

# Proposals for Wastewater Treatment at MCS

**It's Alive: Using Nature's Designs to Purify Water**  
**2022 HHS March Intensive**

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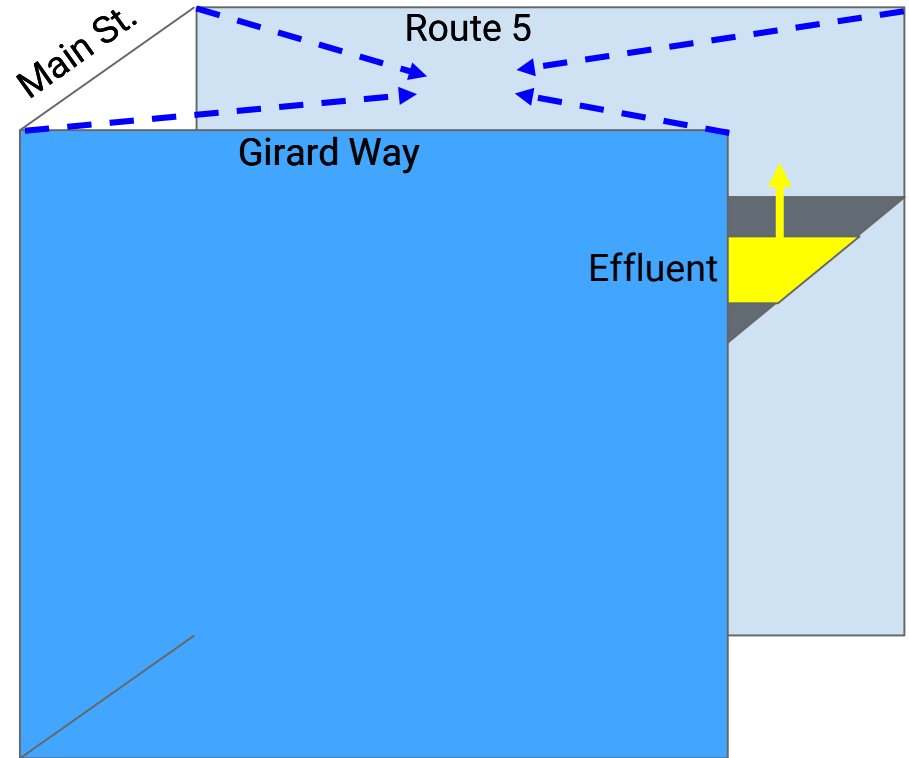
# Introduction

- ❖ **Who we are** - We're a group of Hanover high school students and Marion Cross alumni who wanted to explore potential solutions to the septic problem, and see it not only as a problem to be solved, but as an educational and ecological opportunity.
- ❖ **Who we've met** - We've met with state engineers who approve septic designs including innovative alternative technologies, sales reps from companies who sell innovative technologies, King Arthur and Montshire facilities directors, school administrators, and business administrators
- ❖ **Exploring all the options** - We've toured both conventional and ecologically-based wastewater treatment systems to fully explore the options before us at Marion Cross.



# Existing Problem

- ❖ According to state and local engineers
- ❖ History of Problem
- ❖ The Science



# Options Explored

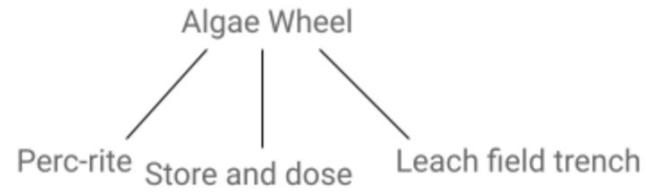
1. Collaboration with the Montshire
2. Collaboration with King Arthur
3. Moving wastewater to Hartford or Hanover

Our recommendation: Treat the MCS waste on MCS property

# The Solution as We See It



- Pretreatment - local experts and state officials have indicated that pretreatment should be incorporated into any design for this site
- Algae wheel
- Three possibilities for the effluent after pretreatment
  - Perc-Rite
  - Leach field trench
  - Store and dose



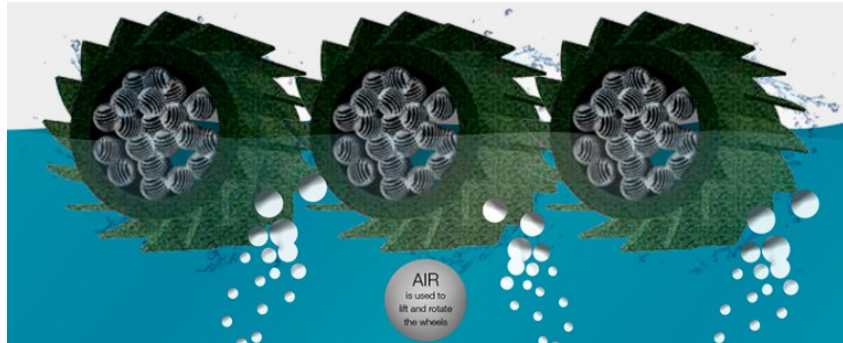
# Septic Tank and Algae Wheel

## Grease Trap

- Needed if a cafeteria was built

## Septic Tank

- Wastewater Process



## Algae Wheel

- Pretreatment and How it Works
- Why Algae Wheel?
  - Approved ecological alternative
  - Learning opportunities
  - Lower maintenance
  - It's possible to generate the power to heat the space using solar energy
  - Lower energy compared to any off site treatment option
  - Economical

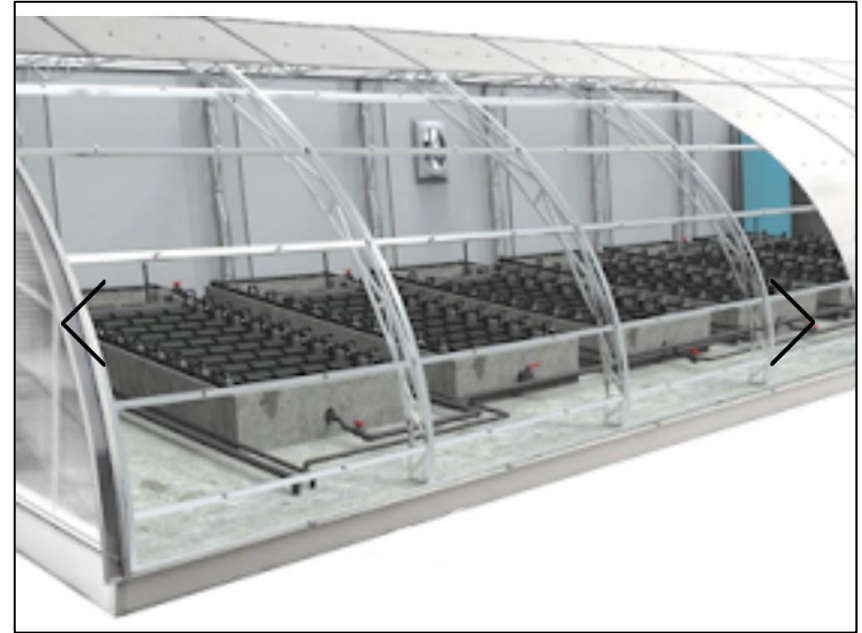
grease trap → septic tank → algae wheel →



# Algae Wheel (continued)

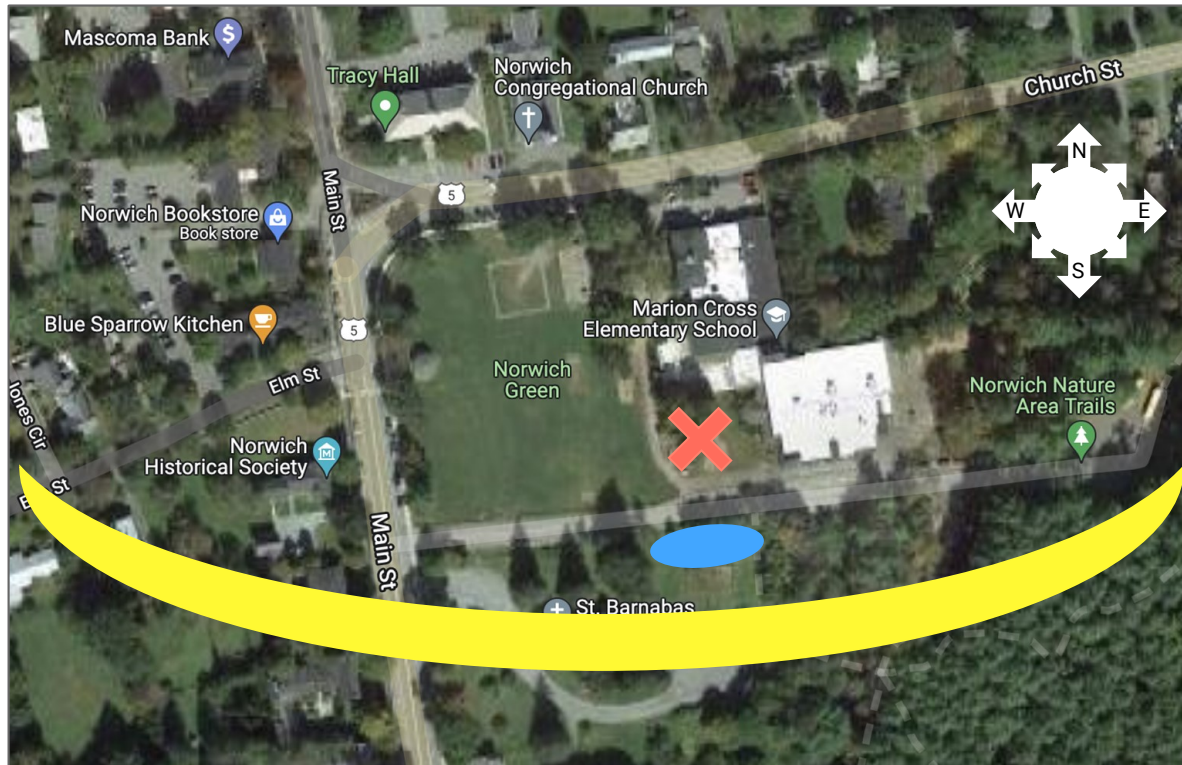
## Algae Wheel

- Algae Units
  - 1 unit = 10x20 ft
  - 1 unit  $\cong$  \$100,000 (includes greenhouse, algae units, and treatment tanks)
  - Depending on the ability to reuse or need to replace pumps, storage tanks, septic tanks etc. Could be an additional  $\cong$  \$200,000
  - We would also like to seek grant money to make the greenhouse large enough to accommodate a class and make educational allowances in the plumbing for use in science classes
- Ongoing Considerations
  - Seasonal Plan
  - Operator Expenses
    - \$200-500/per month
  - Maintenance
  - Extra Algae
    - Closing the loop





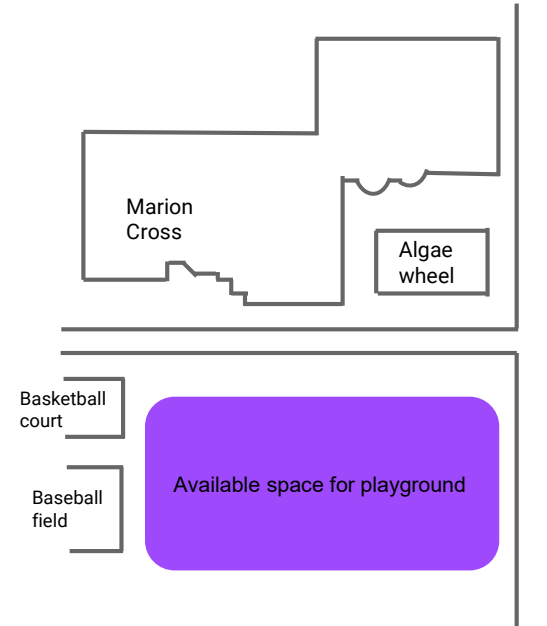
# Proposed Algae Wheel Location



- Algae wheel needs to be 25 ft from the existing building
  - Requires a sunny location so that algae can undergo photosynthesis and produce oxygen
  - Would have to ask St. Barnabas to trim the pine trees to allow for sunlight (crucial especially on shortest days when sun is low)
- or**
- Cut down pine trees and replace with native trees/plants that are shorter and can still allow for light to get through
  - Replace the playground w/ the algae wheel
  - Relocate new playground to the green



# Proposed Algae Wheel Location (continued)

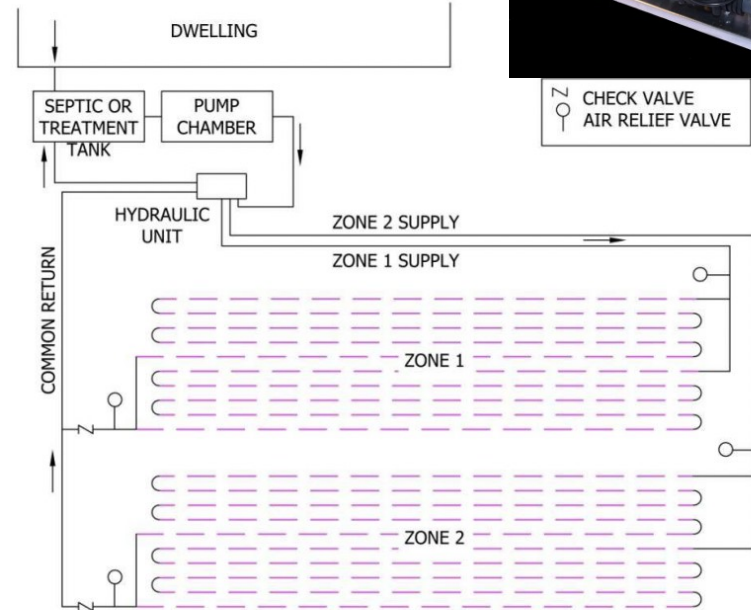
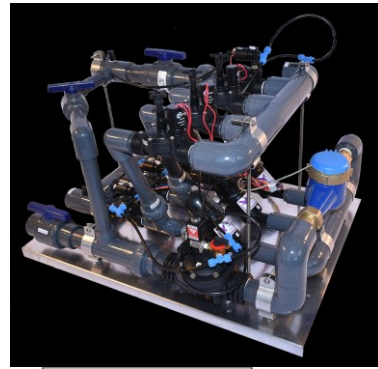


# Options for dispersing the clean, sanitized wastewater from the Algae Wheel:

## 1. Perc-Rite



- What is Perc-Rite?
- Why Perc-Rite?
- Garden potential



**TYPICAL MULTIPLE ZONE LAYOUT DETAIL**  
NOT TO SCALE

## 2. Leach Field Trench



- Create a long and narrow leach field as an alternative to Perc Rite
- A minimum of 25 feet of the green would have to be removed along Girard Way
- Girard Way would be moved (blue line)
- A gully alongside the leach field would be made to prevent effluent from flowing onto St. Barnabas property

Proposed location of leach field

Leach field 1 is the current leach field on the green

Leachfield 2 is the new leach field on existing Girard Way

# 3. Store and Dose

- Store effluent when leach field 1 groundwater level is too high
- Effluent is then diverted to leach field 2
- Once water level recedes from leach field 1, effluent can be sent to leach field 1 again

## Pros

- Leach field much smaller
- Less expensive than the leach field trench
- Can use existing leach field nine months out of the year

## Cons

- Would need a second leach field installed - unlike the Perc-Rite
- If water levels aren't checked regularly there is still the possibility of overflow up past the surface, but the water would be clean.
- Would still have to move Girard Way



# Regrading the Green

- Existing drainage issues on the green could be contributing to the problem
- Designers from the State suggest re-grading the Green to effectively shed water



# Works Cited

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