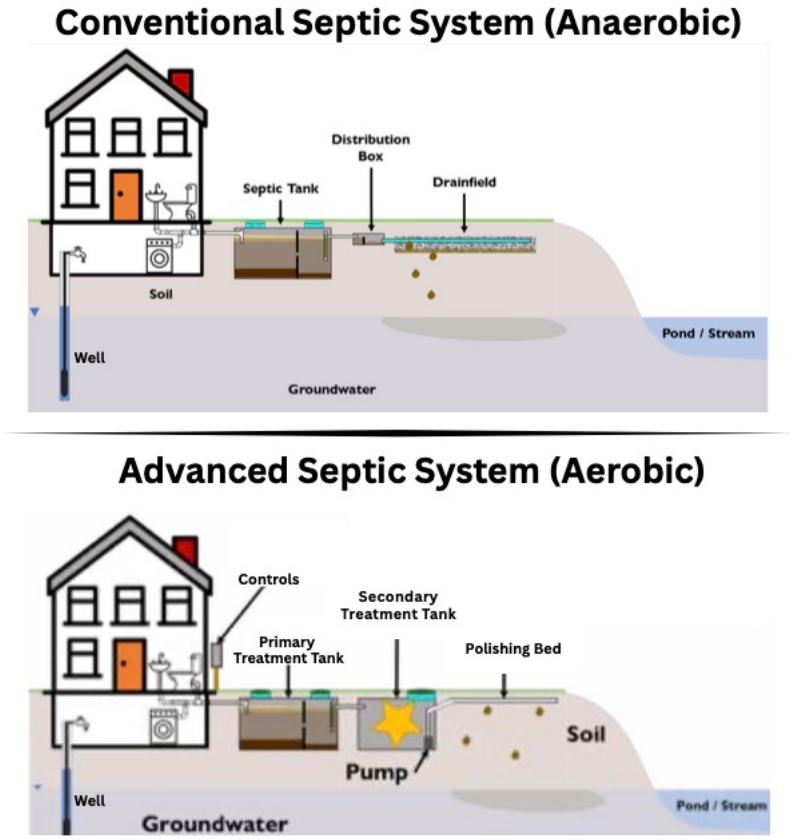
Protecting Your Lake, One Septic System at a Time

A Homeowner's Reference Guide to Septic Systems for Madison County Lakes & Watershed Properties

Your septic system is part of your lake's ecosystem — what happens in your yard doesn't stay in your yard.

Your Septic System & Your Lake

A septic system that is not working well is nearly invisible — which is exactly the problem. Systems can meet code, show no backups, and still leak nitrogen and phosphorus into the soil for years. Those nutrients feed algae. Algae blooms rob the water of oxygen as they die and decompose, and under the right conditions they turn into harmful algal blooms (HABs) and keep us and our pets from enjoying the lake.



Data Source: URI College of the Environment & Life Sciences. Advanced systems normally referred to ETU/ATU systems.

The minimum requirements for septic systems are typically not appropriate for systems near waterbodies that benefit from nutrient reduction of phosphorus and nitrogen.

The numbers are bigger than most people expect

- **~20%** of septic systems statewide are often estimated to be failing at any given time — a figure widely repeated in New York water-quality reporting — and many failing systems show no obvious symptoms.
- **23% failed, 16% substandard** of the systems inspected in the Lake George basin's first full year of septic inspections (2023); in the Town of Queensbury alone, 47 out of 148 inspections failed, nearly 32%.
- **~22% of New Yorkers** rely on a septic system rather than a sewer connection — it's a shared, statewide responsibility, not a rare exception.

Source: *Lake George Park Commission, "Final Report: 2023 LGPC Septic System Inspection Program and New Wastewater Regulations" (Jan. 2024, lgpc.ny.gov). The ~20% statewide figure is widely repeated (e.g., Governing magazine, Protect the Adirondacks).*

Which System Fits Your Property?

There is no single "best" septic system — the right choice depends on your soil, water table depth, slope, lot size, and distance to the lake. A design engineer evaluates all of this before recommending a system (see "The Design Engineer & the Permit Process on page 7).

Conventional Systems (Anaerobic)

System Type	Best Fit For	Watch Out For
Conventional Gravity Absorption Field	• Flat, well-drained lots • Deep soil, low water table, percolation requirements • Sites set back well from the shoreline	• High water tables or shallow soil • Steep slopes • Small shoreline lots — a poor fit
Pressure-Dosed Shallow Absorption Field	• Shallow-to-moderate depth to water table or bedrock • Sites needing more even effluent distribution	• Needs electricity and a pump • More components to maintain than gravity systems
Mound System	• High water table or thin soil over bedrock • Undersized or poor-soil shoreline lots	• Highly visible raised mound in the yard • Higher cost; pump requires upkeep • Can fail without regular maintenance
Holding Tanks	• Lots too small for any other septic system approach • Holding tank approach not always approved by Dept. of Health	• Recurring long term costs for regular pumping • Requires a fluid level monitor with an alarm and possibly an automatic shutoff

Why this matters for shoreline lots

Shoreline properties often present the worst-case conditions for a conventional system: thin or rocky soil, a high-water table, a nearby well, and a short distance to the water on small lots. That is why alternative designs exist—see below.

Advanced & Nutrient-Removing Options

When soil and space alone can't do the job — or when a lake's water quality calls for extra protection — engineers turn to advanced treatment technologies. The most common is the **Aerobic Treatment Unit (ATU)**, which adds a mechanical or biological treatment step before wastewater reaches the soil. An ATU treats wastewater pathogens more thoroughly but does not necessarily strip out nitrogen or phosphorus unless paired with dedicated nutrient-removal media or a separate system.

Which System Fits Your Property? (Continued)

System Type	Best Fit For	Watch Out For
Aerobic / Enhanced Treatment Unit (ATU/ETU)	• Environmentally sensitive sites near lakes or wetlands • Small lots or where higher effluent quality is required	• Needs electricity and mechanical parts (blower/pump) • Typically needs a yearly service contract • Shorter component lifespan than gravity systems
Innovative/Alternative (I/A) Nutrient-Removing System	• Lakefront lots in nutrient-sensitive watersheds • Sites where regulators or grant programs call for enhanced nitrogen/phosphorus removal	• Highest cost and most complex permitting • Often requires ongoing monitoring • See "Phosphorus-Removing Systems" on page 5
Sand Filter System	• Small lots where soil alone can't treat effluent • Sites wanting cleaner effluent before it reaches soil	• Higher cost than gravity systems • Needs a pump and more frequent maintenance

Rule of thumb, not guarantee

Soil tests, percolation tests, and a site visit from a licensed design engineer determines what your specific lot actually requires**. Two neighboring lots can call for two very different systems.**

Phosphorus-Removing Septic Systems

Ordinary septic effluent carries roughly 9–16 mg/L of phosphorus. Advanced treatment aims to cut that to under 1 mg/L — about 90% removal — using one of three approaches: chemical precipitation (iron or aluminum salts bind phosphorus into stable minerals), adsorptive filter media (iron- or calcium-based filters that capture phosphorus as effluent passes through), or enhanced biological treatment.

A Central New York case study: Owasco Lake, Cayuga County

Owasco Lake — one county over from Madison County — is on the state's impaired-waters list due to bacteria and recurring cyanobacteria blooms. As part of Cayuga County's watershed protection plan, engineers installed a nutrient-removing system at a lakefront campground facility, combining an NSF-certified treatment unit with a passive phosphorus filter and gravelless leaching chambers. Two years of weekly monitoring are informing whether — and how — similar systems could scale to ordinary homes.

Phosphorus Removal Systems Approvals are on a Case-by-case Basis

Phosphorus-removing septic technology in New York is in the pilot and demonstration stage. Many countries and states already use this technology with success. The U.S. is starting to show interest in these systems, as phosphorus is considered one of the causes of algal blooms. Studies show that phosphorus leaching from septic systems is bioavailable and therefore readily available as food for algae.

Nitrogen vs. Phosphorus: What the Most Common Systems Actually Do

Commonly Used System / Technology	Nitrogen	Phosphorus
Conventional septic tank (baseline)	–	–
Standard ATU (NSF 40 only)	–	–
Sand filter (standard media)	–	– (1)
FujiClean CEN (NSF 245 certified)	✓	–
FujiClean CRX II	✓	✓ (2)
Hydro-Action (NSF 245)	✓	–
Norweco Hydro-Kinetic / Singulair (NSF 245)	✓	–
Norweco [Singulair TNT / Hydro-Kinetic] + Phos-4-Fade Filter		✓ (3)
Orenco AdvanTex (NSF 245)	✓	–
SeptiTech STAAR / Bio-Microbics ("-N"/"D" models, NSF 245)	✓	–
Busse Membrane Bioreactor (MBR) + phosphorus module (Germany)	✓	✓ (2)
Waterloo EC-P (electrocoagulation)	–	✓

NSF Certification applies only to Nitrogen removal to meet the NYS requirements. To date, NSF does not have a phosphorus removal certification parameter.
(1) Sand filters adsorb some phosphorus, but the effect is limited and saturates over time — not a certified or guaranteed removal mechanism.
(2) Phosphorus removal mechanism confirmed via manufacturer/independent test-center data. FujiClean CRX II is imported from Japan and requires site-specific pilot approval. Busse's phosphorus module is a separate ferrous-media add-on tank, and Busse's NY approval is granted county by county.
(3) Norweco uses the Phos-4-Fade filter add-on for phosphorus removal. There are other brands that offer add-ons for phosphorus removal that can be added to a system designed for nitrogen removal.

Lot Size, Soil, Slope & Setbacks

New York's statewide design standard — NYS Department of Health Appendix 75-A — sets the baseline minimum requirements that every onsite system must meet; local towns and counties can require more, but never less unless there is a variance from the local Department of Health. The core siting factors:

- **Minimum separation distances** from wells, surface water, dwellings, and property lines (see table below).
- **Percolation and deep-hole soil tests** measure how fast water moves through your soil and how much usable soil depth you have — required before any system is designed.
- **Depth to seasonal high groundwater or bedrock** limits which system types are even possible on a given lot.
- **Slope** affects both feasibility and cost — steep shoreline lots often need engineered solutions like mound systems.

Component	From a Well	From Lake/Stream/Wetland	From Dwelling	From Property Line
Septic tank or ATU/ETU tank	50 ft	50 ft	10 ft	10 ft
Distribution box	100 ft	100 ft	20 ft	10 ft
Absorption field	100 ft	100 ft	20 ft	10 ft

Source: *NYS DOH Appendix 75-A (10 NYCRR Part 75, Appendix 75-A), Table 2, as summarized by Cornell Cooperative Extension's "Your Septic System" guide.*
Note: Setback = minimum distance between two components

ATU/ETU systems: same setbacks, sometimes a smaller field

Appendix 75-A groups "septic tank or watertight ETU" together in its separation-distance table — an ATU/ETU tank must meet the exact same well, waterbody, dwelling, and property-line setbacks as a conventional tank; distances don't shrink just because the treatment is more advanced.

Source: 10 NYCRR Appendix 75-A §75-A.4(b) Table 2 and §75-A.6(b)(6)(ii)(d) (health.ny.gov/environmental/water/drinking/docs/appendix_75a.pdf

The Design Engineer & the Permit Process

In New York, all new septic systems and substantial system upgrades must be designed by a licensed professional engineer. The engineer assesses site-specific conditions, including soil characteristics, slope, and applicable setback requirements; prepares an appropriate system design; and obtains the required regulatory approvals.

Step	What Happens
1. Site evaluation	The Codes Officer is notified of the impending septic design. A licensed design engineer visits the property to assess soil, slope, water table, and setbacks.
2. Soil & percolation testing	Test holes and perc tests establish how the site can safely treat wastewater. The design engineer uses this info to design the system.
3. System design	The engineer selects and designs a system sized and sited to meet Appendix 75-A* and any local rules.
4. Permit application	Plans go to the Town Code Enforcement Officer for review and approval. The Department of Health will also need to review, approve, and inspect the system, if an alternative system (non-conventional septic system) is used or if a site cannot meet setback requirements. The local ZBA may be required to review the design if the Code Enforcement Officer identifies the need for a setback variance.
5. Construction & inspection	An installer builds the system per the engineer's drawing (NYS does not certify installers near water bodies). The engineer and the Town Code Enforcement Officer inspect the work before it is covered and put into service. When appropriate, the system will also be inspected by the Department of Health.

Source: *Lake George Association, "Carefully Site and Maintain Your Septic System"; NYS DOH Appendix 75-A permitting framework.*
**Appendix 75-A is the NYS regulations for Wastewater Treatment Standards – Residential Onsite Systems.*

Who to call first

For most Madison County properties, your design engineer and the town's Code Enforcement Officer are your two main points of contact through this process. If your property is in a local watershed district (Cazenovia Lake or the Town of Eaton, for example - see "Know the Rules" page 8 for code regulations documented for those towns. Other towns may have their own regulations just not readily available online.

Know the Rules: New York State & Madison County

NYS DOH Appendix 75-A establishes the minimum statewide requirements and applies in every municipality, regardless of whether additional local standards are in effect. Beyond this baseline, septic system regulation in New York is primarily administered at the local level and may differ significantly among lake communities.

Madison County Watershed Districts with Local Laws (check your town for local laws):

Town of Eaton — Residential District No. 2 (RD-2)

- RD-2 covers the areas around all five lakes in the Town of Eaton. Before any sale of developed property in the district, the wastewater system must be inspected and the findings filed with the town's Code Enforcement Officer using the standard OTN inspection forms; that report is **valid for 3 years.**
- If weather prevents a pre-sale inspection, the new owner has 6 months after closing to file it. Refinancing triggers the same filing requirement if a lender requires an inspection or pump-out.
- Aerobic Treatment Units **(ATUs)** in the district must be **inspected annually**, with results sent to the Town Code Enforcement Officer.
- Non-compliance is a violation, with fines up to $250 per day.

  Source: *Town of Eaton Code, Chapter 150 (Sewers) §150-13, "Inspection of Existing Facilities"; Residential District No. 2 defined in Chapter 120 (Land Use) §120-12 (ecode360.com/EA1670).*

Cazenovia Lake Watershed District

- Properties in the Critical Water Quality Protection Zone must have septic systems inspected and pumped **at least every 5 years**, on a rotating schedule by road segment.
- Septic systems must be pumped and inspected by a DEC-licensed hauler **before any property sale or refinance** in the watershed (unless already done within 2 years).
- New or replacement systems must be designed by a licensed engineer or registered sanitarian and approved by the Town or Madison County Department of Health.

  Source: *Town of Cazenovia Code, Chapter 130, Article XIV, "Cazenovia Lake Watershed District" (ecode360.com/33611260)*

NYS Septic Replacement Fund

Madison County was awarded $100,000 for New York's Septic System Replacement Fund, but eligibility is limited to Cazenovia Lake, select tributaries, and part of Canastota Creek in Lincoln — other Madison County lakes are not currently eligible, since NYS DEC sets the priority areas, not the county. Where eligible, the fund reimburses 50% of project cost (up to $10,000) covering design, installation, and enhanced-treatment components, for a property within 250 feet of an eligible waterbody with a failing system (or one at reasonable risk of failure) and a design flow under 1,000 gallons/day. New construction does not qualify. If and when eligibility criteria changes, additional lakes may qualify.

Source: *NYS Environmental Facilities Corporation, Septic System Replacement Fund (efc.ny.gov/septic-replacement); Madison County Planning Dept. program page (madisoncounty.ny.gov/3161/Septic-System-Replacement-Fund.*

Looking ahead

State legislation has been proposed that would require home sellers statewide to provide buyers with the NYS DOH septic maintenance information pamphlet — it was not yet law as of this printing. Local septic laws are also an active topic in lake communities across the state. The connection between septic systems and lake water quality shows up in government inspection data and peer-reviewed research (see reference page for studies).

Your Maintenance Checklist

A well-designed system still depends on the household using it correctly. Most early failures come down to maintenance, not engineering — here's what keeps a system running for its full 20–30 year lifespan.

Pump & Inspect

- Have the tank inspected every 2–3 years and pumped roughly every **3–5 years** (more often with a garbage disposal or heavy use). Properties in the Cazenovia Lake or Town of Eaton RD-2 watersheds have their own requirements by law — see "Know the Rules" earlier in this booklet.

Conserve Water & Don’t Overload the System

- Spread laundry loads across the week instead of running them all in one day.
- Fix leaky toilets and faucets promptly — a running toilet can waste hundreds of gallons a day.
- Install low-flow fixtures where practical.

Watch What Goes Down the Drain

- Never flush motor oil, paint, solvents, pesticides, or medications — use a take-back program instead.
- Keep wipes (even “flushable” ones), paper towels, and sanitary products out of the toilet. These items will clog a septic pump.
- Skip the garbage disposal — it adds solids your tank has to handle.
- Commercial septic “additives” aren't proven to help, and some can stir up solids and clog the drainfield.

Protect the System on the Ground

- No trees or deep-rooted shrubs near the tank or drainfield — willow roots are especially aggressive.
- No sheds, patios, pavement, or parked vehicles over the tank or absorption field.
- Near the shoreline, a vegetated buffer between the drainfield and the water helps intercept nutrients and stabilize soil.

Warning Signs & System Lifespan

- Slow-draining sinks, tubs, or toilets that plungers and drain cleaner don't fix.
- Sewage odors or backups inside the house.
- Standing water, soggy ground, or unusually lush green grass over the drainfield — even in dry weather.
- Algae, weeds, or unpleasant odors in the lake or shoreline near your system.
- Nitrate or bacteria showing up in an annual well-water test.
- A holding-tank high-level alarm will sound — a sign the tank is full and needs pumping.

A properly designed, sited, and maintained system typically lasts 20–30 years. Most systems that fail early do so because of what happened above ground — heavy vehicles, tree roots, excessive water use, or too-infrequent pumping — not because the underlying design was flawed.

Buying or selling a lake home?

Ask for pumping and maintenance records, confirm the tank size matches the bedroom count, and note any plumbing additions since installation. If the system is in the Cazenovia Lake or Town of Eaton RD-2 watersheds, a pre-sale inspection and pump-out are required by local law before the sale can close (see "Know the Rules" on page 8).

When in doubt, test your well

Septic problems often show up in drinking water before they show up anywhere else. An annual well-water test for bacteria and nitrate is inexpensive and can catch a problem early — ask Madison County Public Health about testing options.

Government Resources

Agency / Office	Jurisdiction / Role	Address	Phone / Email
Madison County Dept. of Public Health	Environmental Health / septic permitting	138 N. Court St., Bldg. 5 Wampsville, NY 13163	Phone: (315) 366-2526 Email: health@madisoncounty.ny.gov
Madison County Soil & Water Conservation District	Technical assistance — soil, water quality, on-site wastewater guidance	6503 Wes Road Hamilton, NY 13346	Phone: (315) 824-9849 Web: madcoswcd.com
Madison County Planning Department	County land-use planning & mapping resources	138 N Court Street Building 4, Room 249 P.O. Box 606 Wampsville, NY 13163	Phone: (315) 366-2376 Email: planning@madisoncounty.ny.gov
NYS DEC — Region 7 (Syracuse Headquarters)	Regional Permit Administrator; environmental permits for Region 7 counties	5786 Widewaters Parkway Syracuse, NY 13214	Phone: (315) 426-7438 Email: dep.r7@dec.ny.gov
NYS DEC — Region 7 Sub-Office (Cortland)	Environmental permits (Broome, Chenango, Cortland, Madison, Tioga, Tompkins)	1285 Fisher Avenue Cortland, NY 13045-1090	Phone: (607) 753-3095 ext. 233 Fax: (607) 753-8532 Email: dep.r7@dec.ny.gov
Town Code Enforcement Officers	Review code compliance based on inspection	See your town website	See your town website

Note: Contact information current as of August 2026.

Thank you for your interest in learning about septic systems and for looking after the lake we all share.

Further Reading

Septic System Resources

- NYS DOH Appendix 75-A (design standards) https://health.ny.gov/environmental/water/drinking/docs/appendix_75a.pdf
- NYS Septic System Replacement Fund https://efc.ny.gov/septic-replacement

Madison County

- Madison County Water & Septic – Individual Systems https://madisoncounty.ny.gov/1506/Water-Septic---Individual-Systems
- Madison County Septic System Replacement Fund https://madisoncounty.ny.gov/3161/Septic-System-Replacement-Fund

Homeowner Guides

- Cornell Cooperative Extension — "Your Septic System" https://css.cornell.edu/cwmi/waterquality/septic/CCEWQ-YourSepticSystem-Print.pdf
- Lake George Association — Siting & Maintaining Your Septic System https://lakegeorgeassociation.org/act-now/do-it-yourself-water-quality
- Free soil-suitability lookup for your lot — USDA/NRCS Web Soil Survey https://websoilsurvey.sc.egov.usda.gov

Research & Case Studies

- SU Environmental Finance Center — "Public Problem, Private Property" https://efc.syr.edu/wp-content/uploads/2025/02/Public-Problem_Private-Property_PDF_2024_FINAL.pdf
- Lake George Park Commission — 2023 Septic Inspection Program Final Report https://lgpc.ny.gov/system/files/documents/2024/01/final-report-2023-lgpc-septic-inspection-program.pdf
- Moran & Gregg, "Beneath the Surface" (Water, 2026) — NY septic management research https://mdpi.com/2073-4441/18/9/1010
- Barnstable County MASSTC — Phosphorus Removal in Onsite Septic Systems (MA) https://masstc.org/project/critical-questions/phosphorus-removal-in-onsite-septic-systems
- Skaneateles Lake septic program https://skanlakeinfo.org/septic-systems
- NOWRA — Nutrient-Removing Septic Systems in NY (Cayuga Co. case study) https://nowra.org/Customer-Content/www/CMS/files/22Mega_Jobin_Fostering.pd
- Warren County Soil & Water Conservation District, "Detecting Failing Septic Systems on Your Lake" (with NYS DEC's Onsite Wastewater Working Group) https://warrenswcd.org/wp-content/uploads/2021/07/failingseptic.pdf — a practical field protocol for spotting failing systems near NY lakes.

This booklet is for general educational purposes and does not replace a site-specific evaluation by a licensed design engineer, the Town Code Enforcement Officer, or the Madison County Department of Health.

NOTES