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CRWA

Saving the Charles River since 1965

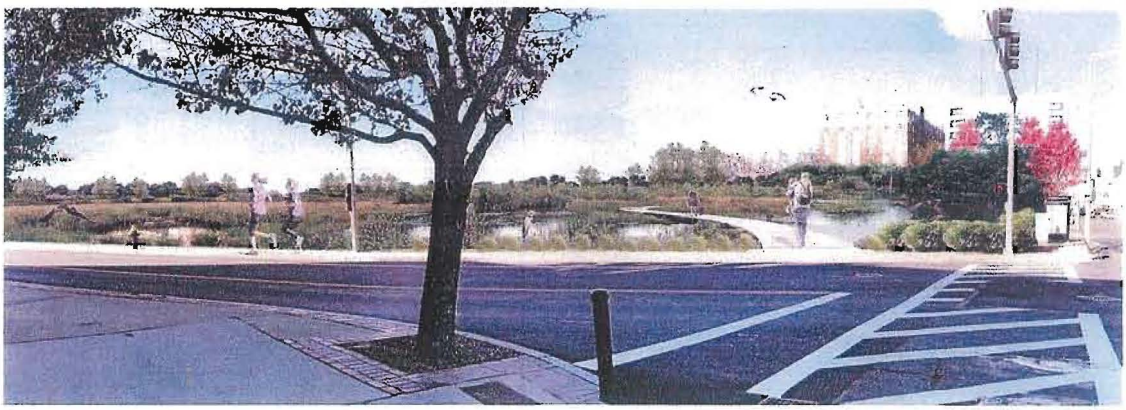
Infrastructure for a Livable Future

Bringing nature's balance to human water and energy systems

Background

Charles River Watershed Association is researching and designing water infrastructure for the 21st century and beyond. Our approach is to design infrastructure that:

- Works with or replicates natural water, nutrient and carbon cycling processes.
- Integrates water management, bringing together management of potable water, waste water, stormwater, and surface and groundwater.
- Captures previously discarded renewable energy sources in wastewater and organic food waste.
- Subsidizes operations and maintenance through the sale of captured energy, treated water and compost.
- Respects and supports the natural and historical flow of surface and ground water.
- Is flexible and adaptable in the face of a changing climate.

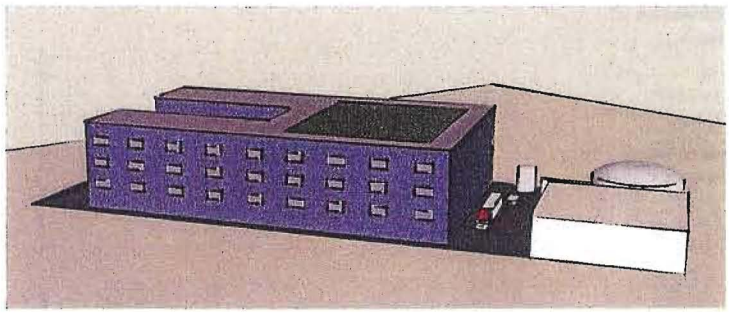


The Challenges

Traditional urban water infrastructure is having devastating effects on our surface and groundwater resources. Groundwater, which supplies the continuous base flow to the Charles, or any river, is aggressively pumped to provide potable water for cities and towns. Groundwater also infiltrates into sewer pipes from local aquifers requiring energy to pump and treat it. The Charles River and surrounding urban watersheds lose about 90 million gallons a day through sewer infiltration; clean freshwater that is ultimately discarded into Boston Harbor. Additionally, extensive development and impervious cover prevent rainwater from getting into the ground to recharge lost groundwater. Instead, rainwater runs across pavement, picking up pollutants and discharging them to local water bodies. Every year, about 20 inches of rain that should be infiltrated becomes stormwater runoff. Climate change is increasing the frequency and intensity of large rain events, leading to increased polluted runoff, flash flooding and severe flooding. Continued use of fossil fuel based energy sources is only exacerbating this devastating global problem.

Our Vision

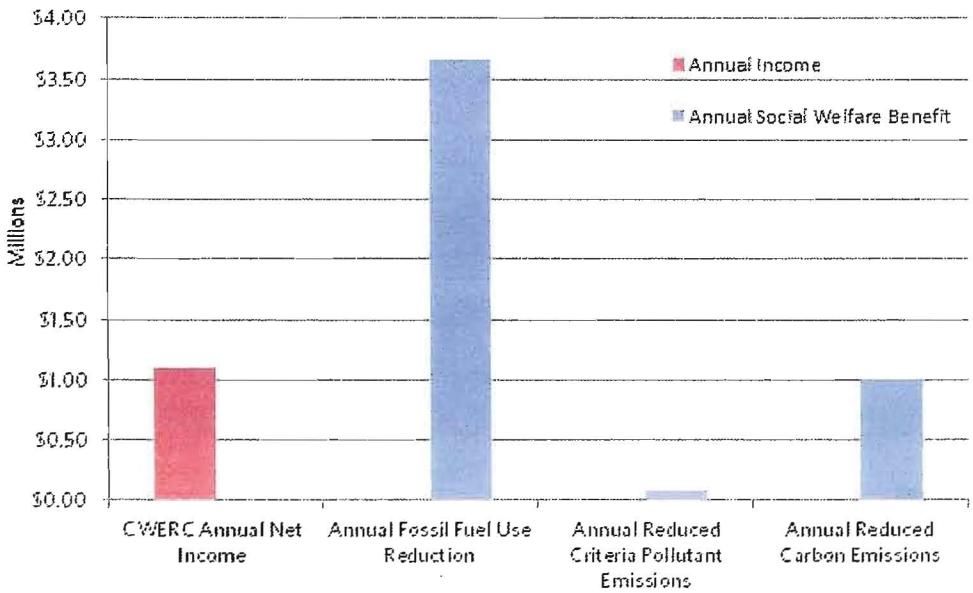
CRWA envisions a new paradigm in urban water management. Wastewater treatment will be managed in distributed ***Community Water and Energy Resource Centers*** (CWERCs). Wastewater is treated in small scale, wholly-enclosed treatment centers. The water itself is reclaimed to potable standards for re-use and the organics are used to generate electric energy through anaerobic digestion. Thermal energy in the wastewater is captured for use heating and cooling surrounding buildings and homes.



As an example, the wastewater produced by 10,000 people can produce 16% of their heating and cooling needs and 2% of their electricity demand. Organic food waste, diverted from landfills to these facilities, reduces greenhouse gas emissions and truck hauling. Solid waste at a CWERC is transformed into beneficial products such as compost for local food production. Treated water is also used to restore the natural environment and beautify our neighborhoods through the restoration of streams and wetlands lost to development or through groundwater infiltration. Green infrastructure fed by reclaimed water also provides treatment and storage of runoff and floodwaters, rendering human water demand merely a bend in the river, working with the natural cycle, not destroying it.

By the Numbers

Charles River Watershed Association has done extensive research and modeling to bring our vision from an idea to a reality. Working with wastewater professionals at Natural Systems Utilities and economists at Industrial Economics we have carefully examined the benefits of CWERCs and associated green infrastructure districts. Building a CWERC to treat 3 million gallons of wastewater per day would cost about $54 million. The graph below shows the estimated annual net income and annualized social welfare benefits of the CWERC.



A Livable Resilient Future

At CRWA we are working toward a resilient and equitable future for humans and nature. The infrastructure of the future needs to be far more flexible and adaptable to be reliable in a changing climate. Small scale distributed wastewater treatment and energy generation infrastructure provides resiliency and redundancy. Deer Island Wastewater Treatment Plant and the Mystic Generating Station are examples of potentially vulnerable centralized systems, single locations with potentially disastrous consequences if they fail. Climate scientists predict our region will see more intense rain storms and impacts from sea level rise within the coming century. To prevent or reduce large scale flooding, CRWA is identifying areas that can provide flood storage and otherwise serve as public parks and environmental amenities. CRWA has a bold vision for the future, join us www.charlesriver.org!