



## Monitoring Protocol for Nitrogen Removal Systems

All new N-removal technologies approved under OWTS Rules 37.4.2 (B) (i), or (ii), must be monitored according to the terms of this protocol. A minimum of 10 systems, with a minimum of four (4) sampling events for each is required. At least seven (7) must have year-round occupancy and at least three (3) shall be seasonal.

All enrolled systems must incorporate a means of measuring and recording forward flow from the treatment system into the leachfield. This may be accomplished using a pressurized in-line wastewater flow meter, a cycle event counter, elapsed time meter, tipping d-box with an event counter, or other suitable method. The forward flow shall be reported as an average daily flow in gallons per day. The measurement period must be at least 15 days but no more than 120 days.

### **System Enrollment:**

The Vendor shall identify each system to be enrolled in the monitoring program. It is the intent of this Protocol to have all 10 test sites identified by the time 25 systems have been approved for construction. RIDEM may relieve an installation from this monitoring protocol based on extenuating circumstances, and order discontinuance and/or enrollment of a replacement system at its discretion.

For each system enrolled in monitoring, the vendor shall provide the following information to RIDEM at the time of enrollment:

- Owner(s') name(s)
- RIDEM OWTS Permit number
- Address at which the system is installed
- Occupancy (estimated number of occupants)
- Occupancy conditions (seasonal, or full time)
- Copy of the O&M contract and name and contact information of service provider
- Name and contact information of the third party performing sample collection and analysis

### **Frequency of monitoring**

Year-round occupancy: Samples shall be collected quarterly. The first sample shall be collected between 60 and 90 days of start up.

Seasonal occupancy: The first effluent sample shall be collected two (2) weeks after initial start up for the season. The second sample in a season must be collected at least four (4) weeks after the first and while the system is still in service for the season. Annually thereafter, samples shall be collected in mid-June, mid-July, mid-August, and mid-September until eight (8) total samples are collected.

### **Sample collection & analysis**

Prior to any sampling, the Vendor shall submit a system-specific sampling protocol to the RIDEM for review and approval. The protocol shall specify the location of sample collection and the procedures for collection of the sample and forward flow information. The sample shall be taken after the full treatment step but before delivery to the leaching field or drainfield.

A third party approved by RIDEM and trained by the vendor shall collect all effluent samples to be analyzed in the lab for BOD5, TSS, pH, total nitrogen (TN), perform field analysis for dissolved oxygen (DO) and temperature and record forward flow data. A chain-of-custody shall be completed for each sample through delivery to the laboratory. [Note: a service provider, distributor or dealer is not considered a third party.]

Effluent will be collected by composite sampler, or grab sample as preferred by the Vendor. Sample bottles will be prepared and sampling equipment will be cleaned between sampling events, following standard laboratory protocol and stored in a clean plastic bag.

Analysis of the wastewater samples will be performed by a laboratory certified by the RI Department of Health (HEALTH) for testing water samples.

Samples must not be collected within one week following a service visit or within one month following a septage pump out. The third party responsible for sampling each system is responsible for scheduling sampling to adhere to these restrictions, and coordinating with the service provider and homeowner as required.

**Testing and reporting parameters**

**Table 1**

<b>Constituent</b>	<b>Report the Following for Routine Sampling events</b>	<b>Report the Following for Resampling events</b>
Forward flow (gpd)	X	X
Dissolved Oxygen ( <i>Field Test</i> )	X	X
Effluent temperature (F) ( <i>Field Test</i> )	X	X
BOD5	X	X
TSS	X	X
pH	X	X
Total Nitrogen (TN)	X	X
Nitrate		X
Nitrite		X
Ammonia		X
Alkalinity		X
TKN		X

**Resampling Option**

The vendor may direct resampling of a system if the vendor has reason to believe the results are not representative of system performance. Reasons may include evidence of excess occupancy, possible shock load from the home, effects of antibiotics or other drugs, or system being in need of service or adjustment. The system must be resampled no sooner than seven (7) days after any adjustment is made to the system and within thirty (30) days of the original sample collection for that round. Resampling may be performed only once per sampling event. The sample must be analyzed for the additional constituents noted in Table 1 for any resampling events. Unless otherwise indicated by the vendor, when resampling is done, DEM will use the lowest N concentration result for each sampling round for each system in its analysis of performance. When resampling is performed, the vendor shall submit to the RIDEM, an explanation of the reasons for resampling and any measures taken to correct the system’s performance.

**Data Submittal**

The vendor is responsible for submittal of all data generated under this protocol to the OWTS Program, as soon as practical following receipt of the analytical data. This includes the average daily forward flow volume (report total gallons and the number of days in the measurement period, and in gallons per day), chain of custody forms, analytical results for all samples including resampling, reason for resampling, and any other explanatory notes. Electronic submission is preferred.

Data and other required reporting must be submitted to RIDEM until the systems are relieved from the requirement for monitoring by RIDEM in writing.