

Rhode Island Department of Environmental Management

To: Interested Parties

Date: April 8, 2021

Subject: **Alternative or Experimental Onsite Wastewater Treatment System (OWTS) Technologies**

Attached herewith is the official “List” of Approved Alternative/Experimental (A/E) Technologies for onsite wastewater treatment. These technologies and components have been approved pursuant to RIDEM OWTS Rules. The technologies have been reviewed and accepted by a nine-member Technical Review Committee composed of representatives of local government, the University of Rhode Island, CRMC, environmental organizations, and the private sector.

Immediately following this cover is a brief summary of the A/E technology application process and a "Guidance to OWTS Designers" that provides additional information and specifies responsibility for designers who are contemplating the use of an approved A/E technology.

Should you have any question or need further information, please contact the OWTS Program Office at DEM.OWTS@dem.ri.gov or 401-222-3961.

Rhode Island Department of Environmental Management

April 2021

ALTERNATIVE/EXPERIMENTAL ONSITE WASTEWATER TREATMENT SYSTEMS (OWTS) TECHNOLOGY PROGRAM

Onsite Wastewater Treatment System Rules, provide the basis for approval of Alternative/Experimental (A/E) Technologies in Rhode Island. A/E systems are designed as alternatives to conventional OWTS or parts of a conventional system. A conventional system is a traditional OWTS with a septic tank, pump chamber with pump or siphon (if needed), distribution box and a standard leachfield with gravity distribution. An Alternative/Experimental System or Technology is an OWTS that does not meet the location, design or construction requirements of a conventional system, but has been demonstrated through field testing, calculations and other engineering evaluations to provide the same degree (or better) of environmental and public health protection.

There are three different categories of A/E technologies: alternative systems, system components, and experimental systems.

Alternative Systems - This category has two classes of certification: Class One and Class Two.

- A **Class One** certification is issued to technologies that have been shown to have at least four (4) consecutive years of performance data per installation for no fewer than ten (10) installations, collected no less frequently than quarterly, which clearly demonstrate that all applicable standards have been met. A Class One system must also have been approved for at least four (4) consecutive years in Rhode Island with no fewer than ten installations or at least four (4) consecutive years in at least three (3) other jurisdictions, with no fewer than ten (10) installations in each jurisdiction. Class One certifications do not require renewal.
- A **Class Two** certification may be issued to technologies under the following conditions:
 - The applicant documents at least two (2) consecutive years of performance data per installation for no fewer than ten installations, with data collected no less frequently than quarterly that demonstrates that Department standards have been met, have demonstrated a theory or applied research, and the applicant demonstrates that the technology has been approved and utilized successfully for at least two (2) consecutive years in Rhode Island or at least two (2) consecutive years in another jurisdiction with no fewer than ten (10) installations in each jurisdiction, *or*

For a nitrogen reducing technology:

- The applicant provides certification that the technology meets NSF/ANSI “Standard 245- Wastewater Treatment Systems- Nitrogen Reduction” and the testing results show a preponderance of treated effluent nitrogen concentrations of nineteen (19) mg/l or less. Systems approved based on being certified to NSF/ANSI Standard 245 are subject to additional monitoring and a maximum of 10 installations will be allowed until the terms of the additional monitoring have been successfully fulfilled; these systems and their approval status are identified in the technology listing. *or*
- Demonstrates approval for use in another jurisdiction in an area where the temperature conditions are similar to or colder than those in Rhode Island and with technology review criteria substantially equivalent to Class One or Class Two summarized above and detailed in OWTS Rules 37.4.1 or 37.4.2 (A)-(B); the full text of the Rules is available at: <http://www.dem.ri.gov/pubs/regs/regs/water/owts16.pdf>. **Effective November 25, 2018**, this information will be in 250-RICR-150-10-6.41(D)(1) and (2); the full text available at: https://risos-apa-production-public.s3.amazonaws.com/DEM/REG_10246_20181105082739.pdf.

Class Two certifications require renewal every five years.

System Components - This category also has two classes of certification: Class One and Class Two.

- A **Class One** system component certification is issued for a component when the applicant documents that applicable manufacturer's and material standards are met; the applicant provides at least two (2) consecutive years of performance data for no fewer than ten (10) installations that demonstrates Department standards are met, if applicable; and the applicant demonstrates that the component has been approved and utilized successfully for at least two (2) consecutive years in Rhode Island or at least two (2) years in at least three (3) other jurisdictions for no fewer than ten (10) installations in each jurisdiction.
- A **Class Two** system component certification is issued for a component when the applicant documents that applicable manufacturer's and material standards are met; the applicant provides at least one (1) year of performance data for no fewer than ten (10) installations that demonstrates Department standards are met, if applicable; the applicant demonstrates that the component has been approved and utilized successfully for at least one (1) year in Rhode Island or at least one (1) other jurisdictions for no fewer than ten (10) installations in each jurisdiction.

Experimental Systems - This category is designed to allow innovative systems that have been demonstrated to work in practice or theory, to be installed on a limited basis as they are further tested and studied.

Experimental use is approved when:

1. The applicant demonstrates that the technology will work in practice and in theory;
2. Provides for three (3) to ten (10) proposed installations, a suitable area at each location for the installation of an OWTS permitted under the OWTS Rules, or a Class One A/E OWTS Technology;
3. The applicant proposing the Experimental Technology, the property owner(s) and subsequent purchaser(s) submit a signed statement to the Director agreeing to abandon the Experimental Technology and install an OWTS permitted under these Rules, or a Department approved Class One A/E OWTS Technology if the Experimental OWTS fails to perform as designed; and
4. The applicant submits documentation securing a bond or other form of financial security acceptable to the Director, to replace the entire OWTS in the event it fails to perform as designed.

Review and Approval Process

For a technology or component to be approved for use in the state of Rhode Island, the Vendor of that technology must submit an application package to the Department's A/E Technology Program for review. The application package is reviewed by Department staff for completeness. Completed applications are forwarded to the Department's OWTS Technical Review Committee (TRC). The TRC is made up of members from the Department, Coastal Resource Management Council, local Universities, OWTS design and installation firms, local municipalities, and environmental organizations. The TRC reviews all A/E applications and makes recommendations to the Department based on their findings. The Department then issues the final approval or denial.

An approval is documented in the form of a Certification signed by the Chief of Groundwater and Wetlands Protection in the Office of Water Resources. The Certification lists any design, maintenance or installation requirements or restrictions placed on the technology and it also indicates the general requirements and any sampling and reporting requirements associated with the technology.

After a technology is approved is certified by the Department, the Vendor must submit a Design and Installation Manual for review. When the technology's Design and Installation Manual is approved the technology is then placed on the Department's List of Approved Innovative/Alternative Technologies. Once an A/E technology is on the list then individual applications to design, construct, alter, or install these technologies may be submitted to the Department. Please note that an A/E technology is not approved for use under the program until placed on the list. Individual OWTS applications submitted to the Department proposing a technology not yet listed as of the date of receipt of the application must be submitted through the variance process.

GUIDANCE FOR OWTS DESIGNERS

Rhode Island Alternative/Experimental OWTS Technology Program

The purpose of this section is to provide guidance on the design, installation and use of the approved technologies under the Rhode Island A/E OWTS Technology Program. By following this guidance, designers will help promote the acceptance and beneficial use of A/E technologies in Rhode Island and expedite the approval process for individual applications.

A/E technologies generally offer improved performance over conventional technologies by using one or a combination of innovative designs, patented products, alternative materials, filtration processes, recirculation systems, pumps, or other electromechanical devices. The primary application for these technologies is at existing home sites on substandard lots having failing or otherwise inadequate OWTSs, and at other sensitive or difficult sites. A/E technologies often require special design and maintenance considerations, and some may involve significant additional design, installation or operational cost.

Certification: The approval certification issued by the Department for each A/E technology is the primary source of information concerning the terms and requirements guiding the use of the technology under the A/E program. The certification includes design requirements, design exceptions, special operation and maintenance requirements (additional detail provided in the Vendors' manuals – see "Manuals" below), and obligations of the vendor. Copies of the certifications and manuals are available from the vendor.

Important: Please note that the certification represents only that the Department has accepted the technology for listing on the List of Approved A/E Technologies in accordance with its Rules. It is not an endorsement of the technology, nor is it a recognition of any claim other than that which is specifically stated in the certification letter.

Authority to Design: Please note that technology certifications' summaries specify the licenses which are authorized to submit to the Department design applications incorporating any of these approved A/E OWTS technologies.

Designer Responsibility to Inform Purchasers and Users: Conventional OWTS systems are relatively well understood by the general public. Most people know about basic septic system components, their limited operation and maintenance requirements, and have a rough idea of costs. A/E technologies, on the other hand, vary considerably from these familiar standards. As a practical matter, the Department will not be able to inform the public adequately about the many different A/E technologies. Accordingly, this responsibility will fall upon the vendors of the technologies and, more particularly, upon designers who elect to use or recommend these technologies to their clients.

Begin by making sure you obtain from the vendor the complete details of the technology, including its design and installation details, operational and maintenance requirements, applicability to the siting or design problem you are attempting to address, and all costs. Next, give your client a complete copy of the certification for the technology issued to the vendor and ask your client to read it. The certification contains many special provisions of which users or purchasers should be apprised. The certification requires that the vendor provide any purchaser of the system with a copy of the Department's approval prior to the sale of the system. Take time to familiarize the client with all relevant details of the technology. These details may include: appearance or aesthetic aspects, such as above ground tanks, vents or other components; manhole covers; motors; pumps; electrical panel boxes; energy requirements; periodic maintenance needs; costs including design, installation, operating and maintenance costs; noise; and odors, if any. The expected service life of the equipment and overall system should also be addressed. Finally, the advantages and disadvantages of each technology being considered should be fully explained.

Design

Manuals: Each A/E technology is required to have a Design, Installation and O&M Manual. The manuals are produced by the manufacturer or vendor and should be obtained directly from them if they are not available as a pdf with the Certification in this List. The contact name, address and telephone number of the vendor is given on the A/E technology list. The manuals are intended to supply all of the required information to enable design and installation of the A/E system. The manuals also include a copy of the Department's certification letter. Vendors must ensure proper training to help acquaint you with their technologies and answer questions. Some vendors offer specific design and installation services. Some offer services as part of the cost of supplying the product; others may offer additional services on a fee for service basis.

Leachfield Size Reduction: Certain A/E technologies have been approved with an allowance for a reduction in leachfield size; in most cases the leachfield size reduction may only be applied to conventional leachfield types contained in the rules. The size reduction ordinarily does not apply to the Eljen GSF system because this system is considered an A/E technology. Sizing for Eljens should comply with the requirement in the certification. For new building construction, the designer proposing a reduced leachfield area must demonstrate that sufficient land area is available to permit installation of a full size leachfield; this should be shown on the plan as an extension of the proposed leachfield area. The additional area must be clearly labeled as the “reserve area”, so that it is clear that no construction will take place in this area. The full size leachfield shall meet all OWTS regulatory requirements.

Electrical: Electrical components and wiring must comply with applicable state and local codes. Power interrupt alarms, where required, generally must be placed on the exterior of the building. The Department will allow interior placement at commercial buildings where access to the interior is readily available during normal business hours.

Operational Requirements: All mechanical treatment systems require electrical power. One or more controllers are normally supplied. Hours of operation are sometimes adjustable and must be reviewed as part of the design process. Operational controls must be set so as to optimize treatment and ensure compliance with the operational efficiencies stipulated by the terms of the certification.

Eljen GSF: The Eljen GSF leachfield system may be used with a single trench line. Normally, two trench lines are required for the minimum trench design according to state Rules.

Effluent Filters: Several effluent filters have been approved for use. Please note that a manhole to grade is required over the outlet port above the effluent filter to facilitate maintenance of the filter.

Variances: Designs incorporating A/E technologies must comply with all other applicable OWTS standards. Where these standards cannot be met, a variance application must be filed in order that the Department properly assesses the impacts of the variance request on the operation of the system and on the environment. The fee for the specially engineered system will not be assessed if the only engineered feature is the approved A/E technology.

Non-Endorsement: The Department of Environmental Management certification under the A/E program does not represent an endorsement by the agency of any system or technology. A representation by any person, vendor or designer that the Department endorses any A/E technology is strictly prohibited.

Onsite Wastewater Treatment System Program
Use of Dispersal Trench and Approved Alternative Leachfields
With Approved A-E Advanced Treatment Systems

October 2, 2008

Effective immediately for all New Building Construction, Alteration and Repair Applications, RIDEM announces the following changes to applicable Alternative – Experimental Technology Certifications concerning requirements for use of pressurized shallow narrow drainfields (PSNDs) or bottomless sand filters (BSFs) with RIDEM approved nitrogen removal OWTS technologies in the Salt Pond and Narrow River Critical Resource Areas:

Dispersal trench (or conventional leachfield) and approved alternative leachfield technologies may be used in the design of any OWTS in the Salt Pond and Narrow River Critical Resource Area provided that the leachfield design complies with all setback and design requirements of the OWTS Rules. Designs employing a reduced leachfield area as may be allowed pursuant to the applicable A-E advanced treatment technology certification must show the 100% leachfield area on the plans and demonstrate compliance with all setbacks required by the OWTS Rules. Designs for Repair applications are not required to show the 100% leachfield area.

Please note that the use of dispersal trenches (conventional leachfields) in the Salt Pond and Narrow River Critical Resource Areas will not likely be allowed where a variance application to any minimum standard is required. For single family residential applications, the designer should employ a pressurized shallow narrow drainfield (PSND) or bottomless sand filter (BSF). If a design using a dispersal trench or alternative leachfield cannot meet the minimum setback standards contained in the OWTS Rules, the Department will require consideration of alternate designs – including a reduction in project scale for new construction and other projects which propose an increase in wastewater flow – that would enable compliance or substantial compliance with the OWTS Rules prior to or as part of any application for variance to the minimum setback standards contained in said Rules.

Please also note that should any language above deviate from that contained in any A-E technology certification, the provisions given herein shall apply to that certification.

List of Approved Alternative/Experimental OWTS

LEACHFIELD SYSTEMS

Technology Name: Perc-Rite® Drip Dispersal System - Certification

Perc-Rite® Drip Dispersal System - Manual

Vendor Information:

Tom Ashton R.E.H.S., C.P.S.S.
Regulatory Relations
American Manufacturing Company, Inc.
PO Box 97
22011 Greenhouse Road
Elkwood, VA 22718
Phone: 1-800-345-3132
Fax: 540-825-7234

Regional Contacts:

Dan Ottenheimer
Oakson
6 Sargent Street
Gloucester, MA 01930
Email: info@oakson.com
Phone: 1-877-Oakson1
1-978-282-1322
Fax: 978-282-1318
Website: www.Oakson.com

Certification: Component Technology - Class Two Component

Technology Type: Alternative Leachfield Component

Authority to Design: CI-II Licensed Designers & RI-PEs

Description: The Perc-Rite® Drip Dispersal System receives time-dosed effluent from a final dosing tank after either a septic tank or a RIDEM approved pre-treatment system producing a minimum effluent quality of TSS/BOD of 30/30 mg/L and FOG of 5 mg/L and following 115-micron disc filtration, disperses effluent below the soil surface through ½” nominal diameter pressurized tubing.

Technology Name: ARC 18*, ARC 24, ARC 36 and ARC 36 HC

Vendor Information: Infiltrator Water Technologies, LLC
4 Business Park Road
P.O. Box 768
Old Saybrook, CT 06475
David Lentz, PE
Regulatory Director
(860) 577-7198
dlentz@infiltratorsystems.net

Technical Services
(800) 221-4436

Certification: Alternative Component - Class Two

Technology Type: Alternative Leach Field Component

Authority to Design: CI-I and II Licensed Designers & RI-PEs

Description: The Component is arc-shaped, molded high-density polyethylene, with a solid roof, louvered sidewalls and an open bottom; it is installed in a trench configuration. Sizing is based on a 1.72 multiplier of the open bottom area with a maximum of 4.0 SF/LF. No stone is used in this installation and trenches are required to be interconnected.

*The ARC 18 chamber is also approved for use as the dome structure in a Pressurized Shallow Narrow Drainfield (PSND). Design and sizing are in accordance with specification in the RIDEM Guidelines for the Design, Use, and Maintenance of Pressurized Drainfields (November, 2013) and the approved vendor's design and installation manual.

Technology Name: Bottomless Sand Filter

NOTE: Effective November 25, 2018 design parameters for Advanced Pressure Drainfields (APDs) are incorporated into the OWTS rules within the RI Code of Regulations (RICR), Title 250 – Department of Environmental Management, Chapter 150 – Water Resources, Subchapter 10 – Wastewater & Stormwater, as PART 6 – Rules Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Onsite Wastewater Treatment Systems.

Vendor Information: Generic

Certification: Guidelines for the Design, Use, and Maintenance of Pressurized Drainfields - November 2013

Technology Type: Alternative Leachfield

Authority to Design: CI-II Licensed Designers & RI-PEs

Description: An equal or superior leachfield for pretreated effluent which is applied under pressure to a 2' bed of specified sand media. The effluent is pumped to and distributed by SCH 40 PVC or equivalent surrounded by a minimum of 6" of pea stone. Wastewater trickles down in unsaturated thin-film flow through sand media in a time dosed mode. After treatment the effluent is disposed directly under the sand filter. The technology is targeted for single family sized systems where soil and site conditions exist that make the use of conventional or shallow narrow drain fields impractical or not economical.

Technology Name: Cultec Contactor Chambers Models 75, 100, 125 & Field Drain Panels (C-1, C-2, C-3 & C-4)

Vendor Information: Cultec, Inc.
878 Federal Road
Brookfield, CT 06804
(800) 4-CULTEC

Certification: Component Technology - Class One Component

Technology Type: Alternative Leachfield Component

Authority to Design: CI-I and II Licensed Designers & RI-PEs

Description: The System consists of high-density polyethylene arch-shaped chambers that have holes along the sidewall of the lower portion of the units. Three models of Contactor Chambers (models 175, 100 and 125) and four Field Drain Panel configurations (C-1, C-2, C-3, C-4) have been approved. The system is installed with 1 ft. of stone beneath the chambers and additional stone filling the sidewall space between the trench wall and the chamber. Trench width and depth varies with the model of the system, see the RIDEM issued Cultec Certification for more details. These chambers shall be sized based on DEM's approval and designed in accordance with DEM Rules for shallow concrete chambers (flow diffusers) Rule 34.2 (**effective November 25, 2018**, shallow chambers will be addressed in 250-RICR-150-10-6.35; the full text is available at: https://risos-apa-production-public.s3.amazonaws.com/DEM/REG_10246_20181105082739.pdf).

Technology Name: [Eljen Geotextile Sand Filter \(GSF\) Certification](#)
[GSF Manual – November 2018](#)
[Eljen-Certified Rhode Island GSF Installers](#). Access list of Installers using Eljen Corporation website [<https://eljen.com/Ri-certified>], then verify license status and obtain contact information using the [RIDEM Installer List](#) [dem.ri.gov].

Vendor Information: Eljen Corporation
Jim King, President
125 McKee Street
East Hartford, CT 06108
(800) 444-1359

Certification: Alternative System or Technology - Class One

Technology Type: Alternative Leachfield

Authority to Design: CI- and II Licensed Designers & RI-PEs

Description: The Eljen GSF is designed to replace the gravel/stone media of a conventional trench leachfield. GSF modules are constructed of a cusped plastic core that is completely enveloped by a geotextile fabric that is folded accordion style over and under the plastic core. Each GSF module unit is 3 feet wide, 4 feet long, and 7 inches high, and is designed to be installed in a trench with a minimum of 6 inches of concrete sand bedding beneath and along the sidewalls of the units. The GSF has been assigned the following sizing criteria: one linear foot of GSF is equivalent to 7 square feet of required leachfield area.

Technology Name: [Geoflow Drip System](#)
Geoflow WASTEFLOW™ Classic WF16-4-24 and WF16-2-24
Geoflow WASTEFLOW™ PC WFPC16-4-24 and WFPC16-2-24

Vendor Information: Karen Ferguson
Geoflow, Inc.
506 Tamal Plaza
Corte Madera, CA 94925

Phone: 800-828-3388
Fax: 415-927-0120
E-mail: krf@geoflow.com
Web: www.geoflow.com/

Regional Contacts:
J&R Sales & Service, Inc.
James Dunlap
44 Commercial Street
Raynham, MA 02767

Phone: 508-823-9566
Fax: 508-880-7232
E-mail: jim@jrengprod.com

Certification: Component Technology - Class Two Component Approval

Technology Type: Alternative Leachfield Component

Authority to Design: CI-II Licensed Designers & RI-PEs

Description: The Geoflow subsurface drip dispersal system time doses effluent below the soil surface through ½" nominal diameter pressurized tubing. Following treatment by a RIDEM approved A/E treatment system producing a minimum effluent quality of TSS/BOD of 30/30 mg/L and FOG of 5 mg/L, the wastewater is discharged to a final dosing tank for timed-dosing to the Component.

Technology Name: [GeoMat Leaching Systems Certification](#)
[GeoMat Design Manual 2016](#)
[GeoMat Installation Manual 2011](#)

Vendor Information: Geomatrix Systems, LLC
114 Mill Rock Road East
Old Saybrook, CT 06475

Contacts: David Potts
Phone: 860-510-0730
Fax: 860-510-0735
Email: info@geomatrixsystems.com
Web: www.geomatrixsystems.com

Certification: Component - Class Two

Technology Type: Alternative Leachfield

Authority to Design: CI-II Licensed Designers & RI-PEs

Description: GeoMat is a leaching system comprised of a one-inch thick core of fused, entangled plastic filaments; it is installed on natural soil or a sand interlayer where specified in applicable design guidance. GeoMat 1200 is sleeved in geotextile fabric and a low-pressure distribution line (1-inch Schedule 40 PVC), with down-facing orifices set in clear plastic orifice shields, is inserted into the fabric sleeve, on top of the mat material and then covered by soil to a depth between 6 and 12 inches. GeoMat 3900 is dosed by two low-pressure distribution lines (1-inch Schedule 40 PVC), with down-facing orifices set in clear plastic orifice shields. The GeoMat 3900 and its two dosing pipes are covered by geotextile fabric prior to backfilling. Cleanout/distal pressure monitoring ports are installed on the terminal end of each of the distribution lines for both GeoMat 1200 and 3900. The Component is used in conjunction with a time-dosed pump apparatus and must be preceded by a RIDEM approved treatment technology producing an effluent quality of at least 30 mg/l TSS and 30 mg/l BOD.

Technology Name: [GST™ Leaching Systems Certification](#)
[GST™ Design Manual](#)
[GST™ Installation and Operation Manual](#)

Vendor Information: Geomatrix Systems, LLC
114 Mill Rock Road East
Old Saybrook, CT 06475

Contacts: David Potts
Phone: 860-510-0730
Fax: 860-510-0735
Web: <http://www.geomatrixsystems.com/>

Certification: Alternative Leachfield Component - Class Two

Technology Type: Alternative Leachfield

Authority to Design: CI-II Licensed Designers & RI-PEs – All Designs
CI-I Licensed Designers – Conventional Septic Tank Effluent with Gravity Distribution to Leachfield and;
CI-I Licensed Designers - Conventional Septic Tank Effluent with Low Pressure Pipe Distribution to Leachfield per OWTS Rule 6.36.A.6

Description: Gravel Sand Treatment system (GST™) is an adaptation of the stone leaching trench. GST™ is formed using a reusable form to construct leaching fingers along the sides of a central distribution channel. Forms are the property of Geomatrix Systems, LLC; they are available through authorized representatives and rented on a per system basis. Leaching fingers are constructed with clean washed ½ inch to ¾ inch stone and are surrounded with ASTM C-33 sand. The leaching fingers increase the sidewall surface area by more than six times that of a traditional stone leaching trench. The narrow profile of the leaching fingers and central distribution channel (stone structure), combined with the uniform profile of the sand treatment media, enhance oxygen transfer. GST™ can receive pretreated wastewater or septic tank effluent.

Technology Name: [Infiltrator Chambers](#)
Double-Wide Standard Infiltrator Chambers
Double-Wide High Capacity Infiltrator Chambers

Vendor Information: Infiltrator Water Technologies, LLC
Judd Efinger
4 Business Park Road
P.O. Box 768
Old Saybrook, CT 06475
(800) 221-4436

Certification: Component Technology - Class One

Technology Type: Alternative Leachfield Component

Authority to Design: CI-I and II Licensed Designers & RI-PEs

Description: The Infiltrator Chambers are arch-shaped high density polyethylene chambers with a nominal width of 2.83 ft. and a length of 6.25 ft. with a ¼ inch high horizontal slots along the sidewall on the lower half of the units. The Standard Chamber is 12 inches high and the High Capacity Chamber is 16 inches high. The system is installed in a 6 ft. wide trench with 1 ft. of stone beneath the chambers and additional stone filling the sidewall space between the trench wall and the chamber. These chambers shall be sized based on DEM's approval and designed in accordance with DEM Rules for shallow concrete chambers (flow diffusers) Rule 34.2, however, **effective November 25, 2018**, shallow chambers will be addressed in 250-RICR-150-10-6.35; the full text is available at: https://risos-apa-production-public.s3.amazonaws.com/DEM/REG_10246_20181105082739.pdf.

Technology Name: [Infiltrators \(Stoneless Trench Configuration\)](#)
Quick 4 Standard Chamber
Quick4 Equalizer 24 Low Profile Chamber

Vendor Information: Infiltrator Water Technologies, LLC
4 Business Park Road
P.O. Box 768
Old Saybrook, CT 06475
(800) 221-4436

Certification: Component Technology – Class One

Technology Type: Alternative leachfield component

Authority to Design: CI-I and II Licensed Designers & RI-PEs

Description: The component is an arch shaped Polyolefin injection molded chamber with louvered side slots installed in a trench configuration. The Quick 4 Standard Chamber is sizing is based on a 1.72 multiplier of the open bottom area with a maximum of 4.0 SF/LF. No stone is used in this Installation and trenches are required to be interconnected. The Quick4 Equalizer 24 Low Profile Chamber is approved exclusively for use as the dome structure in a Pressurized Shallow Narrow Drainfield (PSND). Design and sizing are in accordance with specification in the RIDEM Sand Filter Guidance Document and the approved vendor's design and installation manual.

Technology Name: Pressurized Shallow-Narrow Drainfield

NOTE: Effective November 25, 2018 design parameters for Advanced Pressure Drainfields (APDs) are incorporated into the OWTS rules within the RI Code of Regulations (RICR), Title 250 – Department of Environmental Management, Chapter 150 – Water Resources, Subchapter 10 – Wastewater & Stormwater, as PART 6 – Rules Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Onsite Wastewater Treatment Systems.

Vendor Information:	Generic
Certification:	Guidelines for the Design, Use, and Maintenance of Pressurized Drainfields - November 2013
Technology Type:	Alternative Leachfield
Authority to Design:	CI-II Licensed Designers & RI-PEs

Pressurized Shallow Narrow Drainfield Description: Pre-treated effluent of at least 30 mg/L for each TSS and BOD is applied under pressure through distribution laterals of 1 to 1 ¼ inch Schedule 40, pressure rated PVC pipe, installed 8-12 inches below existing, and finish grades. The distribution pipe is covered with a dome-like structure made of 12 inch diameter PVC pipe (or approved equivalent) cut lengthwise; this dome and the pressure-distribution pipe are supported by one (1) inch diameter Schedule 40 PVC support pipes, which also act as a spreader device for the dome, and provide a greater bearing surface for the dome. Schedule 40 PVC or equivalent sweep elbows (turnups) at the distal end of each drainfield lateral facilitate maintenance and inspection.

SYSTEM COMPONENTS

A. EFFLUENT FILTERS, SCREENED PUMP VAULTS, LIFTING (Pumping) & STEP SYSTEMS

Technology Name: [GAG SIM/TECH Filter](#)

Vendor Information: Gary Koteskey, President
SIM/TECH Filter
06598 Horton Bay North Rd
Boyne City, MI 49712
616-582-7327

Certification: Component - Class One

Technology Type: Pump effluent filter for use with pressure distribution system

Authority to Design: CI-I and II Licensed Designers & RI-PEs

Description: The SIM/TECH filter is 3 inches in diameter, 18 inches in length, made of schedule 40PVC (or ABS) and stainless steel containing 1/16 inch holes with a total open area of 69.52 sq. in. (41%). It is placed on the discharge side of a pump and lessens clogging of small diameter holes of pressure distribution piping.

Technology Name: Orenco Systems, Inc. Effluent Screens, Screened Pump Vaults and Biotube Pump Vaults

Filters: F, FE, FT, and FTI Series

Screened Vaults: OSI200, SV1500

Biotube Pump Vaults: [PVU Series \(replaces SVT Series\)](#)

[PVU57-1819, PVU57-2419, PVU68-1819, PVU68-2425](#)

Vendor Information:

Orenco Systems Inc.
Eric Ball, VP Product Development
Terry Bounds, Executive VP
814 Airway Avenue
Sutherlin, OR 97479-9012
(514) 459-4449
www.orenco.com

Regional Contacts:

Atlantic Solutions
Robert Johnson
2417 East Main Road
Portsmouth, RI 02871
(401) 293-0176

Green Wastewater Solutions
Richard Pezza
80 Kilvert Street
Warwick, RI 02886
(401) 737-7600

Certifications: Component - Class One

Technology Type: Effluent Screen and Pump Vault Filter

Authority to Design: CI-I and II Licensed Designers & RI-PEs

Description: Effluent screens are constructed of reinforced cylinders of 1/8-in. mesh polyethylene with a fiberglass base; they are used in effluent dosing tanks to minimize the solids leaving the tank. Screened pump vaults are designed for use with conventional low-head style effluent and sewage pumps; they are installed at the outlet end of a single or double compartment septic tank. The screened vault minimizes entry of solids to the pump. Biotube pump vaults are installed at the outlet end of a single or double compartment septic tank or separate dosing tanks in effluent pumping systems. Pump vaults house a Biotube effluent filter that minimizes solids carryover to following components in the system. Pump vaults are 12 in. in diameter and accommodate one pump (simplex) or two pumps (duplex).

Technology Name: [Polylok PL-122, PL-525 & PL-625 Effluent Filters](#)

Vendor Information: Polylok, Incorporated
3 Fairfield Blvd.
Wallingford, CT 06492
<http://www.polylok.com>
Patrick Mulhall
Vice President, Sales and Marketing
877-765-9565

Certification: Component - Class One

Technology Type: Effluent Filter

Authority to Design: CI-I and II Licensed Designers & RI-PEs

Description: The Polylok PL-122, PL-525 and PL-625 are wastewater effluent filters designed for installation at the outlet of a septic tank to minimize solids from passing to the leachfield.

- **PL-122** has 122 linear feet of 1/16th-inch slots and is suitable for residential flows up to 1,500 gallons per day; it is modular, providing increased filtration area by snapping two or more filters together.
- **PL-525** has 525 linear feet of 1/16th-inch slots and is rated for residential or commercial flows up to 10,000 gallons per day.
- **PL-625** has 625 linear feet of 1/32nd-inch slots; it is rated for residential or commercial flows up to 10,000 gallons per day and is suitable for use in grease tanks.

All three filters are alarm accessible and are equipped with a gas deflector and buoyant shut-off ball that prevents flow of unfiltered effluent from the tank when the filter is removed for maintenance.

Technology Name: [Zabel A-1800, A-100, A-300 Residential and Commercial Wastewater Filters](#)

Vendor Information: Zabel Environmental Technology
10409 Watterson Trail
Jefferson, KY 40299
(800) 221-5742

Certification: Component - Class One

Technology Type: Effluent Filter

Authority to Design: CI-I and II Licensed Designers & RI-PEs

Description: The Zabel filters are PVC wastewater effluent filters designed to be installed at the outlet of a septic tank to prevent solids from passing to the drain field.

Technology Name: [Zoeller Effluent Filter WW1 \(Part Number 170-0078\)](#)

Vendor Information: Zoeller Pump Co.
3469 Cane Run Road
Louisville, KY 40211
(800) 928-7867

Certification: Component - Class One

Authority to Design: CI-I and II Licensed Designers & RI-PEs

Description: The component is designed for use at single family homes with maximum flow less than 1,500 gallons per day. Installed at the outlet of a septic tank, it provides 132 linear feet of 1/16-inch filtration to prevent solids discharging to the leachfield.

Technology Name: [Zoeller Effluent Filter WW4 \(Part Number 5000-0007\)](#)

Vendor Information:

Zoeller Pump Co.
3469 Cane Run Road
Louisville, KY 40211

(800) 928-7867

Technology Name & Model Numbers:

Zoeller Effluent Filter WW4 (Part Number 5000-0007)

Certification

Alternative component - Class One

Technology Type:

Effluent Filter (Screen)

Design Authority

Class I and II Licensed Designers and RI-PEs

Description: The component is designed residential or commercial use maximum flow less than 4,000 gallons per day. Installed at the outlet of a septic tank, it provides 528 linear feet of 1/16-inch filtration to prevent solids discharging to the leachfield.

Technology Name: [HyAir™ Certification](#)

[HyAir™ Design, Installation and O&M Manual](#)

[HyAir™ Owner's Manual](#)

Vendor Information:

David Potts
Geomatrix Systems, LLC
114 Mill Road East
Old Saybrook, CT 06475

Tel: 860-510-0730
Fax: 860-510-0735
www.geomatrixsystems.com/

Technology Name & Model Numbers:

HyAir™ - HA47, HA71, HA138, HA239, HA1000

Certification

Alternative component - Class Two

Technology Type:

Lifting system – lifting and, or distribution by air pressure

Design Authority

Class I and II Licensed Designers and RI-PEs

Description: HyAir™ is a fiberglass vessel which uses air pressure to lift, or distribute wastewater. It is installed after a septic tank, or treatment system directly in an excavation prepared for it. A level sensor activates the pump when a dose of wastewater is accumulated. The pump increases air pressure until it is sufficient to overcome total dynamic head. When the dose of wastewater has been evacuated, air flow purges the piping of water. If the water level within the Component doesn't drop, an alarm is activated. HyAir can have an optional 12-volt battery backup enabling it to run for two days at design flow.

Technology Name: [Zoeller Centrifugal STEP System](#)

Vendor Information:

Zoeller Pump Co.
3469 Cane Run Road
Louisville, KY 40211

(800) 928-7867

Technology Name & Model Numbers:

Zoeller Centrifugal STEP System

Certification

Alternative Component Technology - Class One

Technology Type:

Centrifugal STEP System

Design Authority

Class II Licensed Designers and RI-PEs

Description: A centrifugal effluent pump, float system, and effluent filter pack (528 linear feet 1/16th-inch filtration) are contained within a polyethylene vault (simplex configuration only). The Component may be installed in a septic tank as an alternative to a separate pump tank or in a distinct pump tank following a septic tank; it can be equipped with a control panel for use in either demand-dosed or timed-dose systems. The vault diameter is 15-3/8 inches and is available in various heights, with a variety of pump and control panel options accommodating flows up to 50 gpm.

Technology Name: [Zoeller Turbine STEP System](#)

Vendor Information:

Zoeller Pump Co.
3469 Cane Run Road
Louisville, KY 40211
(800) 928-7867

Technology Name & Model Numbers:

Zoeller Turbine STEP System

Certification

Alternative Component Technology - Class One

Technology Type:

Centrifugal STEP System

Design Authority

Class II Licensed Designers and RI-PEs

Description: The Component is designed for high head applications; a turbine effluent pump (simplex, or duplex), float system, and effluent filter cartridge (924 linear feet of 1/16th-inch filtration) are contained within a polyethylene vault. It may be installed in a septic tank as an alternative to a separate pump tank or in a distinct pump tank following a septic tank, and can be equipped with a control panel for use in either demand-dose or timed-dose systems. The vault diameter is 17-1/8 inches and is available in various heights, with a variety of pump and control panel options, accommodating discharge rates from 11 gpm to 85 gpm, with Vendor (manufacturer) consultation required for discharge rates over 27 gpm.

SYSTEM COMPONENTS

B. DISTRIBUTION COMPONENTS (D-boxes)

Technology Name: [Polylok PL- Dipper Box](#)

Vendor Information: Polylok, Inc./Zabel Environmental
3 Fairfield Boulevard
Wallingford, CT 06492
877-765-9565

Certification: Component - Class One

Technology Type: Distribution Box

Authority to Design: CI-I and II Licensed Designers & RI-PEs

Description: The Polylok Dipper Box is a leachfield dosing mechanism designed on the pivot and balance principal. The Component is comprised of a specially designed concrete distribution box with dipper tray assembly. The dipper storage tray receives effluent from the septic tank; a volume of 1.5 gallons causes the tray to tip, discharging its contents within the distribution box to equally distribute effluent to each line of the leaching component.

Technology Name: [Roth Monster D-Box, STAR-24DB11 Certification Installation Manual](#)

Vendor Information: Roth Global Plastics, Inc.
P.O. Box 245
Syracuse, NY 13211
Office Telephone (315) 475-0100
Office Fax: (315) 475-0200
www.roth-usa.com

Certification: Component - Class One

Technology Type: Distribution Box

Authority to Design: CI-I and II Licensed Designers & RI-PEs

Description: The Roth Monster D-Box is a leachfield distribution box manufactured of blow molded HDPE, with a Tuf-tite TB4 Tee Baffle. It is designed to evenly split effluent flow among up to 11 outlet lines. The Roth Monster D Box ships with a threaded STAR- 24L gasketed lid that threads directly into the top of the D Box and is compatible with Roth's STAR 24 Riser system. RIDEM requires that the Monster D Box be installed with access at finish grade.

Technology Name: [Zoeller Tru-Flow D-Box](#)

Vendor Information: Zoeller Pump Co.
P.O. Box 16347
Louisville, KY 40256-0347

Certification: Component – Class One

Technology Type: Distribution Box

Authority to Design: CI-I and II Licensed Designers & RI-PEs

Description: The unit is comprised of a diverter basin and a diverter assembly to evenly split flow to five outlet lines by adjusting a bubble level and adjustment screw in the event of uneven settling.

ALTERNATIVE SYSTEMS

A. ADVANCED TREATMENT SYSTEMS for BOD & TSS (and FOG) REMOVAL

Technology Name: AdvanTex AX20 Residential

Approved for TSS, BOD, and FOG removal in Mode 1, also approved for nitrogen removal in Mode 3.
See Nitrogen Reduction Treatment Systems for certification and manuals.

Technology Name: AdvanTex AX20 & AX100 Commercial

Approved for TSS, BOD, and FOG removal in Mode 1, also approved for nitrogen removal in Mode 3.
See Nitrogen Reduction Treatment Systems for certification and manuals.

Technology Name: [AdvanTex® AX-RT Series: AX20-RT, AX25-RT \(Mode 1 Configuration\) Monitoring Protocol, Revised November 27, 2019](#)
[Monitoring Protocol Deadline July 30, 2021](#)

Also approved for nitrogen removal in Mode 3, see Nitrogen Reduction Treatment Systems.

Model Numbers: AX20-RT & AX25-RT

Certification: Alternative System or Technology - Class Two

Technology Type: TSS ≤ 20 mg/L, BOD ≤ 20 mg/L, Oil & Grease ≤ 5 mg/L

Pretreatment Category: Category 1 – Timed-Dosed

Authority to Design: CI-II Licensed Designers & RI-PEs

Technology Name: Amphidrome

Also approved for nitrogen removal, see Nitrogen Reduction Treatment Systems.

Technology Name: Bioclere

Also approved for nitrogen removal, see Nitrogen Reduction Treatment Systems.

Technology Name: BioBarrier

Also approved for nitrogen removal, see Nitrogen Reduction Treatment Systems.

Technology Name: FAST®

Also approved for nitrogen removal, see Nitrogen Reduction Treatment Systems.

Technology Name: FujiClean

Also approved for nitrogen removal, see Nitrogen Reduction Treatment Systems.

Technology Name: Hydro-Kinetic Model 600 FEU

Also approved for nitrogen removal, see Nitrogen Reduction Treatment Systems.

Technology Name: [The NIBBLER® Wastewater Treatment Process](#)
[Models: NIBBLER® SBP \(square pod\) and NIBBLER® CBP \(cylindrical pod\)](#)

Vendor Information:

Aqua Test, Inc.
P.O. Box 1116
Black Diamond, WA 98010
28620 Maple Valley Rd SE
Maple Valley, WA 98038

Tel: 1-800-221-3159

Fax: 425-413-9431

Website: www.aquatestinc.com

Matt Lee, President

Email: aquatestinc@yahoo.com

Tel: 1-800-221-3159

Distributor:

Atlantic Solutions, LTD

Bob Johnson

2417 East Main Road

Portsmouth, RI 02871

Tel: 401-293-0176

Website: www.atlanticsolutionsltd.com/

Email: bjohnson@septicssystems.net

Model Numbers: NIBBLER® SBP (square pod) & NIBBLER® CBP (cylindrical pod)

Certification: Alternative System or Technology - Class Two

Technology Type: Advanced Treatment System for BOD, TSS and FOG Removal

At the design organic loading rate of 0.81 pounds per day BOD per Nibbler pod, the RIDEM recognizes the System as capable of achieving the following guaranteed treatment objectives: At operating capacity: BOD5 <150 mg/L, TSS <125 mg/L and FOG <20 mg/L and, at peak design flow BOD5 <200 mg/L, TSS <150 mg/L and FOG <25 mg/L.

Authority to Design: CI-II Licensed Designers & RI-PEs

Description: The NIBBLER® Wastewater Treatment Process incorporates aerobic fixed film treatment and is designed based on organic load per NIBBLER® pod for removal of BOD, TSS and FOG, to reduce high strength commercial or residential wastewater to levels comparable to that of residential strength septic tank effluent.

The NIBBLER® **SBP** is comprised of a septic tank, grease tank (or comingle tank where a single plumbing stub is available) and a surge tank, which time doses the NIBBLER® based on average daily flow. The NIBBLER® SBP tank is followed by a clarifier tank, a pump tank, and then a leachfield or an advanced treatment system. Multiple NIBBLER® SBP tanks may be installed in parallel following a splitter basin.

The NIBBLER® **CBP** (cylindrical pod) is designed for installation with associated aeration system in existing septic tanks.

Technology Name: [Singular 960 \[concrete\] \(500, 750, 1000 1250 & 1500 gpd\)](#)
[Singular Green® 960-500 \[HDPE\] \(maximum design flow 600 gpd\)](#)

Vendor Information:

Norweco, Inc.
220 Republic Street
Norwalk, OH 44857

Tel: 419-668-4471

Web: www.norweco.com

Scott Hetrick, Vice President of Sales

Email: shetrick@norweco.com

Tel: 419-669-4471

Fax: 419-663-5440

Local Contacts (Distributors / Dealers):

Siegmund Environmental Services

102 West Main Street

Norton, MA 02766

Matthew Dalton

Tel: 401-785-0130

Fax: 508-222-2499

Email: matt@seswastewater.com

Sterling Environmental Technologies

319A West Beach Road

Charlestown, RI 02813

Tel: 401-322-7669

Robert Frost

Certification: Alternative System or Technology - Class Two
Technology Type: TSS \leq 30 mg/L, BOD \leq 30 mg/L, Oil & Grease \leq 5 mg/L
Pretreatment Category: Category 2 – Not Timed-Dosed
Authority to Design: CI-II Licensed Designers & RI-PEs

Description: The Singlair wastewater treatment system is a self-contained three-chambered treatment system utilizing primary treatment (settling), mechanical aeration, clarification, and flow equalization to achieve treatment. Wastewater from the building enters the primary settling chamber through an inlet tee, then enters an aeration chamber. In the aeration chamber, an aspirator at the bottom of a shaft disperses air radially as fine bubbles provide oxygen for the biomass and vertically mix chamber contents. The wastewater in the aeration chamber passes through to the clarification chamber for final settling of solids. Treated wastewater passes through an effluent filter as it exits the system and is then gravity fed to the leachfield. The RIDEM recognizes the System as capable of achieving effluent concentrations of 30 mg/L for both TSS and BOD. Based on these reductions, the RIDEM has allowed for a 40% reduction in leachfield size.

Technology Name: Norweco Singlair TNT [concrete] 750, 1000, 1250 and 1500 & Norweco Singlair Green TNT [HDPE] 500

Also approved for nitrogen removal, see Nitrogen Reduction Treatment Systems.

Technology Name: [SeptiTech M series](#)

SeptiTech D series models are approved for nitrogen removal, see Nitrogen Reduction Treatment Systems.

Vendor Information: Bio-Microbics of Maine, Inc.
16002 West 110th Street
Lenexa, KS 66219

Contacts: Tracey Rioux
69 Holland Street
Lewiston, Maine 04240
Tel: (207) 333-6940
Fax: (207) 333-6944

Models: M400, M550, M750, M1200, M1500, and M3000
Certification: Alternative System or Technology - Class Two
Technology Type: TSS \leq 20 mg/L, BOD \leq 20 mg/L, Oil & Grease \leq 5 mg/L
Pretreatment Category: Category 1 – Timed-Dosed
Authority to Design: CI-II Licensed Designers and RI-PEs

Description: SeptiTech is an aerobic biological trickling filter, hereafter referred as the “System”. The System is a two-tank design with a primary anoxic tank (a septic tank) followed by the aerobic trickling filter tank (the SeptiTech processor tank). Raw wastewater enters and passes through the primary anoxic tank to a reservoir beneath treatment media in the aerobic processor tank. The wastewater is aerated and sprayed onto the media; a programmable logic controller (PLC) controls the timing and sequence of the recirculation of wastewater in the lower collection reservoir. Treated wastewater is time dosed to a leachfield. A 50% reduction of leachfield area is allowed for RIDEM approved Class One leachfield components and conventional leachfields.

Technology Name: [Single Pass Sand Filter](#)
Vendor Information: Generic
Certification: Guidelines for the Design, Use, and Maintenance of Pressurized Drainfields - November 2013
Technology Type: TSS \leq 10 mg/L, BOD \leq 10 mg/L, Fecal Coliform \leq 1,000 cfu/100mL
Authority to Design: CI-II Licensed Designers and RI-PEs

Description: Wastewater, having received primary treatment in a septic tank or equivalent unit, is pressure dosed to a bed of specified sand media. Wastewater applications to the filter surface are controlled by both a programmable timer and float switch. Wastewater is dispersed over the sand filter surface in a PVC pipe distribution network surrounded in pea stone. Wastewater trickles down in unsaturated thin film-flow through the sand media, where biological treatment occurs. The treated wastewater (sand filter effluent) is collected in an underdrain at the bottom of the filter and discharged by pressure to a shallow - narrow drainfield, where additional treatment occurs. The system is capable of significantly reducing biological oxygen demand (BOD₅), and total suspended solids (TSS). Ammonia and pathogens reductions may also be achieved. The technology is targeted for use in critical resource areas and is intended to be used with shallow pressurized drainfields.

B. NITROGEN REMOVAL SYSTEMS

Technology Name: [AdvanTex AX-20 Residential Certification](#)
[AdvanTex Residential Design Manual – October 2019](#)
[AdvanTex Residential Installation Manual – March 2017](#)
[AdvanTex Residential O&M Manual Part 1 – March 2014](#)
[AdvanTex Residential O&M Manual Part 2 – May 2008](#)

(Approved for TSS, BOD, and FOG removal in Mode 1, also approved for nitrogen removal in Mode 3.)

Vendor Information:
 Orenco Systems Inc.
 814 Airway Avenue
 Sutherlin, OR 97479-9012
www.orenco.com

Vendor Contact:
 Joseph Soulia
 1-800-230-9580
jsoulia@orenco.com

Regional Contacts:
Atlantic Solutions, Ltd (Dealer)
 436 Fish Road
 Tiverton, RI 02878
 Contact: Bob Johnson
 (401) 293-0176
bjohnson@atlanticsolutionsltd.com

Effluent Technologies (O&M Provider)
 436 Fish Road
 Tiverton, RI 02878
 Contact: Bob Johnson
 (401) 293-0176
bjohnson@atlanticsolutionsltd.com

Green Wastewater Solutions (Dealer and O&M Provider)
 80 Kilvert Street
 Warwick, RI 02886
 Contact: Rick Pezza
 (401) 737-7600
rickp@gwsne.com

Model Numbers: AX-20
Certification: Alternative System or Technology - Class One
Technology Type: TN \leq 19 mg/L, TSS \leq 20 mg/L, BOD \leq 20 mg/L, Oil & Grease \leq 5 mg/L
Pretreatment Category: Category 1 – Timed-Dosed
Authority to Design: CI-II Licensed Designers & RI-PEs

Description: A prepackaged packed bed filter that significantly reduces BOD and TSS inside a waterproof container installed after a two compartment tank prior to discharge to a leachfield which may be reduced in size by 50%. When configured in Mode 3, this system is acknowledged as an approved nitrogen reducing system.

Technology Name: [AdvanTex AX-20 or AX-100 Commercial Certification](#)
[AdvanTex AX20 or AX100 Commercial Design Manual – September 2017](#)
[AdvanTex AX20 or AX100 Commercial Installation Manual – April 2019](#)
[AdvanTex AX20 or AX100 Commercial O&M Manual – May 2015](#)

(Approved for TSS, BOD, and FOG removal in Mode 1, also approved for nitrogen removal in Mode 3.)

Vendor Information:

Orenco Systems Inc.
814 Airway Avenue
Sutherlin, OR 97479-9012
www.orenco.com

Vendor Contact:

Joseph Soulia
1-800-230-9580
jsoulia@orenco.com

Regional Contacts:

Atlantic Solutions, Ltd (Dealer)
436 Fish Road
Tiverton, RI 02878
Contact: Bob Johnson
(401) 293-0176
bjohnson@atlanticsolutionsltd.com

Effluent Technologies (O&M Provider)
436 Fish Road
Tiverton, RI 02878
Contact: Bob Johnson
(401) 293-0176
bjohnson@atlanticsolutionsltd.com

Green Wastewater Solutions (Dealer and O&M Provider)
80 Kilvert Street
Warwick, RI 02886
Contact: Rick Pezza
(401) 737-7600
rickp@gwsne.com

Model Numbers: AX-20 or AX-100

Certification: Alternative System or Technology - Class Two

Technology Type: $TN \leq 19 \text{ mg/L}$, $TSS \leq 20 \text{ mg/L}$, $BOD \leq 20 \text{ mg/L}$, Oil & Grease $\leq 5 \text{ mg/L}$

Pretreatment Category: Category 1 – Timed-Dosed

Authority to Design: CI-II Licensed Designers & RI-PEs

Description: A prepackaged packed bed filter that significantly reduces BOD and TSS inside a waterproof container installed after a two-compartment tank prior to discharge to a leachfield which may be reduced in size by 50%. When configured in Mode 3, this system is acknowledged as an approved nitrogen reducing system.

Technology Name: [AdvanTex® AX-RT Series: AX20-RT, AX25-RT \(Mode 3 Configuration\) Monitoring Protocol, Revised November 27, 2019](#)
[Monitoring Protocol Deadline July 30, 2021](#)
[\(Also approved for TSS & BOD removal in Mode 1\)](#)
NOTE: No further designs utilizing this technology for Nitrogen removal will be approved by the RIDEM until the terms of the Nitrogen Monitoring Protocol have been fulfilled by the Vendor.

Vendor Information:

Orenco Systems Incorporated
814 Airway Avenue
Sutherlin, Oregon 97479
Website: www.orenco.com

Distributors:

Atlantic Solutions, LTD
Bob Johnson
2417 East Main Road
Portsmouth, RI 02871
Tel: (401) 293-0176
Website: www.atlanticsolutionsltd.com/

Eric Ball, VP Product Development
Terry Bounds, Executive VP
Jason Churchill, Government Relations Representative
Phone: 419-668-4471
Fax: 419-663-5440

Green Wastewater Solutions
Richard Pezza
80 Kilvert Street
Warwick, RI 02886
Tel: (401) 737-7600
Website: www.greenwastewatersolutions.com/

Model Numbers: AX20-RT & AX25-RT
Certification: Alternative System or Technology - Class Two
Technology Type: TN ≤ 19 mg/L, TSS ≤ 20 mg/L, BOD ≤ 20 mg/L, Oil & Grease ≤ 5 mg/L
Pretreatment Category: Category 1 – Timed-Dosed
Authority to Design: CI-II Licensed Designers & RI-PEs

Description: The AdvanTex® AX-RT Series (the AX20-RT, AX25-RT and other smaller or larger-scale models that might be developed), is a recirculating textile filter treatment system. It is contained within a fiberglass tank installed with the access panel at grade. It is preceded by a two-compartment septic tank and discharges to a leachfield. It is approved for a 50% reduction in leachfield size as applicable by leachfield type.

Technology Name: [Amphidrome®](#)
[Amphidrome Design Guidance June 2020](#)
[Amphidrome Operation and Maintenance Manual June 2020](#)
[\(Also approved for TSS & BOD removal\)](#)

Vendor Information:

F. R. Mahony & Associates, Inc.	Contact:
273 Weymouth Street	Mike Sparks
Rockland, MA 02370	Tel: (781) 982-9300
	Fax: (781) 982-1056

Model Numbers: Amphidrome, Residential and Commercial, All Design Flows
Certification: Alternative System or Technology - Class Two
Technology Type: TN ≤ 19 mg/L, TSS ≤ 20 mg/L, BOD ≤ 20 mg/L, Oil & Grease ≤ 5 mg/L
Pretreatment Category: Category 1 – Timed-Dosed
Authority to Design: CI-II Licensed Designers & RI-PEs

Description: The Amphidrome® system uses a submerged attached growth bioreactor process operating in a batch mode.

The Amphidrome® system utilizes two tanks and one submerged attached growth bioreactor, called the Amphidrome® reactor. The first tank, the anoxic/equalization tank, is where the raw wastewater enters the system. The tank has an equalization section, a settling zone, and a sludge storage section. It serves as a primary clarifier before the Amphidrome® reactor.

This Amphidrome® reactor consists of the following four items: underdrain, support gravel, filter media, and backwash trough. The underdrain, constructed of stainless steel, is located at the bottom of the reactor. It provides support for the media and even distribution of air and water into the reactor. The underdrain has a manifold and laterals to distribute the air evenly over the entire filter bottom. The design allows for both the air and water to be delivered simultaneously--or separately--via individual pathways to the bottom of the reactor. As the air flows up through the media, the bubbles are sheared by the sand, producing finer bubbles as they rise through the filter. On top of the underdrain is 18" (five layers) of four different sizes of gravel. Above the gravel is a deep bed of coarse, round silica sand media. The media functions as filter, significantly reducing suspended solids and provides the surface area for which an attached growth biomass can be maintained. The Department allows a 50% reduction in conventional and approved AE "component technology" leachfield size with this System.

Technology Name:

BioBarrier Certification

BioBarrier Installation Manual - February 2016

BioBarrier Owner's Manual – February 2016

BioBarrier Service Manual – April 2016

Monitoring Protocol, Revised November 27, 2019

Monitoring Protocol Notification

Vendor Information:

Bio-Microbics, Inc.
16002 West 110th Street
Lenexa, KS 66219

Tel: 913-422-0707

Fax: 913-422-0808

Web: www.biomicrobics.com/

Regional Contact:

Lauren Usilton, President
J&R Sales and Service, Inc.
44 Commercial Street
Raynham, MA 02767

Tel: 508-823-9566

Web: www.JRSALESINC.COM

Email: laurenu@jrsalesinc.com

Anna Cline, Sales & Regulatory Affairs
Coordinator
Email: acline@biomicrobics.com

Model Numbers: BioBarrier 0.5N, BioBarrier 1.0N, and BioBarrier 1.5N

Certification: Alternative System or Technology - Class Two

Technology Type: $TN \leq 10 \text{ mg/L}$, $TSS \leq 30 \text{ mg/L}$, $BOD \leq 30 \text{ mg/L}$, Oil & Grease $\leq 5 \text{ mg/L}$

Pretreatment Category: Category 2 – Not Timed-Dosed

Authority to Design: CI-II Licensed Designers & RI-PEs

Description: The System incorporates a Membrane Bioreactor (MBR) and uses three-compartment tankage either as a single three-compartment tank, or a single-compartment pre-treatment tank followed by a two-compartment tank. The BioBarrier MBR is in the last of the three compartments in both configurations. The first compartment or tank provides primary treatment and is equipped with an outlet screening device (SaniTEE®). The second and third compartments must be in the same tank. Denitrification occurs in the second compartment of the System under anoxic conditions; a mixing pump installed in this compartment recycles some of the nitrified water through a baffle wall between the second and the third compartments (the aeration/membrane zone). The third compartment contains the Membrane Bioreactor, through which water passes for additional treatment prior to discharge to a leachfield by a float-activated discharge pump. The system is capable of significantly reducing biological oxygen demand (BOD_5), total suspended solids (TSS), and total nitrogen in the effluent. Based on these reductions, the Department has allowed for a 45% reduction in leachfield size.

Technology Name: [Bioclere Certification Manual – September 1, 2019](#)

Vendor Information: Aquapoint.3, LLC
Mark Lubbers
39 Tarkiln Place
New Bedford, MA 02745
508-985-9050, extension 105
mlubbers@aquapoint.com

Model Numbers: Bioclere 16-Series, 24-Series, 30-Series, and 36-Series

Certification: Alternative System or Technology - Class Two

Pretreatment Category: Category 2 – Not Timed-Dosed

Technology Type: $TN \leq 19 \text{ mg/L}$, $TSS \leq 30 \text{ mg/L}$, $BOD \leq 30 \text{ mg/L}$, Oil & Grease $\leq 5 \text{ mg/L}$

Authority to Design: CI-II Licensed Designers & RI-PEs

Description: The Technology consists of a modified trickling filter positioned over a clarifier. Effluent from the septic tank enters the System and is pumped up to the top of the insulated unit where it is evenly distributed over the surface of the filter media. Biochemical oxidation takes place as the water trickles through the filter and over the biological film that grows on the surface of these randomly packed pieces of PVC plastic. Oxygen is supplied to the system through a small axial fan located in the top of the housing. RIDEM has allowed for a 45% reduction in leachfield size as specified in the Certification.

Technology Name: [FAST® Certification FAST Manual – September 10, 2019](#)

Vendor Information:

Bio-Microbics, Inc.
16002 West 110th Street
Lenexa, KS 66219

Tel: 913-422-0707

Tel (toll-free): 800-753-3278

Fax: 913-422-0808

Web: www.biomicrobics.com/

Jim Bell, Executive Vice President

Email: jbelle@biomicrobics.com

Regional Contact:

J&R Sales and Services
5344 Commercial Street
Raynham, MA 02767

Tel: 508-823-9566

Fax: 508-880-7232

Web: www.JRSALESINC.COM

Lauren D. Usilton, President

Email: laurenu@jrsalesinc.com

Model Numbers: MicroFAST 0.5, MicroFAST 0.625, MicroFAST 0.75 and MicroFAST 0.9

Certification: Alternative System or Technology - Class One

Pretreatment Category: Category 2 – Not Timed-Dosed

Technology Type: $TN \leq 19 \text{ mg/L}$; $TSS \leq 30 \text{ mg/L}$; $BOD \leq 30 \text{ mg/L}$; O&G $\leq 5 \text{ mg/L}$

Authority to Design: CI-II Licensed Designers & RI-PEs

Description: The FAST (Fixed Activated Sludge Treatment) system is an aerobic wastewater treatment system that utilizes an aerobic fixed film process that is a combination of the conventional trickling filter and activated sludge processes. The FAST system is designed to be installed within a two-compartment tank where the first compartment provides a primary settling zone for incoming sewage and the second houses the actual FAST system. The system contains submerged media that provide surfaces for microbial growth. Aeration and circulation are provided by a blower that pumps air into a draft tube that extends down the center of the tank. The system is capable of significantly reducing biological oxygen demand (BOD_5), total suspended solids (TSS), and total nitrogen in the effluent. Based on these reductions, the Department has allowed for a 45% reduction in leachfield size.

Technology Name: [FujiClean Certification](#)
[Category 1 Approval March 11, 2021](#)
[Monitoring Protocol, Revised November 27, 2019](#)
[Monitoring Protocol Approval May 14, 2020](#)
[Fuji Clean Design Manual - November 20, 2019](#)
[Fuji Clean Installation Manual – November 20, 2019](#)
[Fuji Clean O&M Manual – November 20, 2019](#)

Vendor Information:
Fuji Clean USA, LLC
41-2 Greenwood Road, Ste 2
Brunswick, ME 04011 USA
Tel: 207-406-2927
Fax: 207-406-2929
Web: www.fujicleanusa.com

Contact:
Scott Samuelson
cell: 207-415-7885
Email: scott@fujicleanusa.com

Model Numbers: CEN5, CEN7 and CEN10
Certification: Alternative System or Technology - Class Two
Pretreatment Category: Category 1
Technology Type: $TN \leq 19 \text{ mg/L}$; $TSS \leq 20 \text{ mg/L}$; $BOD \leq 20 \text{ mg/L}$; $O\&G \leq 5 \text{ mg/L}$
Authority to Design: CI-II Licensed Designers & RI-PEs

Description: The System is a single fiber-reinforced plastic tank divided into three chambers. Wastewater flows in a circuitous path through the sedimentation chamber to an anoxic chamber containing media followed by an aerobic chamber containing two types of media. Media in the System provide mechanical filtration and facilitate fixed-film and suspended-growth microorganisms' anaerobic and aerobic biodegradation of wastewater constituents, including conversions of nitrogen species to nitrogen gas. Wastewater and sludge are recirculated from the third chamber back to the sedimentation chamber. One small blower, a diaphragm compressor, provides aeration, airlift recirculation and airlift pump discharge of treated effluent to a leachfield. A 50% reduction in leachfield size is allowed for conventional leachfields.

Technology Name: [Hydro-Kinetic Model 600 FEU](#)
[Monitoring Protocol, Revised November 27, 2019](#)
[Monitoring Protocol Deadline July 30, 2021](#)

Vendor Information:
Norweco, Inc.
220 Republic Street
Norwalk, OH 44857
Tel: 419-668-4471
Web: www.norweco.com
Scott Hetrick, Vice President of Sales
Email: shetrick@norweco.com
Tel: 419-669-4471
Fax: 419-663-5440

Technology Name & Model Numbers:
Hydro-Kinetic Model 600 FEU
(Maximum design flow 600 GPD)

Certification
Class Two

Pretreatment Category
Category 2 – Not Timed-Dosed

Technology Type:
 $TN \leq 10 \text{ mg/L}$, $TSS \leq 20 \text{ mg/L}$, $BOD \leq 20 \text{ mg/L}$, $O\&G \leq 5 \text{ mg/L}$

Design Authority
Class II Licensed Designers and RI-Pes

Local Contacts (Distributors/Dealers)

Siegmund Environmental Services
102 West Main Street
Norton, MA 02766

Matthew Dalton
Tel: 401-785-0130
Fax: 508-222-2499
Email: matt@seswastewater.com

Sterling Environmental Technologies
319A West Beach Road
Charlestown, RI 02813

Tel: 401-322-7669
Robert Frost
Tel: 401-523-4812
Fax: 401-315-0750
Email: bob@sterling-et.com

Description: The System uses extended aeration, attached growth, nitrification and denitrification processes to treat wastewater. It consists of four treatment chambers (pretreatment, anoxic, aeration and clarification) followed by a Hydro-Kinetic FEU filter containing filter media facilitating additional reduction of BOD and TSS by attached growth, prior to discharge to a leachfield. The clarification chamber incorporates a flow equalization unit. Aeration is controlled by a factory-programmed timer and wastewater is recirculated from the clarifier back to the anoxic chamber at factory set intervals. The system is available with both concrete and HDPE tankage and with the pre-treatment tank either integral to the other three chambers in a four-chambered tank, or as a distinct tank. Designs incorporating this System and a conventional leachfield shall be allowed a 40% reduction in the required leachfield size.

Technology Name: Nitrex™

Effective April 9, 2019 Nitrex is no longer an approved technology in Rhode Island; the RIDEM OWTS Program will not accept construction applications specifying Nitrex.

System owners may contact Lombardo Associates, Inc. at:

Pio Lombardo, PE
Lombardo Associates, Inc.
188 Church Street
Newton, MA 02458
Tel: (617) 964-2924
Fax: (617) 332-5477
E-mail: pio@LombardoAssociates.com

Technology Name: Singulair DN [concrete] (500, 750, 1000, 1250 & 1500 gpd)
Singulair DN Green® 500 [HDPE](maximum design flow 600 gpd)

Vendor Information:

Norweco, Inc.
220 Republic Street
Norwalk, OH 44857

Tel: 419-668-4471
Web: www.norweco.com

Scott Hetrick, Vice President of Sales
Email: shetrick@norweco.com
Tel: 419-669-4471
Fax: 419-663-5440

Technology Name & Model Numbers:

Concrete:

Singulair DN 500, 750, 1000, 1250 & 1500 gpd

HDPE:

Singulair DN Green® 500 (maximum design flow 600 gpd)

Certification

Class Two

Pretreatment Category

Category 2 – Not Timed-Dosed

Technology Type:

TN ≤ 19 mg/L, TSS ≤ 20 mg/L, BOD ≤ 20 mg/L, O&G ≤ 5 mg/L

Design Authority

Class II Licensed Designers and RI-PEs

Local Contacts (Distributors/Dealers)

Siegmund Environmental Services
102 West Main Street
Norton, MA 02766

Matthew Dalton
Tel: 401-785-0130
Fax: 508-222-2499
Email: matt@seswastewater.com

Sterling Environmental Technologies
319A West Beach Road
Charlestown, RI 02813

Tel: 401-322-7669
Robert Frost
Tel: 401-523-4812
Fax: 401-315-0750
Email: bob@sterling-et.com

Description: The Singlair wastewater treatment system is a self-contained three-chambered treatment system utilizing primary treatment (settling), mechanical aeration, clarification, and flow equalization to achieve treatment. Wastewater from the building enters the primary settling chamber through an inlet tee, then enters an aeration chamber. In the aeration chamber, an aspirator at the bottom of a shaft disperses air radially as fine bubbles provide oxygen for the biomass and vertically mix chamber contents. The wastewater in the aeration chamber passes through to the clarification chamber for final settling of solids. A portion of the clarified wastewater is recirculated back to either the inlet pipe (building sewer) or into the primary chamber for denitrification. Treated wastewater passes through an effluent filter as it exits the system and is then gravity fed to the leachfield. The RIDEM recognizes the System as capable of achieving effluent concentrations of 30 mg/L for both TSS and BOD and less than or equal to 19 mg/L TN. Based on these reductions, the RIDEM has allowed for a 40% reduction in leachfield size.

*Where site conditions and design flow accommodate, Norweco Singlair Green® 600 may be used in place of the concrete Singlair tank.

Technology Name:

[Singlair TNT \[concrete\] 600, 750, 1000, 1250 and 1500](#)

[Singlair Green TNT \[HDPE\] 500](#)

[Monitoring Protocol, Revised November 27, 2019](#)

[Monitoring Protocol Deadline July 30, 2021](#)

NOTE: No further designs utilizing this technology for Nitrogen removal will be approved by the RIDEM until the terms of the Nitrogen Monitoring Protocol have been fulfilled by the Vendor.

Vendor Information:

Norweco, Inc.
220 Republic Street
Norwalk, OH 44857

Tel: 419-668-4471
Web: www.norweco.com

Scott Hetrick, Vice President of Sales
Email: shetrick@norweco.com
Tel: 419-669-4471
Fax: 419-663-5440

Technology Name & Model Numbers:

Concrete: Singlair TNT 600, 750, 1000, 1250, 1500

HDPE: Singlair Green TNT 500
(Maximum design flow 600 GPD)

Certification

Class Two

Pretreatment Category

Category 2 – Not Timed-Dosed

Technology Type:

TN ≤ 19 mg/L, TSS ≤ 20 mg/L, BOD ≤ 20 mg/L, O&G ≤ 5 mg/L

Design Authority

Class II Licensed Designers and RI-PEs

Local Contacts (Distributors/Dealers)

Siegmund Environmental Services
102 West Main Street
Norton, MA 02766

Matthew Dalton
Tel: 401-785-0130
Fax: 508-222-2499
Email: matt@seswastewater.com

Sterling Environmental Technologies
319A West Beach Road
Charlestown, RI 02813

Tel: 401-322-7669
Robert Frost
Tel: 401-523-4812
Fax: 401-315-0750
Email: bob@sterling-et.com

Description: The Singulair TNT and Singulair Green TNT Wastewater Treatment System

The System consists of a three-chambered tank. The first chamber provides pretreatment, the second is an aeration chamber with an infused air system: air is introduced to the aeration chamber by an aeration system, which spins a hollow aspirator shaft, drawing air into the hollow shaft through four intake ports located beneath the aerator handle; the aerator vent through which the air is drawn is integral to the access cover above the aerator. The aeration system is controlled by a factory programmed, non-adjustable timer to run a 60 minute aeration cycle followed by a 60 minute anoxic cycle, during which the aerator is not running. Settling takes place in the clarification chamber (the third chamber) following aeration and currents generated by the spinning aerator draw sludge from the clarification chamber back to the aeration chamber. The Bio-Kinetic filter within the clarification chamber filters wastewater prior to discharge to a leachfield. The system is capable of significantly reducing biological oxygen demand (BOD₅) and total suspended solids (TSS) in the effluent. Based on these reductions, the Department has allowed for a 40% reduction in leachfield size.

Technology Name: [Recirculating Sand Filter](#)

Vendor Information: Generic

Certification: Guidelines for the Design, Use, and Maintenance of Pressurized Drainfields - November 2013

Technology Type: TN ≤ 19 mg/L, TSS ≤ 10 mg/L, BOD ≤ 10 mg/L, Fecal Coliform ≤ 10,000 cfu/100mL

Authority to Design: CI-II Licensed Designers and RI-PEs

Description: Wastewater, having received primary treatment in a septic tank or equivalent unit, flows by gravity to a recirculation (mixing) tank. In doses controlled by both a programmable timer and float switch, the mixed fresh wastewater and partially treated filter effluent is applied to a bed of coarse sand (fine gravel) media. This mixed wastewater is dispersed over the filter surface in a PVC distribution network surrounded in pea stone. Wastewater trickles down through the sand media, where biological treatment occurs. The treated effluent is collected in an underdrain at the bottom of the filter and discharged back to the recirculation tank. There most of it mixes with incoming wastewater, a small amount gets discharged to the drainfield, and the cycle begins again. Typically, a buoyant-ball check valve is used to control discharge and recirculation. Treated wastewater is discharged to a drainfield for additional treatment. The system is capable of significantly reducing biological oxygen demand (BOD₅), total suspended solids (TSS), and total nitrogen in the effluent. The technology is targeted for use in critical resource areas and is intended to be used with shallow pressurized drainfields.

Technology Name: [SeptiTech
Models M400D, M550D, M750D, M1200D, M1500D, M2500D and M3000D
\(M series models approved for TSS & BOD removal\)](#)

Vendor Information: Bio-Microbics of Maine, Inc.
16002 West 110th Street
Lenexa, KS 66219

Contacts: Tracey Rioux
69 Holland Street
Lewiston, Maine 04240
Tel: (207) 333-6940

Fax: (207) 333-6944

Models: M400D, M550D, M750D, M1200D, M1500D, M2500D and M3000D
Certification: Alternative System or Technology - Class Two
Technology Type: $TN \leq 19 \text{ mg/L}$, $TSS \leq 20 \text{ mg/L}$, $BOD \leq 20 \text{ mg/L}$, Oil & Grease $\leq 5 \text{ mg/L}$
Pretreatment Category: Category 1 – Timed-Dosed
Authority to Design: CI-II Licensed Designers and RI-PEs

Description: SeptiTech is an aerobic biological trickling filter, hereafter referred as the “System”. The System is a two-tank design with a primary anoxic tank (a septic tank) followed by the aerobic trickling filter tank (the SeptiTech processor tank). Raw wastewater enters and passes through the primary anoxic tank to a reservoir beneath treatment media in the aerobic processor tank. The wastewater is aerated and sprayed onto the media; a programmable logic controller (PLC) controls the timing and sequence of the recirculation of wastewater in the lower collection reservoir. A portion of the wastewater is pumped back to the septic tank; this process is self-adjusting based on demand and is controlled by the PLC. Treated wastewater is time dosed to a leachfield. A 50% reduction of leachfield area is allowed for RIDEM approved Class One leachfield components and conventional leachfields.

D. LEACHFIELD RENOVATION

Technology Name: [SoilAir™ Certification](#)
[SoilAir™ Design Manual](#)
[SoilAir™ Installation Manual](#)
[SoilAir™ Operation and Maintenance Manual](#)

Vendor Information: David Potts
Geomatrix Systems, LLC
114 Mill Road East
Old Saybrook, CT 06475
Tel: 860-510-0730
Fax: 860-510-0735
www.geomatrixsystems.com/

Certification: Alternative Component – Class Two
Technology Type: Air Supplementation - Leachfield Renovation and New Construction
Authority to Design: CI-I and II Licensed Designers & RI-PEs

Description: SoilAir™ is installed after a septic tank, or a RIDEM-approved advanced treatment system; it intermittently supplies air which flows through the leachfield and surrounding soil. It may be used for repair of septic systems that have failed due to excessive organic build up resulting in a restrictive biomat, by eliminating oxygen deficit in and around the leachfield. It may also be used with new systems to prevent an oxygen deficit from developing in and around the leachfield.

Technology Name:

[White Knight™ Microbial Inoculator Generator Certification
Models WK-40, WK-78, WK150, WK200](#)

[White Knight MIG Design, Installation, Operation, & Service Manual for
RI – June 2020](#)

Vendor Information:

Mark C. Noga, President
Knight Treatment Systems, Inc.
281 County Route 51A
Oswego, NY 13126
Tel: 800-560-2454
Fax: 315-343-6114
mark@knighttreatment.com
www.knighttreatment.com

Certification:

Alternative System or Technology – Class Two

Technology Type:

Microbial Inoculator/Generator Leachfield Renovation

Authority to Design:

CI-I and II Licensed Designers & RI-PEs

Description: The White Knight™ Microbial Inoculator/Generator (White Knight™) is contained within a HDPE cylinder, designed to be installed into a septic tank, continuously inoculating the tank with non-pathogenic IOS-500™ bacterial cultures. An air pump provides fine bubble aeration and circulation within the System bringing the bacteria into contact with fixed film substrate and the suspended organic compounds in the septic tank. The IOS-500™ bacteria released by the System digest organic wastes in the septic tank and in the leachfield.

White Knight™ is approved for renovation of Onsite Wastewater Treatment Systems (OWTS) that are organically clogged resulting in hydraulic failure, as follows.

1. a) In the Salt Pond and Narrow River Critical Resource Areas White Knight™ may be used only if the leachfield was properly sized in accordance with the Regulations in effect at the time the permit was approved, as evidenced by the approved permit. If the leachfield did not meet the requirements of the Regulations in effect at the time the permit was approved, or if there is no permit available for the subject system, the site is not eligible for use of White Knight™.
b) In all other areas of the State an approved permit, or system analysis performed by a Class II OWTS designer, or a RI-PE, documenting that the system is suitable for use, is required.
2. Statewide, in addition to the two sets of requirements cited above, candidate site eligibility is determined based on system size, type and condition. The site evaluation must confirm that the system failure is due to organic clogging in the leachfield.

White Knight™ may also be installed in a properly functioning OWTS as well as a new OWTS, by application for new construction.

E. EXPERIMENTAL TECHNOLOGIES

Non- Proprietary**Technology Name:**

[Layered Soil Treatment Area \(LSTA\) Certification
LSTA Design, Installation, and O&M Manual – March 2, 2021
LSTA A/E Technology Application – March 2, 2021](#)

Applicant Information:

Town of Charlestown, RI
Office of Environmental Scientist and On-Site Wastewater Management
Charlestown Town Hall
4540 South County Trail
Charlestown, RI 02813
Phone: 401-364-5030

Contacts:

Matthew J. Dowling
Email: mdowling@charlestownri.org

Certification:

Experimental Leachfield Technology

Technology Type:

TN ≤ 19 mg/L, TSS ≤ 30 mg/L, BOD ≤ 30 mg/L, Oil & Grease ≤ 5 mg/L

Description: The LSTA OWTS technology is a non-proprietary method of facilitating waste strength reduction as well as sequential nitrification and denitrification of residential strength septic tank effluent (STE) utilizing only the drainfield and no other additional treatment components. The treatment train consists of a two-compartment septic tank with a hanging pump vault in the second compartment and the LSTA. The waste strength reduction and nitrogen removal processes are passive, using only one pump to time-dose STE to the LSTA surface. Because the LSTA is a single pass media filter it does not require wastewater to be recirculated between multiple compartments or actively aerated. The LSTA configuration relies only on stratification of aerobic and anaerobic carbon-amended zones within the LSTA, leveraging the microbial communities to sequentially nitrify and denitrify the incoming nitrogen in the septic tank effluent within the two layers of the LSTA.