

Appendix G

Technical Requirements to Enter Advanced On-Site Wastewater Treatment Practices into Scenario Builder and the Phase 5.3.2 Watershed Model

Presented to WTWG for Review and Approval: May, 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 panel report. The purpose of this technical appendix is to describe how the Onsite Wastewater Treatment Expert Panel's recommendations will be integrated into the modeling tools including NEIEN, Scenario Builder and the Watershed Model.

Q1. What are the efficiency reductions a jurisdiction can claim for the advanced on-site waste treatment systems (advanced septic systems) in the Phase 5.3.2 Watershed Model?

A1. The panel's recommendations include 20 distinct combinations of in situ and ex situ practices that reduce septic nitrogen loads beyond a conventional septic system. The information in the table below was taken from Table ES-1-3 in the expert panel report (p. 11). The qualifying technologies for each ex situ and in situ practice are described in Answer 2 below.

Table 1. Percent Nitrogen Reductions for New Septic System Treatment BMPs

NEIEN BMP Name	Scenario Builder BMP Name	Percent Nitrogen Reduction
Septic Effluent with Shallow Pressure	Septic Effluent with Enhanced In Situ	38%
Septic Effluent with Elevated Mound	Septic Effluent with Enhanced In Situ	38%
NSF 40	Secondary Treatment with Conventional In Situ	20%
NSF 40 with Shallow Pressure	Secondary Treatment with Enhanced In Situ	50%
NSF 40 with Elevated Mound	Secondary Treatment with Enhanced In Situ	50%
IMF	Secondary Treatment with Conventional In Situ	20%
IMF with Shallow Pressure	Secondary Treatment with Enhanced In Situ	50%
IMF with Elevated Mound	Secondary Treatment with Enhanced In Situ	50%
Constructed Wetland	Secondary Treatment with Conventional In Situ	20%
Constructed Wetland with Shallow Pressure	Secondary Treatment with Enhanced In Situ	50%
Constructed Wetland with Elevated Mound	Secondary Treatment with Enhanced In Situ	50%

RMF	50% Denitrification Unit with Conventional In Situ	50%
RMF with Shallow Pressure	50% Denitrification Unit with Enhanced In Situ	69%
RMF with Elevated Mound	50% Denitrification Unit with Enhanced In Situ	69%
IFAS	50% Denitrification Unit with conventional In Situ	50%
IFAS with Shallow Pressure	50% Denitrification Unit with Enhanced In Situ	69%
IFAS with Elevated Mound	50% Denitrification Unit with Enhanced In Situ	69%
Proprietary Ex Situ	50% Denitrification Unit with Conventional In Situ	50%
Proprietary Ex Situ with Shallow Pressure	50% Denitrification Unit with Enhanced In Situ	69%
Proprietary Ex Situ with Elevated Mound	50% Denitrification Unit with Enhanced In Situ	69%

Q2. What technologies qualify for the reductions listed in the table above?

A2. Qualifying technologies are listed below.

Secondary Treatment– Pre-treatment practices are those occurring prior to dispersing effluent into the soil treatment unit. Secondary ex situ systems include: certified, NFS 40 Class I or equivalent systems; intermittent media filters (IMF); and constructed wetlands (p. 29-30). Additional details about these systems are provided in the expert panel report.

50% Denitrification Units– Pre-treatment practices are those occurring prior to dispersing effluent into the soil treatment unit. 50% Denitrification ex situ systems include: recirculating media filters (RMF); Anne Arundel County Integrated Fixed-Film Activated Sludge (IFAS). Many proprietary treatment systems also exist that offer 50% denitrification (p. 30). The proprietary treatment systems that fall into this category will generally be verified through a two step process that includes a controlled test condition and then a field test condition. Additional details about these systems are provided in the expert panel report.

Enhanced In Situ – In situ processes are those occurring after ex situ treatment, within the soil treatment unit. These practices include shallow-placed, pressure-dosed dispersal units and elevated sand mounds with pressure-dosed dispersal (p. 31). Additional details about these systems are provided in the expert panel report.

Proprietary Systems –Proprietary technologies exhibiting a reduction of total nitrogen greater than 50% will be assigned a total nitrogen reduction credit of 50% in the watershed model. It is up to each jurisdiction to determine which systems exhibit a reduction of 50% or greater based upon third-party monitoring. Additional details about third-party monitoring protocols can be found in Section 3.2.1.

Q3. How do these new BMPs interact with the existing reductions for disconnections, septic pumpouts and de-nitrification systems?

A3. The septic disconnection (sewer connection) BMP will be simulated prior to any existing or new septic BMPs. The panel recommended that the 5% credit for septic pumpouts for conventional septic systems should remain within the modeling tools. The panel recommended this credit should only be reported once every five years for any given system, and the credit should only apply in the model for the year reported. Additionally, the panel recommended septic pumpout credits should not be available for systems claiming a credit through a BMP above p. 29).

The septic de-nitrification BMP currently in the model will be replaced by the 9 new system types that also reduce N by 50%. Jurisdictions should no longer report the de-nitrification BMP for progress or planning purposes. Existing de-nitrification systems in the model will remain in the model until NEIEN data is updated by jurisdictions to reflect the type of ex situ and in situ practices being used. Septic pumpouts will still be available on historically reported systems with de-nitrification.

Q4. What do jurisdictions need to report in NEIEN in order to receive credit for the new onsite treatment practices in the modeling tools?

A4. Jurisdictions should report the NEIEN BMP names listed in Table 1 above, as well as the location of the systems and the date the systems were installed.

Q5. How will the reductions be applied to septic systems in the current modeling tools?

A5. The efficiency reductions listed in Table 1 above will be applied to conventional septic systems within the modeling tools. These reductions will result in lower edge-of-stream nitrogen loads from the modeled, conventional septic systems. Please note that each of the system types is mutually exclusive meaning that a jurisdiction should only report one practice type per septic system. Please also note that septic pumpouts and the current septic de-nitrification practices are also mutually exclusive with each of the system types and should not be reported in conjunction with these new BMPs.

Q6. In what order will Scenario Builder credit all of the septic BMPs?

A6. Table 2 below lists the unique Scenario Builder BMP names that will now be associated with septic systems, and places these names in the order in which Scenario Builder will credit the BMPs.

Table 2. Order of Credit for Septic System BMPs in Scenario Builder

Scenario Builder BMP Name	Percent Nitrogen Reduction
Septic Disconnections (Existing)*	N/A
50% Denitrification Units with Enhanced In Situ	69%
Secondary Treatment with Enhanced In Situ	50%
50% Denitrification Units with Conventional In Situ	50%
Septic Effluent with Enhanced In Situ	38%
Secondary Treatment with Conventional In Situ	20%
Septic De-Nitrification (Existing)**	50%
Septic Pumpouts (Existing)**	5%

*The existing Septic Disconnection BMP is simulated prior to any other septic BMPs.

**The existing Septic Pumpout and Septic De-Nitrification BMPs cannot be submitted along with any of the new systems treatment practices described in this document.

Q7: Can a jurisdiction receive credit for a proprietary system?

A7: Yes. The panel recommended that proprietary, ex situ systems with NSF Standard 245 certification or similar and field testing to verify performance could receive a default 50% reduction in nitrogen (p.27). The panel also stated that technologies exhibiting a reduction of total nitrogen greater than 50% will be assigned a total nitrogen reduction credit of 50% in the watershed model (p. 28). It is up to each jurisdiction to determine which systems exhibit a reduction of 50% or greater based upon third-party monitoring. Additional details about third-party monitoring protocols can be found in Section 3.2.1.

Q8: Can a jurisdiction request a nitrogen reduction efficiency of greater than 50% for a system?

A8: Yes. A jurisdiction may request a reduction efficiency of greater than 50% for a particular type of system based upon third-party monitoring. The jurisdiction must submit the results of third-party monitoring data and design specifications to the Wastewater Treatment Workgroup for consideration. Per the CBP's BMP Protocol, the Wastewater Treatment Workgroup will then have the discretion to determine if a system should receive greater than 50% reduction in the modeling tools. Additional details about third-party monitoring protocols can be found in Section 3.2.1.

Q9: Can jurisdictions receive credit for non-proprietary or non-conforming systems?

A9: Jurisdictions may receive credit for non-proprietary systems that have similar specifications and reductions as one of the BMP types listed above. It is up to each jurisdiction to determine which systems exhibit characteristics and reductions described above based upon third-party monitoring (p. 28). Additional details about third-party monitoring protocols can be found in Section 3.2.1.

A jurisdiction may request a reduction efficiency review for any non-conforming (proprietary or non-proprietary) system based upon results of third-party monitoring. The jurisdiction will need to submit the results of third-party monitoring data and design specifications to the Wastewater Treatment Workgroup for consideration as a new BMP (p.28). Per the CBP's BMP Protocol, the Wastewater Treatment Workgroup will then have the discretion to determine if a system should be assigned a different reduction efficiency. Additional details about third-party monitoring protocols can be found in Section 3.2.1.