Septic Advances to Safeguard Lake Kitchawan

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June 5, 2026

Woodard & Curran

Agenda

- Background Information
  - Project Location
  - Previous Studies
  - Lake Kitchawan Water Quality
  - Alternative Analysis
- Proposed Project
  - Advanced Septic Systems
  - Selected Technology
  - District Formation Process
- Next Steps
- Q&A

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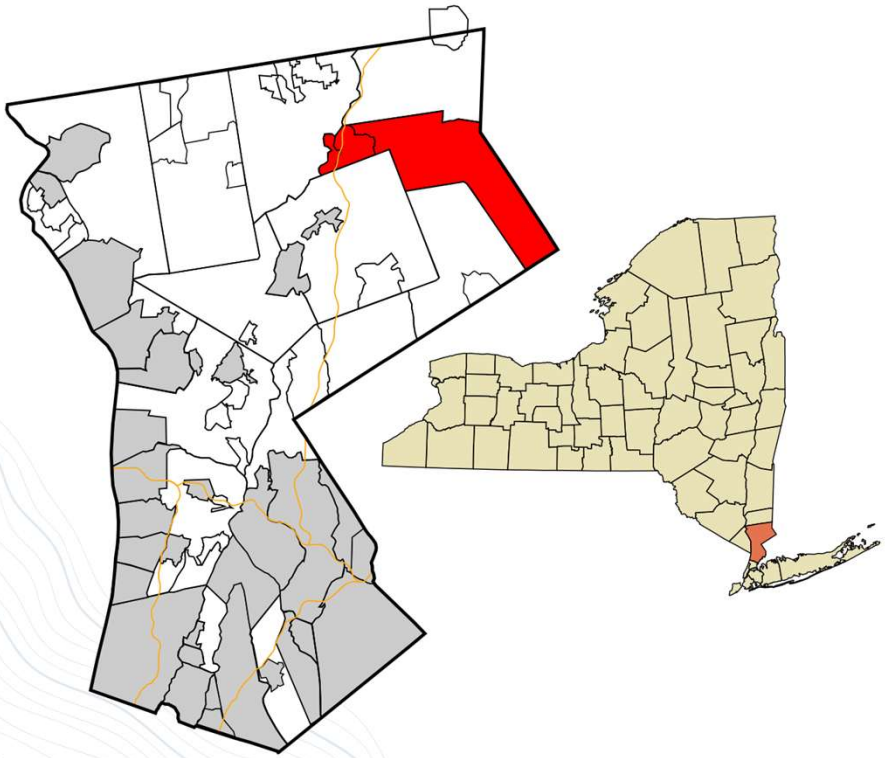
Project Location:
Lewisboro, New York



- Founded in 1747
- Northeast Westchester County, NY
- As of the 2020 census, the population was ~12,300
- 7 Lakes
  - All within Croton River Watershed (supplies drinking water to NYC)

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Project Location:
Lake Kitchawan

- 90-acre lake
- Listed on the NYSDEC Priority Waterbodies List for high nutrients
- Class B waterbody
- Located within the Cross River basin (sub-watershed of the Croton Watershed)
- Surrounding area transitioned from summer cottages to year-round residential community

Timeline

2008

Lake Kitchawan Watershed Management Plan identifies septic systems as a source of 60% of the phosphorus loading in Lake Kitchawan

Lake Kitchawan Wastewater Study was completed

2021

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Background Information

- Poor water quality has been reported in Lake Kitchawan since 2008
- Per multiple previous studies ~220 lbs/year phosphorus loading into Lake Kitchawan comes from septic systems.

- 1 lb of phosphorus can create 500 pounds of algae
- Therefore, septic system phosphorus loading can support **55 TONS** of algae in Lake Kitchawan per year

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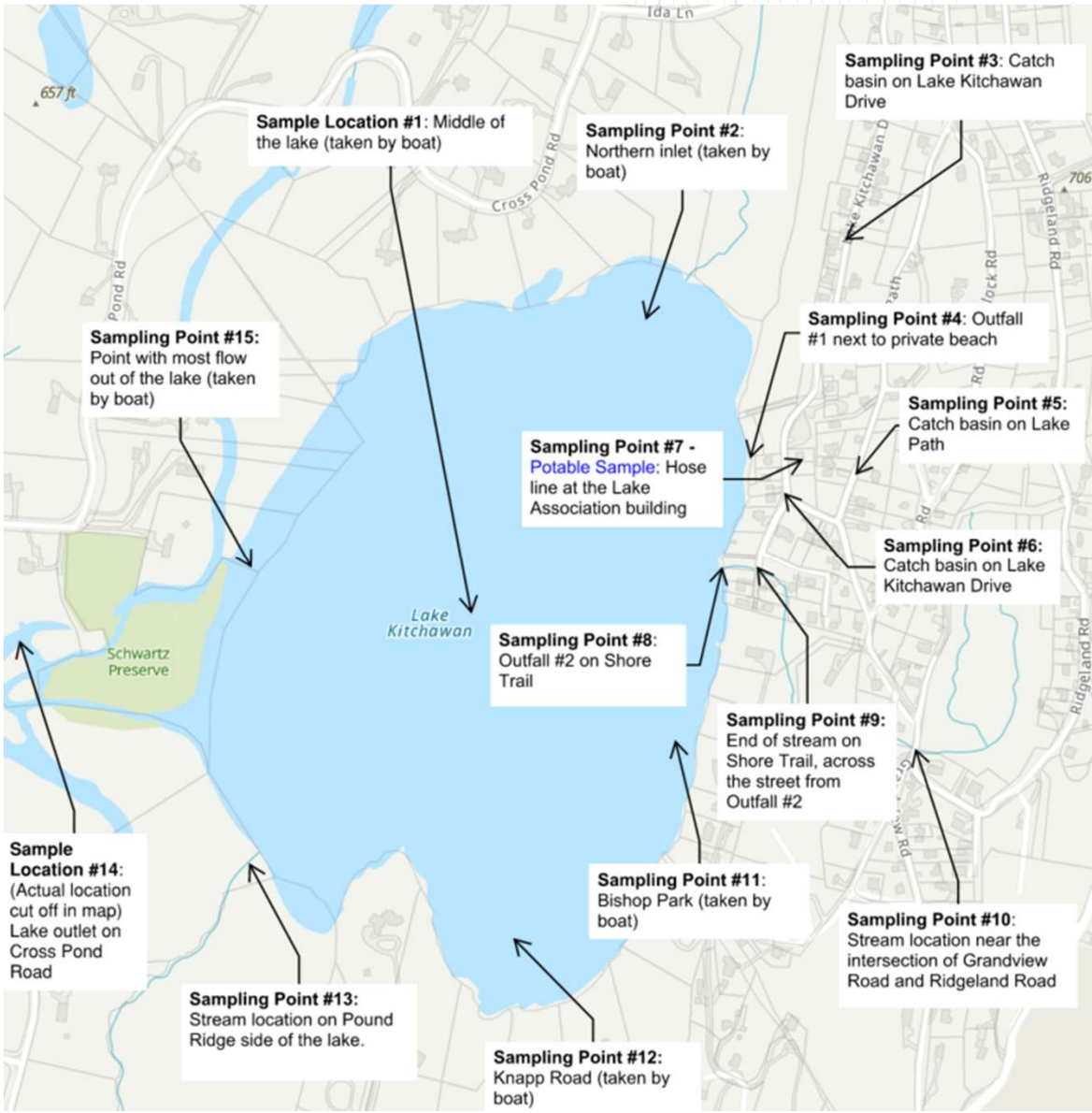
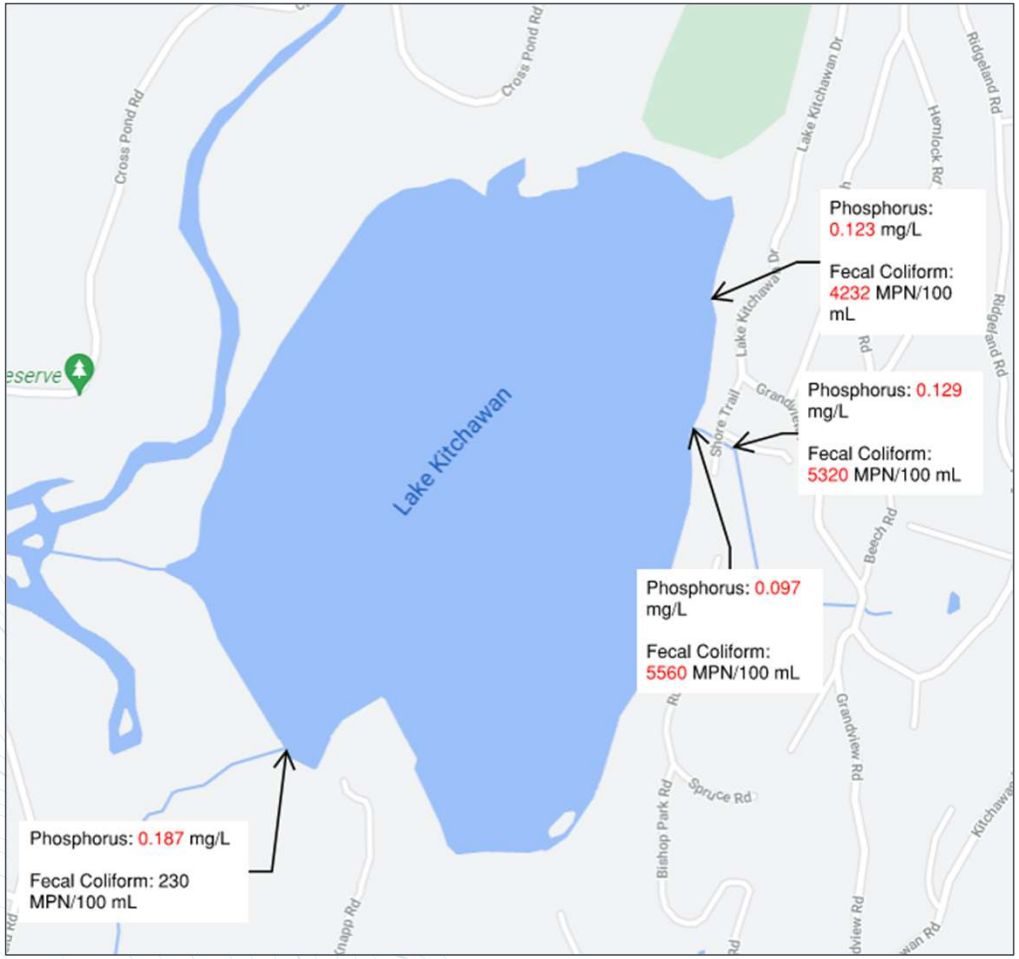
2021 Sampling



Sampling Results



2021 Average Concentrations

Eutrophic Conditions: Phosphorus > 0.020 mg/L
Fecal Coliform Health Hazard > 1,000 MPN/100mL

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Water Quality in Lake Kitchawan

- Phosphorus at the outfall on Shore Trail has increased by **66%** between 2008 and 2021
- Both outfalls on the east side of the lake have fecal coliform and E.coli levels that exceed NYSDOH health hazard levels

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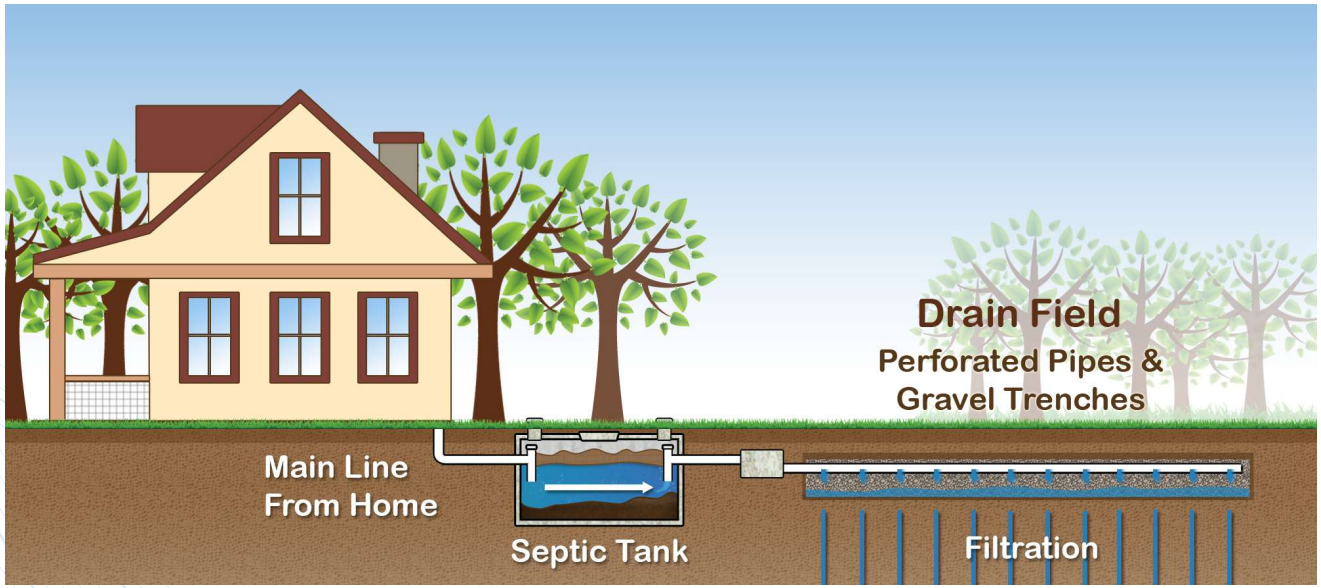
Conventional Septic Systems



- **Limitations:**
- Parcel size and setback requirements
- Topography and steep slopes
- Soil type
- Depth to groundwater
- Proximity to waterbodies

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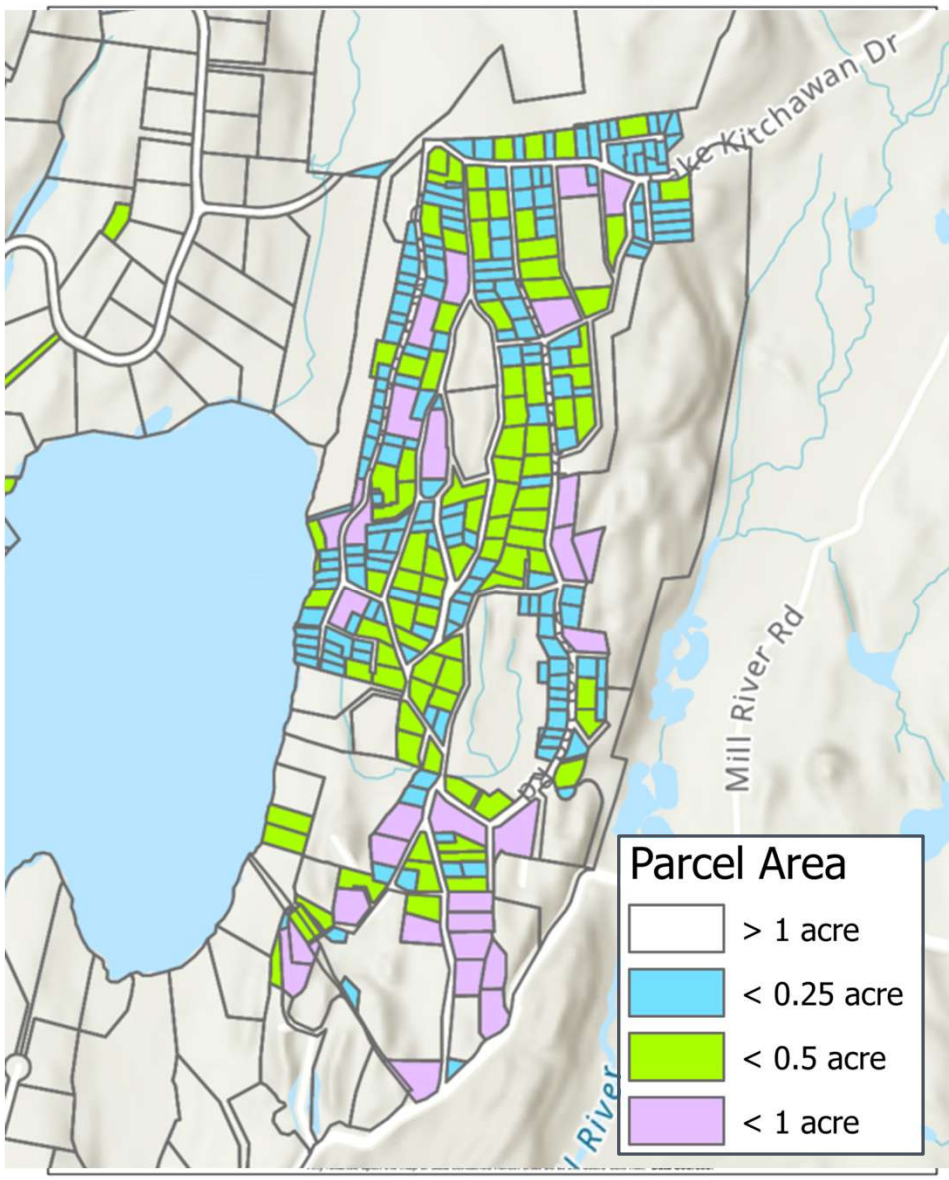
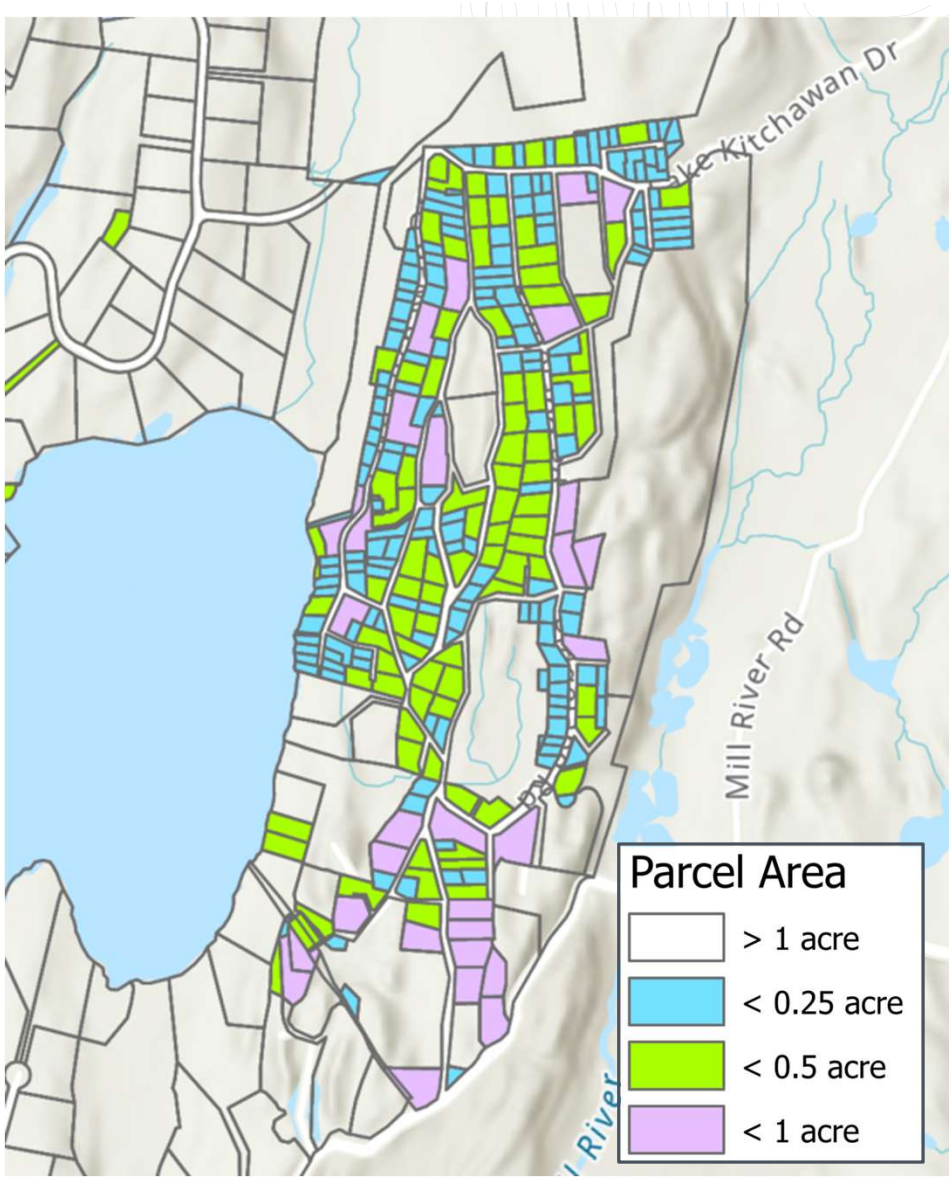
Site Conditions

- Average Parcel Size: 1.94 acres
- LKA/LKCC Average Parcel Size: 0.34 acres



Site Conditions

- Average Parcel Size: 1.94 acres
- LKA/LKCC Average Parcel Size: 0.34 acres
- Septic Density:
  - Lake Kitchawan Study Area = 274 septic systems per square mile
  - EPA Density Designation = 40 septic systems per square mile



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- Septic Density:
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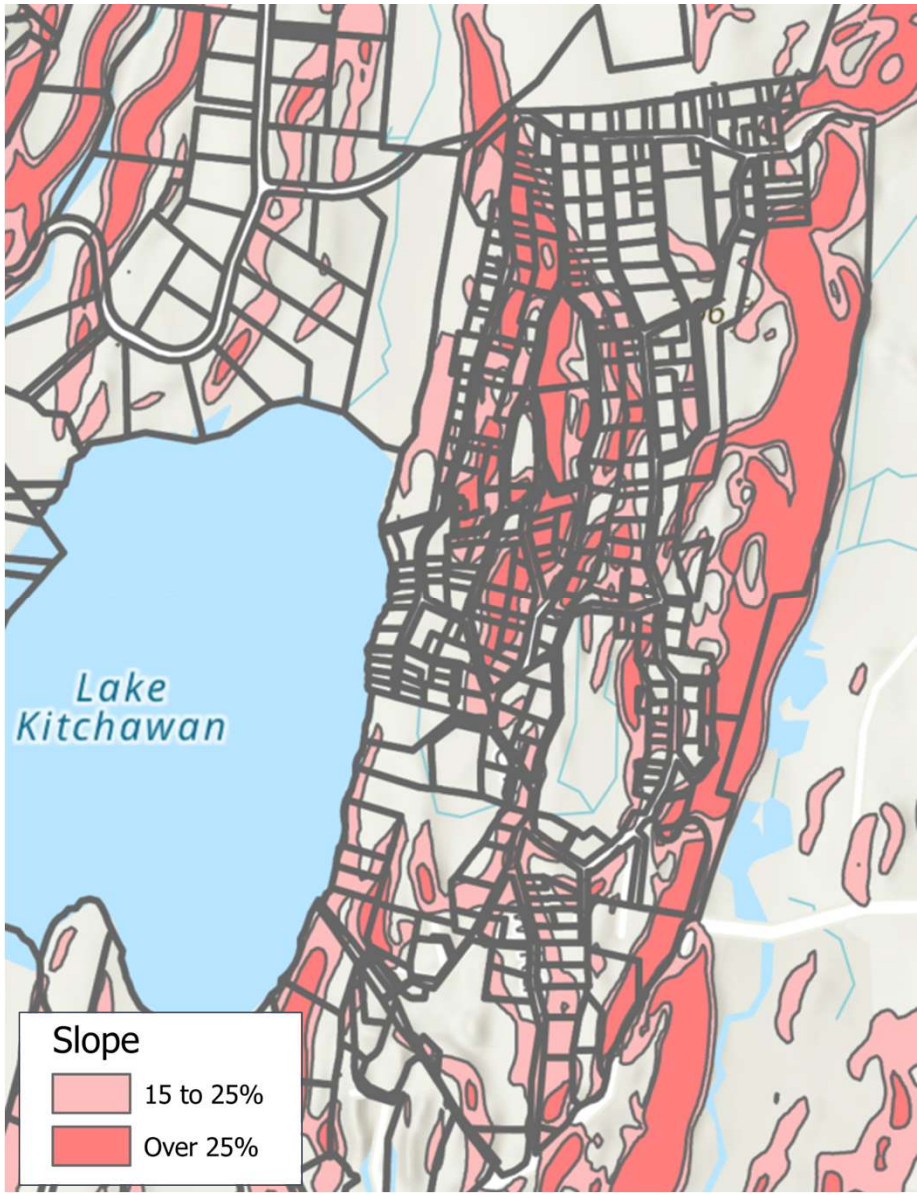
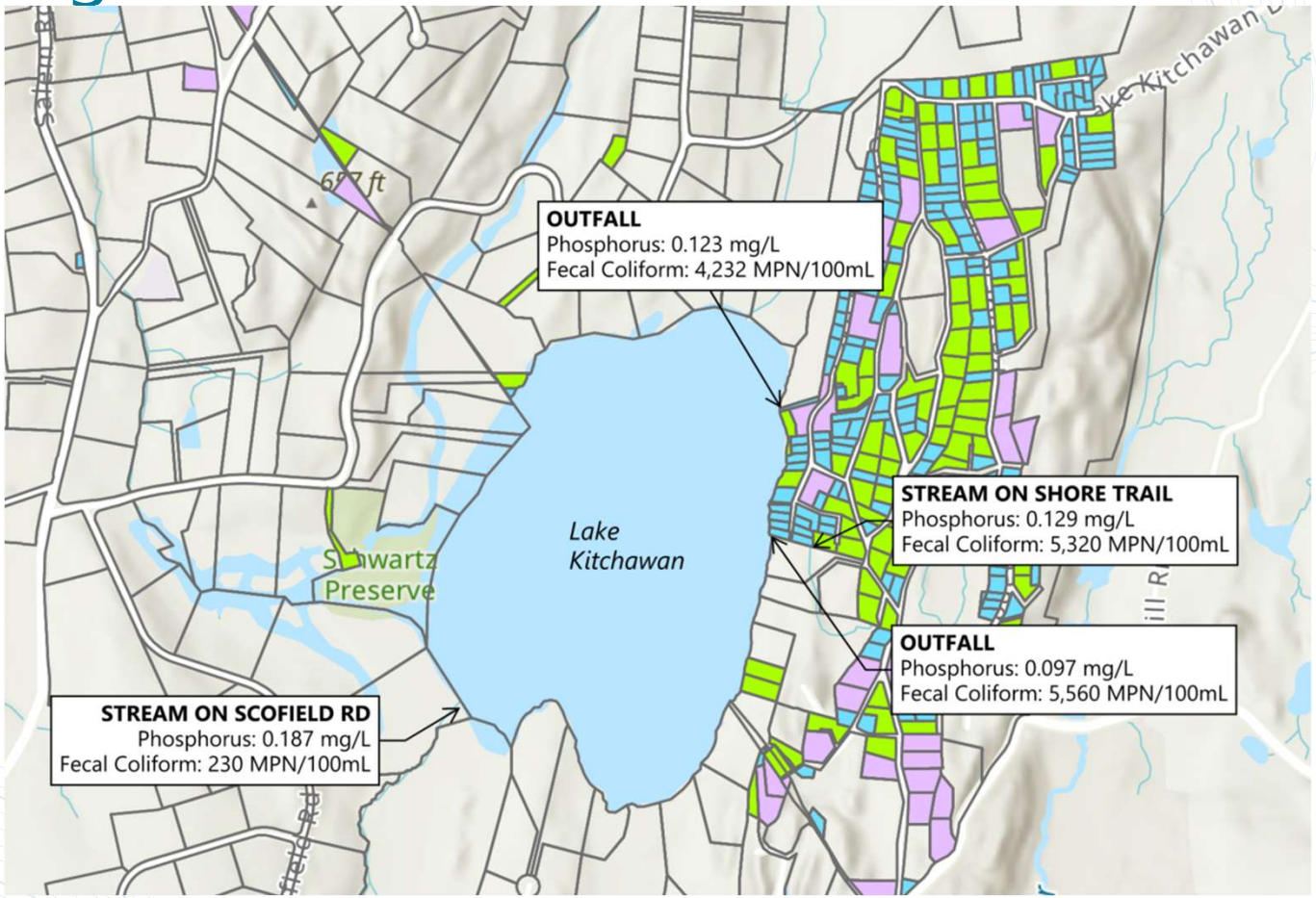
- Steep slopes directing flow toward the lake



Sampling Results



2021 Average Concentrations

Eutrophic Conditions: Phosphorus > 0.020 mg/L
Fecal Coliform Health Hazard > 1,000 MPN/100mL

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Alternatives Evaluated

- No Action
- Regional Consolidation
- Centralized Treatment
- Decentralized Treatment
- Upgrade Individual Septic Systems to Advanced Treatment Units

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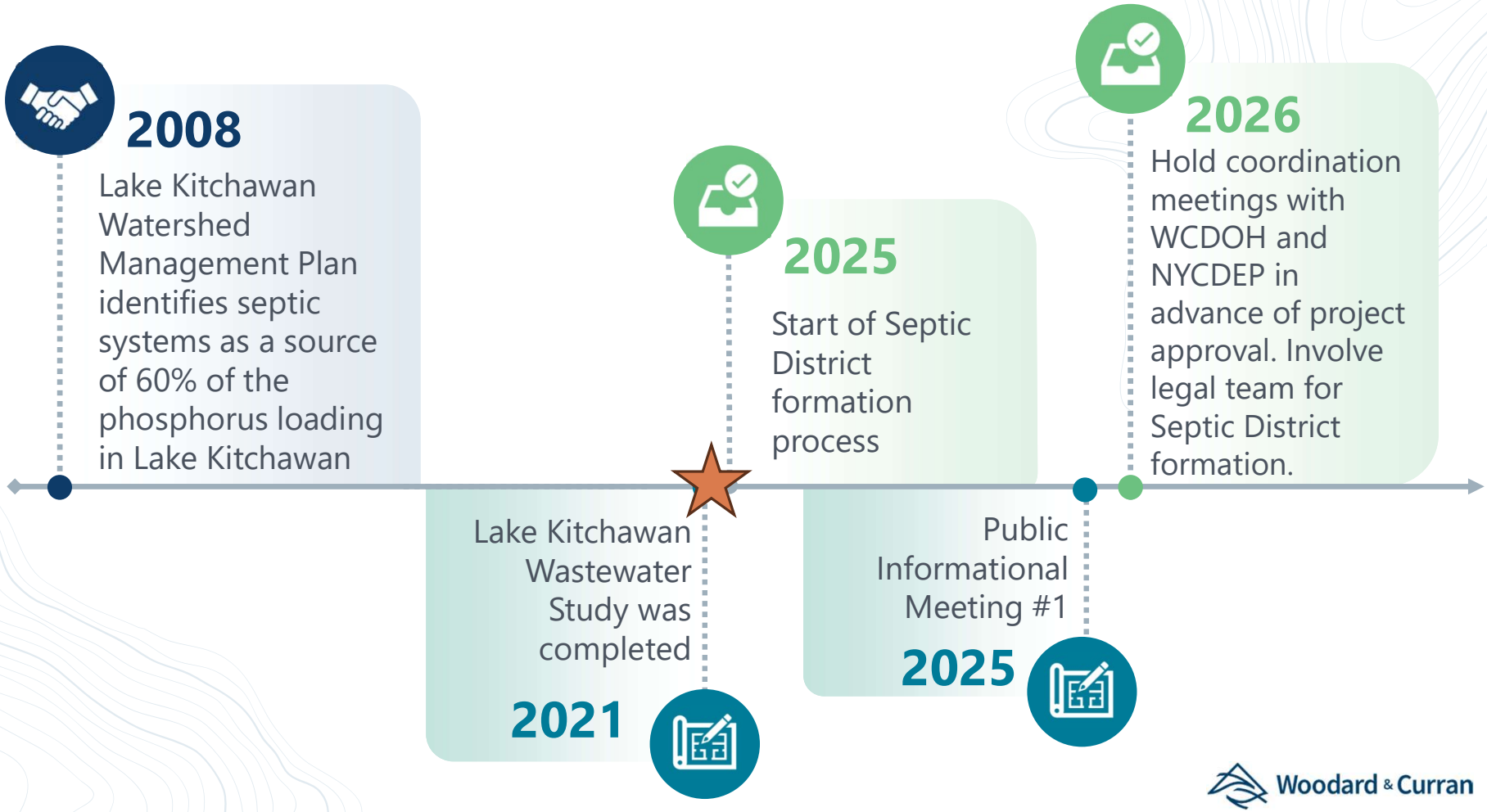
Alternative Analysis Results

Alternative	Comments
~~No Action~~	No immediate costs but worsening water quality and infrastructure failures over time
~~Regional Consolidation~~	An existing plant is not available in proximity to Lake Kitchawan
~~Centralized Treatment~~	High cost associated with sewer construction and new centralized facility. Local topography also increases costs.
~~Decentralized Treatment~~	High cost and requires land acquisition
Upgrade Individual Septic Systems to Advanced Treatment Units	**Most cost-effective solution to improve water quality**

Recommended Alternative: Advanced Treatment Units

- Lower upfront capital costs than centralized/decentralized
- Adequate treatment capabilities and maintains environmental and operational goals
- Focus on residences east of Lake Kitchawan since this was identified as a critical area based on sampling results, steep slopes, and small parcels.

Timeline



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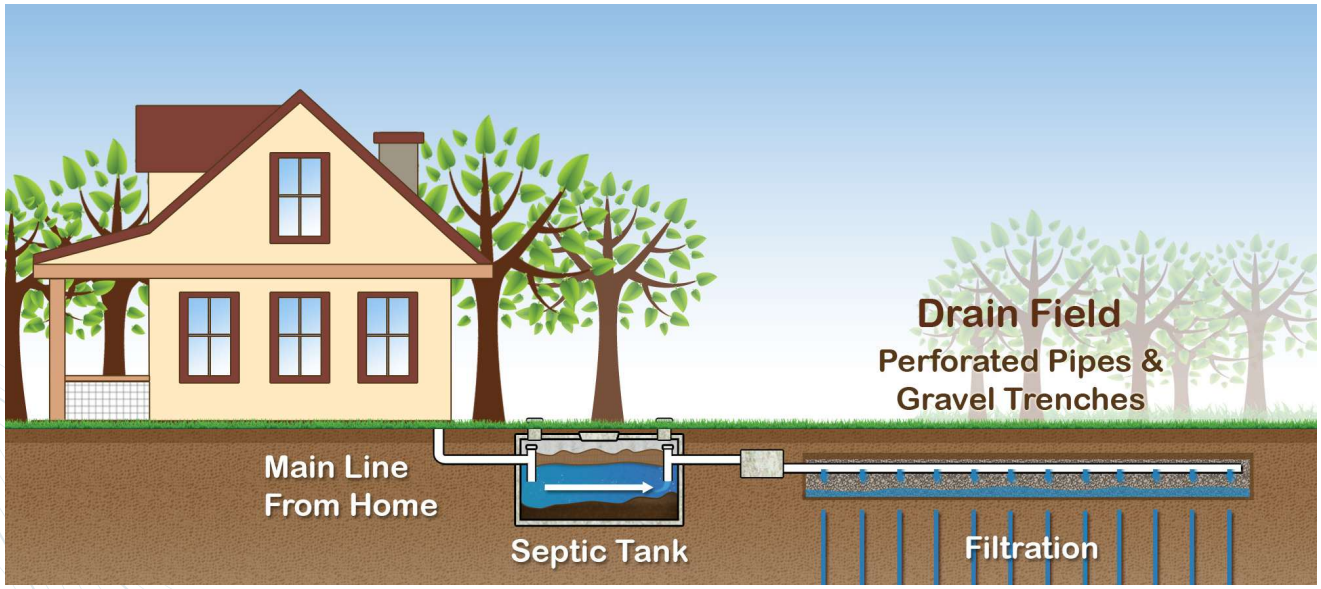
Conventional Septic System Challenges



- Parcel size and setback requirements
- Soil type
- Depth to groundwater
- Topography and steep slopes
- Proximity to waterbodies
- **Type of Treatment**
- **Individually owned and maintained by property owners**

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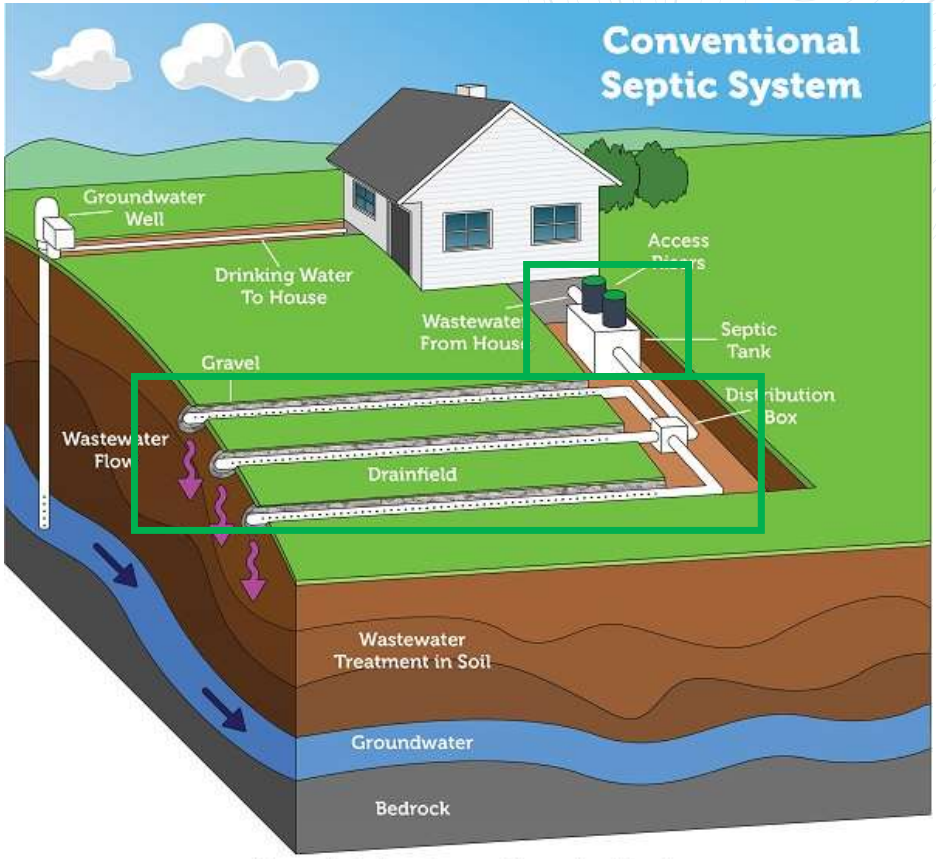
Septic Systems Components

- Treatment Systems
- Disposal Field Systems



Please note: Septic systems vary. Diagram is not to scale.

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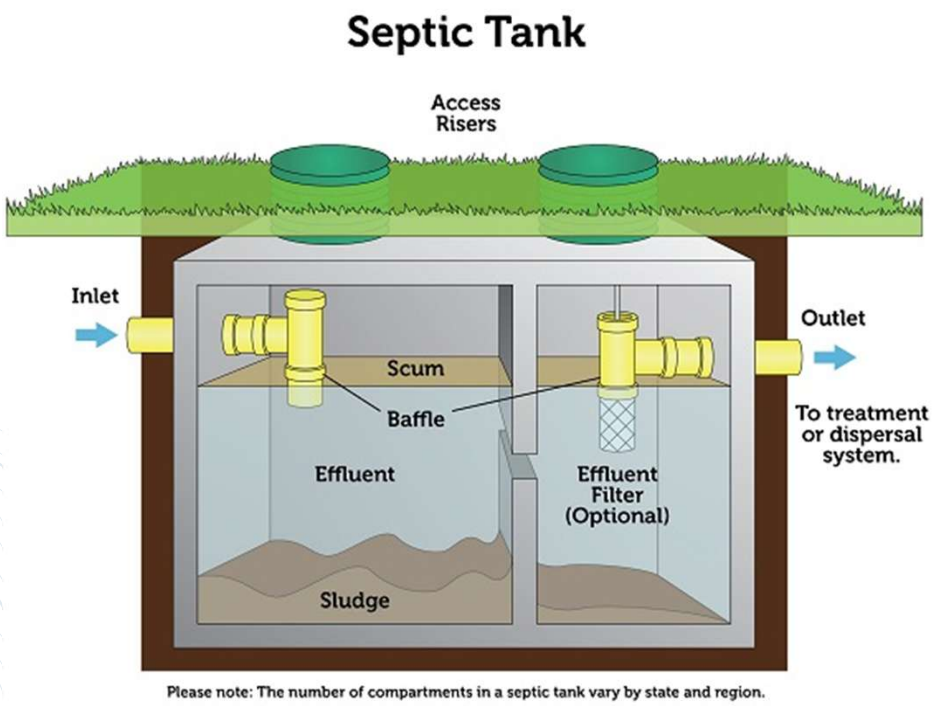
Conventional Septic System Treatment



- Solids settle
- Water is filtered
- Water is discharged to drainfield

- **Limited nutrient removal**
  - effluent P concentration of **9-16 mg/L**

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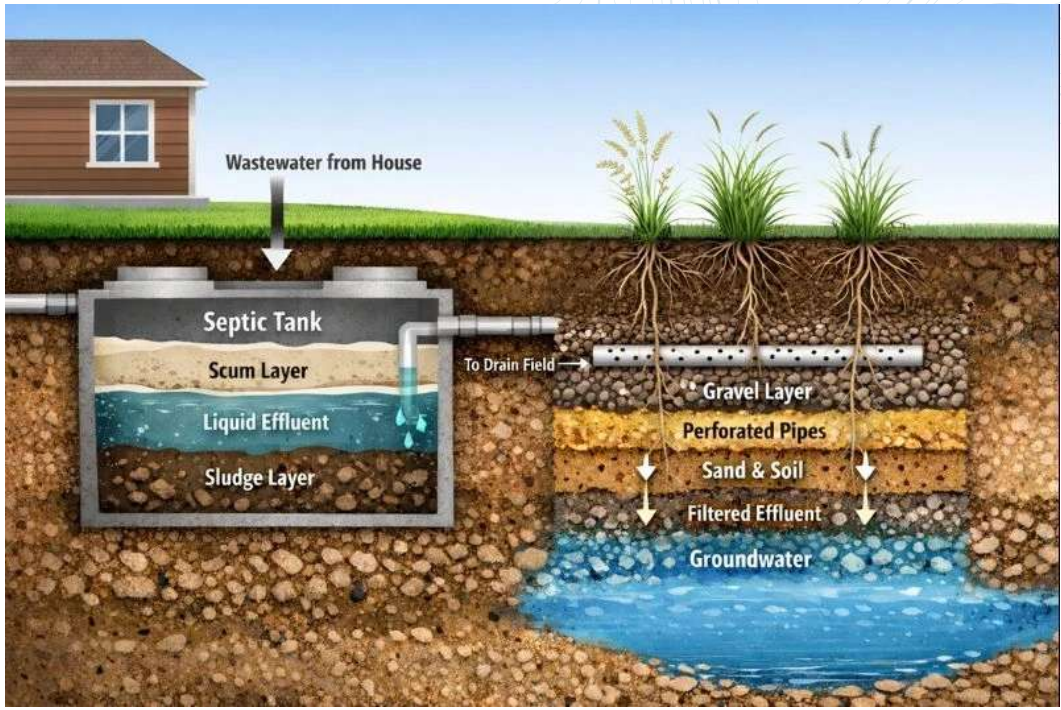
Conventional Septic System Disposal Fields

- Disposal Field Systems
  - Series of perforated pipes
  - Liquid from tank is filtered and absorbed in soil



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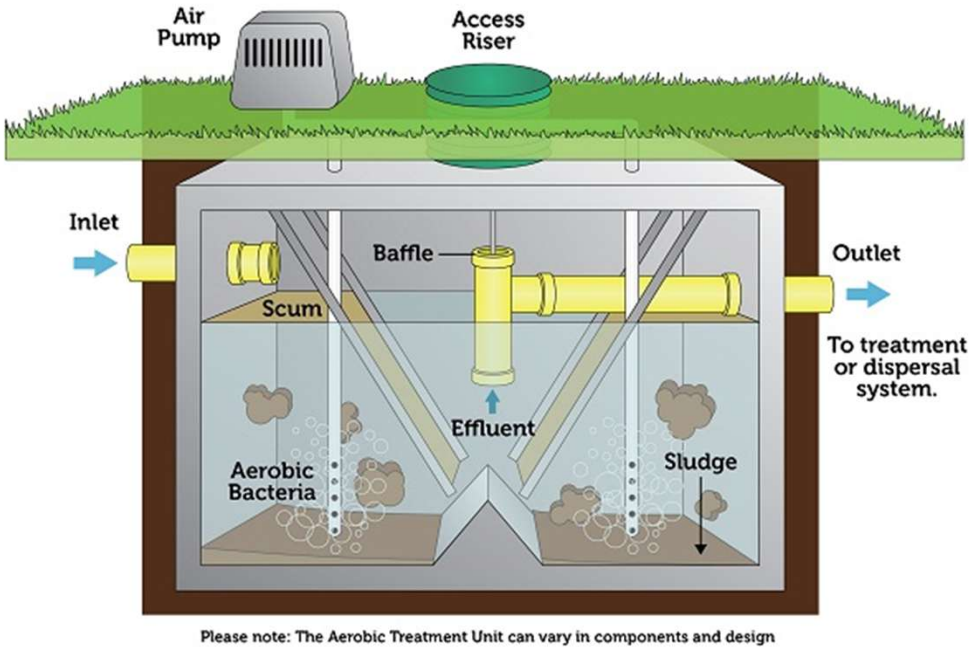
Advanced Septic System Treatment



- Solids settle
- Biological Treatment
  - Aeration (Aerobic Bacteria)
  - Nutrient Removal
    - Nitrogen ~70%
    - Phosphorus~90%
- Filtration (optional)
- Disinfection (optional)
- Water is discharged to drainfield

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Advanced Septic Disposal Fields

- Engineered Media/Aeration
- Pumping required in some systems
- Vendors
  - Eljen Geotextile Sand Filter
  - Geomat Leaching System
  - SoilAir Leaching System

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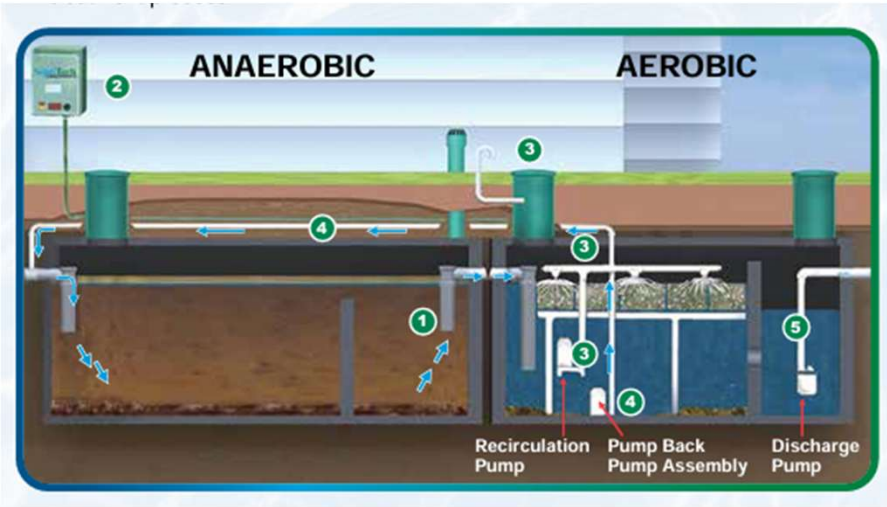
Advanced Septic Systems

- Treatment Systems
  - FujiClean Advanced Septic System
  - PhosRID Advanced Septic System
  - SeptiTech Residential Tricking Filter System



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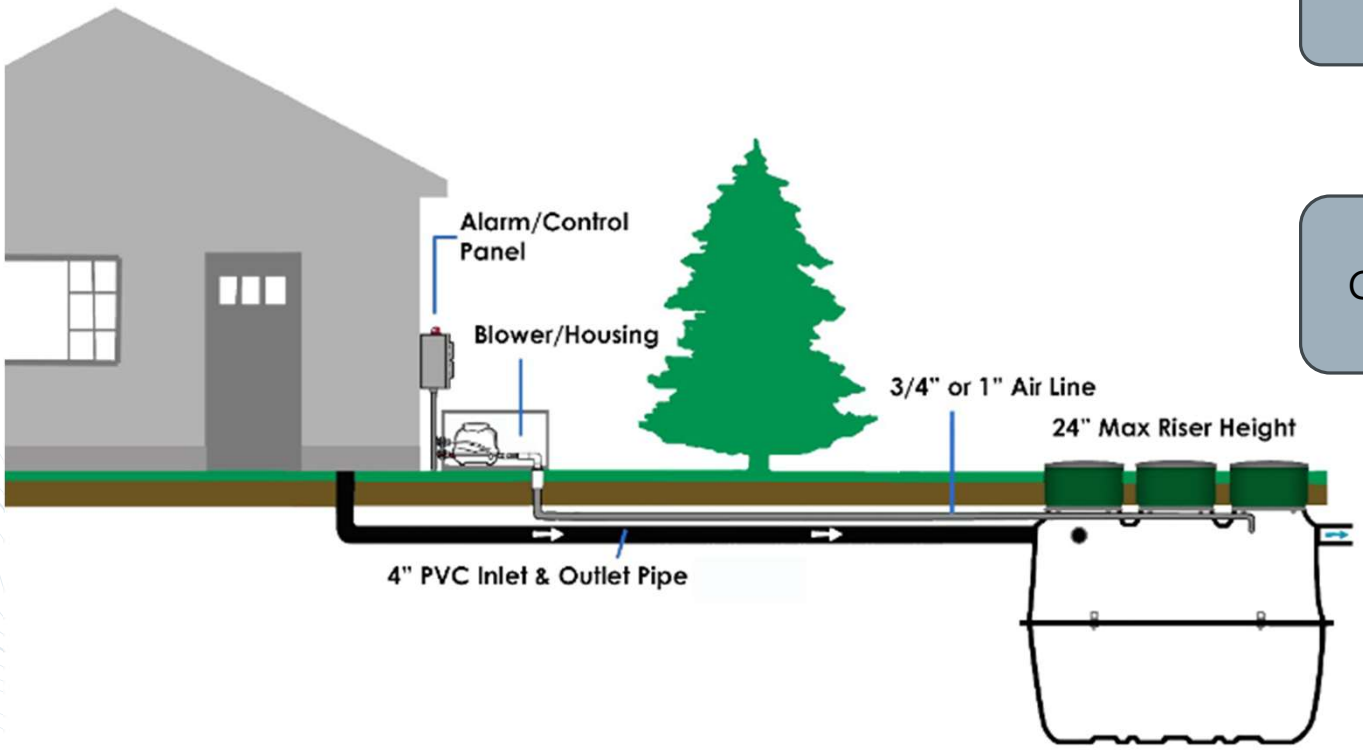
Selected Technology



LEACH FIELDS
(ALSO TO BE REPLACED)

PHOSPHORUS CONCENTRATION OF 1 mg/L OR LESS

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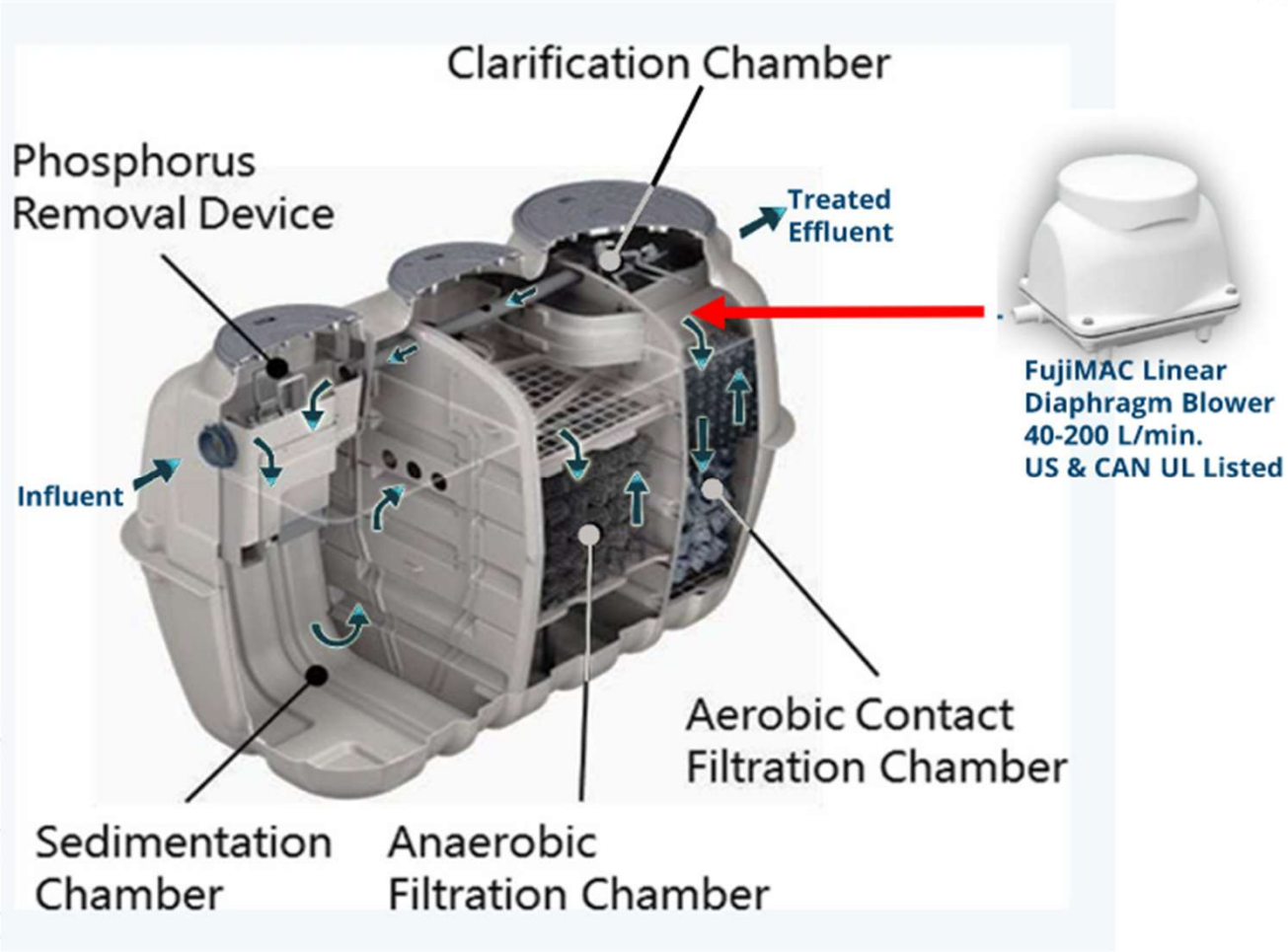
Selected Technology



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Selected Technology Maintenance

- Fiberglass structure is resistant to corrosion
- Plastic Media
  - Self-cleaning
  - Recommended to be washed down during servicing
- Blower
  - 5-8 years of service life
- Wireless alarm panel via wifi
- Pump Out
  - 2-3 years
- Annual Inspection
  - Includes media wash down (20 to 30 mins)

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Selected Technology Advantages

- Tank Footprint
  - ~8ft by 4 ft
  - Depth 5ft – 5 in
  - Replace within same footprint to minimize construction impacts to residents
- NSF 40/245 Certified
- Precedence within NYS

Implementation

Septic Systems typically owned and operated by property owner

Funding from NYCDEP for water quality projects within the watershed

Town decides to take ownership and operation of new septic tanks

- New “septic district” required
- Town can ensure compliance with WCDOH requirements

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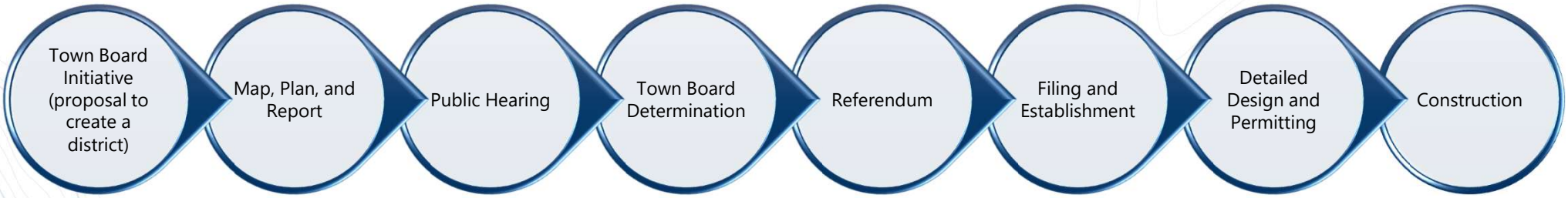
District Formation Process

- Governed by New York Town Law



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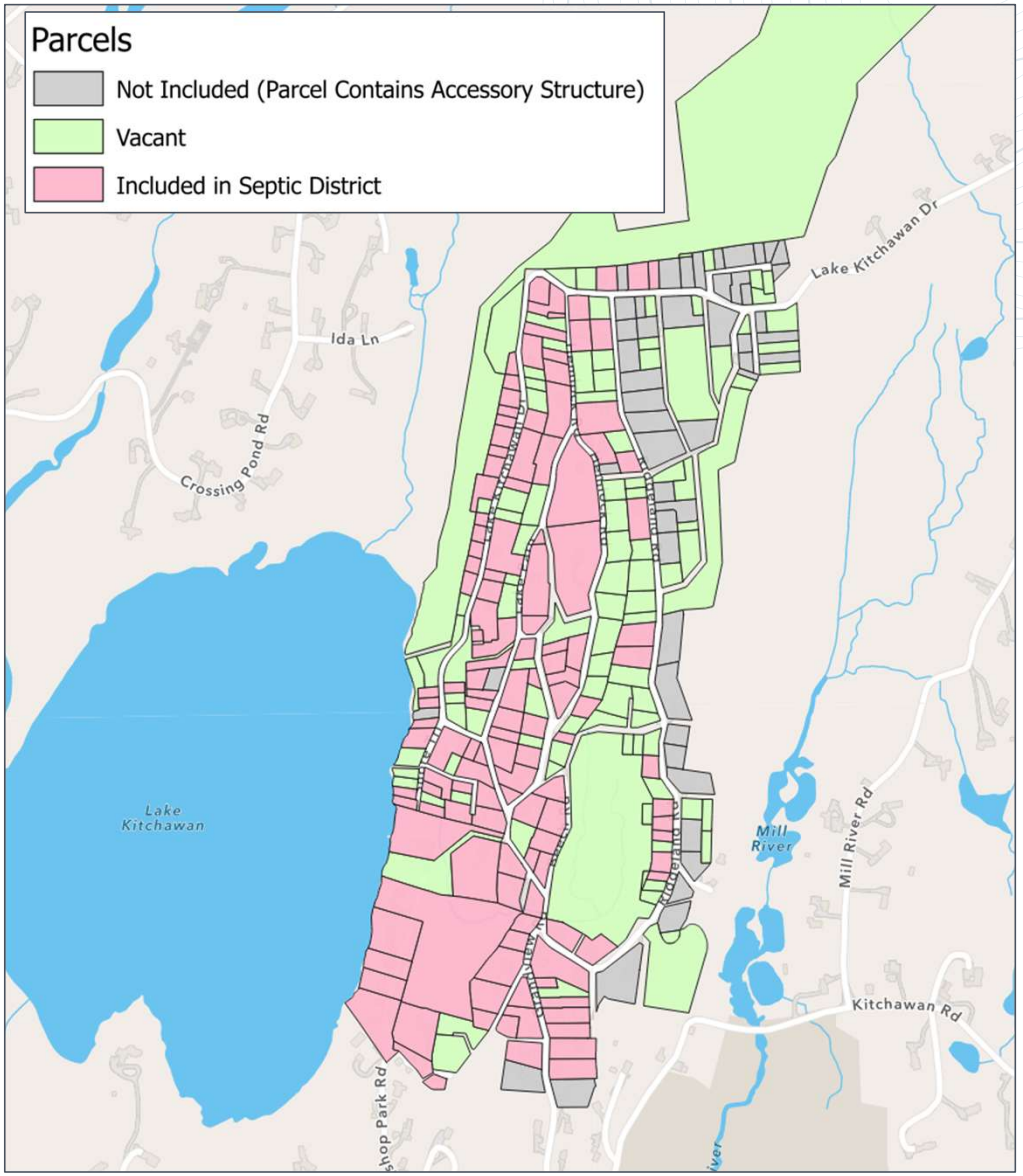
Sewer District Boundary

- Eastern side of Lake Kitchawan
  - Fully developed area

- Within Croton Watershed
- Drainage Toward Lake
- Vacant parcels excluded
- 131 parcels



Septic System Design Criteria

- Replace Conventional Tanks and Leachfields
  - FujiClean CRX
  - Conventional Leachfields
- Flow
  - Design
    - 450 gallon per day (gpd)
  - WCDOH Rules and Regulations
    - Single family residential homes (110/130/150 GPD based on year of build)
- Electrical connection to homeowner panel
- Septic System Approvals required by WCDOH
  - Soil Testing including percolation tests and deep hole tests

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Septic District Responsibilities

- District to be administered by Town
  - Responsible Management Entity (RME)
- Replacement of existing septic systems
- Maintenance and repairs
  - Septic tank pump out
- Coordination with property owners
- Collect district fees

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Property Owner Responsibilities

- Notify the Town if issues arise
- Allow access for system servicing
- Maintain piping up to the junction with septic tank
- Maintain electrical service to the blower (estimated at $10/month)
- Pay Septic District fee

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Sewer District Costs

- Project Cost: $6.7M
  - Anticipated to be fully funded by NYCDEP
- Property Owner Cost:
  - Annual Costs (Estimated at $600/year)
  - Power Costs (Estimated at $10/month)

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Water Quality Benefits

Reduce Nitrogen by ~ 70%
Reduce Phosphorus by ~ 90%

Stakeholder Coordination

- Working closely with WCDOH and NYCDEP
- Quarterly Town/WCDOH Meetings
  - Began November 2023
  - Approval of advanced septic technology
  - Streamline approval process
- Public engagement
  - Informational meeting - November 2025

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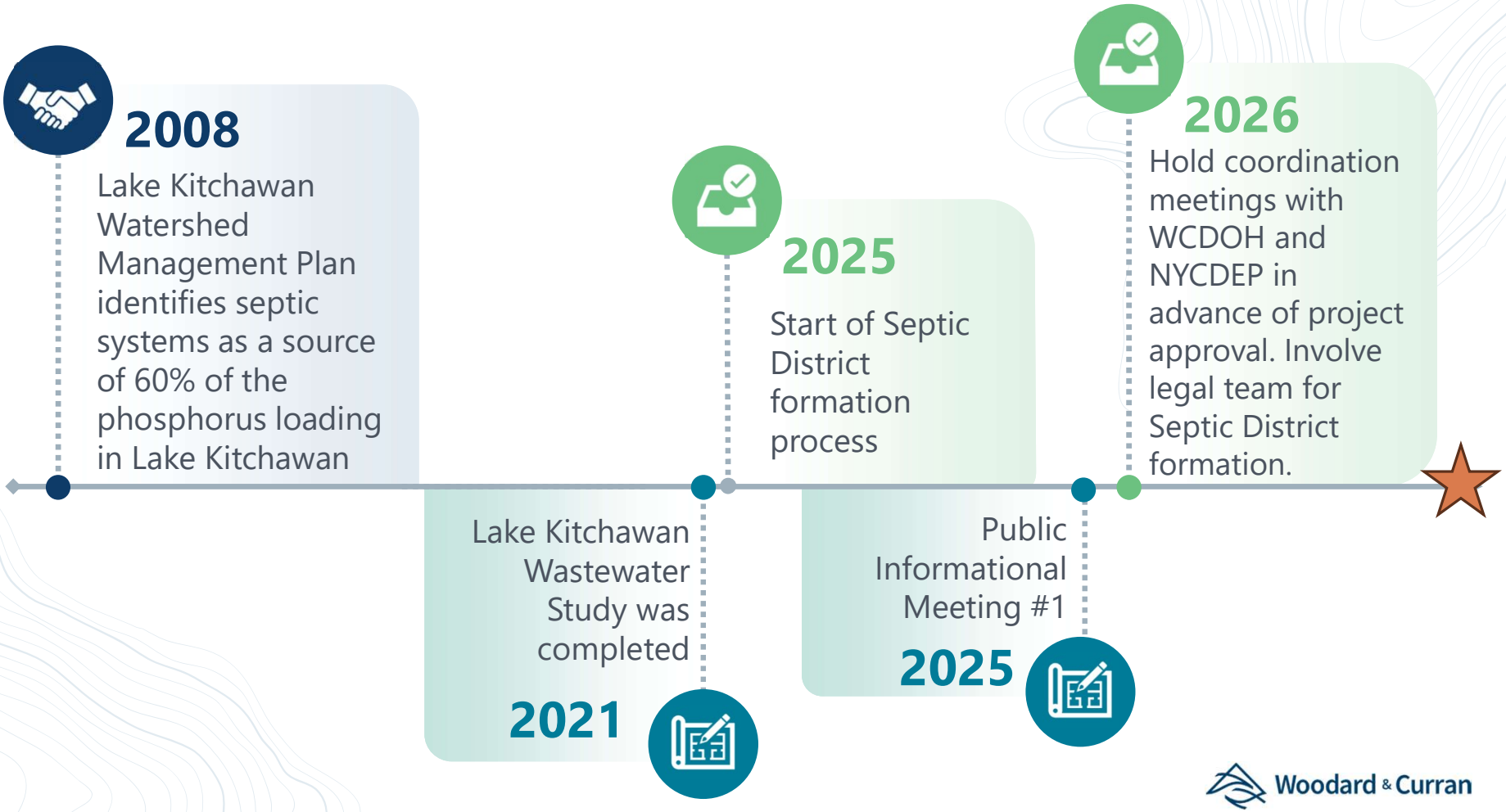
Timeline



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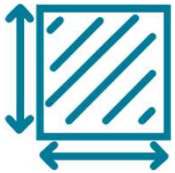
Next Steps

Septic District Formation

- 3 - 6 months
- Pending Legal Review
- Requires formal public hearing, Town Board resolution, public vote, and submission to NYS Comptroller's office for approval.



Design and Permitting

- 1 year
- Site evaluations
- Work through design details

Construction

- 1 year

***Schedule depends on release of approved funding.**

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Acknowledgements

- Janet Anderson
- Tony Gonçalves
- Kerri Wolfe
- Chris Burdick
- Anthony Catalano
- Westchester County Department of Health
- Westchester County Planning
- NYSDEC
- NYCDEP
- East of Hudson Watershed Corporation

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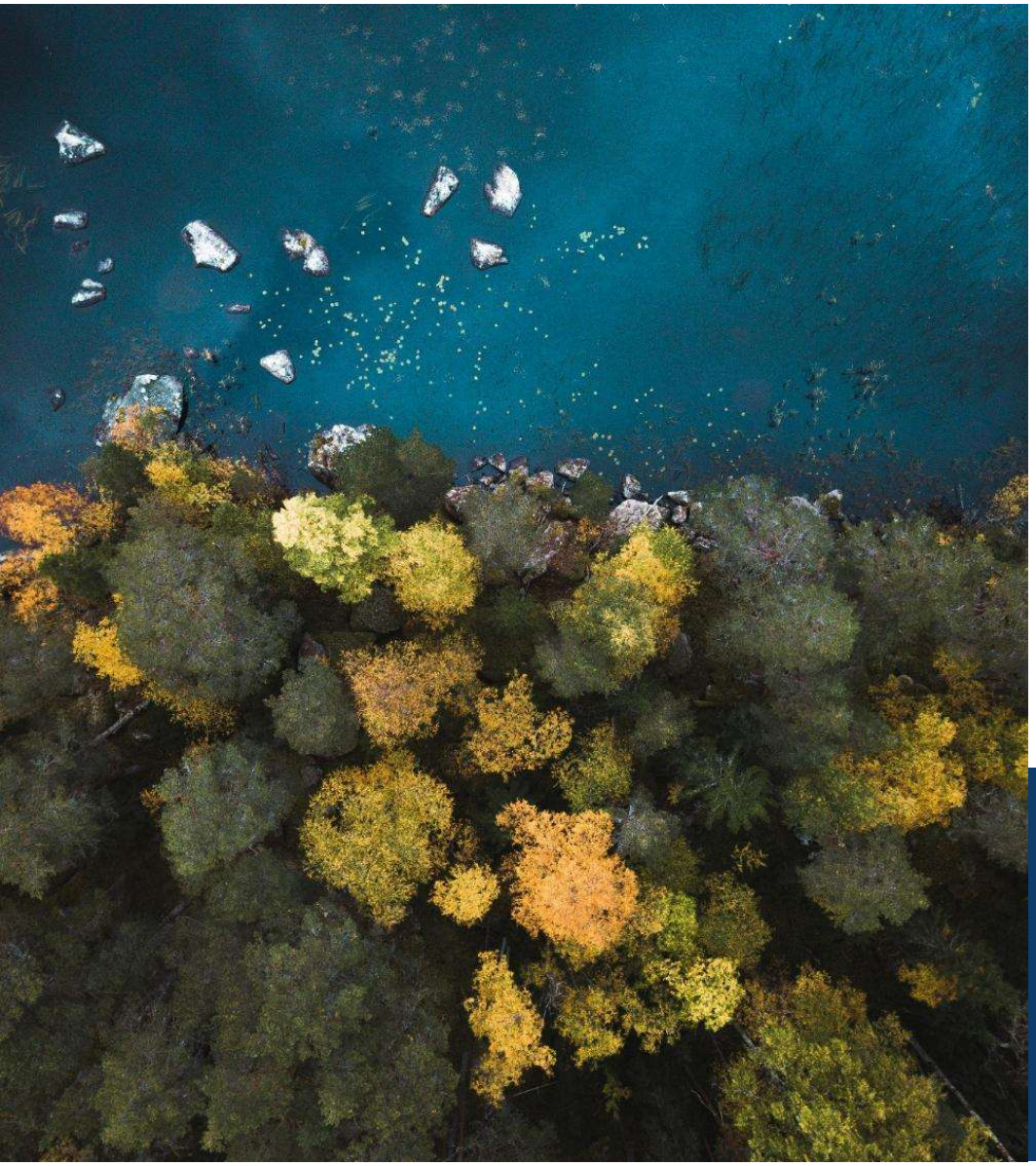

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Thank You!