

Calvert County WIP II Strategy

Section I: Calvert County's Phase II WIP Team Process

Calvert County's Phase II WIP Team is comprised of a multi-disciplined team committed to developing a strategy to meet 2017 interim target loads and 2020 load goals. The team membership is listed below.

- DNR Coordinator
 - Claudia Donegan
- Planning and Zoning
 - Dave Brownlee, County Lead
 - Mary Beth Cook, Deputy Director
 - Tay Harris, Assistant Lead
 - Steve Kullen, Watershed Planner
 - Robin Munnikhuysen, Environmental Planner
 - John Swartz, Environmental Planner
 - Denise Cherry - Secretary
- Public Works
 - Terry Carlson, Director
 - Allen Brunson, Water and Sewer, Project Engineer
 - Mighel Jackson, Stormwater Engineer
 - Rick Mason, Water and Sewer, Project Engineer
 - Shukri Sharabi, Division Chief, Water and Sewer
- General Services
 - Wilson Freeman, Director
- Economic Development
 - Linda Vassallo
- Calvert Soil Conservation District
 - Bill Clark, Director
 - Ron Babcock
- Environmental Health Dept.
 - Paul McFaden, Director
- North Beach
 - John Hofmann, Town Engineer
- Chesapeake Beach
 - Bill Watson, Zoning Officer
- Maryland Cooperative Extension
 - Herb Reed, Director
- Tri-County Council
 - Wayne Clark, Executive Director
- State Highway Administration
 - Ling Li, Engineer
- U.S. Navy
 - Tracy Maningas

The team met monthly, from January 2011 to present (monthly meetings are on-going) to discuss potential actions to achieve Phase II WIP nitrogen, phosphorous and sediment target load goals. The team concentrated on existing programs and projects to achieve target load goals, assessed the load gaps, and identified actions to close the gaps. Some actions will be difficult to implement including the proposed schedule of septic system upgrades (due to an aggressive implementation schedule and a lack of qualified pool of contractors to install systems and County staff needed to administer upgrades); implementation of selected urban management measures (including County staff to administer BMP implementation), financing the strategy in its entirety; and passing legislation associated with a stormwater utility fee and septic system required upgrades. To implement the Phase WIP II strategy, the County estimates it would need to double its annual operating budget.

Current programs in place that contribute to meeting target load goals include:

- The County's practice of land application of wastewater effluent rather than direct discharge at 2 of the County's 3 major waste water treatment plants (WWTPs)
- The use of shared community septic systems that utilize pretreatment and land application
- Identifying and upgrading failing septic systems
- Initiating watershed implementation plans in selected subwatersheds to identify pollution sources and develop a strategy to reduce pollutants
- Upgrading to enhanced nutrient removal (ENR) at Chesapeake Beach WWTP
- Targeting growth to town centers served by public sewer
- Conducting public outreach and education on the importance of pumping septic systems through programs such as the Calvert County Environmental Commission's "Pump for the Bay Contest"
- Upgrading existing conventional septic systems to nitrogen-removing systems through a Bay Restoration Fund grant
- Minimizing future residential development in the Farm and Forest Zoning District through two downzonings and a TDR program, providing funding for land preservation through the Purchase and Retirement of TDRs (PAR Program)
- Implementing lots-to-TDRs program to convert existing undeveloped lots to open space

Calvert County Phase II WIP Target Loads

It is anticipated that the Calvert County's Phase II WIP Strategy will not meet the County's target loading goals for nitrogen, phosphorus and sediment by 2020 due to the speed of implementation and the very high costs. Extending the 2020 target loads to 2025 will help with the implementation schedule, but the high costs of stormwater retrofits are prohibitive. The strategy proposed will, however contribute to achieving Maryland's Chesapeake Bay total maximum daily load (TMDL) for nitrogen, phosphorous and sediment. The County's required reductions for non-federal lands are given in Table 1. Reductions on federal lands are being addressed by the federal government. The Phase II WIP Strategy includes a capacity analysis in terms of staffing and funding, a description of tracking of progress, and a discussion of contingency measures if the strategy fails to accomplish the required reductions in the timeframe proposed. A discussion of the 2012-2013 (2-Year Milestones Report) milestones is also included. The Environmental Protection Agency's (EPA) assessment to account for growth is being developed; therefore, growth is not accounted for at this time. Upon EPA's completion of an "accounting for growth analysis" and EPA's guidance, the Calvert County Phase II WIP Team will develop its analysis accounting for future growth.

Table 1. Calvert County Target Loads and Required Reductions

<u>Nitrogen</u>	<u>Loadings</u>			<u>Reductions</u>	
Non-Federal Land¹	2009	2017 Target	2020 Target	2017²	2020³
Agriculture⁴	148,669	109,362	92,516	-39,307	-56,153
Urban	195,663	154,264	136,522	-41,399	-59,141
Septic	299,785	215,492	179,366	-84,293	-120,419
Forest	150,410	150,667	150,776	257	366
Wastewater	27,893	32,589	30,313	4,696	2,420
Total	822,420	662,374	589,493	-160,046	-232,927
Total Excluding Ag⁴	673,751	553,012	496,977	-120,739	-176,774
<u>Phosphorous</u>	<u>Loadings</u>			<u>Reductions</u>	
Non-Federal Land¹	2009	2017 Target	2020 Target	2017²	2020³
Agriculture	14,020	11,558	10,503	-2,462	-3,517
Urban	20,777	14,164	11,330	-6,613	-9,447
Septic	0	0	0	0	0
Forest	3,881	3,886	3,888	5	7
Wastewater	12,803	6,917	4,740	-5,886	-8,063
Total	51,481	36,525	30,461	-14,956	-21,020
Total Excluding Ag⁴	37,461	24,967	19,958	-12,494	-17,503

Notes to Calvert County load goals and reductions

¹Loads and Reductions on Federal lands are being addressed by the Federal Government

²Calculated as the 2017 Target Load minus the 2009 load

³Calculated as the 2020 Target Load minus the 2009 load

⁴Agricultural loads and reductions are being addressed by the Soil Conservation Districts and the Maryland Department of Agriculture

Calvert County Phase II WIP Estimated Costs

The preliminary cost estimate to achieve Calvert County’s required reductions is approximately \$1.26 billion dollars (Table 2). This amount includes implementation of WWTP upgrades and improvements; septic system upgrades including adding three staff persons and implementation of stormwater management (SWM) best management practices (BMPs). These costs do not reflect necessary land acquisition costs for SWM devices, three (3) additional staff persons to administer stormwater BMP implementation or contingency measures. The County would develop a stormwater utility to fund staff dedicated to the implementing the stormwater BMPs and administering the stormwater utility. A cost breakout of stormwater BMPs is provided in Table 3. A cost breakout and upgrade schedule for septic systems is provided in Table 4. The average cost per septic system upgrade is \$12,000 (which includes a \$200.00 administrative fee). Property owners would pay for the required upgrades. The average cost per septic system connection to a WWTP is roughly \$20,000.

The strategy’s tidal water monitoring program, conducted by the Chesapeake Biological Laboratory (CBL), has been in existence for 23 years in Mill Creek and from 1-3 years for the other creeks (6 in addition to Mill Creek in the Patuxent River drainage and 3 that drain to the Bay). In June of 2010, the County began quarterly sampling of one site in each of 21 of the County’s 22 subwatersheds. The samples are collected by County staff and volunteers, and the samples are delivered directly to the CBL for processing. The program is designed to recognize “hot spots” of pollution and provides a baseline from which to assess future water quality improvements that would be accomplished by the Phase II WIP Strategy. The tidal monitoring program is funded through the County and the freshwater sampling has been supported by a grant from the Cove Point Natural Heritage Trust (CPNHT). If the CPNHT and County funding continues, there would be no increased costs associated with this aspect of the strategy. The estimated cost breakdowns can be found on the next two pages.

Table 2: Calvert County Phase II WIP Implementation Estimated Costs

<u>Source</u>	<u>Best Management Practices</u>	<u>Estimated Total Costs</u>
Urban	Stormwater Management Practices	\$1.09 Billion
Additional Urban Land Costs	Land for Placement of Stormwater Practices	under development
	Technician, Reviewer and Inspector	under development
Septic System Upgrades	Nitrogen-removing septic systems(12,673 systems)	\$152 Million
Additional Septic System Upgrade Costs	Planner II and Health Department Inspector	under development
Septic System Connections	To Waste Water Treatment Plants (962 connections, contingency measure)	\$19 Million (contingency measure)
Wastewater	Plant Upgrades	\$20 Million
	Total	\$ 1.26 Billion (does not reflect SWM staffing, land costs or contingency measures)

Table3. Stormwater Management Cost Breakdown

<u>Best Management Practice</u>	<u>2017</u>	<u>2020</u>	<u>Delta</u>
Bioretention/raingardens	\$201,866,531	\$266,855,156	\$64,988,625
Bioswales	\$21,640,458	\$24,731,952	\$3,091,494
Impervious Surface Reduction	\$106,270,106	\$141,693,475	\$35,423,369
Shoreline Erosion Control	\$15,000,000	\$15,000,000	\$0
Urban Stream Restoration	\$15,985,809	\$15,985,809	\$0
Infiltration Practices	\$251,986,075	\$325,125,670	\$73,139,596
Vegetated Channels	\$12,365,976	\$17,665,680	\$5,299,704
Wet Ponds/Wetlands	\$228,020,533	\$285,025,666	\$57,005,133
Staff (Technician, Reviewer & Inspector) & Land Costs	under development	under development	under development
Total	\$853,135,488* *does not reflect staffing or land costs	\$1,092,083,408* *does not reflect staffing or land costs	\$238,947,920* *does not reflect staffing or land costs

Table 4: Septic System Upgrade Schedule and Costs

	2017	2020	2025		
# Systems Upgraded - Cumulative	8,782	12,673	17,562		
	2013-2017	2018-2020	2021-2025	Average	
# Systems Upgraded	8,782	3,891	4,889		
# Systems Upgraded /yr	1,756	1,297	978	1,344	

Staffing	Cost/yr				
2 positions Health Department	\$150,000				
1 Position Planning and Zoning	\$75,000				
Total \$	\$225,000				
\$/System	\$167	(\$225,000/1,344 systems)			

System Installation Costs
 75% of system installed are conventional and cost \$11,300/system
 25% of the systems installed are composite tanks and cost \$13,285/system

Cost Breakdown				
\$847,500	(\$11,300 * 75 systems)			
\$332,125	(\$13,285 * 25 systems)			
\$1,179,625	Total			
\$11,796	Cost/System			
\$11,964	Cost/System including staffing			

Costs to 2020
 \$151,615,893

Costs to 2025
 \$210,106,393

Section II: Calvert County’s Phase II WIP Strategy Point Sources

Point Sources

Wastewater Treatment Plants (WWTPs) - Implementation Milestones

The County anticipates meeting 2017 interim reduction goals and 2020 load cap goals for point sources through system reconstruction and Enhanced Nutrient Removal (ENR) upgrade to Chesapeake Beach WWTP (Table 5). Funding sources include the Bay Restoration Fund and the Maryland Department of the Environment (MDE) funds. Project completion is anticipated in 2012. The County’s two other large WWTPs are land application.

The County is also engaging in discussions with the U.S. Navy and MDE regarding the potential connection of the Naval Research Laboratory (NRL) minor WWTP in Randle Cliffs to the Chesapeake Beach WWTP. Potential funding being considered is the Maryland Bay Restoration Fund, bonds, capturing repayments through rate increases and federal funds. Alternative funding options will be explored and estimated costs will be developed as discussions evolve.

Table 5: Waste Water Treatment Projected Loading Rates and Target Loads

	<u>2009</u> <u>Loading</u> <u>Rates</u>	<u>2017 Loading</u> <u>Rates</u>	<u>2017</u> <u>Target</u> <u>Loads</u>	<u>2020</u> <u>Loading</u> <u>Rates</u>	<u>2020 Target</u> <u>Loads</u>
Flow (mgd)	1.19	1.79	1.79	1.96	1.96
Nitrogen (lbs)	27,893	32,009	32,589	31,271	31,271
Phosphorous (lbs)	12,802	6,908	6,917	4,899	4,899

Non-Point Sources

Proposed Septic System Upgrades - Implementation Milestones

The County does not anticipate meeting 2017 interim reduction goals or 2020 load cap goals for septic system upgrades through the proposed actions described below; however, the County does anticipate meeting 2025 load caps by implementing these actions:

- Continue installing about 60 nitrogen-removing septic systems per year via the County’s on-going Bay Restoration Fund (BRF) Grant Program
- Require all new septic systems within the Critical Area as per State law to be advanced systems and require further that these systems have a nitrogen removing efficiency of at least 69%
- Require all new systems outside the Critical Area to be advanced systems with a nitrogen removal efficiency of at least 69%
- Require all repairs of failed systems (about 1.9%/year) to use advanced systems with a nitrogen removal efficiency of at least 69%
- Require all septic systems at “time of sale” (about 5%/year) to be upgraded to advanced systems with a nitrogen removal efficiency of at least 69%

Proposed Septic System Upgrades – Programmatic Milestones

The County would need to pass legislation requiring the use of advanced denitrifying systems capable of achieving nitrogen reductions of at least 69%; and requiring such systems within the Critical Area, outside of the Critical Area, when repairing failed systems, and “at time of sale”. This process is anticipated to take one year.

Based upon these proposed policies and the timetable associated with passing legislation, Table 6 contains the proposed schedule of septic systems upgrades to achieve 2025 target nitrogen loads. The number of systems upgraded accounts for decrease in housing stock without upgraded septic systems over time.

Table 6: Proposed Septic System Upgrades

	# Systems from MAST	2017		2020		2025	
		Upgraded systems	% Upgraded	Upgraded systems	% Upgraded	Upgraded systems	% Upgraded
Critical Area	5,323	1,876	35.2	2,676	50.3	3,681	69.1
Within 1,000 ft of a stream	7,583	2,331	30.7	3,370	44.4	4,675	61.7
Other	15,163	4,575	30.2	6,627	43.7	9,206	60.7
Total	28,069	8,782	31.3	12,673	45.1	17,562	62.6

As discussed under *Section V: Identification of technical Discrepancies*, Maryland’s Assessment Scenario Tool (MAST) gives a 50% reduction in nitrogen load credit per upgraded septic system. However, the advanced systems being installed via the County BRF Program achieve 69%

nitrogen reduction. Table 7, found on the next page, shows the loading reductions reached using the 50% reduction allowed in MAST, a 69% reduction based on our current and proposed future programs, a 93% reduction based on using the most efficient nitrogen-removing septic systems (a contingency measure) and reductions from proposed septic systems to WWTP connections. The County implementation strategy for septic systems falls short of meeting the 2017 and 2020 target load goals with or without the septic systems to WWTP connections based on the projected 50% or 69% nitrogen reduction. If the 2020 target load is extended to 2025, the target load is exceeded in 2025 only if the 69% nitrogen reduction is applied. Using the 69% reduction, the goal is exceeded with or without the septic systems to WWTP connections.

Table 7: Comparison Table for Septic Systems with 50%, 69% and 93% Denitrification Capabilities(includes septic connections without growth)

		2017			
		2009 Loadings	lbs N removed (50%)	lbs N removed (69%)	lbs N removed (93%)
Critical Area	102,672	84,814	17,858	24,644	33,216
Within 1,000 ft of a stream	90,924	77,160	13,764	18,994	25,601
Other	109,099	92,857	16,242	22,414	30,210
Septic Connections			2,236	2,236	2,236
Total	302,695	254,831	50,100	68,288	91,263
Target			84,293	84,293	84,293
lbs reduction relative to target			-34,193	-16,005	6,970
Without Septic Connections			-36,429	-18,241	4,734
		2020			
		2009 Loadings	lbs N removed (50%)	lbs N removed (69%)	lbs N removed (93%)
Critical Area	102,672	77,043	25,629	35,368	47,670
Within 1,000 ft of a stream	90,924	70,916	20,008	27,611	37,215
Other	109,099	85,474	23,625	32,603	43,943
Septic Connections			13,838	13,838	2,236
Total	302,695	233,433	83,100	109,420	131,063
Target			120,419	120,419	84,293
lbs reduction relative to target			-37,319	-10,999	46,770
Without Septic Connections			-51,157	-24,837	44,534
		2025			
		2009 Loadings	lbs N removed (50%)	lbs N removed (69%)	lbs N removed (93%)
Critical Area	102,672	67,368	35,304	48,720	65,665
Within 1,000 ft of a stream	90,924	63,031	27,893	38,492	51,881
Other	109,099	76,178	32,921	45,431	61,233
Septic Connections			13,838	13,838	13,838
Total	302,695	206,577	109,956	146,481	192,617
Target			120,419	120,419	120,419
lbs reduction relative to target			-10,463	26,062	72,198
Without Septic Connections			-24,301	12,224	58,360

Funding of required upgrades would be paid by homeowners and homebuyers unless the County develops another funding mechanism. When the above policies are in place, the BRF could be used to pay for upgrades for low income families or to upgrade systems from 69% removal to 93% removal. The Department of Planning and Zoning would administer the system upgrades. Inspections of all upgrades and denitrifying systems would be administered by the Health Department. All upgraded system would be required to include an alarm system with tele-monitoring, which provides an email or text message to the County Health Department and service provider upon system failure or the development of mechanical problems.

The Department of Planning and Zoning administers the BRF Grant Program including receiving applications, evaluating sites, prioritizing sites, preparing bids for installations, providing property owner outreach and education and assisting in the upgrades process. The Environmental Health Department evaluates sites, reviews designs and inspects and monitors installed upgrades. The Health Department and Planning and Zoning would administer additional upgrades through this process. The County has identified the need for three additional staff people to administer septic upgrades. One (1) staff person is needed in Planning and Zoning to conduct homeowner outreach/educational/technical assistance, handle a bid process to obtain the best systems at the lowest cost and monitor and track systems; and two (2) staff persons are needed in the Environmental Health Department to conduct field inspections and monitor installed systems. A \$200 administrative fee per system would fund these positions (Table 4).

Proposed Septic System Connections to WWTPs:

Since the target loads for septic systems can be met by 2025 without the septic system to WWTP connections (Table 7), the connections proposed below will be considered as contingency measures.

- **Proposed Residential Connections to the Chesapeake Beach WWTP:** The Chesapeake Beach WWTP serves 9,750 equivalent dwelling units (EDUs). According to MAST, 2010 flow was 0.60 million gallons per day (MGD). The Chesapeake WWTP's planned capacity is 1.5 MGD,ⁱ which will be accomplished upon the completion of its reconstruction and ENR upgrade in 2012. Proposed septic system connections to the Chesapeake Beach WWTP include:
 - 289 EDUs in Summer City/Randle Cliff sits along the shores of the Chesapeake Bay, south of Chesapeake Beach (contingency).
- **Proposed Residential and Institutional Connections to the Prince Frederick WWTP:** The Prince Frederick WWTP, comprised of two wastewater treatment plants, serves 2,775 EDUs. Prince Frederick WWTPs I and II are interconnected via a force main that allows these facilities to work in tandem providing a combined capacity of 750,000 gallons per day of sewage disposal. According to the Chesapeake Bay's MAST tool, due to the fact that these facilities utilize land application, nutrients are considered a 0 discharge into the Bay. Therefore, septic system connections to the Prince Frederick WWTP will translate into a 0 discharge. Proposed septic system connections to the Prince Frederick WWTP include:

- 121 EDUs in Dares Beach, east of Prince Frederick, sits along the shores of the Chesapeake Bay (40-50 by 2017, the rest are contingency). Septic system failures occur due to high groundwater and poor percolation
 - 278 in Bayside Forest, which is located north of Dares Beach (contingency)
 - 40 EDUs in Central Village, which is located on the north side of Dares Beach Road between Dares Beach and Prince Frederick (contingency)
 - 33 EDUs in Hallowing Point Trailer Park, which is located near where Route 231/Hallowing Point Road crosses the Patuxent River (contingency but may happen with private funds)
 - The Department of Natural Resources (DNR) building, which is located where Route 231/Hallowing Point Road crosses the Patuxent River (contingency)
 - The Calvert County Industrial Park currently using a sewage treatment plant with subsurface disposal (essentially a large septic system) (in planning)
- **Proposed Residential and Institutional Septic System Connections to Solomons WWTP:** Capacity at the Solomons WWTP is 1.052 MGD with an actual flow of 0.335 MGD (CY 2006). Proposed septic system connections to Solomons WWTP are presented below. According to the Chesapeake Bay's MAST tool, due to the fact that this facility utilizes land application, nutrients are considered a 0 discharge into the Bay. Therefore, septic system connections to the Solomons WWTP will translate into a 0 discharge. Proposed septic system connections to the Solomons WWTP include:
- 200 EDUs in Cove Point, which is located north of Solomons Island and south of Calvert Cliffs State Park, at the end of Cove Point Road on the Chesapeake Bay (contingency)
 - Cove Point, LNG, which is located west of the Cove Point community, north of Solomons Island and south of Calvert Cliffs State Park on Cove Point Road (contingency)
- **Proposed Septic Systems Connections to Marley Run WWTP:** Marley Run treatment facility is a shared community system that serves sixty (60) homes in the Marley Run Subdivision. The system discharges effluent to nearby drip irrigation fields. The current permitted capacity of the treatment facility is 15,000 gallons per day (gpd). Permitted capacity of the treatment facility is 40,000 gpd. The facility is currently being upgraded to meet the required build-out capacity and more stringent treatment limits for 160 EDUs. According to the Chesapeake Bay's MAST tool, due to the fact that Marley Run utilizes land application, nutrients are considered a 0 discharge into the Bay. Therefore, septic system connections to Marley Run will translate into a 0 discharge. Proposed septic system connections to the Marley WWTP include:
- Huntington High School, which is located on Rt 2/4 in Huntingtown. The effluent is currently treated by extended aeration, clarification, nitrification/denitrification and discharged to an underground drainage field.ⁱⁱ Capacity is 0.0115 MGD, and 2007 average peak flows were 0.0024 MGDⁱⁱⁱ. (Land application to land application, therefore no loadings charged and no loading reduction credits given.)

Septic system to WWTP connections in areas with failing septic systems could occur without amendment to the County Comprehensive Plan and Comprehensive Water and Sewerage Plan.

In areas without failing septic systems, amendments to the County Comprehensive Plan and Comprehensive Water and Sewerage Plan would be required. Upon deciding to utilize this contingency measure, it is estimated to take one year to pass legislation. Project funding sources would be bonds. Bond repayments would be captured through rate increases. Estimated cost per equivalent dwelling unit (EDU) is estimated at \$20,000. Additional staff requirements would be assessed when and if the need becomes apparent. Table 7 shows the target load reduction projections with septic system upgrades and connections.

Contingency Actions:

Require Septic System Upgrades that Achieve a 93% Nutrient Reduction: In the event that the County fails to keep on track to meet 2025 load goals by implementing the above described septic system upgrades (at 69% removal), the County will consider requiring septic system upgrades that achieve 93% removal efficiency wherever feasible. The schedule of implementation as described above would be modified accordingly. If this contingency measure were used, it is estimated that passing the required legislation would take one year.

Require Septic System to WWTP connections: Require a sufficient number of septic connections to cover the shortfall. Implement the ones that do not require plan amendments first, then proceed to the others.

Urban Nutrient: Stormwater Management - Implementation Milestones

Upgrading Existing Failing And Inadequate Stormwater Management Facilities: Calvert County's urban nutrients stormwater management strategy initially focuses on upgrading existing failing and inadequate stormwater management facilities to provide greater detention quality treatment of runoff. Existing facilities such as dry extended detention ponds and grass swales will be converted to wet ponds, wetlands and bioswales where appropriate to achieve higher nutrient removal efficiency than can be achieved in their current form even when properly maintained. Current drainage channel repair and stream restoration implementation will be increased substantially to reduce the sediment and nutrient loads that are flowing into our waterways.

Treat Unmanaged Impervious Surfaces: Calvert County is also proposing to provide stormwater management for currently unmanaged impervious areas through the reduction of impervious areas, providing stormwater management for all County structures and the majority of County roadways, and incentivizing the construction of infiltration and filtering facilities on existing residential and commercial properties. See the bulleted list below for the suite of combined actions: upgrades to existing failing or inadequate stormwater management facilities and treatment of impervious surfaces.

- Convert approximately 200 miles of grass swales to bioswales and install an additional 160 miles of new grass swales along county and private roadways
- Increase current rate of drainage channel repair from 200 feet per year to 715 feet per year, representing a total of 5,000 feet

- Pursue implementation of regenerative stormwater conveyances or other vegetated flow attenuation wherever appropriate
- Partner with local communities to sponsor cliff stabilization projects at a rate of 715 feet per year, representing a total of 5,000 feet
- Provide or upgrade stormwater management facilities on approximately 30 County structures to provide environmentally sensitive design (ESD), to include public schools, the golf course and the County Services Plaza
- Construct or upgrade approximately 160 miles of grass swales along currently unmanaged County and privately owned roadways to provide water quality treatment
- Reduce total impervious cover in Calvert County by 15% by 2017, and by 20% by 2020 through changes to parking requirements
- Incentivize removal of unused impervious area, green roof retrofits, and expanded use of permeable pavement
- Incentivize the use of microscale ESD practices on approximately 600 existing commercial properties that drain to regional facilities or pre-2000 stormwater management facilities to reduce nutrient loading closer to the source
- Incentivize the construction of bioretention, micro-bioretention and raingarden facilities on approximately 1,250 single family residential lots; focusing primarily on densely populated areas such as Chesapeake Ranch Estates where facilities can treat multiple homes

The stormwater management portion of the Phase II WIP strategy requires one staff person to review projects, one staff person to inspect projects and one person to administer the stormwater management impact fee and identify projects. All three staff persons would be housed in the Public Works Division of the Department of Inspections and Permits. The County will develop a stormwater utility to implement this program and provide funding for these positions.

Urban Nutrient: Stormwater Management - Programmatic Milestones

The County would need to pass legislation establishing a stormwater utility fee. The County is considering two different approaches to developing the stormwater utility fee. The first approach would consist of a flat rate per household and an impervious surface-based fee for non-residential development. With an estimated 33,000 households in the County, \$1.98 million/year could be collected through a \$60 flat fee per household (similar to some other jurisdictions). The non-residential fees generated will need to be developed based on impervious surface coverage if this is the method approved. The second approach would consist of an impervious surface based approach for both residential and non-residential development. If the second option is the approved method, the County would need to develop an estimated income from this approach. In order to fund the required implementation only through residential development, each property owner would have to pay an additional \$2,753/year between 2013 and 2025. This is unreasonable and is extremely problematic. As a better handle on the non-residential contribution to the stormwater utility is achieved, the residential cost would be reduced.

Tree Plantings: Through Calvert’s existing Critical Area Program and Forest Conservation Program, the fees-in-lieu (FIL) fund for these programs currently contains enough funds to plant two (2) acres of trees per year inside the Critical Area and two (2) acres of trees outside the Critical Area annually through 2017, but more revenue from fees-in-lieu are expected during this time. Planning and Zoning will administer and track the four (4) acres of tree planting per year.

Technical Discrepancies and Alternative Measures: Stream Restoration and Oyster Reefs and Floats

Alternative options for meeting 2017 interim goals and 2020 target load goals include stream restoration projects and oyster reefs and floats. The Southern Maryland Oyster Cultivation Society (SMOCS) has been active in encouraging oyster floats attached to private and commercial piers and in creating oyster reefs in local tidal creeks. The oysters remove algae (that contain nitrogen and phosphorous) and sediment from the water though this method of reducing pollutants is not yet recognized as a valid BMP in the Chesapeake Bay Model. It is hoped that this BMP will be recognized in future years. Stream restoration projects are more expensive in nature (\$150/ linear foot) than other storm water management measures. State and Federal Grant funding will be sought to implement stream restoration projects.

Section III: Calvert County’s 2012-2013 Milestones

The County’s 2012-2013 milestone goals are to:

- Pass septic system upgrade legislation, requiring:
 - All new septic systems within the Critical Area as per State law to be nitrogen-removing systems and require further that these systems have a nitrogen removing efficiency of at least 69%
 - All new systems outside the Critical Area to be advanced systems with a nitrogen removal efficiency of at least 69%
 - All repairs of failed systems (about 1.9%/year) to use advanced systems with a nitrogen removal efficiency of at least 69%
 - All septic systems at “time of sale” (about 5%/year) to be upgraded to advanced systems with a nitrogen removal efficiency of at least 69%
- Pass a stormwater management impact fee to create a stormwater utility
- Complete ENR upgrade at the Chesapeake Beach Wastewater Treatment Plant
- Hire five (6) additional staff people to implement the septic system upgrade and stormwater management aspects of the Phase II WIP.
- Resolve the septic system “50%” credit issue with EPA and the Chesapeake Bay Program, so that the County receives the accurate credit of 69% nitrogen reductions for upgraded septic systems; and the ability to receive 93% reduction credit if the County implements the requirement for septic systems to have 93% nitrogen reduction capabilities.
- Apply for Federal and State grants to conduct stream restoration projects.

Section VI: Calvert County's Tracking, Verification and Reporting Methods

Water Quality Monitoring. The County will monitor the Phase II WIP implementation by utilizing its existing water quality monitoring program (in existence for 24 years, 1987-1988 and 1990-2011) in 10 locations within Mill Creek; and from stations in nine (9) tributaries, 6 located in the lower Patuxent River drainage (Helen Creek, St. Leonard Creek, Island Creek, Battle Creek, Hunting Creek and Hall Creek) and 3 in the Chesapeake Bay Drainage (Fishing Creek, Plum Point Creek and Flag Harbor). Sampling in the 9 tidal tributaries has been in existence for 1-3 years. The Calvert County Board of County Commissioners has provided the University of Maryland Center for Environmental Science, Chesapeake Biological Laboratory (UMCES CBL) with funding to conduct this water quality monitoring. The focal point of these studies was to measure the variables that best indicate stress to an estuarine system (oxygen in bottom waters and algae pigments - chlorophyll-a) due to increased development and recreational activity. Variables measured included chlorophyll-a, temperature, water column clarity, dissolved oxygen concentrations and salinity. .

Section V: Identification of Technical Discrepancies

Septic System Nitrogen Credit: As discussed in the septic system upgrades portion of the County's Phase II WIP Strategy, Maryland's Assessment Scenario Tool (MAST) gives a 50% reduction in nitrogen load credit per upgraded septic system. However, the advanced systems being installed via the County BRF Program achieves 69% nitrogen reduction. The County will seek approval from EPA and the Chesapeake Bay program to receive 69% denitrification credit. The County possesses the scientific data to verify the findings and make the argument. In addition, the County has utilized, on a limited basis, a septic system that achieves 93% denitrification, and has the scientific data to verify such findings. The County will pursue, simultaneously in its pursuit to receive a 69% credit, approval to receive 93% credit per unit that achieves a 93% reduction in nitrogen. Table 7 shows the comparable loading reductions achieved using:

- The 50% reduction allowed in MSAT
- A 69% reduction based on our current and proposed future programs
- A 93% reduction if the County were to require 93% nitrogen removing septic systems in the future

Septic System Connections to WWTPs Utilizing Land Application: Additionally, the County proposes to explore connecting a potential 683 residential septic systems and three (3) non-residential septic systems to WWTPs. However, commercial septic system connections to WWTPs (i.e. Calvert County Industrial Park) provides the County with no additional "credit" even though there will be water quality benefits. Recognizing that this is a double edged sword because commercial septic system loadings are not counted against the County, the County's feasible options for addressing nonpoint source loads is limited due to MAST's inability to credit and account for such measures.

Land Use Categories in MAST: The current land use categories in MAST lack details that provide a more accurate measurement of impervious surface, which impacts the accuracy of assessing stormwater management BMP implementation needs to meet urban loading goals. MAST should incorporate land uses that better reflect land uses used in the discipline of planning, and incorporate more accurate impervious surface ratios associated with the different types of land uses (e.g. low, medium and high density residential land uses, light and heavy industrial land uses, commercial and retail land uses, etc.)

Ground Truthing MAST Numbers with County Numbers: MAST's inventory and location of septic systems needs to be verified. The County identified a discrepancy in the number of septic systems within the County and their locations (inside the Critical Area versus outside the Critical Area, within 1,000 feet of a stream, etc.). The County using a more complete stream GIS layer, found a greater % of septic systems outside of the Critical Area but within 1,000 ft of a stream than those outside the Critical Area but beyond 1,000 ft of a stream. MAST's inventory shows the opposite result.

ⁱ Calvert County Draft Comprehensive Water and Sewer Plan 2011, Table 10, pg.71.

ⁱⁱ Calvert County Comprehensive Water and Sewer Plan 2011, Table 10, pg. 72.

ⁱⁱⁱ Calvert County Draft Comprehensive Water and Sewer Plan 2011, Table 10, pg. 72.