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## IV-K: Infrastructure

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For the purpose of this SCMP, infrastructure has been defined as those physical facilities or features which are maintained and operated at the municipal level for the benefit of the residents and visitors to the watershed. In the Batavia Kill Watershed, the infrastructure reviewed by the GCSWCD included water supply, waste water treatment, stormwater management, transportation and flood control. As in any watershed, certain components of the infrastructure (most notably transportation, stormwater and flood control) generally have the greatest potential to impact the stream systems located in the watershed.



### 1. WATER SUPPLY

In the Batavia Kill watershed, the primary source of water for businesses and homes is groundwater. At the time of this report, the hamlets of Windham and Hensonville are the only locations where municipal water is available, with a series of wells in each of these communities serving the water district. The Town of Ashland has been examining the possibility of developing a municipal water system in the hamlet area for many years, but has been hampered by the cost of developing a system. In Prattsville, several homes along the Batavia Kill on Conine Road have experienced contamination of their wells as the result of seepage from the Town's salt storage facility at the lower end of the watershed. The town is currently providing bottled water as well as filter systems to these homes and is investigating a number of long term options including extension of the municipal system from the hamlet of Prattsville to the Conine Road area.

Interestingly, the Town of Windham has reported an overall decline in water usage from a high daily usage of 2,968,585 gallons per day in 1996, to a daily usage rate of 1,902,898 gallons in 1998. The reason for this decline is unknown. There has been no substantial repairs to the water system to remove leaks or other water losses, however the system has still experienced a 35% decrease in water usage during this period.

The GCSWCD noted that the location of the municipal wells in the Windham hamlet may present some risks to the protection of the well heads. These wells are located near the school bus garage property, which is a short distance down the gradient of a tricky hill and curve on NYS Route 23. In the event that a major spill of chemicals from a tanker accident

occurred, the town would have to respond quickly to protect the well head and surrounding recharge area from contamination. At the time of this report, there is no well head protection plan or ordinance in place.

## 2. WASTE WATER TREATMENT

At the time of this SCMP, there was no municipal waste water treatment infrastructure in place in the Batavia Kill watershed. Presently, most homes and business rely on traditional on-site wastewater treatment systems (septic systems) and there are a number of privately owned, smaller treatment systems in place and permitted by NYSDEC. These facilities operate State Pollution Discharge Elimination System (SPDES) permitted systems and include the larger resorts such as the Thompson House, some of the restaurants (i.e. Frog House), Ski Windham, and a number of condominium complexes. The Town of Windham also operates a package plant system at the C.D. Lane Park facility which uses a UV light system for disinfection.



**Figure IV-44:** Replacement or upgrades of failing septic systems is a high priority of NYCDEP and the Catskill Watershed Corporation. (CWC)

Under the 1998 Watershed Partnership and Protection Program, the NYCDEP provided over 6 million dollars in funding through the Catskill Watershed Corporation to replace failing septic systems in the watershed area. Initially coordinated in Greene County by the GCSWCD, a large number of failing septic systems were inspected and scheduled for replacement in the Batavia Kill Watershed.

During the time that the GCSWCD coordinated the CWC Septic System Rehabilitation & Replacement Program, inspections of numerous on-site systems in the watershed lead the GCSWCD to predict that as many as 50% of the existing systems may be substandard, in a state of failure, or minimally not working to full effectiveness. To a large degree, this is due to the type of soils present in the watershed as well as the presence of many older systems which pre-date current rules and regulations. A review of the Greene County Soil Survey indicated that over 90% of the soils in the Batavia Kill watershed were characterized by moderate to severe limitations to on-site septic system construction. At the time of this SCMP, the CWC funding has been limited to areas outside the Batavia Kill watershed, but it is projected that additional funding may be present in the future to allow for more systems to be replaced.

In the Town of Windham, plans for the construction of a new municipal wastewater

treatment system are well underway. Funded by the NYCDEP, the new treatment plant will provide tertiary treatment to a service area focused on the hamlets of Windham and Hensonville. While the DEP initially investigated sub-surface methods of discharging the effluent from the plant, these methods have been eliminated due to low capacity for the soils to infiltrate the effluent and the plant is now proposed to discharge directly to the Batavia Kill stream. According to the Draft Town of Windham Comprehensive Management Plan (Chazen Companies 2000), a chiller unit may be used to minimize the thermal impact of the treatment plant on the Batavia Kill aquatic life.

As proposed, a treatment plant with a 247,000 gallon per day (gpd) flow would be constructed as well as all of the required main and lateral collection lines. While the GCSWCD has not specifically reviewed the engineering work completed for the plant, a simplistic estimate of the discharge of the plant on the hydrology of the Batavia Kill indicate that the plant will have only minimal impacts at very low stream flows and would be insignificant at moderate to large flows. Assuming a midsummer low flow of 1.5 cubic feet per second (cfs) in the Batavia Kill, the daily flow at the discharge point would be 969,120 gallons. Further assuming that the full rated treatment capacity is discharged (247,000 gpd), this would result in a 25% increase in the stream flow. Since the Batavia Kill has experienced flows below 1.5 cfs during drought season, measures to address the thermal condition of the treatment plant may be required to prevent adverse impacts on stream life. As a cold water fisheries, the Batavia Kill already suffers from poor thermal conditions due to loss of riparian areas and potentially from pre-regulation stormwater systems.

### 3. STORMWATER SYSTEMS

In the Batavia Kill watershed, the largest impact from stormwater runoff involves the transportation network. NYS Route 23 which runs East and West through the watershed involves a significant number of culverts, storm drains and drainage ways which convey not only the runoff from the road network, but also drainage from the up slope areas above the roads. In many instances, NYSDOT maintains stormwater features which convey smaller waterways across the route of the state highway.

In the Hamlets of Windham, Hensonville, and Ashland, the state maintains a system of drop inlets and stormwater piping which carry flows to the stream. In Hensonville, Greene County Highway department also manages a section of stormwater system which was substantially rehabilitated as the result of extensive damage in the January 1996 flood event. The Batavia Kill watershed is characteristic of many areas in the Catskills where the focus on flood damage control is generally on stormwater management. Based on the GCSWCDs work



**Figure IV-45:** Aerial view of stormwater treatment pond at Ski Windham. The pond captures runoff and provides a controlled release to the stream system.

with FEMA, SEMO and the local municipalities, it is common for damages to culverts, roadside ditches, ditch slopes and other stormwater conveyances to be the largest focus of federally funded disaster relief in the watershed. Often, these flood-related failures of the stormwater system have a detrimental effect on the stream. Large quantities of sediment, a portion of which are contaminated by chemicals associated with roadway runoff, are carried to the stream network.

As the NYC Watershed Rules and Regulations are implemented in the watershed, there has been, and will continue to be, a notable increase in the number of stormwater Best Management Practices (BMPs) constructed in the watershed. Presently, the watershed rules require a Stormwater Pollution Prevention Plan for all development with a disturbance of 2 acres or more in size and the NYCDEP requires extensive measures to treat not only the quality of runoff from new development, but also to increase mitigation of the rate of runoff. As seen in the photo above, new development in the watershed will require development of retention/detention facilities which would release the stormwater in such a manner that it will not impact the stream hydrology. In some instances, if the NYCDEP requires a landowner to implement BMPs which exceed current state standards, funding may be available from the CWC Stormwater Controls for New Development Program.

During the past few years, the GCSWCD has been working with the Town of Windham to seek a solution to a stormwater problem associated with the old "Windham Mill Race". First brought to the Districts attention during the development of the Town of Windham Flood Mitigation Plan, the Mill Race runs from the area of Greek Hill at the lower end of Mitchell Hollow, through the hamlet and to a point in the stream near GNH Lumber. Constructed as a conveyance for an old mill, the Mill Race has seriously degraded over the years and it now causes flooding of the roadway (NYS Route 23) as well as yards, septic systems, and basements in the hamlet of Windham. The GCSWCD and Town of Windham prepared an application under the Catskill Watershed Corporation Stormwater Retrofit Program and funding is expected for mitigation of this problem in the summer of 2000. Additionally, the GCSWCD submitted two additional applications for stormwater projects in the Batavia Kill watershed in the fall 2002 grant cycle.

#### **4. TRANSPORTATION**

In the Batavia Kill watershed, the transportation infrastructure is maintained by three local municipalities, the Greene County Highway Department and NYS Department of Transportation. The watershed is the location of a major East-West route (NYS Route 23) as well as two major North-South routes (NYS 296 & County 17).

Typical of most watersheds with narrow valleys and steep side slopes, a major portion of

the road network runs very close to the Batavia Kill and its tributaries.

In any watershed, the transportation infrastructure has a very high potential to adversely impact stream systems. In some instances, road fill may be placed in the stream floodplain resulting in entrenchment of the stream system and destabilization of the streambanks and stream bottom. In other cases, bridges or culverts used to cross streams may be incorrectly sized and/or located, also causing degradation of the streams stability.



**Figure IV-46:** Bridges over the Batavia Kill or the tributaries have often been the subject of extensive damage due to flooding.

When bridge crossings are incorrectly sized they can accelerate stream velocity under the bridge, causing severe down cutting of the stream bottom and undermining of the bridge abutments (see **Figure IV-46**). Unfortunately, the standard mitigation for this type of problem is the installation of a deeper scour wall in front of the eroded abutment which just makes the problem worse. On some older bridges, it is not uncommon to see from 2-4 different scour walls which were poured after flood events damaged the bridge. With each of these incisement activities, the streambed undergoes changes to its profile for some distance upstream and downstream of the bridge, further destabilizing the stream system.

During the course of the Batavia Kill Stream Corridor Management Pilot Project, the GCSWCD and Greene County Highway Department conducted an inventory and assessment of all the bridges over the Batavia Kill and its main tributaries, as well as an inventory of large culverts ( $\geq 36$ "). Each bridge and culvert was located with a GPS unit and GCSWCD field crews returned the following summer to undertake surveys of the hydraulic openings of most of the major bridges. The inventory and assessment work included town, county, state, and private owned bridges and culverts is provided in section V-B: Watershed Inventory and Assessment.

Based on this inventory, the GCSWCD identified 23 bridges on the main stem of the Batavia Kill, which is an average of over one bridge per stream mile. On the tributaries, a total of 19 additional bridges were identified. For the most part, these bridges are fairly new, with most having been replaced due to damage or washout during flood events. It has been reported by some that the flood of 1960 washed out every bridge over the Batavia Kill. The inventory of culverts in the watershed identified 111 with all located on tributaries or other smaller watercourses entering the Batavia Kill main stem.