Sugar Maples Stream Restoration Project

Assessment and Design Report

Town of Windham, Greene County, New York

April 2008

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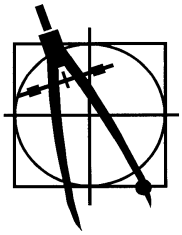

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1.0 Project Summary

The Greene County Soil and Water Conservation District (GCSWCD) will work with the Catskill Mountain Foundation, the owners of the Sugar Maples Center for Arts and Education, to restore natural stream conditions to a small tributary to the Batavia Kill that flows through the Foundation's Maplecrest (Town of Windham) site.

Existing channelized condition looking downstream through the project reach.

Recent rainfall events have caused the concrete and stone wall lined channel to collapse in sections causing the channel to avulse and erode adjacent agricultural fields. On several occasions, field observations after rain events have noted turbid conditions on the Batavia Kill as far downstream as the NYS Route 296 Bridge under conditions when all other streams and water courses were running clear. Following the turbidity upstream to its source, it was found to be originating at the outfall of this tributary at the Batavia Kill.

The project will involve the restoration of the channel and the development of a diverse riparian buffer/wetland complex along approximately 550 linear feet of the tributary. All materials associated with the existing concrete/stone channel will be removed, and a channel with a stable geomorphic form will be constructed. The channel will also include excavation of a bankfull bench that will create a floodplain area. The bench will be established as wetland and woody riparian buffer. Road crossings at the top and bottom of the job will be replaced using larger culverts with stone filled bottoms to provide continuity of the channel substrate. Along the restored channel, wetlands will be constructed on the bankfull bench, as well as in the riparian buffer, to replace wetlands impacted during construction.

The project also presents a unique opportunity to integrate public access and educational components, and it will have a secondary benefit of assisting in the rehabilitation of the former Sugar Maples resort, adding to the economic growth of the community. The project will also include development of a pedestrian walk way along the restored stream corridor that will focus on establishment of a naturalized area. The walkway will include an interpretive kiosk that will focus on stream management, wetlands, and other natural resource issues.

2.0 Project Reach Characterization

The Batavia Kill watershed is located in the northeastern limits of the Catskill Mountains located within the Appalachian Plateau physiographic province. The watershed is located entirely within Greene County in the Towns of Windham, Ashland and Prattsville. A portion of the watershed is located within the protected 700,000-acre Catskill State Park which includes a short section of the stream that carries a National Scenic River Designation from the United States Park Service.

Existing channel conditions in middle of the reach.

The project reach is located in the upper portion of the Batavia Kill watershed in the Town of Windham. The project reach is currently lined by stone walls, confining it to a narrow width with a moderately steep valley slope of approximately 1.0%. This morphology varies substantially from upstream sections of the stream marked by a reduced sinuosity and substantial disconnection from its floodplain. The Rosgen (1996) classification system uses geomorphic measurements including entrenchment, sinuosity, gradient, and width to depth ratio to classify and delineate river reaches for communication and comparison. Classification of project reach and upstream reaches indicate upstream segments are dominated by stable C5 and E5 type reaches, while the project reach is structurally modified entrenched channel form with very low sinuosity. **Appendix A** contains location map **(A-01)** containing topographic information and the location of the reach within the Batavia Kill watershed.

Natural and cultural resources were inventoried as part of the assessment and design process including the presence of existing wetlands and historic resources in and near the project area. Field inventories in the winter of 2008 designated 0.81 acres of wetland within the area. These areas can be seen on maps **JD-03** and **JD-04** in **Appendix B**, and are further discussed in a delineation report by Diversified Soil Services Inc. in **Appendix B**. Archeology investigations by Tracker Archaeological Services were performed to inventory resources within the area and document any potential constraints on the stream restoration design. Field investigation identified no prehistoric materials as well as no historic material. The archaeological report has been provided in **Appendix C**.

2.1 Channel Characteristics

Channel planform characteristics are most readily assessed using aerial photography. Measurements and evaluation of physical characteristics commonly include sinuosity, meander amplitude or beltwidth, wavelength, radius of curvature, and feature spacing.

In general all of the above characteristics are severely impacted by the stone walls confining the channel to a straightened path. The condition is presently causing the channel to erode vertically causing the walls to be undermined and collapse blocking flow. The failures are causing storm flows to overtop its banks and erode new channels through the adjacent agricultural fields. This human induced disturbance has drastically altered the

planform and profile of the stream in the project reach and the vertical erosion is further disconnecting the channel with its natural floodplain

Channel width and depth have also been severely altered by the stone walls. Channel width in some places is less than a foot, which is far lower than would be expected in a natural channel. The reduced width of the channel has resulted in some downward scour as the channel is forced by the hard walls to entrain sediment from the bottom as opposed to the banks. The confinement of the channel has modified these stream dimensions in addition to those of the planform.

2.2 Hydrologic Assessment

The drainage areas associated with the project site were delineated and soil types and land covers within these areas were classified. The delineated drainage areas can be found on map **A-02** in **Appendix A**. Delineation and classification is necessary in order to properly calculate run-off volumes.

An evaluation and understanding of the flow corresponding to the bankfull discharge is central to the application of natural channel design and stream restoration. The channel forming discharge is commonly assumed as a flow that transports the most sediment over time and determines the principal dimensions and characteristics of natural channels. Based on observations of numerous researchers across the country, bankfull flow, assumed as the dominant discharge, has been proven to approximate the 1-and 2-year event. A combination of several methods for determining bankfull discharge was performed for the development of the proposed design, field inventories of bankfull indicators along adjacent reaches, evaluation of NYCDEP regional curves (Miller and Davis 2003), and USGS regression equations (Lumia 1991). NYCDEP regional curves estimate a bankfull discharge of 16 cfs. **Table 1** displays summary of estimated discharges for specific frequencies within the project reach.

Table 1. Discharge estimates for the Sugar Maples Project Reach. (cfs)

Investigator/Source	Q2	Q5	Q10	Q25	Q50	Q100
USGS Regression Equations	18	38	58	92	124	270

3.0 Proposed Design

The morphology of a stream consists of its shape, pattern, and position in the landscape. The forces resisting movement in relation to those imposed by water and sediment moving in the channel largely dictate the channel morphology. Physical factors influence morphology including valley structure, soil type and cohesion factor of the bed and bank material. Successful channel design and implementation must account for these factors.

An important part of any restoration project is predicting stable channel dimensions for the project reach. The geomorphic approach to channel restoration embraces the notion of dynamic equilibrium allowing some degree of freedom to erode and deposit sediment, while maintaining the general character and stability of the system. Naturally occurring stream channels have a "most probable state" for hydraulic geometry variables that result from the variable flow and sediment regime paired with the channel boundary conditions. The general approach to natural stream channel design is to estimate the "most probable state" and determine how to best achieve the channel form within the project constraints, in order to realize that state with the minimum possible intervention.

3.1 Project Goals and Objectives

As project partners reviewed the condition of the reach and its potential for restoration, a number of goals and objectives were identified. Water quality is negatively affected by erosion during larger storm events. This erosion often results from stream migration which occurs frequently when portions of the rock wall collapse into the channel. The restoration of the reach presents the opportunity to minimize erosion, while providing a number of environmental benefits.

To accomplish the improved water quality goal it was determined that the design needed to address the existing condition of stream channels bed and banks, conveyance of water and sediment, and riparian vegetation condition. Further, it is suspected that restoring stream form and function within the project reach would reduce the safety hazard and property losses, improve aquatic and fisheries habitat as well as recreational and aesthetic values.

3.2 Project Constraints

A number of potential constraints for the project were identified during the design process including physical site constraints, landowner approval and access, project permitting and data needs and limitations. The project design addressed channel stability and processes while working within the existing physical site constraints. The design needed to modify planform, channel profile and cross sectional parameters in order to achieve the goals and objectives of the project which include long-term channel stability. Physical site constraints were identified that could impact various design alternatives, making an analysis of the costs and risks involved with each design alternative critical to the development of an appropriate restoration strategy.

The most significant challenge to design development was to identify a channel planform alignment meeting appropriate channel morphology conditions and bank stability objectives while still connecting to the upstream and downstream culverts.

A wetland inventory identified approximately 35,200 sq ft (0.81 acres) of wetland located in and around the project site (maps **JD-03** and **JD-04** in **Appendix B**). Substantial effort was made to limit disturbance to these areas during the design and planning for construction and project implementation. The design proposes 18,000 sq. ft. of wetland disturbance within the project grading extent (map **A-03** in **Appendix A**). Proposed wetland mitigation will include revegetating all disturbed wetland areas with native wetland species. Detailed mitigation planning information is available on map **A-03** in **Appendix A** and on construction drawing **SM-04** in **Appendix E** as well as in sections 3.4.2 and 5.2 of this report.

Archeological inventories documented no prehistoric or historic materials on the project site. The study performed by Tracker Archaeological Services indicated no special measures needed to be taken to protect the historical significance of the site.

Landowner approval of the project is prerequisite to project construction. Implementation of the project requires formal approval to be obtained in the form of Landowner Project Agreements. These agreements contain a ten year easement where attainable for protection of the project and to facilitate project maintenance when necessary. Education of the landowner included the presentation of information about stream instability, need for action, project benefits and long term maintenance and management. Initial planning and design for this project incorporated landowner knowledge of the site and addressed owner concerns where appropriate. The provisions of landowner approval were set forth via the Landowner Project Agreement, which is a temporary license between the landowner and the GCSWCD. Long term operation and maintenance agreement is discussed in ensuing sections. **Appendix F** contains the agreement between GCSWCD and Catskill Mountain Foundation.

Construction of the project requires ACOE, NYSDEC and NYCDEP permits. Project design and construction requires close coordination with these agencies. The NYSDEC has authorized similar projects under Article 15 of ECL, while the ACOE utilizes Nationwide 27 permits. NYCDEP requires the preparation and approval of stormwater pollution prevention plan outlining erosion and sediment controls to be used during construction.

3.3 Design Approach

Several approaches were used to develop the proposed channel to achieve equilibrium channel conditions. These include analog and reference reach, empirical, and analytical techniques applied at various times through the design process. Typically, the analog design approach utilizes historic site data or field collected data from reaches exhibiting desirable physical forms from areas assessed to be in sediment and hydrological equilibrium. The project reach design utilized this approach incorporating data from the upstream reach as a reference reach as a starting point for design. Empirical relations including regional curves and suitable regime equations were also used to validate the initial channel dimensioning. Analytical techniques were used to refine and validate equilibrium channel conditions for the proposed channel. These techniques make use of the continuity equation, roughness equations, hydraulic modeling and various sediment transport functions.

3.4 Design Components

The proposed channel design includes the complete realignment of approximately 550 linear feet of the stream channel and the replacement of two existing culverts. Channel reconstruction will include the modification of the channel geometry and stream channel profile, floodplain and adjoining banks and terraces. The design proposes the replacement of the two existing round culverts that bound the project reach with larger embedded arch style culverts. Construction drawings and details can be found in **Appendix E**.

3.4.1 Culvert Replacement

Two circular culverts bound the project reach. These culverts are required for the gravel road crossings which provide access to multiple facilities within the property. Field investigations, hydrologic and hydraulic modeling were performed to assess the current conditions of the culverts and their influence on the stability and flooding of the reach. These evaluations determined both culverts were in generally poor condition and inadequate in size and capacity to handle the existing runoff from the contributing drainage areas.

Blocked and buried inlet of upstream culvert.

The removal of the two circular culverts and replacement with larger embedded arch style culverts is proposed to improve hydraulic conditions during large storm events and improve migration and habitat within the reach. Conveyance of extreme events was considered in the material specification and design of the gravel road profile.

3.4.2 Channel Reconstruction

During the design process, channel sizing was used to promote channel equilibrium and to provide long-term self-sustainability. The project reach design utilized regime, reference reach and analytical techniques to develop the channel design. The channel was designed to provide for sediment transport and passage of the base, bankfull and flood flows, with considerations for future channel boundary conditions.

Empirical relationships that relate channel geometry to hydrology are termed “regime equations” and are based on observations of groups of streams and commonly used for comparative purposes. **Table 2** summarizes the bankfull channel width and depth in relation to discharges estimated for the site. The average top widths determined by regime equations indicate an average width of 15.7 feet and depths of 1.4 feet for the project reach. Several regional curves developed by NYCDEP SMP relating drainage area to width and depth estimate a width of 7 feet and depth of 0.58 feet which correlated well with bankfull morphology of the upstream and downstream adjoining reaches.

Table 2. Regime relations for bankfull channel width and depth.

Investigator/Source	Formula	BF Top Width	Bankfull Depth
Bray (1982) (General)	W=2.38 *Q2^.53 d=.226*Q2^.33	20	0.8
Emmett (1972) (Alaska Meander Streams)	W=2.39*Qbf^.5 d=.26*Qbf^.35	15	0.9
Drage & Carlson (1977) (Braided Streams)	W=4.66*Qbf^.47 d=.13*Qbf^.38	26	0.5
USGS Channel Width (Used Williams (1986) W/d Relationship)	W=(Q2/.4)^1/1.82) d=0.12*W^0.69	15	0.8
Lacey (1948)	W=2.67*Qbf^0.5 d=(Qbf/(13.5*((D50*25.4)^.5)))^.333	17	4.4
Yukon Placer 1990 DFO W/D Charts (converted from metric)	W=2.73*Qbf^0.5 d=0.22*Qbf^0.33	17	0.7
Leopold et al. (1956)	W=5*Qbf^.5 d=0.1*Qbf^.0.33	32	0.3
Simons & Albertson (1971)	W=2.5*Qbf^.51 d approx R= 0.43*Qbf^0.43)	16	1.6
Nixon (1959)	W=1.67*Qbf^.5 d=0.55*Qbf^0.33	11	1.9
Nash (1959) (for clays)	W=1.32*Qbf^.54 d=0.93*Qbf^0.27	10	2.5
Chang (1988)	W=[1.905+0.249*ln(0.0001065*D50^1.15)/(S*Qbf^0.42))]*Qbf^0.47 d=[.2077-0.0418*ln(0.000442*D50^1.15)/(S*Qbf^0.42))]*Qbf^0.42	3	2.0
Miller & Davis (2003) NYCDEP Regional Curves (Region 4)	W=17.07*DA^.46 d=1.05*DA^0.32	7	0.58
	Average	**15.7**	**1.4**

Base flow channel dynamics will be enhanced through the creation of pools at the outside of meander bends. These pools will improve base flow conditions by increasing storage, enhancing bedform diversity and restoring floodplain connectivity during larger storm events.

The proposed plan form dimensions were drafted and incorporated into a design template, which was transposed onto the existing topographic survey of the project site. Modifications to the alignment were made to achieve the best feasible alignment through the project area in order to connect upstream and downstream reaches and avoid existing high banks, terraces, wetlands and archeological resources. The proposed channel

pattern results in a consistent slope through the project reach, suitable for the valley setting. Substantial effort was also made to minimize the disturbance to the existing floodplain vegetation and to use the existing vegetation as bank protection where applicable.

The channel profile was designed to provide for bed feature variation, simulating a more natural riffle/pool complex, in order to provide for increased channel habitat diversity and energy dissipation. The existing grade of the floodplain was used to target the proposed bankfull elevation of the project throughout the majority of the channel length. **Table 3** summarizes the proposed channel dimensions and compares them to channel dimensions for a similar reference reach.

Table 3. Summary of reference, and proposed conditions during bankfull flow.

Morphological Value	NYCDEP SMP C5 Reference Reach	Proposed Reach
Rosgen Stream Type	C5	C5
Drainage Area (sq. mi.)	0.9	0.16
Bankfull Width (ft)	15.5	10.0
Bankfull Mean Depth (ft)	0.8	0.5
Width to Depth Ratio	20.8	21.8
Entrenchment Ratio	>2.2	>2.2
Sinuosity	1.31	1.35
Average Slope (%)	0.5	0.8

3.4.3 Project Site Re-Vegetation

Establishment of an effective riparian buffer zone is critical to the success of a stream stabilization design. A combination of dormant plant materials, conservation seed mixtures, and plantings of live trees and shrubs will be employed to initiate the development of a functioning riparian community. Native willow and dogwood species will be planted on the streambanks. Areas of disturbance will be treated with conservation seed mixtures and mulched to minimize soil losses. Various species of woody trees and shrubs, appropriate for the riparian zone, shall be planted in the disturbed areas.

The project requires disturbing approximately 27,400 sq. ft. (0.63 acres) of land. The existing wetland area within this disturbance is 18000 sq. ft. (0.41 acres). Wetland will be developed totaling 19,500 sq. ft. (0.44 acres). This will result in a 1,500 sq. ft. increase in wetland size. In addition to the wetland areas there will be a reestablishment of 44,000 sq. ft. (1.0 acres) of riparian buffer.

The 19,500 sq. ft. of wetland will be developed along the margin of the newly constructed channel throughout the project reach. The attached project drawings (**A-03** in **Appendix A** and **SM-04** in **Appendix E**) further clarify the proposed location of the constructed wetlands and riparian buffer re-vegetation plan. Wetland vegetation will be established by use of a wet meadow seed mixture, with species selected for known wetland and wildlife values. A detailed list of species that will be used can be found in the Wetland Seed Mix table in the attached project drawing (**SM-04** in **Appendix E**). The emergent species

selected for this area would be tolerant of irregular surface inundation and are expected to survive in saturated soil conditions. The wetland seed mixture would encourage the establishment of a uniform herbaceous cover. Seed mix's to be used will include "OBL Wetland Mix" and "FACW Wetland Meadow Mix" marketed by Ernst Seed.

4.0 Project Construction Details

4.1 Construction Schedule

Project construction should be undertaken during the summer/early fall season. Construction should occur during normal base flow periods, and equipment staged from dry portions of the dewatered streambed, wherever possible, to avoid damage to the existing adjacent riparian vegetation.

4.2 Project Access

Project access will be attained using existing gravel access routes on both the upstream and downstream extents of the project. Equipment staging and material storage and topsoiling will be located in existing paved parking areas and courts. Whenever possible all construction activities and transport should utilize the existing and proposed stream channels and access roads as work areas in order to minimize the damage to surrounding floodplain vegetation.

4.3 Dewatering and Erosion and Sediment Control

Stream channel construction will be required to be completed in a dry condition in order to meet the requirements of various regulatory agencies. During all construction in the existing or proposed stream channel, the contractor shall divert the entire stream flow around the work area. Dewatering must be maintained 24 hours per day, 7 days per week during the construction period and will be accomplished by a pump and pipeline scenario. Dewatering will be performed in two phases and will require the excavation of a sump and construction of a gravel coffer dam across the existing channel at both the top and bottom of each phase. Upon completion of the construction of the phase all areas will be restored as soon as possible to preconstruction conditions. Construction drawing **SM-06** in **Appendix E** displays the location, extents and details of the dewatering plan.

Sediment control during construction will be accomplished through collection of all turbid water within the work area, and pumping the sediment-laden water to designated filter areas. In the event that adequate sediment control cannot be accomplished using existing filter areas, the Contractor will be required to develop open sediment basins constructed of hay bales lined with filter fabric. These constructed basins would be placed near the locations of the existing filter areas and will pre-treat the discharge before it enters the existing filter areas. All disturbed areas will be temporarily stabilized as soon as possible to minimize soil erosion. The sediment control measures will ensure that no turbid water discharges from the work area.

All construction infrastructure including roads, staging areas, borrow and storage sites, construction entrances and other infrastructure as deemed necessary by the project engineer with be restored as outlined in the Stormwater Pollution Prevention Plan (SPPP) that is located in **Appendix D** and on construction drawings **SM-06** in **Appendix E**. All areas will be restored as soon as possible to preconstruction conditions. Sediment and erosion control measures follow the procedures indicated in the New York State Standards and Specifications for Erosion and Sediment Control (2005) and will be in place throughout the construction period.

4.4 Clearing and Grubbing

Clearing and grubbing will consist of the clearing, grubbing, and disposal of trees, snags, logs, brush, stumps, shrubs, and rubbish from the designated areas. These areas will be flagged in order to minimize any impacts to adjacent vegetation. It is anticipated that three trees and less than 3,000 sq. ft. of brush will need to be removed to perform grading activities. These areas will be completely re-vegetated as part of the project as displayed on construction drawing **SM-04** in **Appendix E**. Clearing and grubbing will also include removal of concrete, wood or steel structures within designated areas. Significant materials primarily consisting of stone, concrete and metal near and around the project reach will be removed from the site and disposed of as a component of the project.

4.5 Construction Sequence

Construction sequencing would consist of first excavating the proposed stream channel and filling the existing channel areas. The excavation of the proposed stream channel can initially be done in rough format, in close approximation of the final grade channel elevations. Upon the completion of the rough channel grading, any prescribed structures should be installed in sequence around the proposed stream meander. After all structures are installed around a specific meander, the channel can be brought to finish grade. Work should be performed largely in the dry, though some equipment operation may take place in ponded areas where excavation to groundwater elevation occurs.

The acquisition of plant material for the bioengineering component of the project should be conducted during the dormant growth cycle occurring in the late fall. The bioengineering components of the project can be installed anytime during the dormant period of the specific plant species, but it is recommended to install the plant material expeditiously after harvesting in order to reduce the probability of damage to the plant material.

5.0 Post Construction Monitoring

An as-built survey will be conducted immediately following construction in order to document the accuracy of the project implementation. The as-built survey provides baseline conditions for comparison against regular inspections and annual monitoring surveys to evaluate the stability and performance of the restoration project. Project inspections include photographic documentation of the project reach and a visual inspection of the channel stability, bioengineering, riparian vegetation and wetlands. The inspections are conducted annually during the project site survey as well as during, and after, significant flow events. The project monitoring surveys include measurement of key physical parameters that are used as indicators of channel and structural stability.

5.1 Stream Channel Stability Monitoring

A five-year project-monitoring program will be initiated to confirm the stability of the project site. The monitoring program will include: an as-built survey with establishment of permanent monitoring cross-sections as determined by on-site personnel, yearly cross-section and longitudinal profile surveys completed during the same season, yearly pavement/sub-pavement sampling, yearly assessments of banks, photo-documentation both yearly and after large flow events, and a yearly description of conditions.

The relationship of channel morphology "at-a-station", and general morphology trends through the reach will be analyzed using the collected data. These physical measures will be further stratified by specific stream feature. The change in physical parameters will be determined and an evaluation of the observed rates of change will be conducted. The rates of change will be correlated to available gage data to reveal associations to hydrologic inputs from storm events and their impacts on sediment transport.

USACOE Nationwide Permit 27 requires monitoring and reporting to document the performance of the restoration. The permit requires that three copies of reports on the status of the stream restoration and the riparian buffer and wetland establishment activities be provided to the Corps of Engineers New York District office. The reports will include the riparian buffer and wetland establishment data collected during the growing season. The reports will be submitted no later than October 31 in the first, second, third and fifth years after the authorized activities have been completed. These reports will include the following at a minimum:

- As-built drawings of the stream reach, in plan view, that locate all in-stream stabilization and habitat structures in relation to the stream's bankfull elevation in reporting years 1 and 5.

- Level II stream reach classification for the 550 linear foot reach to include channel dimensions at bankfull in riffle and pool sections, a longitudinal reach profile, a pebble count, and the identified stream types. Monitoring and classification to be performed in years 1-3 and 5.

- Photographs of the restored stream channel taken at least once each year during normal

flow conditions, and also taken immediately following all bankfull flow events that occur during the five year monitoring period.

- A written description of existing conditions in the project vicinity, including the condition of the restored section of channel and the habitat and stabilization structures, conditions of the upstream and downstream reaches from the permit area, how the restored section of stream channel and associated features are accomplishing the primary goal of improving water quality, and the observed usage of fish and wildlife.

5.2 Riparian Vegetation and Wetland Mitigation Monitoring

Establishment of wetlands equal to the amount of wetlands impacted within the project extent is necessary to remain in compliance with the USACOE Nationwide Permit 27. As proposed this project will establish 44,000 sq. ft. of riparian buffer achieved through the planting of appropriate vegetation, and the establishment of 19,500 sq. ft. of compensatory wetlands along and adjacent to the project reach. Implementation will be conducted in a way that will ensure the following:

- The established wetlands will meet the federal wetland criteria outlined in the report entitled "Corps of Engineers wetlands Delineation Manual", dated January 1987, with current Corps of Engineers guidance.

- All planting and seeding in conjunction with the wetland establishment effort will have an 85% survival and/or coverage rate of hydrophytic vegetation which will be met or exceeded at the end of the second growing season following the initial planting and seeding of the site, if the 85% survival rate is not met at the end of the second growing season, all necessary measures to ensure the level of survival by the end of the next growing season will be taken, including re-grading and re-planting if necessary.

- All planting and seeding in conjunction with the remainder of the riparian buffer establishment effort will have an 85% survival and/or coverage rate of hydrophytic vegetation which will be met or exceeded at the end of the second growing season following the initial planting and seeding of the site. If the 85% survival rate is not met at the end of the second growing season, all necessary measures to ensure the level of survival by the end of the next growing season will be taken, including re-grading and re-planting if necessary.

- All vegetation within the 44,000 sq. ft. riparian area, including the 19,500 sq. ft. wetland establishment areas, will not consist of more than a total of 5% aerial coverage of common reed (Phragmites australis), purple lustrife (Lythrum salicaria), reed canary grass (Phalaris arundinacea), Japanese Knotweed (Polygonum cuspidatum), Tartarian honeysuckle (Lonicera tartarica), and/or Eurasian milfoil (Myriophyllum spicata).

Three copies of reports on the status of the stream restoration and the riparian buffer and wetland establishment activities will be provided to the Corps of engineers New York District office, with the riparian buffer and wetland establishment data collected during the growing season, no later than October 31 in the first, second, third and fifth years after the authorized

activities have been completed. These reports will include the following at a minimum:

- All plant species, along with their estimated relative frequency and percentage cover, identified by using plots measuring 10 feet by 10 feet with at least one representative plot located in each of the habitat types within the riparian buffer and wetland establishment sites. The location of the plot will be identified on the plan view engineering drawing.

- Vegetation cover maps, at a scale of one inch equals 100 feet, or larger scale, for each growing season in the above listed reporting years.

- Photographs showing all representative areas of the riparian buffer and wetland establishment sites. Photographs of the riparian buffer and wetland establishment sites shall be taken at least once each year during the period between June 1st and August 15th. Photographs of the restored stream channel will be taken at least once each year during normal flow conditions, and will also be taken immediately following all bankfull flow events that occur during the five year monitoring period.

- A remedial plan, if necessary, outlining all practicable steps taken, or proposed to be taken, to ensure the success criteria outlined above are met by the specified due date of the next monitoring report.

6.0 Operation and Maintenance

During the initial years after project completion, as the restoration site experiences a range of flows and the channel sediment becomes naturalized, projects usually require modifications and design enhancements. Project sponsors must be prepared to undertake adjustments in channel form if project monitoring indicates such adjustments are necessary. It is believed that as project vegetation becomes established the overall operation and maintenance of the project will decrease. The creation of a project Operation and Maintenance Plan, in addition to the Landowner Agreements, is recommended and should utilize data collected from the project monitoring. The Landowner Agreements are temporary easements between the landowner and GCSWCD, and are for a term of 10 years. The agreement stipulates that the GCSWCD is responsible for maintenance and repairs of the project for a period of three years and monitoring of the project for a period of 10 years if funding is available. The agreement also stipulates that the Landowner must not (within the next 10 years): disturb vegetation within the project area, disturb the soil, construct any permanent structures within the project area, or commence any work within the project area without notifying the GCSWCD. These measures may help ensure the stability of both the stream restoration project and the constructed wetlands.

6.1 In-Stream Maintenance

The channel may require some modification and enhancement in the future. The monitoring and inspections performed by project partners will assist in prescribing any debris and sediment maintenance that may be required. The annual project status reports will document these needs and modifications and will require notification and approval by ACOE and NYSDEC and NYCDEP.

6.2 Riparian Vegetation

Vegetative establishment in the project area is a critical component to the project's long-term stability. General site constraints and gravelly soil conditions limit the success and establishment of the designated vegetative elements of the project. Careful planning, monitoring, and maintenance are required for all of the installed vegetation. Increased browsing pressure from mammals, potential for disease, and extreme weather conditions can reduce the success of the plant materials. Inspection and monitoring of the plant materials throughout the initial stage of development will assist in ensuring plant viability. Supplemental installation of plant material, as needed, in the form of bioengineering and riparian plantings will ensure effective riparian establishment. Plantings will require maintenance to ensure proper moisture levels are sustained at critical times.

References

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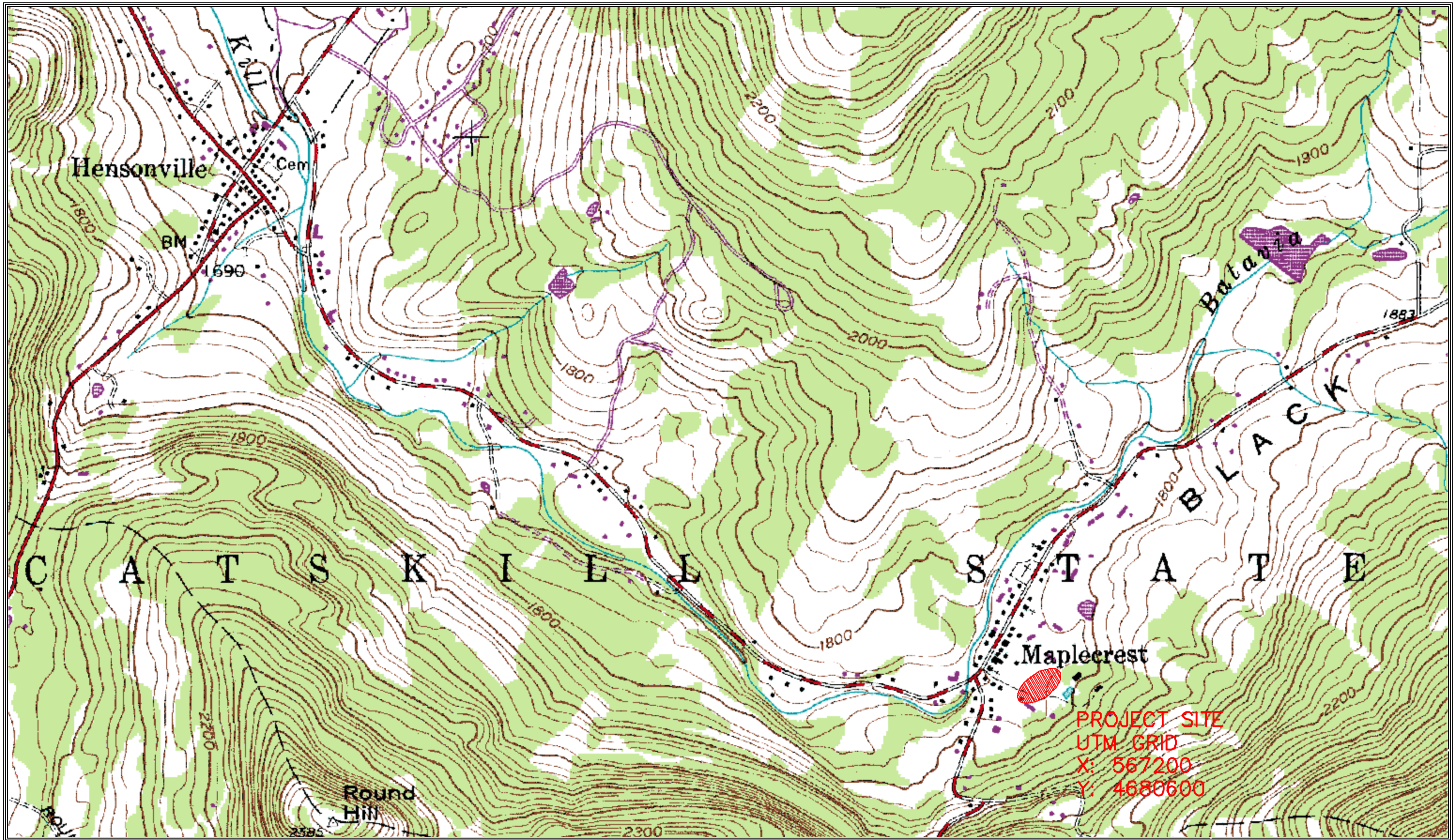
New York State Department of Environmental Conservation, Division of Water, Bureau of Water Quality Management. 1992. Reducing the Impacts of Stormwater Runoff from New Development. Albany, NY.

Rosgen, D.L. and Silvey, H.L., 1996. Applied River Morphology, Printed Media Companies, Minneapolis, MN. ISBN 0-9653289-0-2.

Appendix A - Maps



GREENE COUNTY SOIL & WATER CONSERVATION DISTRICT

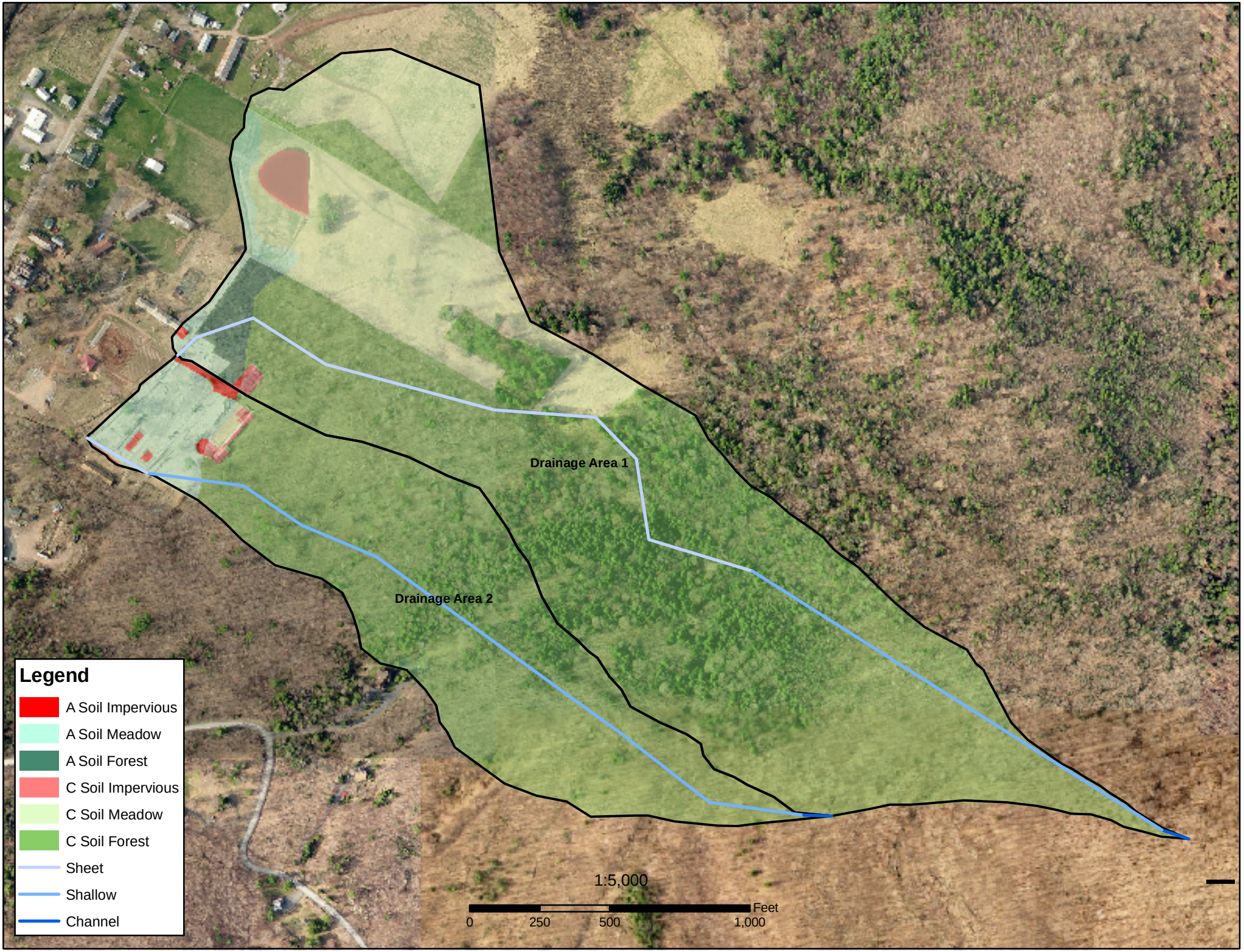
BOX 907 GREENE COUNTY OFFICE BUILDING, CAIRO, NY 12413
PHONE (518) 622-3620
FAX (518) 622-0344

SUGAR MAPLES STREAM RESTORATION PROJECT
FOR
CATSKILL MOUNTAIN FOUNDATION
COUNTY ROUTE 55
TOWN OF WINDHAM — GREENE COUNTY, NY

PROJECT LOCATION MAP - USGS TOPO

PROJECT:	BK2008
DATE:	04/21/08
SCALE:	1"=1000'
DRAWN BY:	NSH/JRB
DESIGN BY:	

DRAWING:
A-01
SHEET 1 OF 3


Drainage Area 1
Drainage Area 2
Legend
A Soil Impervious
A Soil Meadow
A Soil Forest
C Soil Impervious
C Soil Meadow
C Soil Forest
Sheet
Shallow
Channel
1:5,000
Feet
0
250
500
1,000

GREENE COUNTY SOIL & WATER CONSERVATION DISTRICT

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SUGAR MAPLES STREAM RESTORATION PROJECT
FOR
CATSKILL MOUNTAIN FOUNDATION
COUNTY ROUTE 55
TOWN OF WINDHAM — GREENE COUNTY, NY

WETLAND AREAS - DISTURBED & PROPOSED

PROJECT: BK2008
DATE: 04/21/08
SCALE: 1"=50'
DRAWN BY: NSH/JRB
DESIGN BY:

DRAWING:
A-03
SHEET 3 OF 3

Appendix B – Wetland Delineation Report

Sugar Maples Stream Restoration Project
Request for Wetland Jurisdictional Determination

Town of Windham, Greene County, NY

PREPARED FOR:

Department of the Army
ATTN: CENAN-OP-R, Christine Delorier
U.S. Army Engineer District, New York
Upstate Regulatory Field Office
1 Buffington Street
Watervliet, NY 12189-4000
Christine.Delorier@usace.army.mil

PREPARED BY:

Greene County Soil & Water Conservation District
907 County Office Building
Cairo, NY 12413
Phone (518) 622-3620 Fax (518) 622-0344
www.gcswcd.com

Contact Information

Property Owners

The Catskill Mountain Foundation
7970 Main Street
P.O. Box 924
Hunter, NY 12442
Phone: 518-263-2074
Fax: 518-263-2025
Email: barkerp@CatskillMtn.org

Applicant

Greene County Soil and Water
Conservation District
Attn: Jeff Flack
Executive Director
907 County Office Building
Cairo, NY 12413
Phone: 518-622-3620
Email: jake@gcswcd.com

Wetland Delineator

Diversified Soil Services, LTD.
Attn: Roger Case
PO Box 489
Claverack, New York 12513
Phone: 518-851-795

DIVERSIFIED SOIL SERVICES, LTD.
POST OFFICE BOX 489, CLAVERACK, NY 12513

February 8, 2008

RE: Sugar Maples Stream Restoration
Maplecrest, New York

Introduction

This wetland investigation and delineation was done February 4, 2008. This report describes the extent and composition of the wetlands on the property in the town of Windham, New York in accordance with the 1987 U.S. Army Corps of Engineer's wetland manual. The project is being done for the Catskill Mountain Foundation.

Site Description

The site is just north of the intersections of county routes 40 and 56 on the east side of county route 56 (42 16' 53"N & 74 11' 14" W). The property is a large parcel that had been a up scale Catskill Mountain Resort that closed in the 1970's and has fallen into ruin and disrepair. A portion of the resort is being restored as an art colony.

The portion of the property that will be impacted by this project is a stretch of stream channel [RPW] that has been confined by a stone lined channel with vertical sides and stone bottom that starts at the edge of the undisturbed wetland at the north end of the channel and ends on the south side of the driveway into the site. The stream segment is about 600 feet long. There are adjacent wetlands on both side of the stream channel; more prominent on the east side of the channel than on the west which has been developed as an organic produce garden.

All of the soil adjacent to the channel both upland and wetlands are composed of Udorthents, smoothed in the upland and Udorthents, wet-substratum in the wetlands. The soils have been graded, filled or excavated to accommodate the stream channel and the adjacent resort uses including lawn, tennis courts, landscape gardens, parking and buildings.

Soils

The undisturbed upland soil is well to somewhat excessively drained Tunkhannock gravelly silt loam. The disturbed uplands are gravelly Udorthents, smoothed.

The soil in the wetland is Udorthents, wet substratum with a silty alluvial cap on the wetlands adjacent to the stone lined channel. The channel has vertical sides and a stone lined bottom. In a few places the vertical stone wall of the channel has blown out and some silt has collected in the channel near the stone wall failures.

Hydrology

There is a broad wetland at the north end of the project site. The main hydrologic feature on the property is the [RPW] stone lined stream channel that crosses the site. The original intent of the channel was to convey water from the natural wetland across a portion of the resort that was used for recreation and allow the stream to reach the Batavia Kill [TNW] south of the intersection of county routes 40 and 56.

The unnamed [RPW] stream goes under county route 40 at and empties into the Batavia Kill (@ 42 16' 49" N & 74 11' 25" W). The Batavia Kill flows west and empties into the Schoharie Creek [TNW] @ (42 18' 13"N 74 25' 28'W) in the town of Prattsville.

The Schoharie Creek flows west and then north and is a major tributary to the Mohawk River [TNW] @ 42 56.46N 74 16.93W. The Mohawk River flows into the Hudson River [TNW] just north of Albany, NY @ 42 47.08N 73 40.59W. The Hudson River empties into the Atlantic Ocean.

The drainage area behind this project is 99.6 acres. The watershed of the Batavia Kill is 7252 acres.

The nearest state regulated wetlands are H-9 and HT-1.

VEGETATION

The uplands are mostly ornamentals, lawn and landscaped areas, with driveways, parking and recreational facilities.

The wetlands have sensitive fern, soft rush, reed's canary grass, mixed sedges and one cattail in the herbaceous layer. Shrubs and trees are red osier, gray stiff dogwood, willow, speckled alders and red maple.

Dominant Upland Plant List

Upland canopy:	Sugar maple, white pine, blue spruce
Upland shrub:	Honeysuckle, multiflora rose, ornamental hedges
Upland herbaceous:	Mixed upland lawn grasses, broad leaf plantain, curly dock, mullen, wild strawberry

Dominant Wetland Plant List

Wetland canopy:	Red maple
Wetland shrub:	Stiff gray dogwood, speckled alder and multiflora rose
Wetland herbaceous:	Soft rush, sensitive fern, and mixed sedges

Delineated Wetlands

There are no isolated wetlands.

There is only one wetland on the property but it is delineated by 7 wetland segments. Wetland line A starts at the north end of the stream channel at the edge of the undisturbed natural wetland. Line A extends south along the west side of the channel and ends at the fence just beyond the project impact area. There are 8 flags in wetland line A. The wetland soil is Udorthents, wet substratum.

Line B delineates an upland island about half way along the stone lined channel on the west side of the channel, near the large white pines. There are 7 flags in line B. The upland island is Udorthents, smoothed, the adjacent wetland is Udorthents, wet substratum.

Wetland line C starts on the west side of the stone lined channel at the edge of the project area and picks up the edge of the channel and follows it south to the culvert under the southern driveway into the property. Line C goes across the channel and continues east along the edge of the driveway to the next culvert. Line C crosses the channel again and follows the east side of the stone lined channel for a short distance that abruptly goes east and end near the edge of the driveway and a low stone wall outside the project area. There are 14 flags in line C.

Line D delineates a small lobe of upland that starts at the stone wall outside the project area. The line loops to the west down to the edge of the channel and follows the channel for a short distance north and then loops back around the north end of the stone wall. There are 6 flags in line D.

Wetland line E starts outside the project impact area just north of line D. Line E follows the base of a short steep slope cut into the hillside. The line follows the slope down toward the stream channel and the wraps around to the north and then east back the spring house east of the project area. There are 7 flags in line E.

Line F starts on the opposite side of the seep draining out of the spring house. The line follows the south side of the driveway back to the stone lined channel. Line F picks up a small mound of fill near the driveway. The line crosses the driveway and the abruptly goes east just north of the driveway and ends near some lawn ornaments. There are 9 flags in wetland line F.

The remaining line; line G marks the center line of the channel south of the driveway. The channel is a constructed channel with no adjacent wetlands. The channel is about 4 feet wide in the bottom and 8 feet wide at the top of the bank. The banks are about 4 feet high and the stream bottom is cobblestone.

Beyond lines A and F the wetland spreads out and continues north.

FUNCTION

The wetland has relatively low function. The wetland while not isolated is mostly within an area of extensive disturbance and continuous pedestrian and vehicular interference. The main function is to convey flow from the undisturbed wetland further north to the location where the [RPW] stream empties into the Batavia Kill.

No unusual, rare or endangered flora or fauna were observed.

HYDRIC SOILS

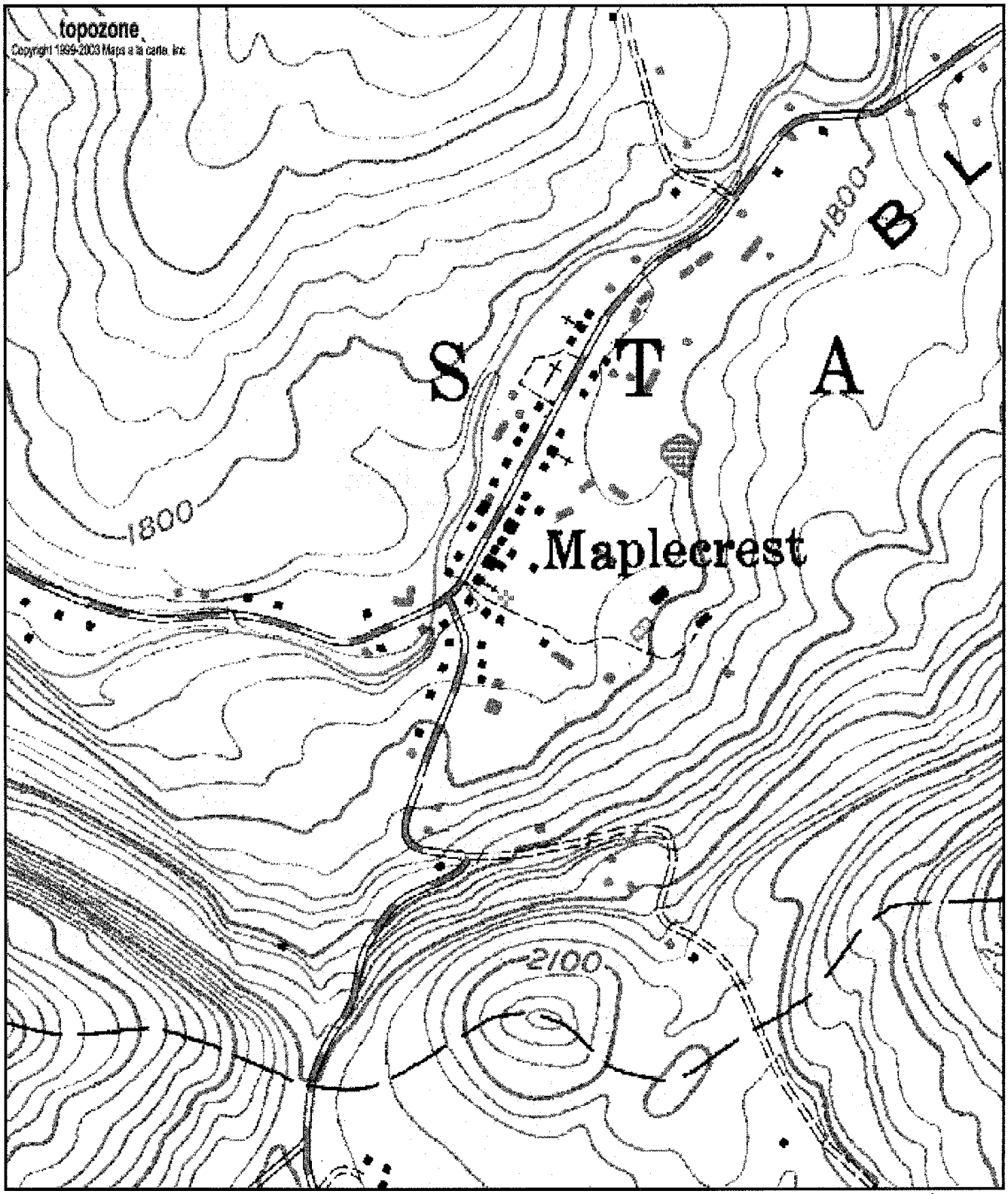
Udorthents, wet substratum soils are somewhat poorly to very poorly drained soils formed in medium to coarse textured local glacial till or glacial outwash soils that has been graded, filled or excavated to create hydric soil conditions. At this property the surface layer is gray (5YR 4/1) silt loam over gray (gleyed) 7.5YR 4/1 gravelly silt loam. The soil is saturated at the surface in some locations.

Wetland data table

Wetland Number	Wetland line Segments	Size (acres)	Lineal feet of channel
1	A,B,C,D,E , F & G	.81	700

Wetland impacts

The proposed wetland impacts involve restoration of the natural stream channel and improving the capacity of the flow across the property. Design and details of the restoration will be addressed in other submissions.



0 0.1 0.2 0.3 0.4 0.5 km

0 0.09 0.18 0.27 0.36 0.45 mi

M * G

M=-13.553
G=0.547

UTM 18 567106E 4680658N (NAD83/WGS84)

Maplecrest, USGS Hensonville (NY) Quadrangle

Projection is UTM Zone 18 NAD83 Datum

42° 16.49' N 74° 11.20' W

Above: The un-named [RPW] stream flows out of a broad wetland at the north end of the project area near wetland flags #A1 and #F8. There are specked alders, willows, sensitive fern and soft rush on very poorly drained Onteroa soils in the wetland.
Below: The stream is confined to a stone lined channel that flows south across the project area.

Above: The stone lined channel cuts through the property with wetlands on each side. There is an upland island on the west (left) side of the channel near the pines and a small mound of upland with some refuse on the east side of the channel near the pines.
Below: The stone lined channel ends at the driveway and a constructed ditch directs flow west and south eventually exiting the property and emptying into the Batavia Kill.

Above: The upland island on the west side of the channel is delineated by flags #B1 to #B7. The upland soil is Udorthents, smoothed. The plants are white pine, multiflora rose, golden rod, Queen Anne's lace and timothy

Below: The Udorthents, smoothed upland soil on the east side of the channel has a substantial component of trash and refuse. The vegetation is multiflora rose, broad leaf plantain, golden rod and timothy. The upland is delineated by flags #D1 to D6.

Above: Sensitive fern and soft rush are the dominant herbaceous plants is the broad portion of the wetland between wetland lines D and E.
Below: Line G marks the center line of the excavated channel south of the driveway on the south side of the project area. There are 4 flags in line G. There are no adjacent wetlands.

Above & Below: The uplands surrounding the project area are mostly maintained as lawn, gardens or buildings.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site: Sugar Maples Stream Restoration Project
Applicant/Owner: Catskill Mountain Foundation
Investigator: Roger J. Case

Date: 2/04/08
County: Greene
State: NY

Do Normal Circumstances exist on the site? ___ Yes _X_ No
Is the site significantly disturbed (Atypical Situation)? _X_ Yes ___ No
Is the area a potential Problem Area? ___ Yes _X_ No
(If needed, explain on reverse.)

Community ID: wetland
Transect ID: E
Plot ID: E4

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. sensitive fern	herb	FACW	9.		
2. *soft rush*	herb	FACW	10.		
3. *mixed sedges*	herb	FACW	11.		
4. *cattail*	herb	OBL	12.		
5. *Reed:s canary grass*	herb	FACW	13.		
6. *red osier*	shrub	FACW	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:

Depth of Surface Water: none (in.)
Depth to Free Water in Pit: >15 (in.)
Depth to Saturated Soil: 6 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
_X_ Saturated in Upper 12 inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary indicators (2 or more required):
___ Oxidized root channels in upper 12 inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

SITE: Catskill Mountain Foundation
DATE: 2/04/08
PLOT ID: E4

SOILS

Map Unit Name (Series and Phase): Udorthents wet substratum, smoothed
Drainage Class: poor
Taxonomy (Subgroup): aquent
Field Observations Confirm Mapped Type? X Yes ___ No

Profile Description:

Depth Inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-3	A	5YR 3/2	10YR 4/4	com, med, prom	silty clay loam, weak fine granular structure
3-18	Bg	7.5YR 4/1	NONE (GLEYED)	NA	silty clay

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
X Aquic Moisture Regime
X Reducing Conditions
X Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
X Listed on Local Hydric Soils List
X Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? X Yes ___ No
Wetland Hydrology Present? X Yes ___ No
Hydric Soils Present? X Yes ___ No

Is this Sampling Point Within a Wetland? X Yes ___ No

Remarks:

Approved by HQUSACE 3/92

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DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site: Brittny Estates
Applicant/Owner: Catskill Mountain Foundation
Investigator: Roger J. Case

Date: 02/04/08
County: Greene
State: NY

Do Normal Circumstances exist on the site? ___ Yes _X_ No
Is the site significantly disturbed (Atypical Situation)? _X_ Yes ___ No
Is the area a potential Problem Area? ___ Yes _X_ No
(If needed, explain on reverse.)

Community ID: upland
Transect ID: E
Plot ID: E4

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. curly dock	herb	FACU	9.		
2. *timothy*	herb	FACU	10.		
3. *mullen*	herb	FACU	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0

Remarks: The area is a lawn and recreational use area.

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
_____ No Recorded Data Available

Field Observations:

Depth of Surface Water: none (in.)
Depth to Free Water in Pit: >20 (in.)
Depth to Saturated Soil: >20 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary indicators (2 or more required):
___ Oxidized root channels in upper 12 inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:.

SITE: Catskill Mountain Foundation
DATE: 02/04/08
PLOT ID: E4

SOILS

Map Unit Name (Series and Phase): Udorthents, smoothed
Drainage Class: well
Taxonomy (Subgroup): udepts
Field Observations Confirm Mapped Type? X Yes ___ No

Profile Description:

Depth Inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-6	A	7.5YR 3/2	NONE	NA	silt loam, weak fine granular structure
6-15	Bw1	5YR 3/4	NONE	NA	gravelly silt loam weak medium subangular blocky structure

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ___ Yes X No
Wetland Hydrology Present? ___ Yes X No
Hydric Soils Present? ___ Yes X No

Is this Sampling Point Within a Wetland? ___ Yes X NO

Remarks:

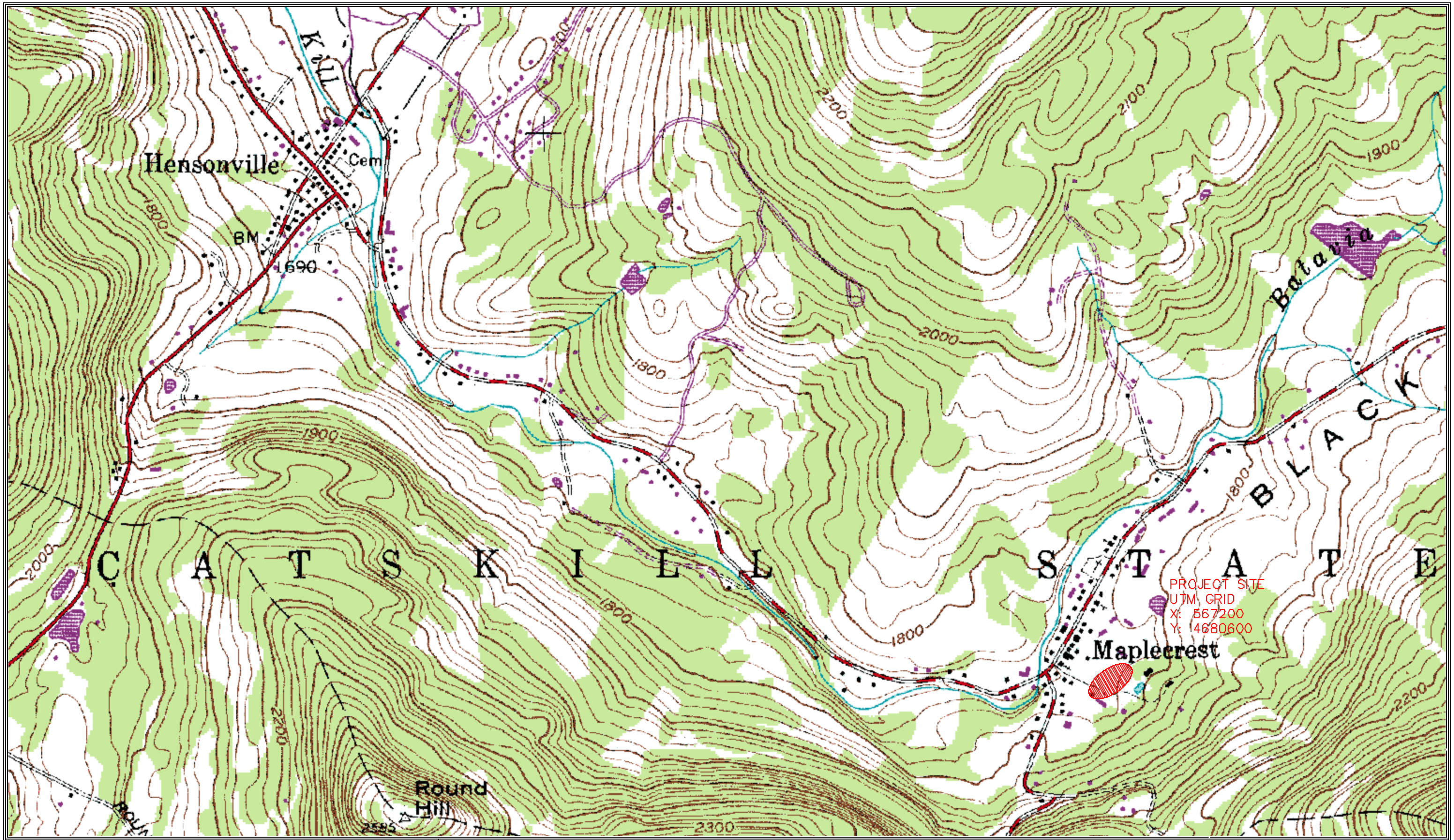
Approved by HQUSACE 3/92

42° 18.04'N, 74° 17.48'W (NAD83/WGS84)

USGS Ashland (NY) Quadrangle

Projection is UTM Zone 18 NAD83 Datum

M=-13.499
G=0.477



GREENE COUNTY SOIL & WATER CONSERVATION DISTRICT

BOX 907 GREENE COUNTY OFFICE BUILDING, CAIRO, NY 12413
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FAX (518) 622-0344

SUGAR MAPLES STREAM RESTORATION PROJECT
FOR
CATSKILL MOUNTAIN FOUNDATION
COUNTY ROUTE 56
TOWN OF WINDHAM — GREENE COUNTY, NY

PROJECT LOCATION MAP - USGS TOPO

PROJECT:	BK2008
DATE:	02/07/08
SCALE:	1"=1000'
DRAWN BY:	NSH/JRB
DESIGN BY:	

DRAWING:
JD-01

GREENE COUNTY SOIL & WATER CONSERVATION DISTRICT

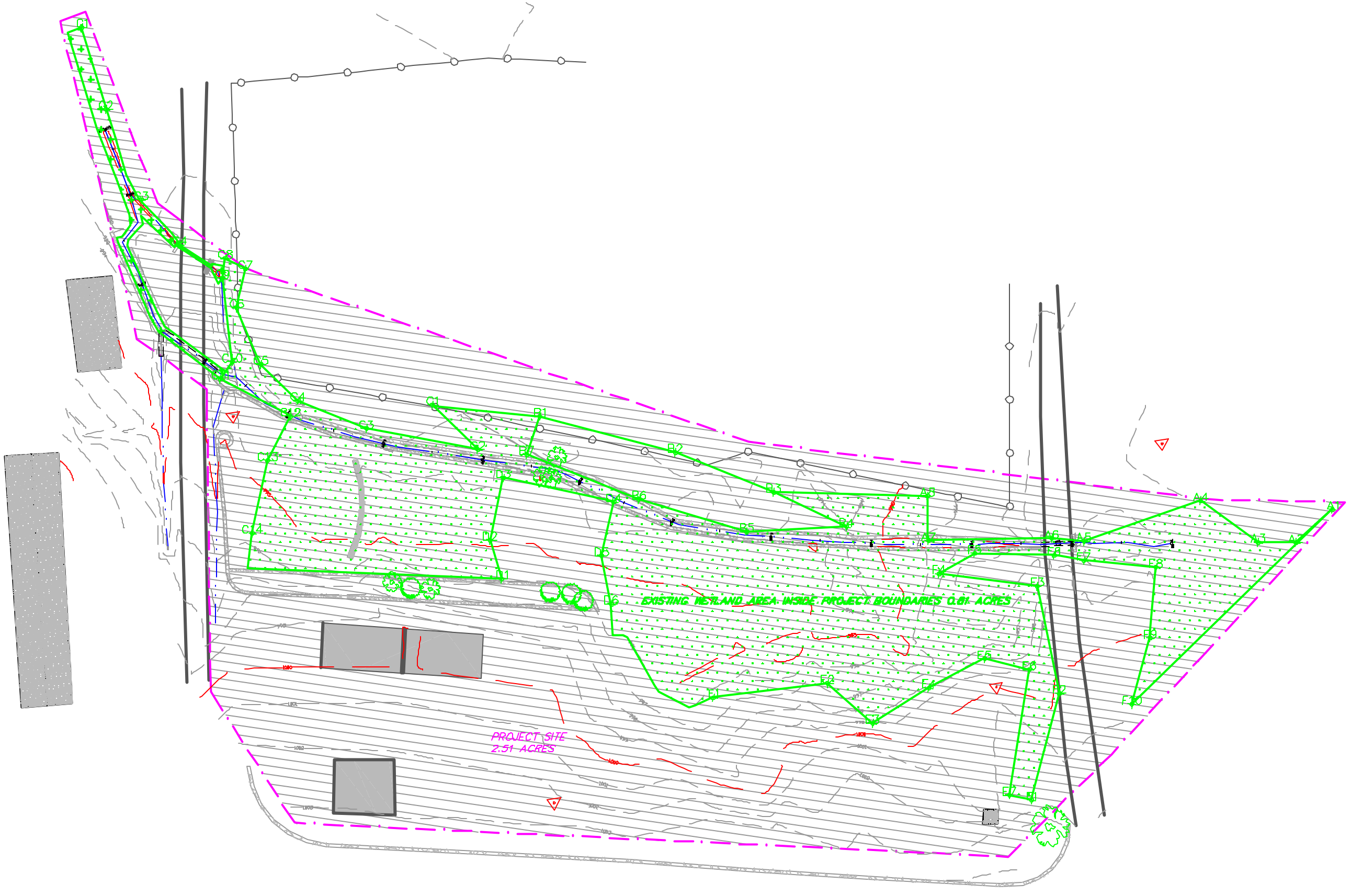
BOX 907 GREENE COUNTY OFFICE BUILDING, CAIRO, NY 12413
PHONE (518) 622-3620
FAX (518) 622-0344

SUGAR MAPLES STREAM RESTORATION PROJECT
FOR
CATSKILL MOUNTAIN FOUNDATION
COUNTY ROUTE 55
TOWN OF WINDHAM — GREENE COUNTY, NY

PROJECT AREA, SOILS, TAX PARCELS

PROJECT:	BK2008
DATE:	02/07/08
SCALE:	1"=150'
DRAWN BY:	NSH/JRB
DESIGN BY:	

DRAWING:
JD-02
SHEET 2 OF 5



GREENE COUNTY SOIL & WATER CONSERVATION DISTRICT

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FAX (518) 622-0344

SUGAR MAPLES STREAM RESTORATION PROJECT
FOR
CATSKILL MOUNTAIN FOUNDATION
COUNTY ROUTE 55
TOWN OF WINDHAM — GREENE COUNTY, NY

DELINEATED WETLANDS - TOPOGRAPHY

PROJECT: BK2008
DATE: 02/07/08
SCALE: 1"=50'
DRAWN BY: NSH/JRB
DESIGN BY:

DRAWING:
JD-03

GREENE COUNTY SOIL & WATER CONSERVATION DISTRICT

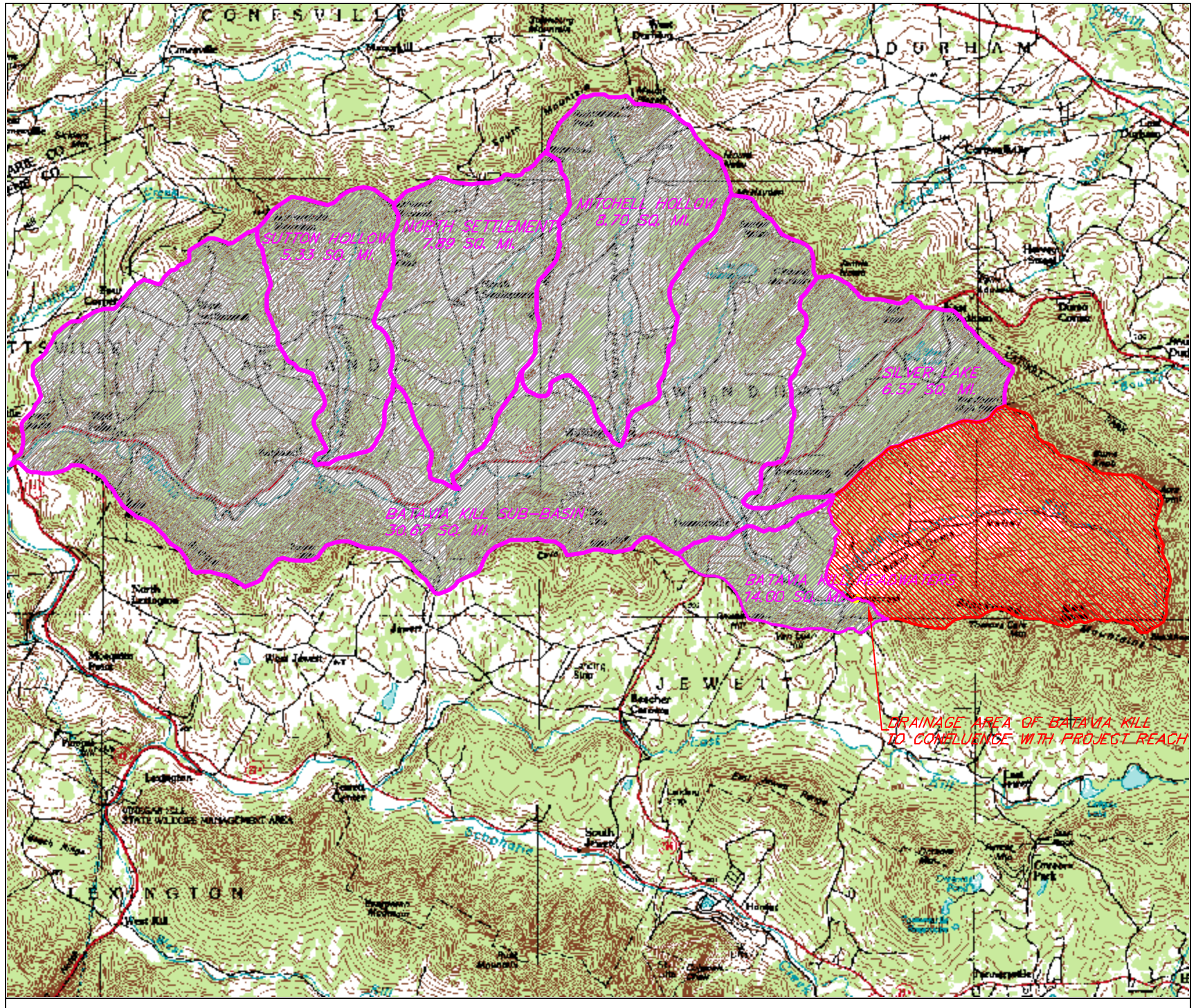
BOX 907 GREENE COUNTY OFFICE BUILDING, CAIRO, NY 12413
PHONE (518) 622-3620
FAX (518) 622-0344

SUGAR MAPLES STREAM RESTORATION PROJECT
FOR
CATSKILL MOUNTAIN FOUNDATION
COUNTY ROUTE 55
TOWN OF WINDHAM — GREENE COUNTY, NY

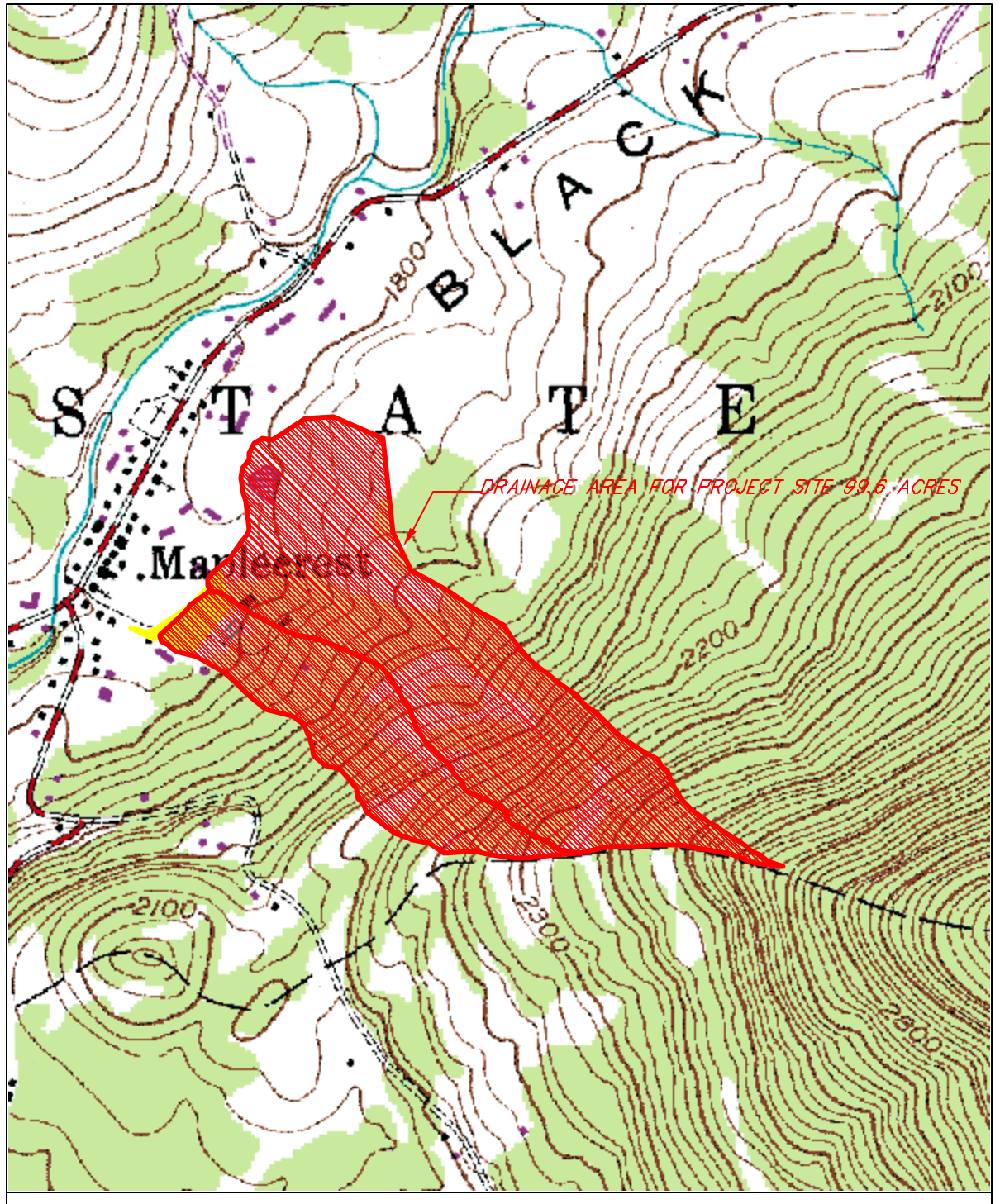
DELINEATED WETLANDS, PHOTO - 2006 AERIAL

PROJECT: BK2008
DATE: 02/07/08
SCALE: 1"=50'
DRAWN BY: NSH/JRB
DESIGN BY:

DRAWING:
JD-04
SHEET 4 OF 5



BATAVIA KILL BASIN AND SUB-BASINS SCALE (1"=10000')



DRAINAGE AREA OF PROJECT REACH SCALE (1":1000')

WATERSHED	AREA
PROJECT REACH	99.6 ACRES
BATAVIA KILL AT CONFLUENCE WITH PROJECT	7252 ACRES
BATAVIA KILL	73.16 SQ. MI.
SCHOHARIE	315.31 SQ. MI.

GREENE COUNTY SOIL & WATER CONSERVATION DISTRICT
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SUGAR MAPLES STREAM RESTORATION PROJECT
FOR
CATSKILL MOUNTAIN FOUNDATION
COUNTY ROUTE 55
TOWN OF WINDHAM GREENE COUNTY, NY
WATERSHED, DRAINAGE AREA - USGS TOPO

PROJECT: BK2008
DATE: 02/11/08
SCALE: AS NOTED
DRAWN BY: NSH/JRB
DESIGN BY:

DRAWING:
JD-05
SHEET 5 OF 5

Appendix C – Archaeology Report

Appendix D– Stormwater Pollution Prevention Plan

Sugar Maples Stream Restoration Project

Stormwater Pollution Prevention Plan

Town of Windham, Greene County, New York

Prepared for:

NYCDEP
71Smith Avenue
Kingston, New York 12401

Prepared by:

Greene County Soil and Water Conservation District
907 County Office Building
Cairo, New York 12413

April 2008

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Project Information:

Project Name and Location

Sugar Maples Stream Restoration Project
Town of Windham
Greene County, New York

Owner Name and Address

Greene County Soil and Water Conservation District (GCSWCD)
Jeff Flack, Acting Director
907 County Office Building
Cairo, New York, 12413
(518)-622-3620
(518)-622-0344

Project Description:

Purpose and Extent of Proposed Project

The Greene County Soil and Water Conservation District (GCSWCD) will work with the Catskill Mountain Foundation, the owners of the Sugar Maples Center for Arts and Education, to restore natural stream conditions to a small tributary to the Batavia Kill that flows through the Foundation's Maplecrest (Town of Windham) site.

Recent rainfall events have caused the concrete and stone wall lined channel to collapse in sections causing the channel to avulse and erode adjacent agricultural fields. On several occasions, field observations after rain events have noted turbid conditions on the Batavia Kill as far downstream as the NYS Route 296 Bridge under conditions when all other streams and water courses were running clear. Following the turbidity upstream to its source, it was found to be originating at the outfall of this tributary at the Batavia Kill.

The project will involve the restoration of the channel and the development of a diverse riparian buffer/wetland complex along approximately 550 linear feet of the tributary. All materials associated with the existing concrete/stone channel will be removed, and a channel with a stable geomorphic form will be constructed. The channel will also include excavation of a bankfull bench that will create a floodplain area. The bench will be established as wetland and woody riparian buffer. Road crossings at the top and bottom of the job will be replaced using larger culverts with stone filled bottoms to provide continuity of the channel substrate. Along the restored channel, wetlands will be constructed on the bankfull bench, as well as in the riparian buffer, to replace wetlands impacted during construction.

This SPPP covers the complete project construction scheduled to be completed in fall of 2008 by Greene County Soil and Water Conservation District. As proposed, the project will involve approximately 0.63 acres of total disturbance. The disturbance will be limited to the immediate stream corridor and is represented on Figure 1 labeled Project Location Map. All post construction storm water runoff from the project area will be consistent with the project areas existing hydrological and hydraulic regimes. The GCSWCD will operate and maintain the project through permanent stabilization.

Existing Site Conditions

Project Location

The project site is located on Greene County Route 56, in the Hamlet of Maplecrest, in the Town of Windham. The project reach is located approximately 600 ft. upstream of the tributaries confluence with the Batavia Kill near the intersection of Greene County Route 56 ands 40. Figure 1 is a location map containing topographic information and the location of the reach within the Batavia Kill watershed.

Watershed Setting

The project reach is located in the upper portion of the Batavia Kill watershed in the Town of Windham and has a drainage area measuring 0.16 square miles. The reach is currently lined by stone walls, confining it to a narrow width with a moderately steep valley slope of approximately 1.0%. This morphology varies substantially from upstream sections of the stream marked by a reduced sinuosity and substantial disconnection from its floodplain. The Rosgen (1996) classification system uses geomorphic measurements including entrenchment, sinuosity, gradient, and width to depth ratio to classify and delineate river reaches for communication and comparison. Upstream and downstream reaches are dominated by stable C5 and E5 type reaches, while the project reach is structurally modified and generally a entrenched channel form with very low sinuosity.

Existing Land Use and Cover

Current land use within the project area is vacant riparian lands and floodplain. Adjacent land uses are variable with low density residential and meadow on the northwest side of the corridor and vacant meadow and forest on the southeast side of the corridor.

The project area land cover consists of meadow. Small impervious surfaces exist within the project area. These impervious areas consist only of the two gravel roadways under which the culverts will be replaced. The cover types within the project area are 99% meadow and 1% impervious surface. Figure 2 delineates the land use and cover of the project area and surrounding areas.

Project Area Soils

One soil types is located within the project area; Tunkhannock gravelly loam, fan, 3-8% slopes (TvB). The Hydrological Soil Group (HSG) for TvB soil is A, indicating that the soil on the site is well drained.

Water Resources

The project reach is a first order unnamed tributary of the Batavia Kill. The Batavia Kill listed on the 2002 NYS DEC Priority Waterbodies List (PWL) under HUC 02020005/020 Batavia Kill, Middle and tributaries (1202-0058) as Habitat/hydrology known to be stressed, Minor Impacts with a known problem species (knotweed) and Silt/sediment as suspected pollutants. Sources of pollutants are listed as; Known - streambank erosion and habitat modification, and Possible - construction, and failing onsite systems.

Existing Storm Water Systems

Two circular culverts bound the project reach. These culverts are required for the gravel road crossings which provide access to multiple facilities within the property. Field investigations, hydrologic and hydraulic modeling were performed to assess the current conditions of the culverts and their influence on the stability and flooding of the reach. These evaluations determined both culverts were in generally poor condition and inadequate in size and capacity to handle any substantial runoff from the contributing drainage areas.

Sequence of Major Activities:

This SPPP presents erosion and sediment controls, to the degree practicable, all temporary erosion and sediment control mitigation measures shall be installed immediately before associated project areas are disturbed in anticipation of all soil disturbing activities to follow.

Project Construction Sequence

The project will involve 0.63 acres of total disturbance located almost entirely within the stream corridor. The construction will be completed in a series of two Phases progressing in the downstream direction. **An overall phasing layout is shown on plan sheet SM 06. All measures shall be installed in accordance with New York State Sediment and Erosion Control Guidelines (2003). Any change in construction design, construction operation or maintenance or construction sequencing, will require an amendment to the storm water pollution prevention plan and approval by the GCSWCD, Project Engineer, Contracting Officer, and NYCDEP.**

Phase I

Phase I will include the installation of project erosion and sediment controls and the construction of stream restoration measures beginning at Station 0+00 and continuing to Station 3+40. The phase will include the disturbance of 0.38 acres and is shown on construction plan sheet **SM-06**. Site access and staging area will utilize the existing driveways from Greene County Route 56. Erosion and sediment control details and notes are provided on sheet **SM-06**. Phase I construction sequencing is as follows:

1. Install designated perimeter controls for staging and material storage area.
2. Construct stone outlet sediment trap.
3. Install Phase I coffer dams and de watering pump and pipeline.
4. Install dewatering outlet controls.
5. Install turbidity pumps and pipe lines.
6. Perform clearing and grubbing and culvert removal.
7. Perform grading.
8. Install vegetative measures of seed & mulch as specified.

Phase I bioengineering will commence in the in the fall of 2008 when materials enter dormancy for long term erosion and sediment control.

Phase II

Phase II will include the installation of project erosion and sediment controls and the construction of stream restoration measures beginning at Station 3+40 and continuing to Station 5+74. The phase will include the disturbance of 0.27 acres and is displayed on construction plan sheet **SM-06**. Erosion and sediment control details and notes are provided on sheet **SM-06**. Phase II Construction Sequencing is as follows:

1. Install Phase II coffer dams and de watering pump and pipeline.
2. Install dewatering outlet controls.
3. Install turbidity pumps and pipe lines.
4. Perform clearing and grubbing.
5. Perform grading.
6. Install vegetative measures of seed & mulch as specified.

Phase II bioengineering will commence in the in the fall of 2008 when materials enter dormancy for long term erosion and sediment control.

Controls:

Erosion and Sediment Controls / Stabilization Practice

The construction of the project shall proceed in 2 phases each of which is sized at under 0.4 acres. For a layout of applicable erosion and sediment control measures and details see the attached plan sheet **SM-06**. All measures shall be installed in accordance with New York State Sediment and Erosion Control Guidelines (2005).

Temporary Stabilization

Topsoil stockpiles, staging areas and disturbed pervious portions of the project area where construction activity temporarily ceases for at least 21 days shall be stabilized with temporary seed and mulch no later than 7 days from the last construction activity in that area.

Temporary seed shall be Rye (grain) applied at the rate of 30 pounds per acre. Mulch shall be applied in conjunction with seeding and applied at the rate of 90 lbs per 1000 square feet. Mulch shall be reapplied as necessary.

Rip-rap outlet protection shall be installed at all pump and pipe line outlets. Rip-rap material shall be hard, durable field or quarry stone which is angular and resists breaking down when exposed to water or weathering.

Sediment control fencing shall be installed around the site where depicted on the attached plan sheets. Sediment control fencing shall be "dug-in" using a narrow ditch witch device. Prior to commencing any earthwork, a stabilized construction entrance shall be installed as indicated on the attached plans. This entrance shall be utilized as the exclusive construction entrance and exit to the construction areas. Construction traffic shall be limited to the designated construction entrances.

Permanent Stabilization

Disturbed portions of the project area where construction activities permanently cease shall be stabilized with permanent seed no later than 7 days after the last construction activity. The permanent seed mix shall be in accordance with the project specifications and plans. Construction and maintenance of erosion and siltation control measures are in accordance with the New York Standards and Specifications for Erosion and Sediment Control (2005).

Where construction activity is complete, over areas to be permanently vegetated, stabilize with permanent seeding. Evenly apply seed in accordance with the species and rate indicated in the previous section by broadcasting or hydroseeding. Verify seeding dates with engineer. If engineer determines that seed cannot be applied due to climate, topsoil shall not be spread and mulching shall be applied to the exposed surface to stabilize soils until the next recommended seeding period.

Stormwater Management and Water Quality Measures

The proposed project enhances vegetative cover, and proposes no increase in impervious surface. Soil characteristics will remain unchanged, as well as local drainage and surface hydrology. These attributes waive the need for permanent storm water quality controls, and requirements for extended detention of the 1-year 24-hour storm and mitigation of the peak flows from the 10-year and 100-year 24-hour storm events.

Other Controls

Waste Disposal

Waste materials – Foreign waste materials shall be collected and stored in a secured area until removal and disposal by a licensed solid waste management company. All trash and construction debris from the project area shall be disposed of in a portable container unit. No foreign waste materials shall be buried within the project area. All personnel shall be instructed regarding the correct procedure for waste disposal. Notices stating these practices shall be posted in the project trailer and the individual who manages day-to-day project operations will be responsible for seeing that these procedures are followed.

Hazardous Waste - All hazardous waste materials shall be disposed of in a manner specified by local or state regulations or by the manufacturer. Project personnel shall be instructed in these practices and the individual who manages day-to-day project operations shall be responsible for seeing that these practices are followed.

Sanitary Waste - Any sanitary waste from portable units shall be collected from the portable units by a licensed sanitary waste management contractor, as required by NYS DEC regulations.

Sediment Tracking by Vehicles

The existing roadways into the site on both the upstream and downstream ends will function as construction entrances. These entrances will be maintained as necessary to help reduce vehicular tracking of sediment. The entrance shall be cleaned of sediment and redressed when voids in the crushed stone become filled and vehicular tracking of sediment is occurring. Dump trucks hauling materials to and from the construction project area shall be covered with a tarpaulin to reduce dust. Any sediment and debris tracked from work area along project adjacent roadways shall be immediately removed with a street sweeper or equivalent sweeping method.

Non-Stormwater Discharges

Non-stormwater discharges are not expected to exit the project area during construction.

Timing of Controls/Measures

The erosion and sediment control measures shall be constructed prior to clearing or grading of any portion of the project. Where construction activity temporarily ceases for more than 21 days, areas to be vegetated shall be stabilized with a temporary seed and mulch within 7 days of the last disturbance. Once construction activity ceases permanently in an area, that area shall be stabilized with permanent measures. After the entire project area is stabilized, the accumulated sediment shall be removed from the project area. Erosion control devices shall remain in place until disturbed areas are permanently stabilized.

Certification of Compliance with Federal, State, and Local Regulations

The stormwater pollution prevention plan reflects the New York State requirements for stormwater management and erosion and sediment control. To ensure compliance, this plan was prepared in accordance with New York State standards, and plan review and approval by NYCDEP.

Maintenance/Inspection Procedures:

Erosion and Sediment Control Inspection and Maintenance Practices

These are the minimum required inspection and maintenance practices that shall be used to maintain erosion and sediment controls:

- All control measures shall be inspected at least once each week and following any storm event of 0.5 inches or greater in a 24 hour period using the "Construction Duration Inspection Form" referenced from Appendix H of the New York State Standards and Specifications for Erosion and Sediment Control. A copy of this form is included in the "inspection reports" section of this plan. GCSWCD will perform these inspections
- A copy of the SWPPP must be posted onsite, in a publicly accessible location.
- A summary of the project area inspection activities shall be posted monthly in a publicly accessible location. A copy of the "Monthly Inspection Summary Form" is included in the "inspection forms" section of this plan.
- The operator shall prepare a written summary of the SWPPP's status with respect to compliance with the general permit (GP-02-01) at a minimum frequency of every three months during which coverage under the permit exists. The summary should address the status of achieving each component of the SWPPP. A copy of the "Monitoring, Reporting and Three-Month Status Inspection Form", referenced from Appendix H of the New York State Standards and Specifications for Erosion and Sediment Control, is included in the "inspection forms" section of this plan.
- Prior to filing of the Notice of Termination or the end of permit term, the Operator shall perform a final project area inspection. This inspection shall certify that the project area has undergone final stabilization using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not

needed for long-term erosion control have been removed. A copy of the "Final Stabilization and Retention of Records Inspection Form", referenced from Appendix H of the New York Standards and Specifications for Erosion and Sediment Control, is included in the "inspection forms" section of this plan.

- All measures shall be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours of report or as ordered by the owner's representatives.
- Built up sediment shall be removed from any silt fence when it has reached one-third the height of the fence / dike.
- Sediment control fencing and wetland protection barrier shall be inspected for depth of sediment, and tears, to see if fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground.
- The construction entrance shall be cleaned of sediment and redressed when voids in the crushed stone become filled and vehicular tracking of sediment is occurring.
- Dust shall be controlled on access points and other disturbed areas subject to surface dust movement and blowing.
- Stabilization fabric and rock dams shall be inspected to ensure that slopes and swales are not being eroded. Fabric shall be replaced / reinstalled and rock dams added as necessary to prevent any such erosion
- Inspection of diversion swales shall be conducted to check condition of swale.
- The temporary sediment basin shall be inspected to check condition of basin.
- Inspection must verify that all practices are adequately operational, maintained properly and that sediment is removed from all control structures.
- Inspection must look for evidence of soil erosion on the site, potential for pollutants entering drainage systems, problems at the discharge points, and signs of soil and mud transport from the site to the public road.
- The site operator or superintendent shall select the individuals who will be responsible for the inspections, maintenance, repair activities, and filling out the inspection and maintenance report.
- Personnel selected for inspection and maintenance responsibilities shall have received proper training in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used on-site in good working order.
- The operator shall retain copies of SWPPP's, any reports submitted in conjunction with this permit and records of all data used to complete the NOI to be covered by this permit for a period of at least three years from the date that the site is finally stabilized.

Post-Construction Inspection and Maintenance Practices

GCSWCD will maintain ownership of the site. Long-term inspection forms for the stormwater management practices (included in the "inspection forms" section of this plan) are referenced from Appendix H of the New York Sate Stormwater Management Design Manual.

Inventory for Pollution Prevention Plan:

The materials or substances listed below are expected to be within the project area during construction:

- Fertilizers / seeding materials.
- Stone.
- Petroleum based products.
- Silt fence fabric.
- Lumber.
- CMP.
- Cellulose fiber mulch.
- Straw/hay mulch
- Anchoring chemicals

Spill Prevention:

The following are the material management practices that shall be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff.

Good Housekeeping

The following good housekeeping practices shall be followed within project areas during construction:

- An effort shall be made to store only enough products required to do the job.
- All materials stored within project areas shall be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
- Products shall be kept in their original containers with the original manufacturer's label.
- Substances shall not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product shall be used up before disposing of the container.
- Manufacturers' recommendations for proper use and disposal shall be followed.
- The project superintendent shall inspect daily to ensure proper use and disposal of materials.

Hazardous Products

These practices are used to reduce the risks associated with hazardous materials:

- Products shall be kept in original containers unless they are not resealable.
- Original labels and material safety data shall be retained.
- If surplus product must be disposed of, manufacturers' or local and state recommended methods of proper disposal shall be followed.
- Material Safety Data Sheets for all hazardous products shall be within the project area for the duration of construction.

Product Specific Practices

The following product-specific practices shall be followed within the project areas:

Petroleum Products

All project related vehicles shall be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products shall be stored in tightly sealed containers which are clearly labeled.

Fertilizers

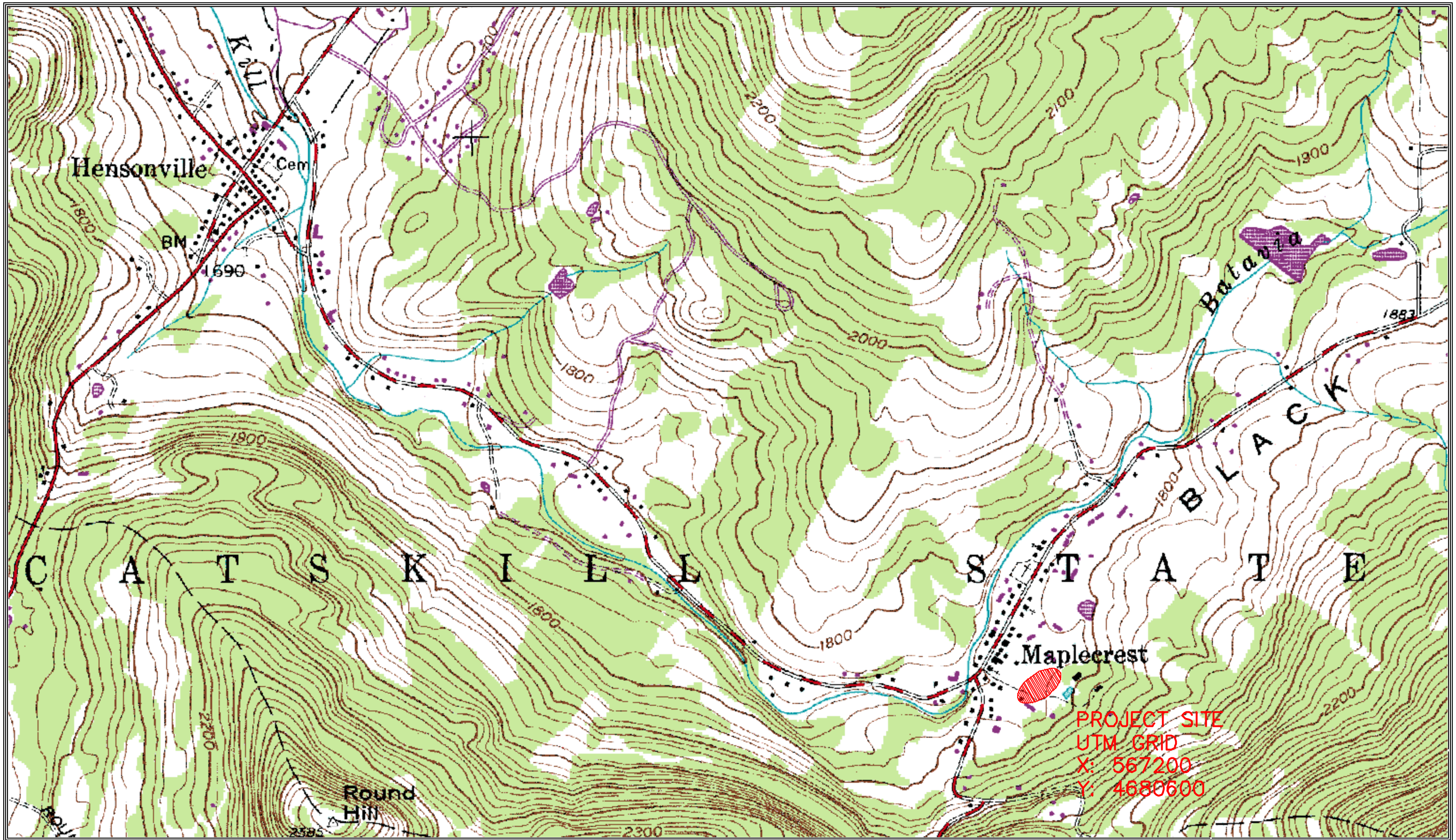
Fertilizers used shall be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer shall be worked into the soil to limit exposure to stormwater. Fertilizers shall be stored in a covered or other contained area.

Spill Control Practices

The contractor will be responsible for preparing a project area specific spill control plan in accordance with local and NYS DEC regulations. At a minimum this plan should:

- Reduce stormwater contact if there is a spill.
- Contain the spill.
- Stop the source of the spill.
- Dispose of contaminated material in accordance with manufactures procedures, and NYS DEC regulations.
- Identify responsible and trained personnel.
- Ensure spill area is well ventilated.

Appendix A - Figures



GREENE COUNTY SOIL & WATER CONSERVATION DISTRICT

BOX 907 GREENE COUNTY OFFICE BUILDING, CAIRO, NY 12413
PHONE (518) 622-3620
FAX (518) 622-0344

SUGAR MAPLES STREAM RESTORATION PROJECT
FOR
CATSKILL MOUNTAIN FOUNDATION
COUNTY ROUTE 55
TOWN OF WINDHAM — GREENE COUNTY, NY

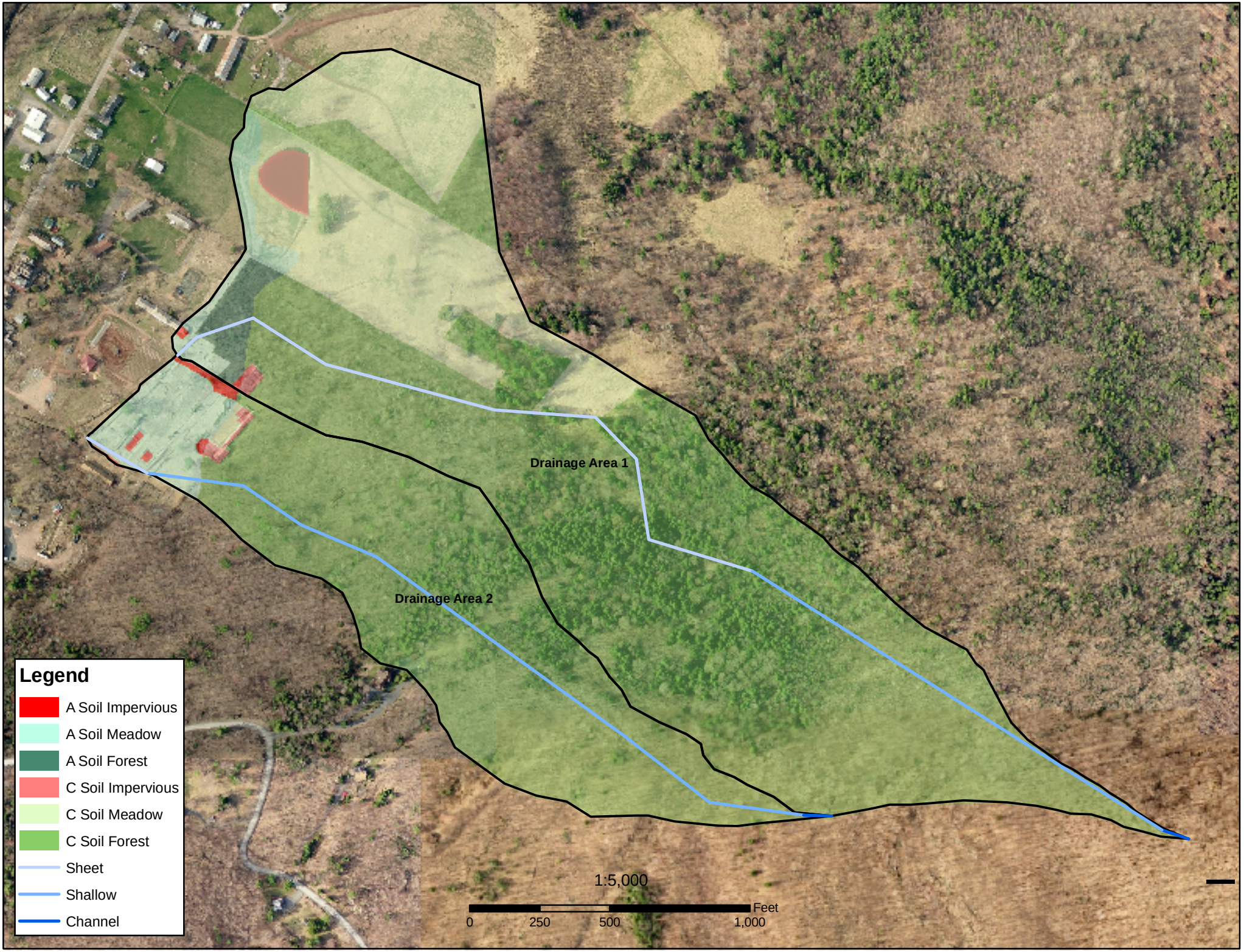
PROJECT LOCATION MAP - USGS TOPO

PROJECT:	BK2008
DATE:	04/21/08
SCALE:	1"=1000'
DRAWN BY:	NSH/JRB
DESIGN BY:	

DRAWING:

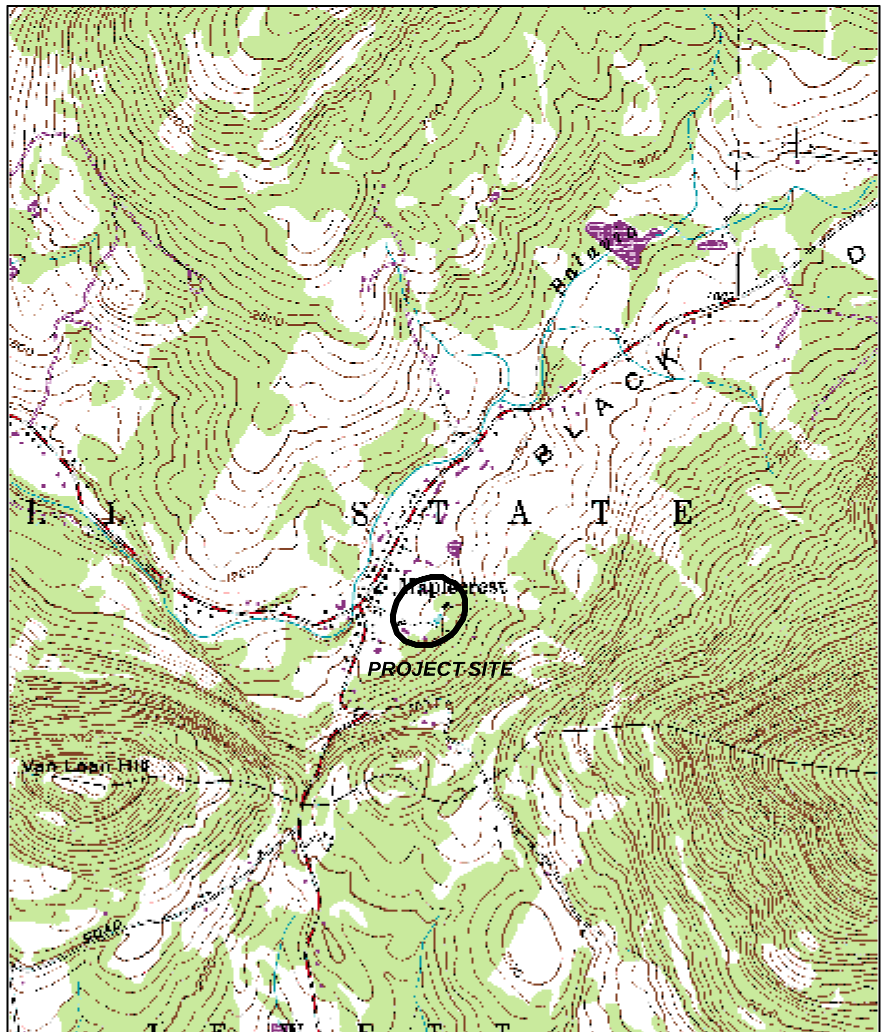
FIG-01

SHEET 1 OF 2


Drainage Area 1
Drainage Area 2
Legend
A Soil Impervious
A Soil Meadow
A Soil Forest
C Soil Impervious
C Soil Meadow
C Soil Forest
Sheet
Shallow
Channel
1:5,000
Feet
0
250
500
1,000

Appendix E – Construction Drawings and Details

SUGAR MAPLES STREAM RESTORATION PROJECT



PROJECT SITE LOCATION SCALE(1":1000')

DRAWING INDEX

SHEET NO:	SHEET TITLE	REVISION HISTORY NO:	REVISION HISTORY DATE
SM-01	TITLE SHEET		
SM-02	EXISTING CONDITION, DEMOLITION & REMOVAL		
SM-03	PROPOSED PLAN		
SM-04	VEGETATION PLAN		
SM-05	DETAILS		
SM-06	EROSION AND SEDIMENT CONTROL PLAN		

LEGEND

EXISTING		PROPOSED
	FIRE HYDRANT	
	MANHOLE	
	WATER SHUT OFF	
	UTILITY POLE	
	STONE WALL	
	SIGN	
	TREE	
	CATCH BASIN	
	PROPERTY LINE	
231	1' OR 2' CONTOUR LINE	231
150	5' OR 10' CONTOUR LINE	150
+125.6	SPOT ELEVATION	+125.6
	IRON ROD, PIN, PIPE	
—S—	SANITARY SEWER LINE	—S—
—OHW—	OVERHEAD WIRES	—OHW—
	CULVERT	

Note:
The primary objective of this project is to reduce stream bank and bed erosion rates and resulting sediment loading to the Batavia Kill Watershed from the project site. The project is not designed or intended to provide flood prevention or control and no representation are being made regarding its impact on flood control. A secondary objective of this project is to evaluate the effectiveness and the applicability of Natural Channel Design concepts in New York City's Catskill watershed. Natural Channel Design is an emerging science, and available design guidance is extremely limited. Stream restoration projects based on Natural Channel Design concepts have been demonstrated to be effective at reducing erosion rates in the Batavia Kill Watershed (Buck Engineering PC, 2004 - Batavia Kill Watershed Stream Design and Monitoring Evaluation), however, no representation are being made regarding the overall impact on turbidity. Success of Natural Channel Design projects relies heavily on establishment and maintenance of a healthy and vigorous riparian vegetation community. Damages sustained on the project prior to development of mature riparian vegetation must be anticipated, and repaired as necessary. This design assumes the accuracy of the information and data that was provided to the engineer by other parties. The engineer was not funded or requested to confirm or verify the accuracy of the data provided.

CALL 2 FULL WORKING DAYS BEFORE YOU DIG
1-800-962-7962
UFPO
IT'S THE LAW

PROJECT SITE AERIAL SCALE(1":100')

KAATERSKILL ASSOCIATES
SURVEYORS, ARCHITECTS AND ENGINEERS
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DRAWN BY:

GREENE COUNTY SOIL & WATER CONSERVATION DISTRICT
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FAX (518) 622-0344

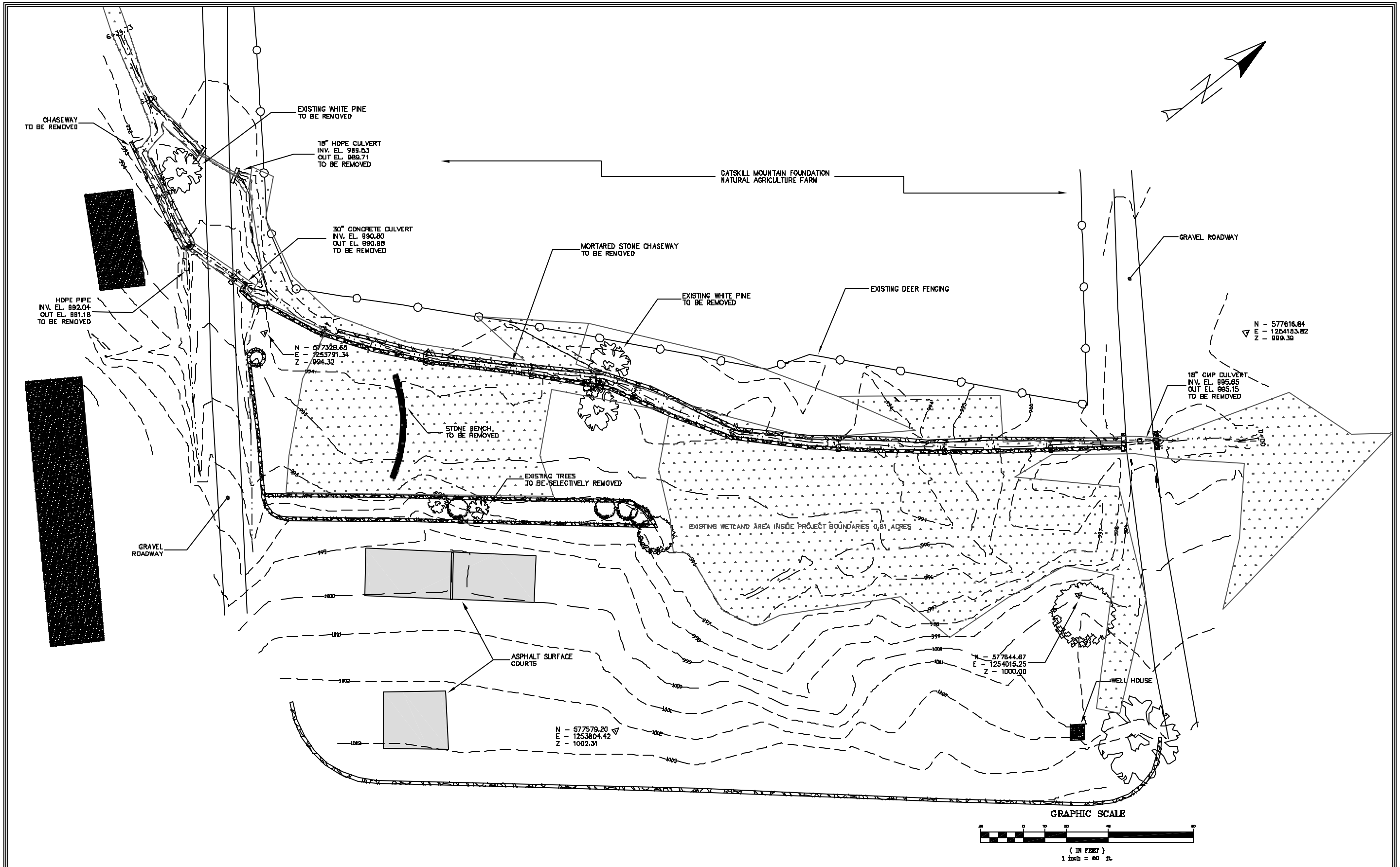
SUGAR MAPLES STREAM RESTORATION PROJECT
FOR THE
CATSKILL MOUNTAIN FOUNDATION
COUNTY ROUTE 56
TOWN OF WINDHAM GREENE COUNTY, NY

TITLE SHEET

PROJECT:	BK2008
DATE:	03/03/08
SCALE:	AS NOTED
	JRB
DESIGN BY:	JRB

DRAWING: SM-01

SHEET 1 OF 6



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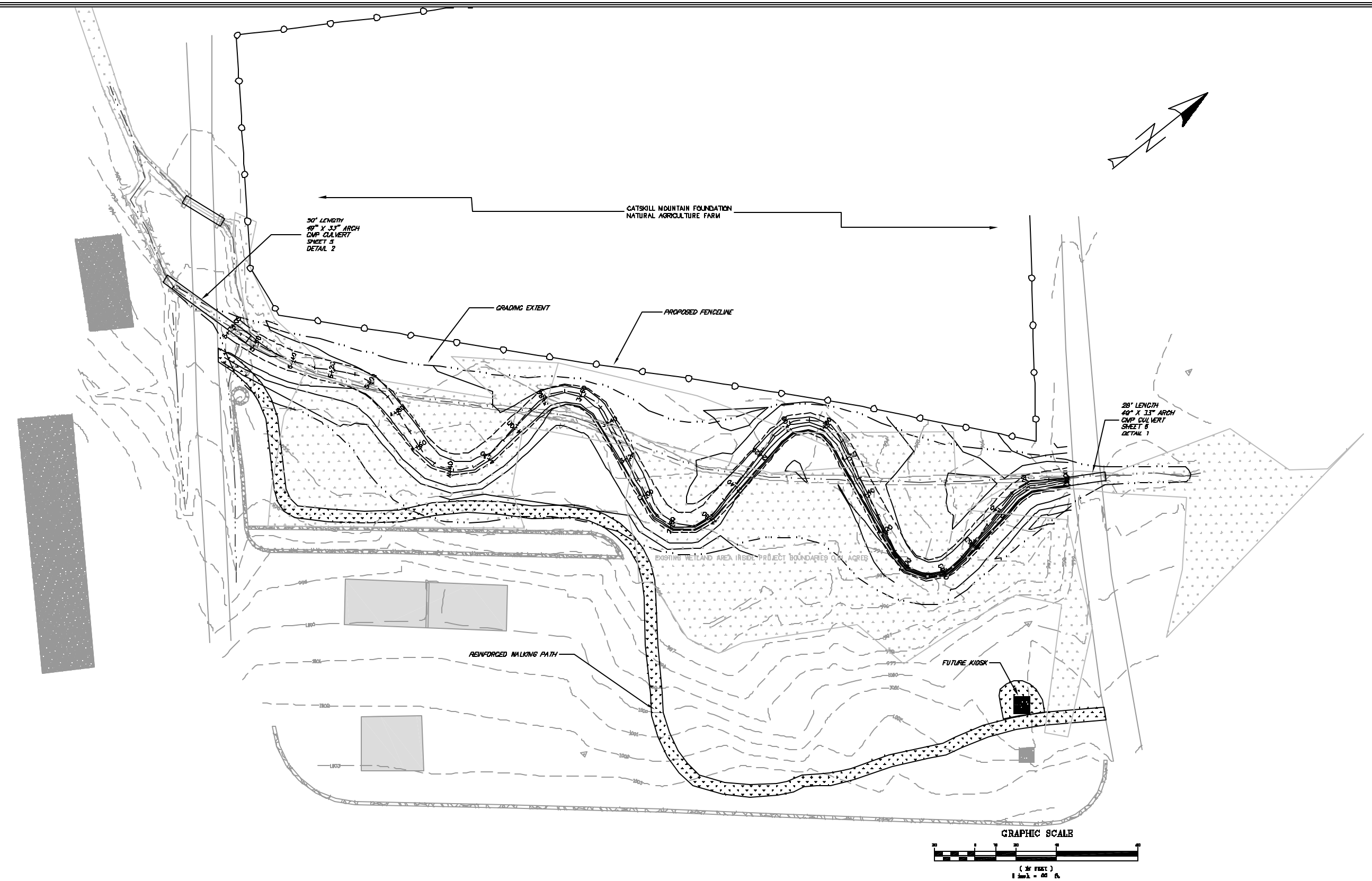
SUGAR MAPLES STREAM RESTORATION PROJECT
FOR THE
CATSKILL MOUNTAIN FOUNDATION
COUNTY ROUTE 56
TOWN OF WINDHAM GREENE COUNTY, NY

EXISTING CONDITION, DEMOLITION & REMOVAL

PROJECT: BK2008
DATE: 03/03/08
SCALE: 1"=50'
DRAWN BY: JRB
DESIGN BY: JRB

DRAWING:
SM-02



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FAX (518) 622-0344

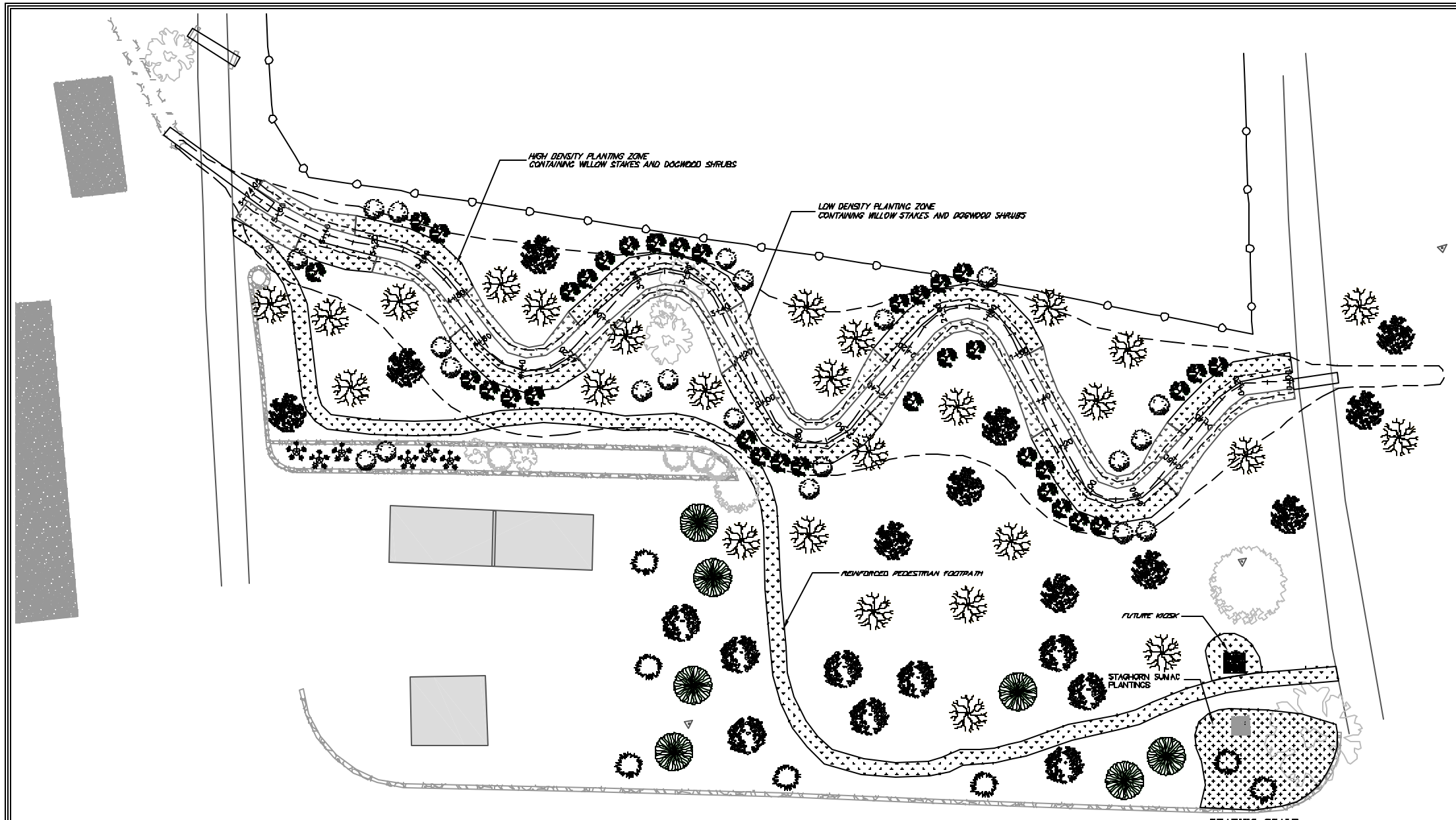
SUGAR MAPLES STREAM RESTORATION PROJECT
FOR
CATSKILL MOUNTAIN FOUNDATION
COUNTY ROUTE 56
TOWN OF WINDHAM GREENE COUNTY, NY

PROPOSED PLAN

PROJECT:	EK2008
DATE:	03/03/08
SCALE:	1"=50'
DRAWN BY:	JRB
DESIGN BY:	JRB

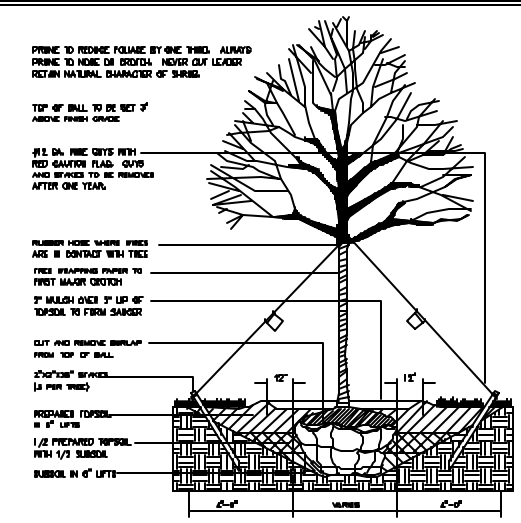
DRAWING: **SM-03**

SHEET 3 OF 8

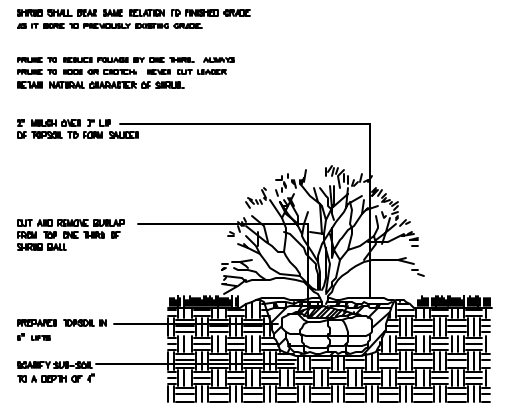


GRAPHIC SCALE

(IN FEET)
1 inch = 50 ft.



TREE PLANTING DETAIL
(NOT TO SCALE)



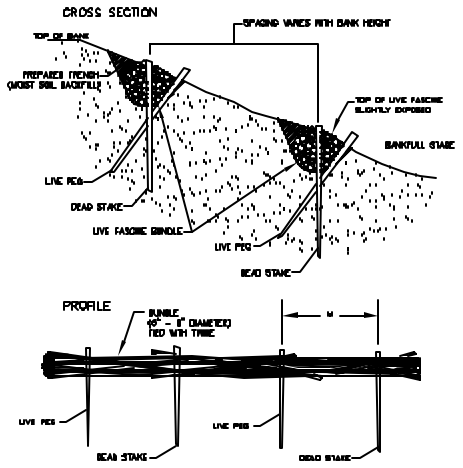
SHRUB PLANTING DETAIL
(NOT TO SCALE)

Symbol	Common Name	Scientific Name	Quantity	Size	Material Type	Planting Density
	Paper Birch	Betula papyrifera	27	2"	Ball & burlap	as shown
	Speckled Alder	Alnus rugosa	34	1.5"	Ball & burlap	10' o.c. along bends
	Shadblow Serviceberry	Amelanchier canadensis	21	seedling	3 gal. container	10' o.c. along bends
	Red Maple	Acer rubrum	11	sapling	3 gal. container	as shown
	Sugar Maple	Acer saccharum	9	sapling	3 gal. container	as shown
	White Pine	Pinus strobus	7	sapling	3 gal. container	as shown
	Canadian Hemlock	Tsuga canadensis	7	sapling	3 gal. container	as shown
	Pin Cherry	Prunus pensylvanica	6	sapling	3 gal. container	10' o.c. in clumps
	Red Osier Dogwood	Cornus sericea	80	seedling	Bareroot	12' o.c.
	Silky Dogwood	Cornus amomum	80	seedling	Bareroot	12' o.c.
	Willow Stakes	Salix spp.*	600	> 0.5"	Live stake	3' o.c.
	Red Osier Dogwood	Cornus sericea	30	seedling	Bareroot	20' o.c.
	Silky Dogwood	Cornus amomum	30	seedling	Bareroot	20' o.c.
	Willow Stakes	Salix spp.*	300	> 0.5"	Live stake	4' o.c.
	Staghorn Sumac	Rhus typhina	75	1"	3 gal. container	5' o.c.
	Existing Coniferous Tree					
	Existing Deciduous Tree					

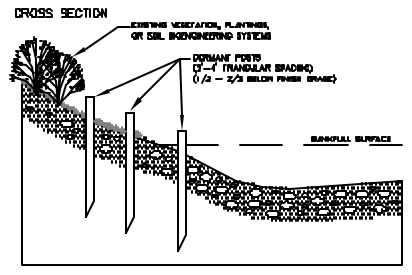
*salix species must conform to the provided list of native plants

Note: o.c. abbriviates "on-center"

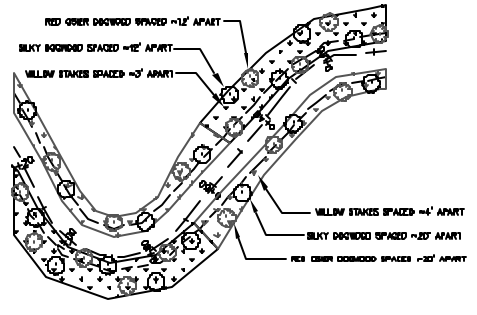
PLANTING SCHEDULE



LIVE FASCINE DETAIL
(Not to scale)



DORMANT POST DETAIL
(Not to scale)



TYPICAL PLANTING DETAIL - PLAN VIEW
(Scale 1"=20')

Common Name	Scientific Name
Virginia Wild Rye	Elymus virginicus
Fox Sedge	Carex vulpinoidea
Lurid (Shallow) Sedge	Carex lurida
Fowl Mannagrass	Glyceria striata
Green Bulrush	Scirpus atrovirens
Blue Vervain	Verbena hastata
Blunt Broom Sedge	Carex scoparia
Ox-Eye Sunflower	Heliopsis helianthoides
Lurid/Shallow Sedge	Carex lurida
Boneset	Eupatorium perfoliatum
American Mannagrass	Glyceria grandis
Soft Rush	Juncus effusus
Sensitive Fern	Onoclea sensibilis
Nodding Bur Marigold	Bidens Cernua
Cosmos (Bristly) Sedge	Carex comosa
Hop Sedge	Carex Lupulina
Joe Pye Weed	Eupatorium fistulosum
Spotted Joe Pye Weed	Eupatorium maculatum
Eastern Lesser Bur Reed	Sparganium americanum
Giant Bur Reed	Sparganium eurycarpum
Path Rush, PA Ecotype	Juncus tenuis, PA Ecotype
Square Stemmed Monkey Flower	Mimulus ringens
Many Leaved Bulrush	Scirpus polyphyllus
Giant Ironweed	Vernonia gigantia
Wool Grass	Scirpus cyperinus
Bailey's Sedge	Carex baileyi
Fringed (Nodding) sedge	Carex crinita
Awl Sedge	Carex stipata
Bristlebract Sedge	Carex tribuloides
Rough Avens	Geum laciniatum
Rattlesnake Grass	Glyceria canadensis
Turk's Cap Lilly	Lilium superbum
Ditch Stonecrop	Penthorum sedoides
Hard Stemmed Bulrush	Scirpus acutus
Soft Stem Bulrush	Scirpus validus
Seedbox	Ludwigia alternifolia

WETLAND SEED MIX

KAATERSKILL ASSOCIATES
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GREENE COUNTY SOIL & WATER CONSERVATION DISTRICT
BOX 907 GREENE COUNTY OFFICE BUILDING, CAIRO, NY 12413
PHONE (518) 622-3620
FAX (518) 622-0344

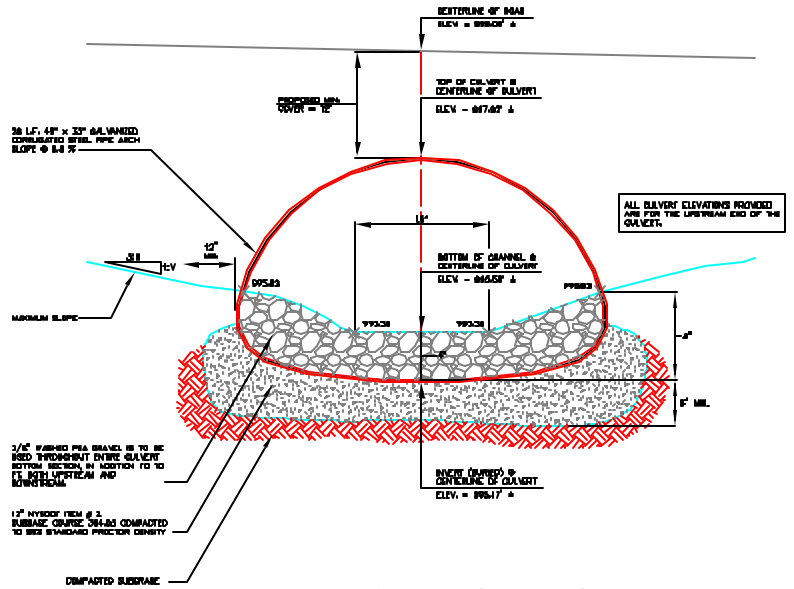
SUGAR MAPLES STREAM RESTORATION PROJECT
FOR
CATSKILL MOUNTAIN FOUNDATION
COUNTY ROUTE 56
TOWN OF WINDHAM GREENE COUNTY, NY

REVEGETATION PLAN

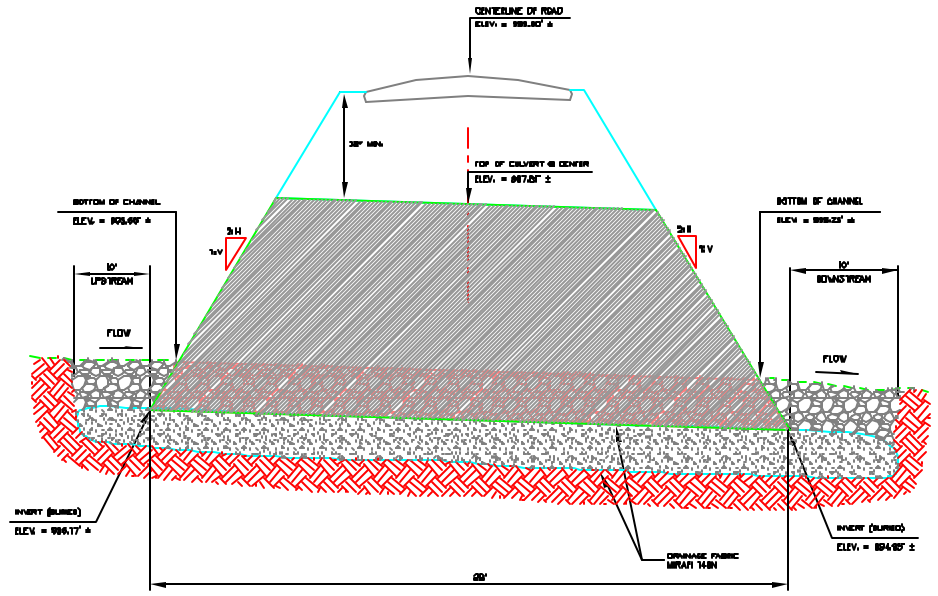
PROJECT: BK2008
DATE: 03/03/08
SCALE: 1"=50'
DRAWN BY: JRB/NSH
DESIGN BY: JRB/NSH

DRAWING: SM-04

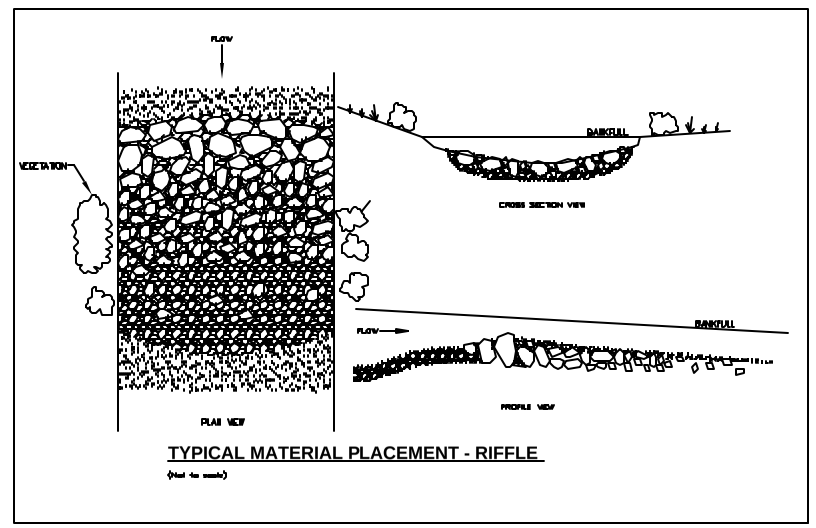
SHEET 4 OF 8



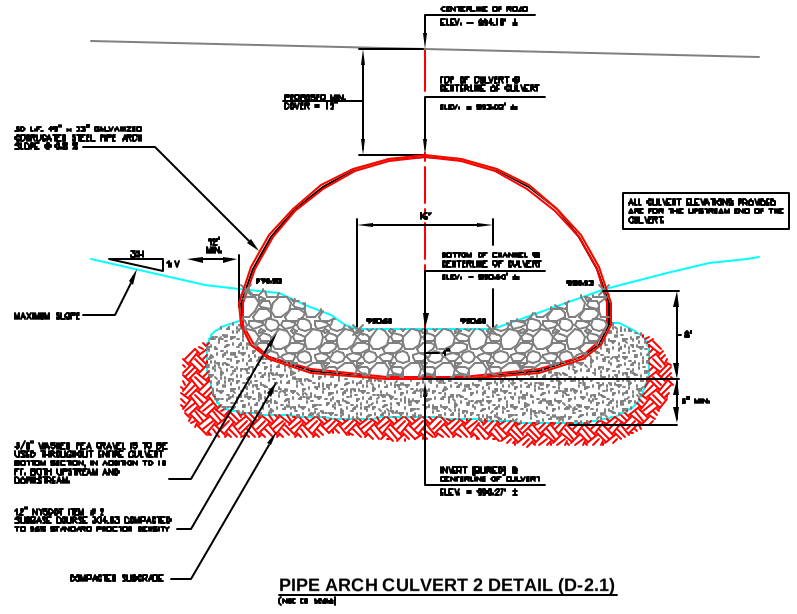
PIPE ARCH CULVERT 1 (DETAIL-1.1)
(Not to scale)



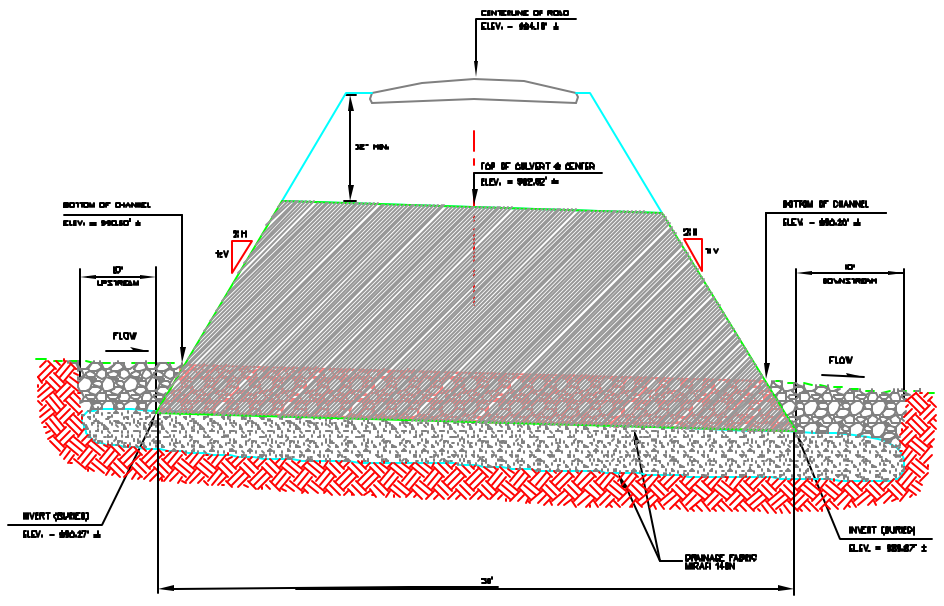
PIPE ARCH CULVERT 1 SECTION (D-1.2)
(Not to scale)



TYPICAL MATERIAL PLACEMENT - RIFFLE
(Not to scale)



PIPE ARCH CULVERT 2 DETAIL (D-2.1)
(Not to scale)



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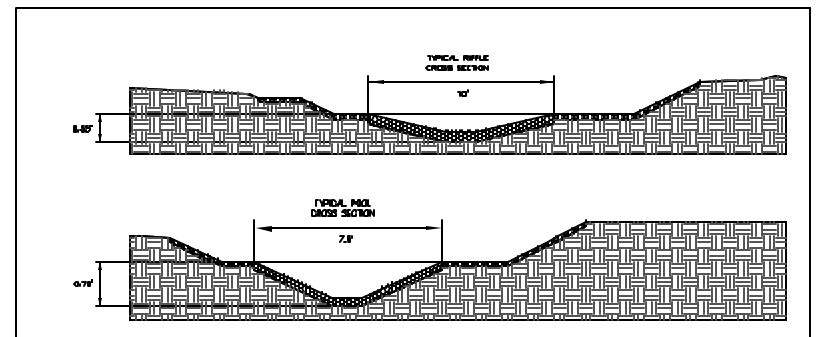

TYPICAL RIFFLE AND POOL SECTIONS
(Not to scale)

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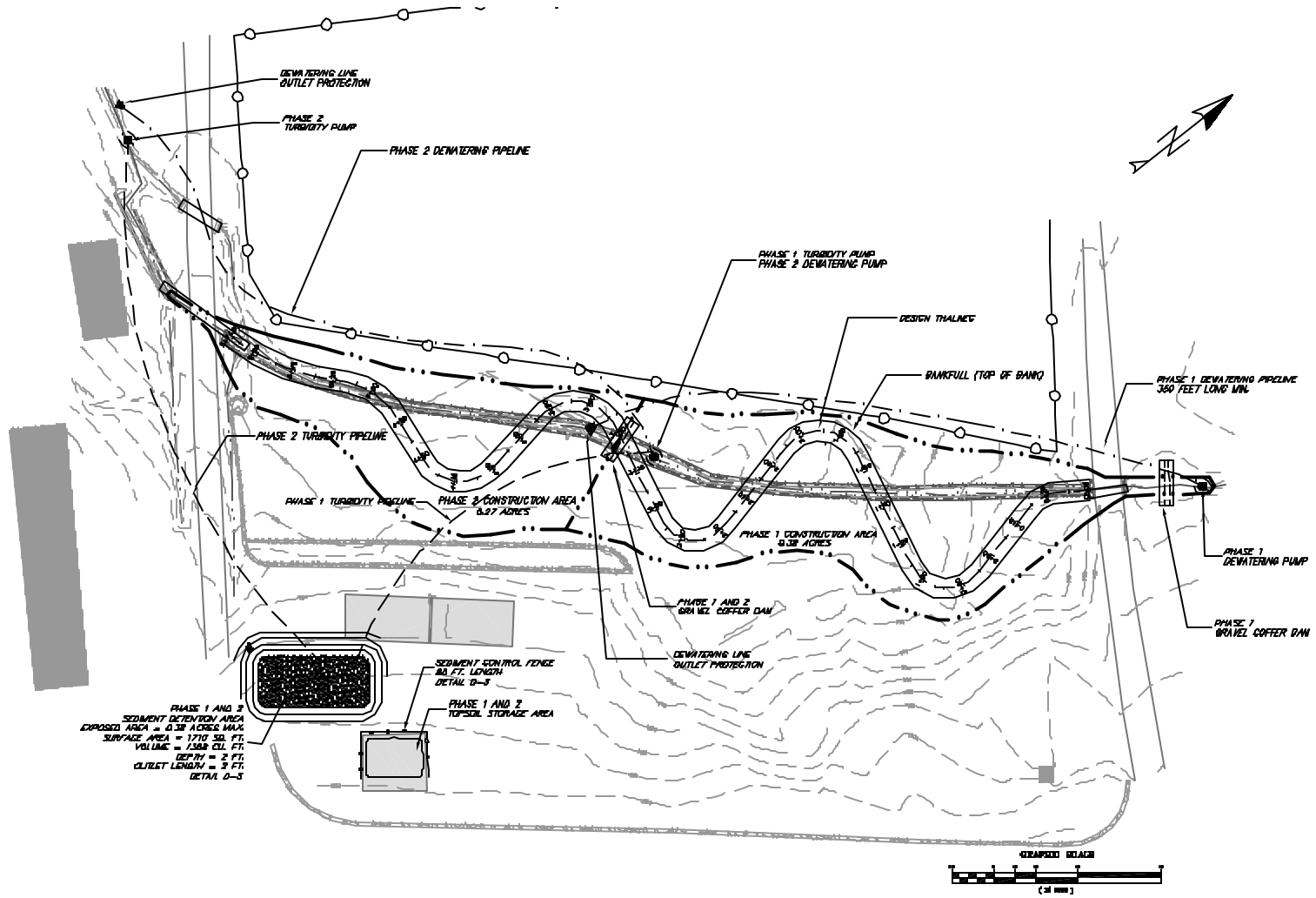
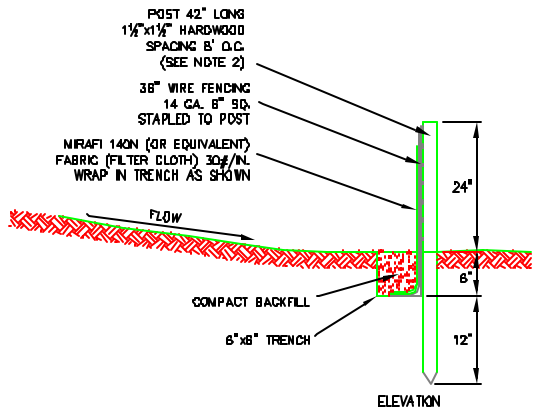
SUGAR MAPLES STREAM RESTORATION PROJECT
FOR
CATSKILL MOUNTAIN FOUNDATION
COUNTY ROUTE 56
TOWN OF WINDHAM GREENE COUNTY, NY
DETAILS

PROJECT: BK2007
DATE: 03/03/08
SCALE: AS SHOWN
DRAWN BY: JRB/NSH
DESIGN BY: JRB/NSH

DRAWING:
SM-05

SHEET 5 OF 8



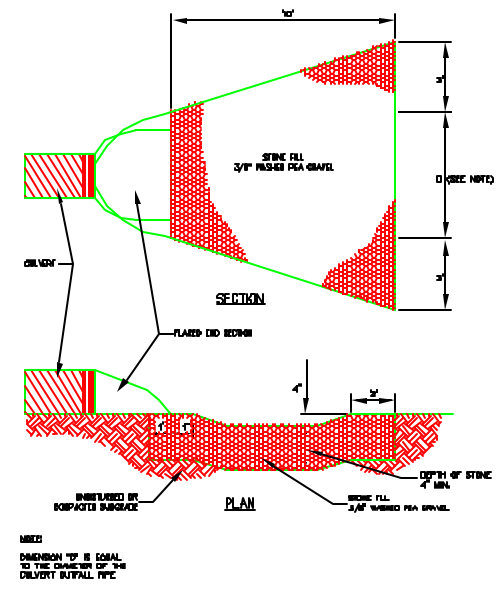


NOTES:

1. TIE FABRIC TO WIRE FENCE IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
2. IF EXTRA STRENGTH FABRIC (GREATER THAN 50#/INCH) IS USED, WIRE CAN BE DELETED IF POST SPACING IS REDUCED TO 6' O.C.
3. AT THE ENDS OF THE FENCING THE FIRST 2.0' SHALL BE TURNED UP THE SLOPE 2'.
4. POSTS SHOULD BE INCLINED TOWARD THE DIRECTION FLOW CAME FROM.
5. OVERLAP FABRIC A MINIMUM OF 6" AND FOLDED AT JOINTS.
6. THE MAXIMUM AREA OF RUNOFF PER 100LF. OF FENCE SHALL NOT EXCEED 0.25 ACRES.
7. MAINTENANCE SHALL BE PERFORMED AS NECESSARY.
8. WHEN FENCE IS NO LONGER NEEDED, THE ACCUMULATED SILT, THE POSTS AND FABRIC SHALL BE REMOVED AND TRENCH BACK FILLED WITH TOPSOIL AND SEEDED.
9. FENCING SHOULD BE PLACED AS SHOWN ON THE DRAWING OR IF NOT SHOWN, 10' BEYOND THE TOE OF THE OF THE SLOPE AND AT A SPACING IN ACCORDANCE WITH THE TABLE.

SEDIMENT CONTROL FENCING (D-3)

(Not to scale)



STORMWATER OUTFALL STONE APRON (D-4)

(Not to scale)

Erosion and Sediment Control Notes

The contractor shall provide all labor, materials, equipment, tools, and incidentals required to ensure adequate environmental protection including implementation and maintenance of all erosion and sediment control measures and site restoration measures as shown, specified, and required to complete the work.

Management Strategies

1. The recommended construction sequence included as part of this design shall be followed as closely as possible in order to minimize sediment and erosion loss.
2. All sediment and erosion control measures must be in place before the start of construction and must be maintained throughout the entire job. Recommended practices are specified on the drawings.
3. Construction traffic shall be limited to the construction entrance.
4. Construction sequence shall be phased to avoid leaving large area exposed for unnecessarily long periods of time.
5. Practices should be done in stages so that the disturbed areas can be seeded and mulched within 48 hours.
6. All construction activities should take place during dry conditions. If possible, schedule construction of BMP(s) sensitive to erosion and storm events. In the event that this can not be worked, the use of mulch over the area will be required (see seeding specification for quantity of mulch to be applied.)
7. The changes in construction design, construction operation or maintenance and construction sequencing, will require an amendment of the stormwater pollution prevention plan and approval of the Engineer.
8. Temporary seed and mulch shall be applied immediately following rough grading.
9. Sedimentation control measures shall be inspected continuously, especially following significant storm events to locate failing control measures and conduct routine maintenance operation.
10. The construction superintendent shall inform all on-site workers of the sedimentation control program.
11. If specified, the detention basins (stormwater management areas) shall be constructed and stabilized prior to any rough grading or clearing on any portion of the site, except as necessary to reach this area. Basins shall have all sediment removed on a routine basis.
12. Alternatives to the suggested practices are possible and shall be discussed with the Engineer prior to the start of construction.

Vegetative Control Practices

1. Topsoil Stockpiling: Topsoil shall be stripped from areas to be disturbed and stockpiled for later use. Stockpile location shall be approved by the owner and engineer.
2. Temporary Seeding: The temporary sediment basins, topsoil stockpile, and rough graded areas shall be seeded with winter rye at a rate of 30 lbs. per acre.
3. Stockpiles of fill and /or topsoil that are to be stored in excess of 14 days shall be protected from wind and water erosion. Methods should include mulching, sprinkling, silt fence, and stacked bales.
4. Permanent seeding of all disturbed areas shall be within 48 hours of finished grading.

A. Site Preparation
   a. Complete all rough grading activities
   b. Remove all rocks and debris larger than 3" in diameter from areas to be temporarily seeded.
   c. Evenly apply lime to achieve a ph value of 6.
   d. Evenly apply 14 lbs per acre of 5-10-10 fertilizer to a depth of 4" using suitable equipment.
   e. Seedbed is to be left in firm and smooth condition.
   f. The last tillage operation shall be performed across the slope.

B. Establishment
   a. Evenly apply seed in accordance with the species and rate indicated above by means of broadcasting or hydro seeding.
   b. Unless hydro seeded, cover seed with ¼" to ½" of topsoil.
   c. Apply mulch immediately following seeding.
   d. Verify seeding dates with engineer. If Engineer determines that seed cannot be applied due to climate, topsoil shall not be spread and mulching shall be applied to the exposed surface to stabilize the soils to the next recommended seeding period.
   e. Permanent seeding shall be applied between April 15 and September 30. Temporary seeding shall be to all disturbed areas outside this timeframe, upon approval of the Engineer.

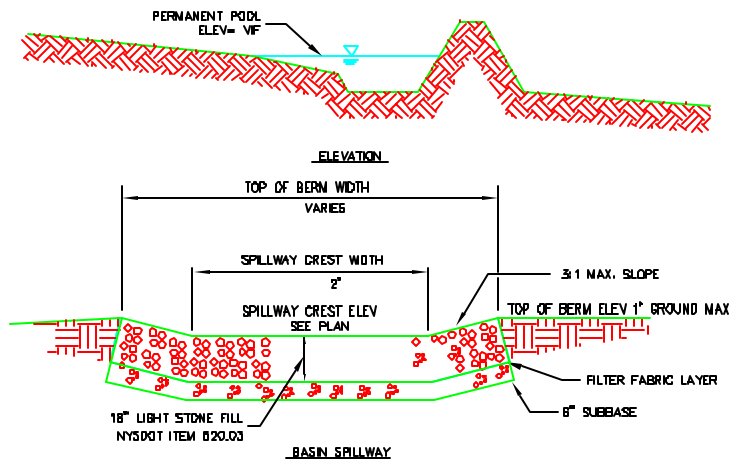
C. Maintenance
   a. All seeded/mulched areas shall be inspected regularly to see that a good stand is maintained. Areas shall be repaired as necessary.

Nonstructural Control Practices

1. Scarification: Exposed slopes exceeding 4:1 shall be scarified at right angles to the slope. Provide periodic spreading or serrations during exposed period until vegetation is established. Provide vegetative cover as soon as possible. Topsoil Stockpiling: Topsoil shall be stripped from areas to be disturbed and stockpiled for later use. Stockpile location shall be approved by the owner and engineer.
2. Mulch: Mulch shall be applied in conjunction with temporary/permanent seeding and to graded areas which remain exposed outside of the recommended seeding dates. Mulch shall be applied at 90lbs. per 1000 square feet. Contractor shall periodically inspect and reapply as necessary, particularly following significant storm events.
3. Topsoil: Disturbed areas shall be top soiled prior to seed application.
   a. Remove all rocks and debris over 1-1/2" in diameter.
   b. Scarify surface prior to seed application.
   c. Apply 8" depth of topsoil.
4. Silt Fence: Silt fence shall be installed around the perimeter of the site, at culvert outlet locations, and as indicated on the drawings. Silt fence shall be inspected and repaired routinely, especially following significant storm events until the site has been stabilized by vegetation.

Structural Control Practices

1. Rip Rap Outlet Protection: Riprap shall be provided at all pipe outlets of detention basins. Material shall be hard, durable field or quarry stone which is angular and resists breaking down when exposed to water and weathering. Rock protection for waterways and culvert outlets should be installed within 24 hours after construction of the waterway and/or culvert.
2. Temporary Diversions: Diversions should outlet to grassed areas or to temporary settling ponds. Sediment laden water can also be pumped to a grass area away from any waterway (> 200ft) to allow filtering of the water.
3. Temporary Sediment Basin: Basin shall be constructed as indicated on drawings. Sediment which accumulates during the construction process shall be removed when accumulations reach elevations shown on drawings.
4. Dust Control: A water truck should be located on site for dust control while work is proceeding.
5. Maintenance: sedimentation control measures shall be checked weekly and after each significant rainfall event. The following items shall be checked in particular:
   a. The basins shall be inspected for silt accumulation. Sediment will be removed when it reaches elevation shown in details.
   b. Rip-rap outlet protection shall be checked regularly for sediment accumulation. If significant sediment accumulation occurs shall be removed and replaced.
   c. Silt fencing shall be inspected regularly for undermining and deterioration. Remove sediment from behind fence when it becomes 1/2" deep.
   d. Seeded/mulched areas shall be inspected regularly to see a good stand is maintained. Areas shall be repaired as necessary.



STONE OUTLET TEMPORARY SEDIMENT BASIN (D-5)

(Not to scale)

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GREENE COUNTY SOIL & WATER CONSERVATION DISTRICT
BOX 907 GREENE COUNTY OFFICE BUILDING, CAIRO, NY 12413
PHONE (518) 622-3620
FAX (518) 622-0344

SUGAR MAPLES STREAM RESTORATION PROJECT
FOR
CATSKILL MOUNTAIN FOUNDATION
COUNTY ROUTE 56
TOWN OF WINDHAM — GREENE COUNTY, NY

EROSION AND SEDIMENT CONTROL PLAN

PROJECT:	EK2008
DATE:	03/03/08
SCALE:	1"=60'
DRAWN BY:	JRB/NSH
DESIGN BY:	JRB/NSH

DRAWING: **SM-06**

SHEET 6 OF 6

Appendix F –Permits and Landowner Agreement

95-19-3 (8/00) pfp

JOINT APPLICATION FOR PERMIT

New York State
United States Army Corps of Engineers

Applicable to agencies and permit categories listed in Item 1. **Please** read all instructions on back. Attach additional information as needed. Please print legibly or type.

1. Check permits applied for:

NYS Dept. of Environmental Conservation

- [x] Stream Disturbance (Bed and Banks)
- [ ] Navigable Waters (Excavation and Fill)
- [ ] Docks, Moorings or Platforms (Construct or Place)
- [ ] Dams and Impoundment Structures (Construct, Reconstruct or Repair)
- [ ] Freshwater Wetlands
- [ ] Tidal Wetlands
- [ ] Coastal Erosion Control
- [ ] Wild, Scenic and Recreational Rivers
- [x] 401 Water Quality Certification
- [ ] Potable Water Supply
- [ ] Long Island Wells
- [ ] Aquatic Vegetation Control
- [ ] Aquatic Insect Control
- [ ] Fish Control

NYS Office of General Services
(State Owned Lands Under Water)

- [ ] Lease, License, Easement or other Real Property Interest Utility Easement (pipelines, conduits, cables, etc.)
- [ ] Docks, Moorings or Platforms (Construct or Place)

Adirondack Park Agency

- [ ] Freshwater Wetlands Permit
- [ ] Wild, Scenic and Recreational Rivers

Lake George Park Commission

- [ ] Docks (Construct or Place)
- [ ] Moorings (Establish)

US Army Corps of Engineers

- [x] Section 404 (Waters of the United States)
- [ ] Section 10 (Rivers and Harbors Act)
- [x] Nationwide Permit (s) Identify Number(s)

For Agency Use Only:
DEC APPLICATION NUMBER

US ARMY CORPS OF ENGINEERS

2. Name of Applicant (Use full name)
Greene County Soil and Water Conservation District

Telephone Number (daytime)
518-622-3620

Mailing Address
907 County Office Building

Post Office
Cairo

State
NY

Zip Code
12413

3. Taxpayer ID (If applicant is not an individual)
14-1549477

4. Applicant is a/an: (check as many as apply)
[ ] Owner [ ] Operator [ ] Lessee [x] Municipality / Governmental Agency

5. If applicant is not the owner, identify owner here - otherwise, you may provide Agent/Contact Person information.

Owner or Agent/Contact Person [ ] Owner [x] Agent /Contact Person
Jeff Flack, Acting Director

Telephone Number (daytime)
518-622-3620

Mailing Address
907 County Office Building

Post Office
Cairo

State
NY

Zip Code
12413

6. Project / Facility Location (mark location on map, see instruction 1a.)

County: Greene

Town/City/Village: Town of Windham

Tax Map Section/ Block /Lot Number: 114.00-1-46

Location (including Street or Road)
Greene County Route 56

Telephone Number (daytime)

Post Office
Maplecrest

State
NY

Zip Code
12468

7. Name of Stream or Waterbody (on or near project site)
Tributary of the Batavia Kill

8. Name of USGS Quad Map:
Hensonville

Location Coordinates:
NYTM-E 567265 NYTM-N 4 680639

9. Project Description and Purpose: (Category of Activity e.g. new construction/installation, maintenance or replacement; Type of Structure or Activity e.g. bulkhead, dredging, filling, dam, dock, taking of water; Type of Materials and Quantities; Structure and Work Area Dimensions; Need or Purpose Served)

The project involves the realignment and natural channel restoration of approximately 550 ft. of an unnamed tributary of the Batavia Kill. Components of the project include the removal of existing stone and mortar walls lining the channel and removal and replacement of two inadequate round culverts with larger buried arch style culverts. Complete revegetation of the riparian buffer with appropriate native vegetation is also planned as a component of the restoration.

See attached documentation for further description of the project.

10. Proposed Use: [ ] Private [x] Public [ ] Commercial

11. Will Project Occupy State Land? [ ] Yes [x] No

12. Proposed Start Date: 8/1/2008

13. Estimated Completion Date: 10/31/08

14. Has Work Begun on Project? (If yes, attach explanation of why work was started without permit.) [ ] Yes [x] No

15. List Previous Permit / Application Numbers and Dates: (If Any)
None

16. Will this Project Require Additional Federal, State, or Local Permits? [x] Yes [ ] No If Yes, Please List: ACOE Nationwide 27

17. If applicant is not the owner, both must sign the application

I hereby affirm that information provided on this form and all attachments submitted herewith is true to the best of my knowledge and belief. False statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law. Further, the applicant accepts full responsibility for all damage, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and agrees to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from said project. In addition, Federal Law, 18 U.S.C., Section 1001 provides for a fine of not more than $10,000 or imprisonment for not more than 5 years, or both where an applicant knowingly and willingly falsifies, conceals, or covers up a material fact; or knowingly makes or uses a false, fictitious or fraudulent statement.

Date 4/21/08 Signature of Applicant Jeff Flack Title Acting Director

Date _____ Signature of Owner Peter Baynes Title Executive Director

617.20

Appendix C
State Environmental Quality Review
SHORT ENVIRONMENTAL ASSESSMENT FORM
For UNLISTED ACTIONS Only

PART I - PROJECT INFORMATION (To be completed by Applicant or Project Sponsor)

1. APPLICANT/SPONSOR	2. PROJECT NAME
Greene County Soil and Water Conservation District	Sugar Maples Stream Restoration Project

3. PROJECT LOCATION:

Municipality Town of Windham Hamlet of Maplecrest County Greene

4. PRECISE LOCATION (Street address and road intersections, prominent landmarks, etc., or provide map)

The intersection of Greene County Route 42 and 56. See report for map.

5. PROPOSED ACTION IS:

☑ New ☐ Expansion ☐ Modification/alteration

6. DESCRIBE PROJECT BRIEFLY:

The project involves the realignment and natural channel restoration of approximately 550 ft. of an unnamed tributary of the Batavia Kill. Components of the project include the removal of existing stone and mortar walls lining the channel and removal and replacement of two inadequate round culverts with larger buried arch style culverts. Complete revegetation of the riparian buffer with appropriate native vegetation is also planned as a component of the restoration. Please see attached documentation for further

7. AMOUNT OF LAND AFFECTED:

Initially .61 acres Ultimately .61 acres

8. WILL PROPOSED ACTION COMPLY WITH EXISTING ZONING OR OTHER EXISTING LAND USE RESTRICTIONS?

☑ Yes ☐ No If No, describe briefly

9. WHAT IS PRESENT LAND USE IN VICINITY OF PROJECT?

☐ Residential ☐ Industrial ☐ Commercial ☑ Agriculture ☑ Park/Forest/Open Space ☐ Other

Describe:

The project bounded by agricultural lands, and open space meadow.

10. DOES ACTION INVOLVE A PERMIT APPROVAL, OR FUNDING, NOW OR ULTIMATELY FROM ANY OTHER GOVERNMENTAL AGENCY (FEDERAL, STATE OR LOCAL)?

☑ Yes ☐ No If Yes, list agency(s) name and permit/approvals:

USACE- Nationwide 27-Restoration
New York City Department of Environmental Protection-funding

11. DOES ANY ASPECT OF THE ACTION HAVE A CURRENTLY VALID PERMIT OR APPROVAL?

☐ Yes ☑ No If Yes, list agency(s) name and permit/approvals:

12. AS A RESULT OF PROPOSED ACTION WILL EXISTING PERMIT/APPROVAL REQUIRE MODIFICATION?

☐ Yes ☑ No

I CERTIFY THAT THE INFORMATION PROVIDED ABOVE IS TRUE TO THE BEST OF MY KNOWLEDGE

Applicant/sponsor name: Greene Cty SWCD Date: 4/21/08

Signature: Black

If the action is in the Coastal Area, and you are a state agency, complete the Coastal Assessment Form before proceeding with this assessment

Reset

PART II - IMPACT ASSESSMENT (To be completed by Lead Agency)

A. DOES ACTION EXCEED ANY TYPE I THRESHOLD IN 6 NYCRR, PART 617.4? If yes, coordinate the review process and use the FULL EAF.
☐ Yes ☐ No

B. WILL ACTION RECEIVE COORDINATED REVIEW AS PROVIDED FOR UNLISTED ACTIONS IN 6 NYCRR, PART 617.6? If No, a negative declaration may be superseded by another involved agency.
☐ Yes ☐ No

C. COULD ACTION RESULT IN **ANY** ADVERSE EFFECTS ASSOCIATED WITH THE FOLLOWING: (Answers may be handwritten, if legible)

C1. Existing air quality, surface or groundwater quality or quantity, noise levels, existing traffic pattern, solid waste production or disposal, potential for erosion, drainage or flooding problems? Explain briefly:

C2. Aesthetic, agricultural, archaeological, historic, or other natural or cultural resources; or community or neighborhood character? Explain briefly:

C3. Vegetation or fauna, fish, shellfish or wildlife species, significant habitats, or threatened or endangered species? Explain briefly:

C4. A community's existing plans or goals as officially adopted, or a change in use or intensity of use of land or other natural resources? Explain briefly:

C5. Growth, subsequent development, or related activities likely to be induced by the proposed action? Explain briefly:

C6. Long term, short term, cumulative, or other effects not identified in C1-C5? Explain briefly:

C7. Other impacts (including changes in use of either quantity or type of energy)? Explain briefly:

D. WILL THE PROJECT HAVE AN IMPACT ON THE ENVIRONMENTAL CHARACTERISTICS THAT CAUSED THE ESTABLISHMENT OF A CRITICAL ENVIRONMENTAL AREA (CEA)?
☐ Yes ☐ No If Yes, explain briefly:

E. IS THERE, OR IS THERE LIKELY TO BE, CONTROVERSY RELATED TO POTENTIAL ADVERSE ENVIRONMENTAL IMPACTS?
☐ Yes ☐ No If Yes, explain briefly:

PART III - DETERMINATION OF SIGNIFICANCE (To be completed by Agency)

INSTRUCTIONS: For each adverse effect identified above, determine whether it is substantial, large, important or otherwise significant. Each effect should be assessed in connection with its (a) setting (i.e. urban or rural); (b) probability of occurring; (c) duration; (d) irreversibility; (e) geographic scope; and (f) magnitude. If necessary, add attachments or reference supporting materials. Ensure that explanations contain sufficient detail to show that all relevant adverse impacts have been identified and adequately addressed. If question D of Part II was checked yes, the determination of significance must evaluate the potential impact of the proposed action on the environmental characteristics of the CEA.

☐ Check this box if you have identified one or more potentially large or significant adverse impacts which **MAY** occur. Then proceed directly to the FULL EAF and/or prepare a positive declaration.

☐ Check this box if you have determined, based on the information and analysis above and any supporting documentation, that the proposed action **WILL NOT** result in any significant adverse environmental impacts **AND** provide, on attachments as necessary, the reasons supporting this determination.

Name of Lead Agency	Date
Print or Type Name of Responsible Officer in Lead Agency	Title of Responsible Officer
Signature of Responsible Officer in Lead Agency	Signature of Preparer (If different from responsible officer)

Reset

Schoharie Basin Stream Management Project
Declaration of Temporary Easement, Covenants and Restrictions

This Agreement, made this 24th day of April, 2008 by and between Catskill Mountain Foundation Inc.[Landowner], 7970 Main St. P.O. Box 924, Hunter, NY 12442, and the Greene County Soil and Water Conservation District [GCSWCD], with its principal office at 907 County Office Building, Cairo, NY 12413.

WHEREAS, GCSWCD, in conjunction with the New York City Department of Environmental Protection (NYCDEP), has prepared Stream Management Plans for the Schoharie Creek, East Kill, West Kill and Batavia Kill (the "Stream Management Plan") that identify certain locations within the stream corridor in need of restoration work to address stream instability; and

WHEREAS, Landowner owns a certain parcel of property known as Tax Parcel 114.00-1-46 in the Town of Windham, Hamlet of Maplecrest, County of Greene (the "Property"), that has been identified in the Batavia Kill Stream Management Plan as a location where such restoration work is needed; and

WHEREAS, GCSWCD has designed a stream restoration project (the "Project"), affecting certain locations within the Property and adjacent to the Property (the "Project Area"), that is intended to reduce rates of stream bank erosion and enhance the overall ecological integrity of the stream reach; and

WHEREAS, the Project has been reviewed and approved by Landowner and Landowner understands that the Project is not intended to control, eliminate or reduce flooding from the stream; and

WHEREAS, Landowner seeks to allow certain parties access over and across the certain portions of the Property for the purpose of constructing the Project, observing and subsequently monitoring, maintaining and/or repairing the Project;

NOW THEREFORE, in consideration of the premises and the respective representations and agreements hereinafter contained, the parties hereto agree as follows:

1. Landowner hereby grants a temporary easement for a period of ten years from the date of this Agreement, to GCSWCD, its heirs and assigns, to provide access to the Project Area (described in greater detail in the drawing annexed hereto as Attachment A and by this reference made a part hereof), which area includes certain portions of the Property, by its employees, agents, subcontractors and contractors, certain employees of the New York City Department of Environmental Protection and other government entities that have an interest in the Project, for the purpose of constructing, observing, maintaining, repairing and monitoring the Project.

2. The area of the Property subject to the easement (Easement Area) is more specifically described in Attachment A.

3. GCSWCD shall meet with the Landowner and review the Project design (Attachment B) and proposed construction activities prior to the commencement of any Project-related work ("Project work") on the Property. No Project work shall be commenced without the prior review of Landowner.

4. GCSWCD shall administer and coordinate all phases of the Project including, among other things: selecting a contractor; obtaining all required regulatory permits, preparing project updates for Landowner, requiring subcontractors to have adequate insurance coverage, overseeing construction activities, monitoring the progress and quality of the work and certifying completion.

5. GCSWCD shall be responsible for maintaining and/or repairing the Project for a minimum of one year from the date of completion and shall monitor the Project for a minimum of five years provided funding continues to be available.

6. The Landowner shall identify the location of any subsurface treatment systems, utilities and/or such other subsurface facilities or conditions located on the Property which should be taken into consideration in the final design.

7. GCSWCD shall consult with the Landowner to determine access points, staging areas and other items required to perform Project work.

8. The Landowner shall maintain the Project in accordance with the Operation and Maintenance Plan (Sugar Maples Stream Restoration Project Landowner Guide to Vegetation Management) annexed hereto as Attachment C and by this reference made a part hereof. In connection with this maintenance obligation, Landowner shall not:

(a) cut, remove, mow or otherwise disturb the vegetation, including but not limited to trees and shrubs, planted or naturally growing in the Project Area;
(b) alter, undermine or remove rock structures constructed within the Project Area;
(c) otherwise excavate, grade or remove soil from the Project area;
(d) construct roads, bridges or permanent structures of any nature within the Project Area;
(e) commence any work within the Project Area without providing notice to GCSWCD

9. GCSWCD shall use best efforts to restore all disturbed areas of the Property to pre-project conditions.

10. GCSWCD shall not be liable to the Landowner for any personal injury or property damage that results from flooding on the Property or from the work performed in connection with the Project unless such injury or damage was caused by negligence or willful misconduct directly attributable to the GCSWCD, its employees or agents.

11. GCSWCD shall indemnify and hold the Landowner harmless from any claims, judgments, causes of action resulting from damage, including sickness or death, to third parties or damage to property resulting from the negligence or willful misconduct of its employees, agents, contractors and/or subcontractors in connection with the Project.

12. Neither the City of New York nor the NYCDEP shall be liable to the Landowner for any personal injury or property damage that results from flooding on the Property or from work performed in connection with this project unless such injury or damage was caused by negligence or willful misconduct directly attributable to the acts of the City, NYCDEP, their employees or agents. Both the City and NYCDEP shall be entitled to rely upon the foregoing language and enforce this provision as if either were a signatory hereto.

13. This Agreement may be recorded in the office of the Greene County Clerk.

14. This Agreement may only be amended in writing and by mutual consent of the parties hereto.

15. Landowner shall, upon receipt of written notice from GCSWCD, immediately undertake to cure any breach of its obligations under this Declaration of Temporary Easement, Covenants and Restrictions, including any obligations set forth in the Operations and Maintenance Agreement.

16. If Landowner fails, within 90 days of receiving such notice of breach from GCSWCD, to cure such breach, GCSWCD may undertake and complete those activities that are reasonably calculated to cure the conditions constituting the breach and, upon receipt of written from GCSWCD that such activities were undertaken and completed, Landowner shall be liable to GCSWCD for the full cost to cure such condition, including reasonable court costs and legal fees, if any.

Peter R. Barker

Peter Barker: Director
Catskill Mountain Foundation Inc.

Jeff Flack, Acting Director GCSWCD

Catskill Mountain Foundation

: Landowner

4/21/08

Date

4/24/08

Date

GREENE COUNTY SOIL & WATER CONSERVATION DISTRICT

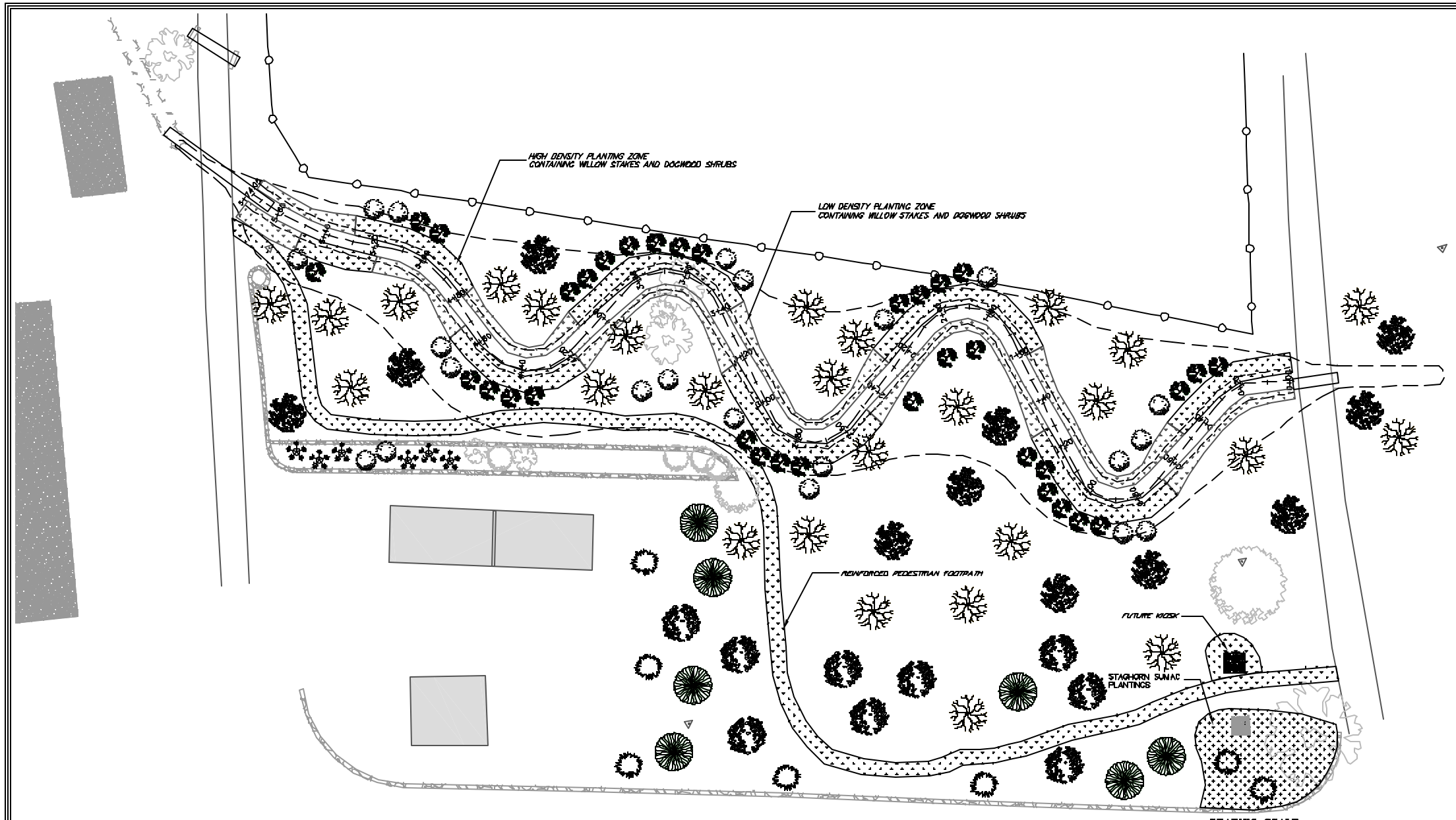
BOX 907 GREENE COUNTY OFFICE BUILDING, CAIRO, NY 12413
PHONE (518) 622-3620
FAX (518) 622-0344

SUGAR MAPLES STREAM RESTORATION PROJECT
FOR
CATSKILL MOUNTAIN FOUNDATION
COUNTY ROUTE 56
TOWN OF WINDHAM — GREENE COUNTY, NY

ATTACHMENT A - EASEMENT AREA

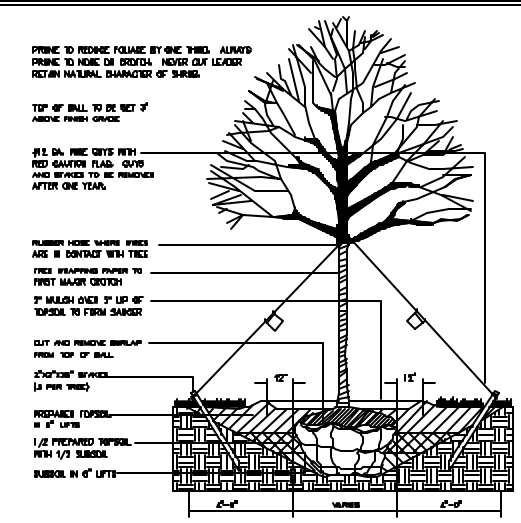
PROJECT:	BK2008
DATE:	04/21/08
SCALE:	1"=150'
DRAWN BY:	NSH/JRB
DESIGN BY:	

DRAWING:
LOA-01

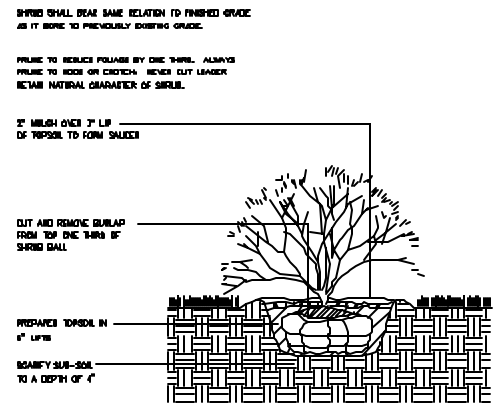


GRAPHIC SCALE

(IN FEET)
1 inch = 50 ft.



TREE PLANTING DETAIL
(NOT TO SCALE)



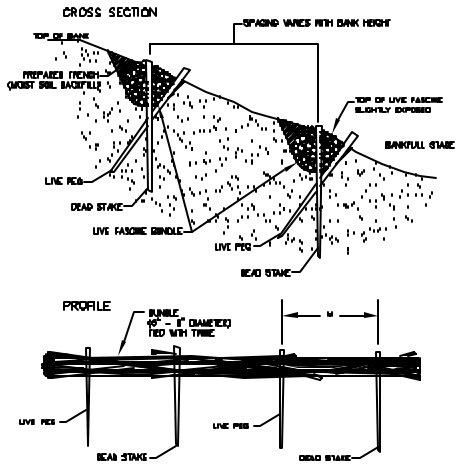
SHRUB PLANTING DETAIL
(NOT TO SCALE)

Symbol	Common Name	Scientific Name	Quantity	Size	Material Type	Planting Density
	Paper Birch	Betula papyrifera	27	2"	Ball & burlap	as shown
	Speckled Alder	Alnus rugosa	34	1.5"	Ball & burlap	10' o.c. along bends
	Shadblow Serviceberry	Amelanchier canadensis	21	seedling	3 gal. container	10' o.c. along bends
	Red Maple	Acer rubrum	11	sapling	3 gal. container	as shown
	Sugar Maple	Acer saccharum	9	sapling	3 gal. container	as shown
	White Pine	Pinus strobus	7	sapling	3 gal. container	as shown
	Canadian Hemlock	Tsuga canadensis	7	sapling	3 gal. container	as shown
	Pin Cherry	Prunus pensylvanica	6	sapling	3 gal. container	10' o.c. in clumps
	Red Osier Dogwood	Cornus sericea	80	seedling	Bareroot	12' o.c.
	Silky Dogwood	Cornus amomum	80	seedling	Bareroot	12' o.c.
	Willow Stakes	Salix spp.*	600	> 0.5"	Live stake	3' o.c.
	Red Osier Dogwood	Cornus sericea	30	seedling	Bareroot	20' o.c.
	Silky Dogwood	Cornus amomum	30	seedling	Bareroot	20' o.c.
	Willow Stakes	Salix spp.*	300	> 0.5"	Live stake	4' o.c.
	Staghorn Sumac	Rhus typhina	75	1"	3 gal. container	5' o.c.
	Existing Coniferous Tree					
	Existing Deciduous Tree					

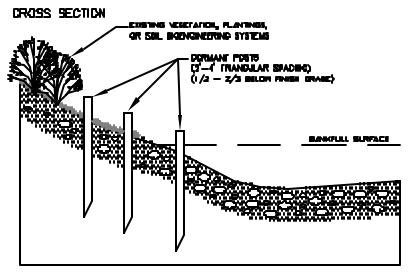
*salix species must conform to the provided list of native plants

Note: o.c. abbriviates "on-center"

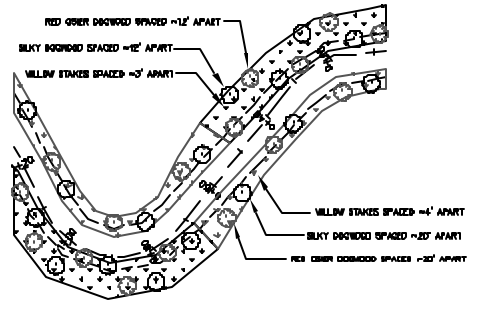
PLANTING SCHEDULE



LIVE FASCINE DETAIL
(Not to scale)



DORMANT POST DETAIL
(Not to scale)



TYPICAL PLANTING DETAIL - PLAN VIEW
(Scale 1"=20')

Common Name	Scientific Name
Virginia Wild Rye	Elymus virginicus
Fox Sedge	Carex vulpinoidea
Lurid (Shallow) Sedge	Carex lurida
Fowl Mannagrass	Glyceria striata
Green Bulrush	Scirpus atrovirens
Blue Vervain	Verbena hastata
Blunt Broom Sedge	Carex scoparia
Ox-Eye Sunflower	Heliopsis helianthoides
Lurid/Shallow Sedge	Carex lurida
Boneset	Eupatorium perfoliatum
American Mannagrass	Glyceria grandis
Soft Rush	Juncus effusus
Sensitive Fern	Onoclea sensibilis
Nodding Bur Marigold	Bidens Cernua
Cosmos (Bristly) Sedge	Carex comosa
Hop Sedge	Carex Lupulina
Joe Pye Weed	Eupatorium fistulosum
Spotted Joe Pye Weed	Eupatorium maculatum
Eastern Lesser Bur Reed	Sparganium americanum
Giant Bur Reed	Sparganium eurycarpum
Path Rush, PA Ecotype	Juncus tenuis, PA Ecotype
Square Stemmed Monkey Flower	Mimulus ringens
Many Leaved Bulrush	Scirpus polyphyllus
Giant Ironweed	Vernonia gigantia
Wool Grass	Scirpus cyperinus
Bailey's Sedge	Carex baileyi
Fringed (Nodding) sedge	Carex crinita
Awl Sedge	Carex stipata
Bristlebract Sedge	Carex tribuloides
Rough Avens	Geum laciniatum
Rattlesnake Grass	Glyceria canadensis
Turk's Cap Lily	Lilium superbum
Ditch Stonecrop	Penthorum sedoides
Hard Stemmed Bulrush	Scirpus acutus
Soft Stem Bulrush	Scirpus validus
Seedbox	Ludwigia alternifolia

WETLAND SEED MIX

KAATERSKILL ASSOCIATES
SURVEYORS, ARCHITECTS AND ENGINEERS
CAIRO, NY (518)622-9667 CATSKILL, NY (518)943-1145 TANNERSVILLE, NY (518)589-3934

GREENE COUNTY SOIL & WATER CONSERVATION DISTRICT
BOX 907 GREENE COUNTY OFFICE BUILDING, CAIRO, NY 12413
PHONE (518) 622-3620
FAX (518) 622-0344

SUGAR MAPLES STREAM RESTORATION PROJECT
FOR
CATSKILL MOUNTAIN FOUNDATION
COUNTY ROUTE 56
TOWN OF WINDHAM GREENE COUNTY, NY

ATTACHMENT B - PROJECT DESIGN

PROJECT: BK2008
DATE: 04/21/08
SCALE: 1"=50'
DRAWN BY: JRB/NSH
DESIGN BY: JRB/NSH

DRAWING:
LOA-02

SHEET 2 OF 2

Batavia Kill Stream Management Project

Sugar Maples Stream Restoration Project

Landowner Guide to Vegetation Management

Project Goals and Objectives

The NYC Department of Environmental Protection (DEP) is working in conjunction with Greene County Soil and Water Conservation District (GCSWCD) to improve water quality throughout NYC's watershed. Through the protection and enhancement of the riparian corridor we are protecting water quality through natural biological means, protecting and increasing habitat diversity and offering some level of stabilization for streambanks. The Sugar Maples Stream Restoration Project will realign and revegetate a section of a tributary that flows to the Batavia Kill.

Sugar Maples Stream Restoration Site - Looking upstream at confined and straightened tributary, proposed site for realignment and riparian buffer plantings

In 2007 GCSWCD and the Catskill Mountain Foundation began discussions centered on better integrating the Foundation's Sugar Maples site into its surrounding environment. The Foundation's goal was to, at a minimum preserve, and preferably better the ecosystem that encompasses the site. It was determined that the ~550 ft section of stream that runs through the Sugar Maples site south east of County Route 56 offers an excellent opportunity to restore a drastically altered stream to its more natural condition (Figure 1). Keeping a buffer zone of trees and shrubs, especially in the first 50 to 100 feet, along streambanks helps prevent erosion and protects property, increases habitat value and filters pollutants. Plantings can include a great variety of flowering trees, shrubs, and sedges native to the Catskills. Native species are adapted

to our regional climate and soil conditions and typically require less maintenance than exotic species following planting and establishment.

In fall 2008, participating streamside landowners will work with GCSWCD to develop planting designs for their property. This program will pay for conservation plantings such as stabilizing sedges and shrubs along the streambanks as well as trees and shrubs in the floodplain. Planting and maintaining a healthy buffer of trees and shrubs along the streambanks and floodplains is one of the most cost effective and self-sustaining methods for landowners to protect streamside property. Following the 2008 planting, GCSWCD will work with the landowner to maintain a healthy riparian buffer.

Figure 1. Sugar Maples stream restoration project area (2008).

Bioengineering and Balled-Burlaped Trees

Vegetation plays a crucial role in stream stabilization. Roots of grass, trees, and shrubs protrude into the ground, creating the intricate framework that holds together soil and provides resistance against runoff and flowing water. A mature vegetation community lasts much longer than rock structures. In restoration projects where rock structures are needed to address erosion, rock structures have been strategically placed to guide the stream in a direction which will sustain itself and allow the vegetation to grow. Even after these structures shift and change over time, the vegetation will continue to help the stream remain stable.

Bioengineering is the use of live vegetation, either alone or in combination with harder materials such as rock or (dead) wood, to stabilize soils associated with stream banks or hillslopes. Two frequently used bioengineering techniques are stakes and fascines, which use dormant materials such as willows to quickly establish vegetation on the banks. Willow stakes are cut from living willow trees when the tree is dormant (usually during the fall). The stakes, ranging from one to several feet long, are hammered or pushed into the stream bank. Willow fascines can also be planted along the stream bank. Willow fascines are made from long branches of willows and are also cut when the tree is dormant. The branches are bundled together and laid in dug trenches adjacent to the stream, then buried leaving the top of the fascine partially exposed. In the spring they will sprout from these ends and will throw new shoots up through the ground along the mid sections. Willow fascine and willow stake locations are typically close to the stream, because they grow quickly and provide necessary bank stabilization where it is most needed.

Willows being harvested at the PMC to be used for willow fascines.

Balled-burlaped trees being dug with a tree spade at the PMC.

Balled-burlaped trees may also be planted throughout the project site. These trees are grown at GCSWCD's Plant Materials Center (PMC) in Maplecrest and dug with a tree spade shortly before transplanting. Balled-burlaped trees are an effective means to bring mature vegetation onto a site, providing shelter for wildlife as well as offering a more pleasing view of the site from homes and roadsides. The species of balled-burlaped trees that have been planted in the past include Poplar, Birch, and Green Ash.

Grass and Container Trees

Hydroseeder in action.

Establishing grass on disturbed areas is essential to a restoration project. Grass roots form quickly and provide crucial immediate erosion control. When grass establishment is necessary, hydro-seeding is typically used to spread grass seed immediately following project completion. This method uses a large tank which mixes water, seed, and mulch and sprays it through a hose. This provides for fast and even spreading, while the mulch protects and binds the grass seed to the soil until it can germinate. Native warm and cold season grasses are typically used to provide the best erosion protection for this environment.

Volunteers helping with container trees at the PMC.

Many different species of container trees and shrubs were planted throughout the project site. These saplings were grown from bare-root stock in containers and maintained at GCSWCD's plant material center where they are allowed to grow until the time of planting. Older containerized plants have a much greater chance of survival when compared to planting bare-root stock the directly in the field. The diverse selection of trees provides for vegetation that has a multitude of favorable conditions and beneficial factors, ensuring the vegetation project's overall success. Native species were selected to reduce the amount of maintenance required. See appendix 1 for a list of the container tree species, including the common name, scientific name, and growing conditions.

Specific species were selected for locations where they would most likely succeed. American Elderberry, American Sycamore, Silky Dogwood, and Speckled Alder are among those planted in wet areas and close to the stream. Once they mature they will provide shade and shelter for local wildlife. Species such as White Pine, White Spruce, and Hemlock were planted in upland areas because these species prefer the dry soil conditions which occur a bit further from the stream. Care was also taken to spread different species throughout the project. A diverse placement of species helps to further ensure the project's overall success.

In a riparian planting project one goal is to create healthy habitats for all types of wildlife. As one of the first creatures to respond to a new habitat, birds are often an important indicator of a restoration projects success. They play an important role in the natural processes which foster life. Plants like Black Cherry and Pin Cherry provide fruit which attracts birds to these areas. Species such as White Spruce grow into large, broad specimens, providing unique habitats for certain types of birds. Each tree species was selected for characteristics such as these. For more information on each individual species, see Appendix 1.

Field Crews

In coming years you may notice GCSWCD and DEP vegetation monitoring crews entering the project site. This is part of an ongoing process to study and document the progress of the project.

Vegetation monitoring crews will be collecting data in order to follow the progress of the planted vegetation. Such factors as height, plant vigor, and survival will annually be documented in order to maintain the site and improve other future plantings. If the monitoring indicates high mortality or a need for different vegetation, field crews may revisit the site to install new vegetation. Monitoring of the invasive species Japanese Knotweed will also take place. This will include observations as well as removal at various locations. Crews may also enter the project site to replant in the future if it is deemed necessary.

You may see crews with GPS (Global Positioning System) units as well. A GPS is a device which uses satellites to determine and record the user's position on the ground. They are often used to collect the location of various features along with information on the condition of the particular feature. These crews collect a wide array of information about various attributes to the stream. The location and condition of such structures as culverts, bridges and utility lines are collected as GPS points. These points can then be placed on maps using GIS (Geographic Information System) software and displayed along with features like roads, soils, and vegetation. The maps and the information collected are used to assess existing or potential problems. The

use of GPS data along with GIS software provides an intuitive, convenient way of comparing various data with respects to many different management concerns, such as minimizing threats to private and public property and protection of water quality and fish habitat.

Vegetation Maintenance

The landowner plays an extremely important role in the success of this project. It is crucial that certain measures are taken by you, the landowner, in order to assure the success of the project. Below is a list of important guidelines to follow with regards to the project area. See the attached project map to view your property in relation to the project boundaries. To ensure the project's success, it is important that you observe the following guidelines unless otherwise instructed by the GCSWCD. If you have any questions, or see any problems you wish to report, please contact GCSWCD at the number listed on the bottom of page 8.

Important Rules to Follow:

- **Do not cut, remove, mow, or otherwise disturb the vegetation. This includes all trees, shrubs and any other vegetation, whether it has been planted or occurs naturally.**
- **Never remove, excavate, or grade the soil.**
- **Never construct roads, bridges, or permanent structures of any kind without appropriate permits.**
- **Always check with GCSWCD before conducting any work within the project area.**

Want to do More?

If you would like to do more to help the success of this project, here are a few suggestions of how to help:

1. **Mulch** can be placed around the trees that have been planted to help them grow. This helps keep weeds from suffocating the tree and helps hold moisture in the soil. Mulch should be spread around the tree, making sure to leave a space of an inch or two around the base of the trunk. If the mulch is piled against the trunk it could damage the tree. If the plants seem to be in drought conditions, you may also choose to water them.

2. The addition of **supplemental native vegetation** could help to keep invasive species away from areas where they might otherwise take over. If you see an area that lacks vegetation, you may wish to plant something. In the case that you should plant anything on or near the restoration site, it is important that you do not introduce any invasive species. What you plant should be healthy for and native to the habitat and free of any unknown materials. Appendix one shows a list of the sapling tree species that have been planted on the job site and can therefore be used as a general guide of what trees are best to plant. In the case of grasses, a conservation or native reclamation mix would work well. Check with your local seed supplier and make sure what you are buying is native to and suited for local habitats.

3. GCSWCD holds an annual plant sale in the spring. Items for sale include bare-root trees and shrubs, wildflower seed mixes, ground cover seed mixes, fertilizer tablets, and bird boxes/feeders. More information as well as order forms can be found on their website, http://www.gcswcd.com/conservation/, or you can call the Cairo office at 518-622-3620 to have an order form mailed to you. Seedlings can also be purchased through the New York State Department of Environmental Conservation (DEC). DEC operates the State Tree Nursery in Saratoga Springs which produces tree and shrub seedlings for conservation on private and public lands. Orders for seedlings can be placed from January 2 through mid-May by calling 518-587-1120. For all other inquiries the nursery office can be reached Monday through Friday, 8 a.m to 4 p.m. at 518-581-1439. More information can also be obtained at the GCSWCD office in Cairo.

4. Taking **digital photos** of the project site during high waters, drought periods, or other times of year can assist GCSWCD with more fully understanding why vegetation is or is not doing well under various conditions.

Concluding Thoughts

GCSWCD will be the main caretakers of this project for the years to come. As a landowner, you may have the unique ability to observe your particular stretch of the project on a regular basis. We appreciate and welcome calls to report potential problems seen on the project site. Problems could include things like flood issues, deer browse damage or anything that seems threatening to the success of the project. If you have any questions regarding your own use of the land, what trees you should plant, to what extent you may mow lawn which borders the project, or anything else please call GCSWCD at the number listed below.

Contact

Greene County Soil & Water
Conservation District
907 County Office Building
Cairo, NY 12413
Phone (518) 622-3620
Fax (518) 622-0344
www.gcswcd.com/stream/

Project Contacts

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jeff@gcswcd.com

Jake Buchanan, Project Manager
jake@gcswcd.com

Nathan Hellinga
nathan@gcswcd.com

David Burns, NYCDEP Project Manager
dburns@dep.nyc.gov
(845)-454-1051