Reducing Phosphorus Pollution from Onsite Wastewater Treatment Systems in the Greenwood Lake Watershed

STONE ENVIRONMENTAL

Services / Expertise
Water Resources Management
Community Wastewater Planning
Treatment System Design Specifications
Treatment System Performance Evaluation
Hydrogeologic Investigations
Water Quality Monitoring
GIS Analysis

Markets
Municipal Clients and Regional Planning Commissions

Project Location
Greenwood Lake, New York

Date Completed
2007–2013

Project Owner
Orange County Water Authority

Project Manager
David Braun
dbraun@stone-env.com
802.229.5379

A packed-bed media filter for phosphorus removal from onsite wastewater, utilizing water treatment residuals and designed based on Stone's research and specifications, in action.

STONE and an engineering partner assisted the Orange County Water Authority in an EPA-supported project to demonstrate energy-efficient technologies capable of reducing phosphorus pollution from onsite wastewater treatment systems in the New York portion of the Greenwood Lake watershed, a 9-mile long lake spanning the New York and New Jersey border. Excess phosphorus is the apparent cause of algal blooms in the lake that impair recreational uses. Stormwater runoff and onsite wastewater systems have been identified as the main causes of the high phosphorus concentrations in the lake. A Total Maximum Daily Load (TMDL) was developed to provide a target for phosphorus reduction—and the implementation plan includes a 43% reduction of total phosphorus loading from each of the two non-point sources.

A central component of the project was the design, construction, and monitoring of demonstration onsite wastewater treatment systems that reduce phosphorus loading to Greenwood Lake. Stone researched applicable technologies and filtering/absorption media for phosphorus removal, treatment system selection, and hydrogeologic evaluation of system sites; supported treatment system installation; and executed a monitoring program to evaluate system performance. One system incorporated urine diverting toilets and plumbing to reduce nutrient inputs to the treatment units. The second system served a cluster of three church buildings and included advanced secondary treatment, followed by a packed bed media filter composed of locally sourced byproducts for phosphorus reduction (water treatment residuals). The media filter reduced effluent phosphorus concentrations by more than 90% over the 18-month monitoring program. The lessons learned during the implementation and testing of the demonstration systems, together with an evaluation of the economic and energy usage benefits and trade-offs of onsite and clustered wastewater treatment systems as compared to centralized options, were combined to develop a comprehensive set of wastewater management strategies for the Village of Greenwood Lake and adjoining areas of the Town of Warwick.