

Septic System Vulnerability Assessment for Stratham, NH

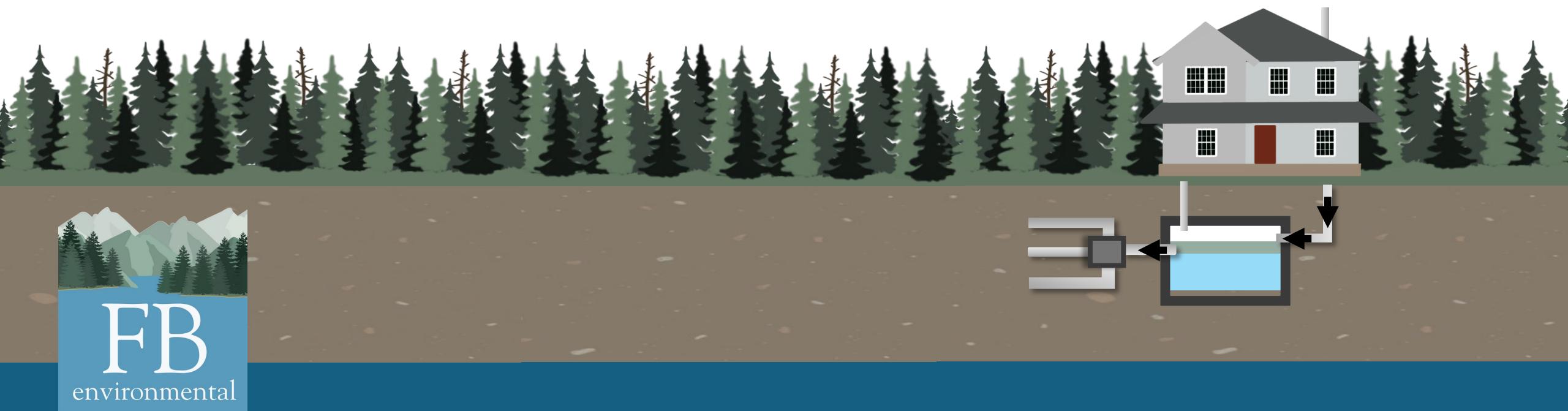
Evan Ma, FB Environmental Associates

September 18, 2025





This project was funded by a **PREPA grant** from the **Piscataqua Region Estuaries Partnership (PREP)**, with support from the United States Environmental Protection Agency through the **Infrastructure Investment and Jobs Act**.



Stratham, NH

Septic System Vulnerability

Today we will discuss...

- What are the septic system basics?
- What is septic vulnerability?
- What is proper septic system operations and maintenance?
- What work has Stratham been doing to understand septic vulnerability in the town?



Septic Systems

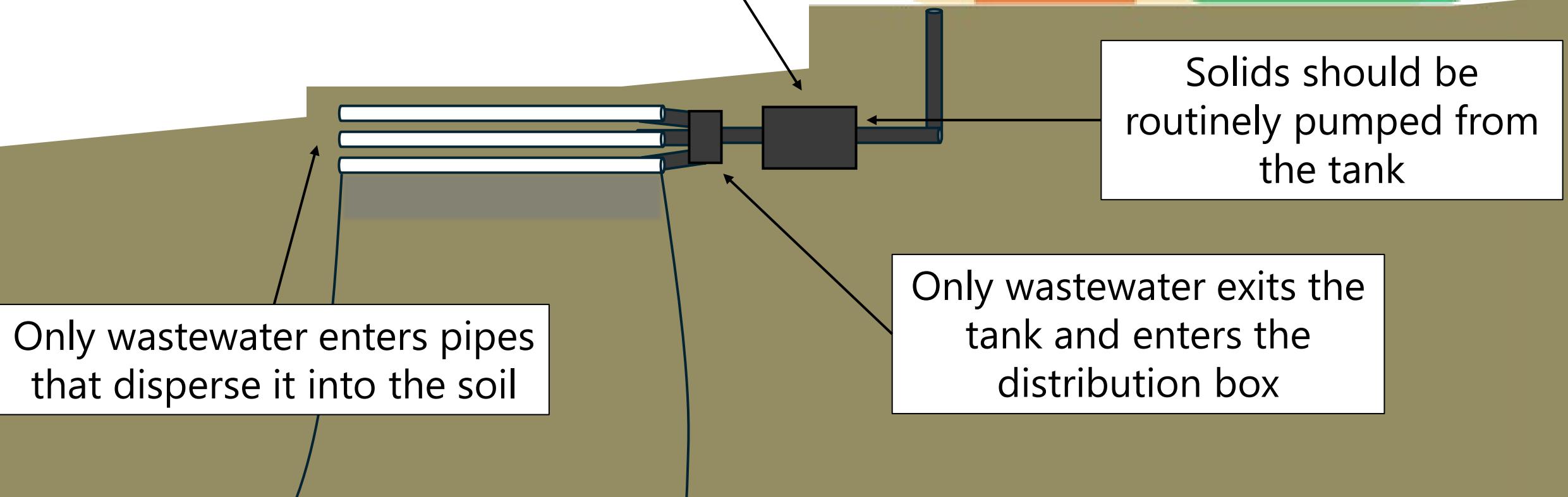
We use water in our homes through the shower, toilet, sink, laundry machine, and dishwasher.

This wastewater exits our home through internal and external plumbing.

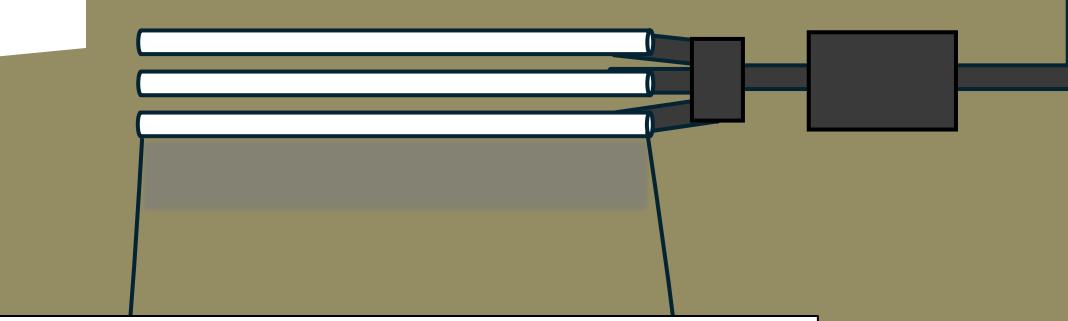


Septic Systems

Waste exits the house and enters the septic tank, where solids, and fats separate from wastewater



Septic Systems



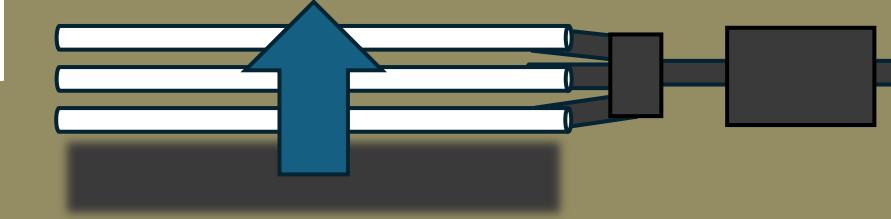
The soil beneath the disposal field is responsible for final wastewater treatment

Wastewater treatment can be more/less complete based on how well the system is functioning and the soil type

Septic System Malfunction



Credit: [Marlin Wastewater Services](#)



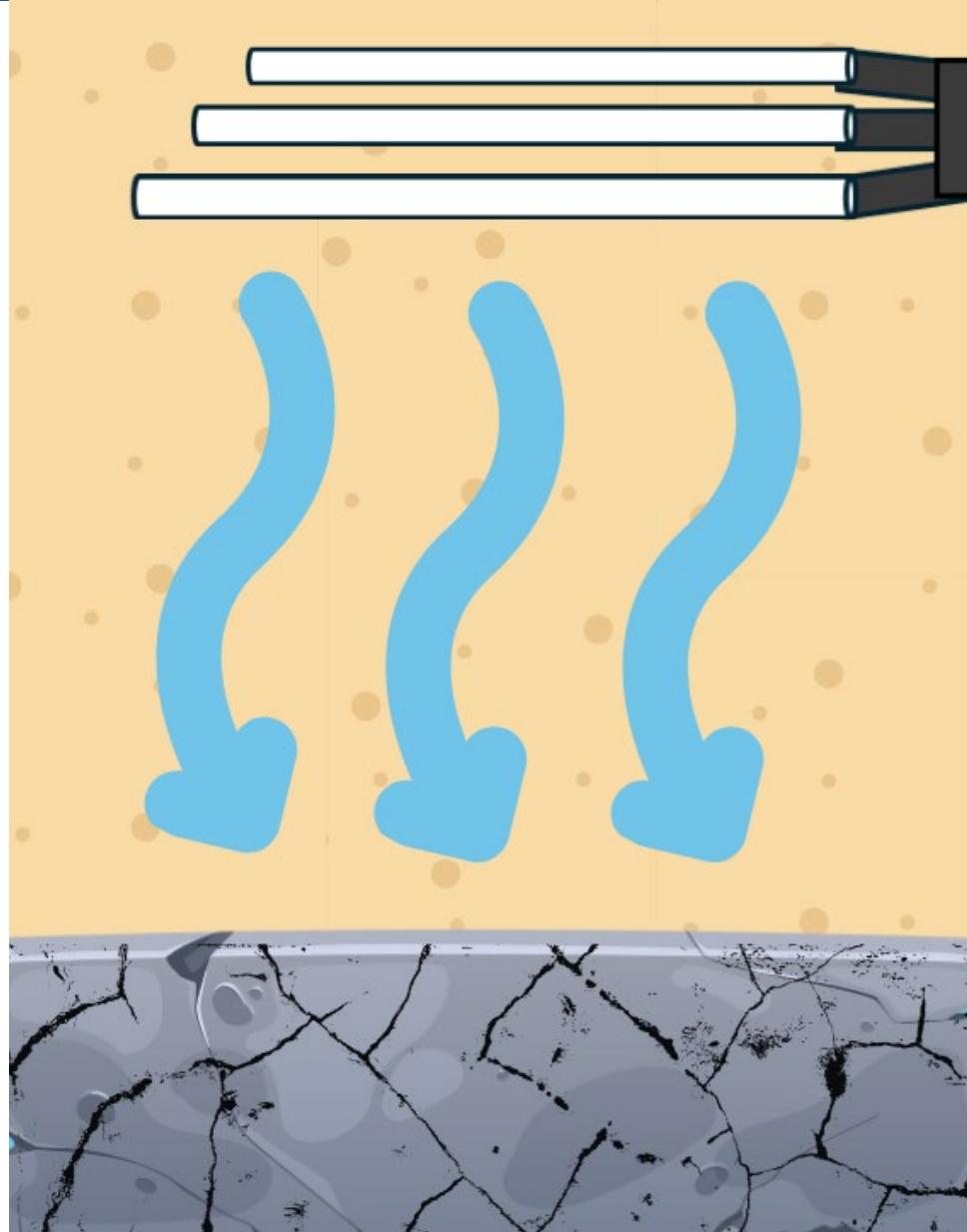
Septic systems can fail, posing an immediate **water quality and public health concern**

Regular maintenance (**pumping and inspection**) can ensure systems work properly

Septic System Underperformance

Where it occurs: coarse gravelly soils or on shallow bedrock (<20 inches)¹

How it occurs: wastewater quickly percolates through the soil with little to no treatment and can pollute the waterbody



¹Marshall et al. (2022) (Ontario)

Septic Systems & Water Quality

- Wastewater contains phosphorus, **nitrogen, pathogens**
- Excessive nitrogen & bacteria loading from septic systems can cause **coastal eutrophication and can make swimming, boating, shellfishing and other recreation unsafe**
- **Septic systems make up an estimated 30% of the nitrogen load to Great Bay (Trowbridge et al., 2014)**



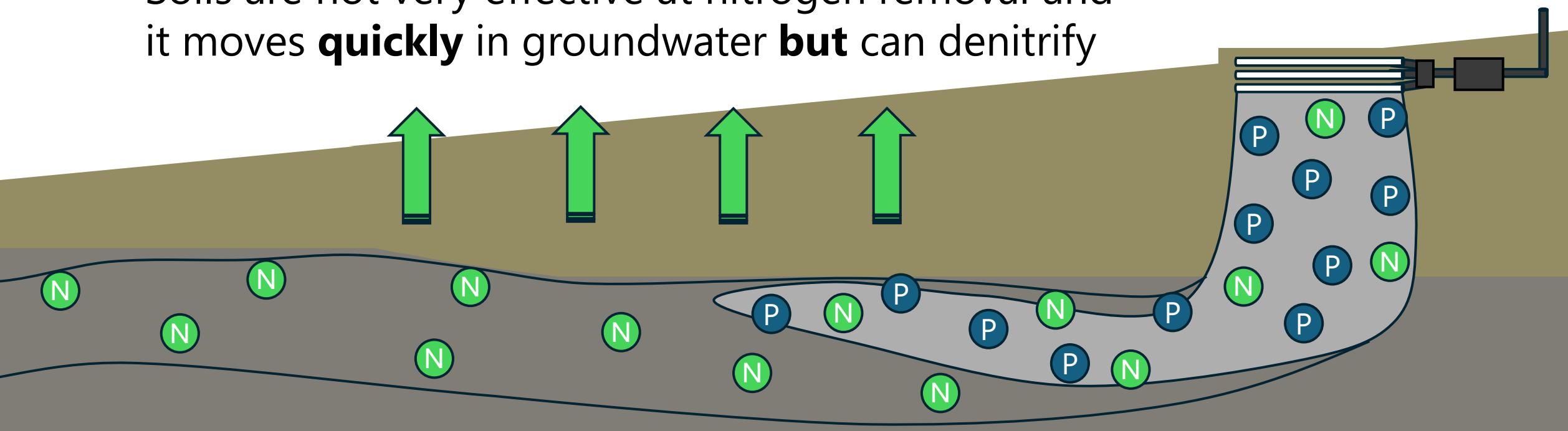
Water Quality



Septic System Performance

Wastewater Treatment:

- Soils are very effective at retaining **phosphorus**
- If the system is not failing, **bacteria** are usually also treated with high efficiency
- Soils are not very effective at nitrogen removal and it moves **quickly** in groundwater **but** can denitrify



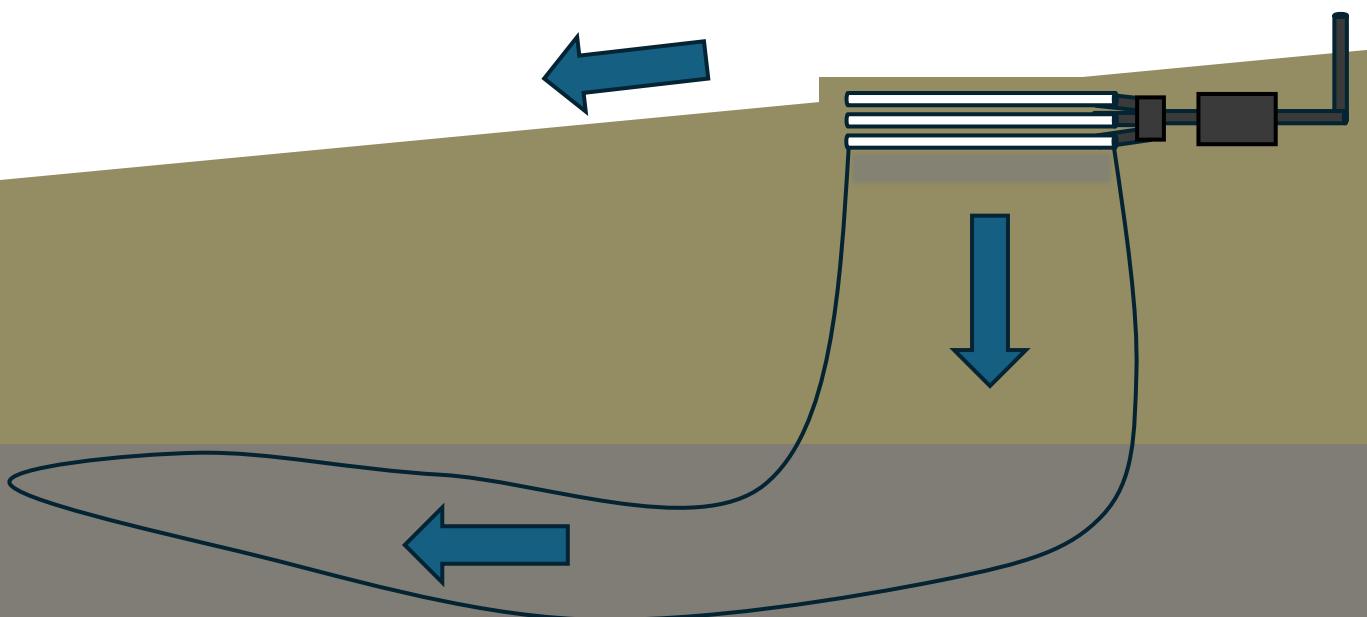
Septic System Performance

Failure occurs when:

- Soil is **unsuitable** (too fine)
- System is **old** (>25 years)
- Damage occurs
- **Shallow water table**
- Installation or O&M errors
- **Steep slopes** (breakout)

Poor performance occurs when:

- Soil is too coarse
- Shallow water table, bedrock
- Too close to waterbody

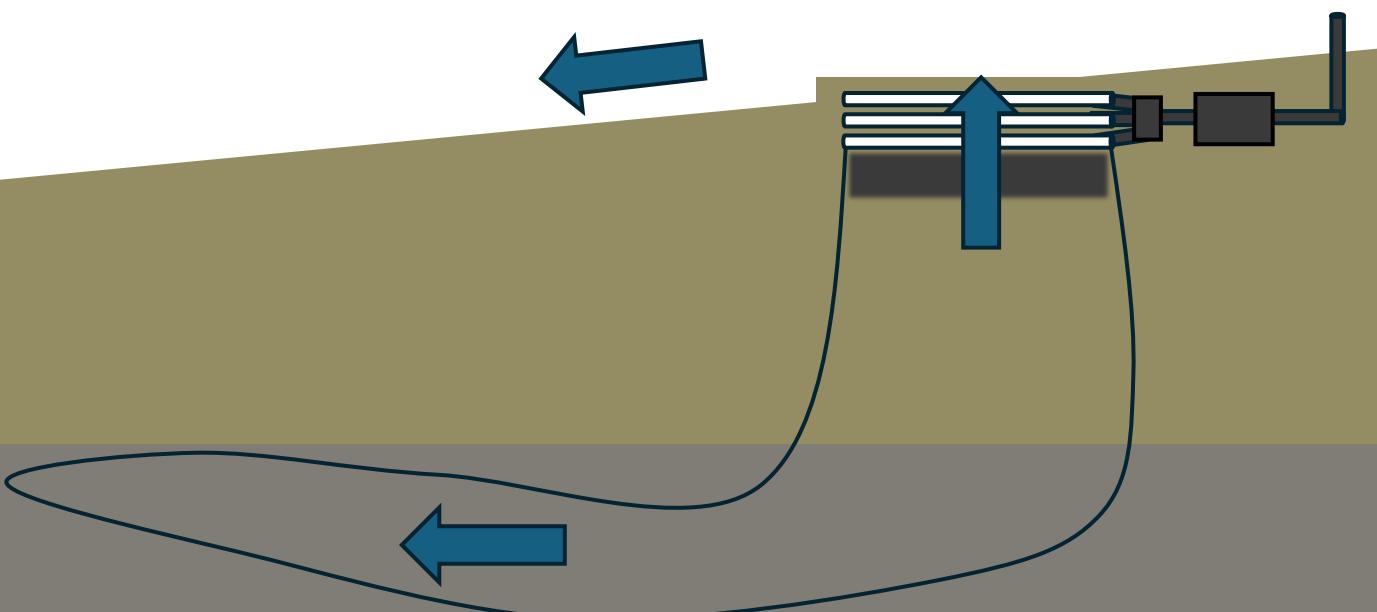


Septic System Vulnerability



Soil characteristics can make some septic systems vulnerable to failure:

- Shallow water table / bedrock
- Slope
- Poor infiltration
- Ponding / flooding



Septic System Vulnerability

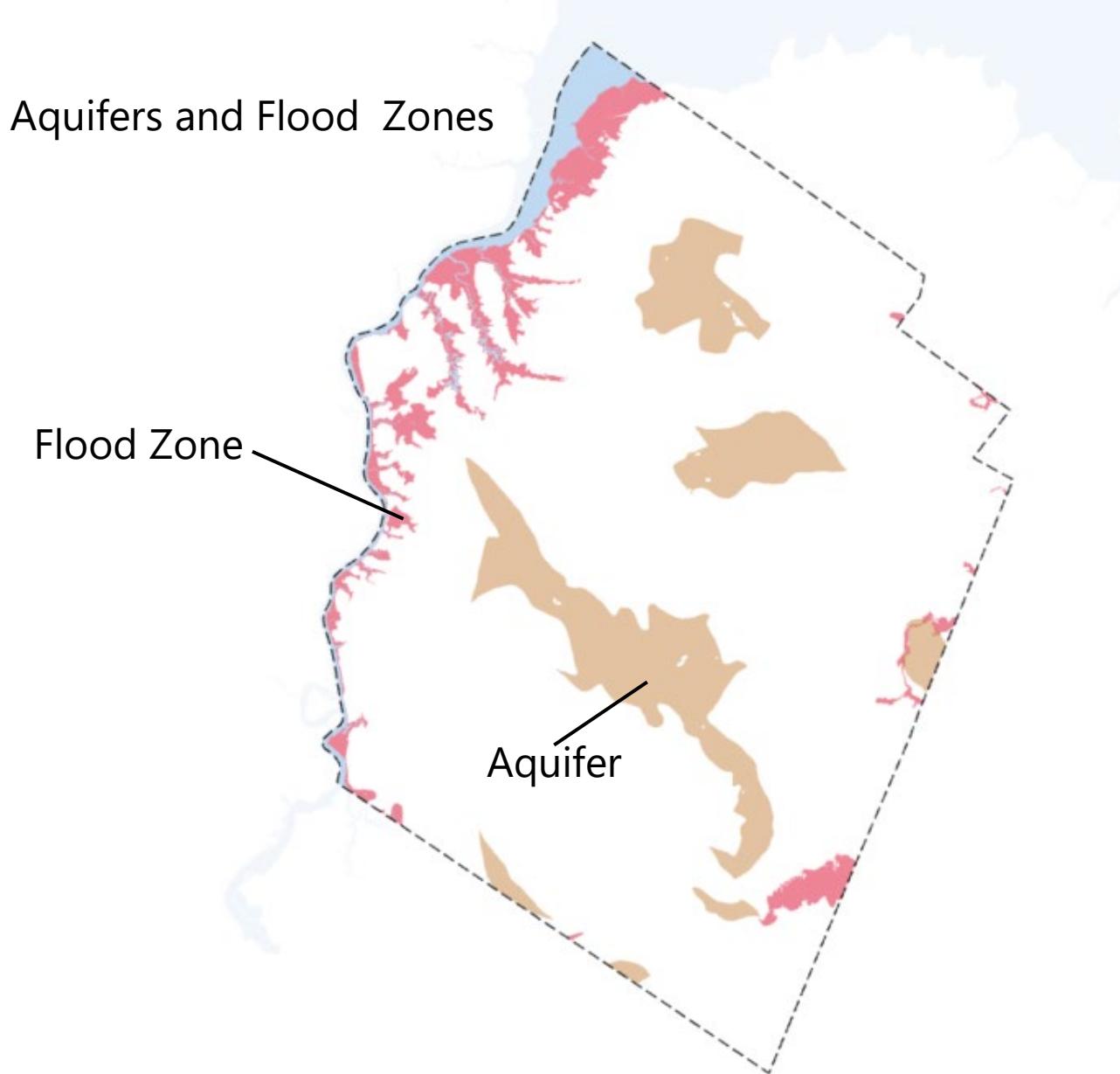
Environmental characteristics that increase the risk of pollution from septic systems:

Septic systems located...

- Close to the waterbody / wetlands
- In flood zones
- On highly transmissive aquifers



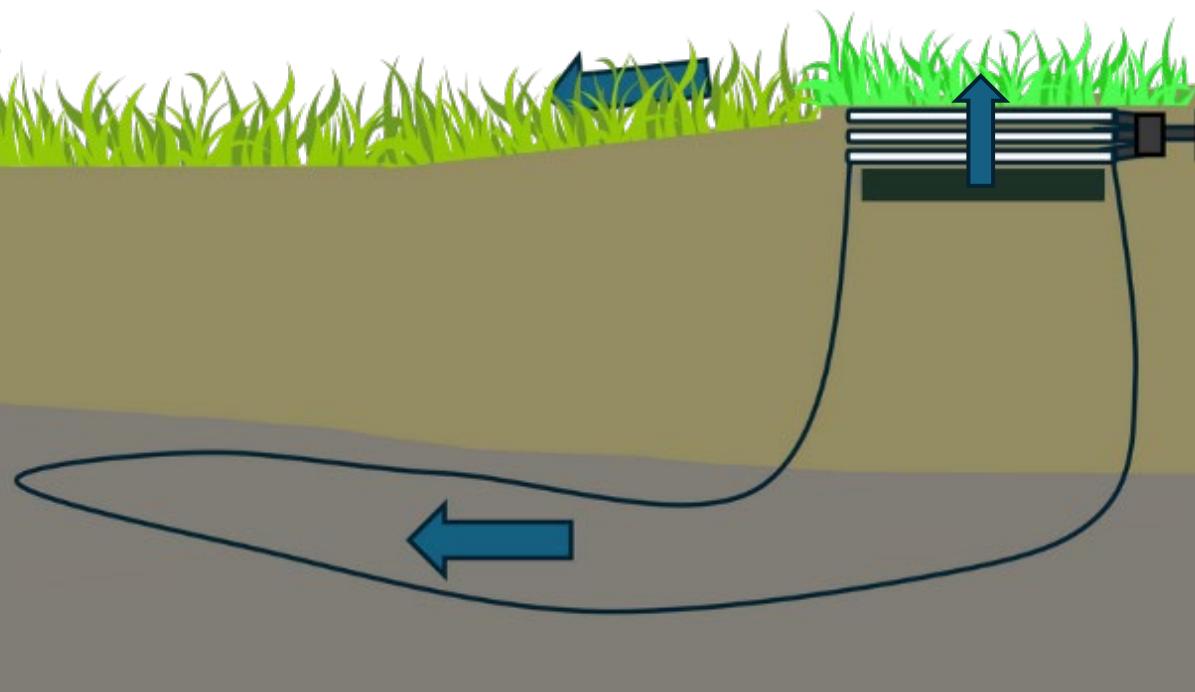
Image Credit: Adobe



Septic System Operations

DO:

- Arm yourself with knowledge!
- Limit water use and be mindful of your system
- Watch for signs of failure (ponding)



DON'T:

- Plant deeply-rooted vegetation over leachfield
- Pour harsh chemicals down drain
- (Over)use the garbage disposal
- Drive vehicles over leachfield



Septic System Maintenance



DO:

- Get an inspection every 1-3 years
- Get the septic tank pumped every 3-5 years



Ensure your septic tank is pumped at regular intervals as recommended by a professional and/or local permitting authority. Learn more at www.epa.gov/septic.

Pumping

Performed by: Septic tank pumper or hauler

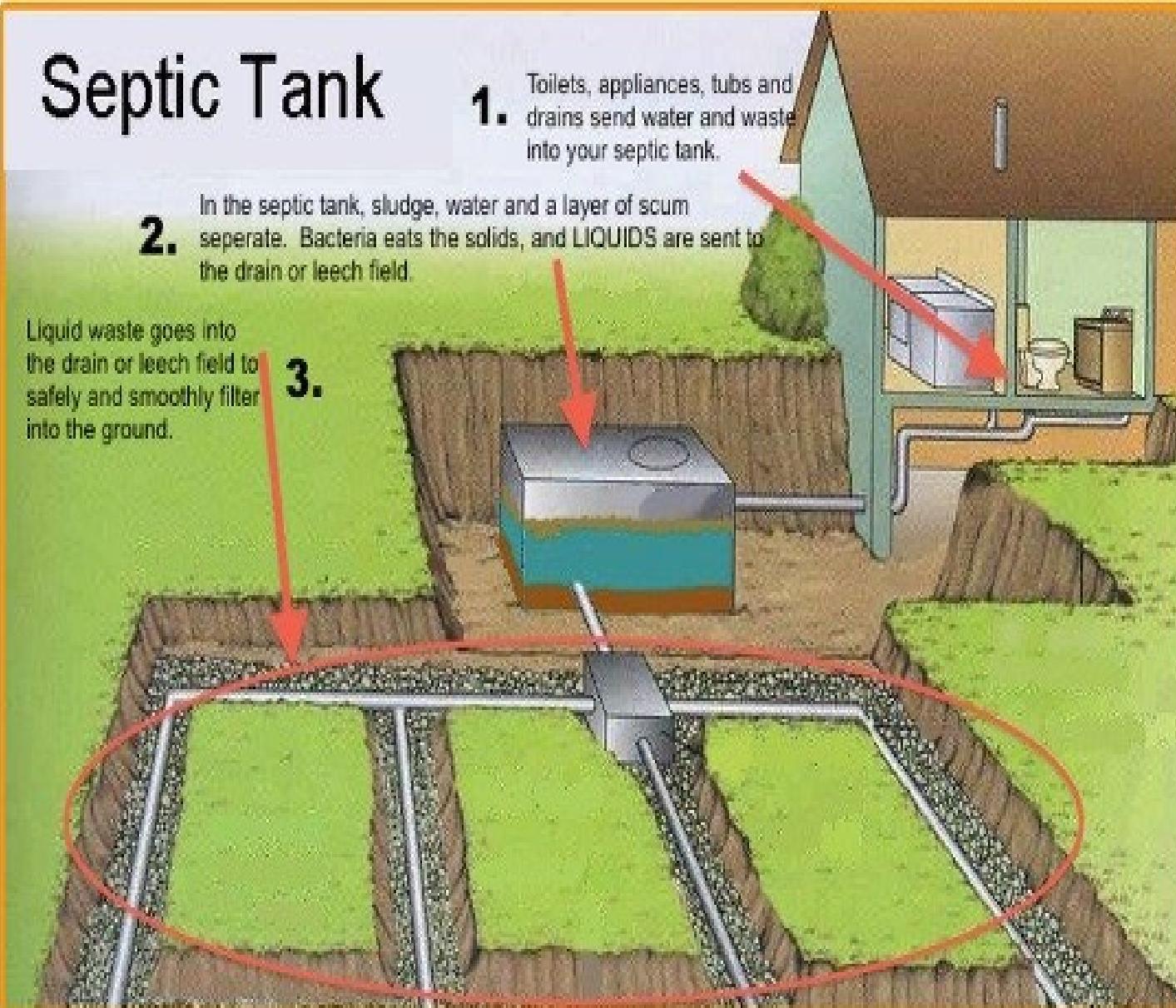
Method: Pump the septic tank to remove sludge



Septic Inspection (Evaluation)

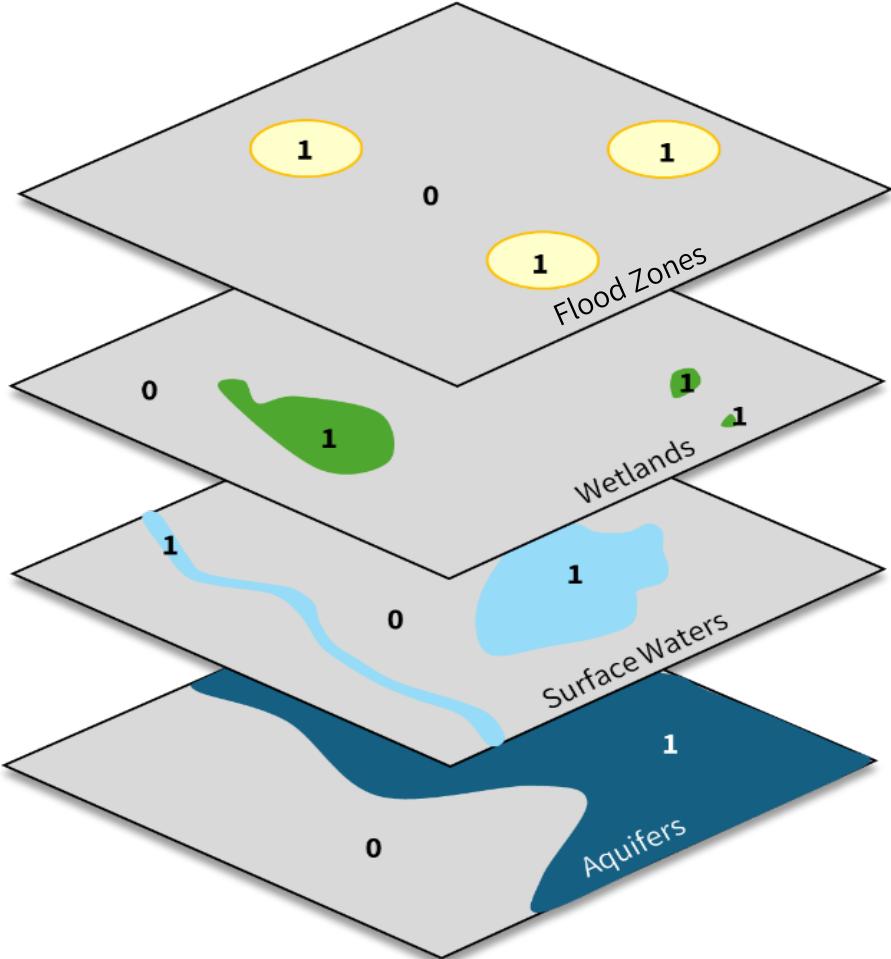
Performed by: NH certified septic system evaluator

Method: inspect all mechanical system components, assess if failing (ponding water) and remedial actions

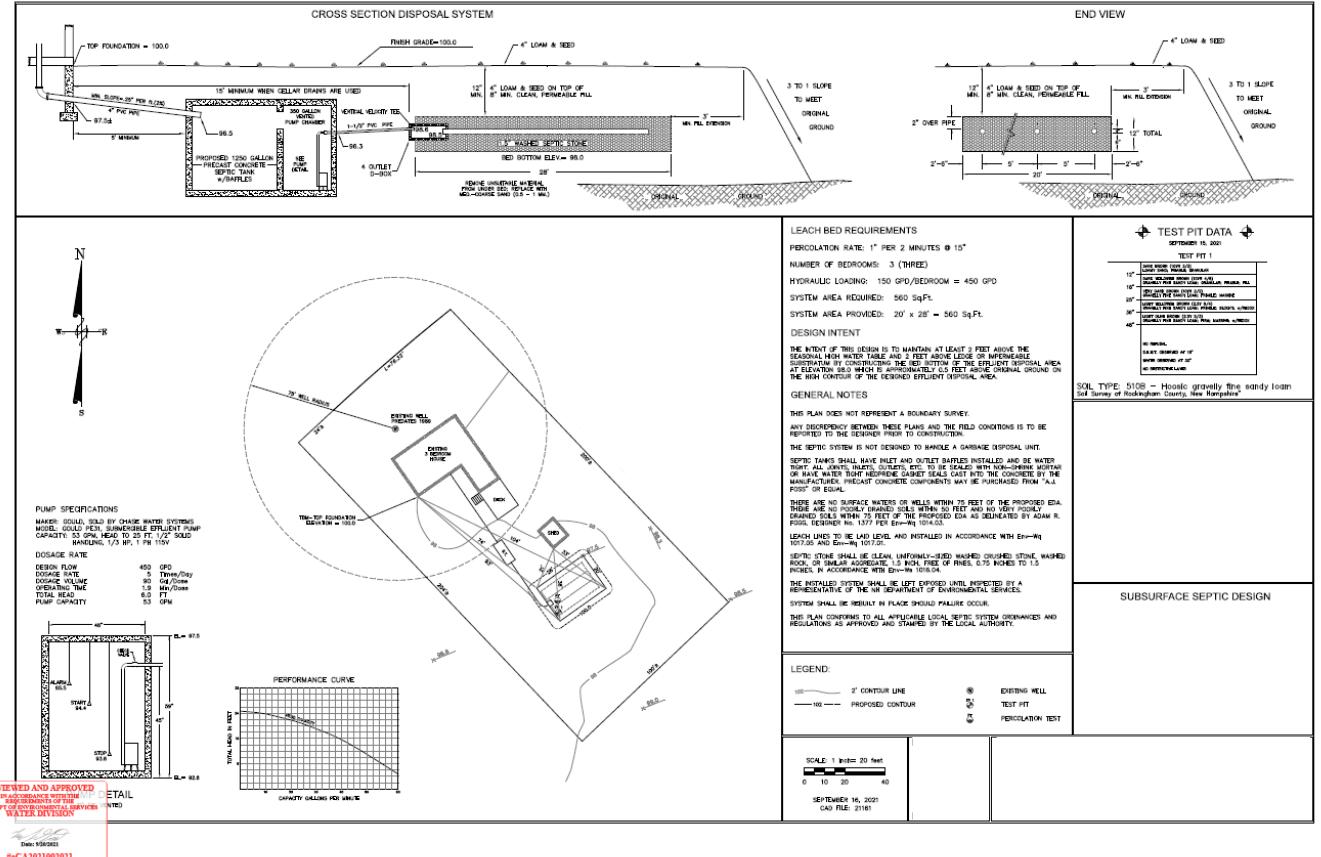


Vulnerability Assessment

Step 1: Mapping



Step 2: Inventory



Vulnerability Assessment



Stratham Septic System Vulnerability

experience.arcgis.com/experience/6976d29093e74e73b7e9dfb794696af/page/Homepage/

Stratham Septic Environmental Risk Assessment Mapper

Find address or place

Welcome to the Stratham Septic Risk Assessment Map Viewer

Town of Stratham NEW HAMPSHIRE Incorporated 1716

PREP Piscataqua Region Estuaries Partnership

This web mapper is an interactive tool that allows residents and town officials within the Town of Stratham to explore the results of the Septic System Vulnerability Assessment completed by the FB Environmental Associates and the Town of Stratham in 2024-2025.

Funded by a generous grant from the Piscataqua Region Estuaries Partnership (PREP) through the Piscataqua Region Environmental Planning Assessment (PREPA) Grant Program and in-kind staff time from the Town of Stratham, the goal of this project is to improve water quality in local streams and the Great Bay by reducing nitrogen and bacteria inputs from failing, malfunctioning, or underperforming septic systems. The PREPA Grant Program has been funded by the United States Environmental Protection Agency under assistance from the Bipartisan Infrastructure Law.

Properly functioning septic systems treat wastewater from our homes and protect both human and environmental health by capturing chemicals, harmful bacteria, and viruses. Septic systems also capture nutrients, like nitrogen, which are found in high concentrations in human waste (and are food for algae in our rivers and lakes!). Outdated and failing systems, or even newer ones that are not properly maintained, threaten the health of the surrounding natural resources and the habitat and wildlife they support.

This web mapper displays septic system failure vulnerabilities based on several environmental risk factors. Environmental risk factors determine how vulnerable or sensitive the environment is to a septic system malfunction or failure, and include shallow groundwater, flooding, proximity to wetlands and waterbodies.

Click Here to Explore Different Septic Risk Score Scenarios

How To Use This App

Buttons at the Top Left Corner of the App:

- The "Default Extent" button at the top left corner takes you back to the original extent (zoom) of the map.
- The "My Location" button at the top left corner will zoom the map to your computer's current location. This requires granting permission to your computer to access its location.
- The +/- buttons at the top left corner can be used to zoom in or out of the map. Alternately, your mouse wheel also lets you zoom in and out, while left clicking and dragging lets you pan around the map.

Buttons at the Top Right Corner of the App:

- Click the "Click Here to Explore Different Septic Risk Score Scenarios" button to view septic risk scores for baseline, 2050, and 2100 individually. Click the title to the mapper to return to this homepage.
- By selecting the "about" button you can access additional information about this project.

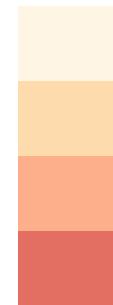
2 km
2 mi

Esri, NASA, NGA, USGS | Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, USFWS | See dataset sp... Powered by Esri

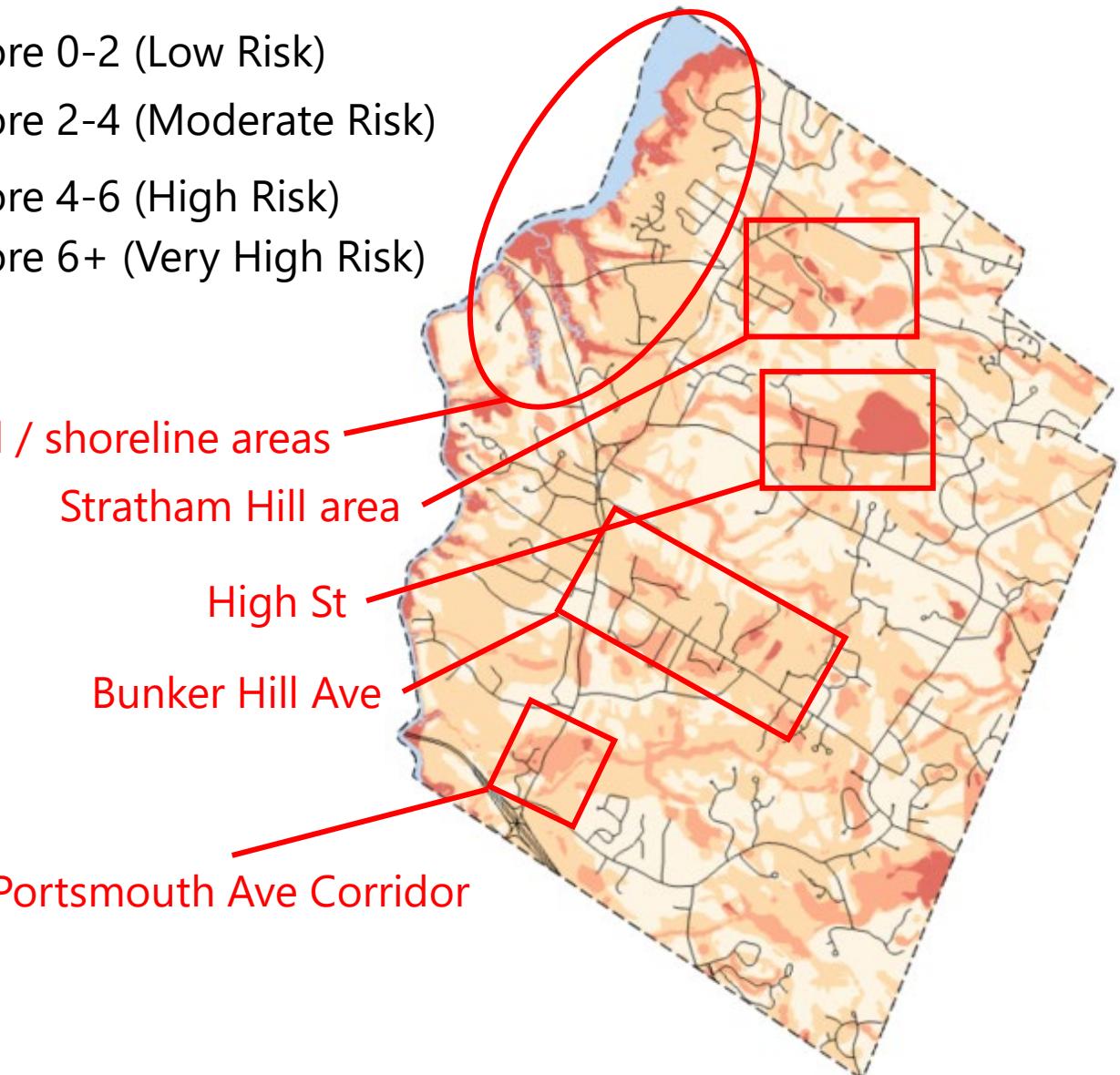
Vulnerability Assessment

Important Caveats:

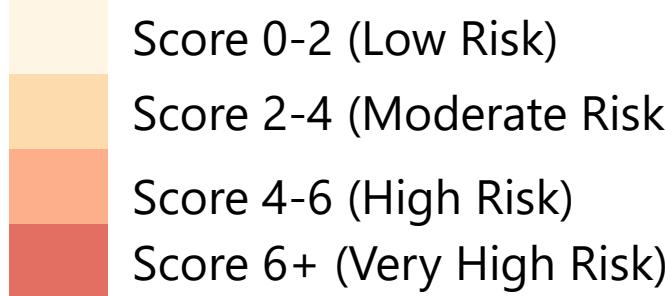
- Planning level tool – risk categories are **RELATIVE**
- Risk does not mean an area is polluting the waterbody
- Stratham is **generally at low-risk** (highest possible score = 9)



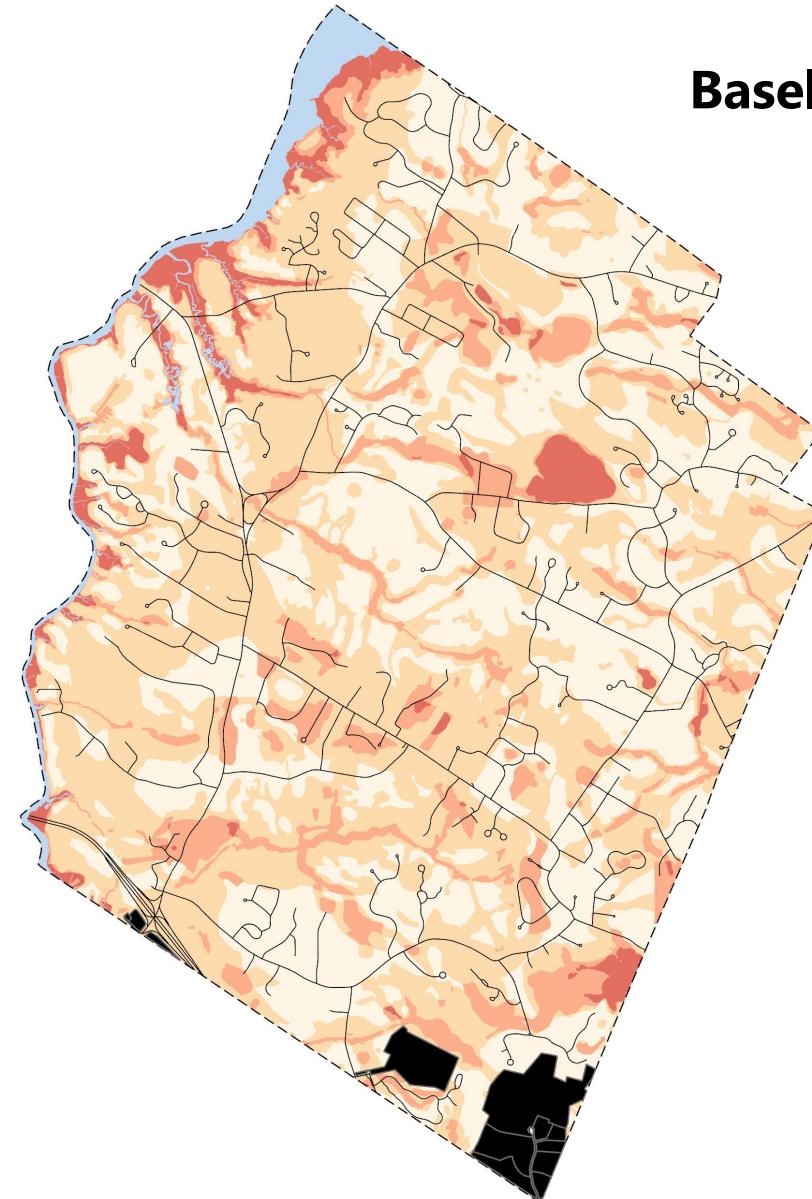
- Score 0-2 (Low Risk)
- Score 2-4 (Moderate Risk)
- Score 4-6 (High Risk)
- Score 6+ (Very High Risk)



Vulnerability Assessment

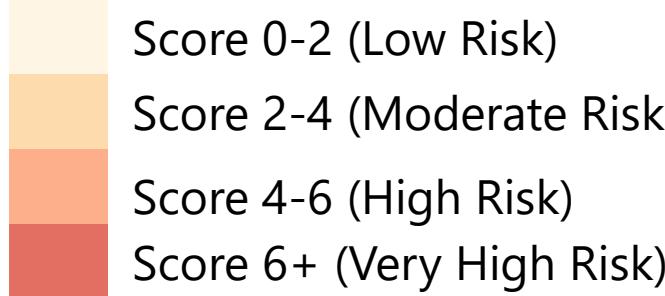


**7% of parcels are at
high risk of septic system
failure / pollution**

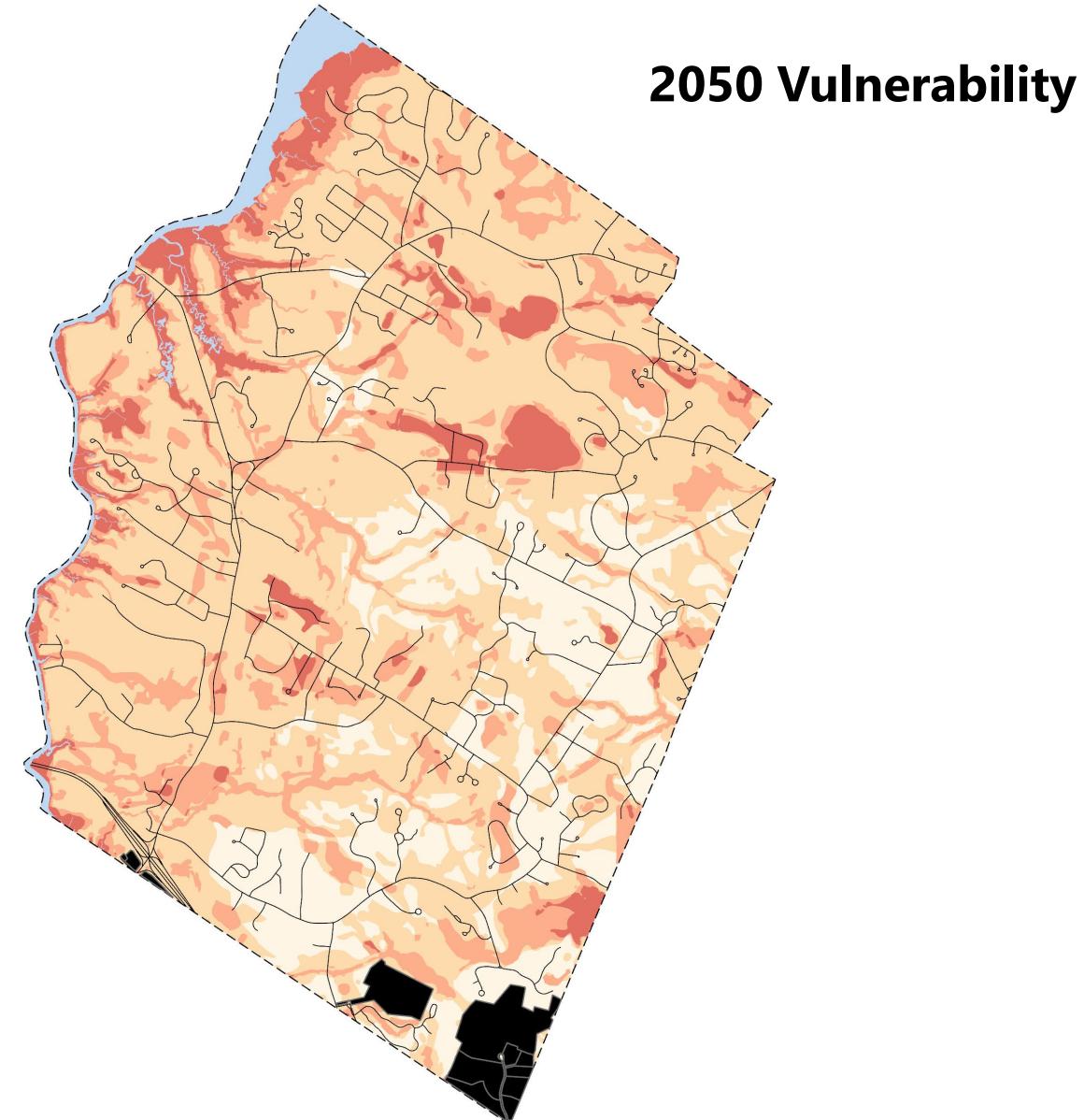


Baseline (2025) Vulnerability

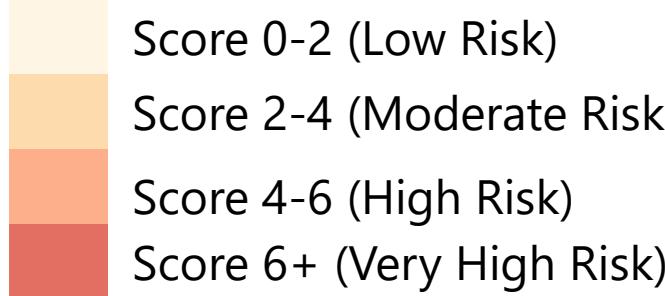
Vulnerability Assessment



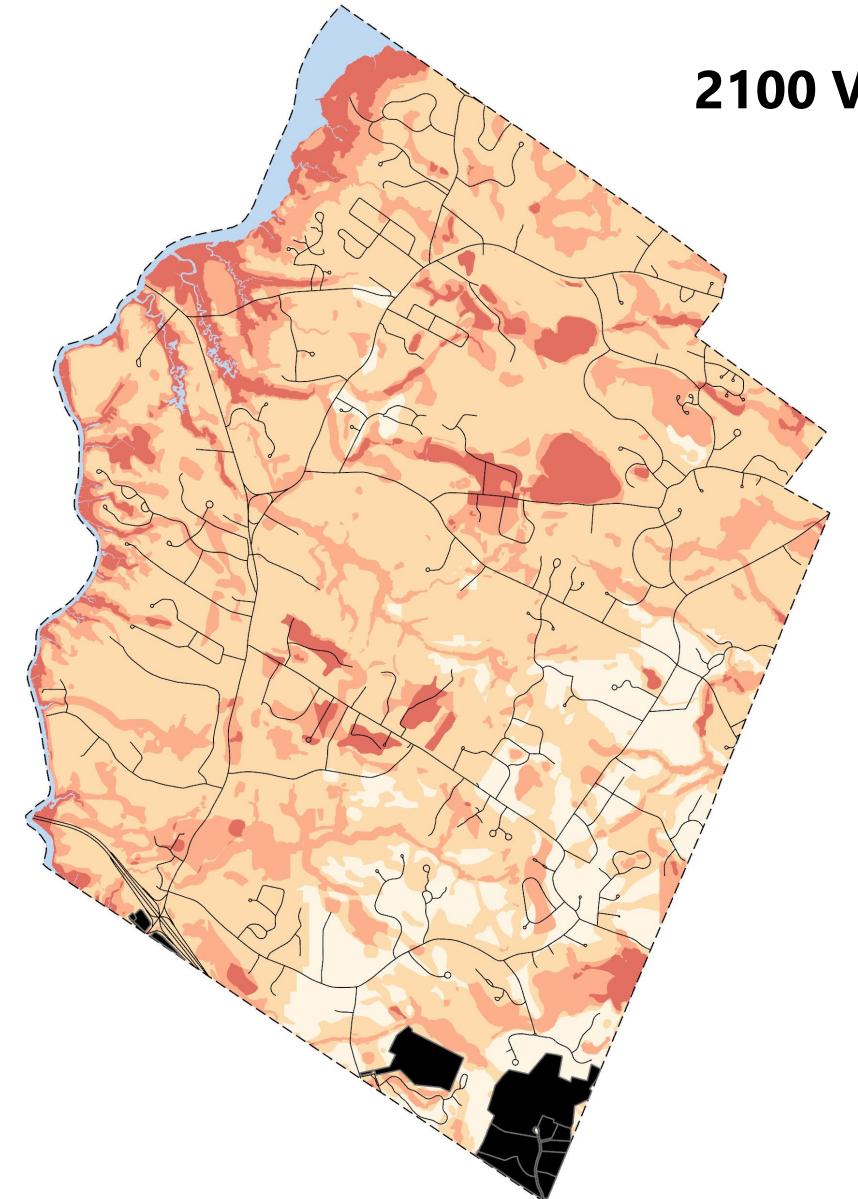
15% of parcels are at
high risk of septic system
failure / pollution



Vulnerability Assessment



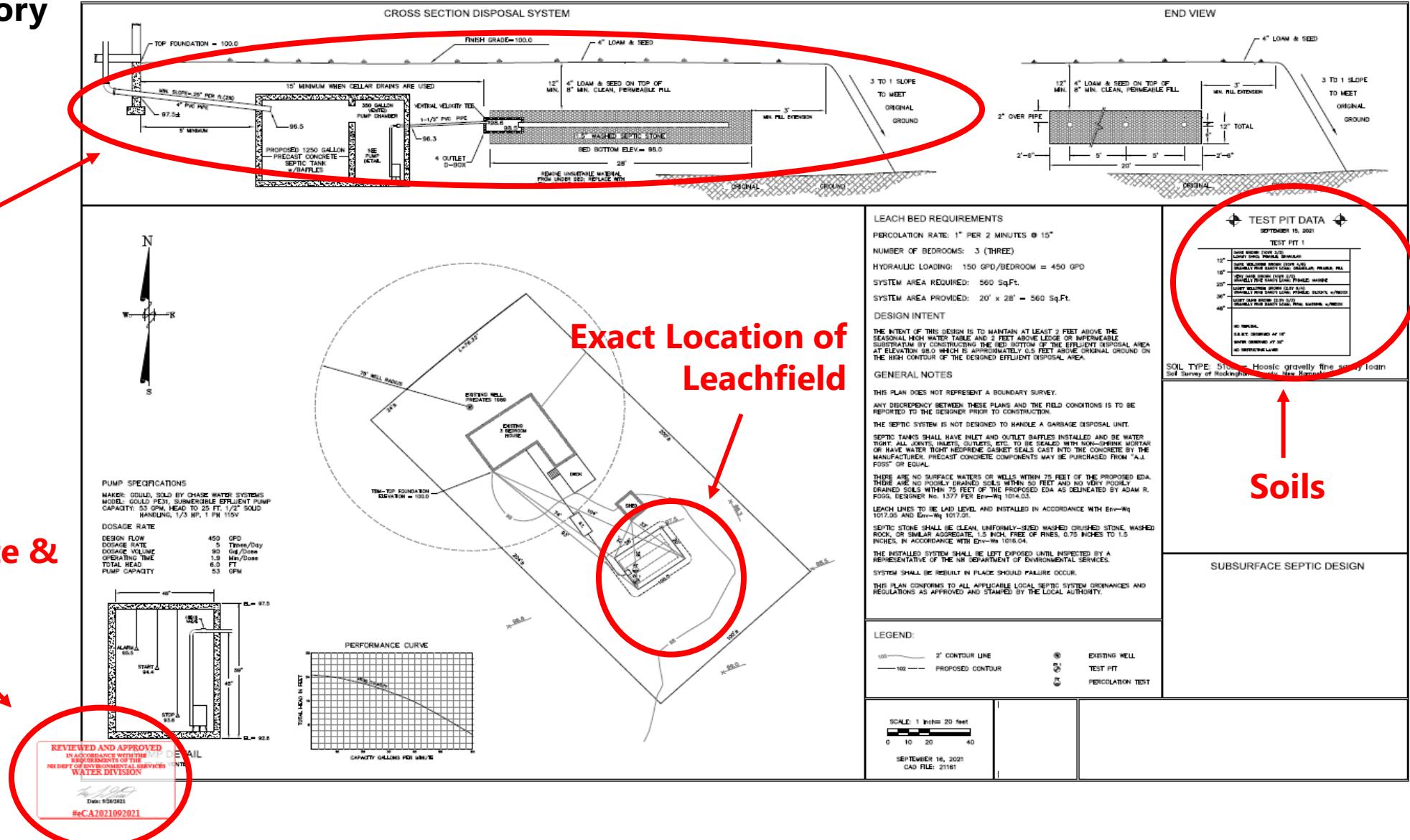
18% of parcels are at
high risk of septic system
failure / pollution



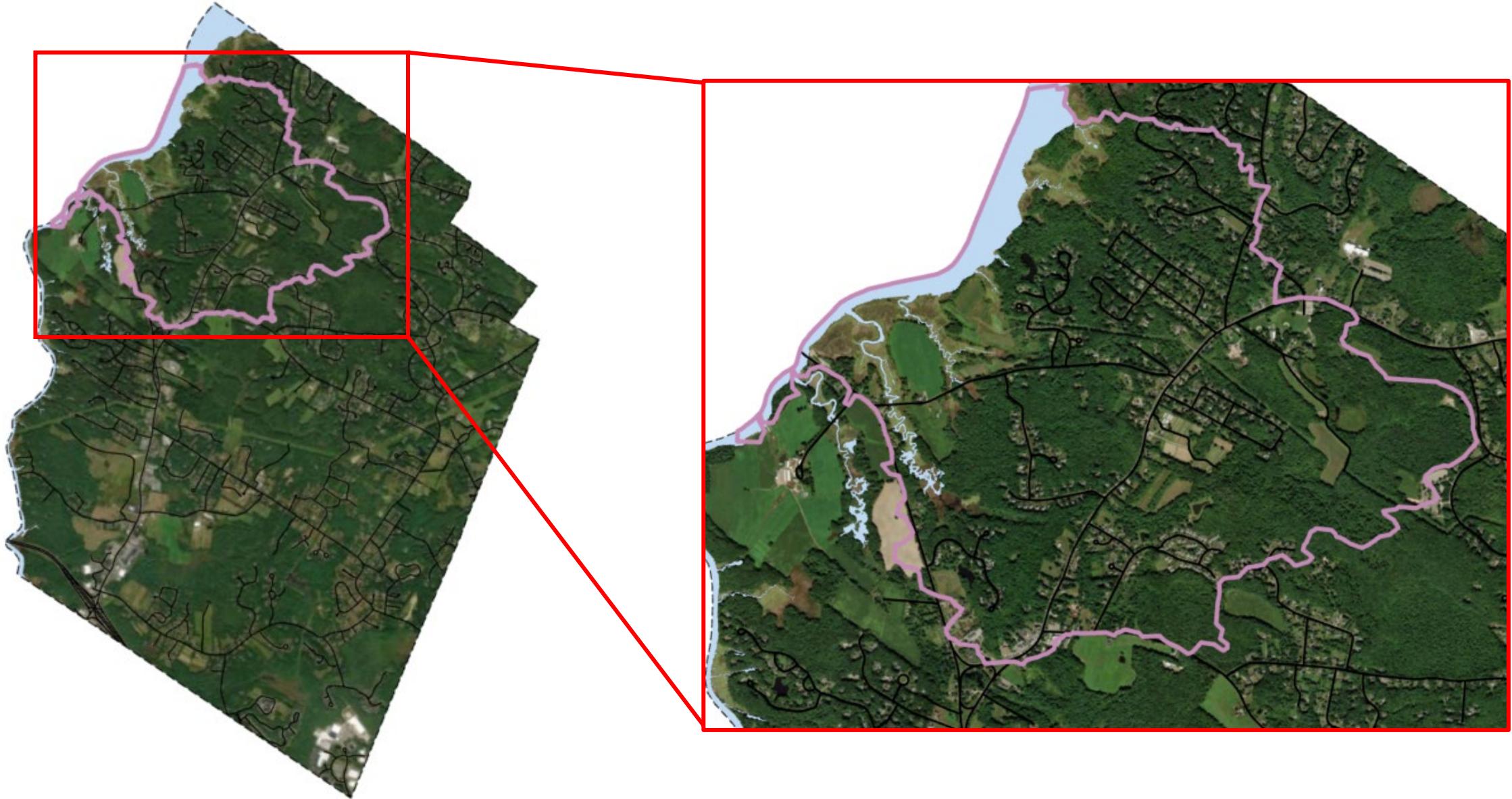
Septic System Inventory

Step 2: Inventory

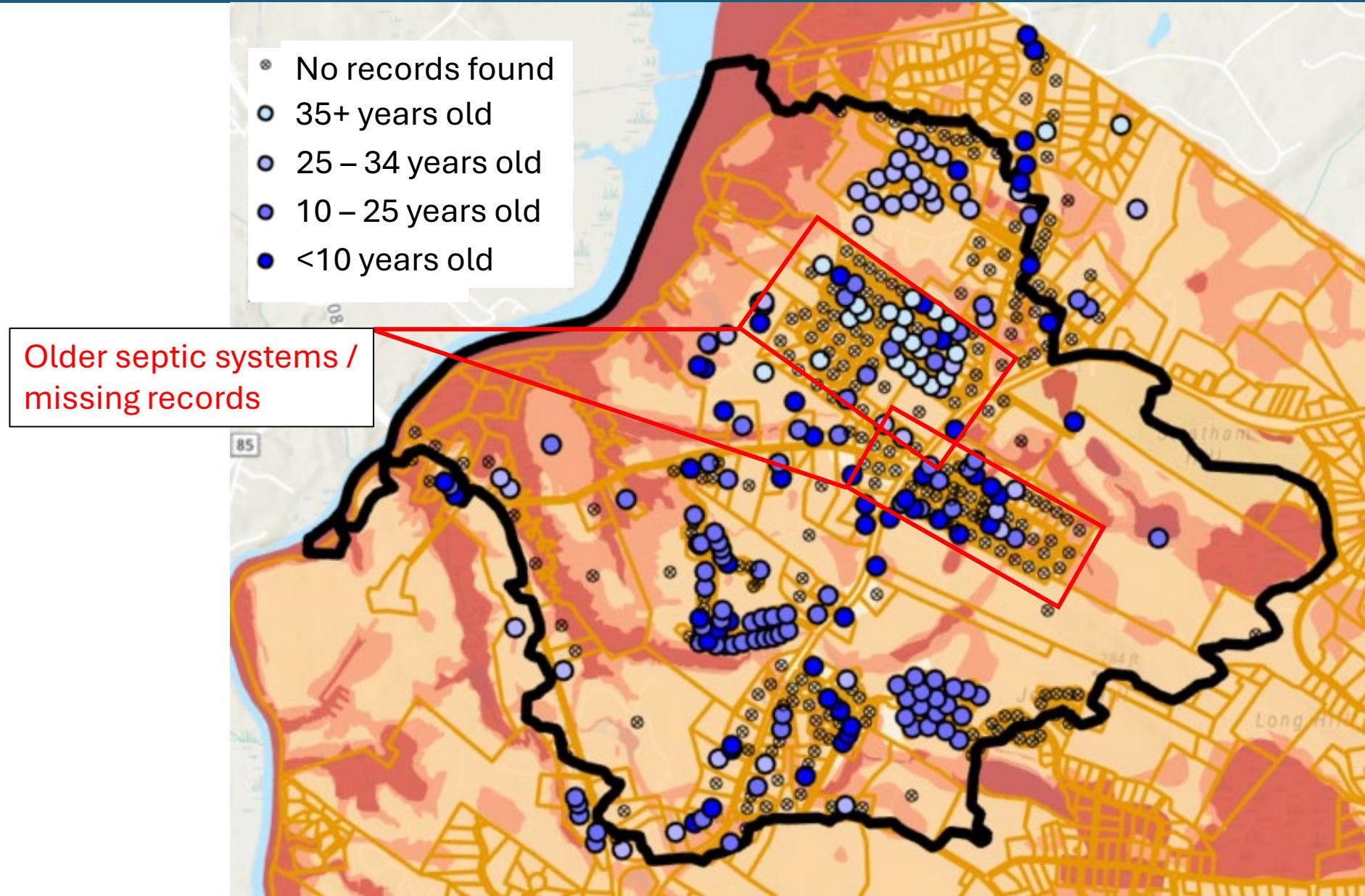
Design



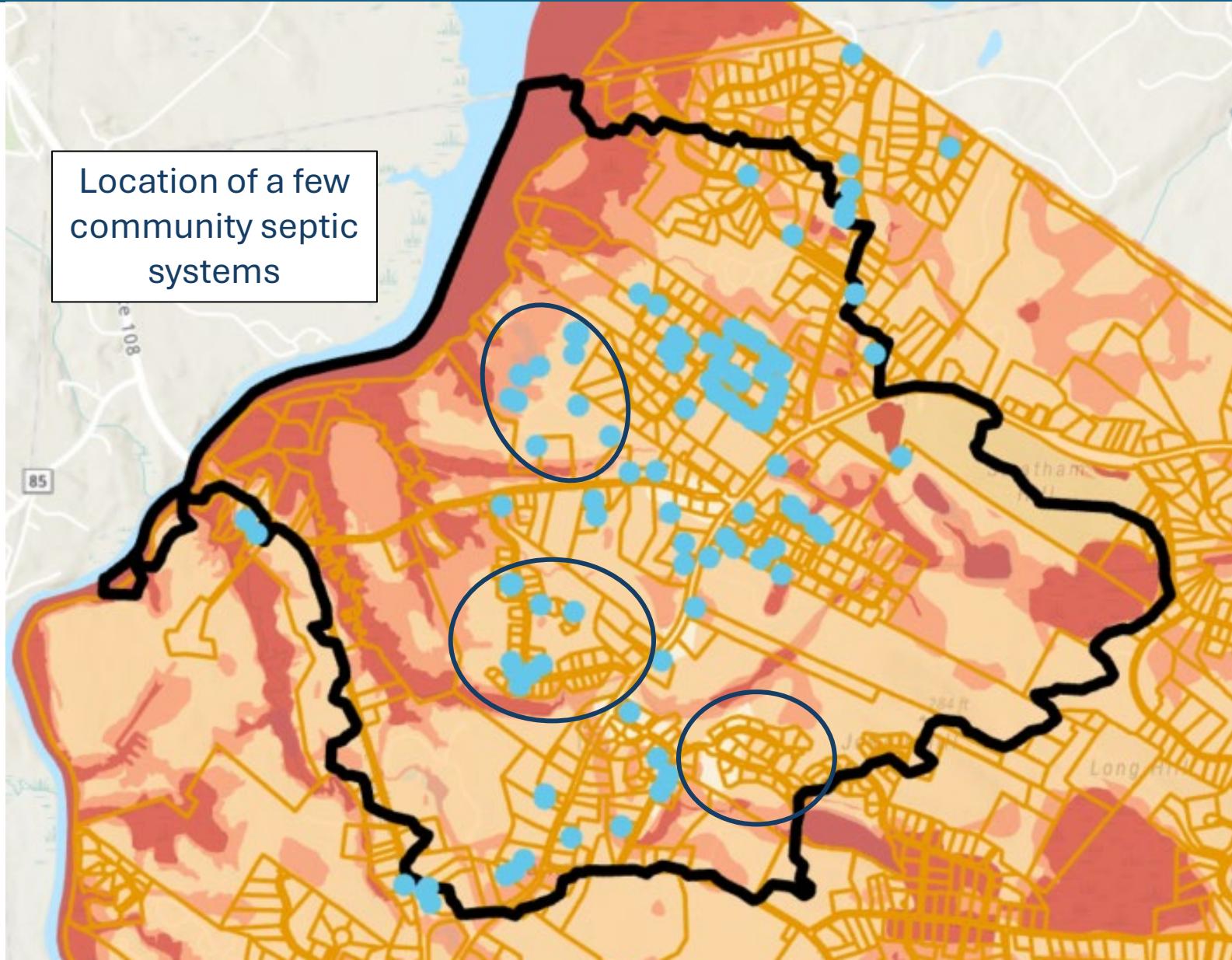
Stratham Study Area



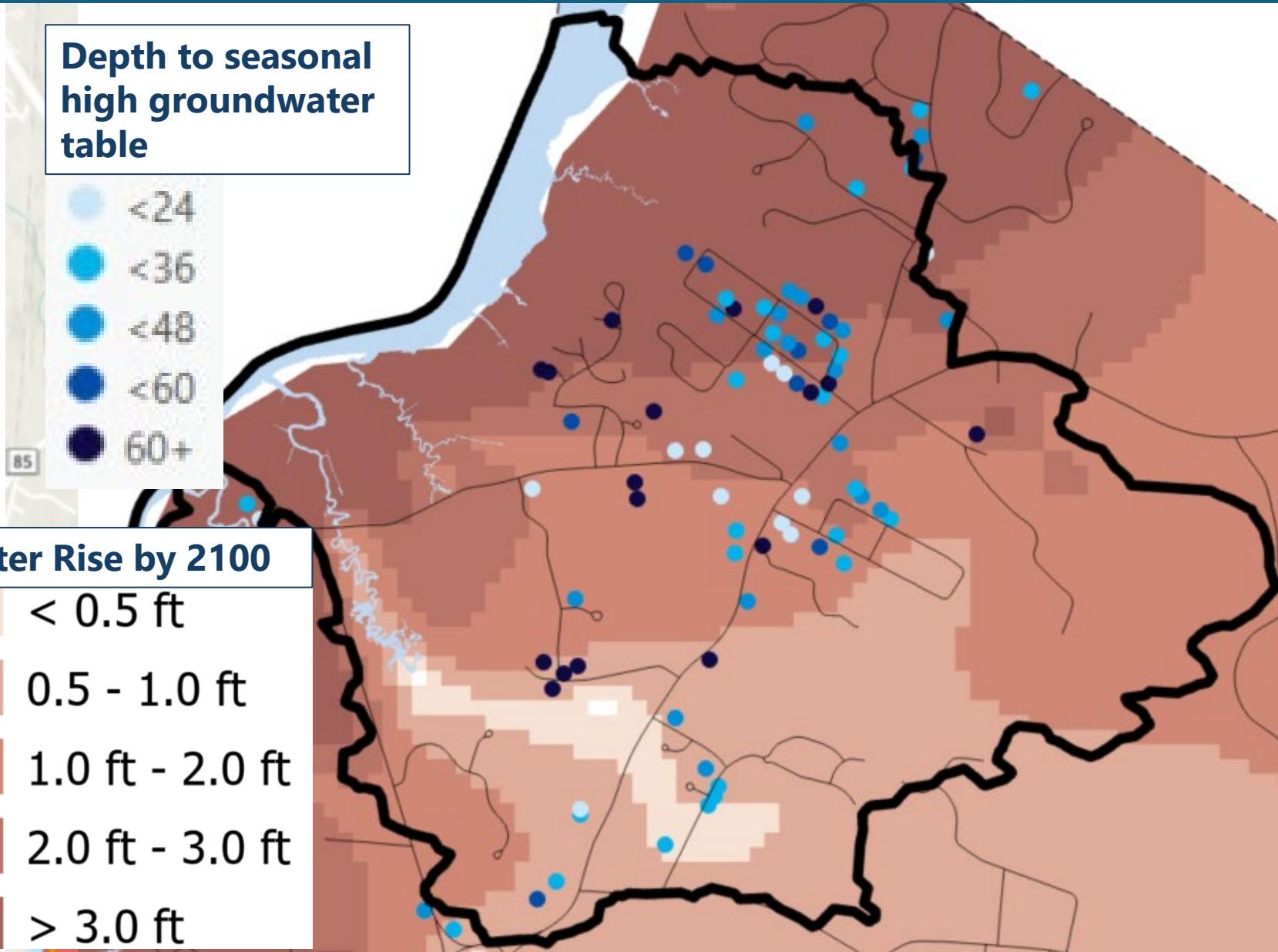
Septic System Age



Septic System Location

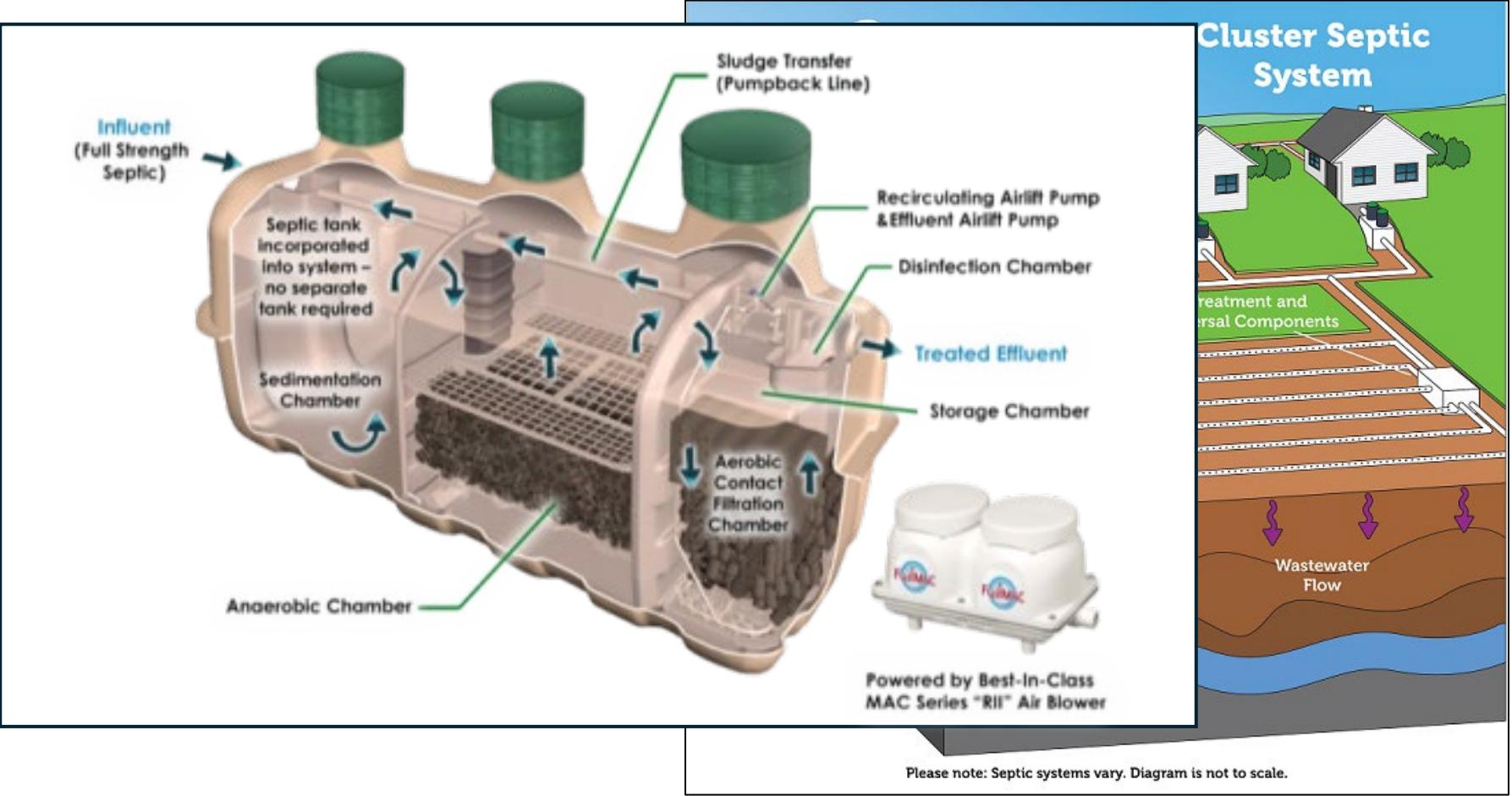
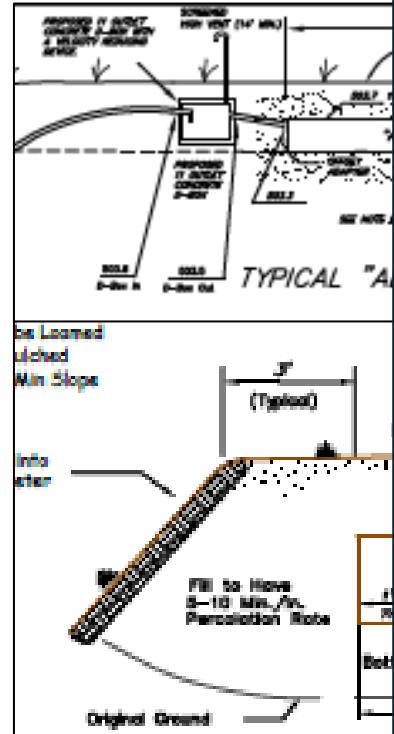


Soil Limitations



Vulnerability Assessment

Nitrogen Reducing Septic Systems



Stratham – Potential Recommendations



- Complete septic system inventory for the rest of the town.
- **Increase septic system setbacks for all waterbodies and wetlands.**
- **Assess viability of collaborating with Exeter to expand sewer services.**
- **Require community septic systems for new subdivisions within the Residential-Agricultural zoning district.**
- **Require additional vertical separation distance in areas susceptible to groundwater rise.**
- **Establish a cost-share or funding program for septic maintenance and replacements.**
- **Implement a septic pump out & maintenance ordinance.**
- **Require advanced nitrogen-reducing systems in sensitive areas.**
- Restrict development in areas highly vulnerable to sea level and groundwater rise
- Target outreach to highly vulnerable areas.
- Consider requiring a septic evaluation at the time of property transfer.
- **Require maintenance contracts or employ other management structures.**

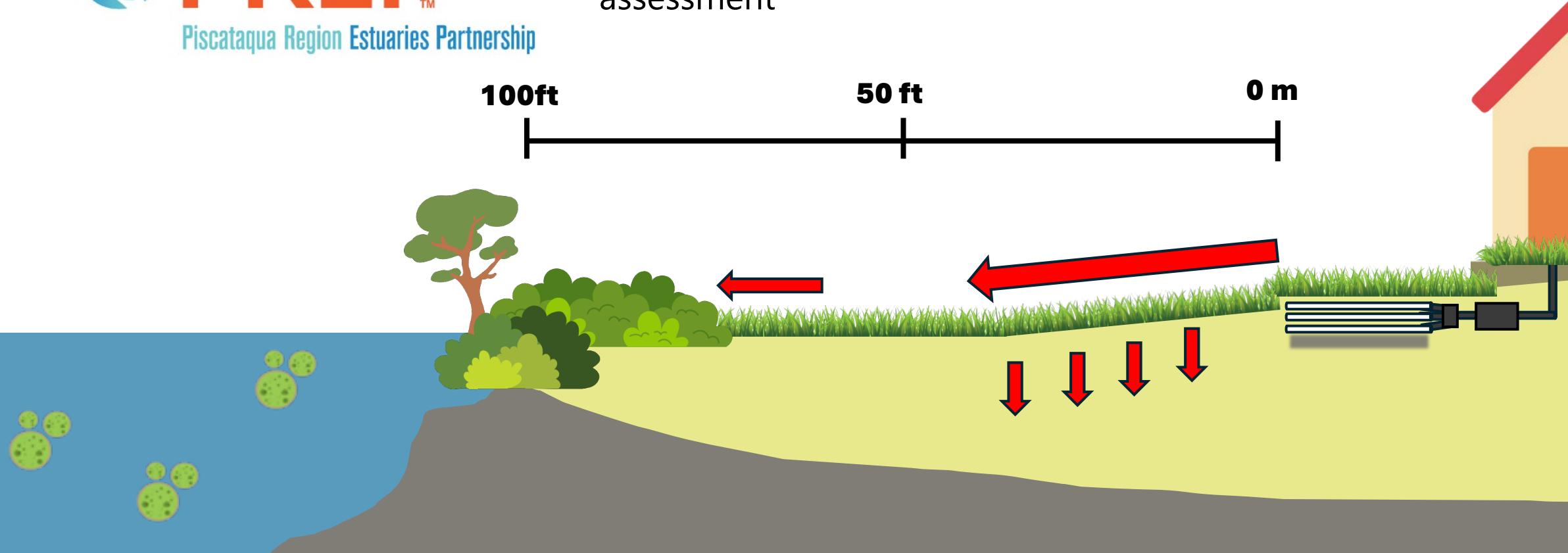
Stratham – Potential Recommendations



- Increase septic system setbacks for all waterbodies and wetlands.



Recommended in PREPs, 2020
assessment

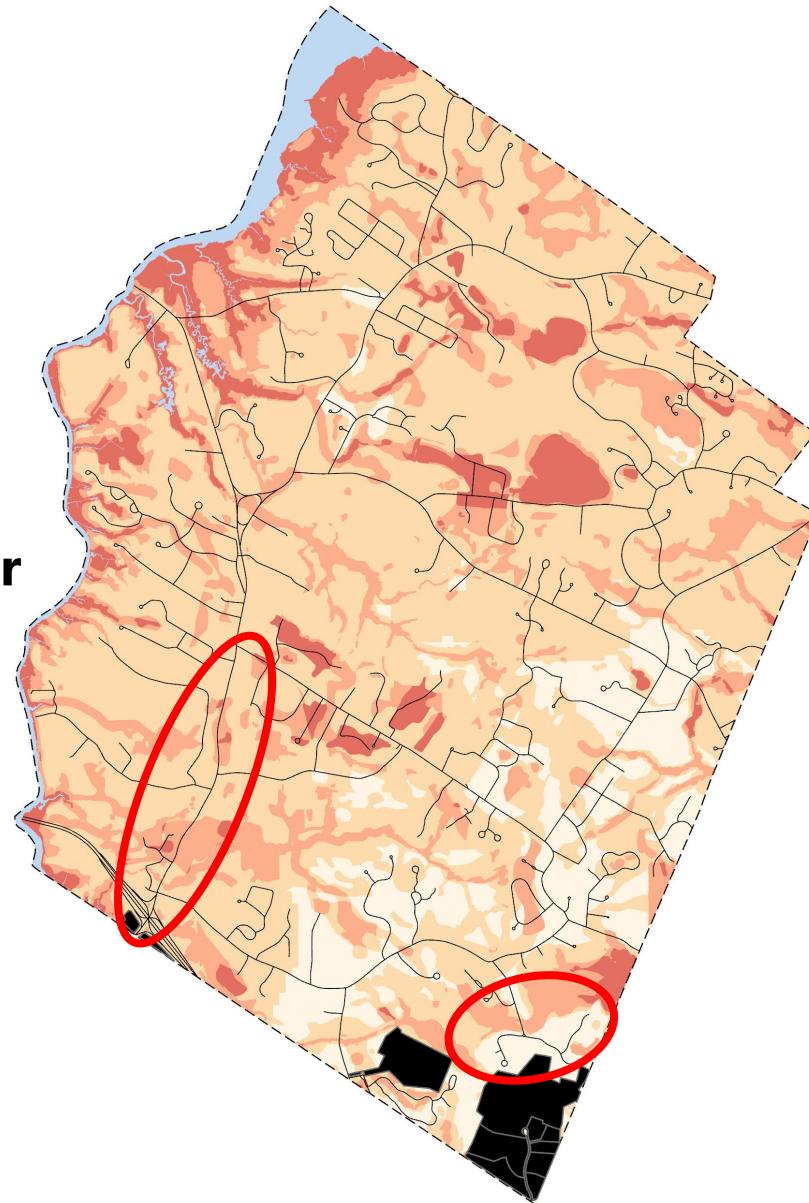


Stratham – Potential Recommendations



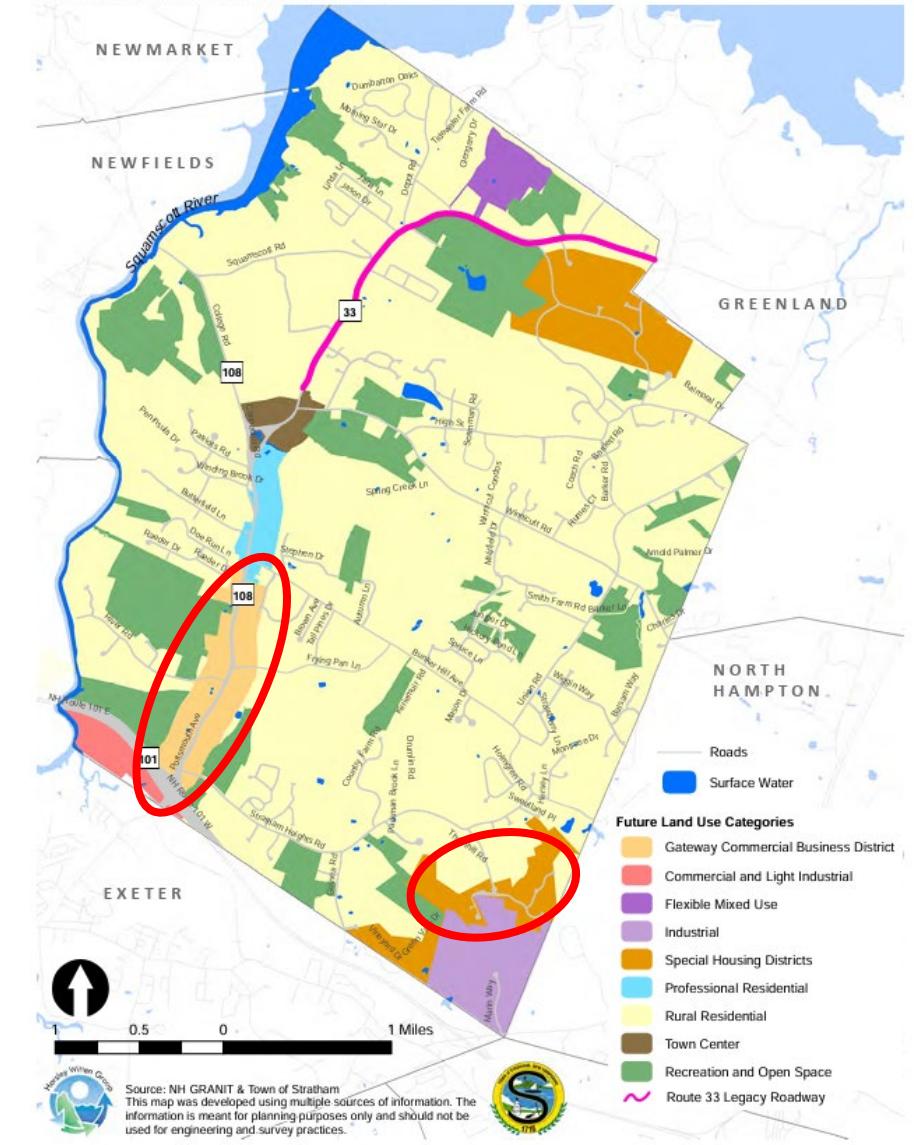
CAVEAT: This is not a capital planning project

- **Assess viability of collaborating with Exeter to expand sewer services.**



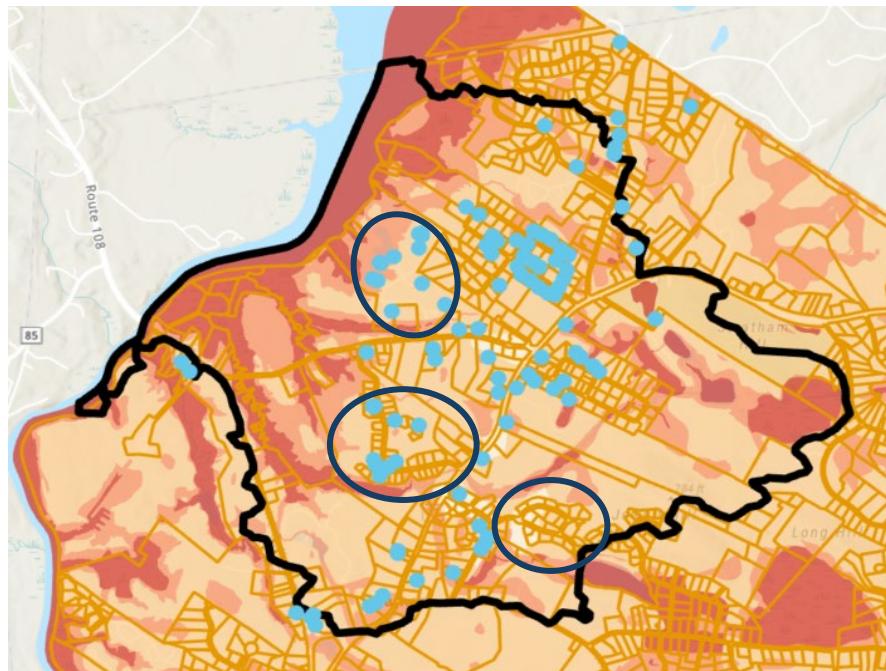
Future Land Use Map

Refer to Future Land Use Category descriptions.



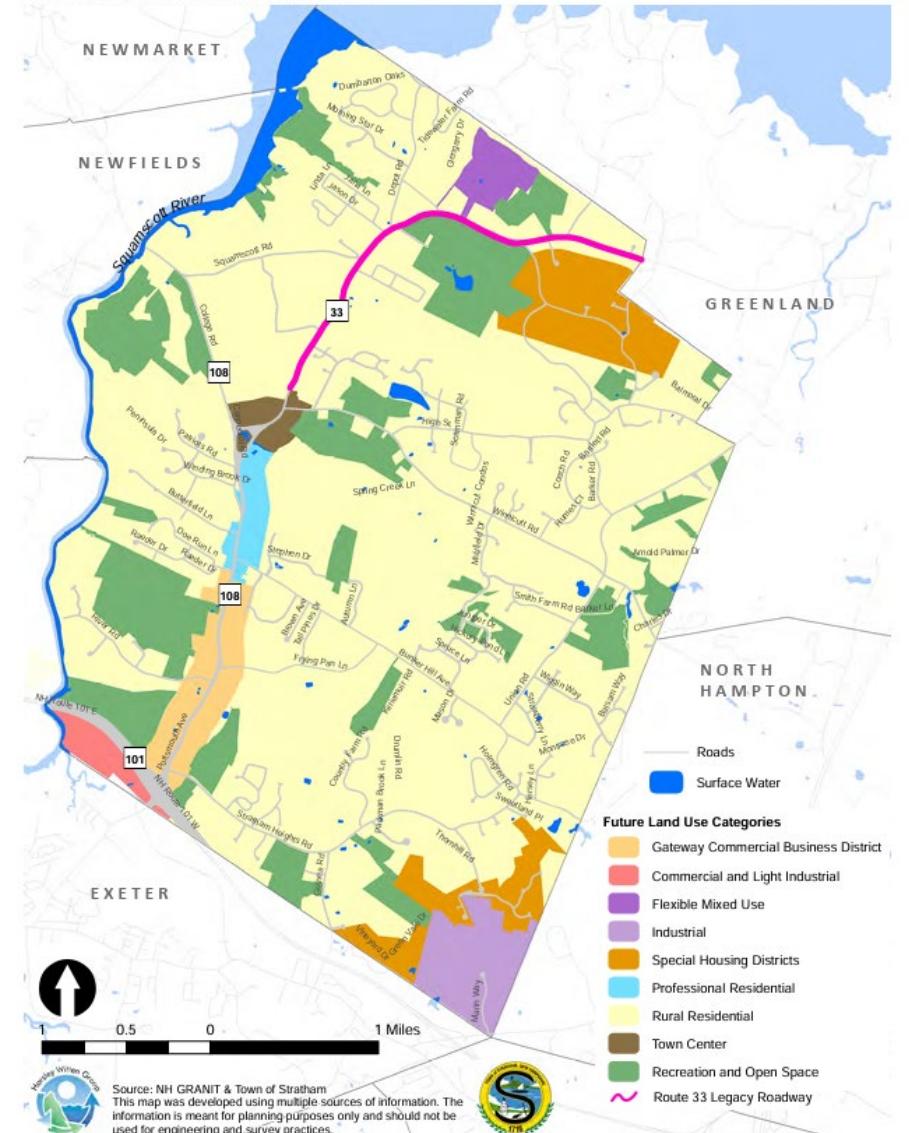
Stratham – Potential Recommendations

- **Require community septic systems for new subdivisions within the Residential-Agricultural zoning district.**



Future Land Use Map

Refer to Future Land Use Category descriptions.

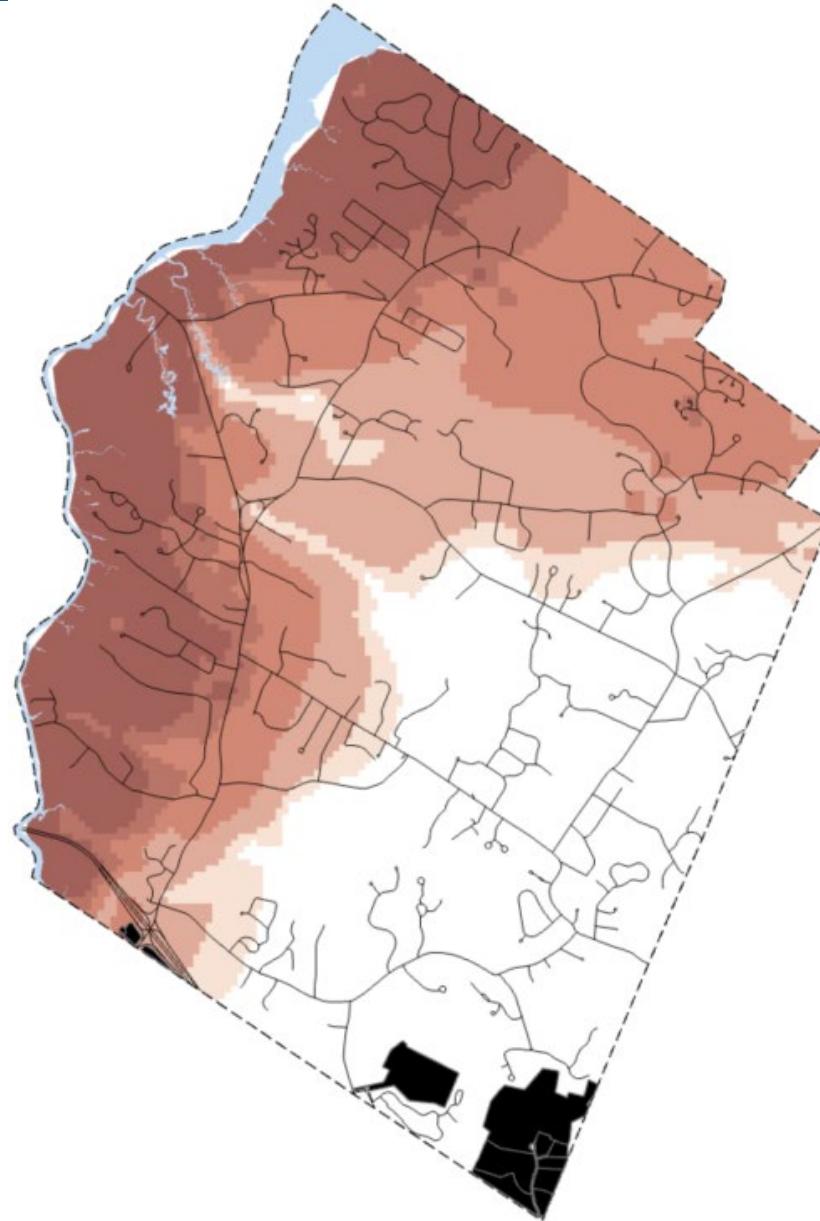
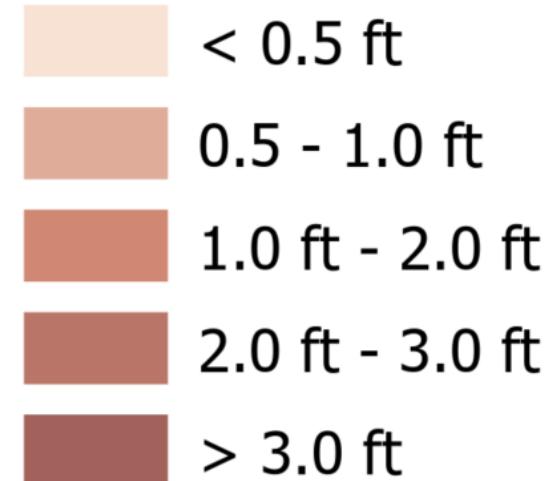


Source: NH GRANIT & Town of Stratham
This map was developed using multiple sources of information. The information is meant for planning purposes only and should not be used for engineering and survey practices.

Stratham – Potential Recommendations

- **Require additional vertical separation distance in areas susceptible to groundwater rise.**

Groundwater Rise by 2100



Stratham – Potential Recommendations



- Establish a cost-share or funding program for septic maintenance and replacements.
- Require maintenance contracts or employ other management structures.



ADVANCED ONSITE SOLUTIONS LLC
P.O. Box 248
Canterbury, NH 03224
(603) 369.4777

The following inspection is required. It is the owner's responsibility to see that this maintenance is performed.

- 1 *THE CLEAN SOLUTION* system shall be inspected every 2 years by a Technician certified AOS.
- 2 Maximum time between pumping the primary septic tank and settling chamber shall not exceed 2 years. More frequent pumping may be required depending on system use and number of occupants. Owner must retain records of pumping.
- 3 Compressor must run continuously and be checked monthly to ensure it is operating properly. Compressor Air Filter to be cleaned or replaced yearly, if in a dusty environment cleaned more frequently
- 4 Typical residential use requires the BioCon Chamber to be pumped and cleaned every 5 to 7 years.
- 5 Leach fields are designed based on a peak design flow measured in gallons per day. Leach fields are not designed to be loaded at the peak design flow on a daily basis. It is important to repair leaking water fixtures promptly and to spread out laundry through the week rather than doing several loads in one day to prevent overloading the septic system
- 6 Pharmaceuticals, medical treatments, and personal care products can disrupt the balance of bacteria in the septic tank, reducing the septic tank's efficiency to break down waste. Unused pharmaceuticals, prescriptions, or over the counter medicines are not to be disposed of in your septic system. Check with your local pharmacy to see if it has a program to dispose of unused medicines.
- 7 If a resident of the home is undergoing medical treatment with high strength antibiotics, the system should be inspected annually to determine the proper maintenance schedule.
- 8 Your system has a septic tank effluent filter and a sewer pump filter, the filters should be checked and cleaned annually. More frequent cleaning may be required depending on use.

The inspection fee does not cover routine maintenance of the BioCon Chamber (pumping and cleaning) or replacement of components not covered under the warranty. See Sales Agreement for warranty information. Compressors under warranty will be replaced at no cost if installed during an inspection. Compressors not providing enough pressure to ensure the system is working efficiently will be replaced during inspection. The owner will be invoiced for replacement of compressors not covered under warranty.

INSPECTION FEE SCHEDULE

Single Family Residential Homes – The current fee is \$235.00 per inspection plus the cost of replacement parts not covered by warranty. AOS may adjust the inspection fees as needed to cover increase in cost of service and goods (i.e. Fuel). Inspection fees are payable at time of service. By signing below, the owner or owner's representative agrees to the performing the necessary inspections.

Stratham – Potential Recommendations



- **Implement a septic pump out & maintenance ordinance** (every 3-5 years)
 - Look to other NH towns such as **Rye, Sunapee, Meredith, New Durham, Enfield**



Ensure your septic tank is pumped at regular intervals as recommended by a professional and/or local permitting authority. Learn more at www.epa.gov/septic.

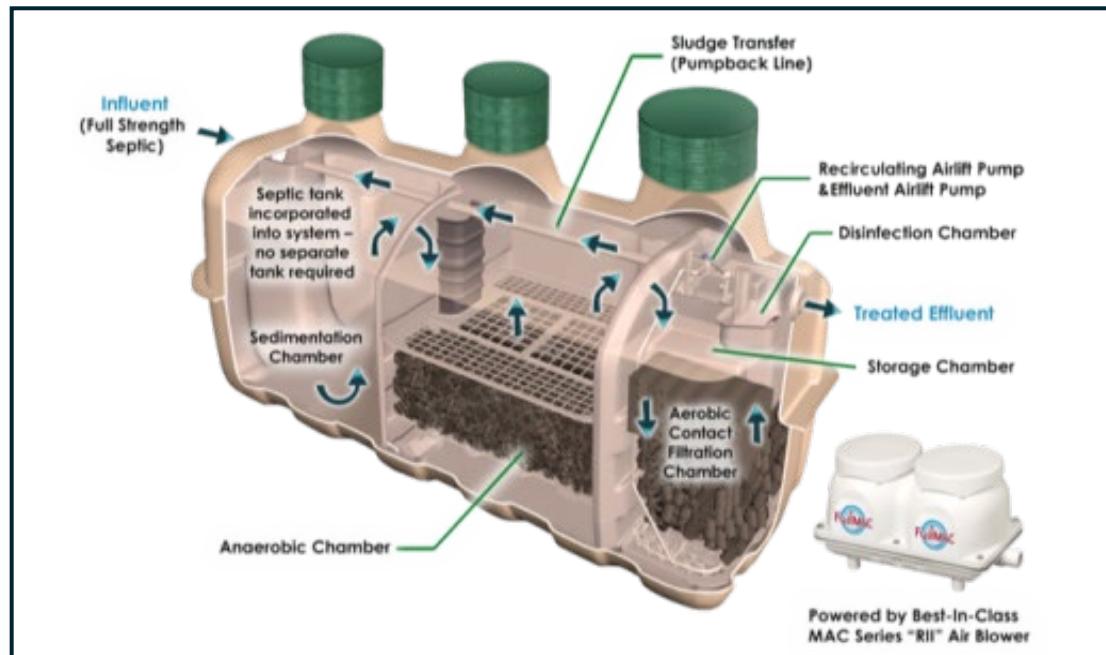


Stratham – Potential Recommendations



- **Require advanced nitrogen-reducing systems in sensitive areas.**
 - Look to Rhode Island (Charlestown), Nassau and Suffolk counties, New York

Nitrogen Reducing Septic Systems



Thank you!

Evan Ma

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