

January 5, 2024

Ed Quann
F.R. Mahony & Associates, Inc.
273 Weymouth St
Rockland, MA 02370

RE: Product Registration Renewal – Notice of Proprietary Treatment Product Listing
Description: Sewage Treatment System, Submerged Attached Growth Bioreactor
Manufacturer: F.R. Mahony & Associates, Inc.
Product Name: Amphidrome® Treatment Systems
Model Number: No specified model numbers (sized for a single family residence and for a range of facilities with design flows up to 10,000 GPD per day)
Product Listing: Category A (residential sewage)

Dear Ed Quann:

Thank you for your application for product renewal for the Amphidrome Treatment System. The system is a biological wastewater treatment system that uses a biologically active filter (BAF), also known as a submerged attached growth bioreactor (SAGB).

In accordance with Minn. R. ch. 7080 through 7083, the MPCA has reviewed F.R. Mahony & Associates submitted materials requesting registration for Category A (residential) treatment product listing of the Amphidrome Treatment System in this application. Based on the submitted documentation, the MPCA finds that the Amphidrome Treatment System is eligible to be registered per Minn. R. ch. 7083.4030 as meeting the following treatment levels:

- **Treatment Level A2** (CBOD₅ of 15 mg/L, TSS of 15 mg/L)
- **Treatment Level B2** (CBOD₅ of 25 mg/L, TSS of 30 mg/L)
- **Treatment Level C** (CBOD₅ of 125 mg/L, TSS of 60 mg/L and Oil & Grease of 25 mg/L)
- **Total Nitrogen** (TN of less than or equal to 20 mg/L)

The Amphidrome Treatment System is registered for systems with a design rated capacity of less than 400 gallons per day, for single family homes, up to design flows of 10,000 gallons per day, as shown in Table 1 and Table 2.

Subject to this determination, the Amphidrome Treatment System will be placed on the List of Registered Subsurface Sewage Treatment System (SSTS) Products. The product information listed in this Notice of Proprietary Product Listing will be maintained on the MPCA website and may not be altered by the manufacturer or any other person without permission by the MPCA.

Table 1. Amphidrome System for Treatment Level A2 and for Effluent Total Nitrogen (TN) of less than 20 mg/L*.

Flow (gpd) **	Anoxic/EQ (gal.)	Reactor	Clearwell (gal.)
<400 - 800	2,000	2.0 ft. Diameter	1,000
700 – 1,200	2,000	2.5 ft. Diameter	1,000
900 – 1,800	2,500	3.0 ft. Diameter	1,500
1,200 – 2,500	2,000 - 3,000	3.5 ft. Diameter	1,500
1,600 – 3,250	2,500 - 4,000	4.0 ft. Diameter	1,500
2,500 – 5,200	4,000 - 6,000	5.0 ft. Diameter	2,000
3,600 - 7,200	5,500 - 9,000	6.0 ft. Diameter	2,600 - 3,200
6,000 - 10,000	9,000 - 13,000	8.0 ft. Diameter	4,500 - 5,200

* Third-party testing showed Amphidrome effluent achieved the Total Nitrogen [TN] level of 15 mg/L [mean TN = 15 mg/L TN with 59 percent removed]; CBOD₅ was 5 mg/L; TSS was 5 mg/L. Fecal coliform bacteria are expected to be greater than 10,000 cfu/100mL. Total nitrogen removal is highly dependent upon BOD and TKN loading, adequate alkalinity, temperature and toxicity; site specific alkalinity levels in the source water supply should be evaluated and homeowners should be well educated in order to achieve optimal total nitrogen reduction.

** The flow range for each reactor listed is the result of the ability to vary the media depth from 4 ft. to 8 ft.

Table 2. Amphidrome Plus System for Effluent Total Nitrogen (TN) of less than 10 mg/L*.

Flow (gpd) **	Anoxic/EQ (gal.)	Reactor	Clearwell (gal.)	Plus
<400 - 800	2,000	2.0 ft. Diameter	1,000	2.0 ft. Diameter
700 – 1,200	2,000	2.5 ft. Diameter	1,000	2.0 ft. Diameter
900 – 1,800	2,500	3.0 ft. Diameter	1,500	2.0 ft. Diameter
1,200 – 2,500	2,000 - 3,000	3.5 ft. Diameter	1,500	2.0 ft. Diameter
1,600 – 3,250	2,500 - 4,000	4.0 ft. Diameter	1,500	2.0 ft. Diameter
2,500 – 5,200	4,000 - 6,000	5.0 ft. Diameter	2,000	2.5 ft. Diameter
3,600 - 7,200	5,500 - 9,000	6.0 ft. Diameter	2,600 - 3,200	2.5 ft. Diameter
6,000 - 10,000	9,000 - 13,000	8.0 ft. Diameter	4,500 - 5,200	3.0 ft. Diameter

* The Amphidrome Plus system is utilized when the effluent total nitrogen must be less than 10 mg/L or when effluent phosphorus limits exist.

** The flow range for each reactor listed is the result of the ability to vary the media depth from 4 ft. to 8 ft.

The registration of the treatment products in Minnesota is contingent upon compliance with the following conditions:

1. Products must be used in compliance with the MPCA rules and the plans and design specifications provided. Any deviation from the plans and specifications shall not be permitted unless authorized by the MPCA for registered use.
2. The manufacturer shall have readily accessible information, specific to a product’s registered use in Minnesota, for designers, regulators, installers, system owners, service providers and other interested parties for the following items: a) product manual;

- b) design instructions; c) installation instructions; d) information regarding operation and maintenance; e) homeowner instructions; and f) list of representatives and manufacturer-certified service providers, if any, as required by Minn. R. 7083.4040 (H).
3. Every Amphidrome system is sized by F.R. Mahony & Associate's Professional Engineer (P.E.) for the specific system being designed by the Intermediate Designer/Advanced Designer and/or Professional Engineer. F.R. Mahony & Associates shall review and approve each design for the specific flow and required effluent limit.
 4. The Anoxic Tank and Clear Well size shall meet the manufacturer's size requirements. All tanks used in the treatment process shall be approved by the manufacturer. Each sewage tank shall be designed to withstand the pressures to which it will be subjected. Tanks and all pipe penetrations, risers, and other connections to tanks shall be watertight.
 5. Each system must be delivered with an installation manual and owner's manual for the Amphidrome Wastewater Treatment System. Each component must be installed in accordance with the manufacturer's installation manual.
 6. F.R. Mahony & Associates, along with the Intermediate Designer/Advanced Designer and Installer, are responsible to ensure that proper flow splitting devices are used to split flows when flow splitting is needed. Flow splitting devices must meet the following criteria: a) designed specifically and reliably to split wastewater flows; b) accessible for on-going operation and maintenance; c) monitored to determine flow rates; d) adjustable after construction should settlement occur; and e) have infinite or continuous adjustment features.
 7. All systems shall be designed and operated with (a) suitable alarm device(s) that monitors the Amphidrome and its component, should any of the system components malfunction.
 8. The treatment products contained in this notice of product registration are considered a Minnesota-registered product for Type IV systems. The effluent, following treatment in the Amphidrome Wastewater Treatment System, is required to be uniformly distributed to the soil for final treatment and dispersal.
 9. When Amphidrome Wastewater Treatment Systems are used in systems to achieve Treatment Levels A2, B2, and C, effluent loading rates to the soil, method of distribution, and vertical separation requirements shall meet the minimum requirements contained in Minn. R. 7080.2350 for flows less than 5,000 GPD. For flows greater than 5,000 GPD, final treatment and dispersal must also meet 7081.0270, which require a minimum three (3) feet vertical separation during operation, after accounting for groundwater mounding.
 10. Systems may only be designated as Type IV systems when designed and installed per the drawings submitted as part of the Application for Registration, dated April 26, 2011, and subsequent documents submitted prior to this registration.

11. As a Type IV system, the system must be constructed and operated under the required local permits.
12. The level of maintenance required for the Amphidrome Wastewater Treatment System shall be as specified in the products Operation and Maintenance Manual. This includes, but is not limited to, inspections and maintenance at six-month intervals, or more frequently, as required by the manufacturer.
13. As specified in the Owner's Manual, limitations of the product are identified. The manufacturer is responsible to provide a listing of other known limitations, made available on the company's website or other means.
14. Training shall be provided to MPCA-licensed Subsurface Sewage Treatment System practitioners before designing, installing, or providing service to Amphidrome Wastewater Treatment System registered for use in Minnesota.
15. During the period of product registration and as part of the renewal process, systems using registered treatment products are subject to an audit by the MPCA.

Please be advised that this registration expires December 31, 2026. Manufacturers desiring to continue product registration beyond this date must obtain MPCA renewal according to the requirements in Minn. R. 7083.4040 (E). If the product has changed or is retested according to the protocol required for registration, renewal shall be based on the most recent test results. If the MPCA finds the product has changed in any way that may affect performance, it may not be renewed and must meet the requirements for initial registration.

The MPCA is in no way endorsing these products or any advertising, and is not responsible for any situation which may result from its use or misuse. The MPCA is not liable for any product failure and these statements are not intended and cannot be relied upon to establish any substantive or procedural rights with the state of Minnesota or the MPCA, either express or implied, that can be enforced in litigation or any administrative proceeding.

If you have any questions, please contact Wendy Chirpich at 507-344-5248 or by email at wendy.chirpich@state.mn.us.

Sincerely,

Wendy Chirpich

This document has been electronically signed.

Wendy Chirpich
Environmental Specialist
Municipal Division

cc: File