# Sidney Brook Watershed Protection Plan

***Union Township Environmental Commission***
***Union Township, New Jersey***

In 2007, the NJDEP approved Union Township as the Lead Planning Agency for the creation of the Sidney Brook Watershed Protection Plan, with Princeton Hydro as the subcontractor. The project partners include: Union and Franklin Township, Hunterdon County, New Jersey Water Supply Authority (NJWSA), and NJDEP. The project is funded under the Clean Water Act 319(h) program and complies with the specifications in the USEPA Watershed Plan Handbook, 2005.

A major component of the study is a detailed analysis of watershed and stream hydrology. While various models were utilized in the completion of the study field measurement of stream discharge was the primary method of determining the hydrology of the system. More specifically, a series of paired staff gauges and pressure transducer dataloggers were installed at various reaches in the stream corresponding to a first-order headwater tributary, downstream of a major impoundment, and on the downstream project bound. Dataloggers recorded stream stage at 10-minute intervals for the duration of the project.

Stage-discharge ratings curves were developed at each of the sites using field measured discharge data collected with a Price AA vertical axis flow meter per USGS methodology. Instantaneous discharge was measured under a variety of flow conditions including baseflow and stormflow. Stage data from the pressure transducers was transformed to align with staff gauge readings and instantaneous discharge was calculated using the ratings curves. As such, discharge was known with a high degree of precision throughout the study period.

Discharge data was used to evaluate differences between stations to calculate unit area hydraulic contributions and to compare this data to subwatershed land use and land cover. The hydrograph was also examined to evaluate the response of the system to precipitation events and to more closely examine the impact on bank erosion and mass bed load transport. This hydraulic information was also used to calculate detailed pollutant and nutrient budgets which are used to evaluate the impacts of watershed loading and development practices, and investigate the observed trophic structure of the stream.