

Innovative/Alternative OWTS Charrette

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NEWEA Annual Conference & Exhibit

Boston Marriott Copley Place



NEW ENGLAND WATER ENVIRONMENT ASSOCIATION

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WORKING FOR WATER QUALITY

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1. Executive Summary

Cape Cod water quality problems are getting worse faster than we seem to be addressing them. How can we accelerate our response? There is a new generation of Innovative/Alternative Onsite Wastewater Treatment Systems (I/A OWTS) that reduces effluent nitrogen concentrations below 12 mg/L, with some as low as 5 mg/L, levels that will make a real difference in Cape water quality.

A key question is how to manage them to ensure continuing performance for the long haul. MassDEP and EPA both support the concept of Responsible Management Entities (RMEs) to oversee Operations, Maintenance and Monitoring (OM&M). RMEs need to be flexible to adapt to multiple town environments, a key in Massachusetts with its Home Rule political structure.

The NEWEA Innovation Council and I/A OWTS Task Force hosted a five-hour charrette on 1/24/2022, bringing 28 senior water professionals together to discuss RMEs and a pilot implementation on the Cape. Once successful, it will inform other areas served by NEWEA and beyond.

We started by listening to a number of key perspectives (recorded), then split into four breakout groups to work on a number of questions. Results are documented in this report, organized according to the meeting flow and questions asked. Some key findings include the need to:

- Treat I/A OWTS as Infrastructure, and it should be managed by professionals (not homeowners).
- Consider I/A systems where sewers are not planned in CWMPs, nor where phosphorus is a problem in ponds (at least until phosphorus treatment is approved in an I/A's configuration).
- Identify N sensitive areas (estuaries, etc.) and incorporate them into the Title 5 regulatory structure to treat the whole problem, not just drinking water.
- Refine the definition of Best Available Technology to include systems that have achieved General Approval and Provisional Approval (where the performance data shows superior treatment) and how that concept will be implemented to drive toward best solutions, not just the cheapest.
- Field test multiple remote sensors and learn how best to use them to reduce costs and for performance management, and eventually for compliance.
- Work to streamline data gathering and analysis to shorten the time and cost of achieving General Permit status for new technologies.
- Find additional funding vehicles to accelerate both General Permit status and market adoption. We will host a follow-on meeting on funding from both private and public sources.

Importantly, The Nature Conservancy has committed \$100,000 in preliminary funding to stand-up an RME Pilot program, and we thank them for their leadership!

2. Introduction to the Charrette and Readout Notes

On 1/24/22 NEWEA's I/A OWTS Task Force hosted a five-hour, virtual charrette with 28 participants, listed below, on the topic of Responsible Management Entities (RME).

This was an invitation-only event due to the need to keep the numbers small and encourage open communications from busy people with significant perspective. The first question was, "Who do we want on the bus?" Everybody we asked enthusiastically agreed to participate. Along the way we solicited input on the format and topics we should "chew on". Originally, we had hoped to address funding as well, but it became clear there was insufficient time to give both topics justice. We are planning a second event on funding in the near future.

A half-dozen questions, listed below, were developed and shared with participants a few days ahead of the event.

We started by listening for 90 minutes to presentations from various perspectives: MassDEP, Pleasant Bay Watershed, Barnstable County/MASSTC, Buzzards Bay Coalition, Long Island, NY's Suffolk County. We are very grateful for the presenters' efforts in putting together and presenting excellent materials. We solicited brief comments from towns around the region who wanted to add thoughts.

Then we broke into four breakout sessions, each with a session-leader and a note-taker. They conferred for the next three hours (with a break for lunch). The teams stayed well focused on the questions at hand and expanded the conversations beneficially.

The final half hour was spent reading out the key findings in a general session. The general sessions have been recorded and can be found on our website.

Subsequently, I have reviewed 34 typed pages of meeting notes and identified well over 200 separate comments. They have organized them into eight topics, generally keeping the discipline of putting each comment into only one "bucket". We also created an executive summary.

This report is in outline format with bold strikes to highlight key terms. The objective was to create a brief outline of key comments and questions, creating a reference check list rather than a narrative tome. Hopefully it will be useful as such.

Participants were highly knowledgeable people. If they say or ask something, it is worth listening to. There should be no surprises here. There was a lot of common understanding and agreement but also plenty of questions and concerns. Much still needs to be developed. Thank you to all who participated. If meetings like this help move things forward, we are being successful.

I especially want to thank the breakout leaders who acted as a wonderful committee in shaping the event and this report. They are Alison Bowden, Scott Horsley, Maggie Fieldsteel and Marianne Langridge. Also, the note-taking function was handled exceptionally well by Emma Gildesgame, Megan Goldsmith, Jennifer Loughran, and Kathleen Mason. Brian Baumgaertel at MASSTC has also provided very helpful

insights along the way. And special thanks to Janice Moran and Heather Howard at NEWEA for their production support.

I would be happy to discuss this with anyone.

Respectfully submitted, Bruce H. Walton

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Home page:

<https://www.newea.org/about-us/committees/innovative-alternative-onsite-water-treatment-systems-task-force/>

Resources:

<https://www.newea.org/resources/innovation/resources/>

I/A Charrette Attendees 1/24/22

<u>Person</u>	<u>Title</u>	<u>Organization</u>
Brian "Brian" Baumgaertel	Director	MASSTC
Alison "Alison" Bowden	Director, Science & Strategy	Nature Conservancy, The
Marybeth "Marybeth" Chubb	Wastewater Section Chief	MassDEP
Alissa "Alissa" Cox	Director, NE Onsite Wastewater Trng Pgm	University of Rhode Island
Zenas "Zee" Crocker	Executive Director	Barnstable Clean Water Coalition
Ian "Ian" Dombroski	SNEP Program Coordinator	EPA Region 1
Matt "Matt" Dowling	On-site Wastewater Manager	Charlestown, RI, Town of
Robert "Bud" Dunbar	President	Verified Water, Inc.
MaryJo "MaryJo" Moubry Feuerbach	Mgr, Watershed & Nonpoint Source Mgt Section	EPA Region 1
Maggie "Maggie" Theroux Fieldsteel	Innovative Technology Specialist - Retired	EPA Office of R&D
Tim "Tim" Gleason	Supervisory Research Biologist	EPA Office of R&D
Andrew "Andrew" Gottlieb	Executive Director	Association to Preserve Cape Cod & Mashpee Selectmen
Thomas "Tom" Groves	Executive Director	NOWRA
Scott "Scott" Horsley	Water Resources Consultant	Independent Consultant
Ian "Ian" Jarvis	Environmental Engineer, SE	MassDEP
Michelle "Shelly" Jenkins	Information Officer	NEIWPCC
Justin "Justin" Jobin	Environmental Scientist	Coastal Wastewater Solutions
Lealdon "Lealdon" Langley	Director, Division of Watershed Management	MassDEP
Marianne "Marianne" Langridge	Founder	Sustainable Synthesis
Pio "Pio" Lombardo	Owner	Lombardo Associates, Inc.
Gerard "Gerard" Martin	Deputy Reg. Dir., Bureau of Water Resources, SE Region	MassDEP
Mark "Mark" Nelson	Principal, Sr. Hydrologist	Horsley Witten Group, Inc.
Timothy "Tim" Pasakarnis	Water Resource Analyst	Cape Cod Commission
Korrin "Korrin" Petersen	Senior Attorney	Buzzards Bay Coalition
Carole "Carole" Ridley	Principal	Ridley & Associates, Inc.
Adam "Adam" Turner	Executive Director	Martha's Vineyard Commission
Bruce "Bruce" H. Walton	Partner	Battalia Winston
John "John" Waterbury	Vice Chair, Water Quality CTTEE	Falmouth, MA, Town of
Emma "Emma" Gildesgame	Analyst	Nature Conservancy, The

Megan "Megan" Goldsmith
Jennifer "Jennifer" Loughran
Cape Cod Commission

Innovation Council Intern
Project Manager - Innovative Solutions
Cape Cod Commission

NEWEA
Barnstable Clean Water
Coalition
Cape Cod Commission

Questions for the Breakout Sessions

What is the vision for where we want I/A to be in 10 years?

- Metrics?
- Milestones?

What do we want a pilot RME to accomplish or prove?

- Guidance on where to start, phases, scale, sites, etc.

How do we take advantage of, and test out, new sensor technologies in a pilot RME?

- Operational status – Are things working (e.g. blowers, others)?
- N sensor
- Measure and manage performance – other new ways

How do we “manage up” across multiple administrations?

- With the coming election, what should we want candidates to know about our issues?
- How do we create and ensure momentum?

What are the other big things we need to address together, now or in future events? For example:

- Funding – Public and private strategies
- Critical Parts for L/T performance assurance – Insurance?
- State and local regulations
- Title 5 for N sensitive areas

Readout Note Topics

1. Executive Summary
2. Introduction to Charrette and Readout Notes
3. Opening General Session
4. Vision for I/A in Ten Years
5. Pilot RME Should Accomplish or Prove...
6. RME Design Guidance
7. Sensors and Other New Technologies
8. Issues/Challenges/Questions
9. Managing Up
10. Funding

3. Opening General Session

From 21 General Session Comments

Please refer to video presentations and slides for perspectives from:

MassDEP

Pleasant Bay Alliance

MASSTC

Long Island - Lessons Learned

Buzzards Bay Coalition

These notes generally focus on highlights and comments/questions after the presentations

MassDEP sees **RME as an effective** way for towns, groups of towns, counties, and designees to meet requirements and administer monitoring, inspection, and O&M required by DEP, watershed permits and any local requirements.

MassDEP Requires, for N reduction credits, that the **town (not homeowner) is responsible for operations, maintenance and monitoring (OM&M)**.

MassDEP provides **technical assistance**, but because of **home rule**, the municipality determines the role of an RME.

MassDEP Suggests

- **Bylaws** to establish I/A program and Adaptive Management Review (AMR) program
- Build **community support**
- **Board of Health** adopts **implementation regulations**, so town does not need Town Meeting approvals on each AMR cycle

Mashpee

- Be mindful of **Phosphorus** in freshwater. Whatever is done, do it once. Don't plan to revisit a distributed site and add phosphorus support later. Very expensive to implement.
- Upgrading installed distributed systems in the field is a huge effort. Avoid the need through good planning.
- In all decisions, consider the **Technical, Practical and Political** implication.
- Also consider the **cost of doing nothing**.

Barnstable County/MASSTC

- I/A systems need to operate at **<= 12 mg/L effluent N** to affect watersheds.
- Basically, MASSTC is already doing RME work at Shubael Pond

- RMEs move **People and Data**
- Estimates upgrading the Barnstable County Septic Management Program (BCSMP) **database** as a two month effort.
- Wants to formalize role as a Pilot RME
- Submitted a draft proposal to Barnstable in November with a **three-year \$700,000 stand-up cost** estimate
- Starting to look at **Phosphorus** (but not as part of the RME)

Barnstable/Brewster

- **Don't let perfect become the enemy of good**
- Act **NOW**
- Study **CECs**
- **Real Time monitoring** is crucial
- **Leach Field** sizing should be standardized by technology

Pleasant Bay Watershed Permit. See **Pleasantbay.org**.

Cape Cod Commission

- Looking at distribution of **Risk**
- **Risk tolerance** of a town is key

Buzzards Bay Coalition

- RME = **Utility Management** = Needed
- **Stop making the problem worse** (i.e. new Title 5 installations)
- Identify **sensitive areas**
- Get **homeowner** buy-in
- Falmouth installed and managed **multiple (5) technologies**. This leads to risk reduction, and everyone will get better.
- RME Needed To
 - Select and pay engineer
 - Select and pay for the system
 - Select and pay installer
 - Manage OM&M
 - Enable volume purchasing and focus on **best, not cheapest**, system

Homeowner **Fees Will Cover RME cost**

When treating I/A as infrastructure under the management of an RME, the target performance should be an **aggregate N removal**, not house by house.

All components need to work together

- Good technology
- User buy-in
- Willing regulators
- Good managers who work with all stakeholders

Lessons from Long Island

- **RMEs save \$**
- **Multi-jurisdictional** effort
- **Rebrand** from I/A Septic Systems to **Clean Water Septic Systems** (more mainstream)
- Need
 - Significant **grant \$**
 - **Training** programs
 - Centralized **record keeping**
 - Strong **web presence**

RME and Funding are the two biggest I/A issues

4. Vision for I/A in Ten Years

From 44 Breakout Session Comments

A possible **Vision Statement** – Decentralized infrastructure has a demonstrated efficacy equivalent to centralized infrastructure where centralized systems are not cost effective.

I/A is viewed as **infrastructure**

Several I/A Systems have **General Permit status** at $\leq 10\text{-}12$ mg/L.

The **public embraces I/A** and is educated, excited and confident in I/A.

There is a clear, streamlined **General Use Approval Process**

- Other states' data is being used regularly in the permitting process

I/A is being **installed at scale and at lower prices**

Title 5 systems are no longer being installed

Watershed-based management is SOP

- Incentives and structures are in place
- Towns are motivated to think this way

Guidance is available on how to decide sewer or I/A at a site. **Economic analysis** is well documented.

An **entity** exists to **oversee and support RMEs**

- Tracks and reviews I/A performance data
- Ensures RME performance and compliance
- Advises towns, watersheds and counties on RME design options

RME concept is **successful**

- **Flexible and adaptable** from town-to-town
- Does data tracking
- Is a clearing house for system performance
- Has a **technical advisory board**
- Does continuous performance improvement
- Is mindful of new technologies that may help
- Uses process control and automation to optimize performance
- Remote monitoring is SOP

Leach field sizing is tied to system performance automatically (not by individual permit application)

Regulations are based on **performance-based standards**, providing a roadmap for cleaner water

Risk – Towns are confident that I/A works and all stakeholders are protected.

Financing is sustainable and with mechanisms in place to enable simple, accessible financing.

Laws and Regulations have evolved to support I/A

Clusters are part of the solution, especially in new construction housing developments

- Town has leverage with developer
- Helpful around conservation easements

I/As are handling **CECs**, too

5. RME Pilot Should Accomplish or Prove...

Key Action Phrases

From over 69 Breakout Session Comments

Build RME **framework and structure**

Drive **system wide or neighborhood performance**

Achieve **water quality improvements**

Prove **cost effectiveness** and **efficiency** of RME

- Remove X amount of nitrogen at Y cost, system-wide. Chart by technology/vendor.
- Compared to what? Sewering?

Include system cost in **system efficacy assessments**.

Develop **DEP partnership and collaboration**. Build a culture of careful innovation.

Design **flexibility** in approach to accommodate town preferences and tax issues.

Define **authority boundaries and accountabilities**

Manage **enforcement, interventions**. (Alert notices to DEP, homeowners (via APP), others?)

- Who has “What” authority?
- How are “noncompliant systems” reported and to whom? What steps will be taken if the systems are not fixed?

Hold **Cost of Maintenance** to under \$1000/year (\$600-800/year target)

Design, manage and deliver **data, reporting structures and reports**

- Become a **clearing house** for system performance.
- Build and maintain **install base inventory**

Prove **successful OM&M**, but not necessarily any vendor’s solution

Learn how **sensors and other technologies** (e.g. GIS) could and should be used.

- **Confidence levels**.
- Study/correlate findings, leading to sensor approval.

Provide **guidance and options** to towns, helping them to act responsibly

Incorporate **Social Equity** concerns

Develop **Contracts** with existing inspectors, maintenance firms, homeowners, vendors

- Set parameters

- Obtain volume pricing

Train inspectors, maintenance firms and eventually town RMEs. (expand URI program?)

Educate communities and **build awareness**

Engage with **MHOA and NOWRA**. Win them to the idea.

Identify **vendor system problems**

Attract multiple **funding types** with an eye for tax efficiency

Streamline and simplify

- For Homeowner
- OM&M processes. Sampling regimes.

Accelerate **permitting** to General level while ensuring **confidence** in these technologies.

- **Reduce perceived risk** to towns and homeowners (insurance?)
- Enable/facilitate **leaders** to emerge.

Take advantage of **stuff already underway** (Shubael, Falmouth, Wellfleet)

6. RME Design Guidance

From 13 Breakout Session Comments

Pilot should cover **multiple** (2-4) **locations** and (4-5) **technologies**

- Start with Shubael Pond and Falmouth; then add Wellfleet
- Pick locations where towns have interest

Avoid locations where **sewering is planned** within 15-20 years **or** where **phosphorus** is a key concern (to avoid upgrading an installation)

Ensure adequate **staffing**

Identify **Data Elements & Flows** and build **yearly report templates** early

- Mock them up and review with DEP
- Build on the Barnstable County Septic Management Program (BCSMP)

Add **water meters** to RME pilot I/A homes for load calculations (separate from irrigation)

Add/study **sensors** broadly throughout the pilot area

- Include in already installed I/A systems

Utilize **alerts to trigger visits**

Develop a planning structure and flowchart approach to develop future RMEs

7. Sensors

From 24 Breakout Session Comments

Starting Point: DEP cannot require sensors, nor are any approved.

Sensors are a potentially a **key tool** for RME effectiveness to **measure and manage performance**

Manage I/A like a wastewater treatment plant with sensing and alert systems

Sensors **flag** the need for **attention and visits**

- Reduces O&M. Increases performance
- Provides robust data

Sensors can **notify** RME, DEP, owner, contractor when I/A system goes down.

Develop **load calculation data**

- Water meters (exclude irrigation) for flow x effluent concentration = Load

Sensors will **require some staff but save field labor**

Approach: **Over-measure** all you can, early on; then back-off as you learn and develop more efficient approaches. Samples will always be needed, but perhaps less frequently as confidence in sensor-based approaches grows.

Sensors to study and exploit:

- Pumps (Amperage (on/off) & Run-time motors (flow))
- Nitrogen Sensor
- Lysimeters under leach fields
- Conductance in/out – system on/off proxy
- Photometers for field work
 - 30 Hanna Instruments systems in use in RI
 - When readings exceed a maximum value, they take a sample
- DO - although equipment needs lots of calibration

Be sure to measure **sensor stability and calibration**.

We should **collaborate with Long Island**

- Build large data sets
- Study correlations to Total N – RME and LI
- Study LI telemetry systems in use

Develop and define acceptable **“range of certainty”** and **“confidence level”** concepts

Install and study all available sensors. Learn.

- Develop path for sensors to aid in compliance as well as performance.

Build a **phone app** for owners

- Bragg to the neighbors
- Builds an alert/follow-up mentality

Develop a **communications channel** to DEP for correlation findings

Use the 8+ sensors already installed in Falmouth and Shubael Pond. Add more ASAP.

8. I/A Issues/Challenges/Questions

From 28 Breakout Session Questions

Funding – How to get it? TNC, SNEP, WRF, ARPA, impact investors, private equity, others?

How to **identify N Sensitive areas** not already with TMDL?

- Impaired watershed definition

What will be acceptable **performance standards**: 12, 10 or 5 mg/L?

- How do we incent using better performing systems?

Who drafts model town **bylaws** (RME could assist?)?

Who/how participates in developing **model regulations**?

Tax issues- How ensure non-taxable benefit assistance?

How to provide **long-term assurance** to key stakeholders – DEP, town, owner, RME?

Who drives **volume pricing**? RME vs town vs county?

Legal agreements with the owner – how to keep **risks in balance**?

Who has the **authority** to create sticks and carrots?

- Home rule vs watershed vs state/county/RME?
- At what point does the state legislature consider over-ruling home rule inaction?
- If it takes a lawsuit, who initiates?

Should **Title 5** systems OM&M be run **by RME**? Perhaps later in the pilot?

Should **nitrogen trading** be considered?

With infrastructure, normally everybody pays equally, as with sewerage. **Why should I/A homeowners pay any more** than sewerage, if they earn TMDL credits? Or otherwise meet established criteria?

How do we incorporate **Social Equity**?

How to balance home rule with a **higher-level entity driving RMEs**?

- Town vs watershed or county?
- How to build motivation for towns to work together?

Who has **watershed enforcement authority**?

What does an **Adaptive Management Review** require of a town? (first one comes next year)

How can we **incent companies to pursue General Permits**?

- Vendors view them as too long and too expensive to warrant MA investment.

- They just go elsewhere

How do we find **leaders**?

- Some towns are saying they don't need this.
- Others won't move until permits are General.
- This requires political capital.

Will towns **adopt I/A into CWMPs** once General Permits are awarded?

What **town-level sign-offs** are needed for starting a **RME Pilot**?

9. Managing Up

From 16 Breakout Session Comments

What can we do with those above us to encourage continuity and progress?

Brief **candidates** on Importance of updating Title 5 ASAP

- Leverage EPA

With the **coming election**

- What can/should we push Gov. Baker on this year?
- How do we avoid losing two years with a new governor?

Leverage **NEWEA Government Affairs Council (GAC)** if/where appropriate.

Identify **common goals, then partner and influence**

- Work within existing structures and systems

Build **broadscale support for pilot RME** and RMEs in general.

Work to get DEP **more authority to require TMDL compliance.**

- How do they get it?
- Require RME oversight.

Need **more permitting trials** in the ground (big \$ chunks), more data collection and funding.

Leadership is key and **champions** are hard to find.

- At town, watershed, county and state levels
- Leaders don't want to go into private property
- We need to build a picture of success and build confidence in the solution

Impaired waters

- Show evidence of it
- Build pain around it
- Get attention and \$

Build the **whole picture, not just about compliance**

10. Funding

From 10 Breakout Comments

Yes, Do the Funding Charrette – In April?

Chicken and Egg Problem – Getting Grants and Funding leads to Leadership interest at state level

- Only then does momentum build for Action

Need a **planning structure and flowchart approach** to funding sources.

Tax status of homeowner **grants**

- Taxable (Federal) currently in LI, NY program
- May get fixed at Federal level
- Could RME help here?

Need funding for **those who cannot afford I/A (social equity)**. With cost equalization (i.e. charging the homeowner the same for sewer services as for using I/A under an RME), all homeowners would be treated the same.

Provide **insurance/guarantees for** property owners, long-term.

Action – Bid for **ARPA** funds

Need **big chunks of \$** for moving permit approvals forward

- Vendors cannot afford
- Only companies with MassCEC, EPA, USGS, etc. awards (e.g. KleanTu and JDL) have accelerated the process to any real degree.

Find funds **beyond the state** – WRF, SNEP, Universities, impact investors, private equity

Need \$ for more **sensor test installations**