

Appendix G (07 18 2018)

Technical Requirements to Enter Advanced On-Site Wastewater Treatment Practices into Scenario Builder and the Phase 6 Watershed Model

Presented to Watershed Technical Workgroup for Review and Approval: July 19, 2018

Background: In October, 2015, a second Onsite Wastewater Treatment Expert Panel was convened to review additional BMPs for the sector. 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 new advanced on-site waste treatment systems (advanced septic systems) in the Phase 6 Watershed Model?

A1. The original 2014 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 is found in Appendix G in the 2014 Panel report. The NEW BMPs from the second panel are highlighted 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% |
| Septic Effluent with Advanced Drip Dispersal | Septic Effluent with Advanced In Situ | 50% |
| 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% |
| NSF 40 with Advanced Drip Dispersal | Secondary Treatment with Advanced In Situ | 60% |
| 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% |
| IMF with Advanced Drip Dispersal | Secondary Treatment with Advanced In Situ | 60% |

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| 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% |
| Constructed Wetland with Advanced Drip Dispersal | Secondary Treatment with Advanced In Situ | 60% |
| 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% |
| RMF with Advanced Drip Dispersal | 50% Denitrification Unit with Advanced In Situ | 75% |
| 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% |
| IFAS with Advanced Drip Dispersal | 50% Denitrification Unit with Advanced In Situ | 75% |
| 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% |
| Proprietary Ex Situ with Advanced Drip Dispersal | 50% Denitrification Unit with Advanced In Situ | 75% |

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 2014 expert panel report.

Proprietary Systems – There are some proprietary systems that may offer significant denitrification benefits above the 50% reduction threshold discussed above. Proprietary system manufacturers who wish to have their system considered for greater than a 50% reduction will be considered on a case by case basis and would require ongoing field verification of the reduction value in most cases. Additional details about these systems and the recommended protocol for third-party testing can be found in Section 3.2.1 of the 2014 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

Advanced In Situ – In situ processes are those occurring after the ex situ treatment, within the soil treatment unit. This advanced practice includes drip dispersal systems only when designed in accordance with the details provided in the 2018 expert panel report to produce a gross 60% TN reduction.

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 Advanced In Situ | 75% |
| 50% Denitrification Units with Enhanced In Situ | 69% |
| Secondary Treatment with Advanced In Situ | 60% |
| Secondary Treatment with Enhanced In Situ | 50% |
| 50% Denitrification Units with Conventional In Situ | 50% |
| Septic Effluent with Advanced 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.