



**INSIDE: ONSITE ADAPTABILITY** A Case Study in High Strength Wastewater Treatment, 12



#### Polylok 24" Rhino (10 Hole) Distribution Box

The Polylok 24" Rhino Box makes even the toughest applications a breeze with its strength and versatility. The Rhino Box has ten potential openings making it great for any drain field application. Polylok's 24" stackable riser system can be used to easily bring the Rhino Box to grade. The Rhino Box will accept 2", 3", 4" & 6" pipe.

Polylok, Inc. has been at the forefront of onsite wastewater technology for over 40 years. With an extensive line of effluent filters, septic tank risers and covers, filter and tank alarms, saftey devices, distribution boxes, and an array of onsite wastewater accessories, we are your one stop shop for all your septic tank needs. Trust the company that experts and professionals have trusted for over 40 years!



Visit our web site for our complete line of more than 200 onsite wastewater & drainage products. www.polylok.com / 1-877-765-9565

#### NEW EMERGING PROFESSIONALS COMMITTEE

We are pleased to announce the formation of a new committee within NOWRA - the Emerging Professionals Committee. This committee was formed after interest and discussions with young professionals at the 2021 Onsite Wastewater Mega-Conference. NOWRA defines an Emerging Professional as a student, a young professional, or a new professional to the onsite wastewater treatment field.

The Mission of the committee is as follows:

NOWRA's Emerging Professionals Committee is dedicated to workforce development, recruitment, and advocacy on behalf of young and early career professionals in the onsite wastewater treatment sector.

If you are interested in finding out more, or joining this committee, please contact the Chairperson, Robert Bair, at rbair@usf.edu. For more information on any of NOWRA's Committees, check out our Committee web page or email the NOWRA office at info@nowra. org.



# **INSIDE THIS ISSUE**

Executive Director's Message	4
A Note From The President	5
State Affiliate News	6
Legislative Update	8
2022 Backhoe ROE-D-HOE® Championship	10
Corporate Members	11
Feature: Onsite Adaptability	12
NOWRA Board of Directors	22

# **ADVERTISER INDEX**

Polylok	2
Hiblow, Inc	5
BioMicrobics, Inc	7
Presby Environmental	9
Jet, Inc	
Salcor, Inc	
Eljen Corporation	15
Roth Global Plastics, Inc	17
Infiltrator Water Technologies	
American Manufacturing Company	BACK



#### PUBLISHED FOR THE NATIONAL ONSITE WASTEWATER RECYCLING ASSOCIATION



National Onsite Wastewater Recycling Association Thomas Groves, Executive Director P.O. Box 982, Westford, MA 01886 Phone: 978-496-1800 Fax: 703-997-5609 Email: executivedirector@nowra.org

Published by Transcript Publishing 817 Central Avenue; PO Box 752 New Rockford, ND 58356 For Advertising Inquiries: Editor/Publisher: Amy Wobbema (701) 947-2417 amyw@transcriptpublishing.com

©2022. All rights reserved.

Contents may not be reproduced by any means, in whole or in part, without prior written permission from Transcript Publishing or the National Onsite Wastewater Recycling Association.



# EXECUTIVE DIRECTOR'S MESSAGE

#### Thomas Groves, Exec. Director

Wow, I can't believe that a year has gone by since I have taken the helm as Executive Director of this great organization. A lot of progress has been made in the last 12 months, but there is still much more work to do.

We concluded 2021 with the exciting news of the President's signing of the Infrastructure Bill that creates a Decentralized Wastewater Grant Program. But unfortunately, our work has just begun, as now we need to do our part to make sure that Congress appropriates enough money to properly fund the program so EPA can begin it's development. The Bill included language that authorized the Decentralized

Wastewater Grant Program at the level of \$50M per year for five years.

NOWRA held our annual Legislative Fly-In on April 5 and 6, and like 2021, we conducted the Fly-In in a virtual format. NOWRA members met with staff members of their congressional delegation to discuss the need for adequately funding the Decentralized Grant Program, along with several other messages related to our industry. The meetings were very successful, with 25

members holding over 50 in-person ZOOM meetings over the two days. For more on NOWRA's Legislative activities, please read the Legislative Update on page 8 inside.

As we are returning to our normal, pre-COVID routines, we are starting to gather once again in industry trade shows and conferences. NOWRA kept a strong presence at many of our affiliate organization events in early 2022 by either providing an update of our activities, and/or attending the events in person. In late February, I attended the WWETT Show in Indianapolis where NOWRA hosted the 2022 Backhoe Roe-D-Hoe® National Championships. Check out some of the action from the Roe-D-Hoe on page 10. We are

also excited that we secured the location of our 2024 Mega-Conference for Spokane, Washington, and believe it or not, work is beginning on 2025.

Our Online Learning Academy had an extremely successful year, as many professionals used NOWRA's online courses to help them achieve the training hours that they need for their license or certification. We plan to continue to roll out NOWRA courses as well as some of our state affiliate courses to enhance the portfolio of courses that are available.

Thank you for allowing me to serve as Executive Director of this organization. I am looking forward to another great year here at NOWRA.



# **A NOTE FROM THE PRESIDENT**

I do not know about you, but I am ready for spring! This winter has been a real one in the Midwest and it is good to know that warmer temperatures are on the way.

It was fabulous to get to attend several state affiliate shows this year including Washington, Texas, Minnesota and be involved with training in Ohio, Pennsylvania, Indiana, Alberta, British Columbia and Iowa. Being at these events reminded me the value of networking. I personally think the networking opportunities through NOWRA and your state affiliates are the #1 benefit of being part of an organization focusing on septic system design, installation, and management. Even though things may vary from county to county or state to state there is much to learn from each other. Networking is not about just connecting with people. It is about connecting people with people, people with ideas, and people with opportunities. Here are highlights of the opportunities NOWRA has been working on to expand our industry over the last few months:

1) Updating our by-laws to assure we are current and relevant to the membership we represent.

2) Publishing Research Needs to further the knowledge base of our industry.

3) Planning a virtual Legislative Fly-in to meet with federal representatives to assure septic systems are kept in mind when federal resources are being allocated and policies developed.



#### Sara Heger, President

4) Developing design training to train more designers, engineers, and regulators on the design of septic systems.

With these and the many other activities going on at the national and local level, we are making good progress in making a difference which is ultimately what we should all be striving for.



The Heart of a Healthy System

5

# **STATE AFFILIATE NEWS**

#### NEBRASKA ONSITE WASTEWATER Association (Nowwa)

The 2022 Nebraska Water Industries Convention & Trade Show was a resounding success!

During February 15-17, 2022, Orton Management and Associates put on the Nebraska Water Industries Convention and Trade Show at the newly christened Crowne Plaza & Younes Convention Center in Kearney, Nebraska. The Nebraska Well Drillers and the Nebraska Onsite Waste Water Associations were excited to finally have all their constituents, members, and exhibitors face-to-face again after the pandemic hiatus. Fifty-six exhibitors and over 500 attendees spent three days reconnecting and gaining Professional Development Hours and Continuing Education Credits for certification of Nebraska's Water Well Drillers and Onsite contractors. These attendance figures were at near record numbers and we expect the statewide attraction of this annual event to continue growing.

#### OHIO ONSITE WASTEWATER Association (Oowa)

Greetings from the Buckeye State! The Ohio Onsite Wastewater Association (OOWA) held their annual conference January 4-5 at the Nationwide Conference Center in Lewis Center. Mike Stiger of Stiger Precast Inc. was awarded the Trent Lydic Memorial Ohio Onsite Wastewater Association Distinguished Service Award.

Board nominations for OOWA recently took place and the following individuals will be holding a leadership position in 2022. Zak Sherman of Infiltrator Water Technologies is President, Chris Mandich of Jet, Inc. is Vice President, Mike Rogich of Delaware General Health District is Past President, Clermont County Public Health's Robert Wildey is Treasurer, and Jason Menchhofer with the Mercer County Health District is Secretary. Dominic Dowell with Jet, Inc. and Ed Nolan with Proformance Fields & Landscape were appointed to the board. The OOWA Board of Directors is excited for the upcoming year!

#### WASHINGTON ON-SITE SEWAGE Association (Wossa)

SEPTIC-CON 2022 was an enormous success and we couldn't be more excited about the strength of

our industry in Washington State! There were 575 people in attendance at this year's conference and trade show, which also included more than 40 of the industry's leading exhibitors. It is always encouraging to see the investment that businesses and employers are willing to make in the education of their workforce. SEPTIC-CON provided an incredible 43 distinct industry training sessions. Smart business owners see education as an investment in an employee's future and their own. We have already begun planning for SEPTIC-CON 2023 and it's going to be BIG. Be sure to mark your calendars for January 27 & 28, 2023.

SEPTIC-CON 2022 was full of incredible achievements. At this year's conference, we awarded William Stuth the second ever WOSSA Lifetime Achievement Award. Not only did he receive the award, but the name of the award was changed to the Stuth and Stonebridge Award in honor of both William Stuth and Jerry Stonebridge. The WOSSA Scholarship and Legislative Fundraiser was epic to say the least. The auction and raffle raised a record setting amount of money ... topping a mind-blowing \$126,000!

Through both Federal and State grant funding sources, WOSSA continues to partner with organizations throughout the US to deliver industry specific safety training for on-site professionals. WOSSA has been awarded its 10th safety specific training grant for workers in the on-site industry, titled: "Workplace Safety and Health Training on Infectious Diseases, Including COVID-19 for On-Site Septic Professionals." Funding for this grant is provided by OSHA's Susan Harwood Training Grant Program. WOSSA has already had the privilege of providing no-cost safety training for NOWWA, NEKES and TOWA in 2022.

#### WISCONSIN ONSITE WATER RECYCLING Association (Wowra)

WOWRA held its Joint Winter Conference on January 13 and 14 in Wisconsin Dells, WI. Session topics included Pharmaceuticals in Septic Systems; Driving Safety + CDL Changes + Substance Abuse Testing; Contracts - Material Shortages and Delays; Septic Systems Around the World; PFAS/PFOS – What You Need to Know; Pooper Bloopers; Soils; and POWTS and High Water/Flood Plain. An exhibitor show was also held, along with the annual meeting of the association.

The future of an existing POWTS replacement program was a hot topic at the Conference, as was the state's allocation of staff resources to help reduce plan review times during peak season. Funding for a septage characterization study was approved, and that study will be completed by Fall 2022. The association will need to prepare for possible opportunities and/or threats that may result from the survey.

Overall, the number of systems installed in the state is on the rise and 2022 is expected to be another big year.

#### YANKEE ONSITE WASTEWATER Association (Yowa)

YOWA remains committed to providing training opportunities, available to both members and non-members. Our latest offering occurred on March 22. Onsite system professionals from the Massachusetts Alternative Septic System Test Center (MASSTC), including George Heufelder, presented on the following topics:

- Title 5 Setbacks: How far is far enough? The experts share their experience with respect to regulation-driven setback requirements involving property lines, foundations, wells and groundwater, and wetlands as well as their expertise in dealing with other challenging site situations.
- Layer Cakes: Are they still on the dessert menu?

Continuing research on so-called "layer cake" systems will be discussed with a focus on assessing whether treatment performance increases or decreases over time.

YOWA also welcomes Alyssa Rusiecki as its new President. Alyssa has taken the reins following three years of active leadership provided by outgoing President Dan Ottenheimer. She has been involved with YOWA since its inception in the mid-1990s and has been active in advancing educational opportunities provided by YOWA. Presently, Alyssa is the Assistant Director for the environmental health program at the University of Massachusetts, where she oversees public health issues on the campus. She is looking forward to leading YOWA for the next several years.

NOWRA conducts bimonthly calls with our state affiliate organizations. For more on NOWRA's affiliate state organizations, visit our web site at: www.nowra.org/.about/state-organizations/ Better Better Water, Better World."

# Innovative

ertifications

Onsite A leader in decentralized wastewater treatment

Microbial

International Commercial Robust

Operationa

Biological

Integrated

Commitment

Standards

# BIO MICROBICS

BETTER WATER. BETTER WORLD."

1-800-753-3287

www.biomicrobics.com sales@biomicrobics.com



#### by Tracy Hammond, Polsinelli

The NOWRA Board of Governors and our government relations team in Washington continue to work with congressional champions, the Senate Environment & Public Works Committee and the House Transportation & Infrastructure Committee in order to secure millions of dollars in funding for decentralized wastewater system grants in the Build Back Better economic recovery package. The House approved a version of this legislation last fall, but progress has slowed in the Senate.

The Build Back Better Act (H.R. 5376) approved by the House of Representatives would direct money to the EPA this year to provide grants to states, municipalities and nonprofits to disburse to homeowners for the construction, repair, or replacement of their individual decentralized wastewater treatment systems. NOWRA sent a letter to Speaker Nancy Pelosi (D-CA) and Majority Leader Chuck Schumer (D-NY) detailing the importance of this funding and expressing our support for the inclusion of this funding in any final package that can be enacted.

The EPA is now beginning the process of drafting new rules and regulations to implement the similar Decentralized Wastewater Grant program that was enacted in the bipartisan Investment in Infrastructure and Jobs Act, H.R. 3684. NOWRA will remain in

# **LEGISLATIVE UPDATE**

communication with our partners at the Agency throughout the process to ensure the program best serves homeowners who rely on decentralized wastewater systems; as well as those who serve and supply them.

While H.R. 3684 authorizes up to \$50 million annually for the Decentralized Wastewater Grant program, Congress must still appropriate the money each year to the EPA. It is now up to NOWRA's members and our team in Washington to work with congressional appropriators to secure funding for this new program through the annual appropriations process beginning this spring.

At the same time, NOWRA and allied stakeholders will keep advocating for funding for Department of Agriculture's Decentralized Water Systems program. This program received \$5 million in the current 2022 fiscal year, the same amount it received in 2021. NOWRA is coordinating with other groups and congressional allies to increase this funding up to \$20 million in the coming year to provide additional assistance to those in rural areas who need assistance to install, repair or replace decentralized treatment systems.

In February, NOWRA formally endorsed H.R. 6591, the Protecting Infrastructure and Promoting Environmental Stewardship (PIPES) Act. The PIPES Act would provide consumers with a flushability standard and the information they need to properly dispose of wet wipes. This will both better protect their onsite systems and the environment. The PIPES Act would require the EPA to establish standards for the flushability of disposable wipes and would impose serious, yet reasonable, financial penalties on companies who are knowingly not in compliance with these standards. NOWRA supports this measure and would like to thank the bill's sponsors, Rep. Lisa McClain (R-MI) and Rep. Alan Lowenthal (D-CA) for their efforts in developing this much-needed legislation.

Finally, NOWRA's Board of Governors and our team in Washington conducted several dozen meetings with our Congressional representatives on April 5 and 6. Like last year, these meetings were held virtually because of COVID-19 and increased security on Capitol Hill due to the events last January 6. We will use these discussions to further educate members of Congress on the important role onsite systems play in America's water infrastructure and push for increased support and resources for our customers and our industry through the 2023 appropriations process.

Tracy Hammond is a Senior Policy Advisor with Polsinelli's Public Policy Group in the firm's Washington Office. He advises clients on federal legislation and regulation in the areas of infrastructure, water and environmental policy and serves as one of NOWRA's lobbyists in Washington, DC.

# A D V A N C E D ENVROSEPTC Passive Onsite Wastewater Treatment Systems

# **Combined Treatment and Dispersal**

- Treats and disperses wastewater in the same footprint.
- No electricity, replacement media or maintenance required.
- Flexible configurations for sloped or curved sites.



f©in



Presby Environmental, Inc.

presbyenvironmental.com · info@presbyeco.com • (800) 473-5298

An Infiltrator Water Technologies Company

# 2022 NATIONAL BACKHOE ROE-D-HOE<sup>®</sup> CHAMPIONSHIP





E LJ300466







#### **Diamond Level:**





Gold Level:

American Manufacturing Co. Jet, Inc. Norweco, Inc. Salcor, Inc.

Silver Level: Bio-Microbics, Inc. Ecological Tanks Orenco Systems Polylok

Bronze Level: Hoot Systems, LLC Netafim USA Roth Global Plastics WaterColor Management **Copper Level:** Ashland Water Group Hiblow USA, Inc. Residential Sewage Treatment Company

To learn more about or to join NOWRA's Corporate Membership program, please contact us at (978) 496-1800, by email at info@nowra.org, or on our website at www.nowra.org/about/corporate-members/.



The Onsite Journal Spring 2022 **11** 



# Onsite adaptability

### Treatment of high strength wastewater from a small rural slaughterhouse and meat processing plant

#### By Dominic Mercier, P.E.

Decentralized Wastewater applications and challenges come in different sizes and shapes. But when it comes to tackling high strength sewage from slaughterhouses, it is often referred to as the "king of sewage challenges." In other words, if not approached and engineered properly, all the ingredients for failure are present. This case study gives some insights on how one should approach this type of project even when stringent effluent quality is required.

A small rural privately-owned slaughterhouse located in Eastern Canada (Photo 1) has been on the radar of the Ministry of Environment for some time for its failing septic system discharging untreated effluent towards a river. The owner hired a couple of different engineering firms over a 5-year period to identify what were the best options to repair the failing system. The main obstacle was that this type of business, regardless of its size, falls under specific regulation pertaining to industrial applications. In other words, the requirements for effluent quality are the same as mega-industries processing thousands of pounds of meat per day. This site is slaughtering once a week and consequently had limited technical and financial resources.

Enviro-STEP Technologies, a Quebec based company specializing in onsite and decentralized technologies engaged in accompanying the owner in finding a solution while meeting the regulatory requirements and staying within the owner's financial and technical capacities.

Obstacles were clearly visible from day one. The most important one was to educate the owner in understanding the impacts of dayto-day operations and wastewater management practices performed by him and his employees on the quality and quantity of his process wastewater. For this type of endeavor to succeed, the owner and his staff must adopt best management practices reducing the variability of the waste stream and the organic load discharged. For example, they implemented rigorous practices for the recuperation of the blood and large solids. Blood is sold to a company producing animal food. Blood has a chemical oxygen demand (COD) of 375,000 mg/L. It is by far the greatest contributor of the wastewater organic loading. Any measured taken to reduce discharge of blood into the wastewater flow will vield huge benefits in terms of cost of treatment and final effluent quality.

Another major challenge was to

make the authorities (regulators) realize that these types of small operations do not follow the same design criteria and hypothesis as their larger industry counterparts. Guidelines and handbooks on slaughterhouses and meat processing plants exist, but they suggest theoretical water use that greatly overestimate flow rates compared to the reality of smaller micro-operations. The only way to demonstrate the lower water use and consequently smaller wastewater flow rate was to undergo a thorough monitoring of the water usage and use real data gathered from several wastewater characterization studies. A water meter was installed on the water well and flow data collected every day for several weeks.

A log of the number of animals slaughtered was also taken for correlating water use with the number of animals killed. Two such wastewater characterizations were done, first in 2011 by another firm and second in 2017/2018 by Enviro-STEP as shown in Figure 1. Data were compared with literature values and appropriate design criteria were developed. These values were accepted by the ministry of Environment (permitting authority) since they were the most representative of the operation.



Figure 1: Water use vs the number of animal slaughtered study done by Enviro-STEP.

The last but not least of the challenges was to comply with the effluent quality requirement, which was to pretreat the wastewater to values comparable to domestic sewage. This needed to be done consistently all year long in a climate that sees outside temperatures ranging from -20°F to 90°F. If succeeding with this task, the pretreated effluent would be authorized to be discharged to a subsurface treatment and dispersal system. One interesting aspect clearly seen in the Figure 1 is that there is a minimum volume of wastewater needed in the cleaning process that is independent of the number of animals processed and that the water use increases rather slowly with the number of animals processed. The difference between one and 45 animals slaughtered was less than 1,500 liters. For this type of operation, the wastewater volume was generally under 3,000 L/d with an average around 2,500 L/d. (Note: 3.785 liters = 1 gallon)

Looking at the wastewater characterization data, we observe significant variations. These variations concurred with the wide range of concentration reported by the literature. As explained earlier, the cleaning and blood recuperation practices play a huge role in the wastewater strength. Consequently, the design values were taken with a certain level of safety factor.



#### **Treatment Strategy and Results**



Photo 2: Pretreatment system installation.

The strategy put forward for this project was to divide the pretreatment system into multiple stages to give as much room as potential for flexibility and adaptability. For example, the use of multiple treatment steps would allow for better troubleshooting and identification of where improvements should be done. It was decided that the main pretreatment process should be a completely mixed biological reactor. This process is a simple technology offering flexibility, can be easily broken down in multiple stages if needed, and it allows for future modifications and enhancements. Amongst those potential modifications that we identified were increasing aeration, introducing recirculation, mixing chemicals for nutrient, pH or alkalinity adjustments, or eventually adding a fixed film media to transform the process into a moving bed bioreactor. Once the process wastewater was pretreated, it would be mixed with the remaining of the building domestic sewage and further handled using a more

traditional septic system.

The treatment system installed in this case has the following two treatment trains:

Train #1: Pretreatment of the high strength wastewater

• Two 5,000-liter (1,320-gallon) grease interceptor in series. Last tank equipped with an effluent filter with alarm.

• One 12,000-liter (3,170-gallon) dual compartment tank. First compartment is a 4,000-liter completely mixed bioreactor called BIO-REDOX followed by 8,000-liter settling and sludge holding compartment. (See Photo 2)

Train #2: Final combined wastewater treatment system (combining pretreated effluent and domestic sewage)

• One 5,000-liter (1,320-gallon) septic tank with effluent filter

• One 4,000-liter flow equalization tank

• One ELJEN GSF combined treatment and dispersal system

consisting of 42 biofiltration GSF modules over a 65 m<sup>2</sup> (700 ft<sup>2</sup>) subsurface dispersal area. (See Photo 3)

The system, referred here as "Phase I," was installed and commissioned late 2017. Table 1 shows the effluent quality measured in the septic tank of the final treatment train. This is referred to as the combined effluent (pretreatment effluent + domestic sewage inflow). We observed that BOD and TKN concentrations were higher in the combined effluent than in the pretreatment effluent, suggesting that the low domestic flow was in fact decreasing the quality of the pretreatment. We also confirm that highest effluent TKN values were seen in the winter months. The **BIO-REDOX** unit was performing very well. Data taken at the pretreatment stage showed an excellent BOD and TKN removal around 80 to 90 percent. Phosphorus was on average higher than the target value of 10 mg/L.



Photo 3: Eljen Treatment and Dispersal System installation.

# Need help with a Tough Site?

CSF

0

18001 AAA 1959

Just call our toll-free number. We're now serving more locations than ever before!



Innovative Onsite Products and Solutions Since 1970

1-800-444-1359 eljen.com



Parameter (mg/l)	<b>BIO-REDOX Influent</b>	<b>BIO-REDOX Effluent</b>	<b>Combined Effluent</b>
COD	2300 to 2740 mg/l	341 to 583 mg/l	-
CBOD₅	910 to 1760 mg/l	45 to 119 mg/l	72 to 280 mg/l
TSS	-		
TKN	222 to 334 mg/l	46 to 60 mg/l	58 to 145 mg/l
Total Phosphorus		-	8 to 18
Fat, Oil and Grease	2	-	5 to 50
рН	19		7 to 8

Table 1: Effluent quality from phase I

Parameter (mg/l)	2019	2020	2021
CBOD <sub>5</sub>	3 to 39 mg/l	4 to 32 mg/l	6 to 30 mg/l
TSS	16 to 83 mg/l	9 to 88 mg/l	24 to 56 mg/l
TKN	16 to 75 mg/l	9 to 60 mg/l	38 to 89 mg/l
Total Phosphorus	7 to 27 mg/l	6 to 24 mg/l	6 to 25 mg/l
Fat, Oil and Grease	-	-	5 to 11
рН	-	<del>, </del>	6.5 to 8

Table 2: Combined effluent quality from phase II

Grease interceptors in series were doing their job well.

After analysis of the data, it was concluded that Phase I, even though giving very encouraging and good results, could not guarantee meeting the "domestic wastewater" quality consistently all year long especially with the negative impact coming from the domestic portion. A phase II was developed to boost nitrogen removal and tackle some of the phosphorus.

It was decided to add three features to the treatment system:

Feature #1: Retrofit of a 3,000-liter (800-gallon) flow equalization tank between grease interceptor #2 and the BIO-REDOX. This modification would spread the high strength stream generated on a single day, over the entire week to enhance even more the pretreatment performances.

Feature #2: Add another 7,000-liter (1,850-gallon) BIO-REDOX stage #2 in front of the existing one strictly dedicated to BOD removal. The intent was to assure a low BOD environment entering stage #2 for the nitrifier bacteria to grow.

Feature #3: Create a circulation loop between the final equalization tank located just before the ELJEN GSF system back to the BIO-RE-DOX stage #1 to induce multiple passes and give the domestic sewage a chance to pass through the pretreatment phases. Recirculation ratio was set at 1 to 1.

Phase 2 was implemented in the summer of 2019. Effluent quality from fall 2019, 2020 and 2021 (Table 2), clearly show the improved BOD removal resulting from the added features as well as the enhanced TKN removal which allowed us the reach an average concentration below the target value. We suspect again that the low water uses from the other "domestic sewage" generating activities are causing higher concentrations in the combined effluent masking the real performance of the pretreatment train. Nevertheless, we can definitely conclude that the treatment train can bring the very high strength wastewater from the slaughterhouse down to domestic levels.

Regarding the fluctuating phosphorus, we are now helping the owner to reduce the phosphorus discharge right from the start by adding tablets of aluminum sulfate (alum) in the wash water drain that slowly dissolve during the cleaning process, allowing phosphorus to react and precipitate in the treatment train. This part is still under investigation.

#### Conclusion

The wastewater treatment from slaughterhouses and many other high strength applications are often some the biggest tasks for onsite designers. This project clearly demonstrates an innovative design approach for reducing very high levels of organic and nitrogen pollution using simple processes and readily available equipment.

This could have not been possible without these essential ingredients that are: adequate data acquisition (flow monitoring and wastewater characterization), education and involvement from the owner and staff, good wastewater engineering knowledge and practices and finally the use of adaptive technology.

The cost of this entire project ended up at around \$50,000 worth of equipment and tankage plus installation. The total cost was less than half of the other proposed solution bid obtained initially by the customer before starting this project. In addition to the lower cost and higher performance, the process selected still offers adaptability potential for the future expansion. In the future, when necessary, the recirculation ratio can be increased, fixed film media can be added in one or the two BIO-RE-DOX reactors stages and a coagulant can easily be added for enhanced phosphorus removal in the reactor.

Adaptability of simple onsite wastewater technologies makes compliance to stringent regulation and effluent criteria possible and accessible.



Photo 4: Repaired system, final product

#### About the Author:

Dominic Mercier is a Professional Engineer with over 25 years of expertise in the design of onsite wastewater systems. He is the owner of Enviro-STEP Technologies, a Canadian company offering onsite wastewater treatment technologies for residential, commercial and industrial applications. Information about onsite treatment solutions offered by Enviro-STEP Technologies is available at www.enviro-step.ca.



Septic Tanks • Water Cisterns Pump Tanks Holding Tanks • Rain Water Harvesting

# Multi Usage

Multi Layer

## Multi Coverage

- Inner layer of FDA approved virgin HDPE, two inside layers of PE for improved stability, plus one outer layer of black and UV-stabilized PE
- Lifetime\* corrosion protection and 5 years of labor insurance
- Strongest & heaviest poly tank on the market
- No water for backfilling required
- Low profile
- 100% watertight

Roth Global Plastics www.rothmultitank.com 866-943-7256





Our multi-layered tank construction, consisting of virgin material surrounded by 3 layers of protection.

# **NOWRA BOARD OF DIRECTORS 2021-22**

#### **EXECUTIVE COMMITTEE DEC 2020 - NOV 2022**

Sara Heger, Ph.D. (President) Research Engineer & Adjunct Asst. Professor University of Minnesota Water Resources Center St. Paul, MN

#### Gary Hawkins, Ph.D.

Agricultural and Biological Engineer University of Georgia Watkinsville, GA

Kate Carney, P.E. Owner Church OWC, LLC. Golden, CO

#### **Chris Chapman**

Owner Show Me Soils St. Clair, MO

#### Marcia Degen, Ph.D., P.E.

Environmental Technical Services Manager Virginia Dept. of Health Roanoke, VA

#### **Jim King** (**Treasurer**) President Eljen Corporation Windsor, CT

Allison Blodig (VP/Pres. Elect) Engineering Systems Consultant Infiltrator Water Technologies Ozawkie, KS

#### Carl Thompson, P.E. (Past President)

Vice President Sales & Delta Advanced Infiltrator Water Technologies Old Saybrook, CT

#### Claude Goguen

National Precast Concrete Association Director of Outreach and Technical Education Carmel, IN

#### Josh Gunia

Vice President A Advanced Septic & Construction Services Sumner, WA

#### Anish Jantrania, Ph.D., P.E., M.B.A.

Associate Professor Texas A & M University College Station, TX

**Chris LeClair, R.E.H.S.** Director Land & Resource Mgmt. Ottertail County Fergus Falls, MN

#### Ed Schloss

Sales Manager Jet, Inc. Cleveland, OH

#### **Tom Schimelfenig**

Owner Schimelfenig Excavating Bowdon, ND

#### Tricia Scott

Onsite Wastewater Program Specialist NE Dept. of Environment and Energy Lincoln, NE

#### Morris Smith, P.E.

Morris Smith Engineering Palm Bay, FL



New Board Member Gary Hawkins, Ph.D. Category: Academic

We welcome Gary Hawkins to the NOWRA Board of Directors. Hawkins was appointed to the Board in December by President Sara Heger to complete the remaining term of Sergio Abit, who needed to step down from the Board. Gary was the Education Committee vicechair and has also agreed to move up to be the chair of that committee. Welcome aboard Gary!

Dr. Gary Hawkins is an Associate Professor and the Water Resource Management and Policy Specialist with the College of Agricultural and Environmental Sciences at the University of Georgia. He has been working with UGA for 21 years in various areas covering pollution prevention, water management and alternative energy. He graduated from Clemson University, Auburn University and the University of Tennessee with degrees in Agricultural Engineering and works in the Crop and Soils Department. His current focus is working with water conservation in agricultural systems, stormwater management, onsite waste treatment, but his job responsibilities also covers all aspects of water quality, quantity and conservation.



# **Engineered For Performance**



**Infiltrator Product Line** 





P.O. Box 982 Westford, MA 01886



#### Visit the "New", "Updated", "Revamped", and "Relaunched"

# www.americanonsite.com

Everything you'll ever need for your Onsite and Decentralized Wastewater project.

Controls for Water & Wastewater Systems Perc-Rite® Drip Dispersal Systems

Septic & Onsite Products



1-800-345-3132