Appendix H

Technical Requirements to Enter ESC Practices into Scenario Builder and the Phase 5.3.2 Watershed Model

Presented to WTWG for Review and Approval: April 8, 2014

Background: In June, 2013 the Water Quality Goal Implementation Team (WQGIT) agreed that each BMP expert panel would work with CBPO staff and the Watershed Technical Workgroup (WTWG) to develop a technical appendix for each expert report. The purpose of this technical appendix is to describe how the Erosion and Sediment Control Expert Panel's recommendations will be integrated into the modeling tools including NEIEN, Scenario Builder and the Watershed Model.

Q-1: What are the efficiency reductions a jurisdiction can claim for qualifying acres of erosion and sediment control?

A-1: Table 1 below lists the nutrient and sediment reductions a jurisdiction can claim for each acre of erosion and sediment control. Please note the descriptions of the efficiency reductions for the Phase 6 Model.

Table 1. Reduction Efficiencies for ESC Practices in the Watershed Model

Sediment and Nutrient Removal Rates for Construction Sites with Erosion and Sediment Control Practices (%)						
Practice Type	**Sediment**		**Nitrogen**		**Phosphorus**	
	Phase 5.3.2	**Phase 6**	**Phase 5.3.2**	**Phase 6**	**Phase 5.3.2**	**Phase 6**
Level 1 ESC	40	74/0*	25	0 **	40	0 **
Level 2 ESC	65	85/42*	25	0 **	40	0 **
Level 3 ESC	77	90/58*	25	0 **	40	0 **

**The reductions are listed for two possible base conditions. The first is a reduction from a construction site without ESC practices, while the second is a reduction from a construction site with Level 1 ESC practices. The ultimate Phase 6 loading rates will be selected by the Modeling Workgroup and will be subject to Water Quality GIT approval.*

*** The expert panel proposed that the zero removal rate be applied to the current nutrient loading rates for construction land in Phase 6 of the CBWM unless new monitoring data acquired between now and then provides strong evidence that the target nutrient loads from construction sites with Level 2 or Level 3 ESC practices should be increased or decreased. The ultimate Phase 6 loading rates will be selected by the Modeling Workgroup and will be subject to Water Quality GIT approval.*

Q-2: Why do the sediment reduction efficiencies reported in Table 1 differ from reduction efficiencies found by the expert panel?

A-2: The expert panel report found that Level 1 ESC practices reduced 74% of the sediment load from construction sites, while Level 2 ESC practices reduced 85% of the sediment load, and Level 3 ESC practices reduced 90% of the sediment load (Executive Summary, p.4). However, Level 1 practices were already reported and credited with reducing 40% of the sediment load from construction sites in the Phase 5.3.2 Watershed Model's calibration period of 1985 through 2005. Therefore, the Urban Stormwater Workgroup agreed to set the panel's recommendations for reduction efficiencies relative to the current Phase 5.3.2 Watershed Model reduction efficiencies.

Level 1 ESC Practices will continue to reduce 40% of the sediment load from construction sites, while Level 2 ESC practices will reduce 65% of the sediment load, and Level 3 ESC practices will reduce 77% of the sediment load. An example of methods and equations used to derive the ESC practice reduction efficiencies is included below:

- Panel found that Level 1 ESC allowed **26%** of load to go untreated. Equation: *(1-0.74)*
- Panel found that Level 2 ESC allowed **15%** of load to go untreated. Equation: *(1-0.85)*
- Thus, Level 2 ESC allowed only **58%** of the Level 1 untreated load. Equation: *(0.15/0.26)*
- Phase 5.3.2 allows **60%** of load to go untreated. Equation: *(1-0.4)*
- Multiplying **60%** by **58%** gives us an untreated load of **35%** for Level 2 ESC practices.

  THEREFORE,
- Level 1 ESC will be seen in the Model as the current **40%** reduction in load.
- Level 2 ESC will be seen in the Model as a **65%** reduction in load, or leaving 35% of the load as untreated.

Q-3: Why do the nutrient reduction efficiencies reported in Table 1 differ from efficiency reductions found by the expert panel?

A-3: The expert panel report found that all levels of ESC practices reduced 0% or nutrients from construction acres due to high levels of fertilization and wash-off of nutrients (Executive Summary, p.5). However, Level 1 ESC practices were credited in the Phase 5.3.2 Watershed Model calibration period with reducing 25% of nitrogen loads and 40% of phosphorus loads from construction lands. Therefore, the Urban Stormwater Workgroup agreed not to penalize jurisdictions by removing nutrient reductions from current practices. All levels of ESC practices will continue to receive 25% reductions in nitrogen loads and 40% reduction in phosphorus loads from construction acres until the Watershed Model is recalibrated in 2017.

Q-4: How are the load reductions for ESC practices actually calculated in the modeling tools?

A-4: The total reductions to loads are determined by the Watershed Model as the product of the efficiency reduction listed in Table 1, the acres of construction land within the model segment, and the total nitrogen, sediment and phosphorus loads simulated for those acres.

Q-5: Is there any change to the reductions for existing ESC practices credited in the before 2005? Is there any change to the reductions for existing ESC practices credited between 2006 and 2013?

A-5: The expert panel defined all ESC practices currently within the modeling tools with dates prior to 2005 as Level 1 ESC, (Section 2.1, p. 11) and the Stormwater Workgroup recommended no change to the sediment and nutrient reductions for these acres of existing ESC practices. As part of the process to clean up historic BMP data, jurisdictions should revise their ESC practices currently in NEIEN with implementation dates from 2006 through 2013 by changing the practice BMP Name to "Level 2 Erosion and Sediment Control." Additionally, all acres submitted for 2014 Progress should be reported as "Level 2 Erosion and Sediment Control." (See Q-7 for more detailed reporting requirements.)

Q-6: What are the definitions of the three ESC practice levels available for credit in the modeling tools?

A-6: The panel provided the following definitions for each practice level:

Level 1 ESC: Includes ESC practices implemented under historical performance standards from approximately 2000 or before. The sediment trapping requirements were typically 1800 cubic feet/acre, stabilization requirements were less rapid, and inspections occurred less frequently, among other factors. At one point, all the Bay states operated at this performance level; none of them are doing so now. Level 1 ESC practices are assumed during the calibration phase of the CBWM (1985-2005), (Section 2.1, p. 11).

Level 2 ESC: This level of performance reflects the more stringent ESC requirements that have been adopted by local and state governments in the Bay watershed over the last several years, and generally conform to the standard requirements in EPA's 2012 Construction General Permit. These include a greater sediment treatment capacity (typically 3600 cubic feet/acre), surface outlets, more rapid vegetative cover for temporary and permanent stabilization, and improved design specifications for individual ESC practices to enhance sediment trapping or removal. In addition, many states now have construction phasing requirements for larger sites and all require more frequent self-inspections and regulatory inspections. As of this writing, all Bay states are operation at this level of performance (Section 2.1, pp. 11-12).

Level 3 ESC: This level of performance reflects the gradual shift in several Bay states to improve performance by expanded use of passive chemical treatment within Level 2 ESC practices. Chemical treatment involves the passive use of polyacrylamide (PAM) and other flocculants. The treatment relies solely on gravity to does the sediments in

construction site runoff (e.g., adding PAM granules to a check dam, erosion control fabric, or running basin flows across a block or sock containing flocculants).

This approach also integrates other design features to enhance the performance of individual practices, such as skimmers, baffles, surface outlets, compost, and stronger geo-textiles. Level 3 also involves more frequent inspection and maintenance, and more stringent requirements for phasing and resource protection. While several Bay states are experimenting with some of these techniques, none of them are currently requiring them on a widespread basis. Therefore, no Bay state yet qualifies for Level 3 practice at this time (Section 2.1, p.12).

Q-7: What do jurisdictions need to report to NEIEN in order to receive credit for ESC practices in the modeling tools?

A-7: Jurisdictions should report the following information:

BMP Name: Erosion and Sediment Control; Level 2 Erosion and Sediment Control; or Level 3 Erosion and Sediment Control
Acres: Number of acres tracked within the reported geographic unit
Location: Approved NEIEN geographies include: County; County (CBWS Only); Hydrologic Unit Code (HUC12, HUC10, HUC8, HUC6, HUC4); or State (CBWS Only)
Date of Implementation: Year the practice was installed/permitted

Q-8: Can jurisdictions continue to submit construction acres to CBP staff each year to replace the default construction acres in the modeling tools?

A-8: Yes. States may submit aggregated permitted construction acreage at approved geographic levels every year. These acres should be based on acres permitted under the construction general permit (Section 7.2, p. 40). These construction acres should be submitted to the CBP by August 31 of each progress reporting year. The panel agreed the CBP should continue to use projected construction acres based on the method for estimating changes in impervious cover for jurisdictions that do not submit construction acres in any given year (Section 7.2, p. 41).

Q-9: Are construction acres eligible for the urban nutrient management plan BMP?

A-9: Yes. The WTWG agreed that construction sites with a **qualifying urban nutrient management plan** would be eligible for a nutrient reduction credit, as defined by the Urban Nutrient Management expert panel. These reductions would reflect better nutrient management on pervious areas of the construction site.