Carr Road Riparian Buffer Project

Implementation Report

Town of Jewett, Greene County, New York

January 20, 2010

Project Partners and Contacts

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1.0 Background

After significant flood damage to Carr and Little Timbermen Roads during the January 1996 flood event, the Town of Jewett secured FEMA funding for relocation of Little Timberman Road. Prior to the relocation, the road ran east and west immediately adjacent to the Schoharie Creek, with only a very narrow riparian buffer along the western extent. Since the road had been the subject of repetitive damage it was eligible for FEMA mitigation funding. The old road was decommissioned and relocated to a terrace past the furthest extent of the 100-year floodplain. During the project, the Town acquired two properties which were necessary to accomplish the relocation.

Figure 1. Aerial view of Carr Road project reach. Project is located to the right of the Schoharie Creek in the above photograph.

In addition, in response to damage from the January 1996 flood event, Greene County Highway Department removed significant mature vegetation and streamside willows from the left streambank upstream of the Carr Road bridge. This left very little vegetation along a 500' length of the stream. This activity was conducted prior to integration of natural channel concepts and was representative of incorrect stream management activities that were typical at the time. These activities were not conducted with intent to impact the stream, but rather were traditional flood response activities.

After the road work was completed, the Town was left with two parcels that bordered the Schoharie Creek. In 2006, the Town put these parcels up for sale and they were acquired by a private landowner that resides on Little Timberman Road. Once the sale was completed, the GCSWCD initiated discussions with the new owner concerning the implementation of buffer plantings, future use of the balance of the property and improvements to an existing NYSDEC fishing access point and parking area. The owner was highly motivated to improve the aesthetics of the property as this was his primary objective when he acquired the property.

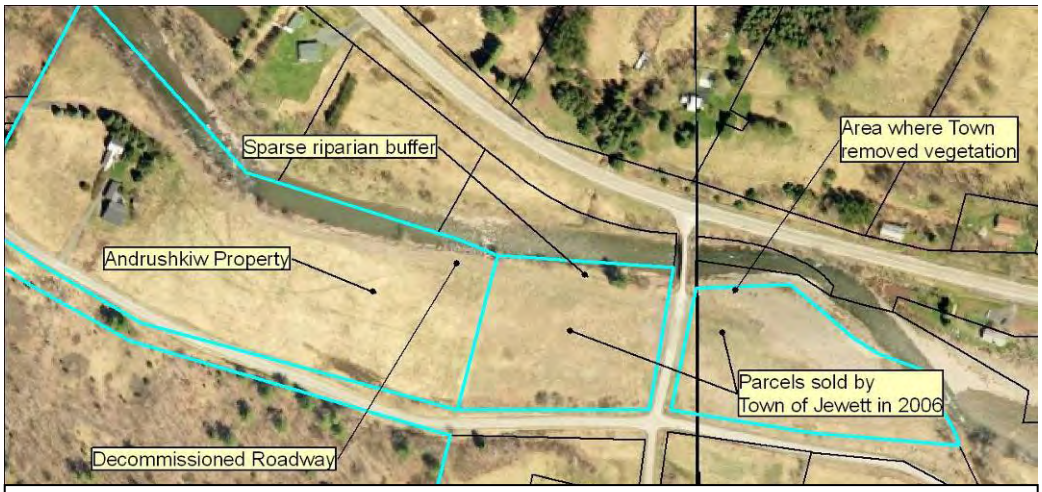


Figure 2. Aerial showing project area and decommissioned roadway.

2.0 Project Goals

In addition to the site specific goals set forth below, the Carr Road Riparian Buffer Project was also considered to be a pilot for the Catskill Streams Buffer Initiative that would provide technical assistance and riparian plantings for private landowners. The pilot would allow the GCSWCD and NYCDEP to work out various issues related to permitting, landowner participation and invasive species. While previous program efforts had focused on major restoration on a limited number of sites, future efforts under the Catskill Streams Buffer Initiative will require streamlining of various project components such as landowner sign-up and permitting. The site specific goals of this project included:

- Enhanced riparian buffer plantings to increase the long term streambank stability
- Improved public access to the existing NYSDEC fishing access area
- Herbicide injection treatment of isolated stands of Japanese knotweed

3.0 Description of Problem

The Carr Road project site shares similar characteristics with many riparian areas along Catskill Mountain streams where roads are frequently found in close proximity to streams. The project focuses on approximately 1,250 linear feet of stream in the Town of Jewett, and is located downstream of the Carr Road crossing of the Schoharie Creek. While the immediate streambank along the reach is relatively stable at this time, the riparian buffer ranges between very narrow and non-existent. Approximately 20' from the top of the bank, the former roadway had been abandoned but never restored. Most of the road was stripped of its surface in the last flood, but the road was never restored to a vegetative cover. Over the past 10 years the old roadway had naturalized with weeds, but no woody vegetation had become established.

Figure 3. Aerial photograph showing the minimal riparian buffer along the left bank of the Schoharie Creek in this reach.

Upstream (east) of the Carr Road bridge, the streambank is essentially absent of any woody vegetation. While a narrow bank of willows is present along the immediate channel, the upper banks and floodplain have no woody vegetation. This area is noted as being highly active during flood events and is the location where the Schoharie first leaves it banks and accesses the floodplain along this reach. While a detailed hydraulic analysis was not completed, it is strongly suspected that the width of the Carr Road Bridge is substantially undersized which results in a hydraulic constriction during flood flows. After the January 1996 flood event, extensive excavation of gravel was completed by the Greene County Highway Department in this area, with the small amount of woody vegetation that was present post-flood being removed during this excavation.

4.0 Project Design

The project involved a very simple design process, which focused on restoration of an effective riparian buffer area in order to increase stream bank stability and to improve riparian and in-stream habitats. The project focused on five primary components:

- Stem injection treatment of Japanese knotweed (*Fallopia japonica*) with Glyphosate (Glypro) to prepare the locations for replanting with native vegetation.
- Enhancement of the existing buffer on the immediate streambank by tapering portions of the bank to a slope that can be planted with willow tublings, dogwoods and willow stakes. The tapered portions should also be reinforced with erosion control matting and a native riparian seed mix.
- Planting of a 100' wide buffer strip from the top of the stream bank. Approximately 2.8 acres of buffer will be established by the end of the project.
- Development of materials that can be used in the future CSBI program, such as a ten-year landowner agreement and a vegetation management guidance document for the landowners.
- Improvement of public access to NYSDEC fishing access area

Stem injection treatment of Japanese knotweed is suggested as an effective method of eliminating small stands of knotweed from a project area. Stem injection is typically performed in the fall when the knotweed plants are actively transporting energy stores from their leaves to their roots. Because of this transport, herbicide injection during the fall maximizes the chances of successful eradication of the knotweed.

Plans for the riparian buffer plantings on the Accardi properties and the Andrushkiw property were created and can be found in Appendix A. The riparian buffer planting plans break the riparian buffer into three zones, the frequently inundated zone adjacent to the stream, the bankfull zone which includes the rest of the bank up to the bankfull stage, and the floodplain zone. A list of plant species was then developed for each of these zones. The list of plant species, and a visual depiction of these zones can be found on the vegetation planting plans located in Appendix A.

In order to improve the NYSDEC fishing access at the site minor grading was required. Due to time constraints this access improvement was performed after the riparian planting and required its own permit. A topographic survey was performed in summer 2008 in order to document the existing condition of the access area, and to be utilized while designing the access improvements. The access is located on the left bank of the stream immediately downstream of the Carr Road Bridge and connects to an existing NYSDEC parking area. The design for improving the access involved grading the bank to create a 3 foot wide, 145 foot long access path which would descend 8.5 feet from the top of the bank to the water surface. The existing condition map and proposed grading plan can be found in Appendix A.

5.0 Project Implementation

The implementation of the Carr Road Riparian Buffer Project has been a classic example of the difficulties the GCSWCD often faces with voluntary participation by private landowners. Initially, the GCSWCD had worked closely with the Town of Jewett prior to the sale of the property in an attempt to gain a permanent conservation easement and a requirement for participation in the buffer project. While the Town recognized the GCSWCD's concern that the property not be allowed to be developed due to its location on an active floodplain, and agreed that the location would benefit from planting a riparian buffer, the Town felt adding restrictions on the properties use would impact the potential sale. The Town advised the GCSWCD to try and work with the eventual purchaser.

Once the Town had accepted sealed bids on the property, the GCSWCD started to work with the potential new owner months before the sale was completed. The eventual new owner (Sam Accardi) owns other properties along Little Timberman Road, and bid on the property strictly due to his desire to make the site look better, and to possibly use it for grazing or forestry purposes. Discussions initially went well, the new owner had a strong interest in both participating in the riparian buffer project as well as donating a permanent conservation easement. However, discussions soon hit a snag due to concerns of another landowner across the creek from the project site.

When the owner across the stream found out about the proposed planting project, he contacted the owner of the project site, and expressed his concerns that the proposed planting project would increase the flooding of his home. The house across the creek was poorly sited in the mid 1960's. The house was constructed with an exposed, walk-out basement which was only 4-5 feet in elevation above the stream channel. This owner has experienced significant flooding on almost an annual basis, and he was concerned that the tree plantings would result in a situation where debris would become trapped in the new trees, reducing the stream's ability to access the floodplain opposite his house. This owner felt that the project would clearly contribute to an increase in the frequency as well as magnitude of his flooding problems. Based on these owner's concerns, the project site owner (Accardi) informed the GCSWCD that he was reevaluating his willingness to participate in the program and did not want to go forward with the plantings unless the concerns of the landowner across the creek could be addressed. Based on site visits and meetings with the landowner across the creek, it was clear that he would continue to oppose the project based on his feelings that the establishment of a riparian buffer would increase the flooding problems at his property. Therefore, the decision was made to focus plantings on approximately 370 feet of riparian area downstream of the Carr Road bridge.

In the Fall of 2007 and 2008, the GCSWCD contracted with a licensed herbicide applicator to inject and eliminate the knotweed in the project area. The treatments were successful at eliminating the isolated stands on knotweed in the project area. In early November 2007, the GCSWCD mobilized its equipment and manpower to the site and initiated planting of the riparian buffer along the section of the project downstream of the Carr Road Bridge. GCSWCD tapered portions of the bank to a slope that could be planted with willow tublings, dogwoods and willow stakes. The tapered portions were also reinforced with erosion control matting and a native riparian seed mix. An early season snow storm effectively shut down work for the season after 940 trees and shrubs had been installed. The adjoining owner (Andrushkiw) downstream of Accardi found out about the planting project, and expressed an interest in having the riparian buffer extended along their streambank (approximately 880 feet) and immediately signed a landowner agreement with the GCSWCD.

In June 2008, the GCSWCD re-mobilized its equipment and manpower and completed the remaining

plantings on the Accardi and the Andrushkiw properties. An additional 837 trees were planted on these properties which brought the total amount of riparian buffer planted to 1,250 linear feet. The fishing access improvements could not be completed at this time as an ammendment to the NYSDEC permit was required.

After acquiring the necessary permits the GCSWCD re-mobilized for the final time in August 2009 in order to complete the fishing access improvements. The bank grading and seeding of disturbed areas was completed over the course of a week. The weather remained dry throughout the week and no issues were encountered during this construction.

6.0 Vegetation

In total, the GCSWCD planted 1777 tree and shrub species native to Catskill watershed streams. The quantities and species of trees and shrubs planted can be found in Appendix B. The GCSWCD and NYCDEP also created a vegetation management document for the participating landowners which can be found in Appendix F, and worked with a licensed herbicide applicator to treat Japanese knotweed on the site.

7.0 Monitoring

In September 2008 the GCSWCD and NYCDEP established vegetation monitoring plots at selected locations in the project area. Planted trees and shrubs within these plots were tagged and measured for height, trunk diameter, and vigor. Monitoring within the plots was also performed in 2009, and will continue to be performed annually until a total of five years of data has been collected. Monitoring should provide growth and mortality rates for the various species planted on the site, and will hopefully provide insight into which species will be most suitable for restoring similar sites in the future.

8.0 Project Costs

The project costs were divided between the NYCDEP and the Army Corp of Engineers (ACOE). The NYCDEP sponsored the majority of riparian planting activities on this site and the ACOE sponsored the bank regrading that was required to improve the NYSDEC fishing access. The following table breaks down the project costs.

Table 1. Project Cost Summary

Description	ACOE Cost	DEP Cost	Total
Materials			
Containerized Trees & Shrubs	$0.00	$8885.00	$8885.00
Machines			
Kubota KX 161 Mini-Excavator (for bank regrading)	$744.96	$0.00	$744.96
Construction Labor			
Herbicide Application	$0.00	$924.71	$924.71
Operator	$644.61	$3311.19	$3955.80
Laborer	$0.00	$2997.72	$2997.72
Supervisor	$0.00	$200.40	$200.40
TOTAL	**$1389.57**	**$16319.02**	**$17708.59**

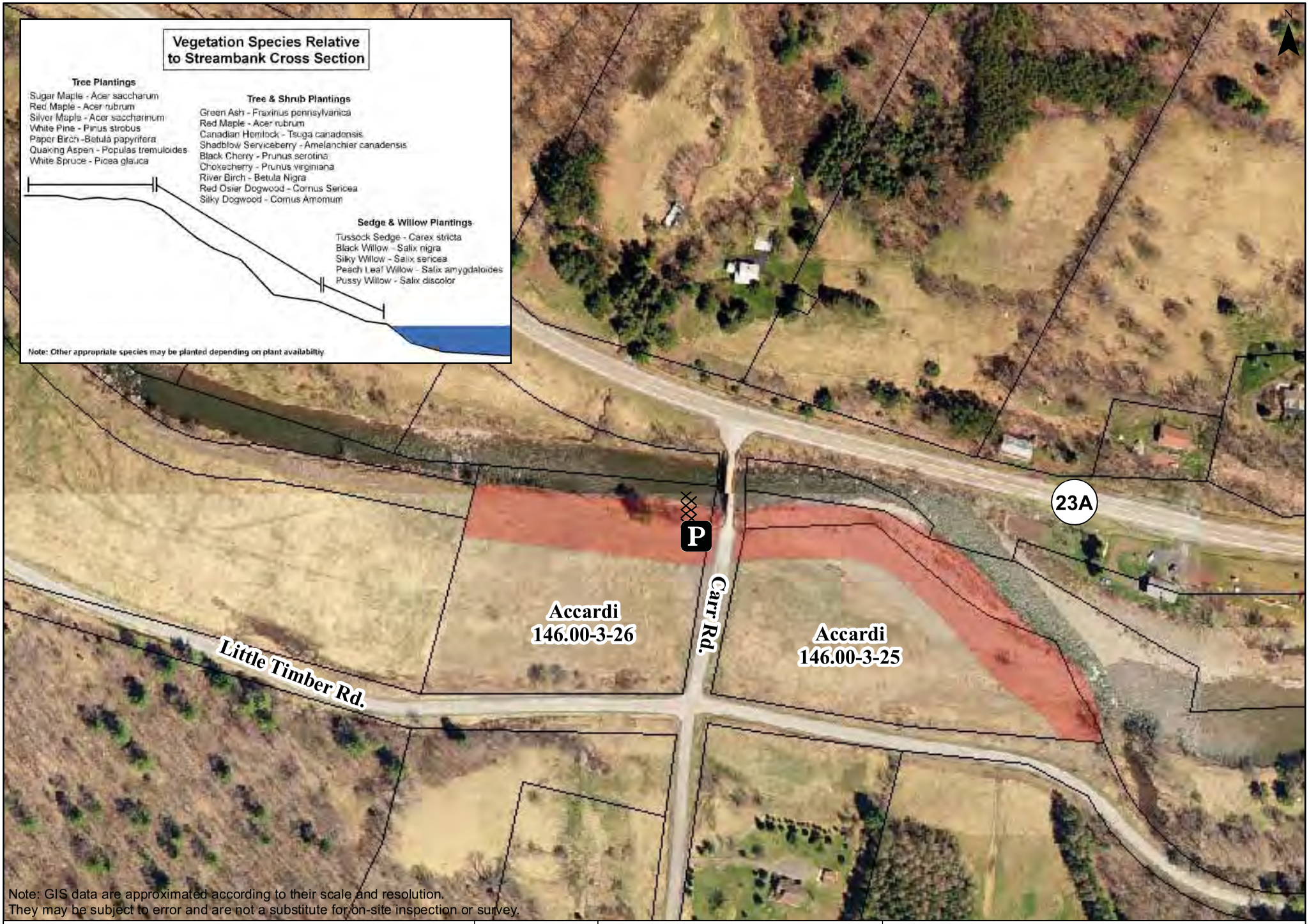
9.0 Operation and Maintenance

Monitoring of restoration projects is important as it is not only a way to measure success, but also a tool to help increase chances of success. Monitoring of the plantings in the riparian area will provide the necessary information to determine if additional maintenance is required, and to ensure plant survivorship. The site should be monitored for at least five years to ensure successful establishment of native vegetation.

Monitoring should focus on ensuring plant survivorship. There are numerous problems which can impact plant survival, but the most common include drought, herbivory, and invasive species. Drought can be very stressful on new plantings, but can be easily amended through irrigation. Herbivory of woody plants can be controlled through the use of protective collars on the plantings. Invasive species pose a significant threat to native plantings as they can often out-compete the native species. If invasive species are identified on the site during monitoring then attempts should be made to remove them as soon as possible.

A vegetation monitoring protocol developed by the NYCDEP's Stream Management Program will be used to monitor the vegetation on the Carr Road site. This protocol involves setting up permanent plots and tagging all planted trees within these plots. The trees are measured annually in order to determine their growth rate and vigor. Vegetation monitoring will be performed for five years following project completion by the NYCDEP in collaboration with the GCSWCD.

Appendix A – Project Design



Note: GIS data are approximated according to their scale and resolution.
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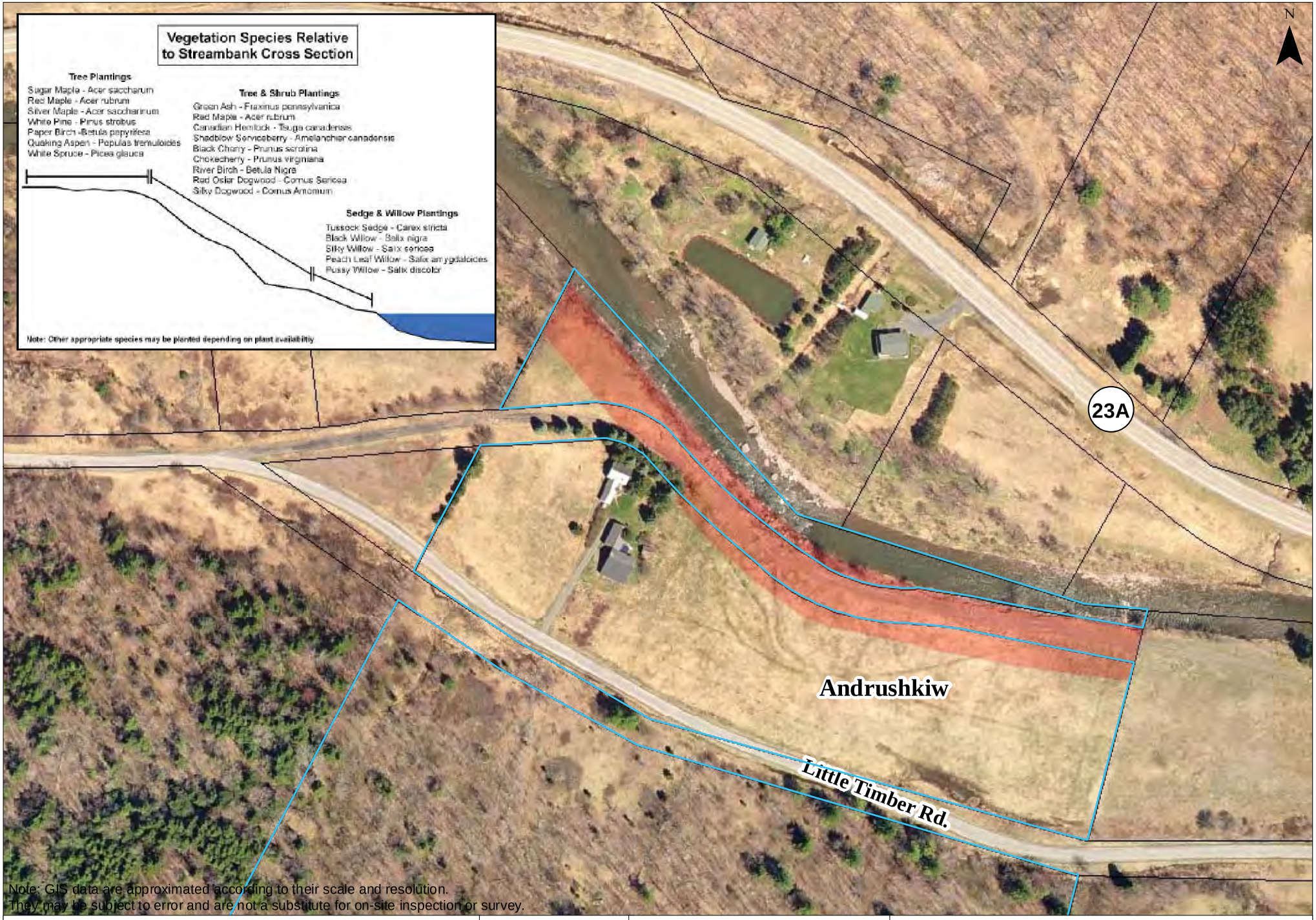
Greene County Soil & Water Conservation District
907 Greene County Office Building
Cairo, NY 12413
Phone: 518-622-3620 Fax:518-622-0344

Legend
- 100' Buffer Area To Be Planted
- Tax Parcel
- Accardi Tax Parcel

Scale = 1:2400

0 150 300 Feet

Attachment B - Project Design
Vegetation Planting Plan - Accardi Property
Town of Jewett - Tax Parcels 146.00-3-25 & 146.00-3-26



Greene County Soil & Water Conservation District

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Legend

- 300ft buffer Planting Area
- Tax Parcel
- Andrushkiw Tax Parcel

Scale = 1:2400

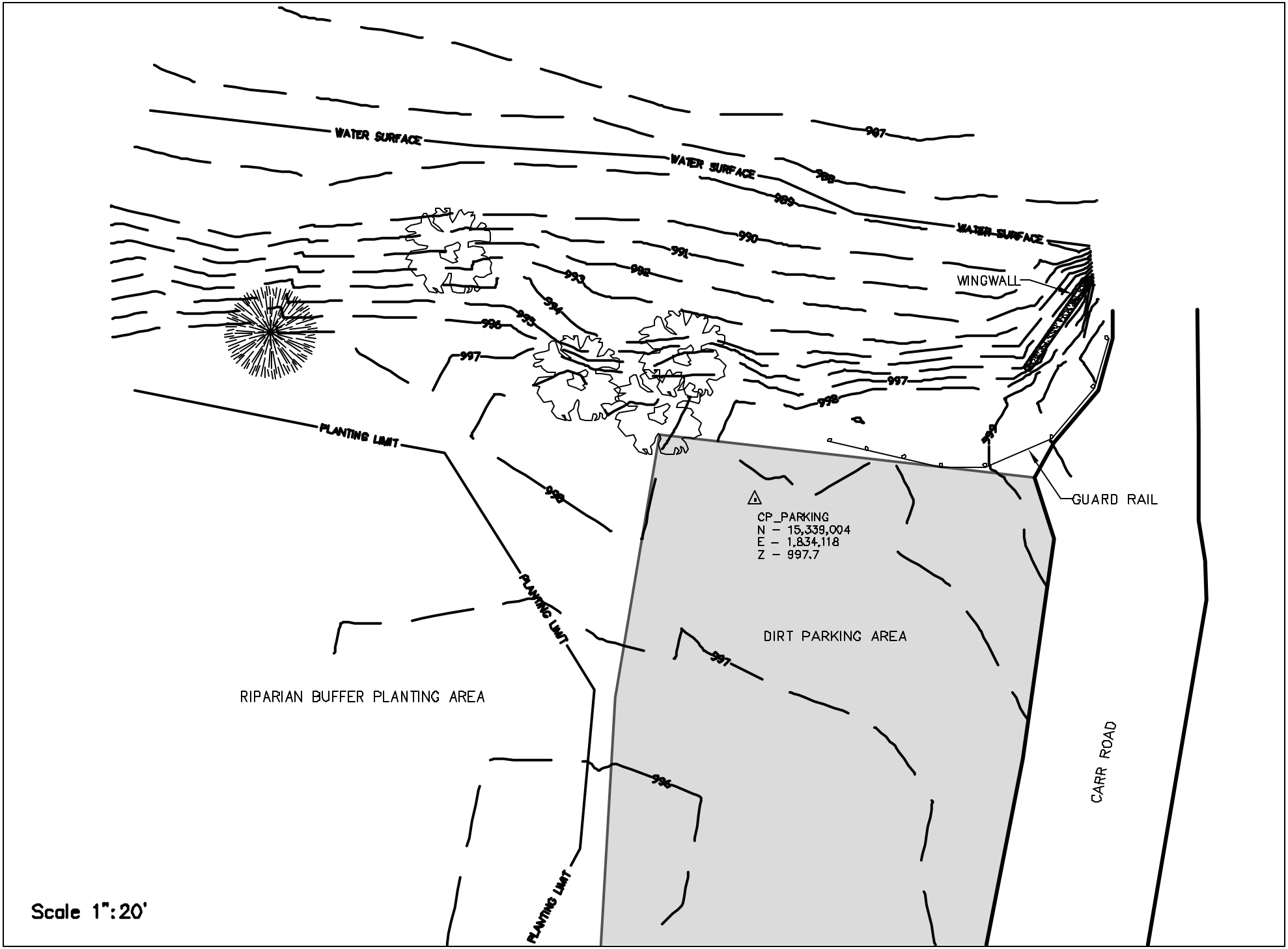
0 150 300 Feet

Attachment B - Planting Plan

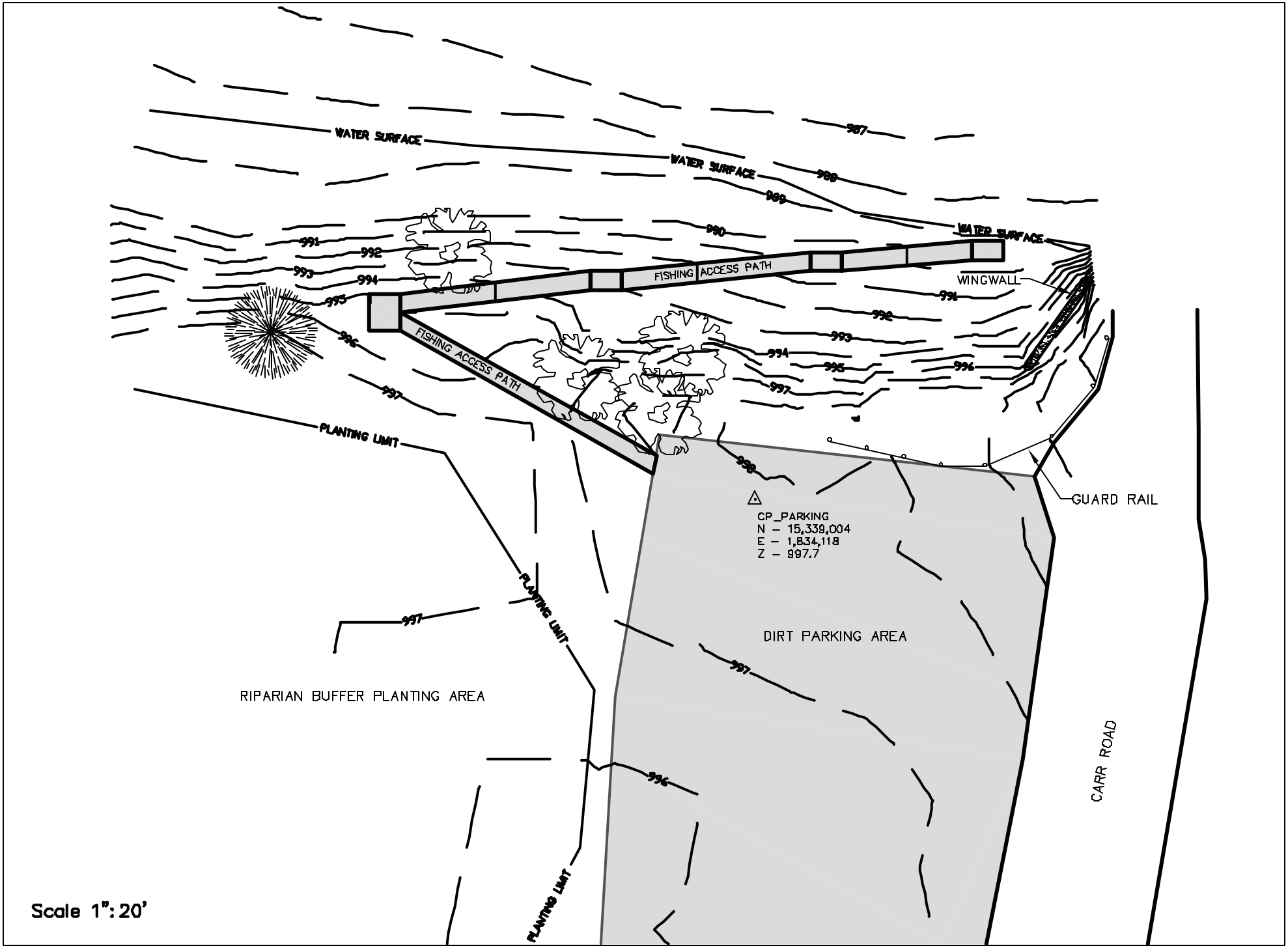
Vegetation Planting Plan - Andrushkiw Property

Town of Jewett - Tax Parcels 146.00-3-22

Carr Road – Existing Topography



Carr Road – Proposed Topography



Appendix B – Plant Materials List

Appendix B: Plant Materials List

Common Name	Scientific Name	Size	Quantity
Speckled Alder(FACW)	*Alnus rugosa*	6-8'	164
Green Ash(FACW)	*Fraxinus pennsylvanica*	3-4'	9
River Birch(FACW)	*Betula nigra*	4-5'	115
Paper Birch(FACU)	*Betula papyrifera*	3-4'	141
Gray Birch	*Betula populifolia*		
Chokecherry(FACU)	*Prunus virginiana*	4-5'	25
Silky Dogwood(FACW)	*Cornus amomum*	2-3'	
Red Maple(FAC)	*Acer rubrum*	4-5'	75
Silver Maple(FACW)	*Acer saccharinum*	4-5'	160
White Oak(FACU)	*Quercus alba*	2-3'	105
American Sycamore(FACW)	*Platanus occidentalis*	3-4'	
Sugar Maple(FACU)	*Acer saccharum*	5-6'	145
Staghorn Sumac	*Rhus typhina*	6-8'	
Red Osier Dogwood	*Cornus sericea*	4-5'	60
Quaking Aspen	*Populus tremuloides*	18-24"	25
Shadblow Serviceberry	*Amelanchier canadensis*	<18"	135
Pin Cherry(FACU)	*Prunus pennsylvanica*	3-4'	80
Arrowwood (FAC)	*Viburnum dentatum*	2-3'	
American Elderberry(FACW)	*Sambucus canadensis*	2-3'	
Gray Dogwood	*Cornus racemosa*	12-18"	36
Nannyberry	*Viburnum lentago*	2-3'	
Red Oak(FACU)	*Quercus rubra*	3-4'	25
White Pine	*Pinus strobus*	8-12"	127
White Spruce	*Picea glauca*	7-15"	100
Canadian Hemlock(FACU)	*Tsuga canadensis*	20-24"	30
Highbush Blueberry	*Vaccinium corybosum*	6-24"	
Hybrid Poplar	*Populus* hybrids	5-12"	100
Black Birch	*Betula lenta*		70
Carolina Rose	*Rosa carolina*		50
		Total	1777

Appendix C – Photographs

Schoharie Creek Stream Management Project
Carr Road Buffer Project Report: Photo Page 1

Figure 1: Aerial view looking East with Carr road bridge in center of picture. NYS Route 23A is in the left, Little Timbermen Road on the right. Note the absence of a riparian buffer on the left back (right side in this view). Below the bridge, the riparian buffer is limited to a very narrow band on the immediate streambank.

Schoharie Creek Stream Management Project
Carr Road Buffer Project Report: Photo Page 2

Figure 2: GCSWCD staff planting containerized trees and shrubs along left floodplain west (downstream) of the Carr Rad Bridge. Each white spot represents a plants label. The excavator with hydraulic auger facilitates planting in the rock soils characteristic of the Schoharie floodplain.

Appendix D – Landowner Agreements

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

This Agreement, made this _____ day of August, 2007 by and between Saverio & Constantian Accardi [Landowner], residing at 162-32 85th Street Howard Beach, NY 11414, 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 146.00-3-25 & 146.00-3-26 in the Town of Jewett, County of Greene (the "Property"), that has been identified in the Stream Management Plan as a location where such restoration work is needed; and

WHEREAS, GCSWCD has designed a riparian buffer 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 (Carr Road Riparian 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.

_____	_____
Saverio Accardi: Landowner	Rene VanSchaack; Executive Director GCSWCD
_____	_____
Constantina Accardi: Landowner	Date
_____	
Date	

Note: GIS data are approximated according to their scale and resolution.
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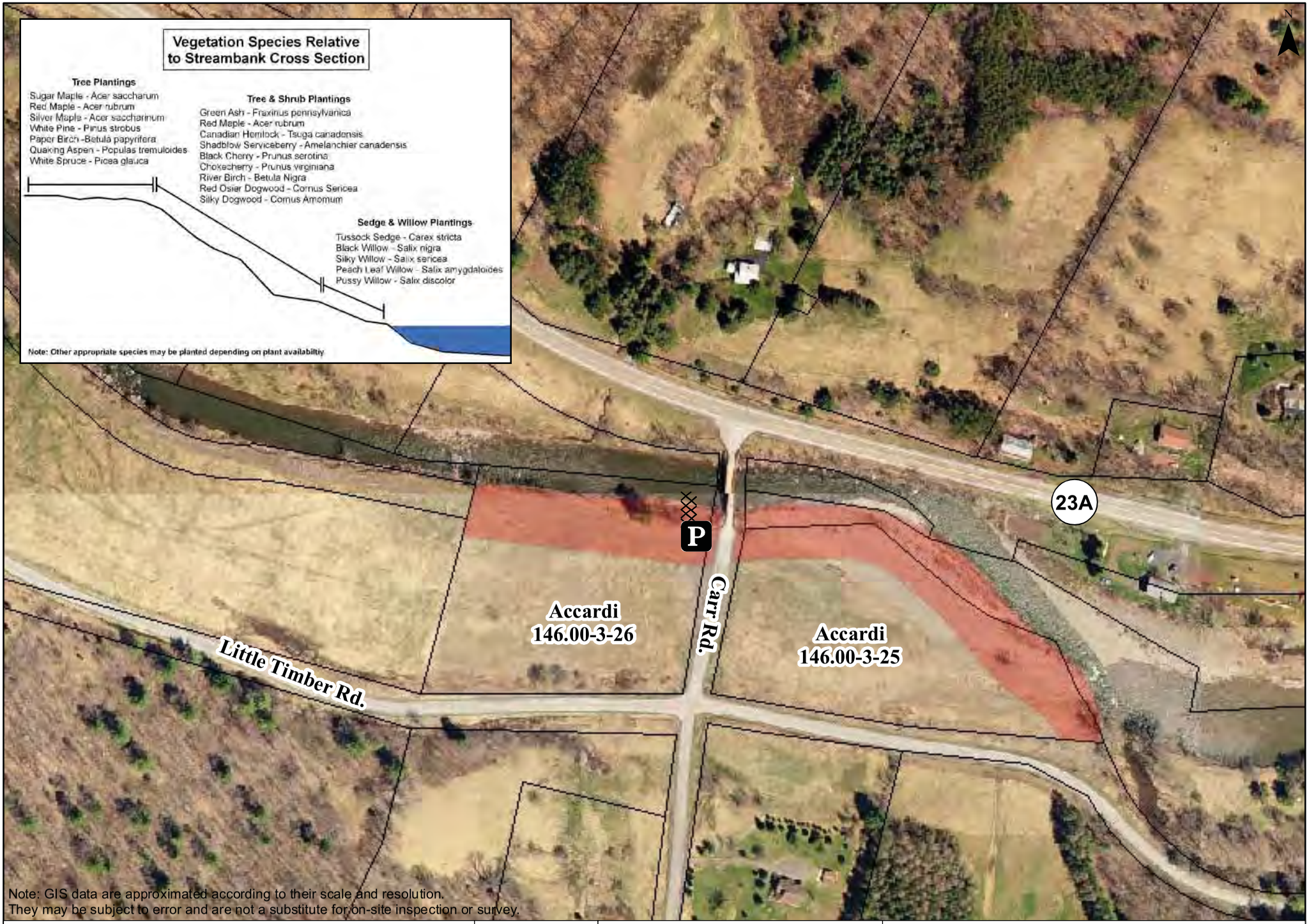
Greene County Soil & Water Conservation District
907 Greene County Office Building
Cairo, NY 12413
Phone: 518-622-3620 Fax:518-622-0344

Legend
- Easement Area
- Tax Parcel
- Accardi Tax Parcel

Scale = 1:2400

0 150 300 Feet

Attachment A - Easement Area
Vegetation Planting Plan - Accardi Property
Town of Jewett - Tax Parcels 146.00-3-25 & 146.00-3-26



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Legend
- 100' Buffer Area To Be Planted
- Tax Parcel
- Accardi Tax Parcel

Scale = 1:2400

0 150 300 Feet

Attachment B - Project Design
Vegetation Planting Plan - Accardi Property
Town of Jewett - Tax Parcels 146.00-3-25 & 146.00-3-26

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

This Agreement, made this 23rd day of August, 2007 by and between Roman & Svitlana Andrushkiw [Landowner], residing at 58 Boydan Ave. Maplewood, NJ 07040, 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 146.00-3-22 in the Town of Jewett, County of Greene (the "Property"), that has been identified in the Stream Management Plan as a location where such restoration work is needed; and

WHEREAS, GCSWCD has designed a riparian buffer 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:

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

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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 (Carr Road Riparian 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.

Roman Andrushkiw: Landowner

Rene VanSchaack; Executive Director GCSWCD

Svitlana Andrushkiw: Landowner

8/25/07
Date

8/28/07
Date

Note: GIS data are approximated according to their scale and resolution.
They may be subject to error and are not a substitute for on-site inspection or survey.

Greene County Soil & Water Conservation District
907 Greene County Office Building
Cairo, NY 12413
Phone: 518-622-3620 Fax:518-622-0344

Legend
- Easement Area
- Tax Parcel
- Andrushkiw Tax Parcel

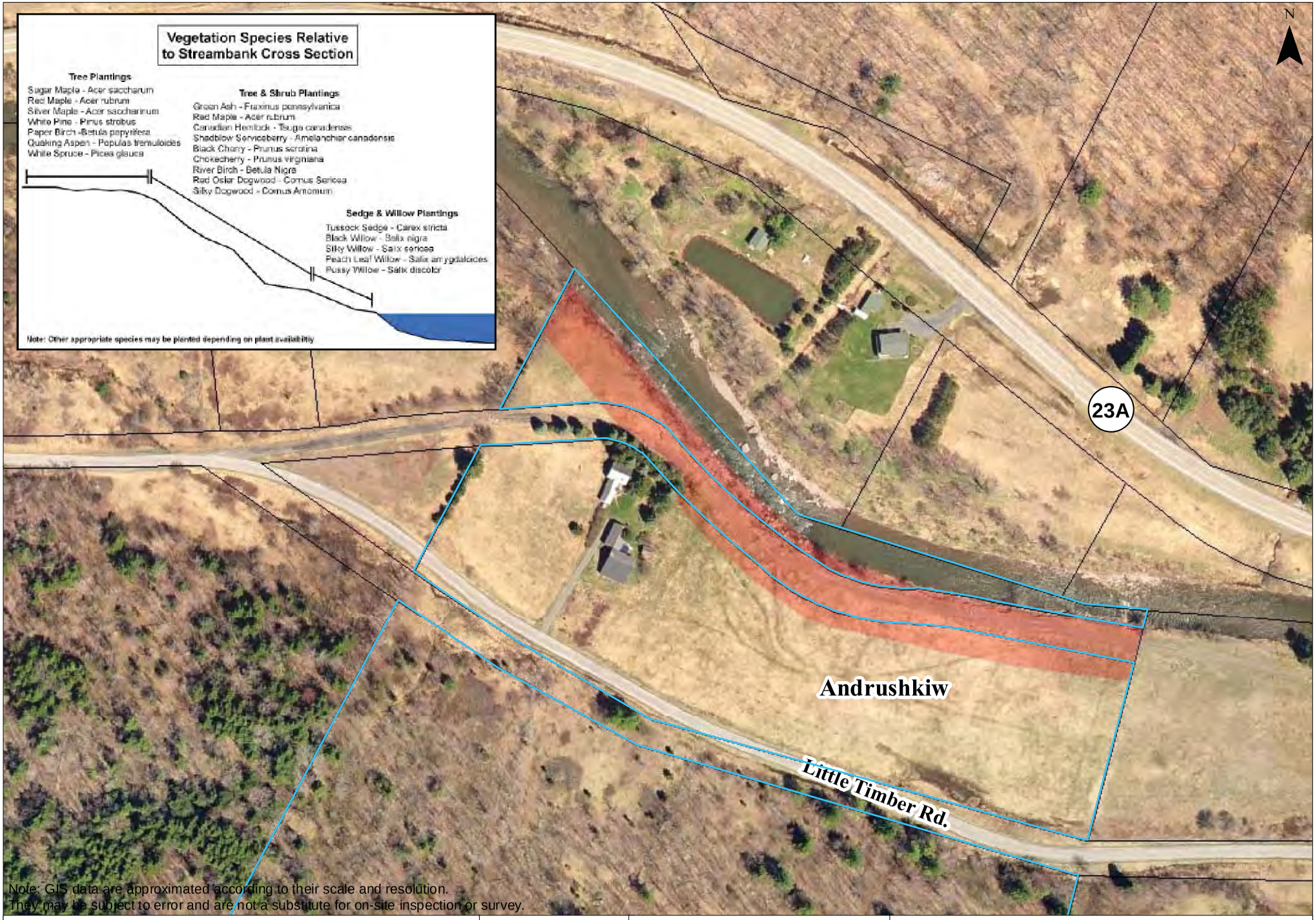
Scale = 1:2400

0 150 300 Feet

Attachment A - Easement Area

Vegetation Planting Plan - Andrushkiw Property

Town of Jewett - Tax Parcels 146.00-3-22



Greene County Soil & Water Conservation District

907 Greene County Office Building
Cairo, NY 12413
Phone: 518-622-3620 Fax:518-622-0344

Legend

- 300ft buffer Planting Area
- Tax Parcel
- Andrushkiw Tax Parcel

Scale = 1:2400

0 150 300 Feet

Attachment B - Planting Plan

Vegetation Planting Plan - Andrushkiw Property

Town of Jewett - Tax Parcels 146.00-3-22

Appendix E – Permits and Approvals

Appendix E – Permits and Approvals (cont.)

Original (2007) DEC & ACOE Permits and Approvals

Amy DeGaetano

From: Olmstead, Peter D NAN02 [Peter.D.Olmstead@nan02.usace.army.mil]
Sent: Thursday, September 13, 2007 11:01 AM
To: Amy DeGaetano
Subject: Carr Road Riparian Planting Project

Amy,
On 14 August 2007 this office received a permit application for the "Carr Road Riparian Planting Project", Town of Jewett, Greene County, New York. Based on the information provided, it appears that this project may meet the requirements of Nationwide General Permit No. 27 Aquatic Habitat Enhancement Activities. As such, this office has determined to take no action in the 45 day review and comment period for Nationwide Permits.

In addition, it is refreshing to see the promotion and implementation of biological stream bank stabilization methods and riparian buffers. None can use it more than the Schoharie, keep up the good work.

Peter D. Olmstead
Biological Science Technician
Western Permits Section
U.S. Army Corps of Engineers
Albany Field Office
One Bond Street
Troy, New York 12180
~~(518) 270-0588~~
(518) 266-6350

New York State Department of Environmental Conservation
Division of Environmental Permits, Region 4
65561 State Highway 10, Suite 1, Stamford, New York 12167-9503
Phone: (607) 652-7741 • **FAX:** (607) 652-3672
Website: www.dec.state.ny.us

Alexander B. Grannis
Commissioner

August 29, 2007

Amy DeGaetano
907 Green County Office Building
Cairo, New York 12413

Re: DEC ID#4-1938-00123/00001
Sam Accardi Property Streambank Plantings
(T) Jewett , Greene County

Dear Permitee,

The permit you applied for is enclosed. Please read it carefully and note the special conditions that are included in it. The permit is valid for only those activities expressly authorized therein. Work beyond the scope of the permit and the approved project plans may be considered a violation of the law and subject to appropriate enforcement action. Should you object to the permit as issued and are unable to resolve such objections with this office you may, within 30 calendar days of this transmittal, send a written request for a hearing to the attention of the Regional Permit Administrator. Please note that granting of this permit does not relieve the applicant of the responsibility of obtaining any other permission, consent or approval from the U.S. Army Corps of Engineers or any other agency.

Please note the effective and expiration date of the permit. If you need additional time to complete your project you must submit your request in writing prior to expiration of the permit. Provide an explanation of why additional time is needed, and how much additional time you are requesting. Applications for the permit renewal must be made in advance of the expiration date. Please refer to the general conditions listed in the permit for specific instructions. The number(s) listed above pertain(s) to this permit and should be referenced on all correspondence related to this permit and any future applications for permits associated with this facility or project.

Also enclosed is a sign that you are to post at the project site adequately protect from the weather, while you are working on your project.

If you have any questions on the extent of the work authorized, or your obligations under the permit, please feel free to contact me.

Sincerely,

Kent P. Sanders

Kent P Sanders
Deputy Regional Permit Administrator
Region 4 - Stamford

cc: Law Enf. (Email)
USACOE
J. Fraine

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DEC PERMIT NUMBER		EFFECTIVE DATE
4-1938-00123/00001	**PERMIT** Under the Environmental Conservation Law (ECL)	August 29, 2007
FACILITY/PROGRAM NUMBER(S)		EXPIRATION DATE(S) September 30, 2008

TYPE OF PERMIT (Check All Appropriate Boxes)

☒ NEW ☐ RENEWAL ☐ MODIFICATION ☒ PERMIT TO CONSTRUCT ☒ PERMIT TO OPERATE

X	ARTICLE 15, TITLE 5: PROTECTION OF WATER		ARTICLE 17, TITLES 7, 8: SPDES		ARTICLE 27, TITLE 9: 6NYCRR 373: HAZARDOUS WASTE MGMT.
	ARTICLE 15, TITLE 15: WATER SUPPLY		ARTICLE 19: AIR POLLUTION CONTROL		ARTICLE 34: COASTAL EROSION MANAGEMENT
	ARTICLE 15, TITLE 15: WATER TRANSPORT		ARTICLE 23, TITLE 27: MINED LAND RECLAMATION		ARTICLE 36: FLOODPLAIN MANAGEMENT
	ARTICLE 15, TITLE 15: LONG ISLAND WELLS		ARTICLE 24: FRESHWATER WETLANDS		ARTICLES 1, 3, 17, 19, 27, 37; 6NYCRR 380: RADIATION CONTROL
	ARTICLE 15, TITLE 27: WILD, SCENIC & RECREATIONAL RIVERS		ARTICLE 25: TIDAL WETLANDS		ARTICLE 27, TITLE 3, 6NYCRR 364: WASTE TRANSPORTER
	6NYCRR 608: WATER QUALITY CERTIFICATION		ARTICLE 27, TITLE 7: 6NYCRR 360: SOLID WASTE MANAGEMENT		OTHER:

PERMIT ISSUED TO Green County Soil & Water Conservation Dist.			TELEPHONE NUMBER
ADDRESS OF PERMITTEE 907 Green County Office Building			
CONTACT PERSON FOR PERMITTED WORK Amy DeGaetano			TELEPHONE NUMBER 518-622-3620
NAME AND ADDRESS OF PROJECT/FACILITY Sam Accardi Carr Rd., Jewett New York 12444			
LOCATION OF PROJECT/FACILITY Accardi Property Carr Road off Rte. 23A, Jewett N.Y. 12444			
COUNTY Greene	TOWN/CITY/VILLAGE Jewett	WATERCOURSE/WETLAND NO. Schoharie Creek	NYTM COORDINATES E: N:

DESCRIPTION OF AUTHORIZED ACTIVITY:

This permit authorizes the Vegetative Planting Plan planting of approximately 1,150 feet of the Schoharie Creek riparian zone on the Accardi property according to the submitted plans and narrative and the terms of this permit.

By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the ECL, al applicable regulations, the General Conditions specified (see page 2) and any Special Conditions included as part of th permit.

DEPUTY PERMIT ADMINISTRATOR: Kentr P. Sanders	ADDRESS NYS DEC, Region 4 Sub-Office 65561 State Highjway 10, Stamford, NY 12167-9503	
AUTHORIZED SIGNATURE Kent P. Sanders	DATE 8/29/2007	Page 1 of 6

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

Item A: Permittee Accepts Legal Responsibility and Agrees to Indemnification

The permittee expressly agrees to indemnify and hold harmless the Department of Environmental Conservation of the State of New York, its representatives, employees, and agents ("DEC") for all claims, suits, actions, and damages, to the extent attributable to the permittee's acts or omissions in connection with the permittee's undertaking of activities in connection with, or operation and maintenance of, the facility or facilities authorized by the permit whether in compliance or not in compliance with the terms and conditions of the permit. This indemnification does not extend to any claims, suits, actions, or damages to the extent attributable to DEC's own negligent or intentional acts or omissions, or to any claims, suits, or actions naming the DEC and arising under article 78 of the New York Civil Practice Laws and Rules or any citizen suit or civil rights provision under federal or state laws.

Item B: Permittee's Contractors to Comply with Permit

The permittee is responsible for informing its independent contractors, employees, agents and assigns of their responsibility to comply with this permit, including all special conditions while acting as the permittee's agent with respect to the permitted activities, and such persons shall be subject to the same sanctions for violations of the Environmental Conservation Law as those prescribed for the permittee.

Item C: Permittee Responsible for Obtaining Other Required Permits

The permittee is responsible for obtaining any other permits, approvals, lands, easements and rights-of-way that may be required to carry out the activities that are authorized by this permit.

Item D: No Right to Trespass or Interfere with Riparian Rights

This permit does not convey to the permittee any right to trespass upon the lands or interfere with the riparian rights of others in order to perform the permitted work nor does it authorize the impairment of any rights, title, or interest in real or personal property held or vested in a person not a party to the permit.

GENERAL CONDITIONS

1. Facility Inspection by the Department

The permitted site or facility, including relevant records, is subject to inspection at reasonable hours and intervals by an authorized representative of the Department of Environmental Conservation (the Department) to determine whether the permittee is complying with this permit and the ECL. Such representative may order the work suspended pursuant to ECL 71-0301 and SAPA 401(3).

The permittee shall provide a person to accompany the Department's representative during an inspection to the permit area when requested by the Department.

A copy of this permit, including all referenced maps, drawings and special conditions, must be available for inspection by the Department at all times at the project site or facility. Failure to produce a copy of the permit upon request by a Department representative is a violation of this permit.

2. Relationship of this Permit to Other Department Orders and Determinations

Unless expressly provided for by the Department, issuance of this permit does not modify, supersede or rescind any order or determination previously issued by the Department or any of the terms, conditions or requirements contained in such order or determination.

3. Applications for Permit Renewals or Modifications

The permittee must submit a separate written application to the Department for renewal, modification or transfer of this permit. Such application must include any forms or supplemental information the Department requires. Any renewal, modification or transfer granted by the Department must be in writing.

The permittee must submit a renewal application at least:

a) 180 days before expiration of permits for State Pollutant Discharge Elimination System (SPDES), Hazardous Waste Management Facilities (HWMF), major Air Pollution Control (APC) and Solid Waste Management Facilities (SWMF); and

b) 30 days before expiration of all other permit types.

Submission of applications for permit renewal or modification are to be submitted to:

NYSDEC Regional Permit Administrator, Region 4 1150 North Westcott Road, Schenectady, NY 12306 (for: Albany, Columbia, Greene, Rensselaer, Montgomery, & Schenectady Counties)	NYSDEC Deputy Regional Permit Administrator, Region 4 Stamford Field Office, Rte. 10, Stamford, NY 12167 (for: Delaware, Otsego, & Schoharie Counties)

4. Permit Modifications, Suspensions and Revocations by the Department

The Department reserves the right to modify, suspend or revoke this permit in accordance with 6 NYCRR Part 621. The grounds for modification, suspension or revocation include:

a) materially false or inaccurate statements in the permit application or supporting papers;

b) failure by the permittee to comply with any terms or conditions of the permit;

c) exceeding the scope of the project as described in the permit application;

d) newly discovered material information or a material change in environmental conditions, relevant technology or applicable law or regulations since the issuance of the existing permit;

e) noncompliance with previously issued permit conditions, orders of the commissioner, any provisions of the Environmental Conservation Law or regulations of the Department related to the permitted activity.

IPS 8/29/2007

Additional General Conditions

FOR ARTICLES 15 (Title 5), 24, 25, 34, 36 and 6 NYCRR Part 608

1. If future operations by the State of New York require an alteration in the position of the structure or work herein authorized, or if, in the opinion of the Department of Environmental Conservation it shall cause unreasonable obstruction to the free navigation of said waters or flood flows or endanger the health, safety or welfare of the people of the State, or cause loss or destruction of the natural resources of the State, the owner may be ordered by the Department to remove or alter the structural work, obstructions, or hazards caused thereby without expense to the State, and if, upon the expiration or revocation of this permit, the structure, fill, excavation, or other modification of the watercourse hereby authorized shall not be completed, the owners, shall, without expense to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may require, remove all or any portion of the uncompleted structure or fill and restore to its former condition the navigable and flood capacity of the watercourse. No claim shall be made against the State of New York on account of any such removal or alteration.

2. The State of New York shall in no case be liable for any damage or injury to the structure or work herein authorized which may be caused by or result from future operations undertaken by the State for the conservation or improvement of navigation, or for other purposes, and no claim or right to compensation shall accrue from any such damage.

3. Granting of this permit does not relieve the applicant of the responsibility of obtaining any other permission, consent or approval from the U.S. Army Corps of Engineers, U.S. Coast Guard, New York State Office of General Services or local government which may be required.

4. All necessary precautions shall be taken to preclude contamination of any wetland or waterway by suspended solids, sediments, fuels, solvents, lubricants, epoxy coatings, paints, concrete, leachate or any other environmentally deleterious materials associated with the project.

5. Any material dredged in the conduct of the work herein permitted shall be removed evenly, without leaving large refuse piles, ridges across the bed of a waterway or floodplain or deep holes that may have a tendency to cause damage to navigable channels or to the banks of a waterway.

6. There shall be no unreasonable interference with navigation by the work herein authorized.

7. If upon the expiration or revocation of this permit, the project hereby authorized has not been completed, the applicant shall, without expense to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may require, remove all or any portion of the uncompleted structure or fill and restore the site to its former condition. No claim shall be made against the State of New York on account of any such removal or alteration.

8. If granted under 6NYCRR Part 608, the NYS Department of Environmental Conservation hereby certifies that the subject project will not contravene effluent limitations or other limitations or standards under Sections 301, 302, 303, 306 and 307 of the Clean Water Act of 1977 (PL 95-217) provided that all of the conditions listed herein are met.

9. All activities authorized by this permit must be in strict conformance with the approved plans and narrative submitted by the applicant or his agent as part of the permit application, except when such plans differ from the Special Conditions of this permit; in which case, the Special Conditions take precedence over the plans and application materials. Such approved plans were prepared by Greene County Soil and Water Conservation District Submitted on August 9, 2007.

Special Conditions
FOR ARTICLE 15

1. The permittee shall notify the Department 3-5 days prior to the commencement of work on the approved project. Notification shall be made by mailing the attached postcard to the Regional Permit Administrator.

2. The use of power equipment to facilitate plantings along the streambank is permitted.

3. No equipment shall be operated in the water.

4. Equipment operation in the water is prohibited

5. There shall be no discharge of sediment or turbid waters to wetlands or water bodies. In the case of stream work, the water below the work area shall remain as clear as the flowing water above the work site.

6. Disturbance to the bed and banks of the stream shall be kept to the minimum necessary to complete the project.

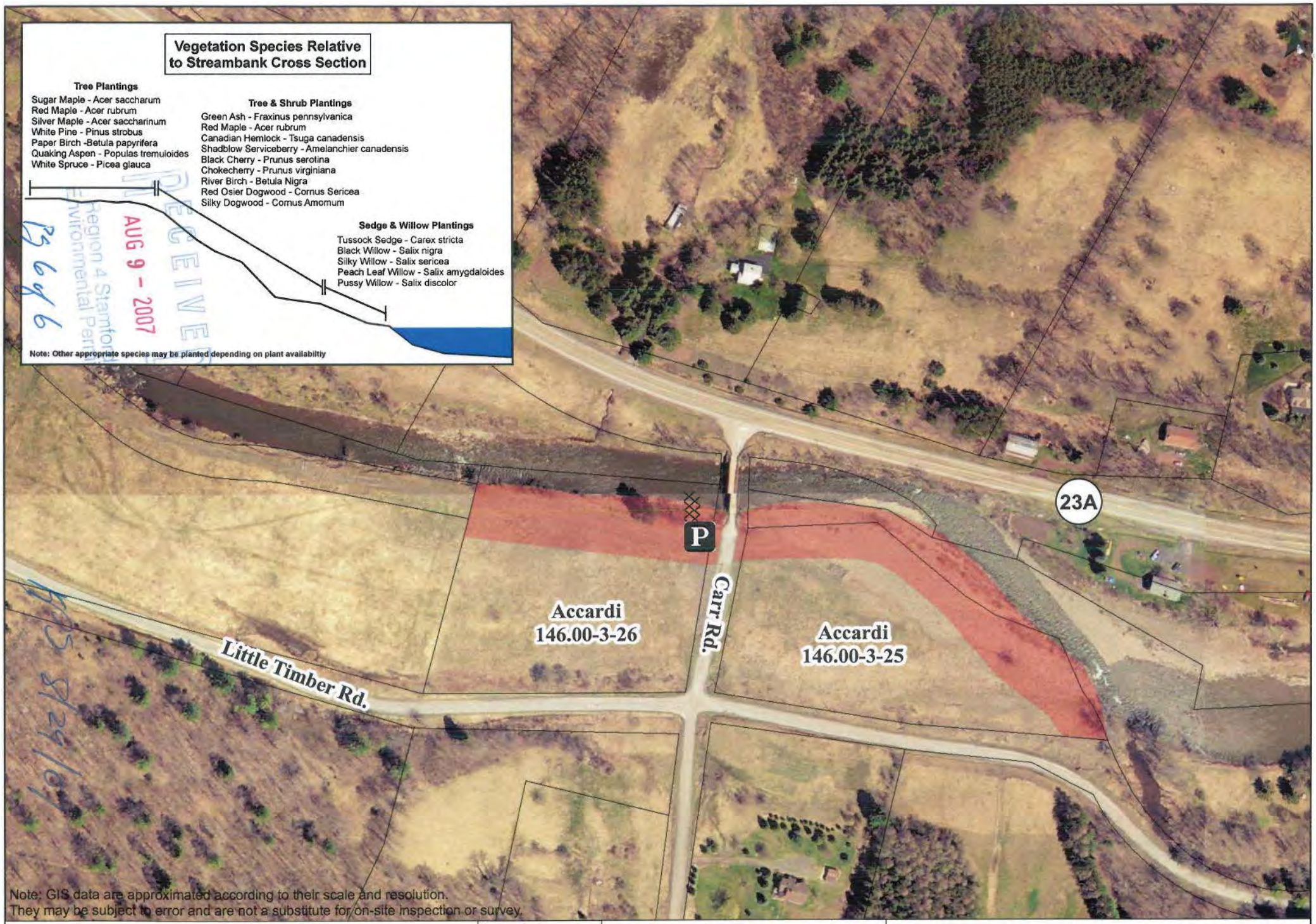
7. All unused, excavated materials and/or construction debris, shall be immediately removed, upon completion of construction, a minimum of 100 feet from the waterbody or wetland or flood plain.

Carr Road Riparian Project Description:

This project aims to enhance buffer functionality and stream bank stability by creating a high quality riparian buffer of native trees and shrubs along the streambanks and adjacent upland area of the Schoharie Creek upstream and downstream from the Carr Rd. bridge. There is a Public Fishing Rights easement along this streambank where plantings may also benefit aquatic habitat.

The proposed planting area (see attached map) includes 2.4 acres of upland floodplain which will be planted with approximately 4,180 (5x5 spacing) native trees and shrubs from September 15 - 30th, using an excavator with an auger attachment to drill planting holes. Approximately 0.3 acres of streambank will be planted with 520 native trees and shrubs (5x5 spacing) between October 15 - November 15th using hand tools. All planting on the streambank face will be done with minimal disturbance to the streambank.

1P5
8/29/2007



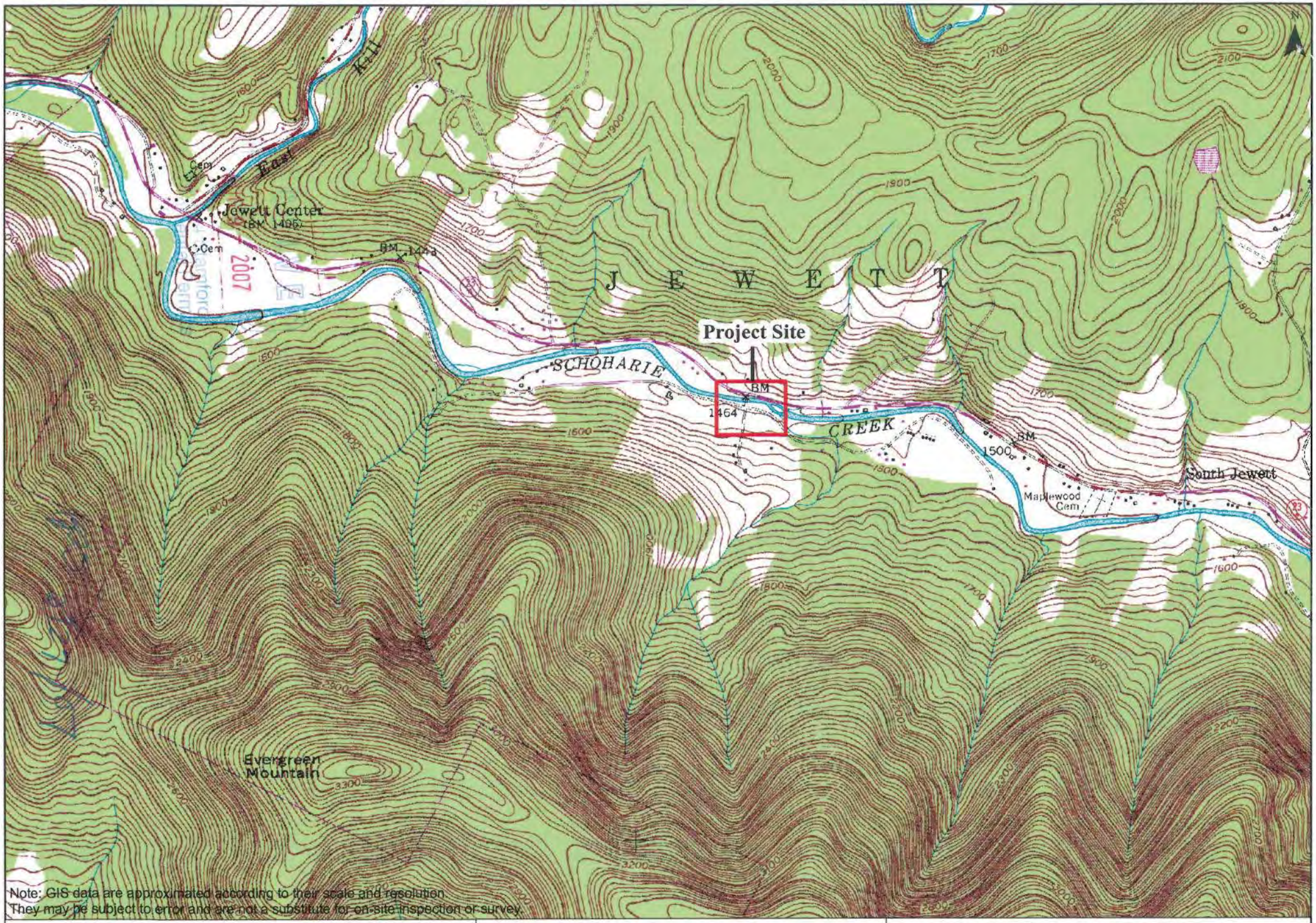
Greene County Soil & Water Conservation District
907 Greene County Office Building
Cairo, NY 12413
Phone: 518-622-3620 Fax:518-622-0344

Legend
- 100' Buffer Area To Be Planted
- Tax Parcel
- Accardi Tax Parcel

Scale = 1:2400

0 150 300 Feet

Attachment B - Project Design
Vegetation Planting Plan - Accardi Property
Town of Jewett - Tax Parcels 146.00-3-25 & 146.00-3-26



Greene County Soil & Water Conservation District
907 Greene County Office Building
Cairo, NY 12413
Phone: 518-622-3620 Fax:518-622-0344

Scale = 1:24000

0 1,500 3,000 Feet

Project Site Map - Accardi Property
USGS Topographic Map - Lexington Quadrangle
Town of Jewett - Tax Parcels 146.00-3-25 & 146.00-3-26

Appendix E – Permits and Approvals (cont.)

Amended (2008) DEC & ACOE Permits and Approvals

DEPARTMENT OF THE ARMY
US Army Engineer District-New York, CENAN-OP-R
Upstate Regulatory Field Office
1 Buffington Street
Watervliet, NY 12189-4000

RECEIVED
MAY 19 2008
By DT

MAY 12 2008

REPLY TO
ATTENTION OF
Western Permits Section

SUBJECT: Permit Application Number NAN-2008-00363-WFI
by Greene County Soil and Water Conservation District

Joel DuBois
Stream Restoration Project Coordinator
Green County Soil and Water Conservation District
907 County Office Building
Cairo, New York 12413

Dear Mr. DuBois:

On February 19, 2008, the New York District Corps of Engineers received your request for Department of the Army authorization for the continuation of a 2,340 foot long riparian restoration project along the Schoharie Creek known as the "Carr Road Riparian Planting Project". The site is located in the Town of Jewett, Greene County, New York.

Based upon the information provided, it appears that in accordance with 33 CFR 320-330, a Department of the Army permit will not be required. Care should be taken so that any fill or other construction materials, including debris, do not enter the waterway to become a drift or pollution hazard. No materials shall be temporarily stockpiled or disposed of in wetlands or other waters of the United States.

This determination does not eliminate the need to obtain any other Federal, State or local authorizations required by law for the above described work, including any required permit from the NYSDEC.

Any inquiries can be directed to the undersigned at (518) 266-6353.

Sincerely,

Heidi Firstencel
Project Manager
Western Permits Section

Enclosures

cc: NYSDEC, Region 4
Town of Jewett

New York State Department of Environmental Conservation
Division of Environmental Permits, Region 4
65561 State Highway 10, Suite 1, Stamford, New York 12167-9503
Phone: (607) 652-7741 • **FAX:** (607) 652-2342
Website: www.dec.state.ny.us

Alexander B. Grannis
Commissioner

RECEIVED
MAY 21 2008
By

May 8, 2008

Mr. Joel DuBois, Stream Restoration Project Coordinator
Greene County Soil & Water Conservation District
907 County Office Building
Cairo, NY 12413

RE: DEC ID# 4-1938-00123/00001
Carr Rd Stream Bank Planting
(T) Jewett, Greene County

AMENDMENT TO PERMIT

The above referenced permit is hereby modified to include the 1140 feet of Stream Bank on the Andruskiw Property adjacent to the previously permitted Accardi property as shown in your February 12, 2008 Modification Request. All other terms and conditions of original permit remain in effect. Please attach this amendment to your permit.

Kent P. Sanders
Deputy Regional Permit Administrator
Region 4 - Stamford

enc.
CC: Law Enforcement (gw)
J. Fraine, BOH

CarrRdPlantingsAmendLett.wpd

Town of Jewett - Tax Parcel 146.00-3-22
Owner: Roman & Svitlana Andrushkiw
58 Boydan Ave. Maplewood, NJ 07040

Scale = 1:2500

0 150 300 600 900 Feet

Note: GIS data are approximated according to their scale and resolution.
They may be subject to error and are not a substitute for on-site inspection or survey.

Appendix E – Permits and Approvals (cont.)

Amended (2009) DEC Permit and Approval

New York State Department of Environmental Conservation
Division of Environmental Permits, Region 4
65561 State Highway 10, Suite 1, Stamford, New York 12167-9503
Phone: (607) 652-7741 • **FAX:** (607) 652-2342
Website: www.dec.state.ny.us

Alexander B. Grannis
Commissioner

July 29, 2005

Mr. Jeff Flack
Greene County Soil & Water Conservation District
907 County Office Building
Cairo, NY 12413-9502

RE: DEC ID# 4-1938-00123/00001
Accardi Property, Schoharie Creek
Jewett(T), Greene County

AMENDMENT TO PERMIT

The above referenced permit is hereby modified to permit the construction of a Fisherman access path as requested in your September 16, 2008 modification request.

The permit is also renewed to extend the expiration date to September 30, 2009. For 2008 only the instream work window is extended to October 31. All other terms and conditions of original permit remain in effect. Please attach this amendment to your permit.

Kent P. Sanders
Deputy Regional Permit Administrator
Region 4 - Stamford

CC: J. Fraine
USACOE
ECO(Groupwise)

Appendix F – Landowner Guide to Vegetation Management

Schoharie Basin Stream Management Project

Carr Road Riparian Project

Landowner Guide to Vegetation Management

Project Goals and Objectives

Left bank downstream of Carr Road bridge – site for increased buffer width with shrubs and trees.

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 Carr Road Riparian Project will stabilize a section of the Schoharie Creek which lacked an adequate riparian buffer.

In the summer of 2006, an evaluation of stream channel stability and streamside vegetation was conducted as part of development of the Schoharie Creek Management Plan. This field evaluation determined that a ~ 1,200' section of the left stream bank up and downstream of Carr Road presented an excellent opportunity to improve the streamside buffer (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 2007, 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 2007 planting, GCSWCD will work with the landowner to maintain a healthy riparian buffer.

Figure 1. Carr road riparian restoration project area (2006).

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

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

Hydroseeder in action.

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.

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.

Volunteers helping with container trees at the PMC.

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.

Invasive Species: Japanese Knotweed

Invasive, non-native species can threaten the ecology of a native plant community. This impact may extend to an alteration of landscape or reduction in bank stabilization. Japanese Knotweed is an invasive, non-native species that in recent years has become a serious issue in the Schoharie Basin. As the name implies it comes from Asia and was originally brought here as an ornamental plant. In an attempt to beautify their homes, residents unknowingly introduced a threatening element to the environment. Knotweed out-competes native plants by growing much faster than most native species, thereby towering over them and cutting off their light supply. Eventually, it can take over entire stretches of stream banks. This is especially dangerous, because knotweed does not hold stream banks together as well as native species. Furthermore, it is a very resilient plant. Simply cutting it down can potentially make the problem worse.

Identification

As a landowner you can help stop the spread of this invasive. The first step is identification. Japanese Knotweed is fairly easy to identify; it has bamboo stalks and large heart-shaped leaves. In late summer, the shrub sprouts long lacy white flowers. It annually grows from a tiny sprout up to over 10 ft tall. It is often seen in large patches where the tall stalks droop outward around the edges. Identification can be difficult in early spring. Often, what gives it away at this time of year are the young sprouts amongst last years dead stalks, which appear as clusters of brown, jointed, hollow wooden poles. See pg 7-8 for more information on the control of Japanese Knotweed.

Japanese Knotweed Management

When dealing with knotweed the most important thing to understand is its diligent ability to spread vegetatively. This means that it spreads through its root system, as opposed to by seed (which it also does, but not as prominently). One of the best things a landowner can do is to monitor the spread of knotweed on his or her section of the project. Never alter the environment in any way that would destabilize the stream banks or disrupt the natural riparian vegetation and allow the spread of knotweed. Any fill material introduced to the area should be screened for the presence of knotweed. Knotweed has a history of spreading through contaminated fill material.

Mowing

Depending on the characteristics of your landscape, it may be beneficial to employ a regular lawn mowing schedule of knotweed infested areas at a *minimum* frequency of every other week. This would help to suppress knotweed colonies by continually oppressing them before they have the ability to grow. This is much more time efficient than manual removal. Keep in mind that mowing too close to the stream and removing native grasses can decrease bank stability and cause erosion problems. Also be careful to avoid mowing over planted trees as well as native trees that occur naturally.

It is important when removing knotweed from areas that will be naturally re-vegetated to make sure you collect all of the root and stalk pieces. The knotweed must then be disposed of in a manner where it will not have the potential to spread and root anywhere else. Even a small piece, if left behind or dumped somewhere, has the potential to root and start a new colony. Be especially careful not to allow debris to fall in the stream, as this will only spread the problem further downstream.

Japanese Knotweed sprouting from a tiny plant fragment.

Removal

The application of herbicide is governed by NYS Department of Environmental Conservation (DEC) and must be administered by a licensed professional. Therefore, cutting and removal may be the only means by which to eradicate Japanese Knotweed. In small patches it may even be beneficial to pull each plant up by the roots. It is important to note that no matter how you remove it, Japanese Knotweed will most likely return due to the fact that any part of the root left underground can re-sprout. Therefore, an effective removal strategy will most likely involve several cuttings per season, perhaps over the course of several years. One method that is suggested for small patches is to employ a combination of cutting and covering. This method involves cutting the knotweed as close to the ground as possible, then covering the area with a tarp or old rug; landscaping fabric can be used, but is costly. This way, when spring comes and the knotweed tries to sprout, it is covered and has no light supply.

The following website contains information about the removal of knotweed throughout the U.S.: http://www.skamaniacounty.org/Noxious_Weeds/TNCreport.htm. It has a wealth of information and links for those who wish to learn more about this troubling invasive species. are Hudsonia, Inc., through a partnership with NYC DEP and GCSWCD, reviewed the state of the knowledge on Japanese Knotweed and conducted basic research into its growth habits as part of an effort to develop management recommendations for its future control. As mentioned, you may see knotweed monitoring crews entering the project site in the future to monitor this problem.

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 call GCSWCD at the number listed below.

Contact

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907 County Office Building
Cairo, NY 12413
Phone (518) 622-3620
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