County of Greene

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February 2, 2012

Mr. David Johnson, Director
Department of Conservation and Recreation
203 Governor Street
Richmond, VA 23219-2010

Re: Phase II Watershed Implementation Plan Local Data and Information Submission

Dear Mr. Johnson,

In response to your letter dated November 9, 2011, Greene County is pleased to submit the requested information to assist Department of Conservation and Recreation (DCR) in preparing Virginia's Phase II Watershed Implementation Plan (WIP) for the Chesapeake Bay Total Maximum Daily Load (TMDL).

Greene County is committed to supporting the Bay TMDL planning process and welcomes the opportunity to provide more specific and local information and to outline County-level activities, should there be sufficient resources. The information provided by this letter to you and your staff via Virginia Assessment Scenario Tool (VAST) and Strategies/Resources Template in Microsoft Excel supports DCR's preparation for the Virginia Phase II WIP. In addition, it demonstrates Greene County's current understanding of the Bay TMDL and Phase II WIP and outlines roles and responsibilities in implementation. This submission supports Virginia's demonstration of "reasonable assurance," as required by U.S. Environmental Protection Agency (EPA).

Scenarios and strategies submitted at this time may change substantially as part of Greene County's need to adaptively manage this and other planning processes. Consideration of factors the County finds relevant including local preferences, cost estimates, new technical information, and new or enhanced technologies may adjust scenarios and strategies in the future.

While the Bay TMDL process has brought the issue of excess nutrients and sediment in the Chesapeake Bay to the forefront of our region's attention, it is imperative that Greene County does not lose sight of the importance of local water quality. Linking the health of the Chesapeake Bay with the health of local waters in Greene County is essential for building local buy-in, creating incentives for local landowners, and for the County to develop and implement the most cost effective and practical strategies.

Overview of Greene County, Virginia

Greene County consists of 157 square miles on the eastern side of the Blue Ridge Mountains, of which 57 percent drains to the James River via the Rivanna River and the remaining 53 percent drains to the Rappahannock River via the Rapidan River. According to 2010 census data, Greene County has 18,403 residents. Stanardsville is the only incorporated town and the County seat. Of the county's approximately 100,000 acres, 6,713 acres are in the growth area, leaving the remaining acreage rural. None of the land is considered "regulated pervious or impervious." Shenandoah National Park comprises a total of 197,438 acres, of which 79,579 are designated as wilderness. The other large federally managed land parcel is the Rapidan Wildlife Management Area (*Greene County Comprehensive Plan*, 2010).

The Rapidan Service Authority manages wastewater for Greene County. All Greene County wastewater is processed through Stanardsville and Ruckersville Wastewater Treatment Plants. The new 0.6 MGD secondary wastewater treatment facility for the U.S. Route 29/33 corridor area of Greene County has been designed to meet future nutrient regulations using biological nutrient removal (*Greene County Comprehensive Plan*, 2010).

Greene County has a tradition of farming and forestry that goes back to its earliest days, and residents have repeatedly confirmed their strong desire to see this heritage perpetuated into the future. Preserving farmland and forestland lies at the crossroads of many aspects of the most recent Comprehensive Plan, from caring for the County's natural resources and heritage to ensuring continued economic development through production and tourism. Greene County is committed to environmental protection as documented in its 2010 Comprehensive Plan, which includes the adoption of the Greene Infrastructure Plan for PD-10 (2010, TJPDC); endorses the recommendations from the Rivanna Conservation Society and University of Virginia's Environmental Law Clinic found in *Reducing Runoff from Stormwater* (RCS and UVa, 2010*);* and recommendations from the Rivanna River Basin Commission's *Menu of Stormwater Best Management Practices* (2008).

In addition, two supervisors and one appointed citizen from Greene County have served on the Rivanna River Basin Commission since its inception in 2007, and planning and environmental inspection staff persons serve on its Technical Advisory Committee. Greene County has recently installed a number of stormwater best management practices (250 linear foot bioswale, one-quarter acre urban tree planting, and 1000 foot stream restoration) at the Greene County Community Park, which serve to protect water quality and model best management practices (BMPs) for the community.

Greene County's Phase II WIP Information Development Process

Greene County has stayed current with the federal and state aspects of the Chesapeake Bay TMDL through its participation on the Rivanna River Basin Commission and from meetings with state representatives hosted by the Thomas Jefferson Planning District Commission (TJPDC). Greene County helped plan and conduct the Piedmont Regional Pilot Project with TJPDC, RRBC, and the Culpeper Soil and Water Conservation District (CSWCD), which serves Greene County. County staff attended the VAST training held at TJPDC on October 28, 2011.

Since November 2011, Greene County staff has, with support from the Rivanna River Basin Commission and Culpeper SWCD, gathered data and developed the input requested by DCR. On January 24, 2012, a presentation was made to the Board of Supervisors about the extent and nature of this submission, which is being forwarded administratively. Please note that while the information contained herein and submitted via VAST is offered in response to DCR's request, the details of this submission have not been explicitly reviewed and endorsed by the Board.

Greene County was fortunate to have support in developing the data, interpreting the data requests, the Chesapeake Bay Model, and the VAST tool. Technical support was provided by the Rivanna River Basin Commission (funded through a National Fish and Wildlife Foundation (NFWF) grant to the TJPDC and Rivanna River Basin Commission). Greene also has been fortunate to have the support and expertise of Culpeper SWCD to help interpret land use data, provide assessments of BMP inventories, and assist in developing the 2025 preferred scenario.

The Chesapeake Bay Model was developed for providing simulations of pollution loads at the Bay-scale not the county-scale. However, Greene County has been asked by DCR to update county-scale information from this Model, we have done given time and resources.

Greene County notes, however, that this process has been hampered by a number of factors, including:

- The lateness of receiving the corrected model data from DCR and the short turn-around time for delivery of input to DCR;
- The change in DCR's emphasis from meeting target goals to an emphasis on achieving a "comparable level of effort," which has been difficult to fully understand and implement based on the limitations of the tool provided (VAST) and the lack of consistent and coherent guidance from DCR;
- The complications and confusion resulting from comparing Model 5.3.2 data and BMP categories with those provided by DCR and via the VAST tool.

WIP Element #1 - BMP Inventory (2009 Progress BMPs) & Implementation progress

Greene County appreciates the opportunity to update the Bay model to include all existing BMPs, understanding that our participation in providing the best available data will contribute to an important "refinement" of the Bay model. Greene County is in the process of developing a complete database of all BMPs on public and private lands in the county; however, because this is only partially completed, input should be considered a reasonable estimate based on the best

professional judgment of staff. Data review included analysis and comparison to available records by the Culpeper SWCD. Thus the BMP inventory submitted through VAST (Attachment 1) is accurate to extent possible at this time. The following provide an overview of complications and/or discrepancies with updating the BMP inventory:

- Greene County did not have time or staff resources staff to count acres of land treated by smaller BMPs, such as individual rain barrels and downspout dis-connections.
- Greene County did not have the data resources to determine the amount of urban pervious land versus urban impervious land in order to categorize the number of urban BMPs.
- For the mining, forestry, septic, and federal land use BMPs, Virginia Department of Mines, Minerals and Energy, Virginia Department of Transportation, Virginia Department of Health, and Virginia Department of Forestry were consulted. Greene County contacted each of these departments to verify the BMPs shown in the Model. However, it would have been more efficient and effective if the Commonwealth had provided these data along to the counties and PDCs for their use in developing the requested input.

Greene County will be interested in providing further BMP inventory updates in the future and specifically requests guidance from DCR of how and when this should happen, with sufficient lead-time, so that the most accurate inventory can be used in developing Bay Model 6.0 in 2017.

Since Greene County has documented that 1,000 linear feet of urban streams have been restored, we wish to be assured that credit for this BMP be allocated as soon as the new efficiency rating has been finalized.

WIP Element #2 – Land Use / Land Cover Corrections

Greene County appreciates the opportunity to provide DCR with more accurate land cover data so that the Bay model can be improved to better reflect land use and pollutant loads at the local scale. Supported by RRBC and Culpeper SWCD and local landowners, we reviewed the land use/land cover data for Greene County. We utilized a high-resolution (one foot) land cover map based on 2009 aerial photography (*Rivanna Watershed and Vicinity Land Use/Land Cover Map*, 2009). The GIS based tool identifies impervious and hydrologic features, deciduous and evergreen tree cover, open land, pine plantation, forest harvest, orchard/vineyard, bare earth, and golf courses. We also consulted with Virginia Cooperative Extension, Virginia Department of Forestry (VDOF), and Virginia Department of Mines, Minerals and Energy. Please note the following, in addition to the comments provided through VAST:

- While the *Rivanna Watershed and Vicinity Land Use/Land Cover Map* served as an excellent data source to describe land covers (especially impervious surfaces), there was not have enough time or resources to resolve discrepancies between this map and output from the Bay Model.

- Lacking comprehensive data from the Virginia Department of Health (VDH) or any other sources, Greene County could only estimate the estimate the number of septic systems based on subtracting the households connected to public sewer from the total number of households in the 2010 census.

- Though assessments did not reveal any major discrepancies between the Bay Model 5.3.2. and local data, we urge the Commonwealth to work with its Bay partners to obtain and maintain high-resolution land cover/land use data that support localities in planning and implementing BMPs and land protection moving forward.

WIP Element #3 – 2025 BMP Scenario Submission (vs 2025 Phase I WIP default)

Greene County worked with the Rivanna River Basin Commission and Culpeper SWCD to develop a preferred scenario for meeting allocated target reductions as described by the Chesapeake Bay Model 5.3.2 (and in VAST). However, it is unclear that this approach "achieves a similar level of effort" as determined by DCR, as the criteria have not been made explicitly clear. Greene County's 2025 scenario provides a different mix of BMPs than the default WIP I scenario based on staff and partners input and should only be considered "preferred" in the sense that it is based on more accurate local land use data and more closely reflects current trends and practices in the County.

Thus, the 2025 scenario was developed as a reasonable submission, though not reflective of a detailed planning process informed by sound and accurate data and conducted over time with adequate input by stakeholders, citizens, source sectors, and elected officials. In addition, Greene County does not have authority over many of the sources contributing to the overall pollution loads allocated in this exercise to the County.

Greene County's 2025 BMP scenario is a demonstration of what seems to be a technically viable way based on limited information of how targets might be met. This scenario has not been selected or adopted by Greene County at this time and is provides only a technical analysis of one theoretical option that may not be viable as a practical matter due to a variety of reasons. The submittal is an analysis, not a plan or commitment. Greene County reserves the right to change these BMP targets rates at any point in the future at the sole discretion of the County.

With respect to the 2025 Scenario submitted and described in Attachment 3, please note the following:

- The Chesapeake Bay Model default for stream restoration is in excess of the number of stream miles in "open land," and thus available for this BMP. In other words, the opportunity to apply this BMP is overstated by the model.
- We have applied our update to the 2009 Progress BMP as part of developing the 2025 scenario. This has been, in some cases, a significant factor in developing target implementation goals of specific BMPs.

- There are numerous small rain gardens and bioretention facilities installed in several of the private developments in Greene County. Though the number of these has not yet been recorded, Greene County encourages these onsite practices and expects an upward trend of their use onsite stormwater treatment.

WIP Element #4 – Implementation Strategies For BMP Scenarios

At this point, given the indeterminate nature of the resources that will be available for BMP implementation as well as a lack of authority and control, Greene County offers the collection of BMP implementation strategies based solely on planning work done to date via tits most recent comprehensive plan update (2010) and input from its planning partners through various studies and reports, including:

- *Menu of Stormwater BMPs,* RRBC via letter recommendation in January 2009.
- *Reducing Runoff Report,* Rivanna Conservation Society and UVa's Environmental Law Clinic (2010)
- *Greene Infrastructure Plan for PD-10,* TJPDC (2010)
- *Opportunities for Stormwater Retrofit on Public Lands In Greene County,* Center for Watershed Protection (2010)

In addition, we cite several of the strategies proposed in Virginia's Draft WIP II as possible strategies to consider in the future.

Strategies submitted are those that Greene County *may* consider, evaluate, or explore in the future. Submission of these strategies does not commit the County to implementation and will be based on resources, political will, economic conditions, and regulatory requirements.

WIP Element #5 – Resource Needs

Greene County has concern about the magnitude of the cost estimates catalogued in the November 2011 report of the Virginia Senate Finance Committee and stresses the importance of federal and state financial support for WIP implementation. The County has provided general comments regarding the level of staffing, needs for resources and enabling legislation for this element in the attached EXCEL spreadsheet.

In closing, Greene County appreciates the opportunity to submit this information to DCR, etc., but reserves the right to reconsider and amend any of the above information in any future regulatory proceeding such as compliance under any permitted activities.

Sincerely,

Barry Clark
Greene County Administrator

Attachments:
1. WIP Element #1 - BMP Inventory (2009 Progress BMPs) & Implementation progress
2. WIP Element #2 – Land Use / Land Cover Corrections
3. WIP Element #3 – 2025 BMP Scenario (vs 2025 Phase I WIP)
4. WIP Elements #4 and #5 – Implementation Strategies For BMP Scenarios and Resource Needs

ATTACHMENT 1

GREENE COUNTY
WIP ELEMENT #1 – BMP INVENTORY / IMPLEMENTATION PROGRESS

Geography	Land Use Type	BMP Name	Acres of BMP Applied to Land Use (unless otherwise noted)	% BMP Applied to Land Use (unless otherwise noted)	Comments Submitted to DCR
Greene, VA	nonregulated pervious developed	Dry Detention Ponds and Hydrodynamic Structures	180.41	2.33	Luck Stone operation in Greene County has E&S applied and "no discharge allowed" (see Permit 12954AA for operational, drainage, and reclamation plan). (Based on RRBC conversation with Tom Bibb, VMME, 1/11/12)
Greene, VA	nonregulated pervious developed	Dry Extended Detention Ponds	40.26	0.52	Approximately 51 acres are being treated with this BMP as of 11/17/2011. It has not yet been determined if the acres treated are impervious and/or pervious. Therefore, the % treated is the same (51 acres treated/9756.1 total developed acres = 0.0052)
Greene, VA	nonregulated pervious developed	Urban Filtering Practices	131.63	1.70	Approximately 166 acres are being treated with this BMP as of 11/17/2011. It has not yet been determined if the acres treated are impervious and/or pervious. Therefore, the % ratio is applied the same to each: 166 acres treated/9756.1 total developed acres = 0.0170.
Greene, VA	nonregulated pervious developed	Urban Infiltration Practices - no sand\veg no underdrain	4.65	0.06	Approximately 6 acres are being treated with this BMP as of 11/17/2011. It has not yet been determined if the acres treated are impervious and/or pervious. Therefore, the % ratio is applied the same to each: 6 acres treated/9756.1 total developed acres = 0.000615.
Greene, VA	nonregulated pervious developed	Wet Ponds and Wetlands	893.54	11.54	Approximately 1,126 acres are being treated with this BMP as of 11/17/2011. Therefore, the % ratio is applied the same to each: 1,126 acres treated/9756.1 total developed = 0.115419.
Greene, VA	nonregulated impervious developed	Dry Detention Ponds and Hydrodynamic Structures	46.91	2.33	Approximately 227 acres are being treated with this BMP as of 11/17/2011. It has not yet been determined if the acres treated are impervious and/or pervious. Therefore, the % treated is the same (227 acres treated/9756.1 total developed acres = 0.0233)
Greene, VA	nonregulated impervious developed	Dry Extended Detention Ponds	10.47	0.52	Approximately 51 acres are being treated with this BMP as of 11/17/2011. Data does not presently exist to characterize whether pervious and/or impervious. Therefore, the % treated is the same (51 acres treated/9756.1 total developed acres = 0.0052)
Greene, VA	nonregulated impervious developed	Urban Filtering Practices	34.22	1.70	Approximately 166 acres are being treated with this BMP as of 11/17/2011. It has not yet been determined if the acres treated are impervious and/or pervious. Therefore, the % ratio is applied the same to each: 166 acres treated/9756.1 total developed acres = 0.0170.

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Greene, VA	nonregulated impervious developed	Urban Infiltration Practices - no sand\veg no underdrain	1.21	0.06	Approximately 6 acres are being treated with this BMP as of 11/17/2011. It has not yet been determined if the acres treated are impervious and/or pervious. Therefore, the % ratio is applied the same to each: 6 acres treated/9756.1 total developed acres = 0.000615.
Greene, VA - Non-Federal	nonregulated impervious developed	Urban Stream Restoration -- Interim	1000 Feet	1000 Feet	Greene County restored a 1,000 ft stream at Greene County Community Park in 2011 (Louise Finger, DGIF, 1/09/12)
Greene, VA	nonregulated impervious developed	Wet Ponds and Wetlands	232.31	11.54	Approximately 1,126 acres are being treated with this BMP as of 11/17/2011. Therefore, the % ratio is applied the same to each: 1,126 acres treated/9756.1 total developed = 0.115419.
Greene, VA - Non-Federal	nonregulated extractive	Abandoned Mine Reclamation	244.63	100.00	Luck Stone operation in Greene County has E&S applied and "no discharge allowed" (see Permit 12954AA for operational, drainage, and reclamation plan). (Based on RRBC conversation with Tom Bibb, VMME, 1/11/12) Per DCR (email to RRBC on 1/23/12), keep Abandoned Mine Reclamation BMP applied to Land Use.
Greene, VA	regulated construction	Erosion and Sediment Control	151.10	100.00	All construction acres are treated with this BMP in accordance with the standards established under the Virginia Erosion and Sediment Control Regulations (Section 4VAC50-30-40).
Greene, VA	septic	Septic Connection	0.00	0.00	Greene County has not had sufficient time and resources to develop a more accurate estimate. VDH records do not facilitate totals. Greene County has thus not had sufficient time and resources to develop a more accurate estimate.
Greene, VA	septic	Septic Denitrification	0.00	0.00	Greene County has not had sufficient time and resources to develop a more accurate estimate. VDH records do not facilitate totals. Greene County has thus not had sufficient time and resources to develop a more accurate estimate.
Greene, VA	septic	Septic Pumpouts	0.00	0.00	Greene County has not had sufficient time and resources to develop a more accurate estimate. VDH records do not facilitate totals. Greene County has thus not had sufficient time and resources to develop a more accurate estimate.
Greene, VA	harvested forest	Forest Harvesting Practices	572.70	84.50	Per Matt Poirot, VDOF Assistant Director of Forest Management for Water Quality (1/23/12), the number of acres harvested in Greene County for the time period of July 1, 2010 to June 30, 2011 was 637 acres (IFRIS from the harvesting database for FY2011).

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Geography	Land Use Type	BMP Name	Acres of BMP Applied to Land Use (unless otherwise noted)	% BMP Applied to Land Use (unless otherwise noted)	Comments Submitted to DCR
Greene, VA	hightill with manure	Conservation Tillage	165.77	40.93	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA - Non-Federal	hightill with manure	Cover Crop Early Drilled Rye	52.70	25.00	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. Greene County currently has an estimated 150 acres under Early Planted Rye Cultivators per Culpeper Soil & Water Conservation District (150 acres/595.4 total acres of crop = 25% crop).
Greene, VA - Federal	hightill with manure	Cover Crop Early Drilled Rye	0.02	25.00	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. Greene County currently has an estimated 150 acres under Early Planted Rye Cultivators per Culpeper Soil & Water Conservation District (150 acres/595.4 total acres of crop = 25% crop).
Greene, VA - Non-Federal	hightill without manure	Cover Crop Early Drilled Rye	41.04	25.00	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. Greene County currently has an estimated 150 acres under Early Planted Rye Cultivators per Culpeper Soil & Water Conservation District (150 acres/595.4 total acres of crop = 25% crop).
Greene, VA - Federal	hightill without manure	Cover Crop Early Drilled Rye	0.02	25.00	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. Greene County currently has an estimated 150 acres under Early Planted Rye Cultivators per Culpeper Soil & Water Conservation District (150 acres/595.4 total acres of crop = 25% crop).
Greene, VA - Federal	lowtill with manure	Cover Crop Early Drilled Rye	0.02	25.00	Per Matt Poirot, VDOF Assistant Director of Forest Management for Water Quality (1/23/12), the number of acres harvested in Greene County for the time period of July 1, 2010 to June 30, 2011 was 637 acres (IFRIS from the harvesting database for FY2011).
Greene, VA - Non-Federal	lowtill with manure	Cover Crop Early Drilled Rye	36.52	25.00	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. Greene County currently has an estimated 150 acres under Early Planted Rye Cultivators per Culpeper Soil & Water Conservation District (150 acres/595.4 total acres of crop = 25% crop).
Greene, VA - Non-Federal	nutrient management hightill with manure	Cover Crop Early Drilled Rye	7.08	25.00	Greene County currently has an estimated 150 acres under Early Planted Rye Cultivators per Culpeper Soil & Water Conservation District (150 acres/595.4 total acres of crop = 25% crop).

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Greene, VA - Non-Federal	nutrient management hightill without manure	Cover Crop Early Drilled Rye	5.51	25.00	Greene County currently has an estimated 150 acres under Early Planted Rye Cultivators per Culpeper Soil & Water Conservation District (150 acres/595.4 total acres of crop = 25% crop).
Greene, VA - Non-Federal	nutrient management lowtill with manure	Cover Crop Early Drilled Rye	4.90	25.00	Greene County currently has an estimated 150 acres under Early Planted Rye Cultivators per Culpeper Soil & Water Conservation District (150 acres/595.4 total acres of crop = 25% crop).
Greene, VA	alfalfa	Forest Buffers	0.74	0.13	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hay with nutrients	Forest Buffers	9.88	0.13	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hay without nutrients	Forest Buffers	1.59	0.13	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hightill with manure	Forest Buffers	0.53	0.13	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hightill without manure	Forest Buffers	0.24	0.13	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	pasture	Forest Buffers	15.34	0.13	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	alfalfa	Grass Buffers; Vegetated Open Channel - Agriculture	0.85	0.15	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hay with nutrients	Grass Buffers; Vegetated Open Channel - Agriculture	11.38	0.15	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hightill with manure	Grass Buffers; Vegetated Open Channel - Agriculture	0.61	0.15	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hightill without manure	Grass Buffers; Vegetated Open Channel - Agriculture	0.28	0.15	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.

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Greene, VA	pasture	Grass Buffers; Vegetated Open Channel - Agriculture	17.19	0.15	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	alfalfa	Land Retirement to hay without nutrients (HEL)	14.86	2.62	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hay with nutrients	Land Retirement to hay without nutrients (HEL)	198.94	2.62	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hightill with manure	Land Retirement to hay without nutrients (HEL)	10.68	2.62	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hightill without manure	Land Retirement to hay without nutrients (HEL)	4.89	2.62	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	pasture	Land Retirement to hay without nutrients (HEL)	308.37	2.62	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	nutrient management pasture	Non Urban Stream Restoration	39.46 Feet	39.46 Feet	No change has been made to default scenario for this BMP.
Greene, VA	pasture	Non Urban Stream Restoration	2610.5 Feet	2610.5 Feet	Per DGIF (1/9/12) and CSWCD (1/27/12) 2,650 feet of non-urban stream restoration has taken place in Greene County through 2011. Subtracting the total estimated amount on Nut Mgt Pasture (36.46 ft) gives you 2,610.5 ft of stream restoration on Pasture.
Greene, VA	alfalfa	Nutrient Management	66.99	11.84	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hay with nutrients	Nutrient Management	896.75	11.84	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hightill with manure	Nutrient Management	28.33	11.84	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hightill without manure	Nutrient Management	22.06	11.84	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.

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Greene, VA	lowtill with manure	Nutrient Management	19.63	11.84	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	pasture	Nutrient Management	1,347.95	11.84	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	nutrient management pasture	Off Stream Watering Without Fencing	197.74	14.67	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	pasture	Off Stream Watering Without Fencing	1,472.39	14.67	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	nutrient management pasture	Prescribed Grazing	345.88	25.66	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	pasture	Prescribed Grazing	2,575.43	25.66	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	alfalfa	Soil Conservation and Water Quality Plans	87.35	17.51	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hay with nutrients	Soil Conservation and Water Quality Plans	1,169.17	17.51	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hay without nutrients	Soil Conservation and Water Quality Plans	269.85	17.51	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hightill with manure	Soil Conservation and Water Quality Plans	36.93	17.51	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hightill without manure	Soil Conservation and Water Quality Plans	28.76	17.51	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	lowtill with manure	Soil Conservation and Water Quality Plans	25.59	17.51	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	nutrient management alfalfa	Soil Conservation and Water Quality Plans	11.73	17.51	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.

ATTACHMENT 1

GREENE COUNTY
WIP ELEMENT #1 – BMP INVENTORY / IMPLEMENTATION PROGRESS

Geography	Land Use Type	BMP Name	Acres of BMP Applied to Land Use (unless otherwise noted)	% BMP Applied to Land Use (unless otherwise noted)	Comments Submitted to DCR
Greene, VA	nutrient management hay with nutrients	Soil Conservation and Water Quality Plans	157.02	17.51	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	nutrient management hightill with manure	Soil Conservation and Water Quality Plans	4.96	17.51	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	nutrient management hightill without manure	Soil Conservation and Water Quality Plans	3.86	17.51	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	nutrient management lowtill with manure	Soil Conservation and Water Quality Plans	3.44	17.51	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	nutrient management pasture	Soil Conservation and Water Quality Plans	236.03	17.51	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	pasture	Soil Conservation and Water Quality Plans	1,757.44	17.51	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	degraded riparian pasture	Stream Access Control with Fencing	207.67	33.43	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hay without nutrients	Streamside Forest Buffers	203.70	20.50	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	degraded riparian pasture	Streamside Grass Buffers	413.53	100.00	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	alfalfa	Tree Planting	2.94	0.52	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hay with nutrients	Tree Planting	39.38	0.52	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hay without nutrients	Tree Planting	8.06	0.52	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hightill with manure	Tree Planting	2.11	0.52	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.

ATTACHMENT 1

GREENE COUNTY
WIP ELEMENT #1 – BMP INVENTORY / IMPLEMENTATION PROGRESS

Geography	Land Use Type	BMP Name	Acres of BMP Applied to Land Use (unless otherwise noted)	% BMP Applied to Land Use (unless otherwise noted)	Comments Submitted to DCR
Greene, VA	hightill without manure	Tree Planting	0.97	0.52	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	pasture	Tree Planting	59.51	0.52	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	alfalfa	Wetland Restoration	0.85	0.15	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hay with nutrients	Wetland Restoration	11.39	0.15	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hay without nutrients	Wetland Restoration	1.80	0.15	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hightill with manure	Wetland Restoration	0.61	0.15	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	hightill without manure	Wetland Restoration	0.28	0.15	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.
Greene, VA	pasture	Wetland Restoration	17.68	0.15	Agriculture BMPs reviewed by Culpeper Soil & Water Conservation District. No change has been made to default scenario for this BMP.

ATTACHMENT 2

GREENE COUNTY
WIP ELEMENT #2 – LAND USE / LAND COVER CORRECTIONS

Landuse	Geography	Land Use in Bay Model (acres unless otherwise noted)	Updated Land Use (acres unless otherwise noted)	Comments Submitted to DCR
alfalfa	Greene, VA - Non-Federal	567.70	567.70	Greene County has not had sufficient time and resources to develop a more accurate estimate.
alfalfa	Greene, VA - Federal	0.30	0.30	Greene County has not had sufficient time and resources to develop a more accurate estimate.
animal feeding operations	Greene, VA - Non-Federal	67.00	67.00	Greene County has not had sufficient time and resources to develop a more accurate estimate.Note: Bay Model 5.3.2 shows 69 acres vs VAST = 67 acres.
concentrated animal feeding operations	Greene, VA - Non-Federal	8.10	8.10	Greene County has not had sufficient time and resources to develop a more accurate estimate. See DEQ permits VPG260193 and VPG100087 for more information.
forest	Greene, VA	66,827.50	72,927.00	Greene County estimates 72,927 forested acres according to the 2009 Rivanna Watershed and Vicinity Land Use Land Cover map (1-meter, 2009 flyover). This map includes Deciduous Forest (63,111 acres), Evergreen Forest (8,407 acres), and Evergreen Forest (527 acres).
harvested forest	Greene, VA	677.80	637.00	Per Matt Poirot, VDOF Assistant Director of Forest Management for Water Quality (email to RRBC on 1/23/12), the number of acres harvested in Greene County for the time period of July 1, 2010 to June 30, 2011 was 637 acres (IFRIS from the harvesting database for FY2011).
hay with nutrients	Greene, VA - Non-Federal	7,599.60	7,599.60	Greene County has not had sufficient time and resources to develop a more accurate estimate.
hay with nutrients	Greene, VA - Federal	3.40	3.40	Greene County has not had sufficient time and resources to develop a more accurate estimate.
hi-till with manure	Greene, VA - Non-Federal	407.80	407.80	Greene County has not had sufficient time and resources to develop a more accurate estimate.
hi-till with manure	Greene, VA - Federal	0.20	0.20	Greene County has not had sufficient time and resources to develop a more accurate estimate.
hi-till without manure	Greene, VA - Non-Federal	186.90	186.90	Greene County has not had sufficient time and resources to develop a more accurate estimate.
hi-till without manure	Greene, VA - Federal	0.10	0.10	Greene County has not had sufficient time and resources to develop a more accurate estimate.

ATTACHMENT 2

GREENE COUNTY
WIP ELEMENT #2 – LAND USE / LAND COVER CORRECTIONS

Landuse	Geography	Land Use in Bay Model (acres unless otherwise noted)	Updated Land Use (acres unless otherwise noted)	Comments Submitted to DCR
nonregulated extractive	Greene, VA - Non-Federal	244.60	243.20	Luck Stone operation (VA permit 12954 AA) is permitted for 387.32 acres of which 243.2 acres are held in bond and 35 acres have been reclaimed and released from bond. (Based on RRBC conversation with Tom Bibb, VMME, 1/11/12)
nonregulated impervious developed	Greene, VA - Non-Federal	1,942.00	1,942.00	Greene County believes that 1,985 acres (Bay Model 5.3.2 from DCR) is reasonably accurate. Note: VAST number (1,942) does not match.
nonregulated impervious developed	Greene, VA - Federal	71.10	71.10	Greene County has not had sufficient time and resources to develop a more accurate estimate. Note: Based on a GIS analysis by RRBC, there are 56.3 Acres Impervious land in Shenandoah National Park and 2.9 Acres Impervious land in Rapidan Wildlife Mgt Area.
nonregulated pervious developed	Greene, VA - Non-Federal	7,743.00	7,743.00	Greene County has not had sufficient time and resources to develop a more accurate estimate.
nursery	Greene, VA - Non-Federal	1.00	8.00	Greene County estimates 8 acres of nursery in November 2011 (Culpeper Soil & Water Consrvation District).
pasture	Greene, VA - Non-Federal	11,797.50	11,797.50	Greene County has not had sufficient time and resources to develop a more accurate estimate.
pasture	Greene, VA - Federal	5.30	5.30	Greene County has not had sufficient time and resources to develop a more accurate estimate.
pasture corridor/degraded riparian pasture	Greene, VA	621.20	286.36	Based on PEC and CSWCD (1/9/12) mapping exercise of available stream bank on open ground in Greene County and assuming 25% of total is actually pasture land, at 100% implementation, only 286.36 ac available.
regulated construction	Greene, VA - Non-Federal	151.10	151.10	Greene County believes that 212 acres (from Bay Model 5.3.2 from DCR) is reasonably accurate. Note that this number does not match with 151.1 in VAST.
septic	Greene, VA - Non-Federal	6081 Systems	6859 Systems	VDH records do not facilitate developing accurate totals. Greene County estimates spproximately 6,859 septic systems as of November 2011 (total number of housing units from the 2010 U.S. Census data minus the number of homes on public sewer).

ATTACHMENT 3

GREENE COUNTY
WIP ELEMENT #3 – PREFERED 2025 BMP SCENARIO

Geography*	Land Use Type	BMP Name	Acres of BMP Applied to Land Use (unless otherwise noted)	% BMP Applied to Land Use (unless otherwise noted)	Comments
Greene, VA	alfalfa	Decision Agriculture	9.56	1.88	No change from default.
Greene, VA	alfalfa	Enhanced Nutrient Management	435.75	85.69	No change from default.
Greene, VA	alfalfa	Forest Buffers	16.3	2.87	No change from default. Based on PEC and CSWCD (1/9/12) mapping exercise of available stream bank on open ground in Greene County and assuming 30% of total is actually ag land, at 100% implementation, only 301.2 ac available. This is 25% of WIP I buffer implementation rate.
Greene, VA	alfalfa	Grass Buffers; Vegetated Open Channel - Agriculture	19.55	3.57	No change from default. Based on PEC and CSWCD (1/9/12) mapping exercise of available stream bank on open ground in Greene County and assuming 30% of total is actually ag land, at 100% implementation, only 301.2 ac available. This is 25% of WIP I buffer implementation rate.
Greene, VA	alfalfa	Land Retirement to hay without nutrients (HEL)	31.33	5.68	No change from default.
Greene, VA	alfalfa	Nutrient Management	55.84	10.98	No change from default.
Greene, VA	alfalfa	Soil Conservation and Water Quality Plans	5.85	79.34	No change from default.
Greene, VA	alfalfa	Tree Planting	26.72	5.06	No change from default.
Greene, VA	alfalfa	Wetland Restoration	1.93	0.35	No change from default.
Greene, VA	animal feeding operations	Barnyard Runoff Control	67.02	100	No change from default.
Greene, VA	degraded riparian pasture	Non Urban Stream Restoration	3200 Feet	3200 Feet	WIP I shows 1015.63 feet of stream restoration (over 500 from the 2009 base period); based on 2011 implementation rate of 2,650 ft, estimate 3,200 ft restored by 2025.
Greene, VA	degraded riparian pasture	Stream Access Control with Fencing	218.35	35.15	No change from default.
Greene, VA	degraded riparian pasture	Streamside Grass Buffers	371.79	92.29	No change from default.
Greene, VA	harvested forest	Forest Harvesting Practices	677.75	100	Increase rate from 95% to 100% by 2025 to achive reductions in forest sector.
Greene, VA	hay with nutrients	Decision Agriculture	127.97	1.88	No change from default.
Greene, VA	hay with nutrients	Enhanced Nutrient Management	5832.82	85.69	No change from default.
Greene, VA	hay with nutrients	Forest Buffers	218.21	2.87	No change from default. Based on PEC and CSWCD (1/9/12) mapping exercise of available stream bank on open ground in Greene County and assuming 30% of total is actually ag land, at 100% implementation, only 301.2 ac available. This is 25% of WIP I buffer implementation rate.
Greene, VA	hay with nutrients	Grass Buffers; Vegetated Open Channel - Agriculture	261.68	3.57	No change from default. Based on PEC and CSWCD (1/9/12) mapping exercise of available stream bank on open ground in Greene County and assuming 30% of total is actually ag land, at 100% implementation, only 301.2 ac available. This is 25% of WIP I buffer implementation rate.
Greene, VA	hay with nutrients	Land Retirement to hay without nutrients (HEL)	419.33	5.68	No change from default.
Greene, VA	hay with nutrients	Nutrient Management	747.4	10.98	No change from default.

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GREENE COUNTY
WIP ELEMENT #3 – PREFERED 2025 BMP SCENARIO

Geography*	Land Use Type	BMP Name	Acres of BMP Applied to Land Use (unless otherwise noted)	% BMP Applied to Land Use (unless otherwise noted)	Comments
Greene, VA	hay with nutrients	Soil Conservation and Water Quality Plans	78.31	79.34	No change from default.
Greene, VA	hay with nutrients	Tree Planting	357.66	5.06	No change from default.
Greene, VA	hay with nutrients	Wetland Restoration	25.85	0.35	No change from default.
Greene, VA	hay without nutrients	Forest Buffers	35.63	2.87	No change from default. Based on PEC and CSWCD (1/9/12) mapping exercise of available stream bank on open ground in Greene County and assuming 30% of total is actually ag land, at 100% implementation, only 301.2 ac available. This is 25% of WIP I buffer implementation rate.
Greene, VA	hay without nutrients	Soil Conservation and Water Quality Plans	1950.31	79.34	No change from default.
Greene, VA	hay without nutrients	Streamside Forest Buffers	134.78	13.42	No change from default.
Greene, VA	hay without nutrients	Tree Planting	131.01	5.06	No change from default.
Greene, VA	hay without nutrients	Wetland Restoration	4.22	0.35	No change from default.
Greene, VA	hightill with manure	Conservation Tillage	340.68	90	No change from default.
Greene, VA	hightill with manure	Cover Crop Early Drilled Rye	0.55	100	Culpeper Soil & Water Conservation District expects to see an increase to 100% application of cover crops by 2025.
Greene, VA	hightill with manure	Decision Agriculture	0.71	1.88	No change from default.
Greene, VA	hightill with manure	Enhanced Nutrient Management	32.44	85.69	No change from default.
Greene, VA	hightill with manure	Forest Buffers	11.71	2.87	No change from default. Based on PEC and CSWCD (1/9/12) mapping exercise of available stream bank on open ground in Greene County and assuming 30% of total is actually ag land, at 100% implementation, only 301.2 ac available. This is 25% of WIP I buffer implementation rate.
Greene, VA	hightill with manure	Grass Buffers; Vegetated Open Channel - Agriculture	14.21	3.57	No change from default. Based on PEC and CSWCD (1/9/12) mapping exercise of available stream bank on open ground in Greene County and assuming 30% of total is actually ag land, at 100% implementation, only 301.2 ac available. This is 25% of WIP I buffer implementation rate.
Greene, VA	hightill with manure	Land Retirement to hay without nutrients (HEL)	22.92	5.68	No change from default.
Greene, VA	hightill with manure	Nutrient Management	4.16	10.98	No change from default.
Greene, VA	hightill with manure	Soil Conservation and Water Quality Plans	0.44	79.34	No change from default.
Greene, VA	hightill with manure	Tree Planting	19.97	5.06	No change from default.
Greene, VA	hightill with manure	Wetland Restoration	1.41	0.35	No change from default.
Greene, VA	hightill without manure	Cover Crop Early Drilled Rye	2.43	100	Culpeper Soil & Water Conservation District expects to see an increase to 100% application of cover crops by 2025.
Greene, VA	hightill without manure	Decision Agriculture	3.15	1.88	No change from default.
Greene, VA	hightill without manure	Enhanced Nutrient Management	143.46	85.69	No change from default.

ATTACHMENT 3

GREENE COUNTY
WIP ELEMENT #3 – PREFERED 2025 BMP SCENARIO

Geography*	Land Use Type	BMP Name	Acres of BMP Applied to Land Use (unless otherwise noted)	% BMP Applied to Land Use (unless otherwise noted)	Comments
Greene, VA	hightill without manure	Forest Buffers	5.37	2.87	No change from default. Based on PEC and CSWCD (1/9/12) mapping exercise of available stream bank on open ground in Greene County and assuming 30% of total is actually ag land, at 100% implementation, only 301.2 ac available. This is 25% of WIP I buffer implementation rate.
Greene, VA	hightill without manure	Grass Buffers; Vegetated Open Channel - Agriculture	6.44	3.57	No change from default. Based on PEC and CSWCD (1/9/12) mapping exercise of available stream bank on open ground in Greene County and assuming 30% of total is actually ag land, at 100% implementation, only 301.2 ac available. This is 25% of WIP I buffer implementation rate.
Greene, VA	hightill without manure	Land Retirement to hay without nutrients (HEL)	10.31	5.68	No change from default.
Greene, VA	hightill without manure	Nutrient Management	18.38	10.98	No change from default.
Greene, VA	hightill without manure	Soil Conservation and Water Quality Plans	1.93	79.34	No change from default.
Greene, VA	hightill without manure	Tree Planting	8.8	5.06	No change from default.
Greene, VA	hightill without manure	Wetland Restoration	0.64	0.35	No change from default.
Greene, VA	lowtill with manure	Cover Crop Early Drilled Rye	4.94	100	Culpeper Soil & Water Conservation District expects to see an increase to 100% application of cover crops by 2025.
Greene, VA	lowtill with manure	Decision Agriculture	6.4	1.88	No change from default.
Greene, VA	lowtill with manure	Enhanced Nutrient Management	291.93	85.69	No change from default.
Greene, VA	lowtill with manure	Nutrient Management	37.41	10.98	No change from default.
Greene, VA	lowtill with manure	Soil Conservation and Water Quality Plans	3.92	79.34	No change from default.
Greene, VA - Non-Federal	nonregulated extractive	Abandoned Mine Reclamation	244.63	100	No change from default.
Greene, VA - Non-Federal	nonregulated impervious developed	Bioretention/raingardens	11.24	0.6	CWP's Stormwater Retrofit Opportunities (2010) identifies opportunities to treat 4.52 acres of public lands with bioretention and/or rain garden. Assuming cost-effectiveness and availability of funding, plan to treat approximately 50 acres by 2025.
Greene, VA - Non-Federal	nonregulated impervious developed	Bioswale	46.85	2.5	Assuming cost-effectiveness and availability of funding, plan to treat approximately 100 acres by 2025. Note lack of pervious soils in Greene, so underdrains are always required for BMPs.
Greene, VA	nonregulated impervious developed	Dry Detention Ponds and Hydrodynamic Structures	91.42	4.7	For 2025, estimate double the amount treated in 2011 (227 acres), which equates to 458.4 acres (91.79 acres impervious land and 366.57 acres pervious land).
Greene, VA	nonregulated impervious developed	Dry Extended Detention Ponds	171.75	8.83	No change from default.
Greene, VA - Non-Federal	nonregulated impervious developed	Impervious Urban Surface Reduction	67.97	3.5	Reduce to 65 acres, assuming cost-effectiveness and availability of funding for public lands and incentives available to encourage this practice on proviate lands.

ATTACHMENT 3

GREENE COUNTY
WIP ELEMENT #3 – PREFERED 2025 BMP SCENARIO

Geography*	Land Use Type	BMP Name	Acres of BMP Applied to Land Use (unless otherwise noted)	% BMP Applied to Land Use (unless otherwise noted)	Comments
Greene, VA	nonregulated impervious developed	Permeable Pavement - no sandveg with underdrain with AB soils	0	0	No change from default.
Greene, VA - Non-Federal	nonregulated impervious developed	Permeable Pavement - with sandveg with underdrain with AB soils	4.87	0.26	CWP's Stormwater Retrofit Opportunities (2010) identifies opportunities to treat 0.42 ac of public lands with permeable pavement. Assuming cost-effectiveness and availability of funding, plan to treat 25 acres with this BMP by 2025.
Greene, VA	nonregulated impervious developed	Street Sweeping Mechanical Monthly	0	0	No change from default.
Greene, VA	nonregulated impervious developed	Urban Filtering Practices	97.26	5	Increase to 95 acres treated by this BMP over the default estimate of 80 acres (15 acres).
Greene, VA	nonregulated impervious developed	Urban Infiltration Practices - no sand\veg no underdrain	55.24	2.84	For 2025, reduce amount acres treated by BMP by 160-acres over the 2025 Default Scenario.
Greene, VA	nonregulated impervious developed	Urban Infiltration Practices - with sandveg no underdrain	0	0	No change from default. Note lack of pervious soils in Greene, so underdrains are always required for BMPs.
Greene, VA - Non-Federal	nonregulated impervious developed	Vegetated Open Channel - Urban	56.22	3	For 2025, increase acres treated to 130-acres by 2025. Greene County rural developments generally do not have curb and gutter.
Greene, VA	nonregulated impervious developed	Wet Ponds and Wetlands	301.5	15.5	The 2011 acres treated is 1,126. Assuming cost-effectiveness and availability of funding, plan to treat 268 additional acres with this BMP by 2025 for a total of 1,395 acres.
Greene, VA - Non-Federal	nonregulated pervious developed	Bioretention/raingardens	39.04	0.5	CWP's Stormwater Retrofit Opportunities (2010) identifies opportunities to treat 4.52 acres of public lands with bioretention and/or rain garden. Assuming cost-effectiveness and availability of funding, plan to treat approximately 50 acres by 2025.
Greene, VA - Non-Federal	nonregulated pervious developed	Bioswale	50.75	0.65	Assuming cost-effectiveness and availability of funding, plan to treat approximately 100 acres by 2025. Note lack of pervious soils in Greene, so underdrains are always required for BMPs.
Greene, VA	nonregulated pervious developed	Dry Detention Ponds and Hydrodynamic Structures	366.93	4.7	For 2025, estimate double the amount treated in 2011 (227 acres), which equates to 458.4 acres (91.79 acres impervious land and 366.57 acres pervious land).
Greene, VA	nonregulated pervious developed	Dry Extended Detention Ponds	689.36	8.83	No change from default.
Greene, VA	nonregulated pervious developed	Permeable Pavement - no sandveg with underdrain with AB soils	0	0	No change from default.
Greene, VA - Non-Federal	nonregulated pervious developed	Permeable Pavement - with sandveg with underdrain with AB soils	20.3	0.26	CWP's Stormwater Retrofit Opportunities (2010) identifies opportunities to treat 0.42 ac of public lands with permeable pavement. Assuming cost-effectiveness and availability of funding, plan to treat 25 acres with this BMP by 2025.

ATTACHMENT 3

GREENE COUNTY
WIP ELEMENT #3 – PREFERED 2025 BMP SCENARIO

Geography*	Land Use Type	BMP Name	Acres of BMP Applied to Land Use (unless otherwise noted)	% BMP Applied to Land Use (unless otherwise noted)	Comments
Greene, VA	nonregulated pervious developed	Urban Filtering Practices	313.06	4.01	No change from default.
Greene, VA	nonregulated pervious developed	Urban Forest Buffers	0	0	No change from default.
Greene, VA	nonregulated pervious developed	Urban Grass Buffers	0	0	No change from default.
Greene, VA - Non-Federal	nonregulated pervious developed	Urban Infiltration Practices - no sand\veg no underdrain	221.72	2.84	For 2025, reduce amount acres treated by BMP by 160-acres over the 2025 Default Scenario.
Greene, VA	nonregulated pervious developed	Urban Infiltration Practices - with sandveg no underdrain	0	0	No change from default. Note lack of pervious soils in Greene, so underdrains are always required for BMPs.
Greene, VA - Non-Federal	nonregulated pervious developed	Urban Nutrient Management	6573.55	84.2	No change from default.
Greene, VA - Non-Federal	nonregulated pervious developed	Urban Stream Restoration (interim)	1500 Feet	1500 Feet	For 2025, increase total amount of stream restored to 1,500 linear feet (500 more than 1,000 ft total reported for 2011 progress).
Greene, VA - Non-Federal	nonregulated pervious developed	Urban Tree Planting; Urban Tree Canopy	3.91	0.05	CWP's Stormwater Retrofit Opportunities (2010) identifies opportunities to treat 3.73 acres of public lands with tree planting. Assuming cost-effectiveness and availability of funding, 3.91 acres by 2025.
Greene, VA - Non-Federal	nonregulated pervious developed	Vegetated Open Channel - Urban	78.07	1	For 2025, increase acres treated to 130-acres by 2025. Greene County rural developments generally do not have curb and gutter.
Greene, VA	nonregulated pervious developed	Wet Ponds and Wetlands	1092.99	14	The 2011 acres treated is 1,126. Assuming cost-effectiveness and availability of funding, plan to treat 268 additional acres with this BMP by 2025 for a total of 1,395 acres.
Greene, VA	nursery	Irrigation Water Capture Reuse	1	100	By 2025, 100% of nurseries in Greene County are projected to have this BMP per Culpeper Soil & Water Conservation District.
Greene, VA	nutrient management alfalfa	Soil Conservation and Water Quality Plans	397.61	79.34	No change from default.
Greene, VA	nutrient management hay with nutrients	Soil Conservation and Water Quality Plans	5322.27	79.34	No change from default.
Greene, VA	nutrient management hightill with manure	Cover Crop Early Drilled Rye	37.3	100	Culpeper Soil & Water Conservation District expects to see an increase to 100% application of cover crops by 2025.
Greene, VA	nutrient management hightill with manure	Soil Conservation and Water Quality Plans	29.6	79.34	No change from default.
Greene, VA	nutrient management hightill without manure	Cover Crop Early Drilled Rye	164.99	100	Culpeper Soil & Water Conservation District expects to see an increase to 100% application of cover crops by 2025.
Greene, VA	nutrient management hightill without manure	Soil Conservation and Water Quality Plans	130.9	79.34	No change from default.

ATTACHMENT 3

GREENE COUNTY
WIP ELEMENT #3 – PREFERED 2025 BMP SCENARIO

Geography*	Land Use Type	BMP Name	Acres of BMP Applied to Land Use (unless otherwise noted)	% BMP Applied to Land Use (unless otherwise noted)	Comments
Greene, VA	nutrient management lowtill with manure	Cover Crop Early Drilled Rye	335.74	100	Culpeper Soil & Water Conservation District expects to see an increase to 100% application of cover crops by 2025.
Greene, VA	nutrient management lowtill with manure	Soil Conservation and Water Quality Plans	266.38	79.34	No change from default.
Greene, VA	nutrient management pasture	Prescribed Grazing	658.55	60.8	No change from default.
Greene, VA	nutrient management pasture	Soil Conservation and Water Quality Plans	859.36	79.34	No change from default.
Greene, VA	pasture	Forest Buffers	338.74	2.87	No change from default. Based on PEC and CSWCD (1/9/12) mapping exercise of available stream bank on open ground in Greene County and assuming 30% of total is actually ag land, at 100% implementation, only 301.2 ac available. This is 25% of WIP I buffer implementation rate.
Greene, VA	pasture	Grass Buffers; Vegetated Open Channel - Agriculture	384.67	3.57	No change from default. Based on PEC and CSWCD (1/9/12) mapping exercise of available stream bank on open ground in Greene County and assuming 30% of total is actually ag land, at 100% implementation, only 301.2 ac available. This is 25% of WIP I buffer implementation rate.
Greene, VA	pasture	Land Retirement to hay without nutrients (HEL)	648.88	5.68	No change from default.
Greene, VA	pasture	Nutrient Management	1083.14	10.98	No change from default.
Greene, VA	pasture	Prescribed Grazing	5339.15	60.8	No change from default.
Greene, VA	pasture	Soil Conservation and Water Quality Plans	6967.24	79.34	No change from default.
Greene, VA	pasture	Tree Planting	525.75	5.06	No change from default.
Greene, VA	pasture	Wetland Restoration	40.12	0.35	No change from default.
Greene, VA	regulated construction	Erosion and Sediment Control	151.1	100	No change from default.
Greene, VA	Septic	Septic Connection	101.55 Systems	1.67	No change from default.
Greene, VA	Septic	Septic Denitrification	1221 Systems	20.42	No change from default.
Greene, VA	Septic	Septic Pumping	886.75 Systems	14.83	No change from default.

ATTACHMENT 4

GREENE COUNTY
ELEMENTS 4 and 5 - STRATEGIES and RESOURCE NEEDS

Virginia Phase II WIP Strategies Document

Introduction

EPA is requesting that states develop a Phase II Watershed Implementation Plan (WIP) that further articulates the Phase I WIP strategies employed locally to meet local implementation scenario for 2025. As Virginia and local stakeholders move forward in Phase II this document has been developed to provide examples of acceptable strategies for BMP implementation and capacity building efforts that may be considered for submission by localities. The strategies presented in this document are examples, not requirements, and provide a format for building and submitting local Phase II strategies. Localities, PDCs and SWCDs will meet submission requests for revised or enhanced BMP data and scenarios through the Virginia Assessment and Scenario Tool (VAST). Strategies and resources, like the examples provided, will be submitted through the DCR local engagement team staff using this formatted spreadsheet.While scenarios and strategies will not be shared with EPA on a locality-by-locality basis, it is important that they are provided to DCR in order to develop a Phase II plan showing local involvement and input.

The table below provides a format for selecting the "Type" of strategy being developed, "Implementation", "Capacity" building, or "New BMP", the "Source" sector this BMP strategy can be applied on, the "BMP", and a field for entering the "Strategy" for implementing the BMP. The final column is for entering "Resource Needs" to successfully implement the proposed strategy. There is a drop down menu in each cell except for "Strategy" and "Resource Needs". Please select the appropriate item in each cell and then enter in a brief sentence describing the "Strategy" and "Resources needed". A couple of examples have been entered in the green shaded cells below.

Strategy and Resources Reporting Template

STRATEGY TYPE	SOURCE	BMP	STRATEGY	RESOURCE NEEDS
BMP Implementation	Septic	Septic Connection	Limit the use of certain kinds of septic systems on slopes of 25% or greater to the extent allowable by State law (2010 Comp. Plan, p. 115).	Research local authority and examples of ordinances. Staff time. Consultant support.
BMP Implementation	Septic	Septic Connection	Consider requiring connection to public water and sewer within the water sewer service area (2010 Comp Plan, p. 132).	Statewide legislation and/or enabling legislation.
Capacity Building	Septic	Multiple	Capture VDH well and septic permit information as part of site plan review; capture and report the number of pumpouts and connections from VDH (VA WIP II draft, p. 20).	VDH state and regional offices need funding. Staff time.
Capacity Building	Septic	Multiple	Encourage and/or require VDH participation in local planning exercises.	VDH state and regional office support for localities.
BMP Implementation	Agriculture	Multiple	Promote use of riparian or vegetated buffers to a minimum width of 35-feet on either side of streams (2010 Comp Plan, p. 80).	Adequate SWCD and VCE funding. Statewide promotion.
BMP Implementation	Agriculture	Multiple	Encourage BMPs (no-till, contour plowing, cover crops that conserve soil integrity and health, rainwater filtration, and reduction of overland flow). (2010 Comp Plan, p. 80.)	Adequate SWCD and VCE funding. Statewide promotion.
BMP Implementation	Agriculture	Grass Buffers; Vegetated Open Channel - Agriculture	Minimize impact and preserve aesthetics of the rural countryside by buffers and natural vegetation screening (2010 Comp Plan, p. 115).	Planning and zoning requirements.
Capacity Building	Agriculture	Multiple	Continue to support the Agriculture and Natural Resources (ANR) programs at the Greene County extension office. Partner with VCE to help recruit young farmers reducing barriers to entry to farming (2010 Comp Plan, pp. 76, 80).	Federal funding.
Capacity Building	Agriculture	Multiple	Encourage organic and/or hydroponic farming (2010 Comp Plan, p. 80) with assurances for adequate water quality protection.	Marketing and partnerships with VCE, et al.
Capacity Building	Agriculture	Multiple	Encourage Greene County residents to participate in cost-sharing programs: (CRP), (CREP), (EQIP) (2010 Comp Plan, p. 80).	Adequate SWCD and VCE funding. Statewide promotion.
BMP Implementation	Agriculture	Multiple	Evaluate feasibility and effectiveness of retrofitting appropriate farm ponds as stormwater BMPs for credit.	Funding for pilot study. State endorsement.
New BMP	Construction	Erosion and Sediment Control	Consider amending the erosion and sediment control ordinance to require that all plans include a time limit by which all denuded terrain must be permanently re-vegetated (RCS Reducing Runoff Report, p. 16).	Staff time and Board approval. Contractor support. E&S ordinance amendment.
New BMP	Construction	Erosion and Sediment Control	Consider expanding the list of erosion control measures explicitly referenced in the form contract used for agreements-in-lieu-of-a-plan (RCS Reducing Runoff Report, p. 17).	Staff time and Board approval. Contractor support. Update measures identified in E&S form.
New BMP	Urban	Multiple	Consider lowering minimum parking space requirements for professional office space and retail buildings (RCS Reducing Runoff Report, p. 6).	Education. Staff time and Board approval. Amend Zoning Ordiance Sections 16-8-7 and 16-8-9.
New BMP	Urban	Multiple	Consider implementing a maximum limit on parking spaces and require mitigation measures when the maximum is exceeded (RCS Reducing Runoff Report, p. 7).	Education. Staff time and Board approval. Amend Zoning Ordiance Section 16-8.

ATTACHMENT 4

GREENE COUNTY
ELEMENTS 4 and 5 - STRATEGIES and RESOURCE NEEDS

Strategy and Resources Reporting Template				
STRATEGY TYPE	**SOURCE**	**BMP**	**STRATEGY**	**RESOURCE NEEDS**
New BMP	Urban	Multiple	Consider increasing landscaping requirements in new parking lots, and require the landscaped areas be designed to collect and filter runoff (RCS Reducing Runoff Report, p. 8).	Education. Staff time and Board approval. Amend Zoning Ordiance Section 19-6-4.
New BMP	Urban	Multiple	Consider explicitly allow perforated curbs along roadsides in the designated growth areas, and publish guidance documents demonstrating acceptable designs.	Education. Staff time and Board approval. Amend subdivision ordiance.
New BMP	Urban	Multiple	Explicitly allow landscaped islands in the middle of cul-de-sacs, and publish guidance demonstrating how the islands can be outfitted with LID stormwater treatments (RCS Reducing Runoff Report, p. 11).	Education. Staff time and Board approval. Amend subdivision ordiance.
New BMP	Urban	Urban Tree Planting; Urban Tree Canopy	Explore adopting a canopy requirement and related incentives to preserve existing trees on new development sites. Explore adopting a tree conservation ordinance and designate specific trees for protection (RCS Reducing Runoff Report, pp. 11-12).	Education. Staff time and Board approval. Adopt a canopy requirement as authorized by Code of Virginia § 15.2-961.1.
New BMP	Urban	Multiple	Consider ways to improve open space requirements to increase pervious surfaces. (RCS Reducing Runoff Report, p. 14.)	Education. Staff time and Board approval.
New BMP	Urban	Multiple	Develop and publish guidance on low-impact development options. RCS Reducing Runoff Report, p. 14 and 2009 RRBC Menu of Practices).	Education. Staff time and Board approval. Contractor support.
New BMP	Urban	Multiple	Discourage road construction on slopes of 15% or greater (2010 Comp Plan, p. 115). Permitted roads should follow the natural topography and minimize grading, cutting, and filling as much as possible.	Staff time and Board approval. Contractor support. Education.
New BMP	Urban	Multiple	Promote conservation/cluster development to protect sites sensitive natural resources for residential development in rural areas (2010 Comp Plan, p. 115).	Staff time and Board approval. Contractor support. Education.
New BMP	Urban	Multiple	Consider requiring a hydrological study for developments of 10 or more homes in A-1 or C-1 zones (2010 Comp Plan, p. 115).	Education. Staff time and Board approval. Contractor support.
New BMP	Urban	Multiple	Consider requiring landowner to demonstrate that the well provides adequate water prior to issuing a building permit in areas not served by central water (2010 Comp Plan, p. 115).	Education. Staff time and Board approval. Contractor support.
New BMP	Urban	Multiple	Discourage excessive changes to the existing topography or tree cover, particularly outside designated growth areas (2010 Comp Plan, p. 115).	Education. Staff time and Board approval. Contractor support.
BMP Implementation	Urban	Nutrient Management	Consider requiring nutrient management on golf courses prior to 2017.	May require authorizing legislation
BMP Implementation	Urban	Multiple	Consider establishing impervious cover limits or open space requirements that preserve and restore site hydrology and implement BMPs necessary to control the discharge of pollutants in stormwater to a greater extent	May require authorizing legislation
Capacity Building	Urban		Promote outreach to developers, planning commissioners, elected officials on the cost savings associated with LID.	Education. Staff time. Contractor support.
Capacity Building	Urban	Multiple	Consider adopting VA Stormwater Management Regulations prior to 2014 (not presently mandatory for non-Bay Act, non-MS4 localities)	Accelerate review of codes & ordinances; establish institutional structures; funding to start the process.
Capacity Building	Urban	Multiple	Consider adopting stricter ordinances requiring the installation of BMPs in existing urban areas.	Accelerate review of codes & ordinances; establish institutional structures; funding to start the process.
Capacity Building	Urban	Multiple	Consider establishing stormwater utility fees, service districts, or pro-rata fee programs to address sediment and nutrient loads associated with stormwater runoff.	Accelerate review of codes & ordinances; establish institutional structures; funding to start the process.
Capacity Building	Urban	Multiple	Encourage corporate stewardship through proffers and other incentives; encourage Corporate Stewardship on Public Lands (VDGIF).	
New BMP	Urban	Multiple	Encourage the construction of "Green Streets" with minimal impervious surfaces.	New Ordinance; Administrative Time
New BMP	Urban	Impervious Urban Surface Reduction	Explore incentives to utilize green roofs, rainwater harvesting systems, and other low-impact development practices (RCS Reducing Runoff Report, p. 14).	
New BMP	Urban	Multiple	Require that 20% of spaces within larger parking lots be designed to "compact car" dimensions (8' X 16') (RCS Reducing Runoff Report, p. 6).	Amend section 16.8 of the zoning ordinance to require that 20% of the parking spaces within parking lots of 10 or more spaces be designed to a "compact car" set of dimensions (8' X 16'), and be marked for use by compact cars only.
Capacity Building		Multiple	Utilize proffer guidelines to promote stormwater management enhanced techniques, especially to meet redevelopment goals.	Proffer development. Staff time. Contractor support.

ATTACHMENT 4

GREENE COUNTY
ELEMENTS 4 and 5 - STRATEGIES and RESOURCE NEEDS

Strategy and Resources Reporting Template				
STRATEGY TYPE	**SOURCE**	**BMP**	**STRATEGY**	**RESOURCE NEEDS**
BMP Implementation	Multiple	Multiple	Implement RRBC Menu of Stormwater Practices	Proffer development. Staff time. Contractor support.
BMP Implementation	Multiple	Multiple	Promote the voluntary establishment of new riparian buffers around 3rd order streams to protect valuable surface water resources and maintain existing riparian buffers.	New Ordinance; Administrative Time. Education. Staff time. Contractor support.
BMP Implementation	Multiple	Multiple	Implement a comprehensive buffer ordinance to protect water quality and the water supply. (RCS Reducing Runoff Report, p. 18.)	New Ordinance. Administrative Time. Education. Staff time. Contractor support.
BMP Implementation	Multiple	Multiple	Establish requirements for enhanced vegetation and native plantings within required open space and pervious areas to boost function of pervious areas.	May require authorizing legislation
Capacity Building	Multiple	Multiple	Continue to support the "Special Assessment for Land Preservation" land use taxation and promote awareness of tax incentives for farmers (2010 Comp Plan, p. 40, 77, 80).	Education. Staff time.
Capacity Building	Multiple	Multiple	Evaluate the fiscal impact of using land use taxation to require conservation practices (VA WIP II draft, p. 13).	VA legislative authority
Capacity Building	Multiple		Continue to support Agricultural and Forestal Districts (2010 Comp Plan, p. 77).	Education. Staff time.
Capacity Building	Multiple	Multiple	Consider adopting Watershed Protection Design Standard (2010 Comp Plan, p. 115).	Work with Center for Watershed Protection
Capacity Building	Multiple	Multiple	Cultivate awareness and practice of water conservation (2010 Comp Plan, p. 115).	
Capacity Building	Multiple	Multiple	Obtain grants to implement recommended stormwater retrofits on public lands (RRBC/CWP Retrofit Opportunities (2010)).	Dedicated grant writer for Greene County
Capacity Building	Multiple	Multiple	Develop and implement trash/waste BMPs as recommended by RRBC/CWP Retrofit Opportunities on Public Lands (RRBC/CWP Retrofit Opportunities (2010).)	Staff time
Capacity Building	Multiple	Multiple	Consider adopting Chesapeake Bay Preservation Act.	Education. Staff time and Board approval.
New BMP	Multiple	Multiple	Encourage conservation easements.	Partner with other organizations to encourage conservation easements for agriculture and forestry. Education. Staff time.
New BMP	Multiple	Multiple	Study the feasibility of administering TDRs and the financial commitment involved in PDR programs (2010 Comp Plan, p. 41).	
New BMP	Multiple	Multiple	Create an Urban Development Area (UDA) to accommodate anticipated residential, commercial, and growth period of at least 10 but no more than 20-years. Concentrate future development into growth areas. Ensure "Critical Environmental Areas" marked on the Green Infrastructure Network lie outside the Future Land Use Growth Areas.	Education. Staff time.
New BMP	Multiple	Multiple	Consider initiating a Mountain Protection Plan process (2010 Comp Plan, p. 115).	