Technical Memorandum_____

Significant Biochemical Oxygen Demand Point and Nonpoint Sources in the Western Branch Watershed, Prince George's County Maryland

EPA requires that Total Maximum Daily Load (TMDL) allocations account for all significant sources. This technical memorandum identifies significant nonpoint sources and their distribution between different sub-watersheds. Biochemical oxygen demand (BOD) is addressed by the TMDL for Western Branch. Details are provided for allocating BOD to the mainstem of Western Branch and the Charles Branch tributary. This technical memorandum also identifies significant surface water discharges of BOD to the system in question. Modeling input information is provided for simulating all potentially significant point sources as discrete discharges. These are conceptual values that are within the TMDL thresholds. They represent viable individual allocations to each nonpoint source and point source. The Maryland Department of the Environment (MDE) expressly reserves the right to allocate the TMDL among different sources in any manner that is reasonably calculated to achieve water quality standards.

A TMDL is being established in the Western Branch watershed for low flow conditions. The nonpoint source loads that were used in the model account for both "natural" and human-induced components, and were based on in-stream monitoring data. Insufficient data are available to distribute the nonpoint source load among different land use categories.

For low flow conditions, the nonpoint source BOD loads were determined using a variety of information sources, including a data analysis of in-stream BOD concentrations provided to MDE by Mou-Soung Cheng of Prince George's County in a correspondence dated January 19, 1999. Other nonpoint source loadings to the stream (nitrogen, phosphorus, chlorophyll *a*, and dissolved oxygen) were obtained from water quality monitoring station WXT0045 on the Western Branch near Upper Marlboro, and represent low stream flow concentrations.

Table 1A provides one possible scenario for the distribution of BOD nonpoint source loads to the Western Branch mainstem and Charles Branch. Table 2A provides one possible scenario for the distribution of BOD to point sources for the low flow TMDL. These are supplemented by Tables 1B and 2B, which provide additional modeling information attributed to each point and nonpoint source for the low flow TMDL calculation.

Table 1A
Loads Attributed to Significant Nonpoint Sources for Low Flow BOD TMDL[a]

Source Name	**BOD Load** *lb/month*	**Flow** *cfs*	**Concentration** *mg/l*
Western Branch Mainstem	970	3	2.0
Charles Branch	70	0.22	2.0
Subtotal	1,040		
Future Allocation	4,680		
Grand Total	5,720		

a. This case corresponds to model scenario 7, not including the margin of safety.

Table 1B
Additional Nonpoint Source Assumptions for the Low Flow TMDL[a]

		Western Branch Mainstem	**Charles Branch**
BOD_5	*mg/l*	11.6	11.6
DO	*mg/l*	7.95	8.05
Chlorophyll *a*	*ug/l*	9.42	46.4
NH_3	*mg/l*	0.07	0.113
ON	*mg/l*	0.65	0.512
NO23	*mg/l*	0.24	0.25
PO_4	*mg/l*	0.02	0.11
OP	*mg/l*	0.08	0.08
Flow	m^3/s	0.0849	0.0062

a. This case corresponds to model scenario 7, not including the margin of safety.

It must be noted that the nonpoint source BOD loads are based on in-stream concentrations. MDE anticipates that better estimates of land use and loading rates will be available in the future.

Table 2A
Loads Attributed to Significant Point Sources for Low Flow BOD TMDL[a]

Source Name	**Permit Number**	**BOD Load** *lb/month*	**Flow** *mgd*	**Concentration** *mg/l*
Western Branch WWTP	MD0021741	75,060	30	10
Croom Manor Housing WWTP	MD0063967	15	.004	15

a. This case corresponds to model scenario 7, not including the margin of safety.

Table 2B
Additional Point Source Assumptions for the Low Flow TMDL[a, b]

		Western Branch WWTP	Croom Manor Housing WWTP
BOD_5	*kg/d*	1137	0.227
DO	*mg/l*	7.0	5.0
NH_3	*kg/d*	227	0.058
ON	*kg/d*	56.9	0.022
NO23	*kg/d*	56.9	0.281
PO_4	*kg/d*	102.4	0.0234
OP	*kg/d*	11.3	0.0032
Flow	m^3/s	1.314	0.00018

a. This case corresponds to model scenario 7, not including the margin of safety.
b. 1 kg = 2.2 lb

The loadings, concentrations, and flows represented in the above tables are for illustrative purposes only. Actual effluent limits and related permit conditions will be established at the time of permit issuance or renewal and will be based upon conditions present at that time, as reflected in populations projections, infrastrucure needs as defined in County Comprehensive Water and Sewer Plans, and appropriate concentrations and loadings needed to address impairments of the water quality limited segments identified by this TMDL and the applicable 303(d) list. The total load reductions from all sources will, however, remain the same as the subtotals and grand totals reflected on the charts. Point source loadings, flows, and concentrations placed in permits will be based upon the information listed above as well as that provided during the public participation process.