# On-Site Wastewater Treatment Systems Nitrogen Reduction Technology Expert Review Panel

## ***Proposed Drip Irrigation BMP***

July 23, 2018

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# Agenda

- Background
- New Drip Irrigation BMP
- Draft Technical Appendix

# OWTS Panel Charge

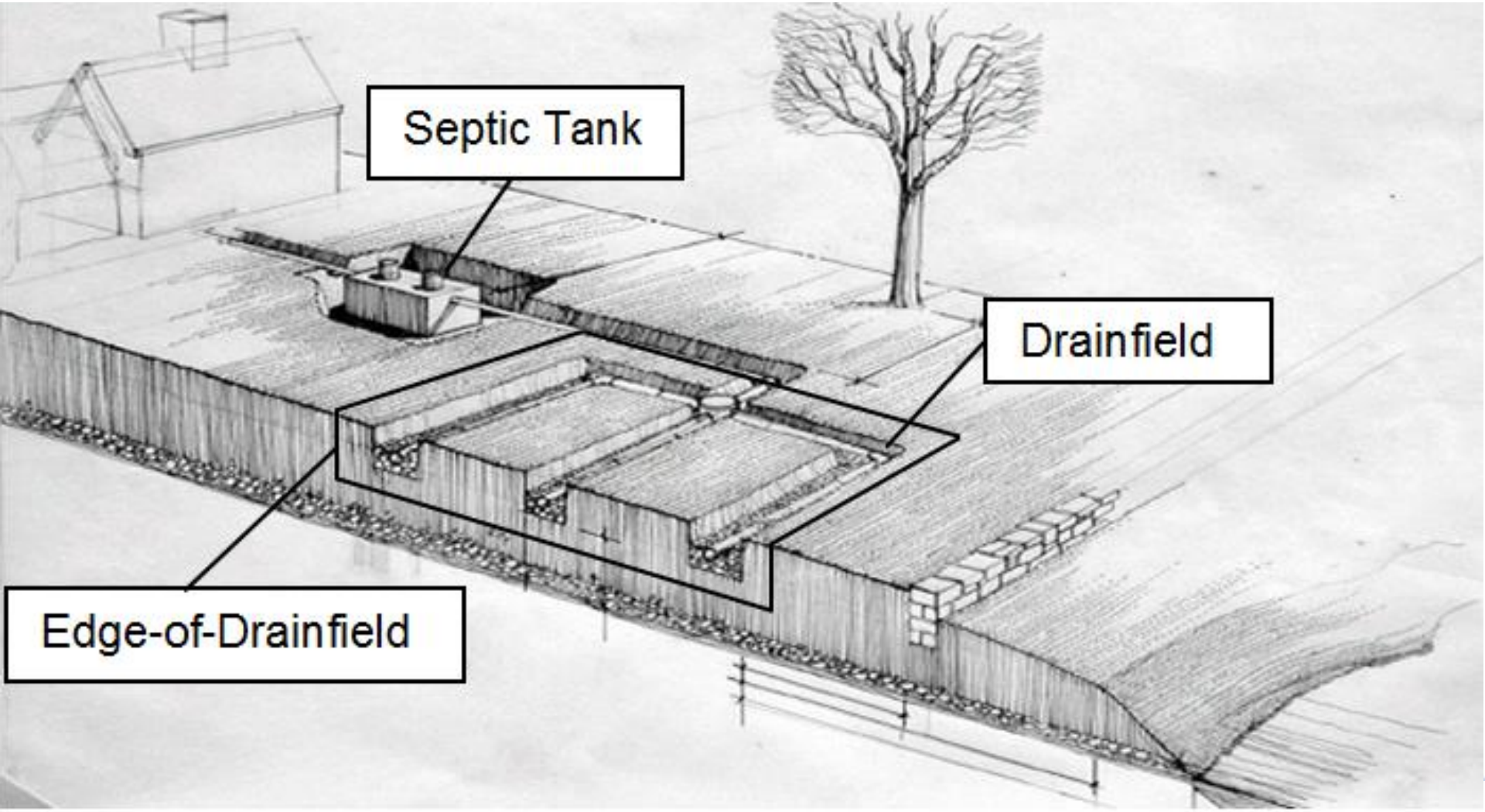
- Convened in July 2015
- Review available science on the nitrogen removal performance of two proposed best management practices:
  - (1) shallow placed (≤ 12”) drip dispersal (currently covered by the BMP of Shallow Placed, Pressure-Dosed Dispersal which combines low pressure distribution and drip dispersal into the same category with a net 38 percent TN reduction)
  - (2) a peat treatment system with dispersal to a pad or a trench (not currently covered by an existing BMP and therefore represents a potentially new BMP for the sector)
- Provide concise definitions, qualifying conditions, and percent reductions for nitrogen load reduction practices

# Current Baseline Load

- 5 kg TN/person/year in raw wastewater and STE
  - Assumed flow of 60 gpcpd
  - TN concentration of 60 mg/L in septic tank effluent (STE)
- 4 kg TN/person/year at edge-of-drainfield
  - 20 percent reduction in drainfield, average
    - 48 mg/l TN at edge of drainfield

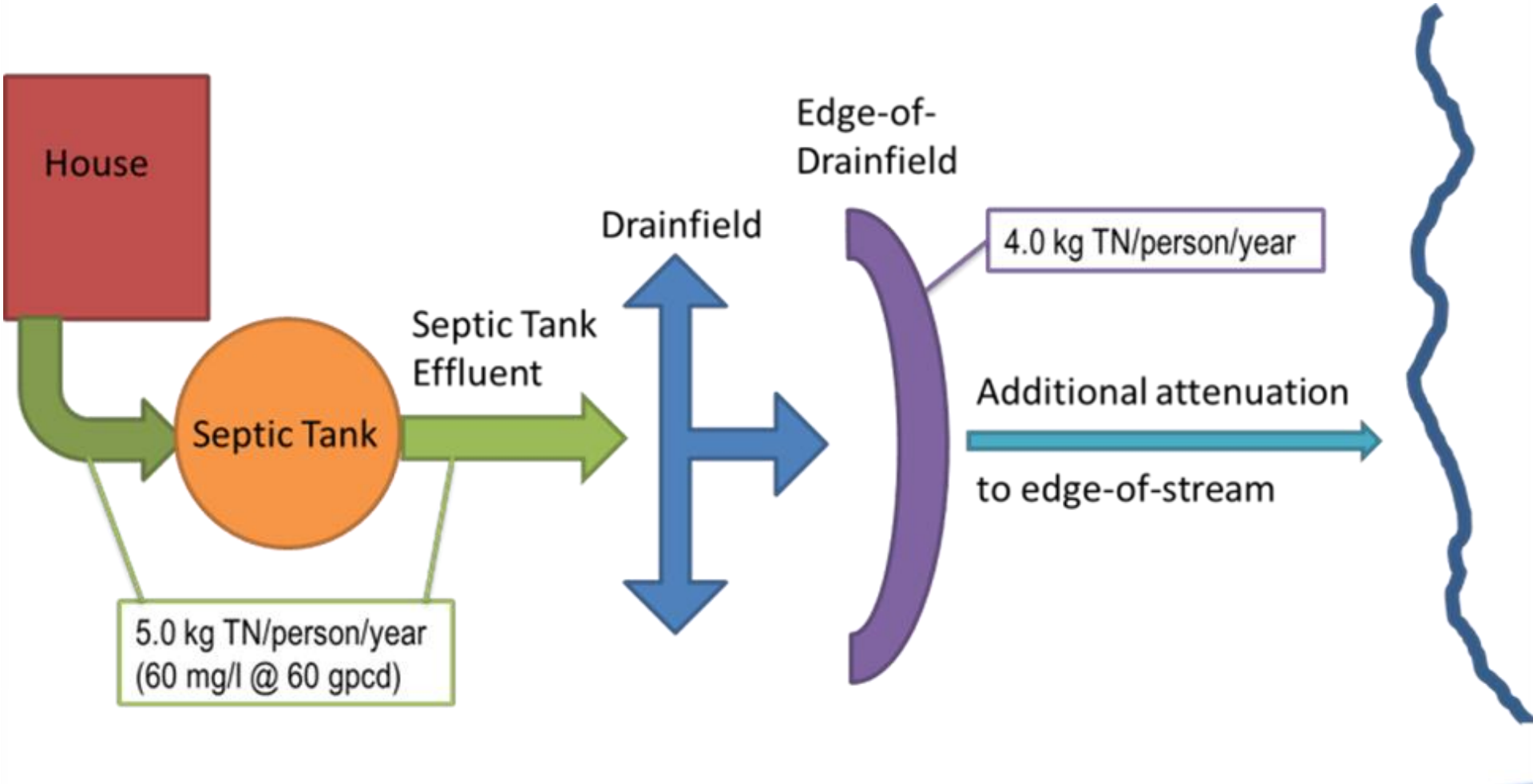
50% net reduction = 24 mg/l TN or 2 kg TN/person/yr at edge of drainfield

# Baseline System

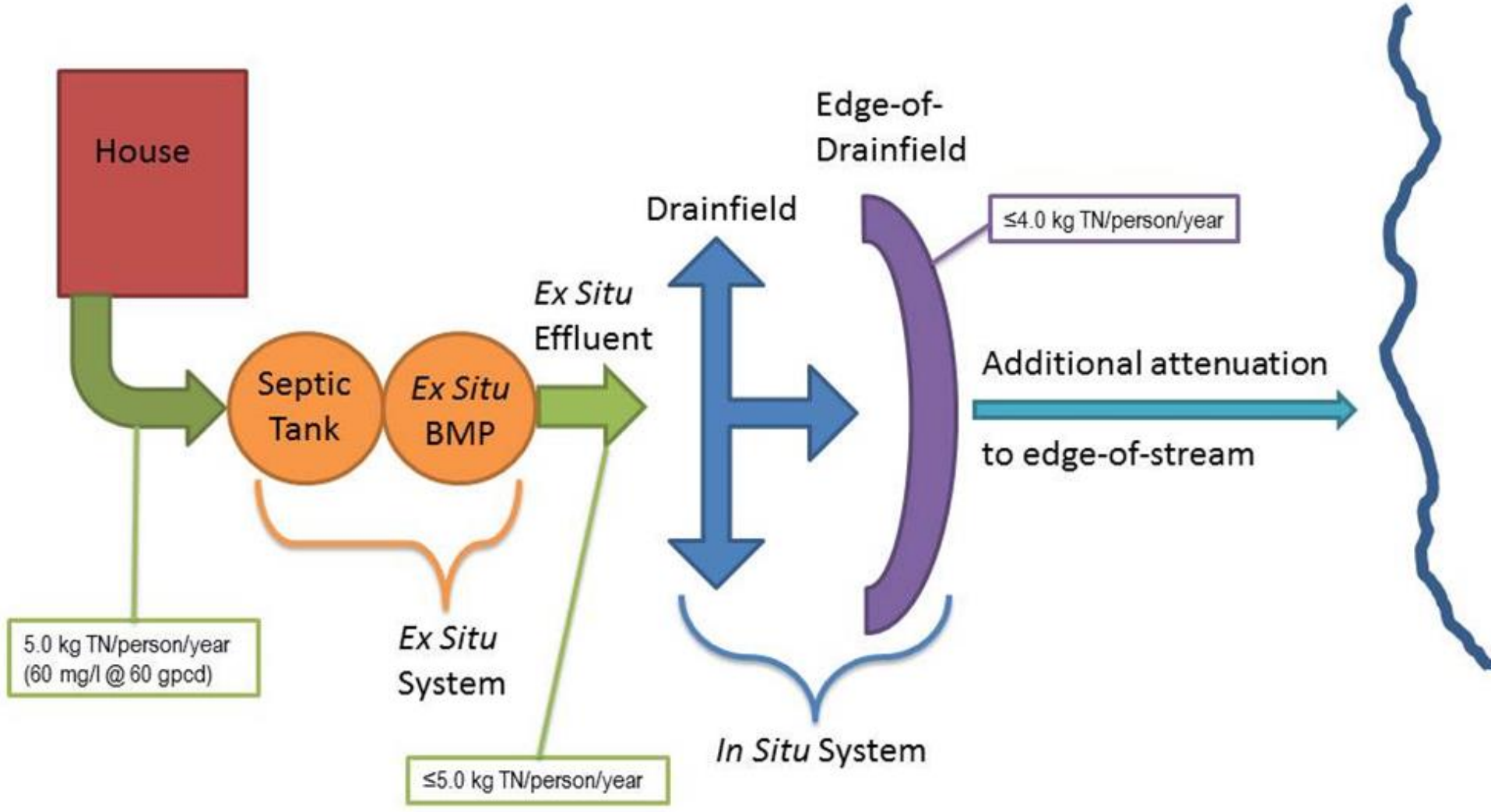



*Source:* Joubert et al. (2005)

# Baseline Load



# Onsite System with BMP



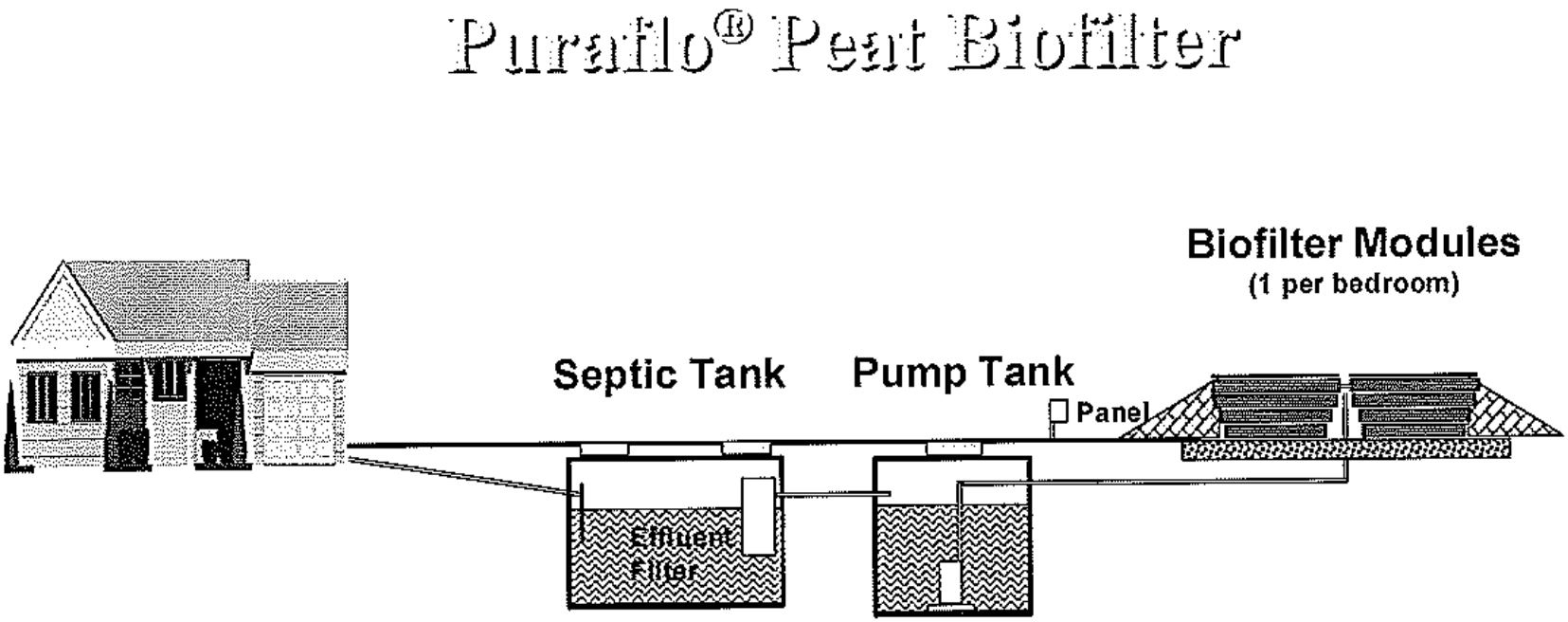
# OWTS BMPs Reviewed

- shallow placed (≤ 12”) drip dispersal with a net TN reduction of 50%

  (currently covered by the BMP of Shallow Placed, Pressure-Dosed Dispersal which combines low pressure distribution and drip dispersal into the same category with a net 38 percent TN reduction)

- a peat treatment system with dispersal to a pad or a trench (not currently covered by an existing BMP and therefore represents a potentially new BMP for the sector) with a net 50% reduction of TN

# Typical pad layout



# Panel Recommendations Summary – Peat

- Upon a review of available field data on single-pass peat filtration systems discharging to a pad or trench, the Panel recommends not adding a new creditable BMP.
- The existing data that were reviewed exhibited an extremely high level of variability and low statistical validity.
- More research is needed.

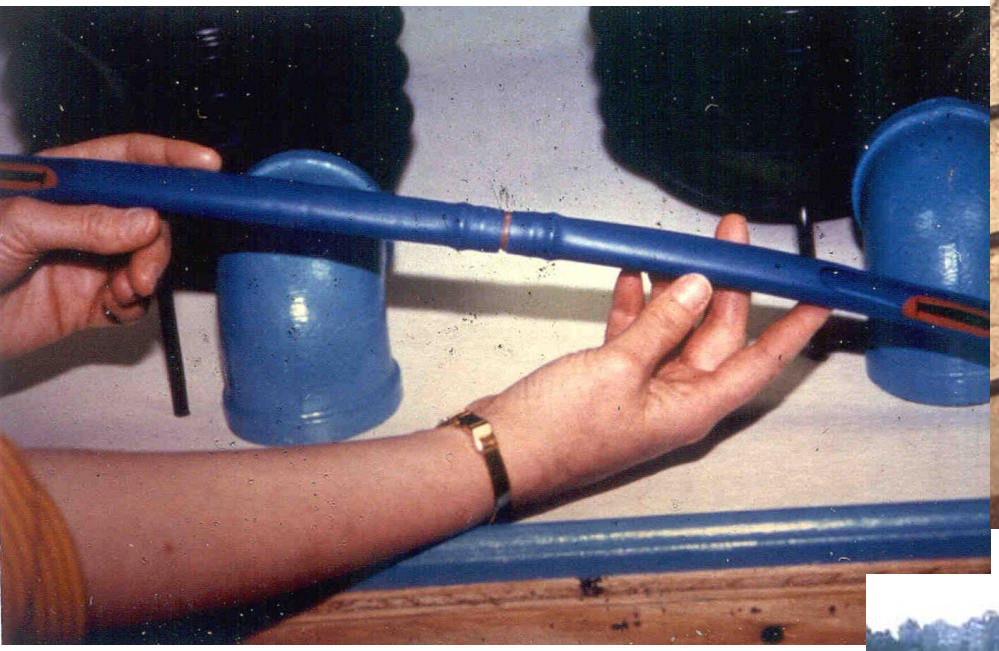
# Drip Dispersal

- Currently addressed in “Shallow-Placed, Pressure-Dosed Dispersal” nitrogen reduction BMP
- BMP includes Drip and Low Pressure Dispersal (LPD) systems
- Current net TN reduction 38%

- Request:  Consider drip dispersal TN reduction data separately, using lower application rates for septic tank effluent, and reassess the TN reduction credits.

# Low Pressure Distribution

# Drip Dispersal



50% net reduction = 24 mg/l TN or 2 kg TN/person/yr at edge of drainfield

- Requires gross TN reduction = 60%

  60 mg/l x 60% reduction = 36 mg/l

  60 mg/l – 36 mg/l = 24 mg/l the target at EOD for 50% TN reduction equivalent

- Review included:
  - Multiple field studies of TN reduction below drip fields
  - Modeling runs with STUMOD to verify field studies and fill in gaps

# Recommendation

Drip irrigation should be recognized as a BMP achieving a net 50% TN reduction when either septic tank effluent or treated effluent is applied to a drip irrigation system designed under the following design criteria.

# Detailed Definition of Practice – Key Points

- Install in a natural surface horizon no deeper than 12 inches.
- No credit where TG 1 soils predominate within 12 inches below
- 18 inches unsaturated zone beneath
- Either septic tank effluent or treated effluent
- Maximum loading rates per Texture Group
  - TG II 0.27 gpd/sf
  - TG III 0.17 gpd/sf
  - TG IV 0.12 gpd/sf

# Technical Appendix Overview

- Drip Dispersal/Irrigation is an ADVANCED In Situ practice with 60% gross TN reduction
- When paired with Ex Situ options creates 7 new BMP categories for the Onsite sector (Table 1)
- BMPs range from 50% to 75% TN reduction

| NEIEN BMP Name | Scenario Builder BMP Name | % N Reduction |
|---|---|---|
| Septic Effluent with Advanced Drip Dispersal | Septic Effluent with Advanced In Situ | 50% |
| NSF 40 w Advanced Drip Dispersal | Secondary Treatment with Advanced In Situ | 60% |
| IMF with Advanced Drip Dispersal | Secondary Treatment with Advanced In Situ | 60% |
| Constructed Wetland with Advanced Drip Dispersal | Secondary Treatment with Advanced In Situ | 60% |
| RMF with Advanced Drip Dispersal | 50% Denitrification Unit with Advanced In Situ | 75% |
| IFAS with Advanced Drip Dispersal | 50% Denitrification Unit with Advanced In Situ | 75% |
| Proprietary Ex Situ with Advanced Drip Dispersal | 50% Denitrification Unit with Advanced In Situ | 75% |

Questions?

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