These are excerpts from the Chesapeake Bay Phase 5.3 Community Watershed Model 6-1. They are referenced in the 12-SW permit as options for consideration.

# SECTION 6. BEST MANAGEMENT PRACTICES FOR NUTRIENTS AND SEDIMENT

## 6.7.3 Erosion and Sediment Control of Construction Sites

Developing land for industrial, commercial, or residential uses include activities such as clearing and grading. Removing vegetation and disturbing soil from development and construction leave soil exposed and susceptible to erosion by wind and water. Nitrogen and phosphorus can also be transported from development sites via adsorption to eroded soil particles or dissolution in runoff from exposed areas. Erosion and sediment control practices protect water resources from sediment pollution and increases in runoff associated with land development activities. By retaining soil on-site, sediment and attached nutrients are prevented from leaving disturbed areas and polluting streams.

The water quality functions of erosion and sediment control BMPs result from diversion of surface runoff treatment areas (e.g. using terracing, berms, or swales), reducing water velocity (e.g., using check dams), filtration (e.g., by silt fences), and by removing suspended particle via settling or infiltration. Grasses are often planted on exposed soils, sometimes stabilized with nets or mats, to reduce erosion, and in swales to reduce velocity by increasing roughness of the surface. Nitrogen and phosphorus can be removed via settling of particulate forms and plant and microbial uptake. Phosphorus can also sorb to soil particles. Significant removal of nitrate is unlikely because the aerobic soil conditions are not favorable to microbial denitrification (an exception would be sediment ponds with permanent standing water). The combined effect of these types of BMPs are likely to promote infiltration, reduce runoff velocity, and store surface runoff water, attenuating flood peaks resulting from storms. That hydrologic function is considered a water quality function that helps to reduce stream channel incision, bank erosion, and loss of in-stream habitat structures that is typical of streams in urban areas with extensive watershed areas covered by impervious surfaces such as building, roads, and parking lots (Schueler 1994).

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| Definition: | Erosion and sediment control practices protect water resources from sediment pollution and increases in runoff associated with land development activities. By retaining soil on-site, sediment and attached nutrients are prevented from leaving disturbed areas and polluting streams. |
| Land use: | *bare-construction (bar)* and *low-intensity developed pervious (pul)* |
| Efficiency credited: | Efficiency |
| Effectiveness estimate: | TN: 25%, TP: 40%, TSS: 40% |
| Reference: | UMD/MAWP |

## 6.7.10 Urban Nutrient Management

Urban areas are divided into pervious and impervious urban areas in the Chesapeake Bay Watershed Model. Pervious urban areas account for suburban areas, parks, lawns, and areas in

which water is able to percolate through the soil. Alternatively, impervious urban land are areas such as roads, paved lots, and rooftops where water is unable to percolate through the soil profile. These lands use groups are derived from CBP Land Use (CBPLU) categories and are described in Watershed Model Appendix E: Watershed Land Uses and Model Linkages to the Airshed and Estuarine Models. The following equations use CBP Land Use estimates to calculate the two categories of urban areas:
(2) Pervious Urban = (CBPLU High Intensity Urban × 0.15) + (CBPLU Low Intensity Urban × 0.6) + (CBPLU Herbaceous Urban × 0.9) + (CBPLU Urban × 0.9) + (CBPLU Exposed × 0.6)

(3) Impervious Urban = (CBPLU High Intensity Urban × 0.85)+(CBPLU Low Intensity Urban× 0.4) + (CBPLU Herbaceous Urban × 0.1) + (CBPLU Urban × 0.1) + (CBPLU Exposed × 0.4)

Generally, on a portion of pervious urban acres including some lawns, golf courses, and portions of park land, intensive turf management practices are applied. For those areas, an estimated recommended fertilizer application is 130 pounds of nitrogen/acre. A portion of the pervious urban areas has little or no turf maintenance and has fertilizer applied only once every 3 years, if at all. Such areas can include lawns, medians of highways, roadside rights of way, and portions of parks. Considering the differences in the amount of fertilizer applied to various types of pervious land and the limitation of the use of the various types of urban land use averaged to represent a single urban land use, an average fertilizer application of 50 pounds of nitrogen/acre/year is applied to all pervious land in the Phase 5.3 Watershed Model. Fertilizer is usually applied during the spring and early fall. For that reason, the timing of fertilizer applications are split into eight periods each with a distribution of 10 days. The applications begin on the following days and last for 10 days; March 9, April 9, May 9, June 9, July 9, August 9, September 9, and October 9. With the implementation of the urban nutrient management practice, a reduction of urban fertilizer is applied. Urban nutrient management involves public education (targeting urban/suburban residents and businesses) to encourage reduction of excessive fertilizer use. The CBP Nutrient Subcommittee's Tributary Strategy Workgroup has estimated that urban nutrient management reduces nitrogen loads by 17 percent and phosphorus loads by 22 percent.

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| Definition: | Urban nutrient management involves the reduction of fertilizer to grass lawns and other urban areas. The implementation of urban nutrient management is based on public education and awareness, targeting suburban residences and businesses, with emphasis on reducing excessive fertilizer use |
| Land use: | *high-intensity developed pervious (puh)* and *low-intensity developed pervious (pul)* |
| Efficiency credited: | Efficiency |
| Effectiveness estimate: | TN: 17%, TP: 22%, TSS: N/A |
| Reference: | Appendix H |