DEPARTMENT OF ENVIRONMENTAL PROTECTION

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Attachment to the Final Water Quality Plan for Clarksburg Town Center Phase II
Description of Monitoring Requirements

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The purpose of this attachment is to add specificity to the county BMP monitoring protocols and to the BMP monitoring plan described in the addendum to the FWQP for Clarksburg Town Center Phase II. Some supplemental monitoring, QA/QC, data analysis, reporting and record keeping tasks will be explained in this attachment.

This BMP monitoring is being done to address whether the site performance goals outlined in the addendum to the FWQP for Clarksburg Town Center Phase II were met or not. The purpose of the data analysis and reporting is to describe quantitatively how the performance goals were met. Monitoring efforts and reports must employ scientific methods in an attempt to determine effectiveness of BMPs. Monitoring is to be done according to DEP BMP Monitoring Protocols. However, these monitoring protocols are intended to provide a framework only. Some supplemental requirements are provided in this attachment. Thorough and careful analysis of data is required. Data analysis methods employed may vary depending on the results obtained. Methods and assumptions should be detailed. DEP BMP Monitoring Protocols are available at http://www.co.mo.md.us/services/dep/Publications/pdf%20files/bmpprotocols.pdf

Specific Monitoring Requirements

1. BMP monitoring reports must include a table with dates of all major construction activities which take place on the site. (Groundbreaking, clearing, grading, BMP construction, BMP conversion, pond maintenance, sediment spills and cleanup, etc.)

2. Annual base flow and flow-weighted stormwater samples will continue to be collected as during pre-construction. Results should be compared to previous results to determine the effects of BMPs and the project overall.

3. Continuous flow data will be collected as during pre-construction. Results will evaluate the effect of BMPs and the project on stream flows. Lag times, base flows, storm peaks, and other parameters will examined and compared to pre-construction conditions.

4. Stream water temperatures will be monitored at the three locations designated during the pre-construction period. This monitoring will occur from June 1 through October 1 each year. Equipment accuracy is to be checked prior to use in spring. An accuracy check after retrieval in fall may be necessary depending on results obtained. Consult with equipment manufacturer or DEP for appropriate procedures. All accuracy checks are to be submitted with data analysis and reports. Temperature loggers should be set to take readings as frequently as possible. Consult with DEP if readings will be taken less frequently than every 30 minutes. Data from the loggers is to be closely compared to preconstruction conditions to identify any patterns indicating temperature impacts of the project. Rainfall, air temperature and flow data should be considered in the analysis. Rain and temperature gages will be maintained on the site to collect the relevant data. Analysis should be presented with illustrative graphs and conclusions regarding BMP effectiveness.

5. TSS grab sample locations will be established at a sediment pond on the site during construction. Exact sampling locations will be determined by DEP in the field to allow evaluation of the effectiveness of redundant sediment traps. Sampling is to be done quarterly during storm events throughout the construction phase. Storms should have at least one half inch of rainfall in a 24 hour period to be counted towards this requirement. Samples should be collected within 24 hours after the storm. The storms during which the data was collected should also be characterized for duration and total rainfall. Storm frequency (return interval) should be reported as described in Technical Paper #40 of USDOC Weather Bureau. Results should be examined to determine the efficiency of the structure and percent removal of pollutants. Data should be compared to past periods and graphs should be provided to support conclusions.

6. Quarterly photographic monitoring of selected outfalls will be required to determine the stability of the area. DEP will locate sites for these photos in the field with the consultant. Photos should be taken from the same location, height, etc. to facilitate comparison. An object of known size should be included with each shot to provide a frame of reference. Reports should evaluate whether flows from the structure are causing erosion or instability.

7. Embeddedness readings will continue as during pre-construction. Photos of the stream bottom should be taken concurrently with embeddedness readings. Reports should compare pre-construction data with data collected during subsequent periods to evaluate the effect of the project. Graphs should be presented along with conclusions.

8. Groundwater monitoring will continue as during pre-construction. Actual elevation of the groundwater should be reported as well as the depth to water from the ground surface. Data should be analyzed to determine the effectiveness of site design and stormwater management in providing infiltration and maintaining groundwater levels. Data from the pre-construction period should be compared to results obtained in subsequent periods. Graphs should be provided to support conclusions.

9. Cross sections established during pre-construction will be monumented and surveyed annually. Data will be plotted and compared over time to evaluate channel stability in the tributary. Photos of the cross section looking upstream and downstream should be collected annually also. Photos should be taken from the same location, height, etc. to facilitate comparison. An object of known size should be included with each shot to provide a frame of reference. Reports should evaluate whether the BMPs are effectively preventing degradation of the channel.

10. Sampling of water quality BMP's will be performed to ascertain their effectiveness and the benefits of redundant design. Grab samples will be collected from the baseflow of pond 3. Automated flow-weighted stormwater samples will be collected from additional BMPs (bioretention filters, groundwater recharge trenches, clean water recharge trenches and sand filters) at inflow and outflow points. Stormwater samples require 0.5 to 1 inch of rain over a 24 hour period not to exceed one inch over 24 hours. Reports should include information on the duration, total rainfall and return interval of the storm based on the site rain gage. Samples will be analyzed for TSS, nitrate, ortho-phosphorus, metals, BOD, TKN, total phosphorus, petroleum hydrocarbons and herbicides/pesticides. Loadings should be estimated where possible and comparisons made to published results for other BMP designs.

Monitoring requirements 1 through 9 will be in effect throughout the construction period. Following completion of construction, TSS monitoring of the sediment pond (requirement 5) will terminate. Post-construction monitoring (requirements 1-4, and 6-9) will continue for five years after construction. Sampling of water quality BMPs (requirement 10) will also have a duration of five years. Reports on BMP monitoring are due to DEP by May 30 and October 31 of each year. County code requires that reports be submitted quarterly. These quarterly reports may be incorporated in these semi-annual reports. This should be reflected in the title of the documents. BMP monitoring reports are to be delivered with data in an electronic format to Mark Sommerfield at Montgomery County DEP and also to Leo Galanko at Montgomery County DPS. Monitoring requirements 1 through 9 above will be in effect throughout the construction phase of the project. Post construction monitoring TSS readings from the sediment ponds (requirement #5) will not be required. The other monitoring requirements will be in effect for three years after the development is completed. Questions on the monitoring requirements and procedures may be directed to the following personnel.

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