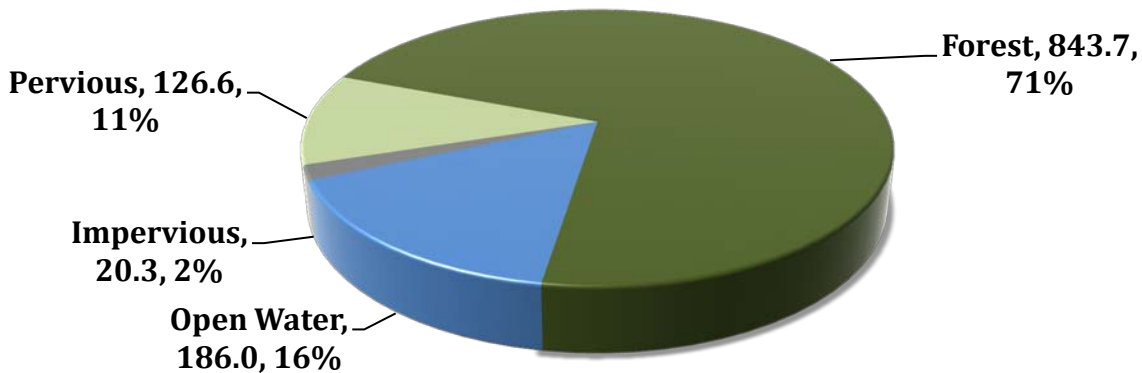
- Per MDE, Edgewood Armory is not considered an independent entity and is included as a component of Aberdeen Proving Ground. Therefore specific baseline loads and allocations for this facility are not available.

**Lauderick Creek Training Site (24A87)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Lauderick Creek Training Site**

The Lauderick Creek Training Site is the largest Maryland Army National Guard facility in the State of Maryland. The 1176.6 acre facility is located at Aberdeen Proving Ground in Harford County. The mostly forested site is bordered by a railroad to the north, Aberdeen Proving Ground to the west, and Bush River on the south and East.

The majority of the Lauderick Creek Training Site is forested (71-percent, 843.7 acres). 2-percent of the 1176.6 acre site (20.3 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 11-percent of the site (126.6 acres) is categorized as high intensity pervious urban land cover, or lawns, brush, and tidal wetlands. The remaining 16-percent (186.0 acres) is open tidal water.



**II. Lauderick Creek Training Site Baseline Loadings March 2012:**

**Facility Size: 1176.6 acres**

**Local Watershed: Lauderick Creek and Monks Creek**

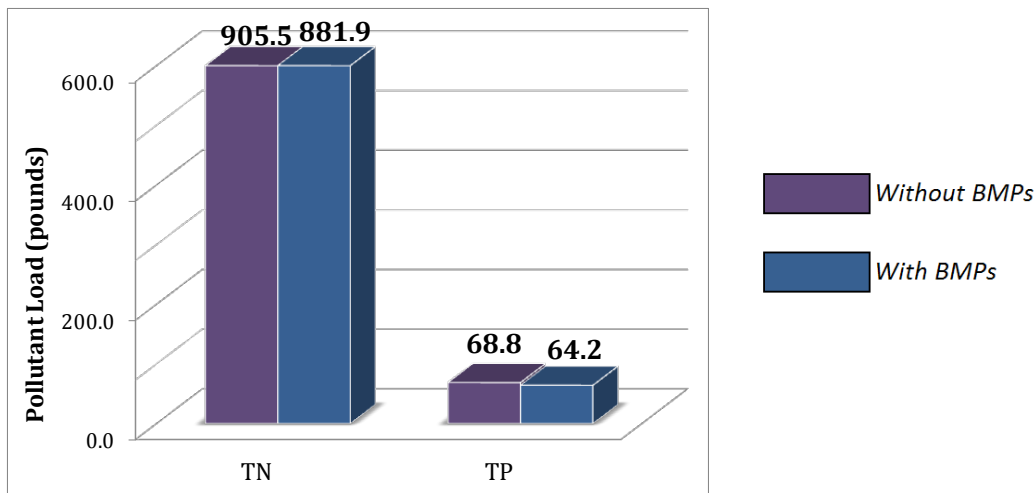
**Regional Watershed: Bush River**

The Lauderick Creek Training Site contains two stormwater BMPs. These BMPs are wet ponds, with one of the ponds being recently constructed. The stormwater BMPs on the Lauderick Creek Training Site treat 11.4 acres of the 1176.6 acre facility (1-percent). The stormwater ponds are in good condition and functioning properly at the time of this study. Figure 1 shows that the BMPs reduce TN loads from the facility by 3-percent and TP loads by 7-percent.



## Lauderick Creek Training Site (24A87) Input to Maryland Department of Environment Watershed Implementation Plan Phase II

Figure 1: Existing BMP Reductions at 24A87



*\*Entire site reduction shown, including forested areas.*

Table 1 shows the existing baseline pollutant loads for Lauderick Creek Training Site which includes the reduction of pollutants associated with the existing stormwater BMPs in urban areas.

**Table 1: Baseline Pollutant Loads for 24A87 (including BMP reduction)**

Site: 24A87-Lauderick Creek Training Site	
Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)	
Pollutant	Load (Pounds per Year)*
TN	471.4
TP	56.0

*\*Values for urban areas only*

### **III. Programmatic Two Year Milestones 2012-2013**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Lauderick Creek Training Site will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Lauderick Creek Training Site will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**Lauderick Creek Training Site (24A87)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Lauderick Creek Training Site and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Lauderick Creek Training Site conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

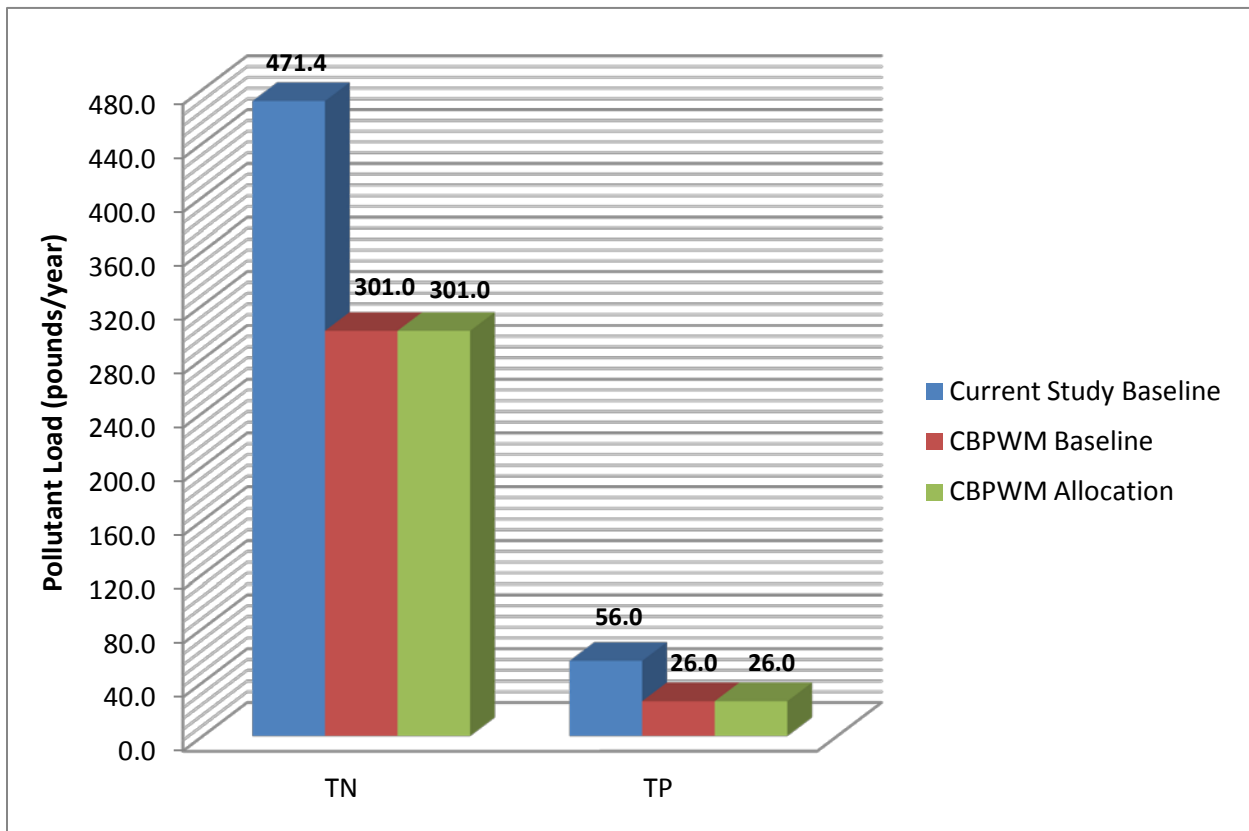
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- BMPs identified on this site are not included in the load calculations. These inaccuracies may result in changes to the expected load reduction for this facility.
- Figure 2 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Lauderick Creek Training Site (24A87)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**Figure 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24A87**

Site: 24A87- Lauderick Creek Training Site			
CBPWM Comparisons (Urban Areas Only)			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)*	CBPWM (Baseline)	CBPWM (Allocation)
TN	471.4	301.0	301.0
TP	56.0	26.0	26.0

*\*Values for urban areas only*

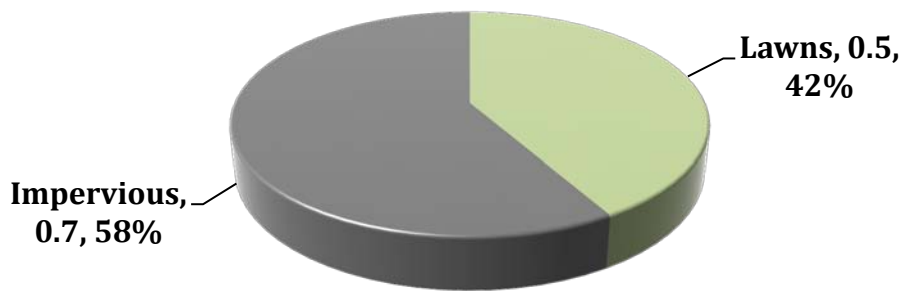


**Elkton Armory (24A90, LTC James Victor McCool Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Elkton Army National Guard Armory**

The Elkton Armory is located in the Town of Elkton, Cecil County, Maryland. The 1.2 acre facility is at the corner of Railroad Avenue and Bow Street. Runoff from the facility enters the Town of Elkton stormwater system via overland flow and an on-site stormwater system in the southern portion of the property.

The Elkton Armory is located in the urbanized Town of Elkton. Fifty-eight percent of the 1.2 acre site (0.7 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 42-percent of the site (0.5 acres) is categorized as high intensity pervious urban land cover, or lawns.



**II. Elkton Armory Baseline Loadings March 2012:**

**Facility Size: 1.2 acres**  
**Local Watershed: Big Elk Creek**  
**Regional Watershed: Elk River**

Runoff from the Elkton Armory drains to an on-site stormwater system consisting of two stormwater inlets and approximately 200 linear feet of corrugated HDPE piping. The stormwater system flows, along with overland flow from the portions of the site, into the Town of Elkton stormwater system. There are no existing stormwater BMPs at this location. Table 1 shows the baseline loadings for the Elkton Armory.

**Table 1: Baseline Pollutant Loads for 24A90**

<b>Site: 24A90- Elkton Armory (LTC James Victor McCool Armory)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	9.2
TP	1.1

**Elkton Armory (24A90, LTC James Victor McCool Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Elkton Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Elkton Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Elkton Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Elkton Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

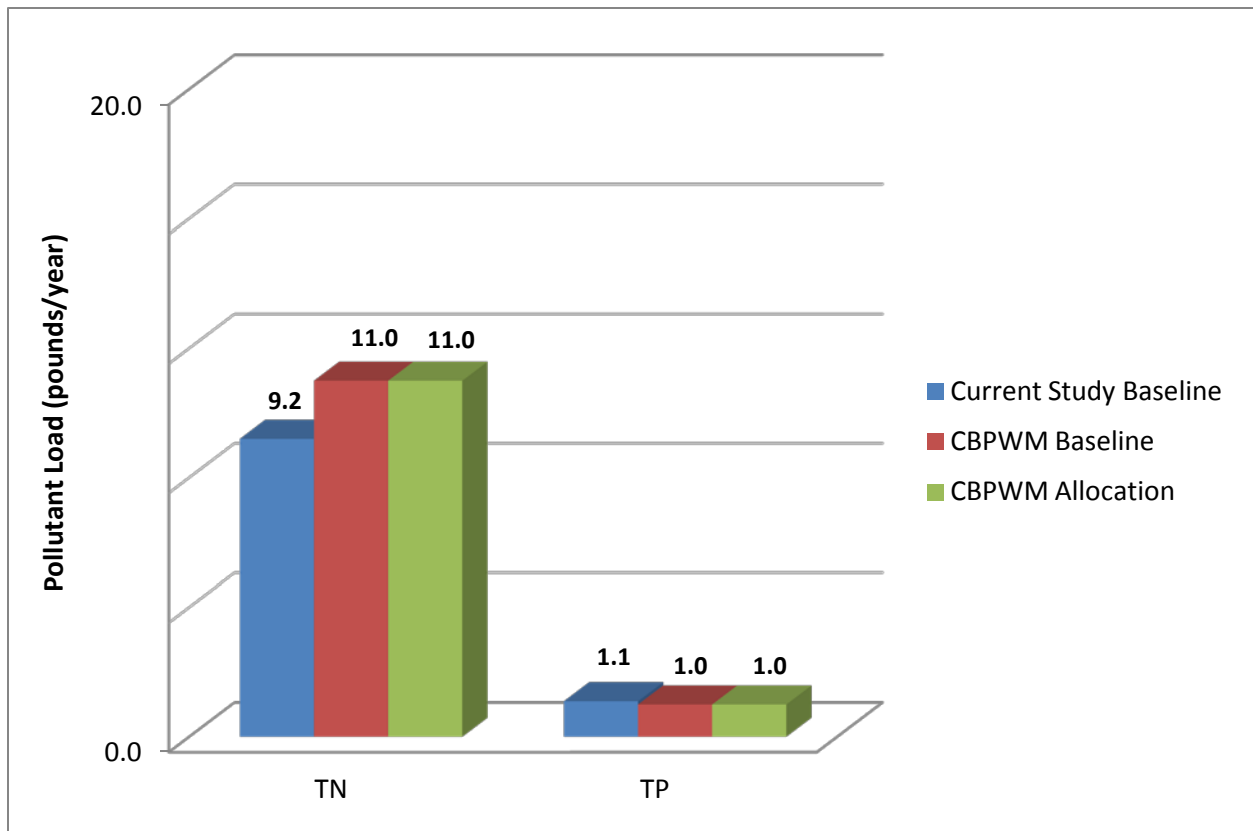
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Elkton Armory (24A90, LTC James Victor McCool Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24A90**

<b>Site: 24A90- Elkton Armory (LTC James Victor McCool Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	9.2	11.0	11.0
TP	1.1	1.0	1.0

**Figure 1: Difference Between Facility Baseline Load Estimates**

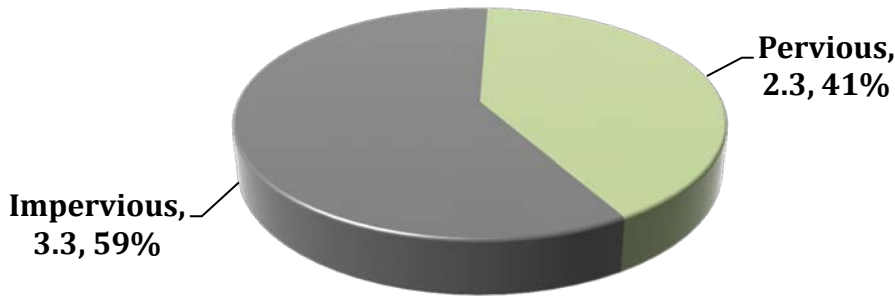


**Ellicott City Armory (24A95, BG Thomas B. Baker Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Ellicott City Army National Guard Armory**

The Ellicott City Armory is located in Howard County, Maryland on Montgomery Road, just east of the MD Route 29 and MD Route 103 intersection. It is located adjacent to the Long Gate Shopping Center. Stormwater from the eastern portion of the site drains into the Long Gate Shopping Center stormwater system, and runoff from the western portion flows to a drainage ditch.

The Ellicott City Armory is located in an urbanized, commercial setting in Howard County. 59-percent of the 5.6 acre site (3.3 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 41-percent of the site (2.3 acres) is categorized as high intensity pervious urban land cover, or lawns and brush.



**II. Ellicott City Armory Baseline Loadings March 2012:**

**Facility Size: 5.6 acres**  
**Local Watershed: Plumtree Branch**  
**Regional Watershed: Little Patuxent River**

Runoff from the Ellicott City Armory drains to an on-site stormwater system. This stormwater system, along with overland flow from a portion of the site, drains into the Howard County stormwater system. There are no existing stormwater BMPs at this location, although runoff from a portion of this site enters the Long Gate Shopping Center stormwater system, which does have stormwater BMPs. Table 1 shows the baseline loadings for the Ellicott City Armory.

**Table 1: Baseline Pollutant Loads for 24A95**

Site: 24A95- Ellicott City Armory (BG Thomas B. Baker Armory)	
Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)	
Pollutant	Load (Pounds per Year)
TN	38.5
TP	4.5

**Ellicott City Armory (24A95, BG Thomas B. Baker Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Ellicott City Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Ellicott City Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Ellicott City Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Ellicott City Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.



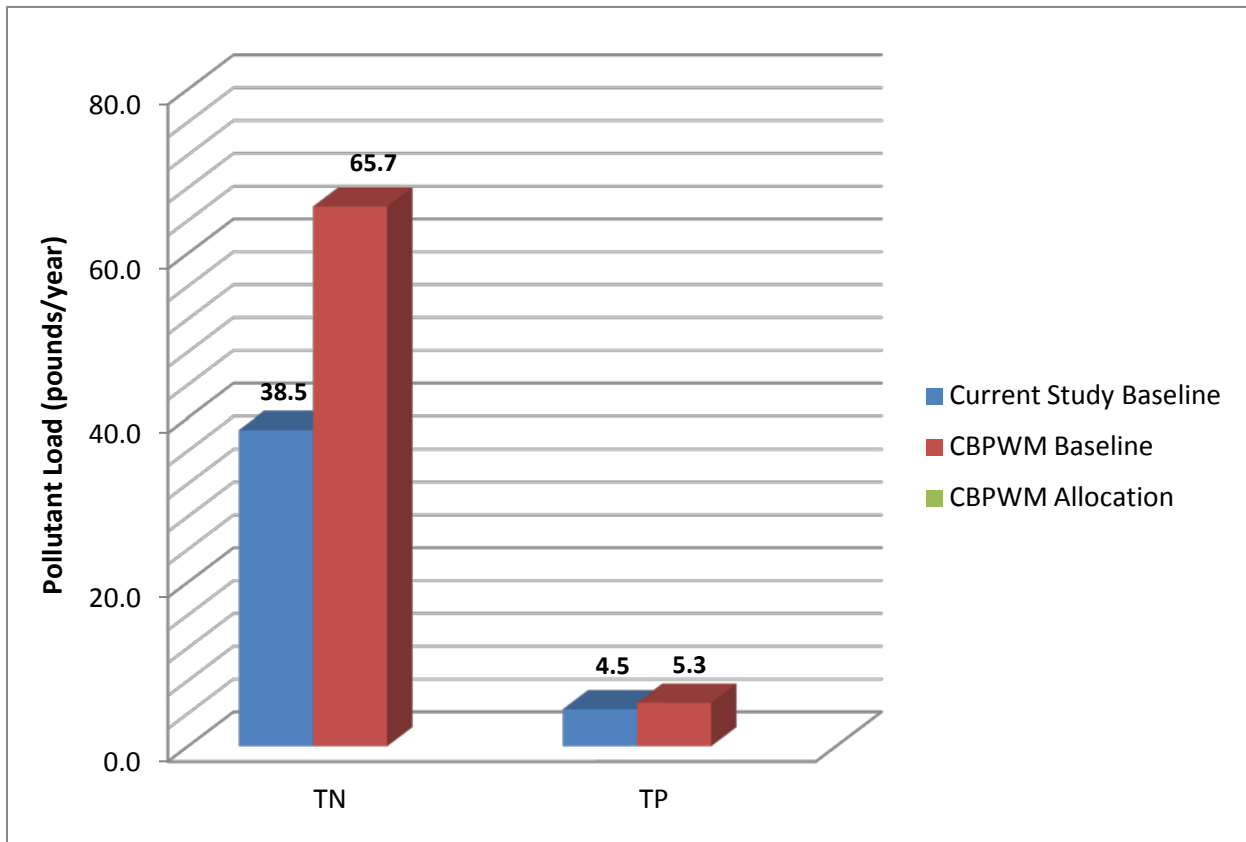
**Ellicott City Armory (24A95, BG Thomas B. Baker Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

- Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24A95**

<b>Site: 24A95- Ellicott City Armory (BG Thomas B. Baker Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	38.5	65.7	Not available
TP	4.5	5.3	Not available

**Figure 1: Difference Between Facility Baseline Load Estimates**

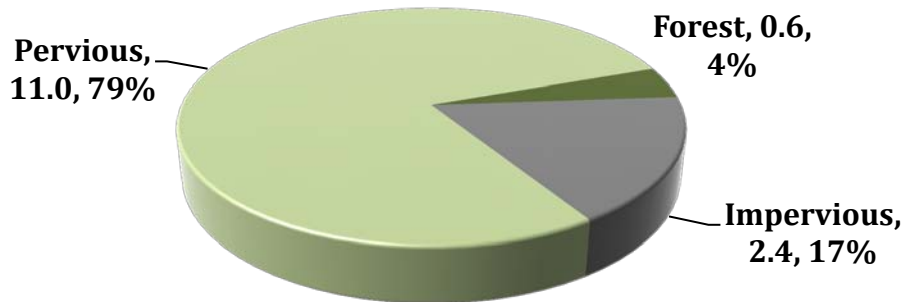


**Frederick Armory (24A99, CPT Michael Cresap Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Frederick Army National Guard Armory**

The Frederick Armory is located just west of the Maryland Route 144 (Old National Pike) crossing over the Monocacy River, just outside the corporate limits of the City of Frederick, in the unincorporated areas of Frederick County. The Monocacy River is located approximately 1,500 feet to the east of the facility.

The Frederick Armory is located in a suburban portion of Frederick County. 17-percent of the 14.0 acre site (2.4 acres) is categorized as low intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 79-percent of the site (11.0 acres) is categorized as low intensity pervious urban land cover, or lawns and brush. The remaining 4-percent of the site (0.6 acres) is forested.



**II. Frederick Armory Baseline Loadings March 2012:**

**Facility Size: 14.0 acres**  
**Local Watershed: Monocacy River**  
**Regional Watershed: Monocacy River**

Frederick Armory contains a stormwater system that contains two culverts under the entry road to the site. Approximately half the site drains to this stormwater system, with the other half draining to an adjacent residential stormwater system. There are no existing stormwater BMPs at this location. Table 1 shows the baseline loadings for the Frederick Armory.

**Table 1: Baseline Pollutant Loads for 24A99**

<b>Site: 24A99- Frederick Armory (CPT Michael Cresap Armory)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
<b>Pollutant</b>	<b>Load (Pounds per Year)</b>
TN	24.7
TP	3.3

**Frederick Armory (24A99, CPT Michael Cresap Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Frederick Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Frederick Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Frederick Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Frederick Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

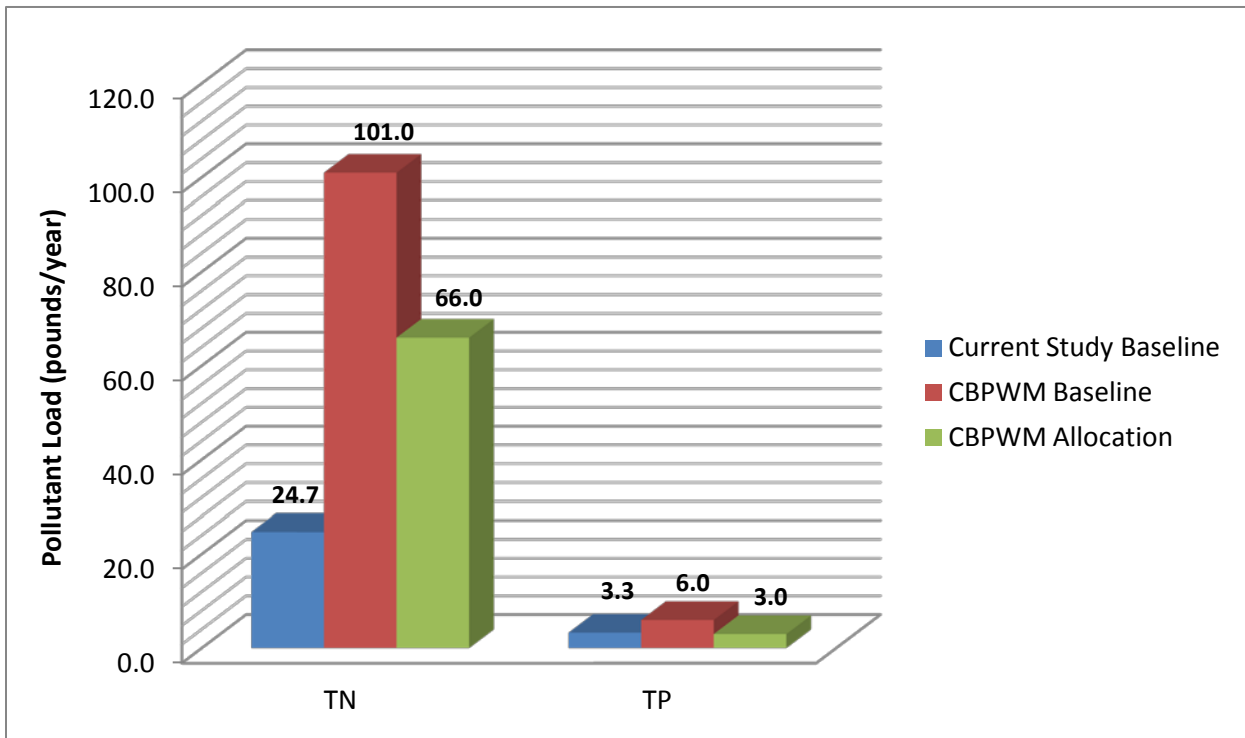
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Frederick Armory (24A99, CPT Michael Cresap Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24A99**

<b>Site: 24A99- Frederick Armory (CPT Michael Cresap Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	24.7	101.0	66.0
TP	3.3	6.0	3.0

**Figure 1: Difference Between Facility Baseline Load Estimates**

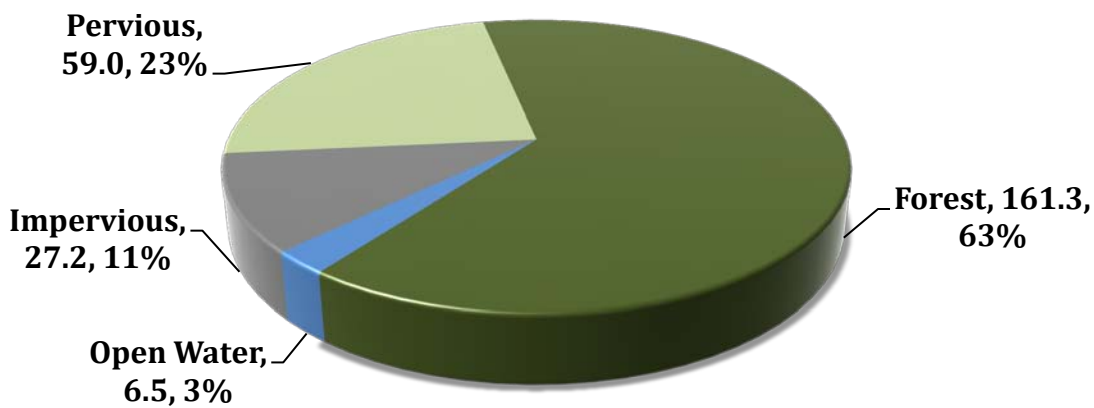


**Gunpowder Military Reservation and Purnell Armory (24B15)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Gunpowder Military Reservation and Purnell National Guard Armory**

The Gunpowder Military Reservation and Purnell Armory are located along Notchcliff Road in rural Baltimore County, Maryland. The 254.0 acre facility is located north of Gunpowder Falls State Park and east of Loch Raven Reservoir. Stormwater from the facility enters tributaries to Gunpowder Falls, which, with Notchcliff Road, forms the southern border of the facility.

The Gunpowder Military Reservation and Purnell Armory are located in rural Baltimore County. Eleven-percent of the 254 acre site (27.2 acres) is categorized as low intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 23-percent of the site (59.0 acres) is categorized as low intensity pervious urban land cover, or lawns and brush. Forest covers 63-percent of the site (161.3 acres), and the remaining 3-percent (6.5 acres) is open water.



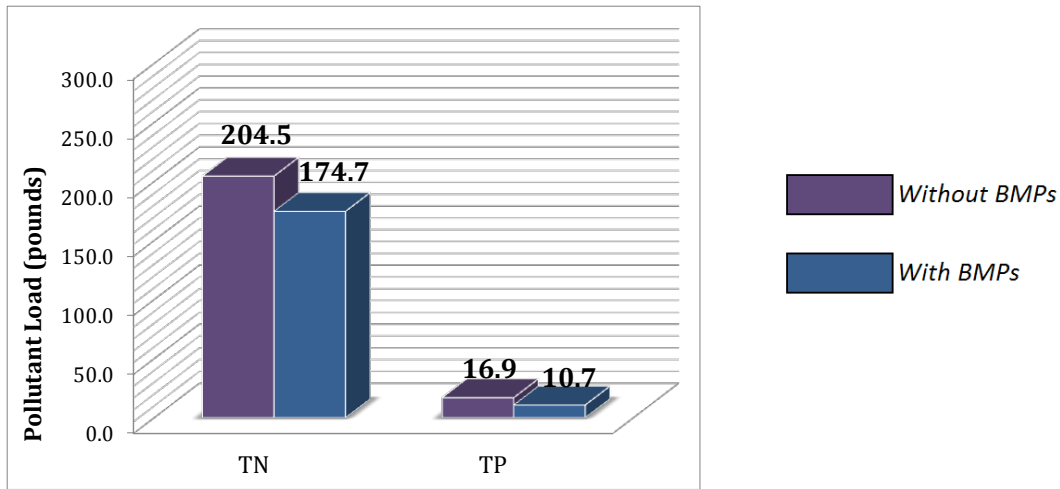
**II. Gunpowder Mil. Res. and Purnell Armory Baseline Loadings March 2012:**

**Facility Size: 254.0 acres**  
**Local Watershed: Gunpowder Falls**  
**Regional Watershed: Gunpowder River**

There are two stormwater BMPs on this facility. Both are wet ponds. The stormwater BMPs on Gunpowder Military Reservation and Purnell Armory treat 111.0 acres of the 254.0 acre facility (44-percent). Both BMPs are in good condition and functioning properly at the time of this study. Figure 1 shows that the BMPs collectively reduce TN loads from the facility by 15-percent and TP loads by 37-percent.

**Gunpowder Military Reservation and Purnell Armory (24B15)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Figure 1: Existing BMP Reductions at 24B15**



*\*Entire site reduction shown, including forested areas.*

Table 1 shows the existing baseline pollutant loads for Gunpowder Military Reservation and Purnell Armory which includes the reduction of pollutants associated with the existing stormwater BMPs in urban areas.

**Table 1: Baseline Pollutant Loads for 24B15 (including BMP reduction)**

<b>Site: 24B15- Gunpowder Military Reservation and Purnell Armory</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)*
TN	127.8
TP	9.8

*\*Values for urban areas only*

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Gunpowder Military Reservation and Purnell Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Gunpowder Military Reservation and Purnell Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for

# **Gunpowder Military Reservation and Purnell Armory (24B15)**

## **Input to Maryland Department of Environment**

### **Watershed Implementation Plan Phase II**

all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

#### **IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Gunpowder Military Reservation and Purnell Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Gunpowder Military Reservation and Purnell Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

#### **V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

#### **VI. Inaccuracies:**

- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Table 2 and Figure 2 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

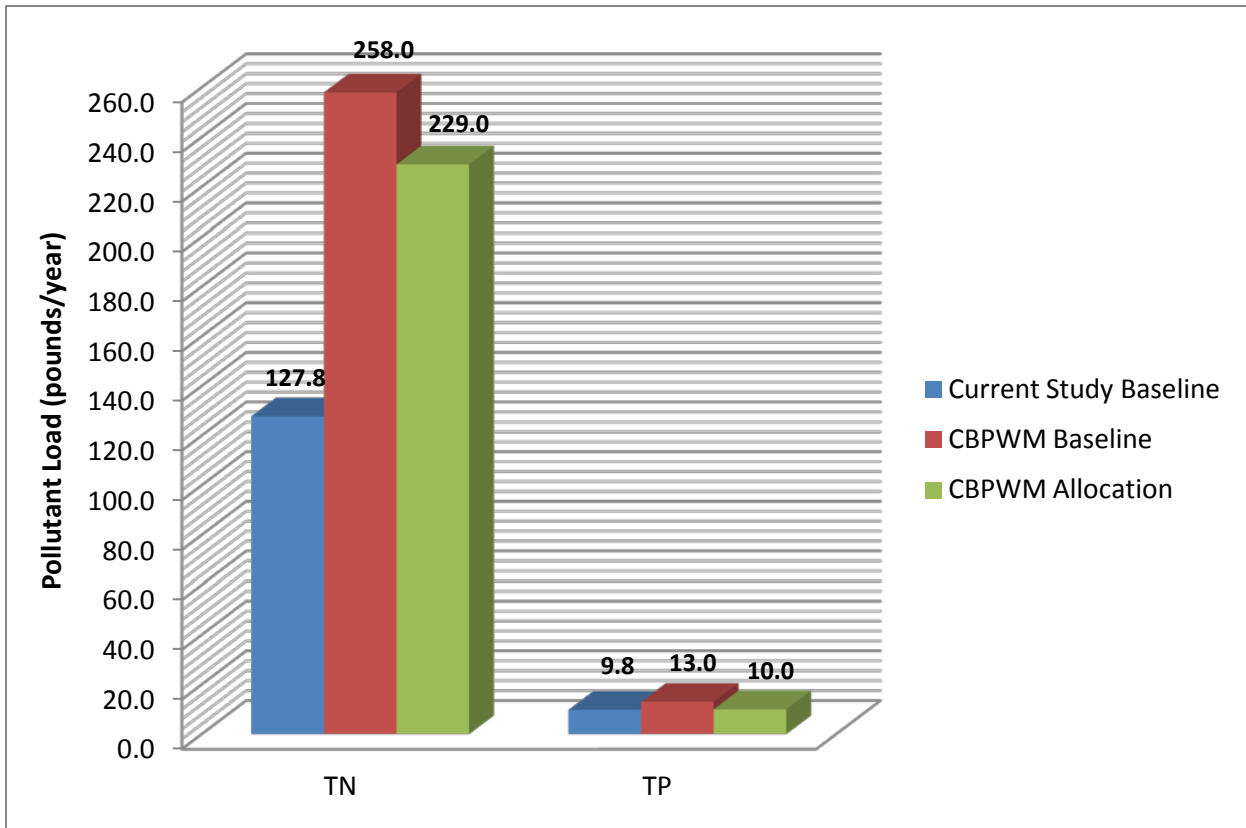
**Gunpowder Military Reservation and Purnell Armory (24B15)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24B15**

<b>Site: 24B15- Gunpowder Military Reservation and Purnell Armory</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)*	CBPWM (Baseline)	CBPWM (Allocation)
TN	127.8	258.0	229.0
TP	9.8	13.0	10.0

*\*Values for urban areas only*

**Figure 2: Difference Between Facility Baseline Load Estimates**



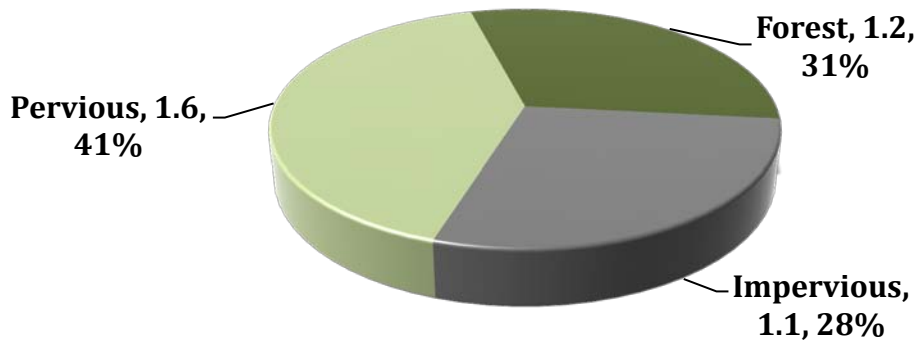


**Glen Burnie Armory (24B20, First Regiment Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Glen Burnie National Guard Armory**

The Glen Burnie Armory is located at the intersection of Maryland Route 176 (Dorsey Road) and Maryland Route 648 (Baltimore-Annapolis Road) in Anne Arundel County. All runoff from this facility drains into an on-site stormwater system or into the Anne Arundel County stormwater system along Dorsey Road, both of which outfall into a tributary to Sawmill Creek.

The Glen Burnie Armory is located in an urbanized area of Anne Arundel County. 28-percent of the 3.9 acre site (1.1 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 41-percent of the site (1.6 acres) is categorized as high intensity pervious urban land cover, or lawns and landscaping. The remaining 31-percent of the site (1.2 acres) is forested.



**II. Glen Burnie Armory Baseline Loadings March 2012:**

**Facility Size: 3.9 acres**  
**Local Watershed: Sawmill Creek**  
**Regional Watershed: Patapsco River**

The Glen Burnie Armory contains an on-site stormwater system. The stormwater system flows, along with overland flow from the portions of the site, into the Anne Arundel County stormwater system. There are no existing stormwater BMPs at this location. Table 1 shows the baseline loadings for the Glen Burnie Armory.

**Table 1: Baseline Pollutant Loads for 24B20**

Site: 24B20- Glen Burnie Armory (First Regiment Armory)	
Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)	
Pollutant	Load (Pounds per Year)
TN	14.9
TP	1.8

**Glen Burnie Armory (24B20, First Regiment Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Glen Burnie Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Glen Burnie Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Glen Burnie Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Glen Burnie Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.

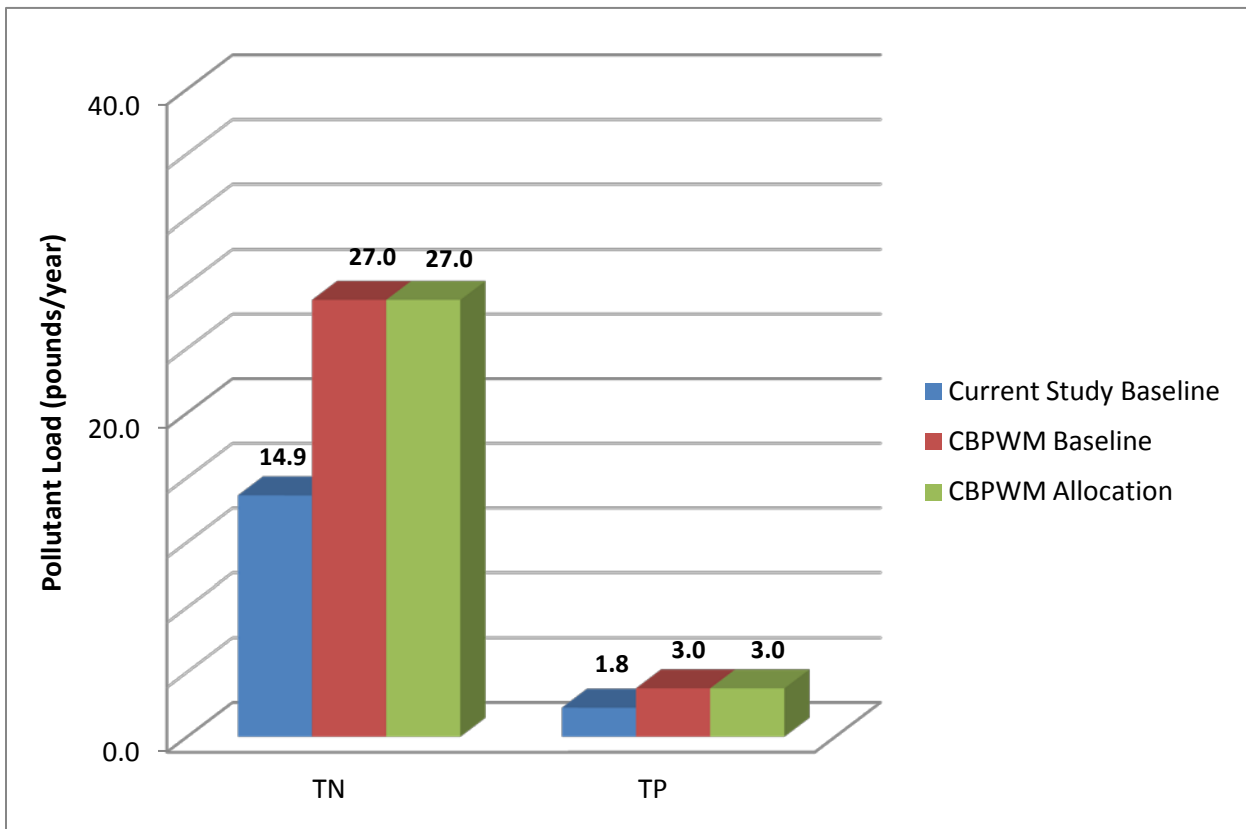
**Glen Burnie Armory (24B20, First Regiment Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

- Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24B20**

<b>Site: 24A90- Glen Burnie Armory (First Regiment Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	14.9	27.0	27.0
TP	1.8	3.0	3.0

**Figure 1: Difference Between Facility Baseline Load Estimates**

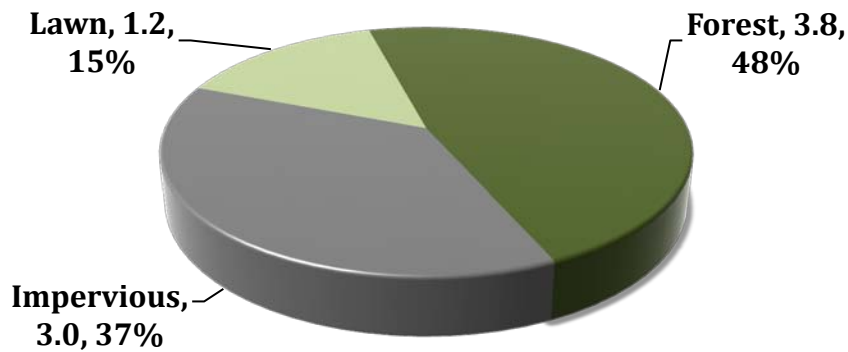


**Greenbelt Armory (24B25, MG (Brevet) John R. Kenly Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Greenbelt National Guard Armory**

The Greenbelt Armory is located in the City of Greenbelt, Prince George’s County, Maryland. The 8.0 acre site is located just west of the Greenbelt Road (MD Route 193) and Baltimore-Washington Parkway (U.S. Route 295) interchange.

The Greenbelt Armory is located in the urbanized Capital Beltway corridor. Thirty-seven percent of the 8.0 acre site (3.0 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. Fifteen-percent of the site (1.2 acres) is categorized as high intensity pervious urban land cover, or lawns. The remaining 48-percent (3.8 acres) is forested.



**II. Greenbelt Armory Baseline Loadings March 2012:**

**Facility Size: 8.0 acres**  
**Local Watershed: Indian Creek**  
**Regional Watershed: Anacostia River**

Runoff from the Greenbelt Armory drains to an on-site stormwater system. This stormwater system, along with overland flow from the portion of the site, drains into the City of Greenbelt stormwater system. There are no existing stormwater BMPs at this location. Table 1 shows the baseline loadings for the Greenbelt Armory.

**Table 1: Baseline Pollutant Loads for 24B25**

<b>Site: 24B25- Greenbelt Armory (MG (Brevet) John R. Kenly Armory)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
<b>Pollutant</b>	<b>Load (Pounds per Year)</b>
TN	38.2
TP	4.4

**Greenbelt Armory (24B25, MG (Brevet) John R. Kenly Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Greenbelt Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Greenbelt Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Greenbelt Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Greenbelt Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

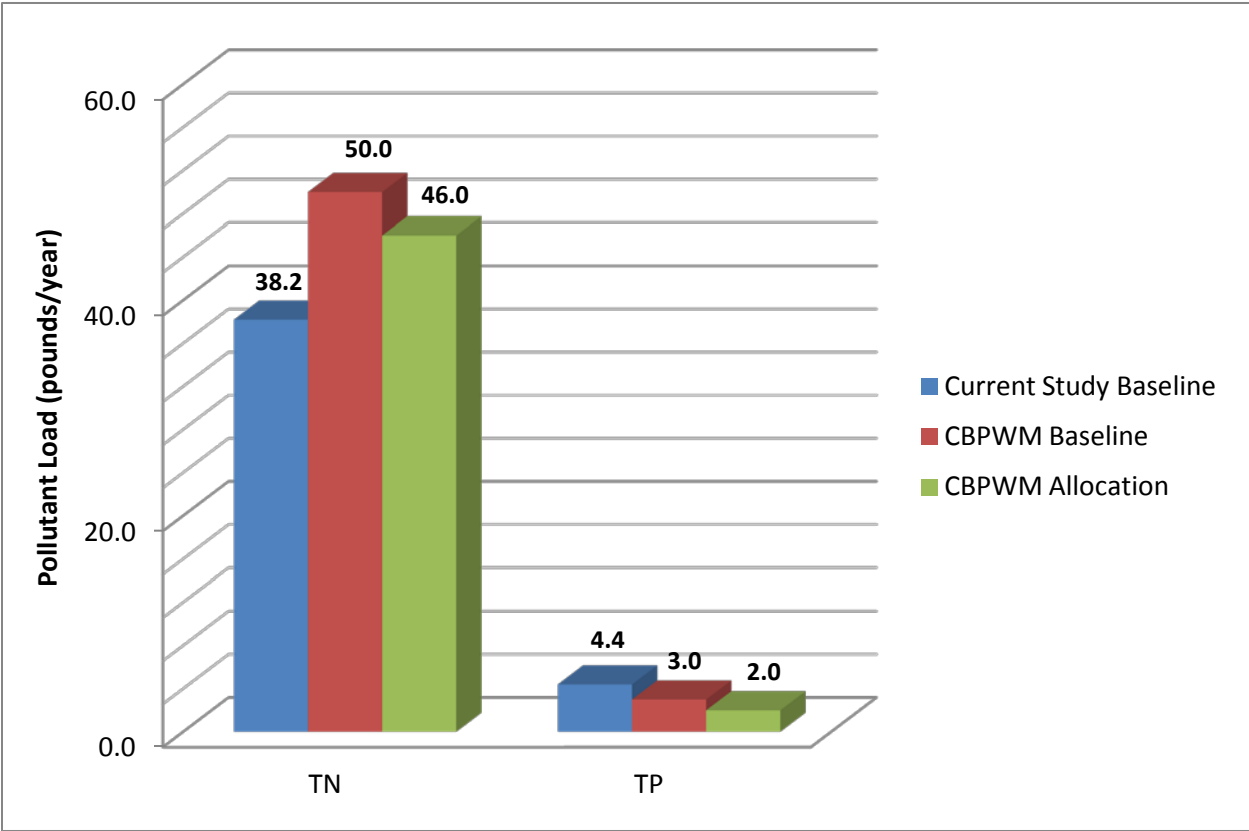
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Greenbelt Armory (24B25, MG (Brevet) John R. Kenly Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24B25**

<b>Site: 24B25- Greenbelt Armory (MG (Brevet) John R. Kenly Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	38.2	50.0	46.0
TP	4.4	3.0	2.0

**Figure 1: Difference Between Facility Baseline Load Estimates**

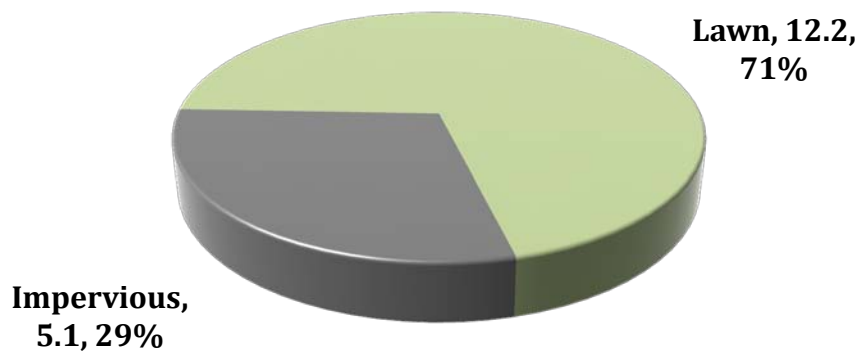


**Hagerstown Armory (24B31, BG (MD) Randolph Millholland & CW4 Lloyd May Arm.)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Hagerstown National Guard Armory**

The Hagerstown Armory is located in the unincorporated area of Washington County, Maryland, approximately 3.5 miles south of Hagerstown. The 17.3 acre site is located east of the intersection of MD Route 65 (Sharpsville Pike) and Roxbury Road. Stormwater drains into an on-site stormwater system as well as overland into the Washington County stormwater system.

The Hagerstown Armory is located in a rural setting. 29-percent of the 17.3 acre site (5.1 acres) is categorized as low intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 71-percent of the site (12.2 acres) is categorized as low intensity pervious urban land cover, or lawns.



**II. Hagerstown Armory Baseline Loadings March 2012:**

**Facility Size: 17.3 acres**  
**Local Watershed: Marsh Run**  
**Regional Watershed: Potomac River**

The Hagerstown Armory contains a stormwater system consisting of a few stormwater inlets and approximately 200 linear feet of vitrified clay, corrugated metal, and concrete piping. For a portion of the site, the stormwater system conveys runoff into stormwater dry pond.

The one stormwater BMP on the Hagerstown Armory treats 3.3 acres on the 17.3 acre facility (19-percent). The BMP is in excellent condition and is functioning properly at the time of this study. Figure 1 shows the BMP reduces TN and TP loads from the facility by 2-percent.

**Hagerstown Armory (24B31, BG (MD) Randolph Millholland & CW4 Lloyd May Arm.)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Figure 1: Existing BMP Reductions at 24B31**

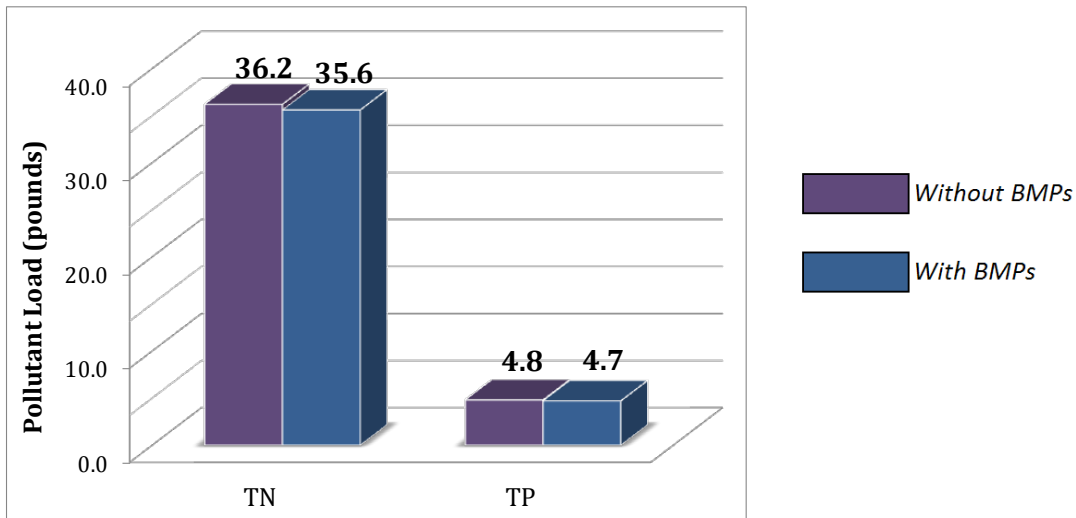


Table 1 shows the existing baseline pollutant loads for the Hagerstown Armory which includes the reduction of pollutants associated with the existing stormwater BMP.

**Table 1: Baseline Pollutant Loads for 24B31 (including BMP reduction)**

<b>Site: 24B31: Hagerstown Armory (BG Randolph Millholland &amp; CW4 Lloyd May Arm.)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
<b>Pollutant</b>	<b>Load (Pounds per Year)</b>
TN	35.6
TP	4.7

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Hagerstown Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Hagerstown Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.



**Hagerstown Armory (24B31, BG (MD) Randolph Millholland & CW4 Lloyd May Arm.)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Hagerstown Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Hagerstown Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

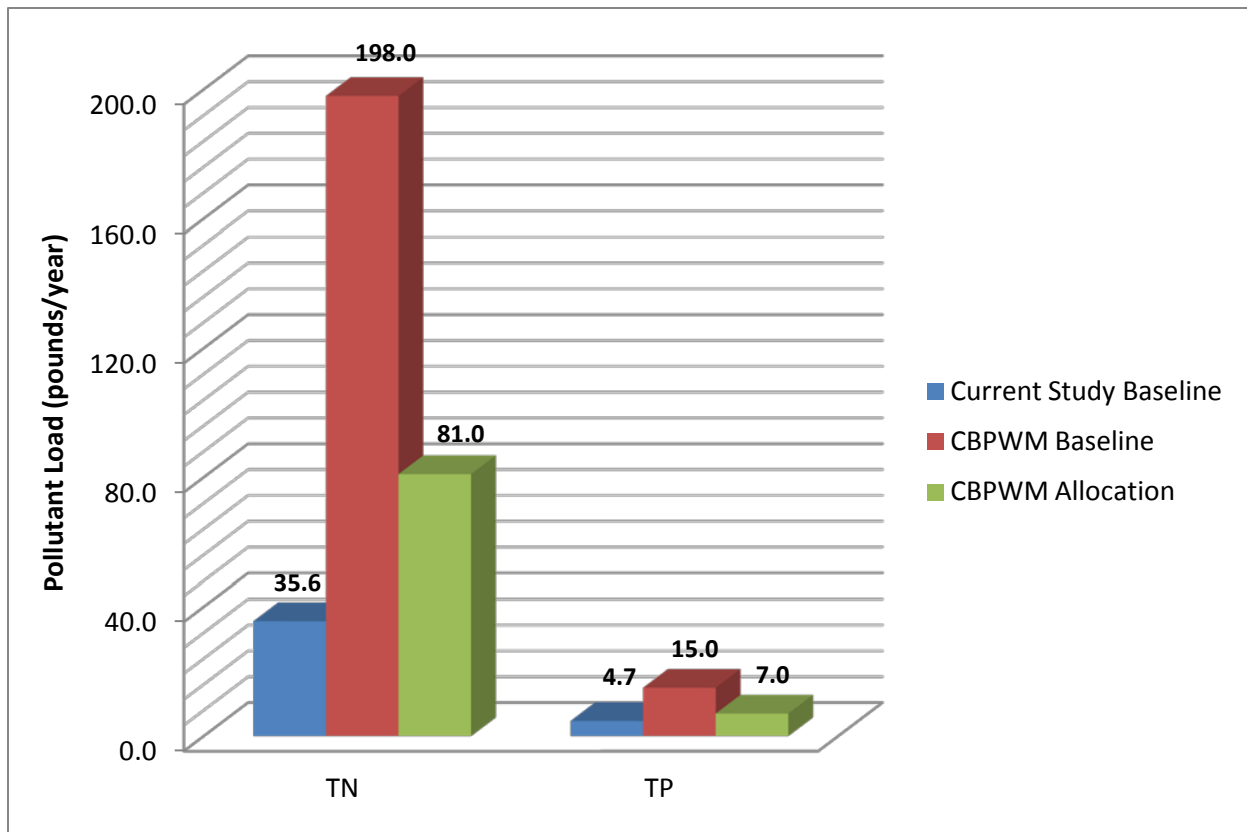
**VI. Inaccuracies:**

- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- The BMP identified on this site is not included in the CBPWM load calculations. These inaccuracies may result in changes to the expected load reduction for this facility.
- Figure 2 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Hagerstown Armory (24B31, BG (MD) Randolph Millholland & CW4 Lloyd May Arm.)  
 Input to Maryland Department of Environment  
 Watershed Implementation Plan Phase II**

**Figure 2: Baseline Pollutant Loads Comparisons with CPBWM for Site 24B31**

<b>Site: 24B31- Hagerstown Armory (BG Randolph Millholland &amp; CW4 Lloyd May Arm.)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	35.6	198.0	81.0
TP	4.7	15.0	7.0

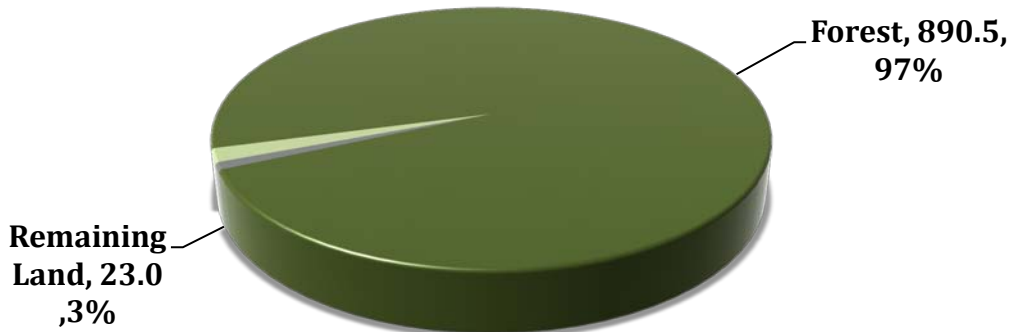


**Lil-Aaron Strauss Wilderness Area (24B33, BG Thomas B. Baker Training Site)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Lil-Aaron Strauss Wilderness Area**

The Lil-Aaron Straus Wilderness Area is located in a mountainous, forested area in Allegany and Washington Counties, Maryland. The 913.5 acre facility is approximately 20 miles east of Cumberland, Maryland and 10 miles west of Berkley Springs, West Virginia, bordered by the Potomac River on the south. Sideling Hill Branch runs through the facility, which is the Allegany/Washington County boundary.

The Lil-Aaron Strauss Wilderness Area is located in rural Washington and Allegany Counties, and is mostly forested (97-percent, 890.5 acres). Of the remaining land, 1-percent (7.7 acres) is categorized as low intensity impervious urban land cover (building rooftops, parking areas, and sidewalks) and 2-percent of the site (15.3 acres) is categorized as low intensity pervious urban land cover (lawns, brush, and open water).



**II. Lil-Aaron Strauss Wilderness Area Baseline Loadings March 2012:**

**Facility Size: 913.5 acres**  
**Local Watershed: Sideling Hill Branch/ Potomac River**  
**Regional Watershed: Potomac River**

There are no existing stormwater BMPs at this location, with a stormwater system comprised mainly of roadway culverts. There is an existing pond on the site, but it is for fire protection and does not have a stormwater management benefit. Table 1 shows the baseline loadings for the Lil-Aaron Straus Wilderness Area.

**Table 1: Baseline Pollutant Loads for 24B33**

<b>Site: 24B33: Lil-Aaron Strauss Wilderness Area (BG Thomas B. Baker Training Site)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	47.1
TP	6.3

**Lil-Aaron Strauss Wilderness Area (24B33, BG Thomas B. Baker Training Site)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Lil-Aaron Straus Wilderness Area will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Lil-Aaron Straus Wilderness Area will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Lil-Aaron Straus Wilderness Area and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Lil-Aaron Straus Wilderness Area conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.

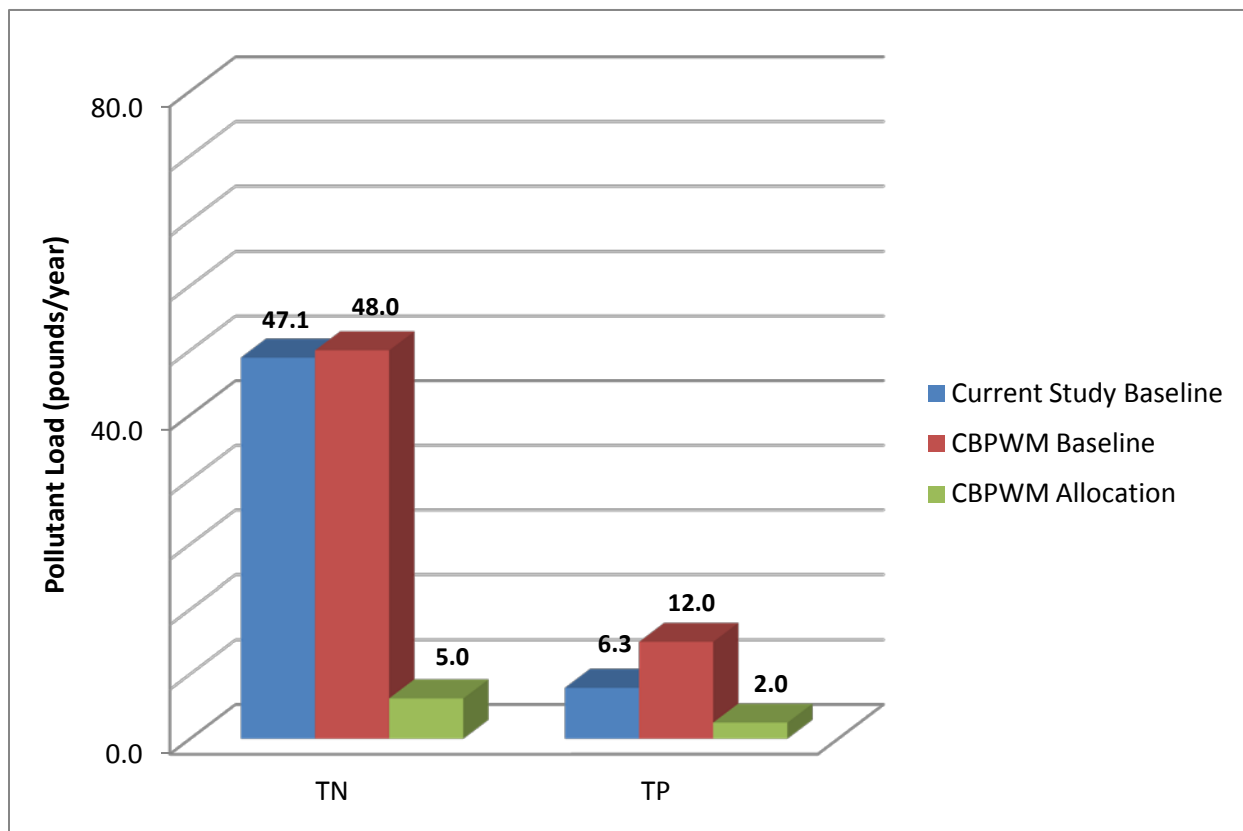
**Lil-Aaron Strauss Wilderness Area (24B33, BG Thomas B. Baker Training Site)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

➤ Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24B33**

<b>Site: 24B33: Lil-Aaron Strauss Wilderness Area (BG Thomas B. Baker Training Site)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	47.1	48.0	5.0
TP	6.3	12.0	2.0

**Figure 1: Difference Between Facility Baseline Load Estimates**

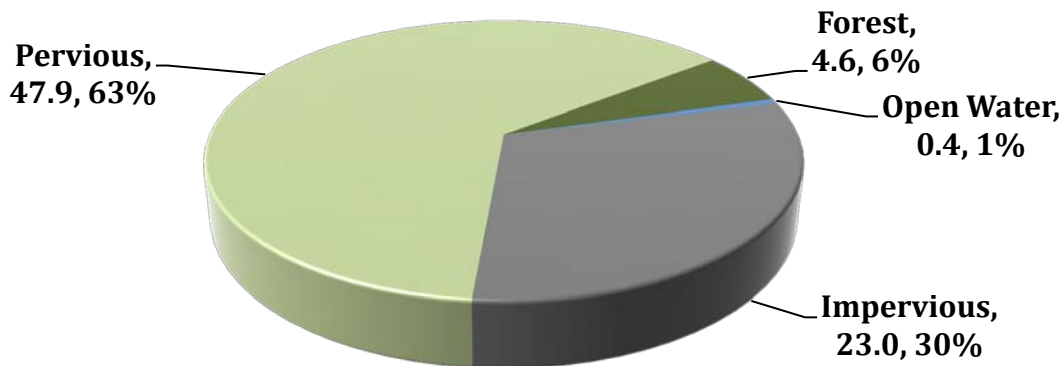


**Havre De Grace Military Reservation (24B35)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Havre de Grace Military Reservation**

The Havre de Grace Military Reservation is located within the boundaries of the City of Havre de Grace, Harford County, Maryland. The 75.9 acre facility east of Old Bay Lane, west of Wilson Street and Jerry Foster Way, and bordered by the Chesapeake Bay to the south.

The Havre de Grace Military Reservation is located in the urbanized City of Havre de Grace. 30-percent of the 75.9 acre site (23.0 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 63-percent of the site (47.9 acres) is categorized as high intensity pervious urban land cover, or lawns, brush, and gravel areas. Forest covers 6-percent of the site (4.6 acres), and the remaining land is open, tidal water.



**II. Havre de Grace Military Reservation Baseline Loadings March 2012:**

**Facility Size: 75.9 acres**  
**Local Watershed: Chesapeake Bay**  
**Regional Watershed: Chesapeake Bay**

The Havre de Grace Military Reservation contains a stormwater system consisting of over 20 stormwater inlets; approximately 1,800 linear feet of terra cotta, concrete and corrugated metal piping; and 1,000 linear feet of concrete and 2,500 linear feet of grassed open drainage channels. There are two stormwater BMPs at this facility.

The stormwater BMPs on the Havre de Grace Military Reservation treat 1.7 acres of the 75.9 acre facility (2-percent). The BMPs are a sand filter and a wet pond. Both BMPs were in excellent condition at this time of this study. Figure 1 shows the BMPs collectively reduce TN loads from the facility by 1-percent and TP loads by 2-percent.

**Havre De Grace Military Reservation (24B35)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Figure 1: Existing BMP Reductions at 24B35**

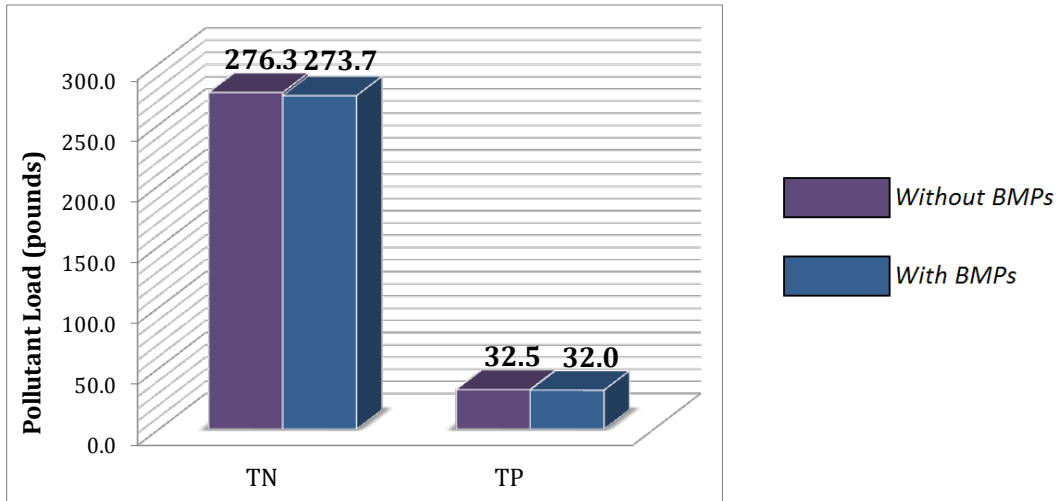


Table 1 shows the existing baseline pollutant loads for the Havre De Grace Military Installation which includes the reduction of pollutants associated with the existing stormwater BMPs.

**Table 1: Baseline Pollutant Loads for 24B35 (including BMP reduction)**

Site: 24B35: Havre De Grace Military Installation	
Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)	
Pollutant	Load (Pounds per Year)
TN	273.7
TP	32.0

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Havre de Grace Military Reservation will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Havre de Grace Military Reservation will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future

# **Havre De Grace Military Reservation (24B35)**

## **Input to Maryland Department of Environment**

### **Watershed Implementation Plan Phase II**

construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

#### **IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Havre de Grace Military Reservation and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Havre de Grace Military Reservation conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

#### **V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

#### **VI. Inaccuracies:**

- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- The BMPs identified on this site are not included in the CBPWM load calculations. These inaccuracies may result in changes to the expected load reduction for this facility.
- Table 2 and Figure 2 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

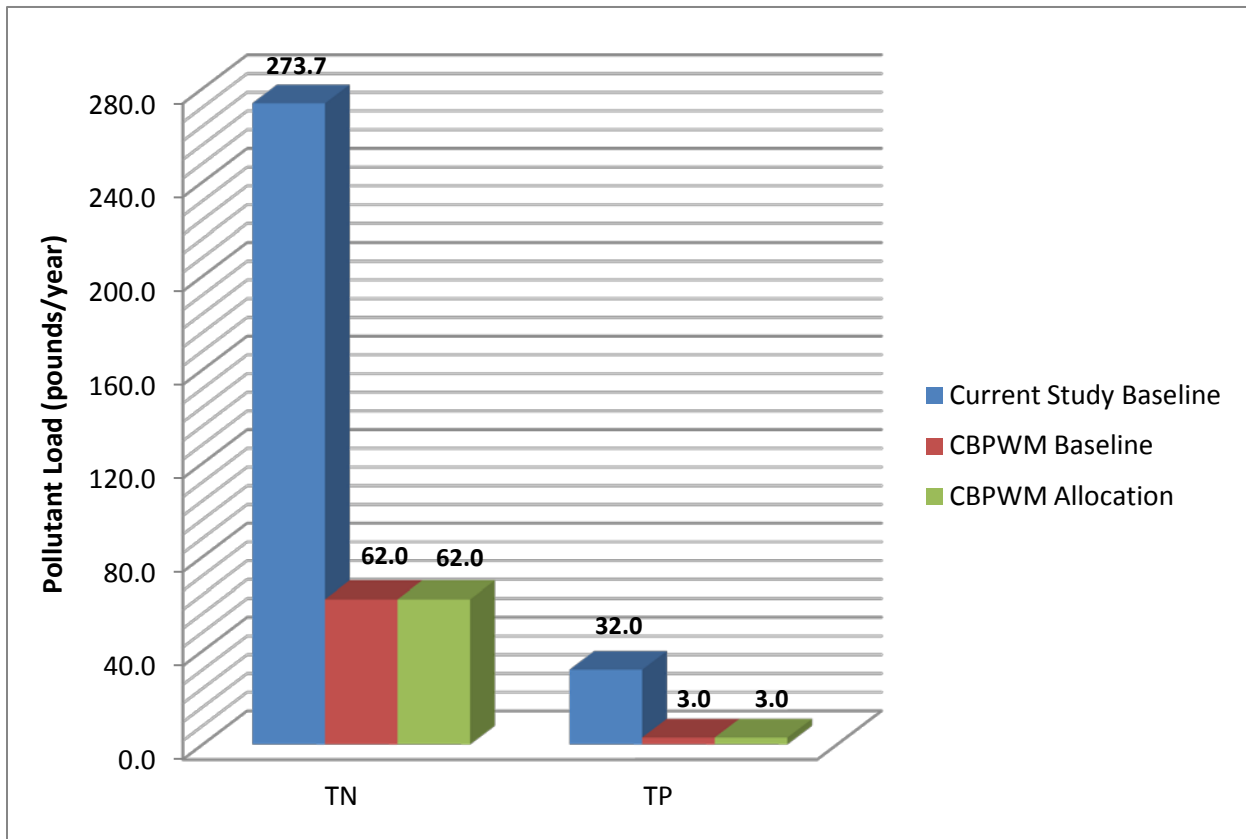


**Havre De Grace Military Reservation (24B35)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 2: Baseline Pollutant Loads Comparisons with CPBWM for Site 24B35**

Site: 24B35: Havre De Grace Military Installation			
CBPWM Comparisons (Urban Areas Only)			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	273.7	62.0	62.0
TP	32.0	3.0	3.0

**Figure 2: Difference Between Facility Baseline Load Estimates**

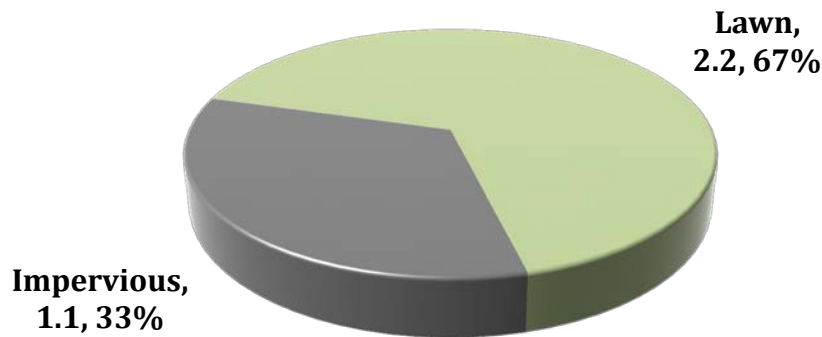


**La Plata Armory (24B55, BG William Smallwood Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. La Plata National Guard Armory**

The La Plata Armory is within the boundary of the Town of La Plata, Charles County, Maryland. The 3.3 acre facility is located in the U.S. Route 301 corridor (Crain Highway), northwest of the intersection of Route 301 and MD Route 225 (West Hawthorne Drive). At the time of this study, this facility was “pending disposal”. The property will no longer be owned by MDARNG in the future.

The La Plata Armory is located in the urbanized U.S. Route 301 corridor (Crain Highway). 33-percent of the 3.3 acre site (1.1 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 67-percent of the site (2.2 acres) is categorized as high intensity pervious urban land cover, or lawns.



**II. La Plata Armory Baseline Loadings March 2012:**

**Facility Size: 3.3 acres**

**Local Watershed: Port Tobacco Creek**

**Regional Watershed: Port Tobacco River**

The La Plata Armory contains an on-site stormwater system. This stormwater system, along with overland flow from a portion of the site, drains into the Town of La Plata stormwater system. There are no existing stormwater BMPs at this location. Table 1 shows the baseline loadings for La Plata Armory.

**Table 1: Baseline Pollutant Loads for 24B55**

Site: 24B55- La Plata Armory (BG William Smallwood Armory)	
Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)	
Pollutant	Load (Pounds per Year)
TN	16.0
TP	1.9

**La Plata Armory (24B55, BG William Smallwood Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The La Plata Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The La Plata Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the La Plata Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the La Plata Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

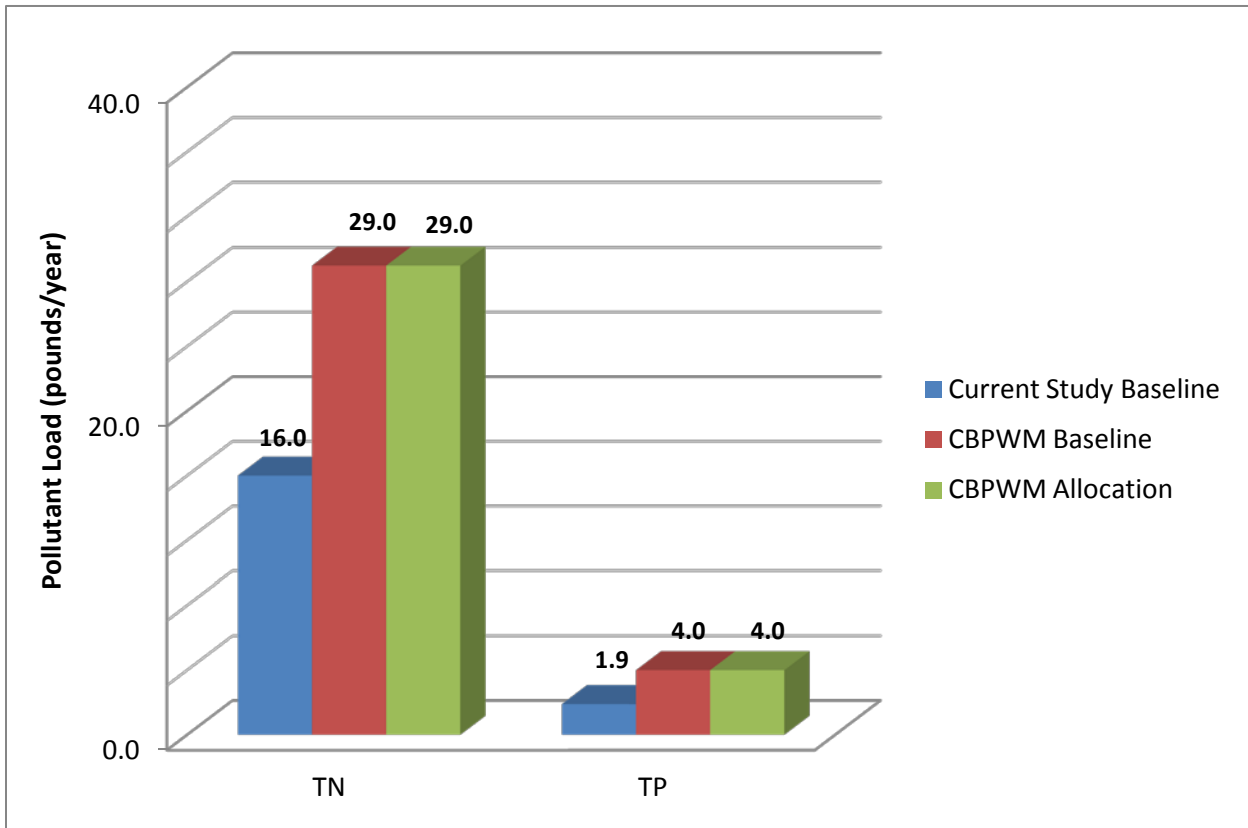
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**La Plata Armory (24B55, BG William Smallwood Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24B55**

<b>Site: 24B55- La Plata Armory (BG William Smallwood Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	16.0	29.0	29.0
TP	1.9	4.0	4.0

**Figure 1: Difference Between Facility Baseline Load Estimates**



**Fort George G. Meade (24B65)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**I. Fort George G. Meade**

Fort George G. Meade is a single building located on U.S. Army Garrison Fort George G. Meade in Anne Arundel County, Maryland. The footprint of the building is 0.50 acres in size and is located northeast of the intersection of Huber Road and Rock Avenue. All drainage from the building flows from the rooftop to the parking lot into the U.S. Army Garrison Fort George G. Meade stormwater system.

Fort George G. Meade is located at the moderately urbanized area U.S. Army Garrison Fort George G. Meade. The entire 0.50 acre site, which is all building rooftop, is considered high intensity impervious land cover.

**II. Fort George G. Meade Baseline Loadings March 2012:**

**Facility Size: 0.50 acres**

**Local Watershed: Midway Branch**

**Regional Watershed: Little Patuxent River**

There are no existing stormwater BMPs or stormwater infrastructure located at Fort Geo G Meade. All runoff from the building rooftop enters the U.S. Army Garrison Fort George G. Meade stormwater system through overland flow across the parking lot for the building. Table 1 shows the baseline loadings for Fort George G. Meade.

**Table 1: Baseline Pollutant Loads for 24B65**

<b>Site: 24B65- Fort George G. Meade</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	5.3
TP	0.6

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Fort George G. Meade will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Fort George G. Meade will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**Fort George G. Meade (24B65)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Fort George G. Meade and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, Fort George G. Meade conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

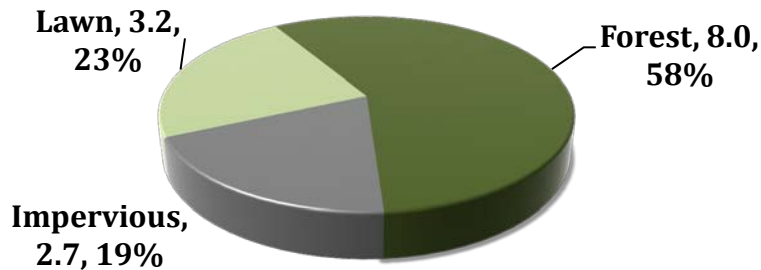
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Programs Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Per Maryland Department of the Environment, Fort George G. Meade is not considered an independent entity and is included as a component of U.S. Army Garrison Fort George G. Meade. Therefore specific baseline loads and allocations for this facility are not available.

**Parkville Armory (24B80, CW4 Melvin Sherr Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II  
DRAFT**

**I. Parkville National Guard Armory**

The Parkville Armory is located on Putty Hill Avenue just southeast of the Whitmarsh Boulevard (MD Route 43) and U.S. Route 695 (Baltimore Beltway) interchange. The 13.9 acre facility is in the unincorporated areas of Baltimore County, and stormwater is conveyed to the Baltimore County stormwater system via an on-site stormwater system.

The Parkville Armory is located in a suburban/ urban portion of Baltimore County. 19-percent of the 13.9 acre site (2.7 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 23-percent of the site (3.2 acres) is categorized as high intensity pervious urban land cover, or lawns. The remaining 58-percent (8.0 acres) is forested.



**II. Parkville Armory Baseline Loadings March 2012:**

**Facility Size: 13.9 acres**  
**Local Watershed: Stemmers Run**  
**Regional Watershed: Back River**

This stormwater system, along with overland flow from a portion of the site, flows into the Baltimore County stormwater system. There are no existing stormwater BMPs at this location. Table 1 shows the baseline loadings for the Parkville Armory.

**Table 1: Baseline Pollutant Loads for 24B80**

<b>Site: 24B80- Parkville Armory (CW4 Melvin Sherr Armory)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	39.3
TP	4.6

**Parkville Armory (24B80, CW4 Melvin Sherr Armory)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**  
**DRAFT**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Parkville Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Parkville Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Parkville Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Parkville Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

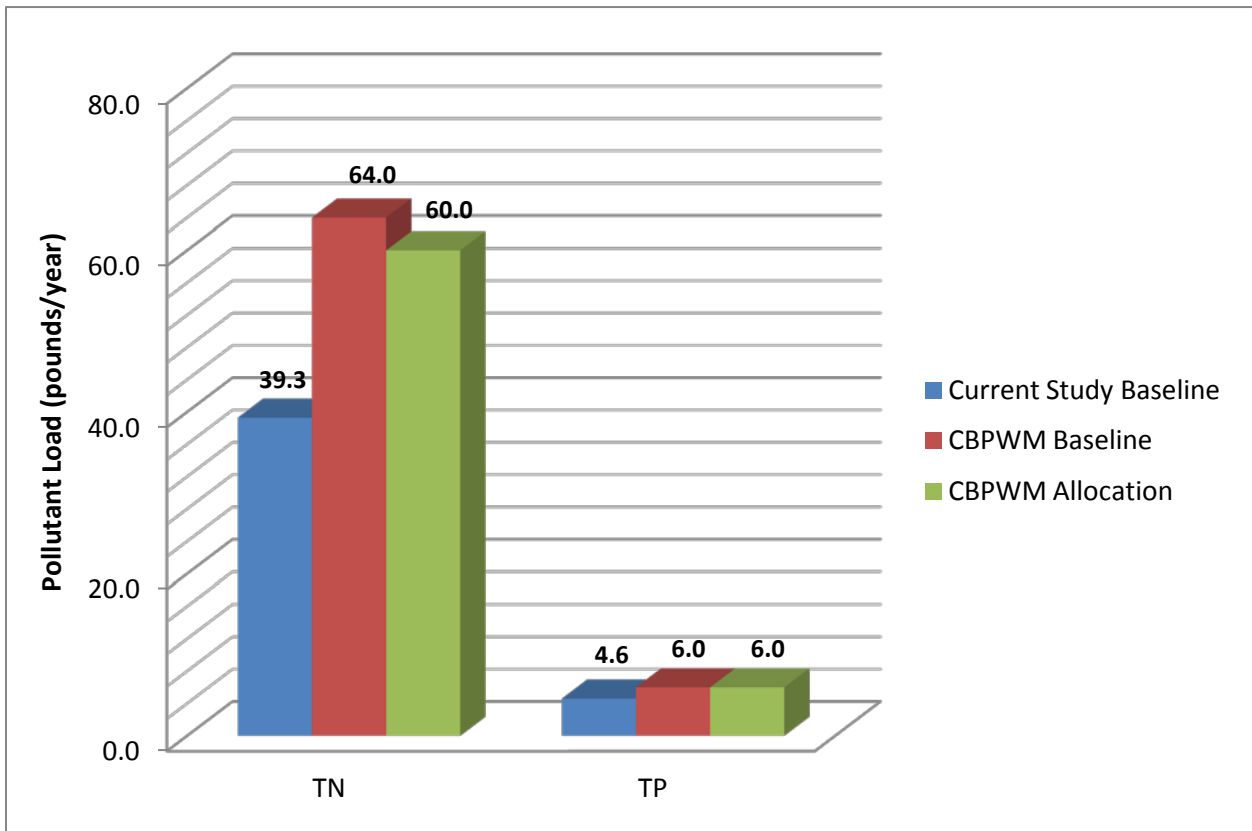


**Parkville Armory (24B80, CW4 Melvin Sherr Armory)  
 Input to Maryland Department of Environment  
 Watershed Implementation Plan Phase II  
 DRAFT**

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24B80**

<b>Site: 24B80- Parkville Armory (CW4 Melvin Sherr Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	39.3	64.0	64.0
TP	4.6	6.0	6.0

**Figure 1: Difference Between Facility Baseline Load Estimates**

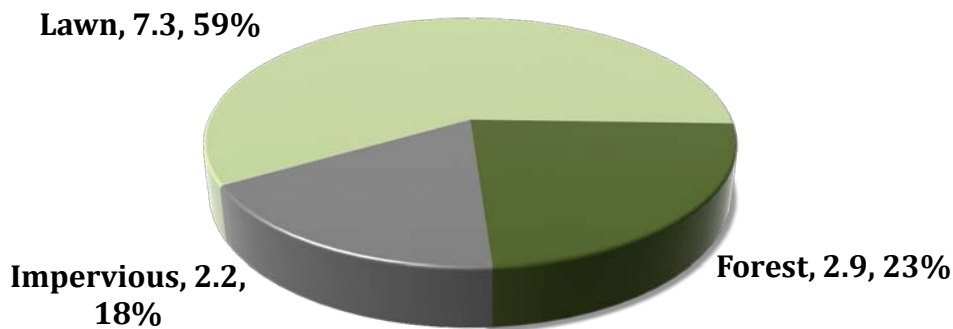


**PAX River Armory (24B85, Patuxent River Readiness Center)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. PAX River Army National Guard Armory**

The PAX River Armory is located within the boundary of Patuxent River Naval Air Station in St. Mary’s County, Maryland. The 12.4 acre facility is on Pine Hill Run Road just east of Forest Park Road. Runoff from this site flows easterly into a stormwater wet pond before entering Pine Hill Run, which flows directly into the Chesapeake Bay.

The PAX River Armory is located in a relatively rural area on the southern edge of the Patuxent River Naval Air Station property. Eighteen-percent of the 12.4 acre site (2.2 acres) is categorized as low intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. Fifty-nine percent of the site (7.3 acres) is categorized as low intensity pervious urban land cover, or lawns. The remaining 23-percent (2.9 acres) of the site is forested.



**II. PAX River Armory Baseline Loadings November 2011:**

**Facility Size: 12.4 acres**  
**Local Watershed: Pine Hill Run**  
**Regional Watershed: Chesapeake Bay**

The PAX River Armory contains a stormwater system consisting of three culvert pipes under an access road and sidewalks, and approximately 1,000 linear feet of open drainage channels. The stormwater system conveys runoff to a stormwater wet pond in the eastern portion of the facility.

The stormwater BMP on the PAX River Armory treats 7.9 acres of the 12.4 acre facility (64-percent). The majority of the remaining 36-percent of the facility is forested and open space. The stormwater pond was in good condition and functioning properly the time of this study. Figure 1 shows the BMP reduces TN loads by 16-percent and the TP loads by 38-percent at the facility.

**PAX River Armory (24B85, Patuxent River Readiness Center)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Figure 1: Existing BMP Reductions at 24B85**

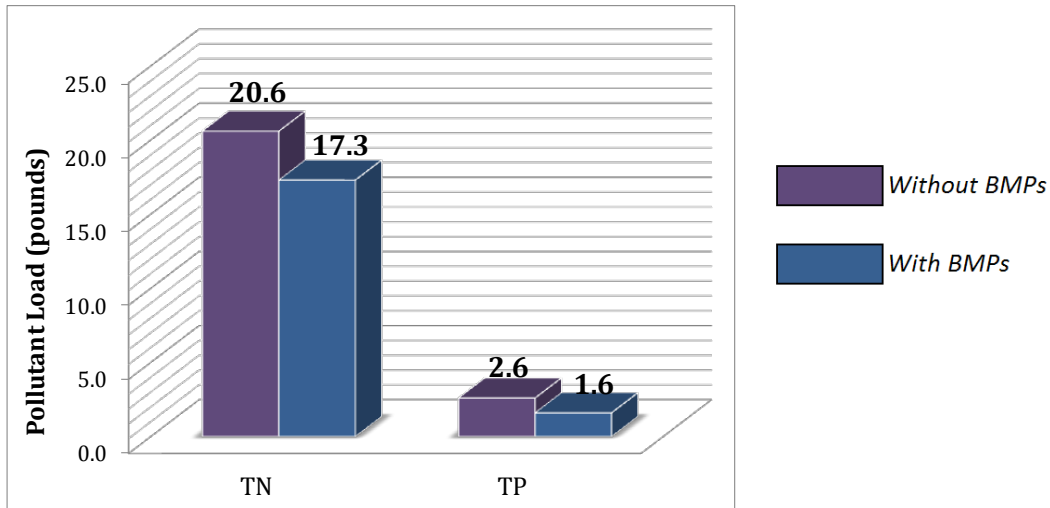


Table 1 shows the existing baseline pollutant loads for the PAX River Armory which includes the reduction of pollutants associated with the existing stormwater BMP.

**Table 1: Baseline Pollutant Loads for 24B85 (including BMP reduction)**

Site: 24B85-PAX River Armory (Patuxent River Readiness Center)	
Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)	
Pollutant	Load (Pounds per Year)
TN	17.3
TP	1.6

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The PAX River Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The PAX River Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**PAX River Armory (24B85, Patuxent River Readiness Center)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the PAX River Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the PAX River Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction’s expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

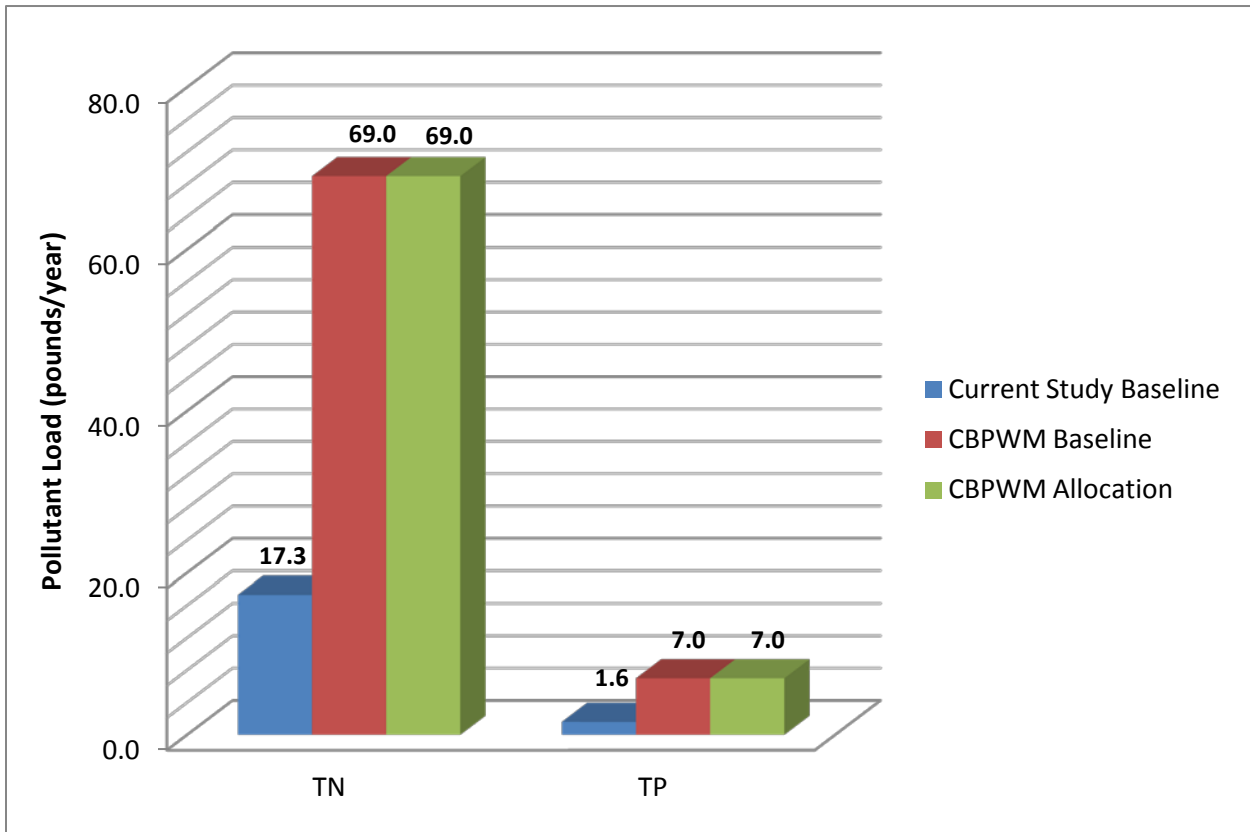
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Table 2 and Figure 2 show the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24C03**

<b>Site: 24B85-PAX River Armory (Patuxent River Readiness Center)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)*	CBPWM (Baseline)	CBPWM (Allocation)
TN	17.3	69.0	69.0
TP	1.6	7.0	7.0

**PAX River Armory (24B85, Patuxent River Readiness Center)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Figure 2: Difference Between Facility Baseline Load Estimates**

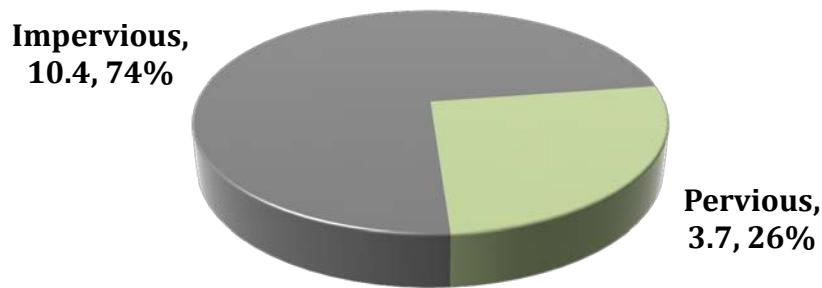


**Pikesville Military Reservation (24B90, 110th Reg./BG (MD) John S. Edwards Admin. Bldg.)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Pikesville Military Reservation**

The Pikesville Military Reservation is located near the intersection of Reisterstown Road (MD Route 140) and Milford Mill Road in the unincorporated areas of Baltimore County, Maryland. The 14.1 acre facility, which is across the street from the Suburban Club Golf Course, has an on-site stormwater system which conveys runoff into the Baltimore County system.

The Pikesville Military Reservation is located in an urban portion of Baltimore County. 74-percent of the 14.1 acre site (10.4 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 26-percent of the site (3.7 acres) is categorized as high intensity pervious urban land cover, or lawns and gravel areas.



**II. Pikesville Military Reservation Baseline Loadings March 2012:**

**Facility Size: 14.1 acres**  
**Local Watershed: Gwynns Falls**  
**Regional Watershed: Patapsco River**

This stormwater system, along with overland flow from portions of the site, drains into the Baltimore County stormwater system. There are no existing stormwater BMPs at this location. Table 1 shows the baseline loadings for the Pikesville Military Reservation.

**Table 1: Baseline Pollutant Loads for 24B90**

<b>Site: 24B90- Pikesville Military Reservation (110th Reg./BG John S. Edwards Admin. Bldg.)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	130.5
TP	15.2

**Pikesville Military Reservation (24B90, 110th Reg./BG (MD) John S. Edwards Admin. Bldg.)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Pikesville Military Reservation will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Pikesville Military Reservation will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Pikesville Military Reservation and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Pikesville Military Reservation conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

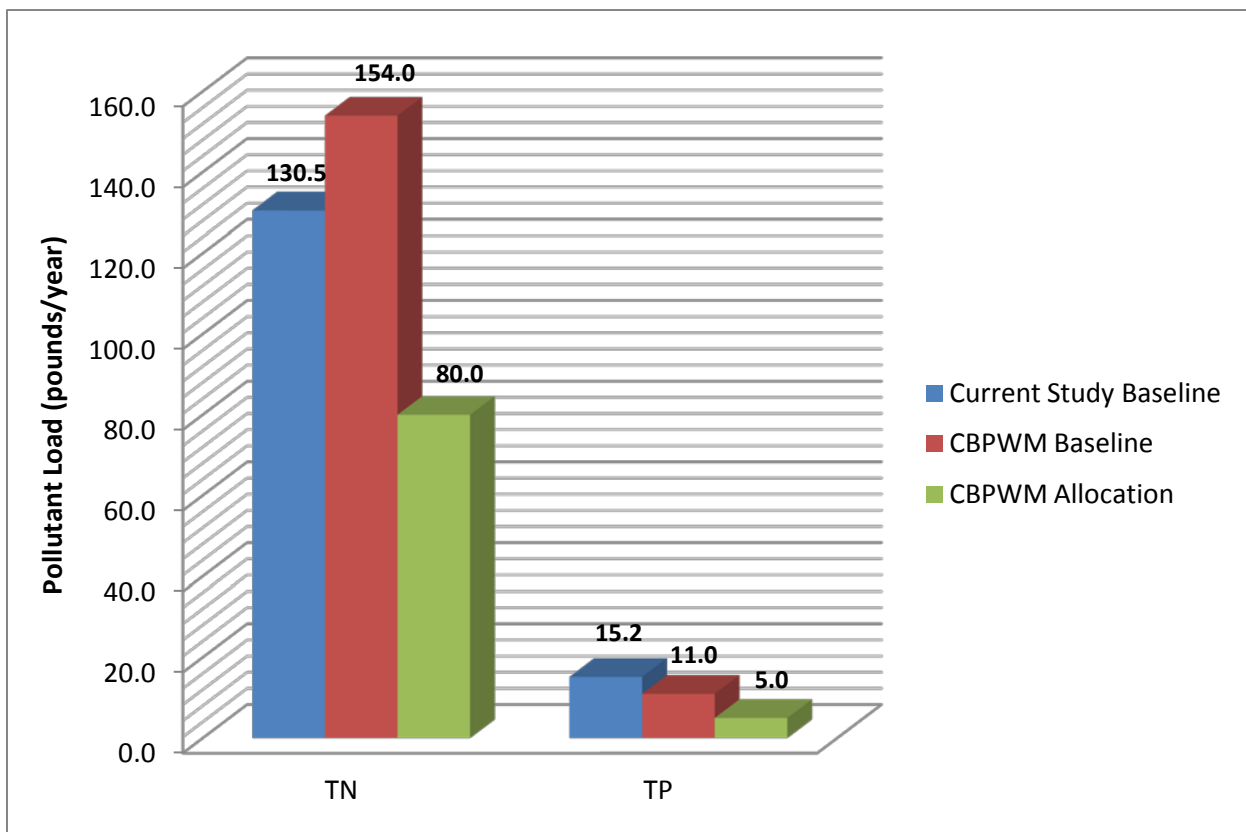
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Figure 1 and Table 2 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Pikesville Military Reservation (24B90, 110th Reg./BG (MD) John S. Edwards Admin. Bldg.)  
 Input to Maryland Department of Environment  
 Watershed Implementation Plan Phase II**

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24B90**

<b>Site: 24B90- Pikesville Military Reservation (110th Reg./BG John S. Edwards Admin. Bldg.)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	130.5	154.0	8.0
TP	15.2	11.0	5.0

**Figure 1: Difference between Facility Baseline Load Estimates**



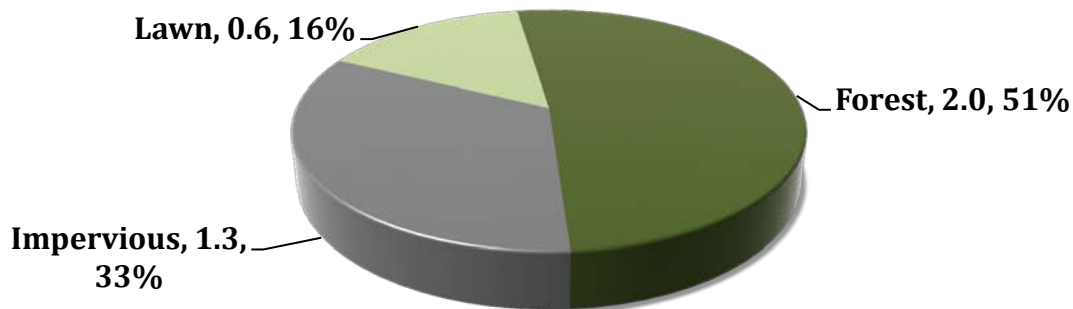


**Prince Frederick Armory (24C00, Comptroller Louis L. Goldstein Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Prince Frederick National Guard Armory**

The Prince Frederick Armory is located in Prince Frederick, within the unincorporated areas of Calvert County, Maryland. The 3.9 acre facility is on Armory Road, east of MD Route 2/4 (Solomons Island Road) and north of MD Route 402 (Dares Beach Road). At the time of this study, this facility was “pending disposal”. The property will no longer be owned by MDARNG in the future.

The Prince Frederick Armory is located in an urbanized, commercial setting in Prince Frederick. Thirty three-percent of the 3.9 acre site (1.3 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 16-percent of the site (0.6 acres) is categorized as high intensity pervious urban land cover, or lawns. The remaining 51-percent (2.0 acres) is forested.



**II. Prince Frederick Armory Baseline Loadings March 2012:**

**Facility Size: 3.9 acres**  
**Local Watershed: Hunting Creek**  
**Regional Watershed: Patuxent River**

There is no existing stormwater infrastructure or stormwater BMPs at the Prince Frederick Armory. Runoff from the facility drains off the site via overland flow directly into to the Calvert County stormwater system. Table 1 shows the baseline loadings for Prince Frederick Armory.

**Table 1: Baseline Pollutant Loads for 24C00**

<b>Site: 24C00- Prince Frederick Armory (Comptroller Louis L. Goldstein Armory)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
<b>Pollutant</b>	<b>Load (Pounds per Year)</b>
TN	16.2
TP	1.9

**Prince Frederick Armory (24C00, Comptroller Louis L. Goldstein Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Prince Frederick Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Prince Frederick Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Prince Frederick Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Prince Frederick Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.

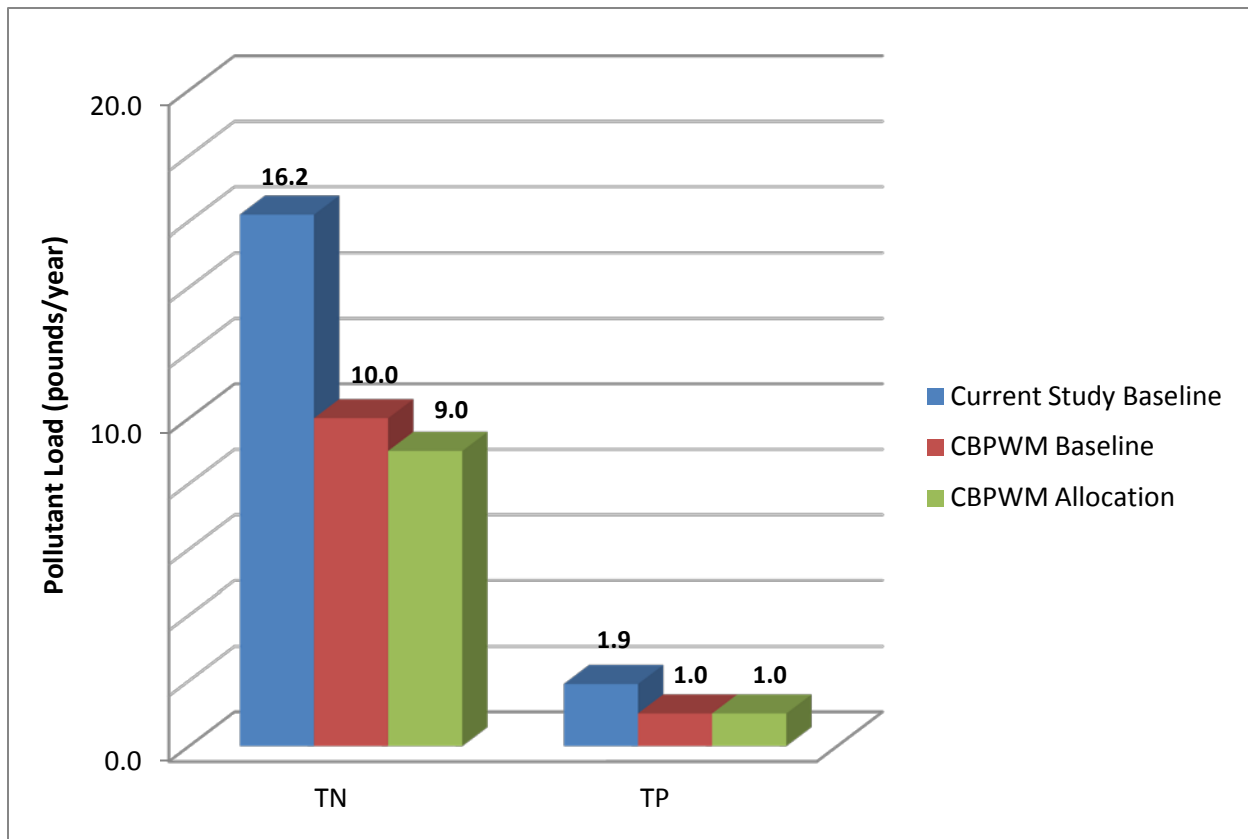
**Prince Frederick Armory (24C00, Comptroller Louis L. Goldstein Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

- Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24C00**

<b>Site: 24C00- Prince Frederick Armory (Comptroller Louis L. Goldstein Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	16.2	10.0	9.0
TP	1.9	1.0	1.0

**Figure 1: Difference Between Facility Baseline Load Estimates**

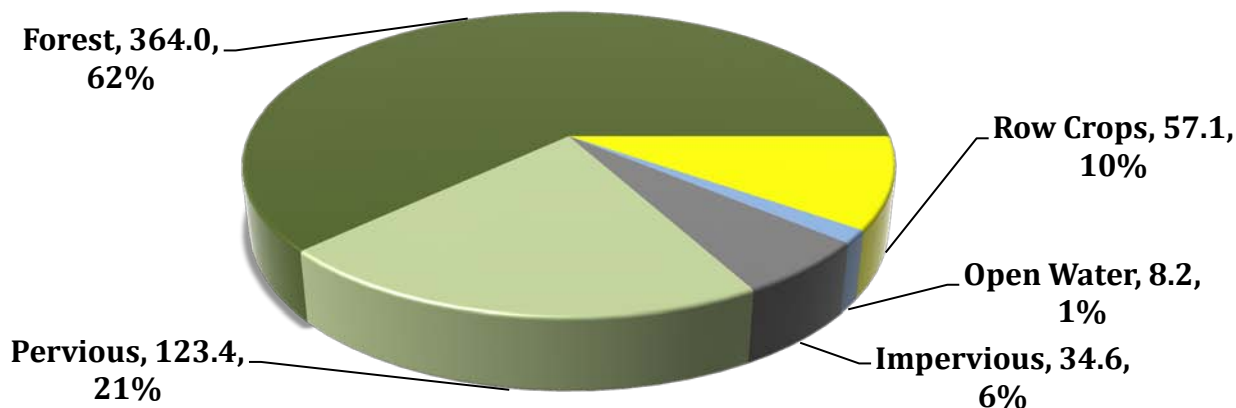


**Camp Frettard Training Site (24C03)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**I. Camp Frettard Training Site**

Camp Frettard Training Site is located in rural Baltimore County, north of MD Route 40 and west of MD Route 30, off Rue St. Lo Drive. Most of the 587.3 acre site drains into the Liberty Reservoir watershed. A small portion in the southeast corner drains to the Western Run watershed, to the Loch Raven Reservoir. The facility, which is the second largest Maryland Army National Guard facility in the state, contains several stormwater outfalls which receive runoff from numerous stormwater structures and miles of stormwater piping.

The Camp Frettard Training Site is located in a rural portion of Baltimore County. 6-percent of the 587.3 acre site (34.6 acres) is categorized as low intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 21-percent of the site (123.4 acres) is categorized as low intensity pervious urban land cover, which include lawns, brush, landscaping, and gravel areas. 62-percent (364.0 acres) of the site is forested, and 10-percent (57.1 acres) is row crops, which is leased out to local farmers.



**II. Camp Frettard Training Site Baseline Loadings March 2012:**

**Facility Size: 587.3 acres**

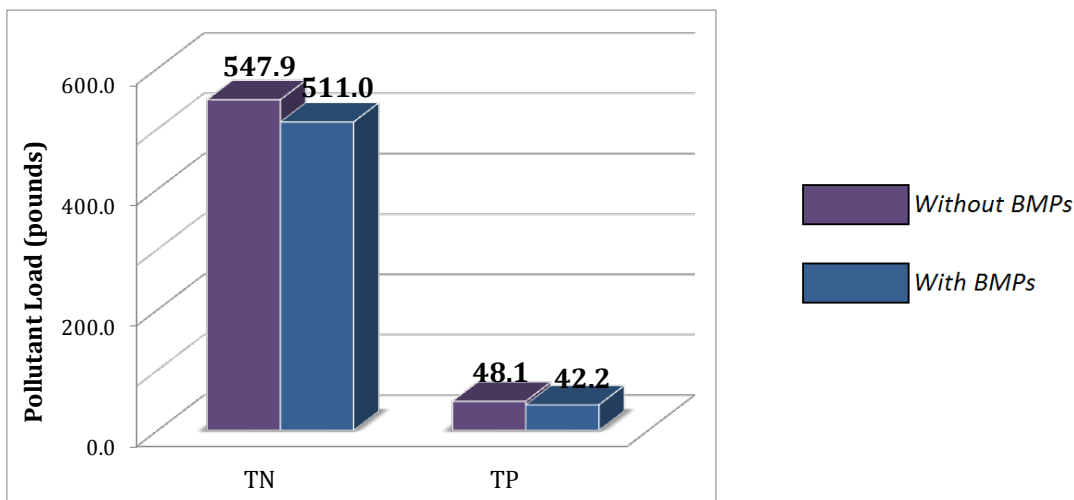
**Local Watershed: Liberty Reservoir and Loch Raven Reservoir**

**Regional Watershed: North Branch Patapsco River and Gunpowder Falls**

There are a total of nine stormwater BMPs on the Camp Frettard Training Site, treating a total of 210.0 acres of the 587.3 acre facility. Figure 1 shows the BMPs collectively reduce TN loads from the facility by 7-percent and TP loads by 12-percent. Of the nine BMPs, 6 are stormwater wet ponds, two are level spreaders, and one is a hydrodynamic structure. All are in good condition and functioning properly at the time of this study.

## Camp Frettard Training Site (24C03) Input to Maryland Department of Environment Watershed Implementation Plan Phase II

Figure 1: Existing BMP Reductions at 24C03



*\*Entire site reduction shown, including forested and agricultural areas.*

Table 1 shows the existing baseline pollutant loads for Camp Frettard Training Site which includes the reduction of pollutants associated with the existing stormwater BMPs in urban areas.

**Table 1: Baseline Pollutant Loads for 24C03 (including BMP reduction)**

Site: 24C03-Camp Frettard Training Site	
Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)	
Pollutant	Load (Pounds per Year)*
TN	293.0
TP	38.2

*\*Values for urban areas only*

### **III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - Camp Frettard Training Site will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.

**Camp Frettard Training Site (24C03)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

- Camp Frettard Training Site will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. There is no new construction projects scheduled for this facility at this time.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, Camp Frettard Training Site and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, Camp Frettard Training Site conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of Federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- BMPs identified on this site are not included in the CBPWM load calculations. These inaccuracies may result in changes to the expected load reduction for this facility.
- Table 2 and Figure 2 shows the differences between facility baseline load estimates and the CBPWM baseline load and allocation estimates. These inconsistencies have resulted from the inaccuracies listed above.

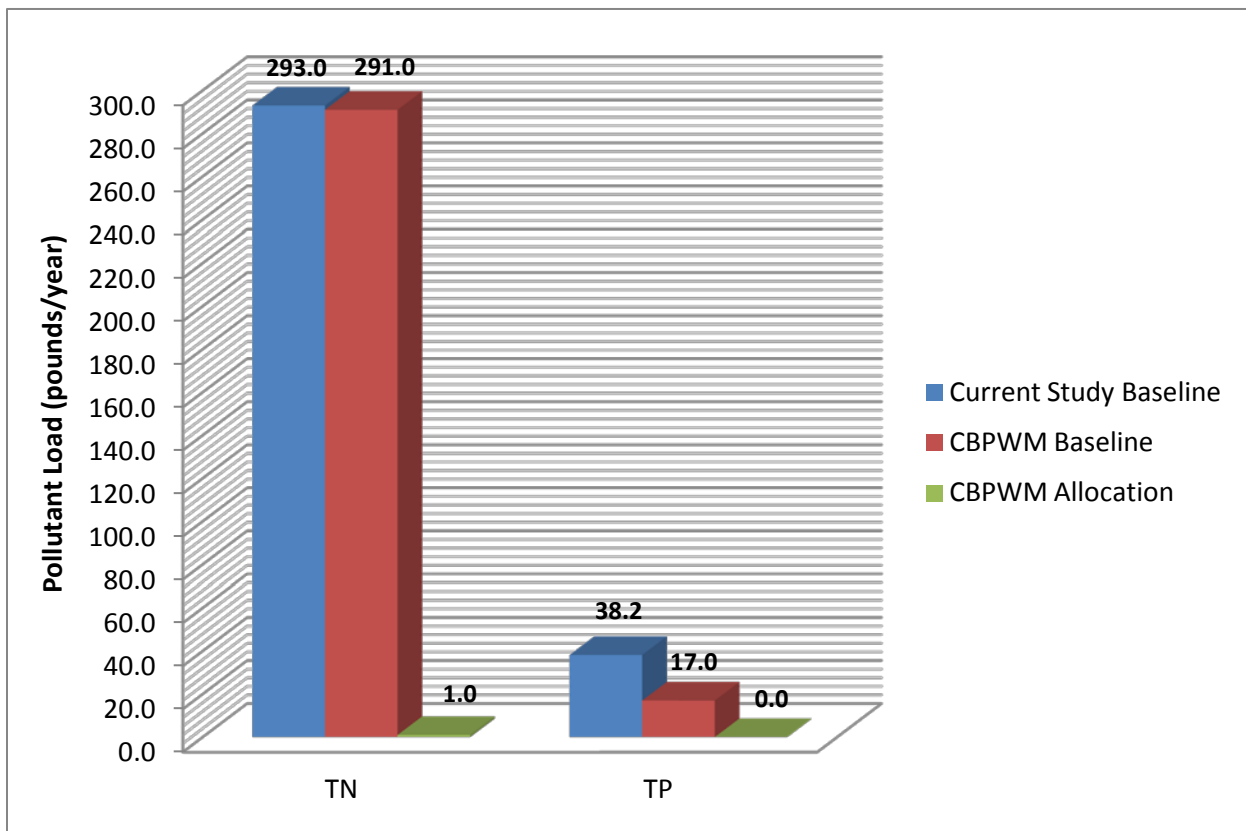
**Camp Frettard Training Site (24C03)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24C03**

<b>Site: 24C03- Camp Frettard Training Site</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)*	CBPWM (Baseline)	CBPWM (Allocation)
TN	293.0	291.0	1.0
TP	38.2	17.0	0.0

*\*Values for urban areas only*

**Figure 2: Difference Between Facility Baseline Load Estimates**



**SFRO-Reisterstown (24C04)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**I. SFRO- Reisterstown**

SFRO-Reisterstown consists of a single “store-front” building located at the intersection of Franklin Boulevard and Reisterstown Road in Baltimore County, Maryland. The footprint of the building is 0.04 acres in size. All drainage from the building flows into the Baltimore County stormwater system via an underground drainage system directly from the rooftop of the building into the stormwater pipes.

SFRO-Reisterstown is located in a highly urbanized area. The entire 0.04 acre site, which is all building rooftop, is considered high intensity impervious land cover.

**II. SFRO-Reisterstown Baseline Loadings March 2012:**

**Facility Size: 0.04 acres**

**Local Watershed: Norris Run**

**Regional Watershed: North Branch Patapsco River**

There are no existing stormwater BMPs or stormwater infrastructure located at SFRO-Reisterstown. All runoff from the building rooftop enters the Baltimore County stormwater system through underground downspouts. Table 1 shows the baseline loadings for SFRO-Reisterstown.

**Table 1: Baseline Pollutant Loads for 24C04**

<b>Site: 24C04-SFRO-Reisterstown</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	0.5
TP	0.1

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The SFRO-Reisterstown will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The SFRO- Reisterstown will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.



**SFRO-Reisterstown (24C04)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the SFRO- Reisterstown and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, SFRO-Reisterstown conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

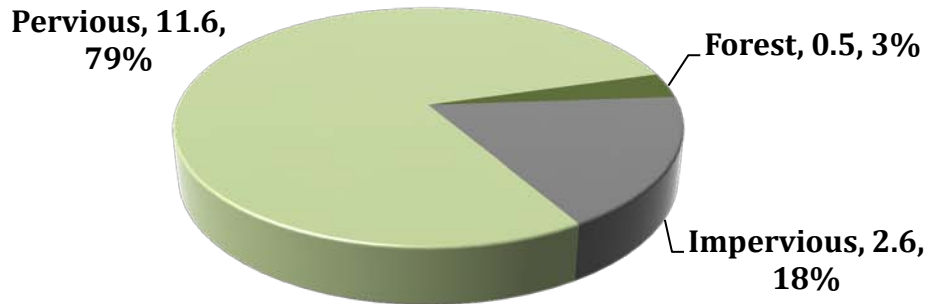
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Per Maryland Department of the Environment, SFRO- Reisterstown is not considered an independent entity and is included as a component of Baltimore County. Therefore specific baseline loads and allocations for this facility are not available.

**Queen Anne Armory (24C05, COL Victor P. Gillespe Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Queen Anne National Guard Armory**

The Queen Anne Armory is located in the unincorporated areas of Queen Anne’s County, Maryland. The 14.7 acre facility is bordered by Tuckahoe State Park on the north and east, Starr Road (MD Route 309) on the west, and Queen Anne Highway (MD Route 404) on the south.

The Queen Anne Armory is located in rural setting. 18-percent of the 14.7 acre site (2.6 acres) is categorized as low intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 79-percent of the site (11.6 acres) is categorized as low intensity pervious urban land cover, or lawns and brush. The remaining 3-percent (0.5 acres) is forested.



**II. Queen Anne Armory Baseline Loadings March 2012:**

**Facility Size: 14.7 acres**  
**Local Watershed: Tuckahoe Creek**  
**Regional Watershed: Choptank River**

The Queen Anne Armory contains an on-site stormwater system. This stormwater system, along with overland flow from a portion of the site, drains into the Queen Anne’s County stormwater system. There are no existing stormwater BMPs at this location. Table 1 shows the baseline loadings for the Queen Anne Armory.

**Table 1: Baseline Pollutant Loads for 24C05**

<b>Site: 24C05- Queen Anne Armory (COL Victor P. Gillespe Armory)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
<b>Pollutant</b>	<b>Load (Pounds per Year)</b>
TN	26.9
TP	3.5

**Queen Anne Armory (24C05, COL Victor P. Gillespe Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Queen Anne Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Queen Anne Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Queen Anne Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Queen Anne Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of Federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this Federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

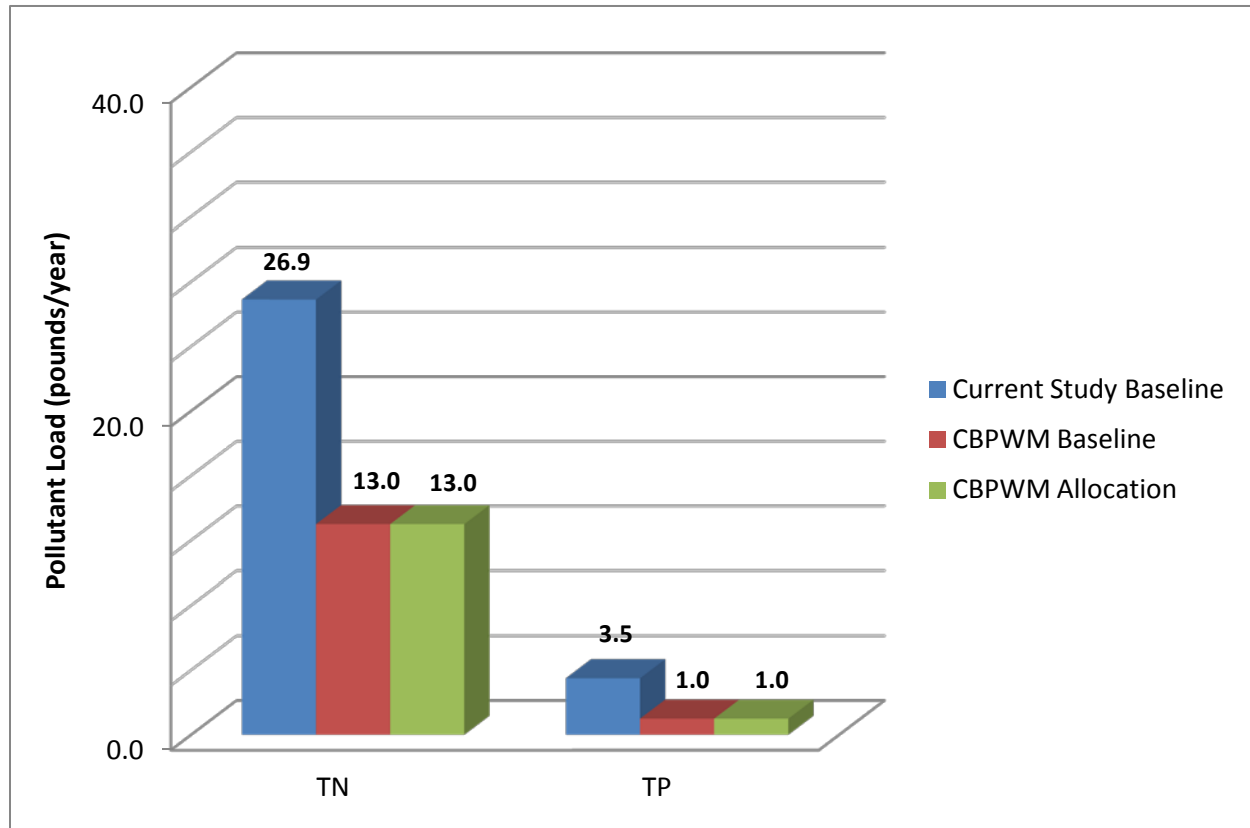
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Queen Anne Armory (24C05, COL Victor P. Gillespe Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24C05**

<b>Site: 24C05- Queen Anne Armory (COL Victor P. Gillespe Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	26.9	13.0	13.0
TP	3.5	1.0	1.0

**Figure 1: Difference Between Facility Baseline Load Estimates**

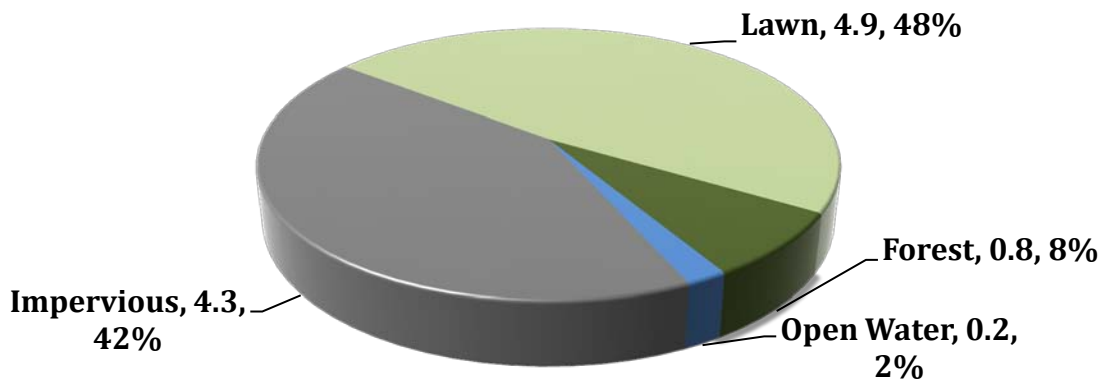


**Salisbury Armory (24C10, CSM Blair Lee Crocket Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Salisbury Armory**

The Salisbury Armory is located just outside the City of Salisbury in the unincorporated areas of Wicomico County, Maryland. The 10.2 acre site, located at the intersection of Booth Street and West Salisbury Boulevard (U.S. Route 50), has recently undergone the addition to the main building as well as significant stormwater improvements, such as the addition of two bioretention cells and a constructed wetland. Runoff from the site drains into the Wicomico County/City of Salisbury stormwater system along U.S. Route 50.

The Salisbury Armory is located in a suburban setting outside the City of Salisbury corporate limits. 42-percent of the 10.2 acre site (4.3 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 48-percent of the site (4.9 acres) is categorized as high intensity pervious urban land cover, or lawns. The remaining 10-percent (1.0 acre) is forested and open water.



**II. Salisbury Armory Baseline Loadings March 2012:**

**Facility Size: 10.2 acres**

**Local Watershed: Owens Branch**

**Regional Watershed: Wicomico River**

The Salisbury Armory contains a stormwater system consisting of 14 stormwater inlets, 7 stormwater manholes, 2 weirs, and approximately 2,500 linear feet of corrugated metal, HDPE, and PVC piping and open drainage channels. The majority of this infrastructure was constructed in 2011. The stormwater system conveys runoff into two bioretention cells and two constructed wetlands/stormwater ponds on the facility.

The four stormwater BMPs at the Salisbury Armory treat a total of 8.4 acres of the 10.2 acre facility. All the stormwater BMPs are in good condition and functioning properly at the time of this study. Figure 1 shows the BMPs collectively result in a significant reduction in pollutant load exiting the facility.

**Salisbury Armory (24C10, CSM Blair Lee Crocket Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Figure 1: Existing BMP Reductions at 24C10**

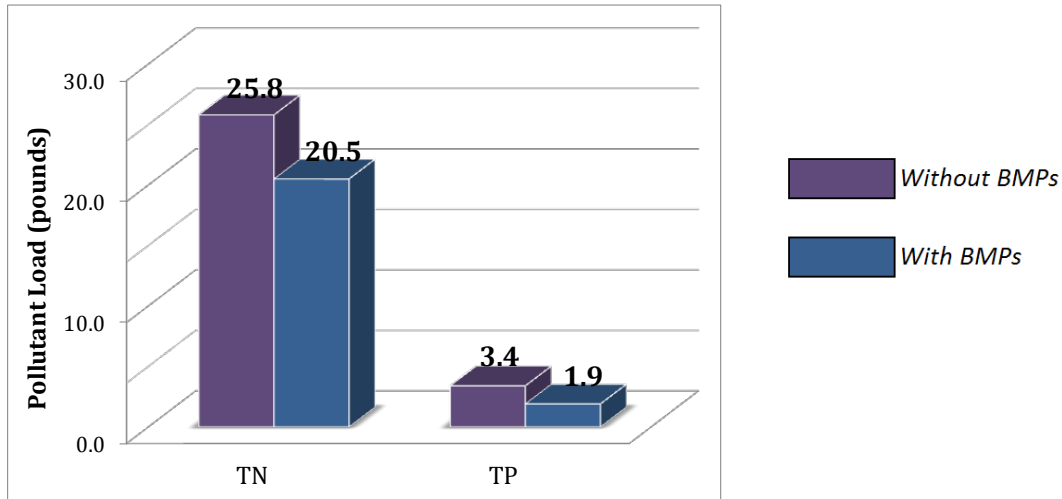


Table 1 shows the existing baseline pollutant loads for the Salisbury Armory which includes the reduction of pollutants associated with the existing stormwater BMPs.

**Table 1: Baseline Pollutant Loads for 24C10 (including BMP reduction)**

<b>Site: 24C10-Salisbury Armory (CSM Blair Lee Crocket Armory)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
<b>Pollutant</b>	<b>Load (Pounds per Year)</b>
TN	20.5
TP	1.9

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Salisbury Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.

**Salisbury Armory (24C10, CSM Blair Lee Crocket Armory)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

- The Salisbury Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. There is no new construction projects scheduled for this facility at this time.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Salisbury Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, Salisbury Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of Federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

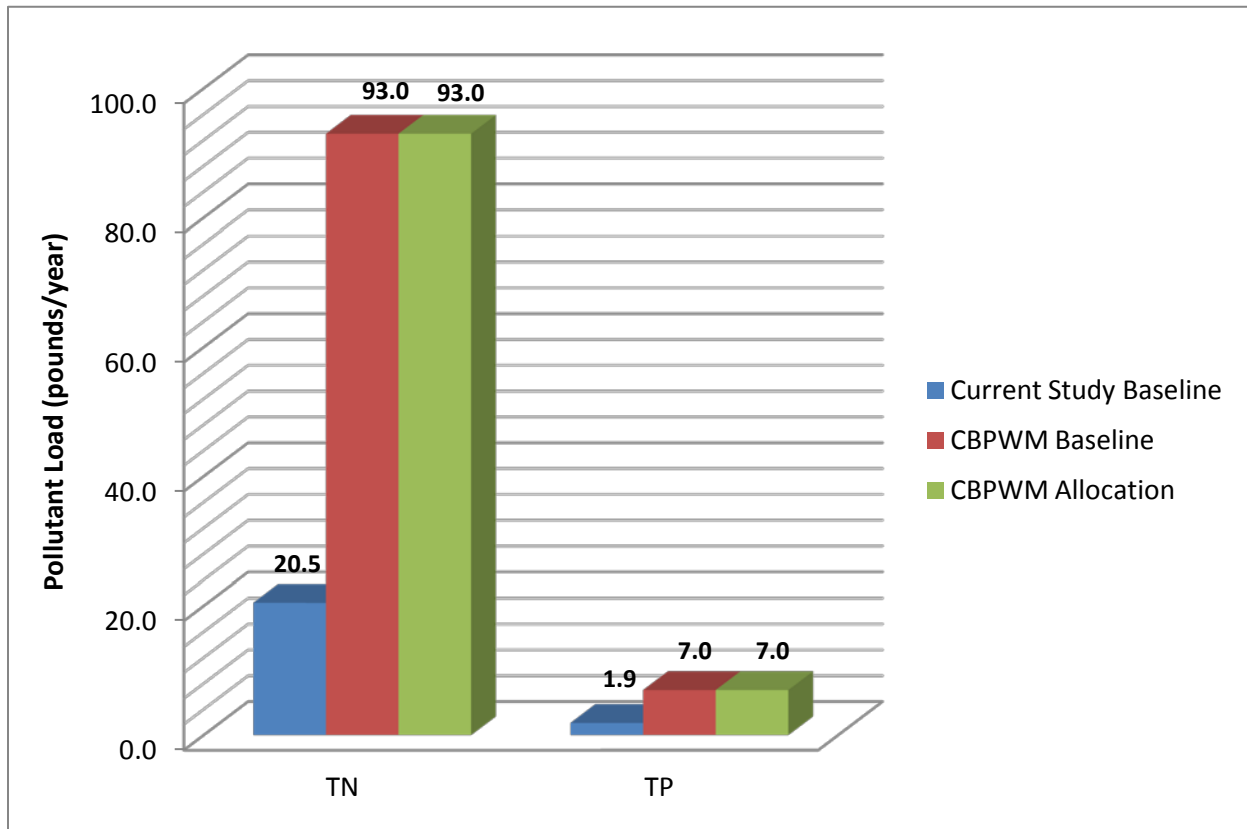
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- BMPs identified on this site are not included in the CBPWM load calculations. These inaccuracies may result in changes to the expected load reduction for this facility.
- Table 2 and Figure 2 shows the differences between facility baseline load estimates and the CBPWM baseline load and allocation estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Salisbury Armory (24C10, CSM Blair Lee Crocket Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24C10**

<b>Site: 24C10- Salisbury Armory (CSM Blair Lee Crocket Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	20.5	93.0	93.0
TP	1.9	7.0	7.0

**Figure 2: Difference Between Facility Baseline Load Estimates**



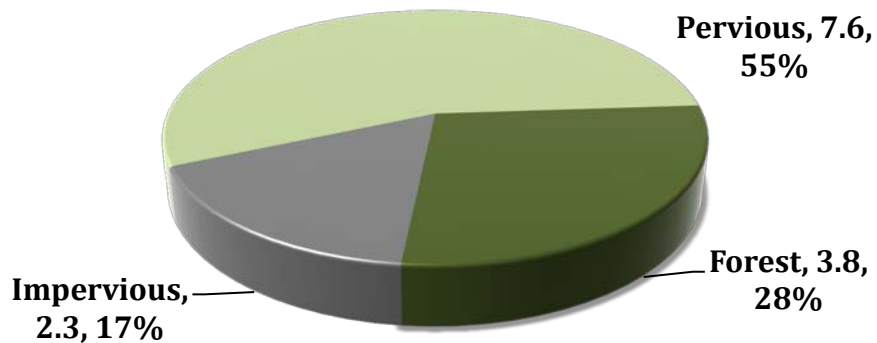


**Salisbury Swing Space (24C11)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**I. Salisbury Swing Space**

The Salisbury Swing Space is located in the unincorporated areas of Wicomico County, Maryland. The 13.7 acre facility is located along Fooks Road just south of the Salisbury-Wicomico County Regional Airport.

The Salisbury Swing Space is located in a rural portion of Wicomico County. 17-percent of the 13.7 acre site (2.3 acres) is categorized as low intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 55-percent of the site (7.6 acres) is categorized as low intensity pervious urban land cover, or lawns and brush. The remaining 28-percent (3.8 acres) is forested.



**II. Salisbury Swing Space Baseline Loadings March 2012:**

**Facility Size: 13.7 acres**

**Local Watershed: Beaverdam Creek**

**Regional Watershed: Wicomico River**

The Salisbury Swing Space contains a stormwater system consisting of 8 stormwater inlets, a stormwater manhole, and approximately 2,000 linear feet of corrugated HDPE and PVC piping and open drainage channels. The stormwater system conveys runoff to a stormwater wet pond in the southern portion of the facility.

Figure 1 shows the stormwater BMP on the Salisbury Swing Space treats 9.5 acres of the 13.7 (69-percent) acre facility. At the time of this study, the BMP was in excellent condition and functioning properly. The BMP reduces TN loads from the facility by 22-percent and TP loads by 37-percent.

**Salisbury Swing Space (24C11)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Figure 1: Existing BMP Reductions at 24C11**

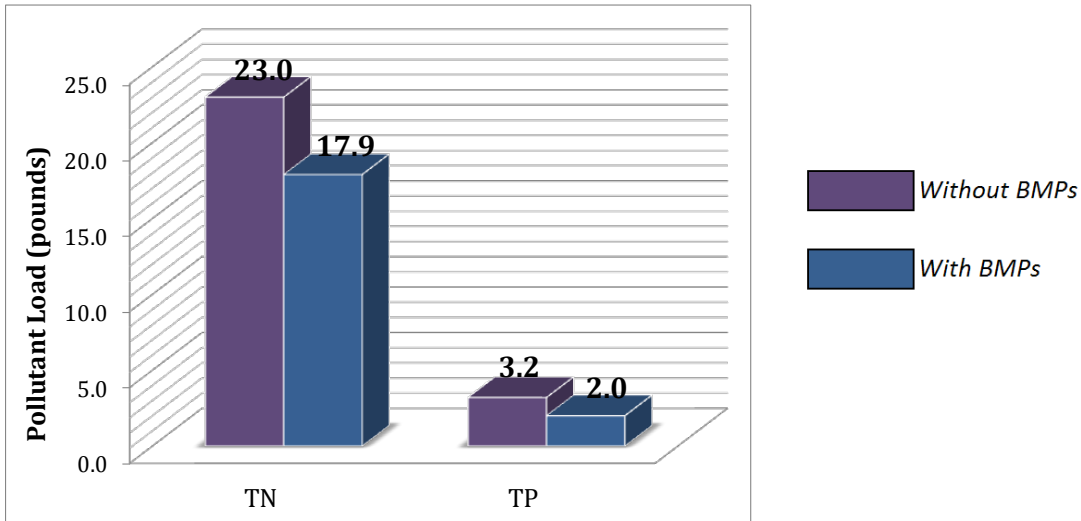


Table 1 shows the existing baseline pollutant loads for the Olney Military Reservation, which includes the reduction of pollutants associated with the existing stormwater BMPs.

**Table 1: Baseline Pollutant Loads for 24001 (including BMP reduction)**

Site: 24C11-Salisbury Swing Space	
Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)	
Pollutant	Load (Pounds per Year)
TN	17.9
TP	2.0

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Salisbury Swing Space will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.

**Salisbury Swing Space (24C11)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

- The Salisbury Swing Space will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently no new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Salisbury Swing Space and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, Salisbury Swing Space conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this Federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

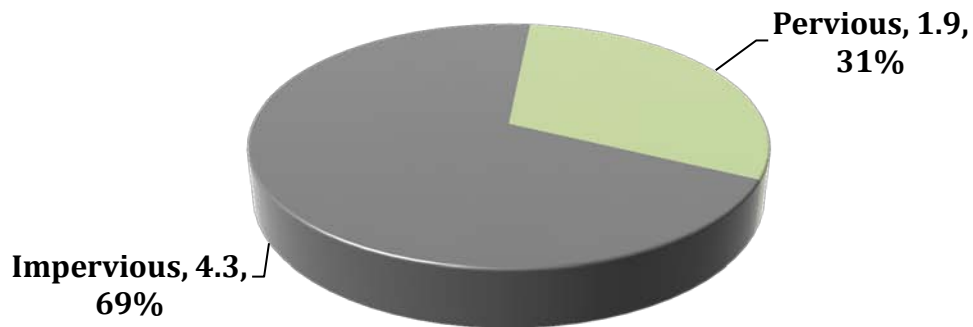
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- The Salisbury Swing Space is currently not in the CBPWM and is a component of Land River Segment A24045-ELO\_5760\_0000. Therefore specific CBPWM baseline loads and allocations for this facility are not available.
- BMPs identified on this site are not included in the load calculations. These inaccuracies may result in changes to the expected load reduction for this facility and Wicomico County.

**Ruhl Armory (24C20, MG (MD) Harry C. Ruhl & CSM James Peacock Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Ruhl National Guard Armory**

The Ruhl Armory is located in Baltimore County, Maryland on York Road adjacent to U.S. Route 695. Runoff from the 6.2 acre facility drains to the southeast via an on-site stormwater system, and flows into the Baltimore County stormwater system to the Loch Raven Reservoir.

The Ruhl Armory is located in an urban setting around the Baltimore Beltway. 69-percent of the 6.2 acre site (4.3 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 31-percent of the site (1.9 acres) is categorized as high intensity pervious urban land cover, or lawns and brush.



**II. Ruhl Armory Baseline Loadings March 2012:**

**Facility Size: 6.2 acres**

**Local Watershed: Loch Raven Reservoir**

**Regional Watershed: Gunpowder Falls**

The Ruhl Armory contains a stormwater system consisting of three stormwater inlets, four manholes, one weir, and approximately 700 linear feet of concrete and cast iron piping. All stormwater is conveyed to the southeast corner of the site, with just less than half of the land draining to a stormwater wet pond. The stormwater BMP on Ruhl Armory treats 2.5 acres of the 6.4 acre facility (40-percent). The stormwater pond is in poor condition and not functioning properly, reducing the pollutant removal efficiency. The pond has been filled in with sediment during snow plowing activities (dumping snow), causing reduced storage and a buried outflow structure. Therefore, the potential pollutant removal of this BMP was not accounted for in the pollutant load calculations for this facility.

Table 1 shows the baseline loadings for the Ruhl Armory.

**Ruhl Armory (24C20, MG (MD) Harry C. Ruhl & CSM James Peacock Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 1: Baseline Pollutant Loads for 24C20**

<b>Site: 24C20- Ruhl Armory (MG (MD) Harry C. Ruhl &amp; CSM James Peacock Armory) Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	56.7
TP	6.6

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Ruhl Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Ruhl Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Ruhl Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Ruhl Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.

**Ruhl Armory (24C20, MG (MD) Harry C. Ruhl & CSM James Peacock Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

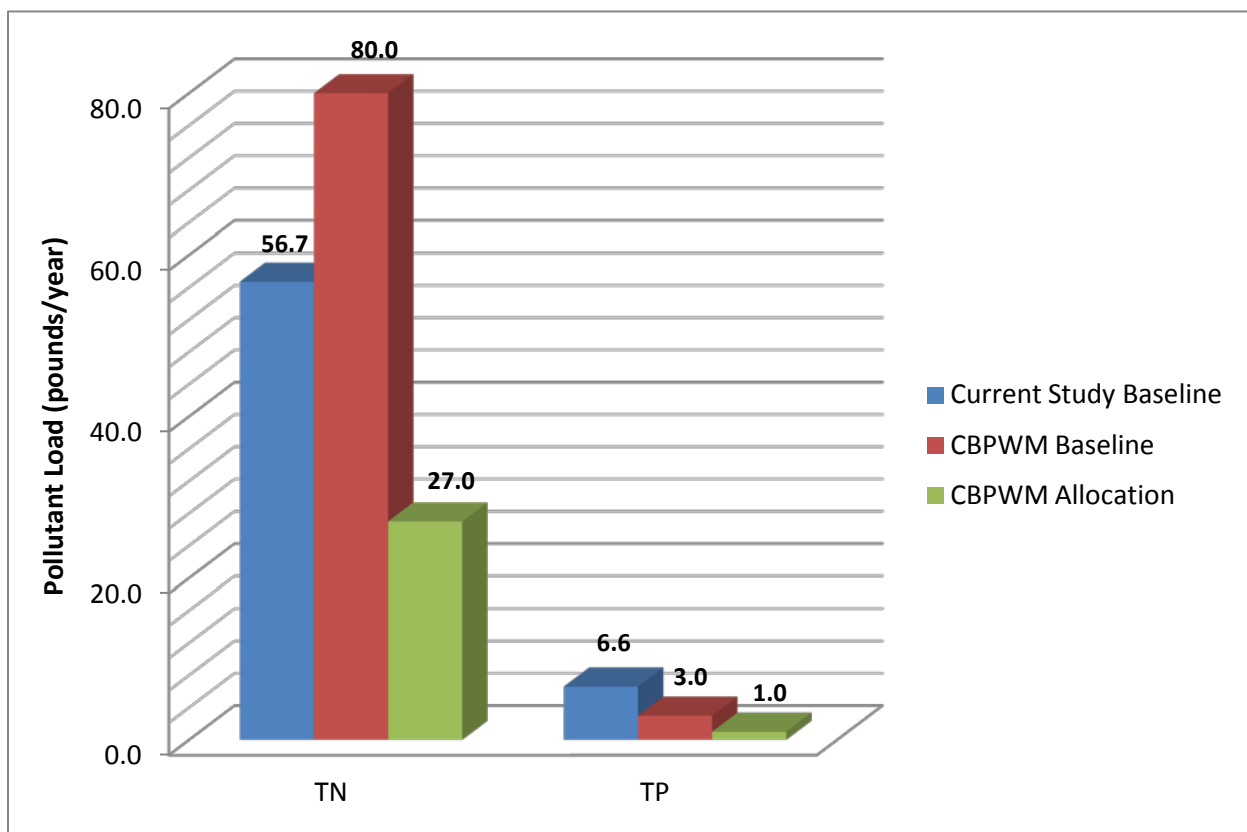
**VI. Inaccuracies:**

- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load and allocation estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24C20**

<b>Site: 24C20- Ruhl Armory (MG (MD) Harry C. Ruhl &amp; CSM James Peacock Armory) CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	56.7	80.0	27.0
TP	6.6	3.0	1.0

**Figure 1: Difference Between Facility Baseline Load Estimates**

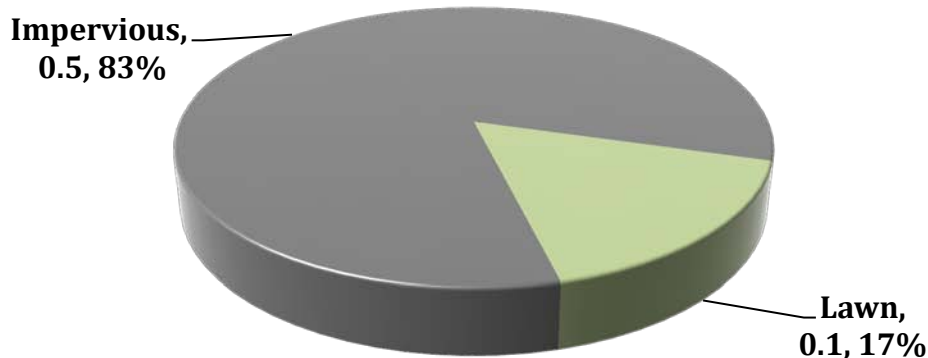


**Towson (Old) Armory (24C21)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**I. Towson (Old) National Guard Armory**

The Towson (Old) Armory is located in the heart of Towson, Baltimore County, Maryland. The 0.6 acre facility is at the corner of Washington Avenue and West Chesapeake Avenue. Runoff from the facility enters the Baltimore County stormwater system at three separate locations around the building.

The Towson (Old) Armory is located in a highly urbanized portion of Baltimore County. 83-percent of the 0.6 acre site (0.5 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 17-percent of the site (0.1 acres) is categorized as high intensity pervious urban land cover, or lawns.



**II. Towson (Old) Armory Baseline Loadings March 2012:**

**Facility Size: 0.6 acres**

**Local Watershed: Jones Falls**

**Regional Watershed: Patapsco River**

Runoff from the Towson (Old) Armory drains to an on-site stormwater system consisting of two stormwater inlets, a stormwater manhole, and approximately 200 linear feet of concrete, cast iron, and corrugated metal piping. The stormwater system flows, along with overland flow from the portions of the site, into the Baltimore County stormwater system. There are no existing stormwater BMPs at this location. Table 1 shows the baseline loadings for Towson (Old) Armory.

**Towson (Old) Armory (24C21)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**Table 1: Baseline Pollutant Loads for 24C21**

<b>Site: 24C21-Towson (Old) Armory</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
Pollutant	Load (Pounds per Year)
TN	6.7
TP	0.8

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Towson (Old) Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The Towson (Old) Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Towson (Old) Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the Towson (Old) Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.



## Towson (Old) Armory (24C21) Input to Maryland Department of Environment Watershed Implementation Plan Phase II

- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

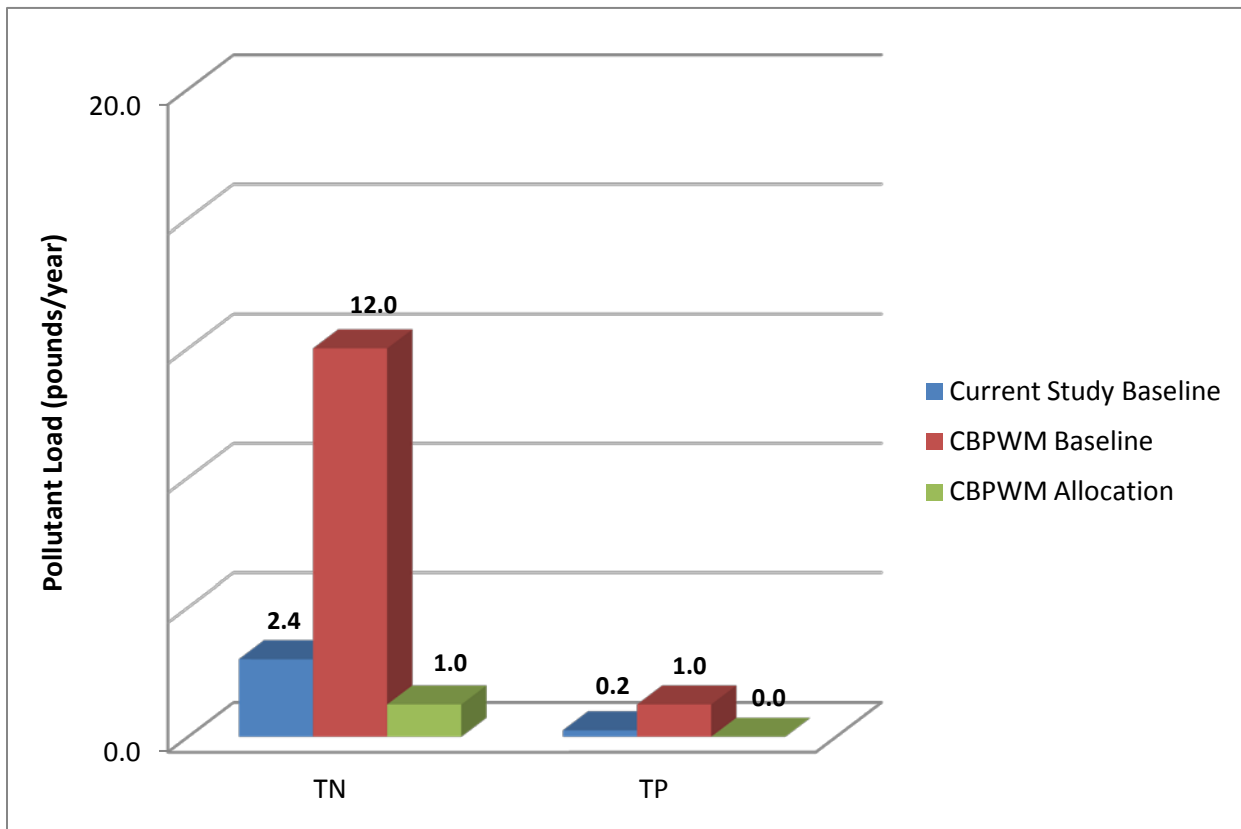
### VI. Inaccuracies:

- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load and allocation estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24C21**

Site: 24C21-Towson (Old) Armory CBPWM Comparisons (Urban Areas Only)			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	2.4	12.0	2.0
TP	0.2	1.0	0.0

**Figure 1: Difference Between Facility Baseline Load Estimates**

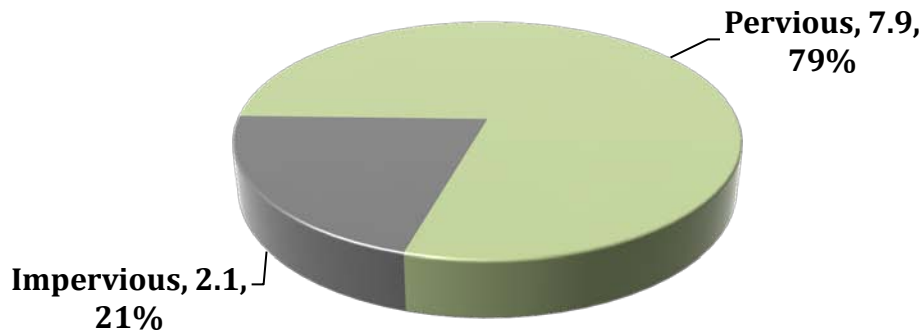


**Westminster Armory (24C31, MG Henry C. Evans Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. Westminster Armory**

The Westminster Armory is located in the unincorporated area of Carroll County, Maryland, just outside the corporate limits of the City of Westminster. The 10.0 acre site is located north of Hahn Road and east of Sunshine Way. Stormwater drains into an on-site stormwater system as well as overland into the Carroll County/City of Westminster stormwater systems.

The Westminster Armory is located in a suburban/urban setting. 21-percent of the 10.0 acre site (2.1 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 79-percent of the site (7.9 acres) is categorized as high intensity pervious urban land cover, or lawns, brush, and gravel areas.



**II. Westminster Armory Baseline Loadings March 2012:**

**Facility Size: 10.0 acres**

**Local Watershed: West Branch**

**Regional Watershed: North Branch Patapsco River**

The Westminster Armory contains a stormwater system consisting of 3 stormwater inlets and approximately 550 linear feet of vitrified clay and corrugated metal piping. There are a total of two stormwater BMPs on the Westminster Armory. A stormwater dry pond, which treats 3.4 acres on the 10.0 acre facility (34-percent), is in good condition and is functioning properly. The second BMP is a sand filter that was originally an oil-water separator that was retrofitted to a sand filter for water quality improvement. This sand filter, which treats 0.6 acres, is in poor condition and is not functioning properly. The material inside the sump is mud rather than sand, causing clogs in the stormwater system (and flooding) and minimal pollutant removal. The remaining 6.6 acres of land on the facility drains via overland flow into the Carroll County stormwater system. Although no stormwater BMPs exist on-site for this land, there are stormwater BMPs within the Carroll County stormwater system that treats this drainage.

Figure 1 shows the BMP (stormwater dry pond) reduces TN loads from the facility by 6-percent and TP loads by 9-percent. Due to the poor condition of the sand filter, it was not used in the calculation for pollutant removal.

**Westminster Armory (24C31, MG Henry C. Evans Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Figure 1: Existing BMP Reductions at 24C31**

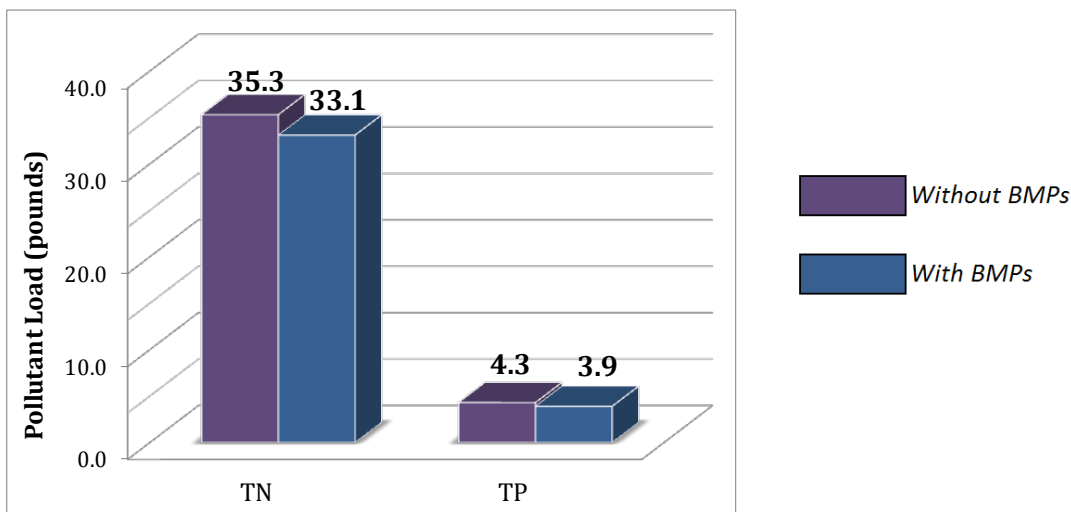


Table 1 shows the existing baseline pollutant loads for the Westminster Armory which includes the reduction of pollutants associated with the existing stormwater BMP.

**Table 1: Baseline Pollutant Loads for 24C31 (including BMP reduction)**

<b>Site: 24C31-Westminster Armory (MG Henry C. Evans Armory)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
<b>Pollutant</b>	<b>Load (Pounds per Year)</b>
TN	33.1
TP	3.9

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The Westminster Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.

**Westminster Armory (24C31, MG Henry C. Evans Armory)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

- The Westminster Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. An addition to the existing facility is scheduled within the next five years.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the Westminster Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, Westminster Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of Federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

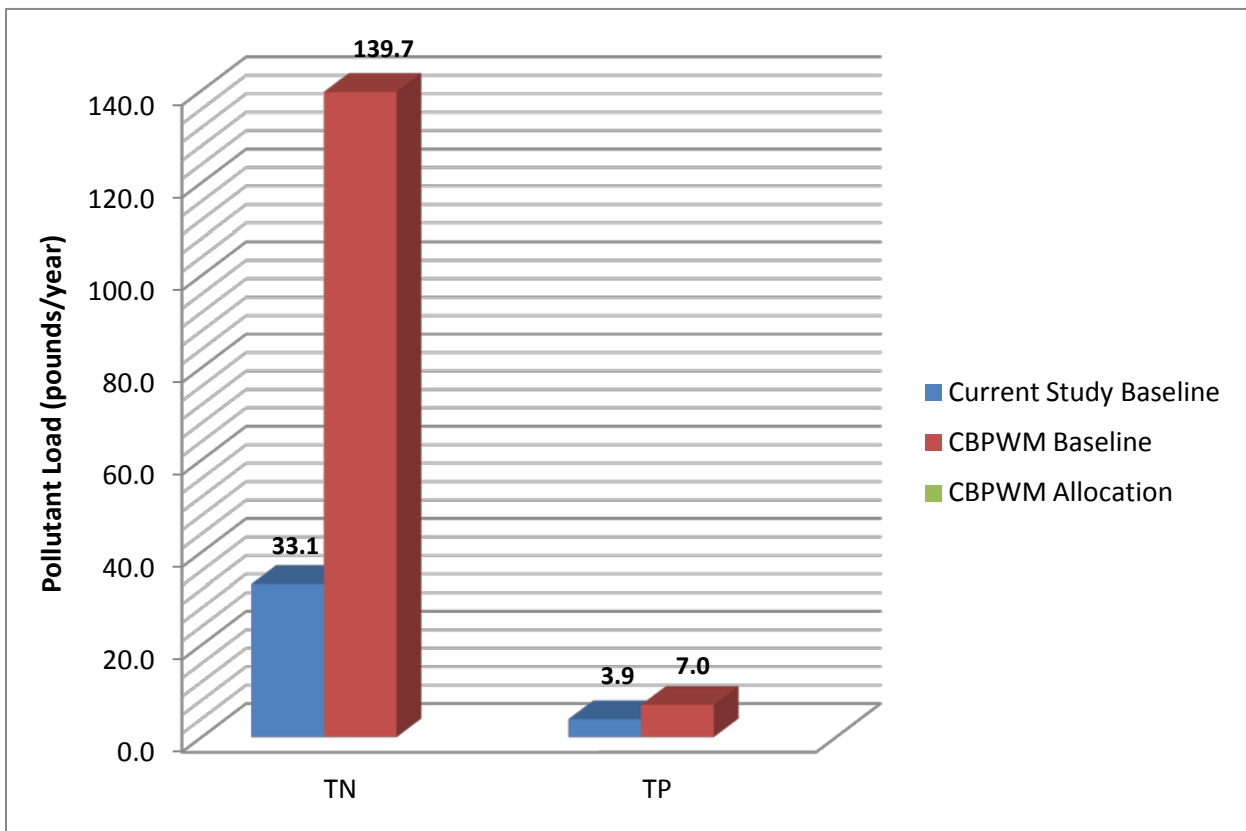
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- BMPs identified on this site are not included in the load calculations. These inaccuracies may result in changes to the expected load reduction for this facility.
- Table 2 and Figure 2 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**Westminster Armory (24C31, MG Henry C. Evans Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24C31**

Site: 24C31-Westminster Armory (MG Henry C. Evans Armory)			
CBPWM Comparisons (Urban Areas Only)			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	33.1	139.0	Not Available
TP	3.9	7.0	Not Available

**Figure 2: Difference Between Facility Baseline Load Estimates**

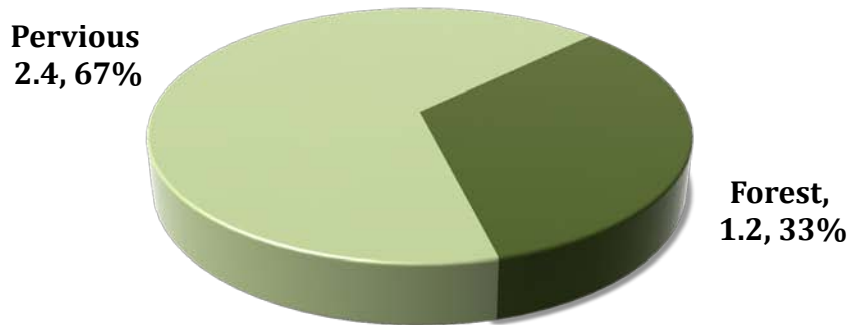


**Webster Field (24C33)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**I. Webster Field**

At the time of this study, Webster Field (MDARNG land) was vacant land located along the eastern runway on the Naval Air Station Patuxent River-Webster Field Annex. The 3.6 acre facility, which is currently open space (brush, forest, and lawn), will be developed in the near future by the MDARNG into a Tactical Unmanned Aircraft System Facility.

Webster Field is vacant land in a rural setting on the Naval Air Station Patuxent River-Webster Field Annex. At the time of this study, development plans were not available to determine the proposed-conditions land use at the site. Currently, 67-percent of the 3.6 acre site (2.4 acres) is categorized as low intensity pervious urban land cover. This includes lawns and brush. The remaining 33-percent of the site (1.2 acres) is forested.



**II. Webster Field Baseline Loadings March 2012:**

**Facility Size: 3.6 acres**  
**Local Watershed: St. Inigoes Creek**  
**Regional Watershed: St. Mary’s River**

Currently, there are no existing stormwater BMPs or stormwater infrastructure located at Webster Field. The proposed development that may occur at the site may contain stormwater infrastructure, but development plans were not available at the time of this study. Table 1 shows the current baseline loadings for Webster Field.

**Table 1: Baseline Pollutant Loads for 24C33**

Site: 24C33- Webster Field	
Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)	
Pollutant	Load (Pounds per Year)
TN	2.4
TP	0.2

**Webster Field (24C33)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - Webster Field will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - Webster Field will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, Webster Field and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, Webster Field conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of Federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this Federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.

**Webster Field (24C33)**  
**Input to Maryland Department of Environment**  
**Watershed Implementation Plan Phase II**

- Per MDE, Webster Field is not considered an independent entity and is included as a component of Naval Air Station Patuxent River-Webster Field Annex.
- Webster Field is combined with other Federal facilities in the region to form Land-River Segment F24037\_PLO\_5982\_0000. Therefore specific CBPWM baseline loads and allocations for this facility are not available.

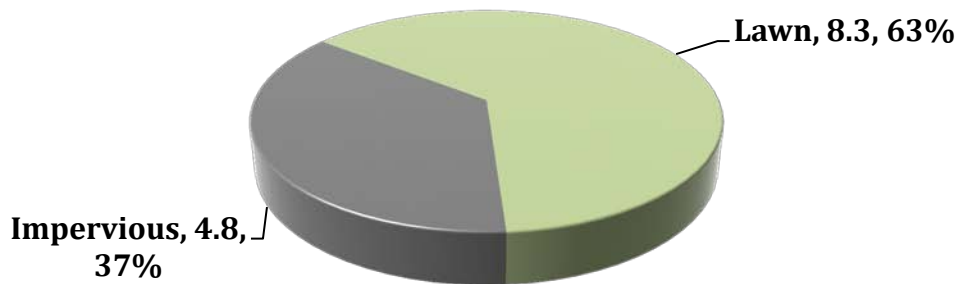


**White Oak Armory (24C35, MG George M. Gelston Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**I. White Oak National Guard Armory**

The White Oak Armory is on Cherry Hill Road east of Maryland Route 29 (Columbia Pike) in the unincorporated areas of Montgomery County, Maryland. The 13.1 acre facility has an on-site stormwater system which conveys runoff into the Montgomery County system.

The White Oak Armory is located in a highly urbanized portion of Montgomery County. 37-percent of the 13.1 acre site (4.8 acres) is categorized as high intensity impervious urban land cover. This includes building rooftops, parking areas, and sidewalks. 63-percent of the site (8.3 acres) is categorized as high intensity pervious urban land cover, or lawns.



**II. White Oak Armory Baseline Loadings March 2012:**

**Facility Size: 13.1 acres**

**Local Watershed: Paint Branch**

**Regional Watershed: Anacostia River**

The White Oak Armory contains an on-site stormwater system. This stormwater system, along with overland flow from portions of the site, drains into the Montgomery County stormwater system. There are no existing stormwater BMPs at this location. Table 1 shows the baseline loadings for the White Oak Armory.

**Table 1: Baseline Pollutant Loads for 24C35**

<b>Site: 24C35- White Oak Armory (MG George M. Gelston Armory)</b>	
<b>Baseline Pollutant Load Estimates: Urban Areas Only (Impervious and Pervious)</b>	
<b>Pollutant</b>	<b>Load (Pounds per Year)</b>
TN	53.7
TP	6.4

**White Oak Armory (24C35, MG George M. Gelston Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**III. Programmatic Two Year Milestones 2012-2013:**

- **Agricultural-** Not Applicable.
- **Stormwater Management Retrofits-** To be determined as part of Opportunity Assessment.
- **Septic System Upgrades-** Not Applicable.
- **Wastewater Treatment Plant Data-** Not Applicable.
- **Accounting for Future Growth-**
  - The White Oak Armory will continue to support Maryland Department of Environment (MDE) Watershed Implementation Plan (WIP) Phase II processes in 2012 and 2013.
  - The White Oak Armory will continue to implement the Army Policy for Sustainable Design and Development (SDD), October 2010 and Low Impact Development (LID) under the Energy Independence and Security Act of 2007 (EISA) as a means to manage stormwater for all future construction and maintenance projects. Currently it is unknown if any new construction projects are scheduled through 2018.

**IV. Successes:**

The WIP Phase II process required collaborative involvement from MDE, the White Oak Armory and the U.S. Army Corps of Engineers to ensure pollutant load reductions as well as current and future BMP implementation levels fulfill the federal share of the needed reductions for Nitrogen, Phosphorous and Sediment pollutants. In an effort to meet WIP Phase II timelines, two year milestones and critical progress milestones in 2017 and 2020, the White Oak Armory conducted a comprehensive assessment of boundary data and land use/land cover data on the facility. Accurate data for National Guard facilities will enable MDE to have a better understanding of Federal properties, their land use and load runoff, and potential reductions now and in the 2017 model run.

MDE and the Services held several meetings. The meetings were helpful and productive. Going forward this Federal-state-local partnership will prove to be instrumental in meeting the long term restoration plan for the Chesapeake Bay as well as improve credibility and accountability for Department of Defense (DoD), a Federal agency leading by example.

**V. Challenges:**

- Coordination with multiple Bay jurisdictions made it difficult to apply one agency approach to meeting the required load reductions. For the Services this required additional resources in order to understand what each jurisdiction's expectations are, and these inconsistencies may result in long term load inaccuracies when determining whether TMDL goals have been met across the watershed.
- It was critical that all boundary and land use cover be verified. Facilities of this size have limited GIS data. Therefore, it took an additional amount of resources and technical capability to ground truth the data and create shapefiles needed to verify boundaries and land use data provided by EPA and MDE.

**VI. Inaccuracies:**

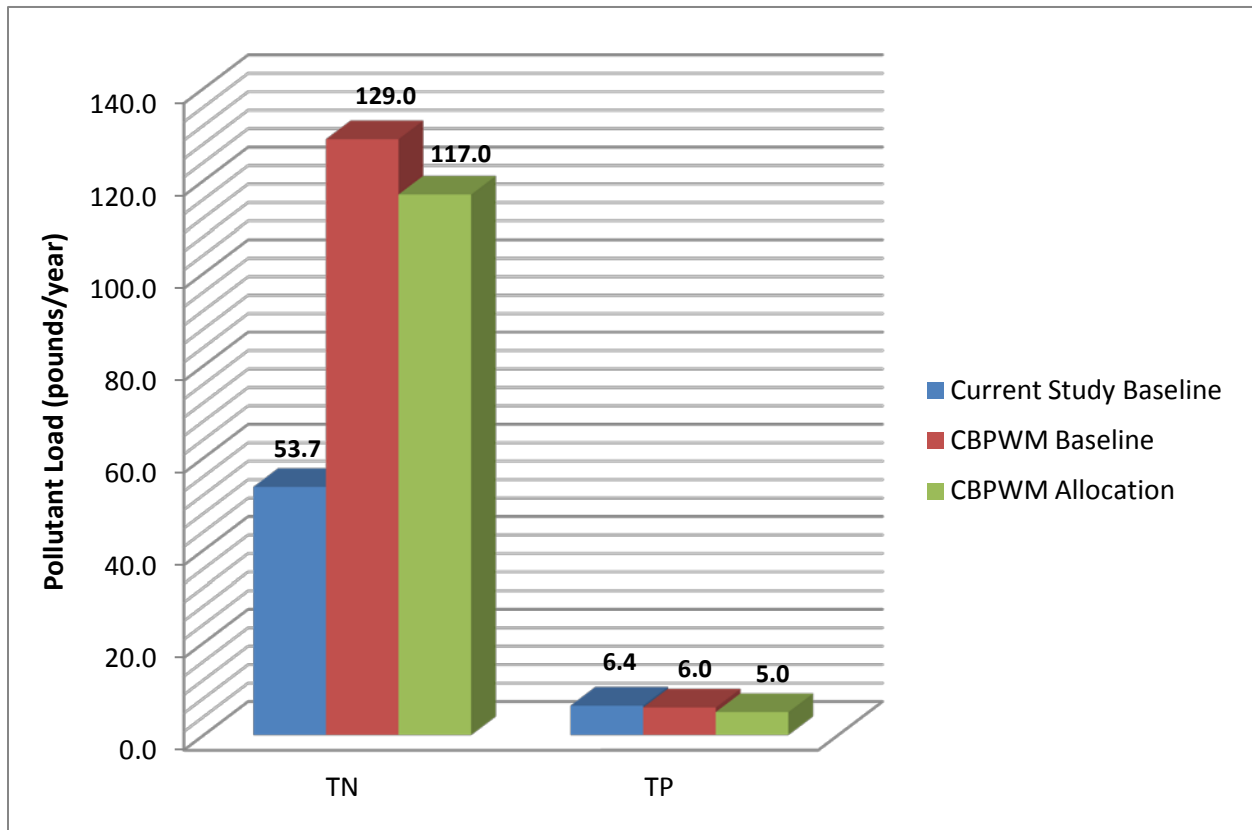
- Newly delineated Federal property boundaries and land use data are expected to be incorporated into future 2017 Chesapeake Bay Program Watershed Model (CBPWM) runs to avoid or reduce inaccuracies.
- Table 2 and Figure 1 shows the differences between facility baseline load estimates and the CBPWM baseline load estimates. These inconsistencies have resulted from the inaccuracies listed above.

**White Oak Armory (24C35, MG George M. Gelston Armory)  
Input to Maryland Department of Environment  
Watershed Implementation Plan Phase II**

**Table 2: Baseline Pollutant Loads Comparisons with CBPWM for Site 24C35**

<b>Site: 24C35- White Oak Armory (MG George M. Gelston Armory)</b>			
<b>CBPWM Comparisons (Urban Areas Only)</b>			
Pollutant	Load (Pounds per Year)		
	Current Study (Baseline)	CBPWM (Baseline)	CBPWM (Allocation)
TN	53.7	129.0	117.0
TP	6.4	6.0	5.0

**Figure 1: Difference Between Facility Baseline Load Estimates**

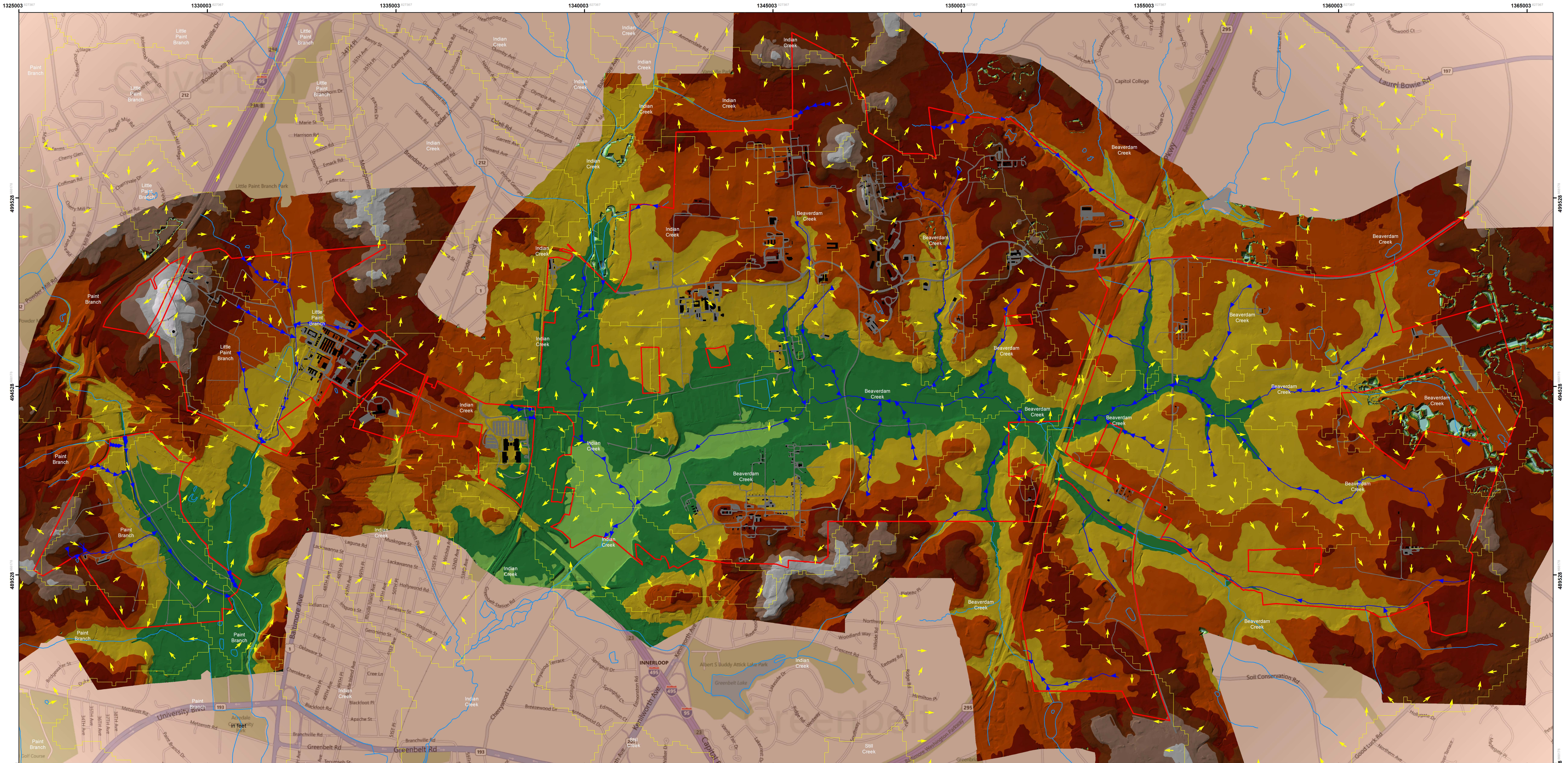


Department of Agriculture  
Agriculture Research Service

<b>Beltsville Agricultural Research Center Stormwater BMPs</b>			
<b>BMP</b>	<b>Description</b>	<b>Acreage</b>	<b>Projected Completion</b>
Nutrient Management Plan	All crop acreage is included in the BARC Nutrient Management Plan and/or the University of Maryland Plan dependent on party responsible for the cropping program.	1621	100% incorporated as of 2011
Continuous No-till	All Nutrient Management acreage is continuous no-till except where research requirements/protocol requires tillage.	1350	100% incorporated as of 2011
Conservation Plans	350 acres of crop land is contoured or strip cropped to minimize soil erosion and nutrient loss. Most areas were initially designed by NCRS with some expansion through in-house design and construction.	350	100% incorporated as of 2011
Increase in Forest cover	In the last several years BARC has worked with Washington Metropolitan Council of Governments (WMCOG) to replant 10 acres of open/minimal forested areas.	10	100% incorporated as of 2011
Forest Buffers	BARC has 22.58 miles of streams with various amounts of forest cover. An estimated 16.90 miles of stream has a buffer area between 35' to 100' between the crop area and stream. Acreage shown does not include forest buffer that extends beyond 100' from the stream. Acreage shown does include some wetlands.	466	100% incorporated as of 2011
Grass Buffer/Waterways	BARC has an estimated 47 acres of grass buffers. Buffers are defined as a sodded area (no minimum or maximum measurement) that filters run off from cropped acreage.	47	100% incorporated as of 2011
Decision Agriculture	Soil samples are taken annually on all crop acreage. Management decisions concerning the fertility program for each field are based on the fertility level, the crop to be grown and the projected yield of the field.	Agricultural land use	100% incorporated as of 2011
Commodity Crop	Commodity crops acreage varies depending on the need for grain, forages and straw. The average for the last several years includes:	Wheat (275) Barley (110) Ryegrass forage (120)	100% incorporated as of 2011
Cover Crop	Cropped acreage that does not receive a commodity crop for the winter months receives one of various cover crops. The goal is to have 100% of cropland covered with vegetation during winter months.	Rye (430) Wheat (150) Radishes (35) Triticale (25) Ryegrass (150) Vetch (5)	100% incorporated as of 2011
Alternative Watering Facility	There are three livestock watering troughs located in cattle herd pastures.		100% incorporated as of 2011
Animal Waste Management	All waste from the lactating dairy cows (110 cows) and 25% of the waste from replacement heifers (130 heifers) is pumped to a solids separator. The solids (+-8%) are moved to the Composting site. The liquid is pumped to the long range concrete holding tank until conditions and timing are acceptable for application to the cropping program.		100% incorporated as of 2011
Compost Site	All non-liquid bedding from the remaining BARC livestock population plus the separated solids from the Dairy operation is accumulated with greenhouse materials and excess organic materials from the Road and Grounds Unit at the BARC composting site. The composting process reduces the estimated volume of 1000 yards to 500 yards. The final product is spread on cropped acreage and/or used in the Roads and Grounds Unit as a soil amendment.		

Department of Agriculture  
Agriculture Research Service

BMP	Description	Acreage	Projected Completion
Barnyard Runoff	Most animal facilities include practices that minimizes/reduces clean water from moving through barnyards. This includes installation of gutters and diverting clean water away from the barnyard areas.		
Dairy Precision Feeding and Forage Management	Phosphorous levels in the dairy herd rations are formulated at a reduced level of less than 110% of NRC guidelines.		
Turfgrass in Building areas and field borders	Fertilizer is no longer applied to turfgrass surrounding the facilities except research plots per protocols.		
Forestry area	500 trees have been planted annually in the turfgrass areas during the past several years		
Integrated Pest Management	All crop acreage uses IPM to minimize chemical usage with the exception of acreage that has research protocols requiring otherwise.		
Pervious surfaces verses impervious surfaces	As shown on attached map 96.1 % of the 6454 acres located at BARC consist of pervious surfaces leaving 3.9% of impervious surfaces.	6195.84 impervious surface	100% incorporated as of 2011
Land usage retirement	36 acres of crop land is being taken out of crop production and planted to trees as part of the <b>ICC Reforestation Project</b> .	36	Projected completion FY 2012-13
Increase in Forest cover	In addition to land retirement, 42 acres of open/minimal forested area is being repopulated ( <b>ICC Reforestation Project</b> ) to provide a full covered forested area.	42	Projected completion FY 2012-13
Wetland Restoration/Creation	26.3 acres of wetlands is being created with a watershed of 450 acres of crop land plus 33 acres of laboratory, office and animal facilities. An additional project is in the design stage ( <b>ICC Project</b> ) with amount of wetlands to be created undetermined at this time.	26 acres wetlands created, with watershed of 450 acres of crop land and 33 acres of Facilities.	Projected completion FY 2012-13
Barnyard Runoff	The above noted wetlands being created will filter the runoff from the dairy facilities and the outside hog lots located at the B-200 Swine Facilities		Projected completion FY 2012-13
Dairy Precision Feeding and Forage Management	Future efforts are being made to reduce the Nitrogen levels in the dairy rations to less than 110% of the NRC guidelines.		Projected completion FY 2012-13

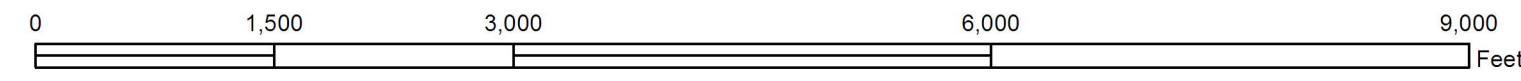


**Legend**

- BARC Boundary - 6454.95 Acres
- BARC Roads
- BARC Buildings
- Anacostia Streams - (WMCOG)
- BARC Streams - 26.08 Miles
- Watersheds - (WMCOG)

**Elevation in Feet**

- |           |           |
|-----------|-----------|
| 250 - 275 | 100 - 125 |
| 225 - 250 | 75 - 100  |
| 200 - 225 | 50 - 75   |
| 175 - 200 | 25 - 50   |
| 150 - 175 | 0 - 25    |
| 125 - 150 |           |



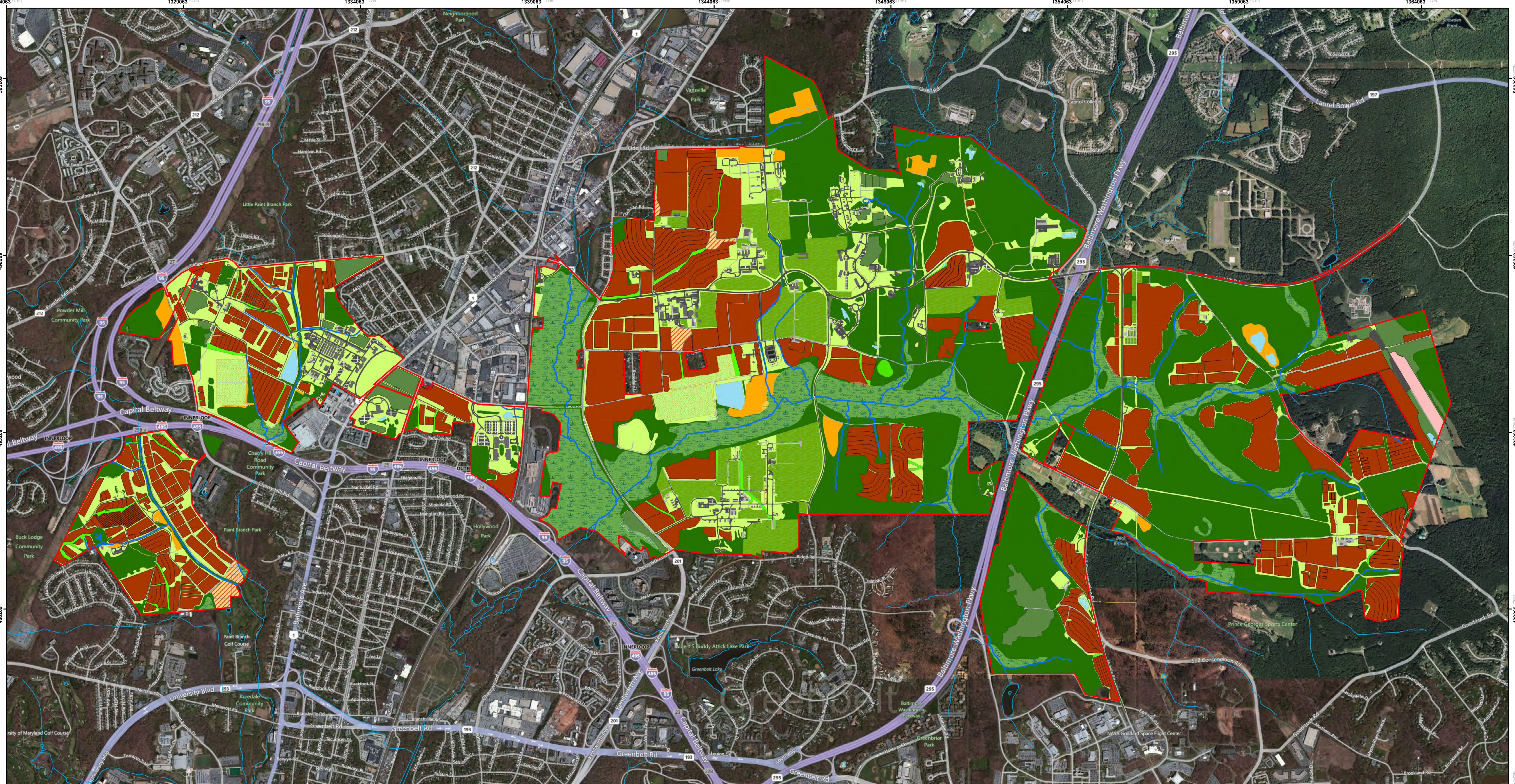
Bing Road Map 2010-11

Coordinate System: NAD 1983 StatePlane Maryland FIPS 1900 Feet  
 Projection: Lambert Conformal Conic  
 Datum: North American 1983  
 False Easting: 1,312,333.3333  
 False Northing: 0.0000  
 Central Meridian: -77.0000  
 Standard Parallel 1: 38.3000  
 Standard Parallel 2: 39.4500  
 Latitude Of Origin: 37.6667  
 Units: Foot US

Data:  
 Tom Callsen  
 Cary Coppeck  
 Keith Hummel  
 George Meyers

Map: George Meyers  
 Date Saved: 11/16/2011  
 Path: C:\GIS\Landuse\WatershedPrint.mxd  
 Research Support Services  
 301-504-5562





**Pervious 6205.91 Acres - 96.15%**

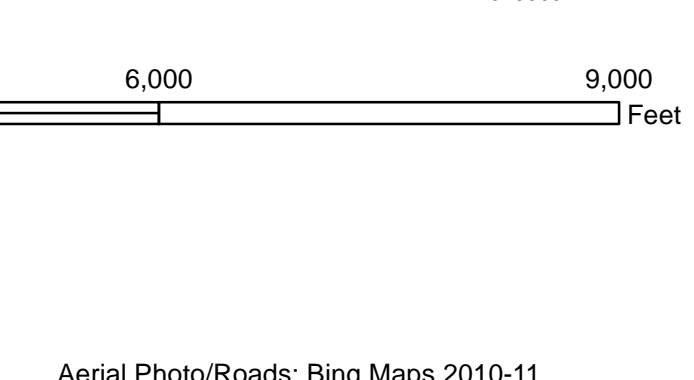
BARC Boundary - 6454.95 Acres	Production; Research - 1621.33 Acres	Mow - 888.07 Acres
Anacostia Streams (WMCOG)	Pasture 351.08 - Acres	Waterway - 49.06 Acres
BARC Streams - 26.08 Miles	Meadow; Low Maintenance - 172.26 Acres	
Wetlands - 672.46 Acres (ENTECH)	Old Effluent Fields - 68.17 Acres	
Forest - 2883.28 Acres	Sludge Field - 18.09 Acres	
Old Landfill - 3.56 Acres		
Ponds - 30.56 Acres		
Reforested/Scheduled - 88.65 Acres		
Future Stormwater Management - 26.36 Acres		

**Impervious 249.04 Acres - 3.85 %**

Asphalt - 130.79 Acres	Concrete - 2.06 Acres	Buildings - 43.21 Acres
Parking Lots - 27.10 Acres	Dirt - 4.18 Acres	
Bridges - 0.14 Acres	Gravel - 41.56 Acres	

**Streams / Forest Buffers:**

26.08 miles = total miles of stream on BARC.  
 22.58 miles = total with some forest cover.  
 5.68 miles = 35 feet or less forest cover.  
 16.90 miles = 35 - 100 feet or more forest cover. (466.22 Acres)



Coordinate System: NAD 1983 StatePlane Maryland FIPS 1900 Feet  
 Projection: Lambert Conformal Conic  
 Datum: North American 1983  
 False Easting: 1,312,333.3333  
 False Northing: 0.0000  
 Central Meridian: -77.0000  
 Standard Parallel 1: 38.3000  
 Standard Parallel 2: 39.4500  
 Latitude Of Origin: 37.6667  
 Units: Foot US

Map: George Meyers  
 Date Saved: 11/16/2011  
 Path: C:\GIS\Landuse\LandUsePrint.mxd  
 Research Support Services  
 301-504-5562

Data:  
 Tom Callsen  
 Cary Coppeck  
 Keith Hummel  
 George Meyers

