United States Department of Agriculture **OMB No. 0578-0030**
Natural Resources Conservation Service **NRCS-PDM-20**

DAMAGE SURVEY REPORT (DSR)
Emergency Watershed Protection Program – Recovery

Section 1A

Date of Report: 03/27/2012

DSR Number: S-TG-05 Project Number: 05

NRCS Entry Only
Eligible: YES ☑ NO ☐
Approved: YES ☑ NO ☐
Funding Priority Number (from Section 4) 2
Limited Resource Area: YES ☐ NO ☑

Section 1B Sponsor Information

Sponsor Name: Schoharie County, Harold Vroman, Chairman, Schoharie County Board of Supervisors

Address: P.O. Box 429

City/State/Zip: Schoharie, NY 12157

Telephone Number: (518) 295-8347 Fax: (518) 295-8482

Section 1C Site Location Information

County: Schoharie State: NY Congressional District: 21

Latitude: 42.41015 Longitude: -74.42720 Section: _____ Township: Gilboa Range: _____

UTM Coordinates: N: 15405065 E: 1795045 (ft)

Drainage Name: Platter Kill Reach: along Flat Creek Rd. above intersection w/ Valenti Rd.

Damage Description: Stream bed and bank erosion threatening road, box culvert and property

Section 1D Site Evaluation

All answers in this Section must be YES in order to be eligible for EWP assistance.

Site Eligibility	**YES**	**NO**	**Remarks**
Damage was a result of a natural disaster?*	☑	☐	
Recovery measures would be for runoff retardation or soil erosion prevention?*	☑	☐	
Threat to life and/or property?*	☑	☐	
Event caused a sudden impairment in the watershed?*	☑	☐	
Imminent threat was created by this event?**	☑	☐	
For structural repairs, not repaired twice within ten years?**	☑	☐	
Site Defensibility			
Economic, environmental, and social documentation adequate to warrant action (Go to pages 3, 4, 5 and 6 ***)	☑	☐	
Proposed action technically viable? (Go to Page 9 ***)	☑	☐	

Have all the appropriate steps been taken to ensure that all segments of the affected population have been informed of the EWP program and its possible effects? YES ☑ NO ☐

Comments: Outreach to municipalities through both NRCS and FEMA and through County Emergency Services and SWCD

* Statutory
** Regulation
*** DSR Pages 3 through 5 are required to support the decisions recorded on this summary page. If additional space is needed on this or any other page in this form, add appropriate pages.

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Section 1E Proposed Action

Describe the preferred alternative from Findings: Section 5 A:

Cobble fill for streambed elevation, rock cross vanes for grade control, bioengineering for habitat improvement, and riprap repair/replacement for bank protection

Total installation cost identified in this DSR: Section 3: $ 3,267,000.0(

Section 1F NRCS State Office Review and Approval

Reviewed By: _____ Date Reviewed: _____
State EWP Program Manager

Approved By: _____ Date Approved: _____
State Conservationist

PRIVACY ACT AND PUBLIC BURDEN STATEMENT

NOTE: The following statement is made in accordance with the Privacy Act of 1974, (5 U.S.C. 552a) and the Paperwork Reduction Act of 1995, as amended. The authority for requesting the following information is 7 CFR 624 (EWP) and Section 216 of the Flood Control Act of 1950, Public Law 81-516, 33 U.S.C. 701b-1; and Section 403 of the Agricultural Credit Act of 1978, Public Law 95334, as amended by Section 382, of the Federal Agriculture Improvement and Reform Act of 1996, Public Law 104-127, 16 U.S.C. 2203. EWP, through local sponsors, provides emergency measures for runoff retardation and erosion control to areas where a sudden impairment of a watershed threatens life or property. The Secretary of Agriculture has delegated the administration of EWP to the Chief or NRCS on state, tribal and private lands.

Signing this form indicates the sponsor concurs and agrees to provide the regional cost-share to implement the EWP recovery measure(s) determined eligible by NRCS under the terms and conditions of the program authority. Failure to provide a signature will result in the applicant being unable to apply for or receive a grant the applicable program authorities. Once signed by the sponsor, this information may not be provided to other agencies. IRS, Department of Justice, or other State or Federal Law Enforcement agencies, and in response to a court or administrative tribunal.

The provisions of criminal and civil fraud statutes, including 18 U.S.C. 286, 287, 371, 641, 651, 1001; 15 U.S.C. 714m; and 31 U.S.C. 3729 may also be applicable to the information provided. According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0578-0030. The time required to complete this information collection is estimated to average 117/1.96 minutes/hours per response, including the time for reviewing instructions, searching existing data sources, field reviews, gathering, designing, and maintaining the data needed, and completing and reviewing the collection information.

USDA NONDISCRIMINATION STATEMENT

"The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, martial status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programms.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202)720-2600 (vocie and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, SW., Washington, DC 20250-9410, or call (800)795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Civil Rights Statement of Assurance

The program or activities conducted under this agreement will be in compliance with the nondiscrimination provisions contained in the Titles VI and VII of the Civil Rights Act of 1964, as amended; the Civil Rights Restoration Act of 1987 (Public Law 100-259); and other nondiscrimination statutes: namely, Section 504 of the Rehabilitation Act of 1973, Title IX of the Amendments of 1972, the Age Discrimination Act of 1975, and the Americans with Disabilities Act of 1990. They will also be in accordance with regulations of the Secretary of Agriculture (7 CFR 15, 15a, and 15b), which provide that no person in the United States shall on the grounds of race, color, national origin, gender, religion, age or disability, be excluded from participation in, be denied the benefits of, or otherwise subjected to discrimination under any program or activity receiving Federal financial assistance from the U.S. Department of Agriculture or any agency thereof.

Section 2 Environmental Evaluation

2A Resource Concerns	2B Existing Condition	2C Alternative Designation		
		Proposed Action	No Action	Alternative
		2D Effects of Alternatives		
Soil				
Water				
Air				
Plant				
Animal				
Other				

DSR NO: S-TG-05

Section 2E Special Environmental Concerns

Resource Consideration	Existing Condition	Alternatives and Effects		
		Proposed Action	No Action	Alternative
Clean Water Act Waters of the U.S.				
Coastal Zone Management Areas				
Coral Reefs				
Cultural Resources				
Endangered and Threatened Species				
Environmental Justice				
Essential Fish Habitat				
Fish and Wildlife Coordination				
Floodplain Management				
Invasive Species				
Migratory Birds				
Natural Areas				
Prime and Unique Farmlands				
Riparian Areas				
Scenic Beauty				
Wetlands				
Wild and Scenic Rivers				

Completed By: _____ Date: _____

DSR NO: S-TG-05

Section 2F Economic

This section must be completed by each alternative considered (attach additional sheets as necessary).

	Future Damages ($)	Damage Factor (%)	Near Term Damage Reduction
Properties Protected (Private)			
		0%	
		0%	
		0%	
		0%	
Properties Protected (Public)			
		0%	
		0%	
		0%	
		0%	
Business Losses			
		0%	
		0%	
		0%	
		0%	
Other			
		0%	
		0%	
		0%	
		0%	
		0%	
Total Near Term Damage Reduction $			
Net Benefit (Total Near Term Damage Reduction minus Cost from Section 3)			-$3,267,000.0

Completed By: _____ Date: _____

Notes:

Section 2G Social Consideration This section must be completed by each alternative considered

(attach additional sheets as necessary).

	YES	NO	Remarks
Has there been a loss of life as a result of the watershed impairment?	☐	☑	
Is there the potential for loss of life due to damages from the watershed impairment?	☑	☐	
Has access to a hospital or medical facility been impaired by watershed impairment?	☐	☑	
Has the community as a whole been adversely impacted by the watershed impairment (life and property ceases to operate in a normal capacity)	☑	☐	
Is there a lack or has there been a reduction of public safety due to watershed impairment?	☑	☐	

Completed By: Thomas Lacko Date: 03/27/2012

Section 2H Group Representation and Disability Information

This section is completed only for the preferred alternative selected.

Group Representation	Number
American Indian/Alaska Native Female Hispanic	
American Indian/Alaska Native Female Non-Hispanic	
American Indian/Alaska Native Male Hispanic	
American Indian/Alaska Native Male Non-Hispanic	
Asian Female Hispanic	
Asian Female Non-Hispanic	
Asian Male Hispanic	
Asian Male Non-Hispanic	
Black or African American Female Hispanic	
Black or African American Female Non-Hispanic	
Black or African American Male Hispanic	
Black or African American Male Non-Hispanic	
Hawaiian Native/Pacific Islander Female Hispanic	
Hawaiian Native/Pacific Islander Female Non-Hispanic	
Hawaiian Native/Pacific Islander Male Hispanic	
Hawaiian Native/Pacific Islander Male Non-Hispanic	
White Female Hispanic	
White Female Non-Hispanic	
White Male Hispanic	
White Male Non-Hispanic	
Total Group	0

Census tract(s)_____

Completed By: _____ Date: _____

DSR NO: S-TG-05

Section 2I. Required consultation or coordination between the lead agency and/or the RFO and another governmental unit including tribes:

Easements, permissions, or permits:

Mitigation Description:

Agencies, persons, and references consulted, or to be consulted:

Section 3 - ENGINEERING SITE EVALUATION

DSR No: S-TG-05

Completed by: W. VanDeValk, J. Hornesky, T. Lacko (*Name*) Date: 03/27/2012

Section 3A

Locate and mark the beginning and end of the project reach at stable banks. see attached aerial photo location map

Length of project reach: see attached aerial photo location map

How will the bank stabilization be keyed back into the stable bank sections? 10 ft. key at each end of vanes *Include this length in the total.*

Locate a benchmark and grade control. Determine the average slope of the reach. 3.6% existing & proposed

Determine the typical cross section upstream and down. see table - "Estimated Stream Channel Geometry - Platter Kill at Flat Creek ...2011 EWP"

Determine the height of the low bank and the height of structural protection needed. approx. 3 ft (vanes), approx. 12 ft (riprap)

Look for opportunities to use vegetation rather than structural measures. Willow wattles/fascines at rock vanes & willow stakes in riprap

Identify if a sill/weir is required in the channel to stabilize the channel bottom. cross vanes for energy dissipation, sediment transport & grade control

How many sills/weirs are required? approx. 112 What spacing? approx. 50 ft.

What depth of key is required in the toe of the slope? 3' ☑ 2' ☐

Determine if a plunge pool is required. Size the plunge pool. W: _____ L: _____ D: _____

Determine the slope of the bank needed in the protected area. see attached aerial photo location map

Determine if geotextile fabric is needed behind the structure. N/A

Determine estimated quantities of excavation, fill, clearing, and debris removal for section B. approx. 36,000 cy fill

Determine the needed pollution control and dewatering practices. Dewatering assumed

Determine the need for traffic control or road closure. Not required

Make a plan view sketch that includes the following:

- The alignment of the streambank to be repaired and the protected structure. see attached aerial photo location map
- The existing stream thalweg, north, the bench mark, and apparent landowners. _____
- Identify items not to be disturbed during construction (e.g., trees, mailboxes, etc.). _____
- Identify debris to be removed. failed bank materials and fallen trees (see attached photos)
- Locate all utilities. _____
- Identify spoil/staging area. _____
- Identify construction limits and access. _____

Take and label photographs. see attached photos

DSR NO: S-TG-05

Section 3 Engineering Cost Estimate

Completed By: W. VanDeValk Date: 03/27/2012

This section must be completed by each alternative considered (attach additional sheets as necessary).

Proposed Recovery Measure (including mitigation)	Quantity	Units	Unit Cost ($)	Amount ($)
(See attached "Engineer's Construction Cost Estimate")	1	each	$3,267,000.0(	$3,267,000.0
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
			Total Installation Cost (Enter in Section 1F)$	3,267,000.00

Unit Abbreviations:

AC	Acre	LS	Lump Sum
CY	Cubic Yard	SF	Square Feet
EA	Each	SY	Square Yard
HR	Hour	TN	Ton
LF	Linear Feet	Other (Specifiy)	

DSR NO: S-TG-05

Section 4 NRCS EWP Funding Priority

Complete the following section to compute the funding priority for the recovery measures in this application (see instructions on page 14).

Priority Ranking Criteria	**Yes**	**No**		**Ranking Number Plus Modifer**
1. Is this an exigency situation?	☐	☑		
2. Is this a site where there is serious, but not immediate threat to human life?	☑	☐		2e
3. Is this a site where buildings, utilities, or other important infrastructure components are threatened?	☑	☐		
4. Is this site a funding priority established by the NRCS Chief?	☐	☑		
The following are modifiers for the above criteria			**Modifier**	
a. Will the proposed action or alternatives protect or conserve federally-listed threatened and endangered species or critical habitat?			No	
b. Will the proposed action or alternatives protect or conserve cultural sites listed on the National Register of Historic Places?			No	
c. Will the proposed action or alternatives protect or conserve prime or important farmland?			No	
d. Will the proposed action or alternatives protect or conserve existing wetlands?			No	
e. Will the proposed action or alternatives maintain or improve current water quality conditions?			Yes	
f. Will the proposed action or alternatives protect or conserve unique habitat, including but not limited to, areas inhabited by State-listed species, fish and wildlife management area, or State identified sensitive habitats?			No	

Enter priority computation in Section 1A, NRCS Entry, Funding priority number.

Remarks:

DSR NO: S-TG-05

Section 5A Findings

Finding: Indicate the preferred alternative from Section 2 (Enter to Section 1E):

I have considered the effects of the action and the alternatives on the Environmental Economic, Social; the Special Environmental Concerns; and the extraordinary circumstances (40 CFR 1508.27). I find for the reasons stated below, that the preferred alternative:

____ Has been sufficiently analyzed in the EWP PEIS (reference all that apply)
Chapter _____
Chapter _____
Chapter _____
Chapter _____
Chapter _____

____ May require the preparation of an environmental assessment or environmental impact statement.
The action will be referred to the NRCS State Office on this date:

NRCS representative of the DSR team:

Name/Title: Thomas Lacko/District Conservationist Date: 03/27/2012

Section 5B Comments:

Section 5C Sponsor Concurrence:

Sponsor Representative

Title: _____ Date: _____

Section 6 Attachments:

A. Location Map
B. Site Plan or Sketches
C. Other (explain)

INSTRUCTIONS FOR COMPLETING THE NRCS-PDM-20, DSR

	Explanation of Requested Item	Who Completes
Section 1	Enter Site Sponsor, Location, Evaluation, Selected Alternative, and Reviewed and Approval Signatures.	NRCS completes with voluntary assistance from Sponsor except for NRCS only portion of Section 1A.
1A	Enter the Date, DSR Number, Project Number. For NRCS only enter Eligible Yes/No, Approved Yes/No, Funding Priority Number, and Limited Resource Area Yes/No.	
1B	Enter Sponsor Name, Address, Telephone, Fax	
1C	Enter site location County, State, Congressional District, Latitude, Longitude, Section, Township, Range, UTM Coordinates, Drainage Name, Reach within drainage, and Damage Description.	
1D	Enter Yes/No and any Remarks for the Site Evaluation information. Any No response means the site is not eligible for EWP assistance and no further information is necessary to complete the DSR. (See NEWPPM 390-502.03 and 390-502-04) Enter Yes/No regarding whether the affected public has been informed of the EWP program.	
1E	Enter the proposed treatment and the cost of installation.	NRCS only.
1F	NRCS Review and Approval.	

	Explanation of Requested Item	Who Completes
Section 2	Use available natural resource, economic, and social, information, including the EWP Programmatic Environmental Impact Statement (PEIS), to briefly describe the effects of the alternatives to the proposed action including the "no action" alternative. Typically, the proposed action and no action are the alternatives considered for EWP recovery measures due to the focus on repairing or preventing damages within a watershed. However, in cases where additional alternatives are considered, include all pertinent information to adequately address the additional alternatives (e.g., proposed action would be bio-engineering for bank stabilization, no action alternative, and an additional alternative may be riprap for bank stabilization). Do not leave blanks where a consideration is not applicable, use NA to indicate the factor was considered but not applicable for the alternative.	NRCS completes with voluntary assistance from Sponsor.
2A	List all resource concerns which are relevant to the area of the proposed action and alternatives. Refer to National Bulletin 450-5-8 TCH-COMPLETING AND FILING MEASUREMENT UNITS FOR RESOURCE CONCERNS IN THE FIELD OFFICE TECHNICAL GUIDE (FOTG). Note: the affected area may extend beyond the construction foot print (ex. where water quality or water rights are affected downstream of the site).	
2B	Provide a brief description of the present condition of each resource concern listed in 2A. Quantify conditions where possible. Reference accompanying photo documentation.	
2C	Briefly summarize the practice/system of practices being proposed, as well as the "no action" alternative, and any other alternatives being considered. The "no action" alternative is the predicted future condition if no action is taken.	
2D	Document the efforts of the proposed action and alternatives for the considerations listed in 2A. Reference applicable quality criteria, information in the CPPE, and quantify effects whenever possible. Consider both long-term and short-term effects. Consider any effects which may be individually minor but cumulatively significant at a larger scale or over an extended time period. Clearly define the differences between proposed action, no action, and the other alternatives.	

2E	Enter Special Environmental Concerns for Clean Water Act Waters of the U.S., Coastal Zone Management Areas, Coral Reefs, Cultural Resources, Endangered and Threatened Species, Environmental Justice, Essential Fish Habitat, Fish and Wildlife Coordination, Floodplain Management, Invasive Species, Migratory Birds, Natural Areas, Prime and Unique Farmlands, Riparian Areas, Scenic Beauty, Wetlands, and Wild and Scenic Rivers for each alternative considered. In the case where the selected alternative from Section 5A impacts a Special Environmental Concern, additional information, coordination, permitting or mitigation may be required and adequate documentation should be prepared and attached to the DSR to identify how NRCS or the Sponsor addressed the concern	
2F	Identify Property Protected both private and public, business losses and other economic impacts considered for each alternative. Enter the dollar value of the potential future damages if no action is taken in the Future Damage (5) column. This would be the estimate of the value lost if the EWP recovery measure is not installed. Use the repair cost or damage dollar method to determine the estimate of future damages. The repair cost method uses the costs to return the impaired property, good, or services based on their original pre-event condition or value. The damage dollar method uses an estimate of the future damage to value (e.g. if the structure is condemned, then enter the value of the structure). Enter the estimated amount based upon existing information or information furnished by the sponsor, contractors or others with specific knowledge for recovery from natural disasters for each alternative considered. Often market values for properties or services can be obtained from personnel at the local county/parish tax assessment office. The DSI team needs to determine the Damage Factor (%) which is a coefficient that indicates the degree of damage reduction to a property that is attributed to the effect of the proposed EWP recovery measures. Use an appropriate estimate of how much of the damage the EWP recovery measure will avoid for the alternative being considered. If the recovery measures from a single site will prevent 100 percent of the damage use 100 percent. The Near Term Damage Reduction is the Future Damage ($) times the Damage Factor (%). Sum the Near Term Damage Reduction values to calculate the Total Near Term Damage Reduction. Enter the Net Benefit which is computed by subtracting the Cost from section 3 from the total near term damage reduction. The economic section must be completed for each alternative considered. Attach additional sheets as necessary.	
2G	Enter information to describe the potential social impacts and considerations for each alternative. Answer Yes or No and any remarks necessary to adequately address each question. The information may be obtained through interviews with community leaders, government officials or sponsors. Factors such as road closures, loss of water, electricity, access to emergency services are used when answering whether the community as a whole has been impaired. This information is part of the environmental evaluation portion of the DSR but may be pertinent in Section 4 regarding priorities. The Social Considerations Section must be completed for each alternative considered. Attach additional sheets as necessary.	
2H	Enter the Group Representation Information for the preferred alternative. Use the most recent census tract information based upon where the EWP recovery measures are located.	Sponsor completes.

2I	Enter whether easement, permissions, or permits, and mitigation will require consultation or coordination for the selected alternative (e.g., Clean Water Act section 404 permit, Endangered Species Act section 10 permits, and any State or county permits or requirements). Describe mitigation to be applied that will offset any adverse impacts and attach any documentation from other agencies regarding mitigation requirements.	NRCS completes with voluntary assistance from Sponsor.

	Explanation of Requested Item	**Who Completes**
Section 3	Enter Proposed Recovery Measure(s) including Quantity, Units, Unit Cost, and Total Amount Cost. Enter sum of all Proposed Recovery Measure Costs to calculate Total Costs. Enter Total Installation Costs in Section 1F. The Engineering Cost Estimate must be completed for each alternative considered. Attach additional sheets as necessary.	NRCS completes with voluntary assistance from Sponsor.

	Explanation of Requested Item	**Who Completes**
Section 4	This section is used to determine the Funding Priority for the preferred alternative and sequence for initiating recovery measures. Enter Yes/No for questions 1 through 4 and enter the number (exigency 1, serious threat to human life 2, etc.) in the right column, Ranking Number Plus Modifier. Complete the Modifier portion by placing the alphabetic indicator a. through f. in the Modifier column. Complete the Ranking Number Plus Modifier column by entering the alphabetic indictor(s) that exists within the site. The number of the site designates the priority (e.g., a site with a designation of 2 is a higher priority that a site with a designation of 3). The modifiers increase the priority for the same numeric site (e.g., a site with a designation of 1a, would be a higher priority than a site with a designation of 1, a site with a designation of 2bc would be a higher priority than a site designated as 2b). Enter the Funding Priority in Section 1A.	NRCS completes with voluntary assistance from Sponsor.

	Explanation of Requested Item	**Who Completes**
Section 5	Enter the Findings, Rationale Supporting Findings, NRCS Representative signature and Comments, and Concurrence signature by the Sponsor(s).	NRCS completes.
5A	Indicate the preferred alternative and check the applicable finding being made. The NRCS Representative signs indicating the Finding selected. If the proposed action was adequately addressed in the PEIS, check all appropriate chapter paragraphs.	
5B	Enter any additional Comments.	
5C	Sponsor(s) review and concurrence.	Sponsor(s) signature.

Section 6	Include attachments for location map, site sketch or plan and other information as needed.	NRCS completes with voluntary assistance from Sponsor.

Computation Sheet

NRCS–ENG-523A Rev. 6-2002

U.S. Department of Agriculture
Natural Resources Conservation Service

State		Project		
NY		EWP - Flat Creek Rd. (Platter Kill)		
By	Date	Checked by	Date	Job No.
WAV	3/20/12			DSR#: S-TG-05
Subject				Sheet 1 of 14
Conceptual Design Analysis & Quantities for Cost Estimating				

GIVEN: An approx. 5,500 LF reach of the Platter Kill along Flat Creek Rd. immediately upstream of the approx. 15'W x 7'H Concrete box culvert near the intersection with Valenti Road in the Town of Gilboa, Schoharie County. Per the digital USGS Topo map layer: Downstream end elevation (at inlet of box culvert) ≈ 1100' AMSL and Upstream end elevation ≈ 1300' AMSL.

① Existing Conditions (per "Platter Kill... Existing Condrtions..." spreadsheet, attached):

Reach Length ≈ 5,500 LF (pre-flood and post-flood)

Reach Slope ≈ 3.6% (pre-flood and post-flood)

Reach US Elev = 1,300' AMSL
Reach DS Elev. = 1,100' AMSL
Reach Fall = 200'

Valley Length ≈ 4,950 LF
Stream Sinuosity ≈ 1.1 (pre-flood and post-flood)

Based on a field reconnaissance on 2/01/12 and again on 3/08/12, the stream alignment does appear to have changed in a few locations, especially near the lower end of the reach. It is anticipated that the restoration work will include reestablishing the original meander pattern, but it is unlikely that this will have an appreciable effect on stream sinuosity. Therefore, assume final sinuosity will remain at approximately 1.1 and no appreciable stream lengthening will occur.

Computation Sheet

NRCS–ENG-523A Rev. 6-2002

U.S. Department of Agriculture
Natural Resources Conservation Service

State		Project		
NY		EWP - Flat Creek Rd. (Platter Kill)		
By: WAV	Date: 3/22/12	Checked by	Date	Job No.: DSR #: S-TG-05
Subject: Conceptual Design Analysis & Quantities for Cost Estimating				Sheet 2 of 14

(2) Conceptual Design Geometry (per "Estimated Stream Channel Geometry - Platter Kill & Flat Creek vs Little Schoharie Creek - 2011 EWP Cost Estimating" spreadsheet, attached):

Bankfull Flow est., Q_{BF} = 375 cfs

" Area ", A_{BF} = 75 sq.ft.

" Width ", W_{BF} = 35 ft.

" Depth ", D_{BF} = 2.1 ft

Max BF Depth ", D_{Max} = 3.2 ft

(3) Channel Length, Slope & Grade Control Conceptual Design:

For B & C Stream Types, Sinuosity should be at least 1.2. However, as discussed in (1) above, restoring pre-flood meander pattern is not expected to increase current stream length significantly. Therefore, existing stream slope of 3.6% is not expected to be changed appreciably by the restored meanders. An average stream slope of 3.6% will result in much too high flow velocities and shear stresses (Vel. on the order of 7.7 ft/sec and $\tau \approx 4.7$ lb/ft^2 ⇒ See NY-Hydraulics2_WAV.xlsx, Channel flow - Unaltered Slope tab).

From NY-Hydraulics2_WAV.xlsx, channel flow - proposed tab, stream slope needs to be approx. 0.016 ft/ft to produce target flow conditions as follows:

@ Stream slope = 0.016 ft/ft and Parabolic channel w/ Max Depth = 3.2 ft, Top Width = 35 ft and Manning's n = 0.06 (for B-type stream w/ boulder bed material)

A = 75 sq.ft = 75 sq.ft. Target

T = W = 35 ft = 35 ft Target

} OK

Q = 383 cfs ≈ 375 cfs Target ⇒ V = 5.1 ft/sec ≈ 5 ft/sec Target

State	Project			
NY	EWP – Flat Creek Rd. (Platter Kill)			
By: WAV	Date: 3/22/12	Checked by	Date	Job No.: DSR#: S-TG-05
Subject: Conceptual Design Analysis & Quantities for Cost Estimating				Sheet 3 of 14

③ Channel Length, Slope & Grade Control Conceptual Design cont.:

Then, 5500± LF stream × 0.016 ft/ft = 88 ft of fall due to slope.

The remainder of the existing fall (200 ft − 88 ft = 112 ft) to be accomplished with rock vanes for energy dissipation, sediment transport, and grade control. Assuming 1-foot of net drop across each cross vane, this will require approx. 112 cross vanes over the 5500± LF reach.

∴ Assume 112 rock cross vanes required

Cross vane geometry as indicated on NY-Hydraulics2_WAV.xlsx, rock vane design_WAV tab (attached):

Channel Top Width	=	35 ft
Bank Angle	=	25 degrees
Vane Height (Avg.)	=	5 ft
Vane Width	=	3 ft
Overall Vane Length	=	68 ft
Total Keyway Length	=	20 ft
Total Vane Face Area	=	434 sq. ft. each

112 cross vanes × 434 $\frac{\text{sq. ft.}}{\text{vane}}$ = 48,608 sq. ft ⇒ **49,000 sq. ft. Total Face Area of Cross Vanes**

④ Temporary Bank Stabilization (Bioengineering) at Cross Vanes &

Assume willow wattles/fascines used at each cross vane for temporary bank stabilization. At each vane, assume 2 rows, each 40 ft long, on each side of stream.

2 rows × 40 ft. each × 2 sides = 160 LF at each cross vane

@ 112 cross vanes = 17,920 LF willow wattles/fascines

Use: 18,000 LF willow wattles/fascines

* Assume 100 LF/hr can be installed w/ unskilled labor & 1 backhoe

State		Project		
NY		EWP - Flat Creek Rd. (Platter Kill)		
By	Date	Checked by	Date	Job No.
WAV	3/22/12			DSR #: S-TG-05
Subject				Sheet 4 of 14
Conceptual Design Analysis & Quantities for Cost Estimating				

(5) Gravel Relocation/Streambed Elevation:

Much of the 5500± LF of existing stream channel has experienced some level of streambed downcutting. This most likely occurred when extremely high flood flows mobilized the large bed and bank armoring, exposing the underlying material to very high shear stresses. For the purposes of this conceptual analysis, it is assumed that the streambed will be raised to reverse this downcutting, to reconnect the stream with its floodplain. For the purposes of this conceptual analysis/design, it is assumed that the streambed will be raised an average of 5ft over its entire 5500 LF length. While some of this fill material may come from the existing raw banks, this is assumed to be unappreciable, primarily due to the difficulties associated with separating out the necessary larger sized materials. It is further assumed that as the stream channel is realigned and raised, a small bankfull bench will be constructed at the base of the high raw banks and that these banks will be allowed to self-stabilize over time. This assumption is considered reasonable since the raw banks are generally not immediately adjacent to roadways or structures, and mechanically stabilizing these extensive, high raw banks is most likely cost-prohibitive and not practical. Assuming an average width of streambed fill of 35 ft, resulting streambed elevation fill volume is estimated as follows:

5,500 LF × 35ft wide × 5ft high (avg.) = 962,500 cu.ft. = 35,650 cu.yd.

Use: 36,000 cu.yd. Cobble Fill for streambed elevation

State	Project			
NY	EWP - Flat Creek Rd. (Platter Kill)			
By: WAV	Date: 3/26/12	Checked by	Date	Job No.: DSR#: S-TG-05
Subject: Conceptual Design Analysis & Quantities for Cost Estimating				Sheet 5 of 14

⑥ Stream Channel Realignment:

As mentioned in ① above, it is assumed that restoration work will include reestablishing the stream's original meander pattern, especially near the lower end of the reach. For the purposes of this conceptual analysis, it is assumed realignment will occur at abandoned meander bends over a total length of 500 LF. It is further assumed that, on average, required excavation area will be three times the required bankfull channel area of 75 sq.ft. Then, for 500 LF of reestablished channel, required excavation volume is estimated as:

500 LF (new channel) × 225 sq.ft. (avg. area) = 112,500 cu.ft.
= 4,200 cu.yd.

Assuming that an equipment group of 1 excavator (mid-size), 1 bulldozer (mid-size), 1 dump truck, and 1 skilled labor (foreman) can remove/relocate approx. 75 cu.yd. of material per hour and place this in its final location. Then

$\frac{4,200 \text{ c.y.}}{75 \text{ c.y./hr}} = 56 \text{ hrs} \Rightarrow$ **Use: 60 hrs req'd for 1 Excavator, 1 Dozer, 1 Dump Truck & 1 skilled labor (Foreman/Supt.)**

⑦ Rip-Rap Bank Stabilization:

Heavy rip-rap was placed along a 100 LF± stretch of roadway near the middle of the reach, in an attempt to stabilize an approx. 36-ft high eroding bank. Unfortunately, the riprap appears to be slumping toward the streambed, likely because the base of the riprap does not appear to have been keyed into the toe of the slope. For the purposes of this Conceptual analysis, it is assumed that the lower portion of the riprap will need to be removed, a rock key installed, and riprap replaced. Since the in-place riprap should be able to be re-used, cost for this work is estimated by assuming new installation over a length of 120 LF (100 LF plus 2 15-ft keys into bank) and a bank height of 12 ft (⅓ total bank height).

Use: 130 LF of Heavy Rock Riprap for a 12-ft High Elev. Difference @ 2H:1V and 250 Willow Stakes planted near the base of the riprap

State	Project			
NY	EWP - Flat Creek Rd. (Platter Kill)			
By: WAV	Date: 3/26/12	Checked by	Date	Job No.: DSR# & S-TG-05
Subject: Conceptual Design Analysis: Quantities for Cost Estimating				Sheet 6 of 14

(8) Dewatering:

Assume that some level of dewatering will be required. Assume that approx. 100 LF of channel can be reconstructed per day.

Then, $\frac{5{,}500\ \text{LF (Total)}}{100\ \text{LF/day}} = 55\ \text{days}$

Use: 55 days of Major Channel Reconstruction (for Dewatering)

(9) Seeding / Mulching:

Assume a 100-ft wide swath on each side of the restored channel is to be seeded/mulched.

Then, $5{,}500\ \text{LF} \times 100\ \frac{\text{ft}}{\text{side}} \times 2\ \text{sides} = 1{,}100{,}000\ \text{sq. ft}$

$= 25.2\ \text{acres}$

Use: 25 acres Seeding/Mulching

(10) Conceptual-Level Cost Estimate:

See attached "Engineer's Construction Cost Estimate" dated 3/26/12 ⇒ $3,267,000

Platter Kill along Flat Creek Road above Box Culvert - Existing Conditions as of January 2012

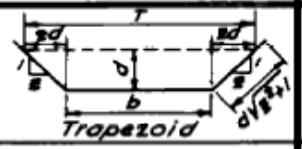
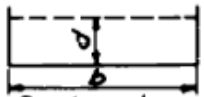
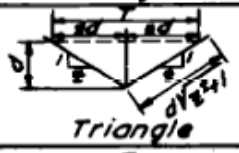
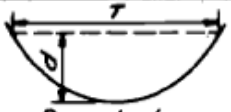
Reach	Description	Stream Length Pre-Flood (ft)	Stream Length Post-Flood (ft)	Valley Length (ft)	Stream Sinuosity Pre-Flood	Stream Sinuosity Post-Flood	Stream Slope Pre-Flood (%)	Stream Slope Post-Flood (%)	Raw Bank Area Left Bank (sq.ft.)	Raw Bank Area Right Bank (sq.ft.)	Raw Bank Area Total (sq.ft.)	Potential Sediment Load @1-ft loss (tons)	Potential Sediment Load @3-ft loss (tons)	Potential Sediment Load @5-ft loss (tons)
A	Platter Kill along Flat Creek Road	5,500	5,500	4,950	1.1	1.1	3.6	3.6	123,400	73,500	196,900	10,337	31,012	51,686
	Total	5,500	5,500	4,950	1.1	1.1			123,400	73,500	196,900	10,337	31,012	51,686

U:\ENG Files\EWP\2011\August_2011\Schoharie_Cty\DSRs\05-Gilboa_FlatCreek\spreadsheet\[Platter_Kill_existing_conditions.xlsx]Sheet1

Estimated Stream Channel Geometry - Platter Kill @ Flat Creek vs. Little Schoharie Creek 2011 EWP Cost Estimating

Preliminary Hydrologic Analysis for Platter Kill @ Flat Creek Rd. and at various locations on the Little Schoharie Creek for EWP Cost Estimating

Parameter	Little Schoharie @ Gridley Rd (Reach D)	Platter Kill at Flat Creek Rd. Box Culvert	Little Schoh. just above Lawton Hollow	Little Scho. below Brooky Holl. (Reach C)	Notes/Comments
Drainage Area, DA (sq.mi.)	10.2 (sq.mi.)	10.8 (sq.mi.)	11.1 (sq.mi.)	15.1 (sq.mi.)	
Flow, Q (cfs)					
Del. Cty. SWCD 2005 Regional Curve Q_{BF} (= 28.65*$DA^{1.01}$)	299 (cfs)	317 (cfs)	326 (cfs)	445 (cfs)	
USGS StreamStats Q1.5	273 "	296 "	296 "	397 "	
USGS StreamStats Q2	369 "	405 "	400 "	538 "	
USGS StreamStats Q5	666 "	739 "	722 "	971 "	
USGS StreamStats Q_{BF}	717 "	750 "	766 "	974 "	
Average Q_{BF}	508 "	533 "	546 "	709 "	
Selected Q_{BF} (cfs)	350 (cfs)	375 (cfs)	380 (cfs)	500 (cfs)	
Bankfull Area, A_{BF} (sq.ft.) and Bankfull Velocity, V_{BF} (ft/sec)					
Del. Cty. SWCD 2005 Regional Curve A_{BF} (= 7.01*$DA^{0.93}$)	61 (sq.ft.) 5 (ft/sec)	64 (sq.ft.) 5 (ft/sec)	66 (sq.ft.) 5 (ft/sec)	88 (sq.ft.) 5 (ft/sec)	
USGS StreamStats A_{BF}	109 " 7 "	114 " 7 "	116 " 7 "	148 " 7 "	
Average A_{BF}	85 " 6 "	89 " 6 "	91 " 6 "	118 " 6 "	
Selected A_{BF} (sq.ft.)	70 (sq.ft.) 5 (ft/sec)	75 (sq.ft.) 5 (ft/sec)	76 (sq.ft.) 5 (ft/sec)	100 (sq.ft.) 5 (ft/sec)	
DCSWCD Post-Flood curve for East Branch Del. Basin (for comparison)	61	64	66	88	
Bankfull Width, W_{BF} (ft)					
DCSWCD 2005 Reg. Curve A_{BF} and W/D=16 for upper reaches (B-Type), W/D=18 for lower reaches (C-Type)	31 (ft)	32 (ft)	32 (ft)	37 (ft)	
USGS StreamStats W_{BF}	50 "	51 "	52 "	60 "	
Average W_{BF}	40 "	42 "	42 "	49 "	
Selected W_{BF} (ft)	35 (ft)	35 (ft)	36 (ft)	40 (ft)	
DCSWCD Post-Flood curve for East Branch Del. Basin (for comparison)	33	34	34	41	
Bankfull Depth, D_{BF} (ft)					
DCSWCD 2005 Reg. Curve A_{BF}/W_{BF}	1.9 (ft)	2.0 (ft)	2.0 (ft)	2.3 (ft)	
USGS StreamStats D_{BF}	2.2 "	2.3 "	2.3 "	2.5 "	
Average D_{BF}	2.1 "	2.2 "	2.2 "	2.4 "	
Selected D_{BF} (ft)	2.0 (ft)	2.1 (ft)	2.1 (ft)	2.5 (ft)	
DCSWCD Post-Flood curve for East Branch Del. Basin (for comparison)	1.9	1.9	1.9	2.1	
Resulting W/D ratio (dimensionless)	18	16	17	16	
Resulting D_{max} (cross vane sizing)	3.0	3.2	3.2	3.8	

Section	Area a	Wetted Perimeter p	Hydraulic Radius r	Top Width T
 Trapezoid	$bd+zd^2$	$b+2d\sqrt{z^2+1}$	$\frac{bd+zd^2}{b+2d\sqrt{z^2+1}}$	$b+2zd$
 Rectangle	bd	$b+2d$	$\frac{bd}{b+2d}$	b
 Triangle	zd^2	$2d\sqrt{z^2+1}$	$\frac{zd}{2\sqrt{z^2+1}}$	$2zd$
 Parabola	$\frac{2}{3}dT$	$T+\frac{8d^2}{3T}$	$\frac{2dT^2}{3T^2+8d^2}$	$\frac{3a}{2d}$

Platter Kill along Flat Creek Rd. above Box Culvert - Existing Conditions (Jan. 2012) - Trapezoidal Channel

Given

Slope (s) = 0.036

Manning's n = 0.06

Compute

	Bottom Width b	Flow Depth d	Side Slope z	Top Width T	Wetted Perimeter p	Hydraulic Radius r	Area a	Velocity V	Discharge Q	Shear Stress τ	Average Rock feet
Trapezoid	20	6	2	44	46.83	4.10	192.00	12.07	2317.33	9.21	4.23474581
Rectangle				0	0.00	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Triangle				0	0.00	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Parabola					#DIV/0!	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Specific Weight of Water = 62.4 lbs/ft^3

Shield's Equation

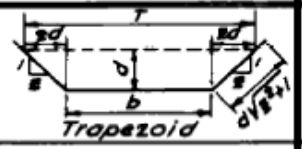
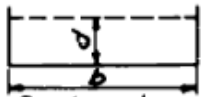
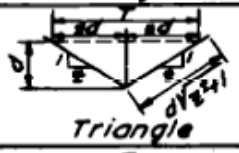
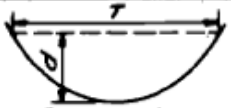
τ = Shear Stress (lbs/ft^2)

γ= specific weight of water (lbs/ft^3)

R=hydraulic radius (ft)

$$\tau = \gamma RS$$

$$V = \frac{1.49}{n} R^{2/3} S^{1/2}$$ Q=VA

Section	Area a	Wetted Perimeter p	Hydraulic Radius r	Top Width T
 Trapezoid	$bd+zd^2$	$b+2d\sqrt{z^2+1}$	$\frac{bd+zd^2}{b+2d\sqrt{z^2+1}}$	$b+2zd$
 Rectangle	bd	$b+2d$	$\frac{bd}{b+2d}$	b
 Triangle	zd^2	$2d\sqrt{z^2+1}$	$\frac{zd}{2\sqrt{z^2+1}}$	$2zd$
 Parabola	$\frac{2}{3}dT$	$T+\frac{8d^2}{3T}$	$\frac{2dT^2}{3T^2+8d^2}$	$\frac{3a}{2d}$

Platter Kill along Flat Creek Rd. above Box Culvert - Stream Length unchanged at ~ 5500 LF with sinuosity ~ 1.1. Resulting slope unaltered.

Given

Slope (s) = 0.036

Manning's n = 0.06

Compute

	Bottom Width b	Flow Depth d	Side Slope z	Top Width T	Wetted Perimeter p	Hydraulic Radius r	Area a	Velocity V	Discharge Q	Shear Stress τ	Average Rock feet
Trapazoid				0	0.00	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Rectangle				0	0.00	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Triangle				0	0.00	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Parabola		3.2		35	35.78	2.09	74.67	7.69	574.52	4.69	3.85287957

Specific Weight of Water = 62.4 lbs/ft^3

Shield's Equation

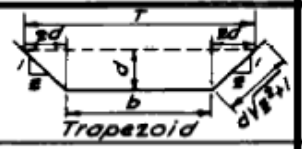
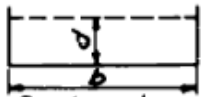
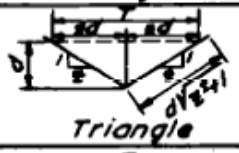
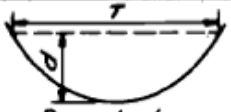
τ = Shear Stress (lbs/ft^2)

γ= specific weight of water (lbs/ft^3)

R=hydraulic radius (ft)

$$\tau = \gamma RS$$

$$V = \frac{1.49}{n} R^{2/3} S^{1/2} \qquad Q=VA$$

Section	Area a	Wetted Perimeter p	Hydraulic Radius r	Top Width T
 Trapezoid	$bd+zd^2$	$b+2d\sqrt{z^2+1}$	$\frac{bd+zd^2}{b+2d\sqrt{z^2+1}}$	$b+2zd$
 Rectangle	bd	$b+2d$	$\frac{bd}{b+2d}$	b
 Triangle	zd^2	$2d\sqrt{z^2+1}$	$\frac{zd}{2\sqrt{z^2+1}}$	$2zd$
 Parabola	$\frac{2}{3}dT$	$T+\frac{8d^2}{3T}$	$\frac{2dT^2}{3T^2+8d^2}$	$\frac{3a}{2d}$

Platter Kill along Flat Creek Rd. above Box Culvert - proposed conditions to model selected bankfull parameters. Stream Length remains at ~ 5500 LF with sinuosity ~ 1.1. Required slope of 0.016 ft/ft to be achieved with cross-vanes.

Given

Slope (s) = 0.016

Manning's n = 0.06

Compute

	Bottom Width b	Flow Depth d	Side Slope z	Top Width T	Wetted Perimeter p	Hydraulic Radius r	Area a	Velocity V	Discharge Q	Shear Stress τ	Average Rock feet
Trapazoid				0	0.00	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Rectangle				0	0.00	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Triangle				0	0.00	#DIV/0!	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Parabola		3.2		35	35.78	2.09	74.67	5.13	383.01	2.08	3.39429853

Specific Weight of Water = 62.4 lbs/ft^3

Shield's Equation

τ = Shear Stress (lbs/ft^2)

γ= specific weight of water (lbs/ft^3)

R=hydraulic radius (ft)

$$\tau = \gamma RS$$

$$V = \frac{1.49}{n} R^{2/3} S^{1/2}$$ Q=VA

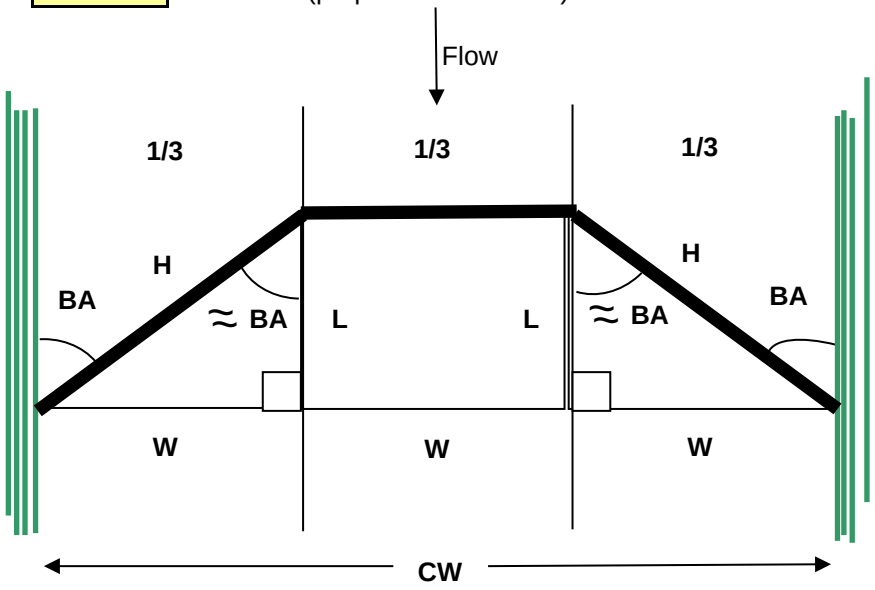
2011 Schoharie County EWP By: W. VanDeValk

DSR No.: S-TG-05 Date: 3/20/2012

Site Description: Platter Kill at Flat Creek Road

Given (Vane Height assumed to vary from 6 ft in center of channel to 4 ft at keyways)

CW =	35	ft	(channel top width)	Keyway into bank	left bank 10	ft
BA =	25	o	(stream bank to structure angle)			
Vane Height =	5.0	ft	(Top Rock to Bottom of Footer)	Keyway into bank	right bank 10	ft
Vane Width =	3.0	ft	(perpendicular to flow)			



Find

Solution

1) Determine weir length, ft.

Tan(BA) = W/L

Sin(BA) = W/H

W =	12	ft	(CW/3)
L =	25	ft	(W/TAN(BA))
H =	28	ft	(W/SIN(BA))

Assume thalweg bed elev. = 100,
vane elev. @ thalweg = 101,
BF elev. = 103.2 (Dmax = 3.2 ft),
top of rock elev. = 103.2

Overall Weir Length

67 ft ((H*2)+W)

Left Arms				
Arm Length	TW Elev.	BKF Elev.	Slope (%)	Keyway Length
28	101.0	103.2	7.97%	10

Right Arms				
Arm Length	TW Elev.	BKF Elev.	Slope (%)	Keyway Length
28	101.0	103.2	7.97%	10

Invert Sill	
Sill Length	
12	
Center 1/3	

Drop in vane elevation 2.2 ft left

2.2 ft right

	Length (ft)	Face Area (ft^2)	Vol (ft^3)	Vol (yds^3)	Tons
Vane Arm Totals =	55	276	828	31	61
Invert Sill Totals =	12	58	175	6	13
Keyway Totals =	20	100	300	11	22
Totals:	87	434	1303	48	97

2011 Schoharie County EWP				By:	W. VanDeValk	
Engineer's Construction Cost Estimate				**Date:**	3/26/2012	
DSR No.:	**S-TG-05**		**Sponsor:**			
Site Description:	Platter Kill at Flat Creek Rd.					
Item	**Description**	**Unit cost**	**Unit**	**Quantity**	**Item cost**	
Mobilization/Demobilization		$5,000.00	job	2	$10,000	
Rip rap	Heavy stone (in place)	$67.00	ton	0	$0	
		$100.00	cy	381	$38,100	
	Medium stone (in place)	$60.00	ton	0	$0	
		$90.00	cy	0	$0	
	Dumped rock (in place)	$53.00	ton	0	$0	
		$80.00	cy	0	$0	
	Pinning	$10.00	ft wall/# rock layers	0	$0	
Gravel	2" minus screened (in place)	$14.00	cy	0	$0	
	#2 Stone (in place)	$22.00	cy	0	$0	
	Cobbles (in place)	$15.00	cy	36000	$540,000	
	Bankrun (in place)	$12.00	cy	0	$0	
Geotextile		$0.15	sq ft	0	$0	
Geo-grid		$0.30	sq ft	0	$0	
Trucking		$85.00	hr	60	$5,100	
Excavator	large	$170.00	hr	0	$0	
	mid-size	$140.00	hr	60	$8,400	
Backhoe		$120.00	hr	180	$21,600	
Dozer	large	$150.00	hr	0	$0	
	mid-size	$130.00	hr	60	$7,800	
Labor	skilled	$50.00	hr	60	$3,000	
	unskilled	$35.00	hr	180	$6,300	
Willow stakes	w/o labor	$2.00	stake	250	$500	
Wattles & Fascines	w/o labor	$9.00	lin ft	18000	$162,000	
Brush layering	w/o labor	$18.00	bundle	0	$0	
Brush mattress	w/o labor	$3.00	sq ft	0	$0	
Silt fence	installed & maintained	$5.00	lin ft	0	$0	
Straw blanket	100 sq yard/roll	$175.00	roll	0	$0	
Geo-jute	65 sq yard/roll	$120.00	roll	0	$0	
Dewatering	small pump (<4"), incl. setup	$3,000.00	day	0	$0	
	mid-size (6") incl. setup	$5,000.00	day	55	$275,000	
	large (8-12") incl. setup	$8,000.00	day	0	$0	
Seeding & Mulching		$2,000.00	acre	25	$50,000	
		$0.05	sq ft	0	$0	
Overhead and Profit, %	20		Overhead and Profit		$225,560	
			Subtotal, excluding Wall Systems		$1,353,360	
Wall System costs (in place; wall system only; includes OH&P)						
Sheet Piling	Under 1000 sq ft	$35.00	sq ft	0	$0	
	Over 1000 sq ft	$30.00	sq ft	0	$0	
Rip rap	6' wall stacked/pinned	$33.00	sq ft	49000	$1,617,000	434 x 112 =
	8' wall stacked/pinned	$31.00	sq ft	0	$0	
	10' wall stacked/pinned	$30.00	sq ft	0	$0	
	12' wall stacked/pinned	$29.00	sq ft	0	$0	
Precast concrete	T-wall system	$35.00	sq ft	0	$0	
	Recon wall system	$35.00	sq ft	0	$0	
Reinforced earth	w/geogrid & fill (15' depth)	$22.00	sq ft	0	$0	
				Subtotal	$2,970,360	
Contingency %	10		Contingency		$297,036	
Additional %	0		Additional		$0	
			Total Estimate		**$3,267,396**	

Conversions for estimating quantities

Assume for each 100' wall, will need to dewater for 3 days

Estimating sloped rip rap protection

Depth of key/toe (2 or 3')	3	ft	Quantity in key/toe	12	(based on trapezoidal key)	
Thickness of rip rap	2.5	ft				

Elevation difference	length of slope for 1.5:1 (ft)	quantity/ft @ 1.5:1		lin footage	total rock	
4	7.21	1.11	cy/ft	0	0	cy
5	9.01	1.28	cy/ft	0	0	cy
6	10.82	1.45	cy/ft	0	0	cy
7	12.62	1.61	cy/ft	0	0	cy
8	14.42	1.78	cy/ft	0	0	cy
9	16.22	1.95	cy/ft	0	0	cy
10	18.03	2.11	cy/ft	0	0	cy
11	19.83	2.28	cy/ft	0	0	cy
12	21.63	2.45	cy/ft	0	0	cy

Elevation difference	length of slope for 2:1	quantity/ft @ 2:1				
4	8.94	1.27	cy/ft	0	0	cy
5	11.18	1.48	cy/ft	0	0	cy
6	13.42	1.69	cy/ft	0	0	cy
7	15.65	1.89	cy/ft	0	0	cy
8	17.89	2.10	cy/ft	0	0	cy
9	20.12	2.31	cy/ft	0	0	cy
10	22.36	2.51	cy/ft	0	0	cy
11	24.60	2.72	cy/ft	0	0	cy
12	26.83	2.93	cy/ft	130	381	cy

2011 EWP- Gilboa (T) Flat Creek Rd. (Platter Kill)

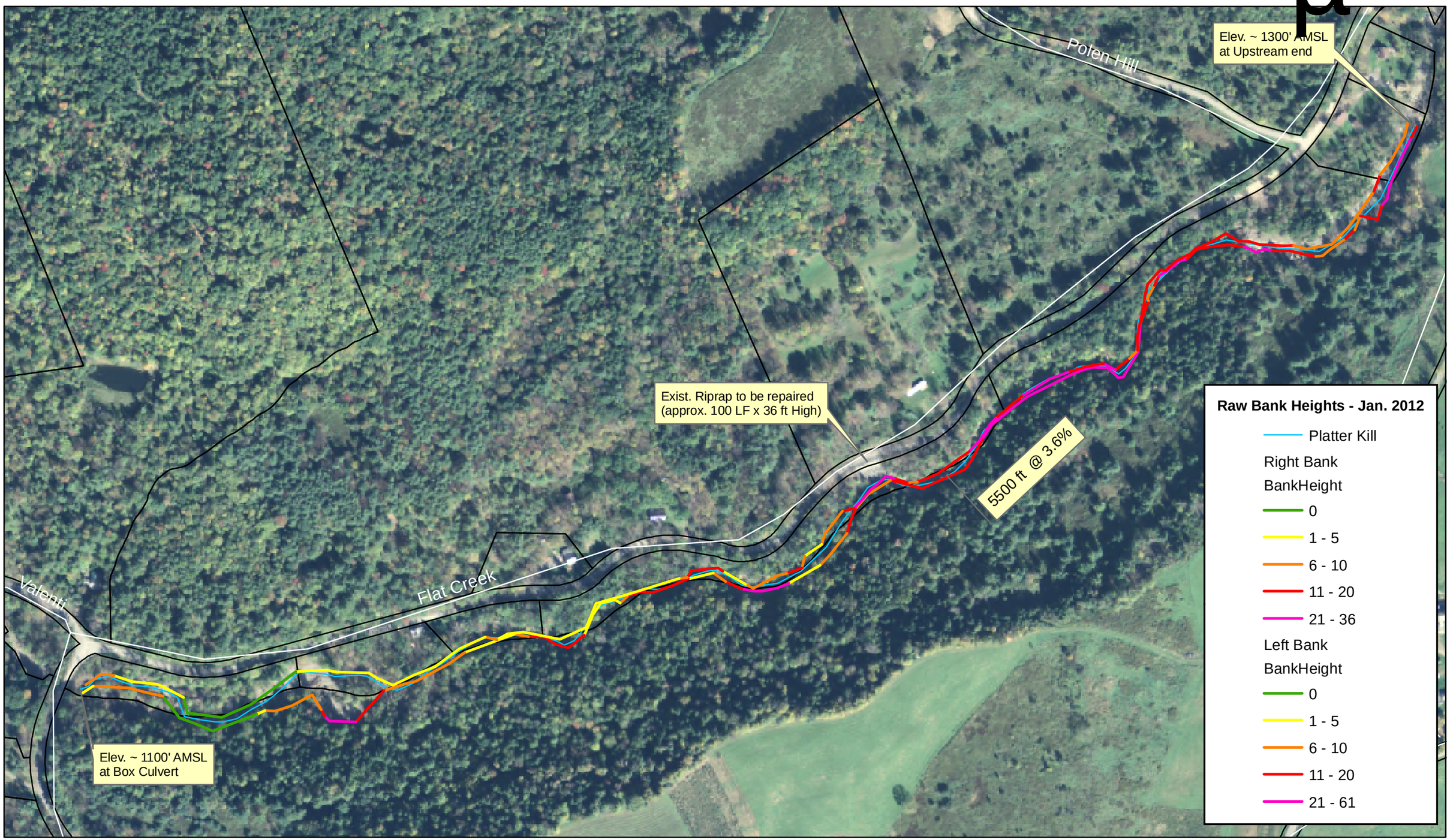


Photo 15: approx. 40-ft high raw left bank near upper end of reach

Photo 21: approx. 12-ft high raw right bank near upper end of reach

Photo 170: raw right bank showing active erosion at toe of loose, saturated soil

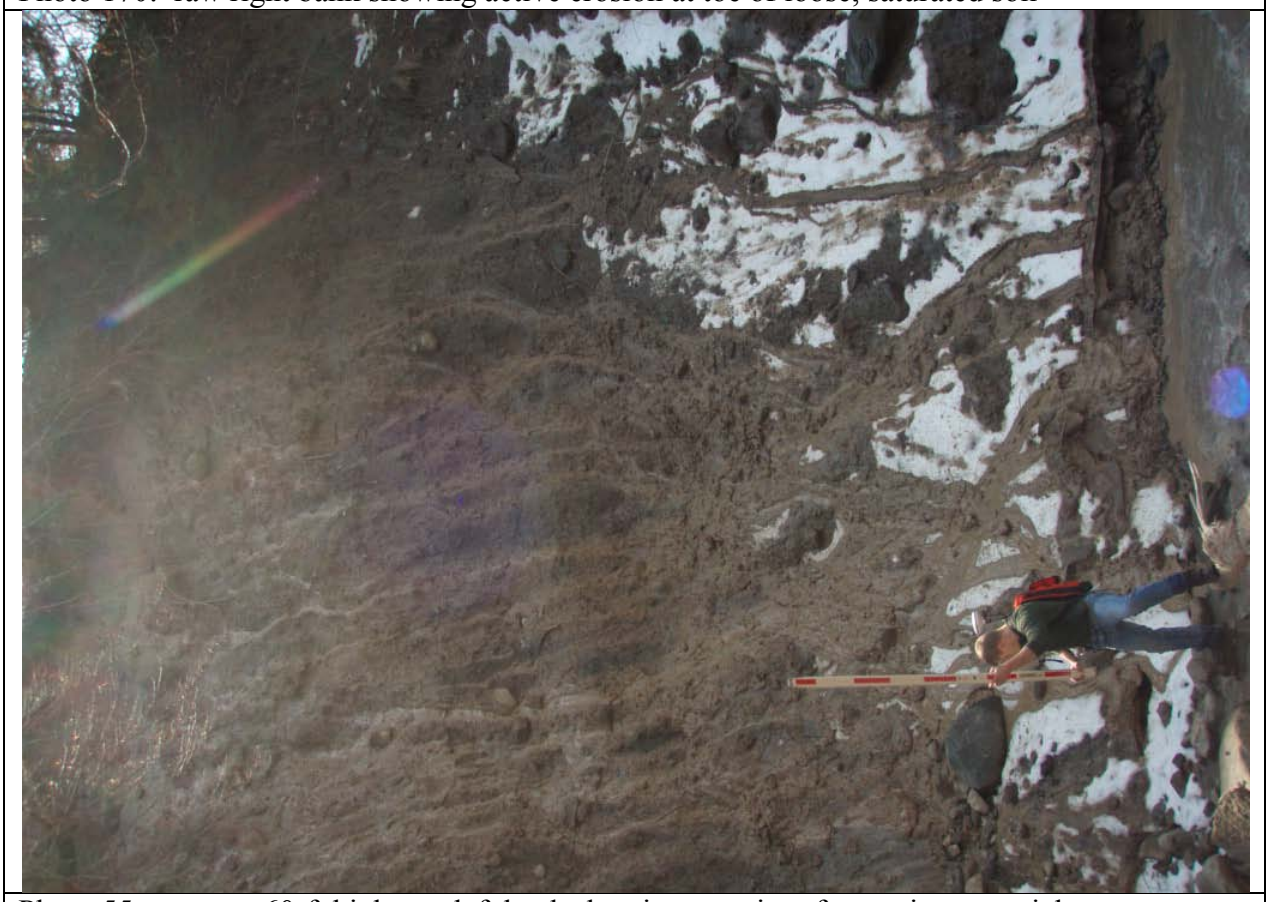


Photo 55: approx. 60-ft high raw left bank showing scarcity of armoring material

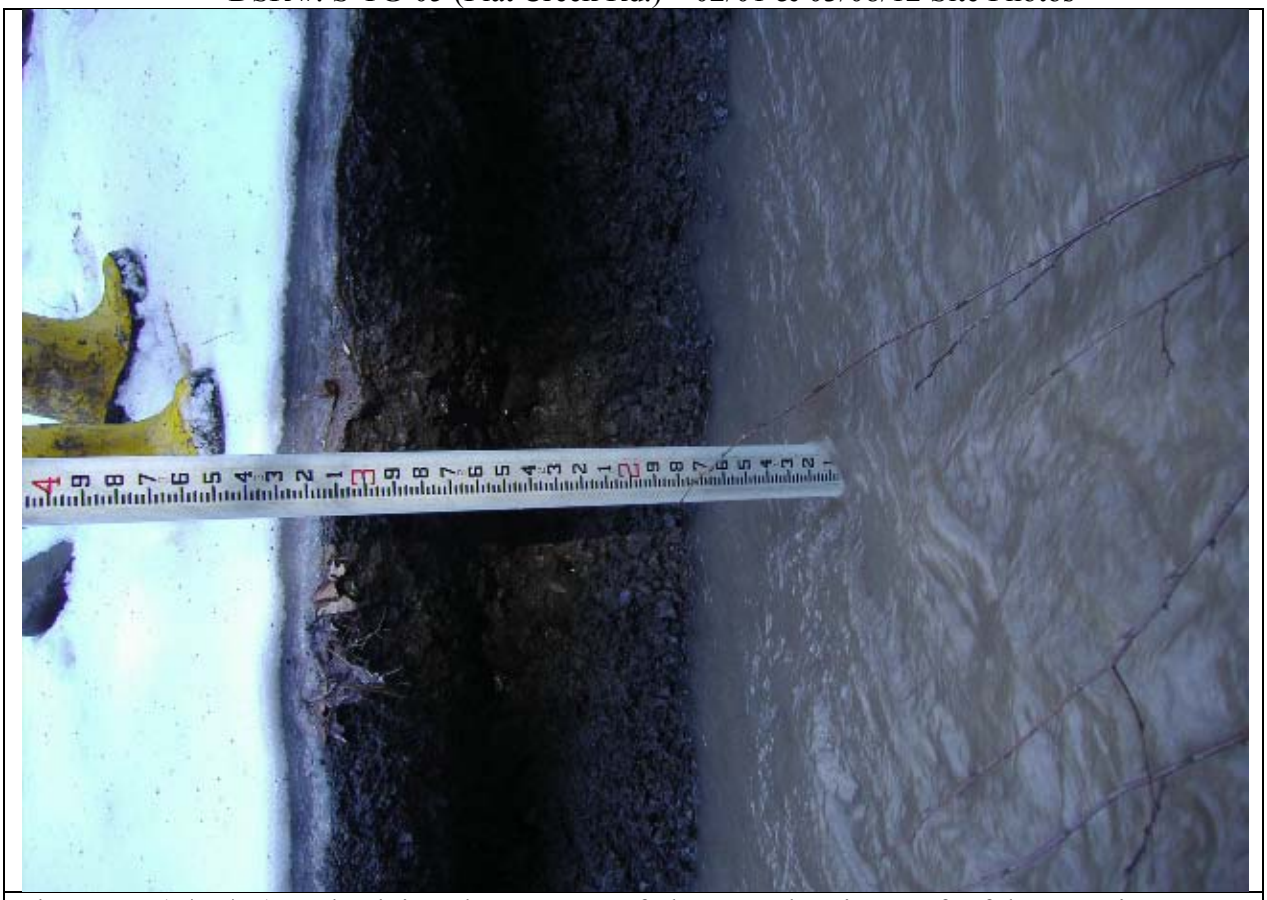


Photo 173 (3/08/12): R. bank just downstream of photo 55 showing 3+-ft of downcutting

Photo 24 (2/01/12): Looking downstream near middle of reach showing LB failure

Photo 30: Looking downstream near middle of reach showing RB failure

Photo 39: Looking upstream near middle of reach showing 6+-ft of downcutting

Photo 40: Looking DS at riprap slope installed post-flood to protect Flat Creek Rd.

Photo 46: Bottom of riprap showing lack of toe key and resulting instability

Photo 64: approx. 20-ft high raw left bank near middle of reach

Photo 75: lower section of reach where stream avulsed to right, abandoning former channel

Photo 93: near downstream end of reach where 2nd avulsion sent stream toward residence

Photo 99: Looking upstream at new channel cut through former residence yard

Photo 105: approx. 15'W x 7'H box culvert beneath Flat Creek Rd. (downstream end of reach)

Photo 16: