Integrated Water Resources Management Planning Project, Colchester, Vermont

STONE ENVIRONMENTAL
100% EMPLOYEE-OWNED

Services / Expertise
Water Quality Monitoring
Community Wastewater Planning
Decentralized Wastewater Management
Urban Stormwater Retrofit Planning
Siting, Prioritizing, Costing of Green / Grey Infrastructure
Geospatial & Data Solutions (GIS)
Spatial Analysis & Mapping
Database Applications & Tool Development

Markets
Municipal Clients
Regional Planning Commissions

Project Location
Colchester, Vermont

Duration
2009-2019

Project Owner
Town of Colchester, Vermont

Project ID#
05-1694-G

Stone field staff replacing a catch basin grate after documenting materials, dimensions, condition, and connections.

STONE worked with Aldrich + Elliott and a social marketing company for the Town of Colchester to develop an Integrated Water Resource Management Plan (the Plan). The primary goal was to improve the overall management of non-point source pollution control within Colchester—a town with many natural resources including 30 miles of shoreline on Lake Champlain, 3,000 acres of wetlands, a major freshwater pond, and two major rivers.

During the first phase of the work, Stone created a geodatabase to support the verification and correction of the Town's existing stormwater infrastructure datasets, as well as the addition of any new infrastructure. Stone designed and built a custom ArcPad application to aid in field data collection. This app was installed on handheld GPS data collectors and used to gather thousands of data features throughout the town. Features such as forms with required fields and drop-down menus enabled quick and accurate data collection. The final result of the stormwater infrastructure inventory was a geodatabase of all stormwater structures, including outfalls, stormlines, stormwater structures, and retention ponds, each with associated attributes.

A study of stream phosphorus concentrations was performed to identify sub-watersheds and land uses contributing disproportionate amounts of phosphorus to surface waters. Due to repeated closings of some of Colchester's beaches and chronically elevated bacteria levels in certain streams, a bacteria source tracking study was also performed in cooperation with the University of New Hampshire. The phosphorus study indicated that streams draining watersheds dominated by agricultural or higher density residential land tend to have elevated phosphorus concentrations relative to streams that drain undeveloped, forested land. However,

near the densely developed Exit 16 I-89 interchange, stream water quality was relatively good despite the watershed being composed of nearly 40% impervious surface. Here, stormwater treatment practices, natural wetlands and ponds, and other natural buffers were effective in maintaining water quality in a portion of the Sunderland Brook watershed.

The infrastructure and water resource knowledge bases developed through these efforts were applied in 2010-2011 to conduct a screening-level assessment of onsite wastewater treatment opportunities, limitations, and needs—both under current conditions and under potential future or "build-out" conditions. The town-wide, current condition needs assessment used a data-driven GIS analysis that combined spatial information, such as LiDAR topography and NRCS soils information, with local information, such as parcel boundaries, building footprint areas, building uses, and current wastewater flows, to determine what, if any, constraints a property may contain for onsite wastewater treatment and dispersal. The current condition onsite wastewater needs assessment was combined with a build-out analysis performed by the Chittenden County Regional Planning Commission to analyze the implications of current zoning, soil conditions, and onsite wastewater treatment management practices on the prospects for future development in Colchester.

In 2012-2013, the science and analyses completed to date were applied to develop management program options, with particular regard to improving and targeting the Town's existing stormwater and onsite wastewater management activities. Our work demonstrated that a town-wide stormwater utility may be the most feasible means of addressing the Town's most critical sources of sediment and phosphorus to local streams and Lake Champlain.