

Green Community Technologies

Executive Summary Prepared for the Town of Richmond, Vermont

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Alternative Methods of Wastewater Treatment

A cursory look at the relative performance and cost-effectiveness of **constructed wetlands** vs. conventional treatment facilities indicates that installing wetlands may not be the best option for addressing Richmond's centralized wastewater needs¹. In Richmond's case, some of the obstacles include: reducing key pollutants to acceptable levels and acquiring suitable land for installation. However, constructed wetlands do hold promise for decentralized systems in Richmond (i.e. residential developments not connected to the municipal wastewater system) and should be considered when looking at new or expanded systems.

Stormwater Source Reduction/Alternative Paving Regimes

Yellow Wood Associates researched a number of alternative paving regimes that minimize stormwater runoff. Based on performance characteristics and history of use, the town should consider using a permeable pavement, such as **porous pavement**, when re-paving a municipally-owned parking lot (i.e. the Town Center). Porous pavement has been shown to significantly decrease stormwater runoff and has performed well in a variety of applications, including some in Vermont. Because parking lots have less direct wear and tear from traffic than roads, they are a more appropriate application for a pilot project. For the planned Jericho Road improvement, there may be an opportunity for using an alternative paving regime for the sidewalk or road; however, state regulations governing non-approved stormwater practices for new projects could create additional costs for the town, in terms of maintenance and monitoring requirements.

Yellow Wood Associates has also compiled research on the **new stormwater regulations** in Vermont and how they apply to Richmond's properties.

Energy Efficient Pumps and Motors for the Wastewater Treatment Plant

As of this summer (2003), construction has begun on Richmond's wastewater treatment facility. In replacing some of the older equipment, such as pumps and motors, reliable alternative measures to the currently planned modifications can be installed that use less electricity and save money. These measures, recommended by Efficiency Vermont, are expected to save 159,000 kWh of electricity per year, leading to savings of approximately \$16,000 per year.

Alternative Methods of Repair/Replacement of Water and Sewer Pipes

The application of **trenchless technologies** for repairing and replacing failing municipal sewer and water lines has been demonstrated as a cost-effective and practical solution for many communities. Because it can save a town money (up to 50% of estimated project cost using open-cut excavation) and minimize the impact on the community, these technologies should be

¹ Although Richmond has already committed to upgrading the municipal wastewater facility, the town's interest in natural treatment systems has provided the impetus for research into the potential application of these systems.

given due consideration for future projects in Richmond. A preliminary review of a proposed project on Esplanade Street by Trenchless Technologies of New England indicates that the pipebursting technique, although cost-competitive with the conventional open-cut excavation, is better suited to projects that entail longer stretches of pipe, few lateral connections, or pipes that are deeply buried.

Energy Efficiency Opportunities at the Town Center Building

An energy audit of the Richmond town office building (built circa 1907) identified multiple opportunities to consider energy efficient measures. New technologies for insulation materials, lighting, and heating could save the town over \$75,000 over a 25 year period in present value² dollars in addition to significant reductions in fossil fuel emissions.

Alternative Fuels for Town Vehicles

The use of **biodiesel** in standard diesel engines has many benefits, including reduced emissions and increased lubricity that can lead to longer engine life. Unfortunately, at this time, there is not a cost-effective source of biodiesel for on-road vehicles in the town of Richmond.³ In spite of this, there are groups in Vermont and greater New England that are currently working towards developing production and distribution systems for biodiesel that may make biodiesel a viable option for Richmond in the future. The town should pay close attention to developments within the industry and encourage opportunities to develop a local pilot project, (i.e. partnering with the school district) given sufficient resources and interest.

Propane, on the other hand, has some of the same benefits as biodiesel and is currently available in Richmond. Conversion of Richmond's 2003 Crown Victoria to a fuel system that can use both propane and biodiesel (dual-fuel vehicle) would cost approximately \$4,300. Although it is doubtful that the reduced fuel costs for propane would pay for this cost over the lifespan of the vehicle, the potential for reduced maintenance costs and air quality improvements as a result of the conversion may help to justify the expense. Conversion to dual-fuel systems is more appropriate for a pilot project, because the vehicle operator has maximum flexibility in fueling and operating the vehicle.

² Present Value (Present Worth): The discounted value of a payment or stream of payments to be received in the future, taking into consideration a specific interest or discount rate. Present value represents a series of future cash flows expressed in today's dollars.

³ Biodiesel is available through a number of local distributors starting at about \$2.50 / gallon. The price that Richmond currently pays for standard diesel is around \$1.00 / gallon or below.