Dated May 15, 2006

NORTHERN VIRGINIA STREAM RESTORATION BANK
Concept Plan

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INDEX

EXHIBITS

DESIGN NARRATIVE

I. Background

Stream restoration will be conducted using *Natural Channel Design* methodologies, subject to the constraints of minimizing tree disturbance, working in an urban environment, and also satisfying all applicable homeowner association, local, state, and federal regulations. An overriding principle in the natural channel design process is that stable streams will maintain a consistent dimension, pattern, and profile – thus understanding these central tendencies of the stream (i.e. where it is now and where it is going) are paramount to developing a successful restoration design that maintains itself within the natural variability of the design parameters. Integral to this approach is the careful analysis of the current geomorphic condition of the stream, followed by the comparison of these results to stable (reference) streams with similar characteristics (valley type, slope, soil type, etc.).

Development of a successful design, one that meets the requirement of providing a self-maintaining stream[1] in an aesthetically pleasing, "natural" manner, requires a very detailed study and design process. Such a process in this area is further complicated by the urban setting in which most of the streams are found. Ideally, stable streams are connected to their floodplains during the "bankfull" event (generally every 1.1-1.4 yrs in urbanized areas). However, given that many of the streams within the service area are essentially in urban settings with limited available space, providing effective alternatives to this ideal situation will be necessary. As such, tree preservation and other constraints posed by the urban setting (i.e. culvert crossings, bridges, utilities, trails, etc.) will be important elements of the design.

Attached to this Concept Plan is a map depicting the Northern Virginia Stream Restoration Bank – Phase I boundary (Exhibit 1). Note that the total stream lengths and resulting number of available SCU's are different than those originally estimated in the MBI – Phase I now includes a total of 79,042 lf for a total of 671,857 SCU's. In the intervening time since the original stream lengths were estimated (based on Fairfax County data), a more detailed field assessment to confirm the stream lengths, as well as some detailed channel surveys of a portion of the Phase I streams, has been conducted. This more detailed review accounts for the difference. A more detailed review of the average restoration drainage area was also conducted using all the currently proposed restoration reaches. The result was a slight decrease in the average restoration drainage area, from the previously stated 229 ac down to 210 ac (details provided in Exhibit 2).

Also included with this Concept Plan is a discussion of the channel design process, elements of the stream restoration site plan, as well as information on the

[1] *A self maintaining stream is defined as one that is able to transport the flow rates and sediment produced by its watershed without significant aggradation or degradation.*

monitoring and maintenance protocols. Finally, details depicting the types of structural practices that will be employed are also provided (Exhibit 3).

II. Channel Design Process

As stated, the *Natural Channel Design* process will be the basis for the restoration designs with modifications applied as necessary to accommodate the specific design constraints of each particular reach. For each stream restoration project undertaken, the applicable elements of the 40-step process that defines the natural channel design methodology (Rosgen, 2004) will be performed to the degree possible given the urban constraints, current lack of gage data for small streams, and local and state regulatory requirements. However, the basic steps that will be performed for every restoration project will include the following (some to run concurrently):

A. Detailed Topographic Survey – To develop a successful restoration design, detailed topographic data (6-in. contour interval) is necessary. Also important is the survey location of all trees adjacent to the streams (as well as tag, measure, and identify) that are greater than 4-in in diameter.

B. Hydrologic Analysis - The process will start with a detailed hydrologic analysis and modeling of the contributing watershed. Watershed models will be verified to make certain the design (bankfull) flow rates are correct – a very important step that is often not performed - as this will be the basis for the design.

C. Regional Curve and Reference Data - A concurrent step will be the assessment of regional curve data to aid in the comparison of the unstable stream dimensions (at bankfull) to the measured dimensions in other streams in the same hydro-physiographic province. Regional curves for this area are available from a study performed in Maryland by the U.S. Fish and Wildlife Service (USFWS, 2002).

The final important piece of background information relates to the identification of “reference” reach data. While regional curves provide information on stream dimension targets, they do not provide a complete picture of the geometry, plan-form, and other important characteristics of a stable reach that can be used as a reference. Ideally, study of a stable reach can provide valuable information as to what might be the natural variability of the stream characteristics – this in turn can help set realistic goals in restoring similar, unstable streams. The goal shall always be to identify a suitable reference reach to apply towards the design of the restored reach. However, realizing that locating an ideal reference reach suitable for each restored reach may not be possible (as finding reference reaches in urbanized areas is a challenge), the natural channel design of each reach shall utilize the best available data.

D. Existing Condition Assessment – A very detailed, geomorphic analysis (applicable elements of the 40-step design process) will be performed to assess the condition of the unstable reach so it can be classified to determine where in the channel evolution process it may be – is it working toward stability, or is it still degrading at a rapid rate? Is sediment supply adequate, excessive, or lacking? Answering these questions will be important in deciding what approach to take in the restoration design.

E. Constraint Assessment – With the above tasks complete, ideally the last tasks would be the design of the restored channel. While a complicated task in and of itself, it is made more complicated in this instance owing to the urban nature of the streams. Analysis of the constraints posed on the design solution is integral to developing a successful restoration. In some instances, it is anticipated that re-connection to the historic floodplain will not be a viable option. Further, trees desired by the community and anthropogenic structures such as sewers, roads, houses, etc. will prevent changes to the existing plan form of the stream.

The alternative, therefore, will be the construction of a multi-staged channel within the existing channel banks. The multi-stage approach is key – given the lack of available data on small, urban streams and the potential difficulty in precisely determining bankfull in severely incised streams, determining with absolute certainty the correct bankfull cross-section may be difficult. By implementing a multi-staged channel that provides a floodplain "relief valve" within the existing eroded banks of the channel, the risk posed by the potential uncertainty in computing bankfull discharge can be minimized. At the same time, the smaller channel within the existing channel can be sized to route sediment, an essential capability of a stable stream. Due to the "flashy" nature of urban watersheds, energy dissipation will also be essential – thus deep lateral scour pools, step pools, and other energy dissipation structures will be employed.

F. Final Design - After completing all of the steps outlined above, the final task will be the completion of the design plans. Structural elements will be necessary to stabilize virtually the entire restored reach to allow time for vegetation to become established. Insufficient structure with no existing vegetation will lead to failure. The types of structures that will be employed include, cross-vanes, j-hooks, step pools, imbricated riprap, and reinforced channel linings, to name a few. Step pools, whether incorporated within other structures or as stand-alone elements, will be very important as significant energy dissipation must be provided.

III. Stream Restoration Site Plan

The Stream Restoration Site Plans will meet all the requirements contained in the Fairfax County Public Facilities Manual or waivers will be obtained as necessary due

to the unique elements of stream restoration that are not specifically detailed in current Fairfax County regulations. As discussed previously, structural measures will be necessary elements of the restoration designs. Designs of many of these structural measures are included in detailed specifications provided with this concept plan. Other elements of the Stream Restoration Site Plans shall include, at a minimum:

A. Cover Sheet

1. Proposed restoration site name/stream name.
2. Site location (i.e. county/city, along adjacent route numbers).
3. Location map (i.e. topo map; include latitude/longitude of center of site, HUC, County PIN).
4. Plan sheet index.
5. Approval blocks for the applicable jurisdiction.

B. Project Narrative

1. Narrative describing the nature of the stream restoration concept.
2. Goals and objectives of restoration in terms of water quality benefits, replacement of functions and values, and stream stability.
3. Summary of restoration activities.
4. Brief summary of construction impacts.
5. Information on the Monitoring and Maintenance program.

C. Hydrologic/Hydraulic Analyses

1. Results of hydrologic modeling of the contributing watershed to determine design flow rates.
2. Results of hydraulic modeling of the existing and proposed reaches.

D. Design Parameters Summary

1. Results of the applicable portions of the 40-step, natural channel design methodology that lead to the channel design. This may include:

    a) reference reach information, including any geomorpholgical measurements,
    b) summary of design geomorphologic measurements (entrenchment ratio, width/depth ratio, sinuosity, stream type, slope, and predominant channel material) for the proposed stream,
    c) proposed stream type,
    d) summary matrix of all proposed restoration measures, including both structural and non-structural components.

2. An SCU analysis based on the Stream Restoration Site Plan for the subject stream reach, utilizing the methodology described in the *Stream Impact Assessment Manual for the Northern Virginia Stream Bank (SIAM), Version 1.3, February 2006*, to estimate the expected number of SCU's that will be created by the plan.

E. Plan and Profile Sheets of Restored Stream

1. Grading plans at a scale of 1" = 50' and providing 0.5 ft contour intervals in stream restoration areas (or metric equivalent), or at a more detailed scale. Plans shall use the vertical and horizontal datums required by Fairfax County DPWES at the time of plan submission, NAD 83 and NGVD 29, respectively, at this time.

2. A survey of all trees measuring 4" and greater in diameter within 25' of all streams and access areas.

3. A surveyed wetland delineation, in accordance with the Corps'1987 Manual, of existing wetlands areas in the vicinity of each reach.

F. Erosion and Sediment Control Plan

1. Developed in accordance with the Fairfax and/or Loudoun County Design and Construction Standards Manual and the most current edition of the Virginia Erosion and Sediment Control Handbook.

2. Details for all proposed E&S measures.

G. Structure Details

1. Details of all proposed structures with specifications for each application.

H. Planting Plan

1. Vegetation plan depicting or listing expected zonation (i.e., stream channel or floodplain/riparian area).

2. Vegetation schedule with plants and seeds selected based on habitat value and projected water elevation and duration. Said schedule shall include:

a) species;
b) wetland indicator status as specified in the current version of the National List of Plant Species That Occur in Wetlands:

Northeast (Region 1)

c) plant size and spacing; and
d) wildlife value assessment.

The vegetation shall primarily comprise of a native riparian buffer seed mix to reflect the expected community type during the initial growth years of tree and shrub seedlings. Tree seedlings (bare root, tublings, or container) and shrubs (livestakes, bare root, tubling, or container) shall be randomly planted in Restoration areas, and comprised of at least 5 of the following species: pin oak, willow oak, sycamore, green ash, red maple, black willow, brookside alder, silky dogwood, or arrowwood.

IV. Monitoring Program

A. Monitoring Goals

It is understood that urban/suburban stream restoration projects in the Northern Piedmont Physiographic Region of Virginia need further assessment by the Regulatory Agencies that comprise the MBRT in order to develop definitive success criteria. Therefore, one of the important goals of the proposed Bank is to collect data that can advance the state-of-the-art of "Natural Channel Design in urban/suburban areas of Piedmont, Virginia". To achieve this, the monitoring and maintenance provisions provided in the MBI are extensive but not determinative – in order to develop sufficient scientific and engineering data to develop better designs and objective measurable success criteria for future Phases of this Bank and any others that will follow.

Adaptive management techniques shall be implemented to ensure that a successful stream restoration project results. In accordance with the MBI, each Phase of the Bank shall be monitored and maintained for a period of 10 years in such a condition as to meet specific monitoring success criteria. It is expected that the success criteria shall be modified in time to reflect knowledge gained from monitoring of this project and apply said modified criteria to subsequent Phases of the Bank.

B. Monitoring Success Criteria

All necessary work required to monitor the Bank to demonstrate compliance with the following Success Criteria established in Part V.E. of the MBI shall be performed:

1. With respect to reforested riparian buffer/areas:

    a. Plant density of at least 400 living wood stems (including volunteers) per acre of trees and shrubs must be achieved by the

end of the first growing season following planting and maintained through the end of the monitoring period or until canopy coverage is greater than 30%, and

b. Herbaceous plant coverage of at least 60% must be achieved by the end of the first growing season, and at least 80% each monitoring year thereafter.

c. Woody plant coverage (from live-stakes, tublings, container grown material, and volunteers) along stream banks shall achieve a density of at least 5 l.f./stem by the end of the first growing season and for each monitoring year thereafter.

2. With respect to the stream and riparian system, the following elements of the restored stream reach shall be assessed using the stated criteria:

a. Dimension - The analysis of each permanent cross-section specified on the Stream Restoration Site Plan shall indicate that:

1) The Width/Depth Ratio (defined as the width at bankfull divided by the mean riffle depth at bankfull) did not increase or decrease by an amount greater than 1.2 of the as-built cross-section.

2) The bankfull Cross-Sectional Area did not increase or decrease by an amount greater than 20% of the as-built cross-section.

3) The Bank Height Ratio (defined as the low bank height divided by the maximum riffle depth) did not increase or decrease by an amount greater than 0.2 of the as-built cross-section.

b. Pattern - The analysis of the plan-view survey of field measurements shall indicate that:

1) The Sinuosity of the stream (defined as the stream length along the thalweg divided by the valley length) did not increase or decrease by an amount greater than 0.2 of the as-built pattern.

2) The Radius of Curvature/Width ratio did not increase or decrease by an amount greater than 0.2 of the as-built condition.

c. Profile - The analysis of the longitudinal profile shall indicate that the slope of the longitudinal profile did not increase or decrease by an amount greater than 0.3% of the as-built slope.

d. Structures - The analysis of each instream structure shall indicate that:

1) The angle of any rock vane, j-hook, or cross vane did not increase or decrease by an amount greater than 3 degrees from the as-built angle, and remains between 20 and 30 degrees from the streambank.

2) The slope of any rock vane, j-hook, or cross vane did not increase or decrease by an amount greater than 2% from the as-built slope (i.e. if the design slope was 5%, then any slope from 3% to 7% would be acceptable) and remains between 2% and 7%.

3. Submittal of required documentation, including monitoring reports, semi-annual Ledgers, as-built drawings, and proof of escrow deposits and withdrawals, shall be performed in accordance with Part VI. C. (Maintenance and Monitoring) of the MBI.

C. Monitoring Protocol

All necessary work shall be performed to monitor the Bank to demonstrate compliance with the Success Criteria listed above, established in the MBI, and as required by the regulatory agencies. As such, the monitoring program shall follow the guidelines established below:

1. With respect to reforested riparian buffer areas:

a. *Visual Description*. Visual descriptions shall be provided with each monitoring report by one of the following means:

1) ground level photographs, taken facing north, south, east, and west from stations located adjacent to each vegetation plot [permanent markers shall be established to ensure that the same locations (and view directions) are monitored in each monitoring period], or

2) one color aerial photograph (8" x 10" or larger) depicting the entire site. An aerial photograph should be taken once the site has been graded, planted, and stabilized (preferably in the 3rd or 5th year following final grading).

b. *Vegetation*. Sample plots shall be located on a stratified random basis over the reforested riparian buffer at locations adjacent to each photo location marker. The following numbers of samples will be required:

1) If the reforested site is < 5 acres, then a minimum of 3 plots/acre is necessary.

2) If the reforested site is > 5 acres but less than 20 acres, then a minimum of 2 plots/acre is necessary.

3) If the reforested site is > 20 acres, then a minimum of 1 plot/acre is necessary.

Each plot shall be of a size no less than 30-ft radius for woody plants and a 3-ft diameter for herbaceous plants. Alternative sampling methods may be submitted for MBRT review and approval. The vegetation data shall be collected in the July - November time period and shall include:

1) Dominant vegetation species identification;
2) Coverage assessment;
3) Number of woody plant stems (total and #/acre);
4) Indicator Status.

2. With respect to the stream and riparian system:

a. Woody plant coverage (from live stakes, tublings, container grown material, and volunteers) along stream banks shall be quantified by species and density (5 l.f./stem along the stream bank edge).

b. Exposure of bank pins (with locations specified on the Stream Restoration Site Plan) shall be measured to provide an assessment of bank erosion in the restored reach.

c. Scour chains (with locations specified on the Stream Restoration Site Plans) shall be assessed to provide data on sediment movement in the stream bed.

d. Pebble counts and bar samples will be collected (with possible locations specified on the Stream Restoration Site Plans) and analyzed to document changes in streambed material particle size.

e. Each Stream Stabilization Structure shall be surveyed, photographed from a permanent monitoring post, or otherwise

designated location, established in the first report, visually evaluated for stability, and a narrative statement provided as to whether or not specific Success Criteria have been violated.

f. To assess channel stability Success Criteria related to cross-sections, at least one cross section per 1,000 lf shall be provided (with permanent markers established the first time in locations specified in the Stream Restoration Site Plan) on a representative mix of riffles and pools.

g. A surveyed profile of the stream along its thalweg provided as soon as practicable after completion, and in years 1, 3, 5, and 10 and compared to the original design to assess compliance with Success Criteria and to provide feedback for future stream restoration designs. The slope of the individual stream features (riffle, run, pool, glide) shall also be measured, as well as the specific stream pattern parameters.

h. Location of any riparian areas with excessive erosion that needs replanting or protection with rock or coir logs shall be identified.

i. Assessment of biological conditions (habitat) using the following methods, with the number of study reaches equal to the length (in feet) divided by 2,000, shall be provided pre-restoration, and then in years 1, 5, and 10:

    1) Biological Reconnaissance (BioRecon) or Problem Identification Survey, following the guidance established in the “Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers” (Barbour et al. 1999).

    2) Calculation of the Virginia Stream Condition Index (VA-SCI) following the guidance established in “A Stream Condition Index for Virginia Non-Coastal Streams” (Burton and Gerritsen 2003).

j. Within one week after any storm event that exceeds 3.2 inches in 24 hours or 2.0 inches in 2 hours (Fairfax County 2 year storms), the subject stream reach shall be visually inspected for damages. Any damage noted shall be immediately reported to the Corps in writing, with supporting photographs, and accompanied by a remediation plan. Photographs and narrative shall be utilized to summarize performance and remediation efforts in the next monitoring report, and shall also be submitted to the Corps immediately upon completion of restoration efforts.

3. Timing. During the 10 year monitoring and maintenance period, monitoring activities shall occur during the growing season, and at least:

   a. Prior to restoration activities, as soon as practicable after completion of restoration, and once during the 1st, 2nd, 3rd, 5th, 7th, and 10th growing seasons following completion of grading (note that the profile survey will be conducted in years 1, 3, 5, and 10 and biological surveys in years 1, 5, and 10, in addition to the pre-restoration surveys);

   b. Monitoring of woody vegetation for the first year or any year following planting shall take place between August and November;

   c. If all Success Criteria have not been met in the 10th year, then a monitoring report shall be required for each consecutive year until two annual sequential reports indicate that all criteria have been successfully satisfied (i.e., that corrective actions were successful).

   d. A final monitoring report (typically prepared the 10th growing season following completion of grading).

   Monitoring may be terminated earlier (for a specific bank phase) at the discretion of the MBRT.

D. Monitoring Reports: Reports shall be submitted to the MBRT describing the conditions of the Bank and relating those conditions to the Success Criteria. Reports will be submitted by November 30th of each monitoring year and shall contain the following:

   1. All data and photos collected in the Monitoring Program, comparison of the data relevant to the Success Criteria with respect to the design plans and previous monitoring reports and as-builts and;

   2. A summary of SCU's created by the Bank and the permits that have been Debited against these SCU's.

V. Maintenance Plan

All necessary work required to maintain the Bank consistent with the maintenance criteria established in the MBI shall be performed. Such maintenance activities shall continue until the completion of the monitoring period described above.

In the event the Bank or a specific phase of the Bank fails to achieve the Success Criteria specified in Part V.E. of the MBI, all necessary contingency plans shall be developed and appropriate remedial actions shall be implemented for the Bank or that phase in coordination with the MBRT.

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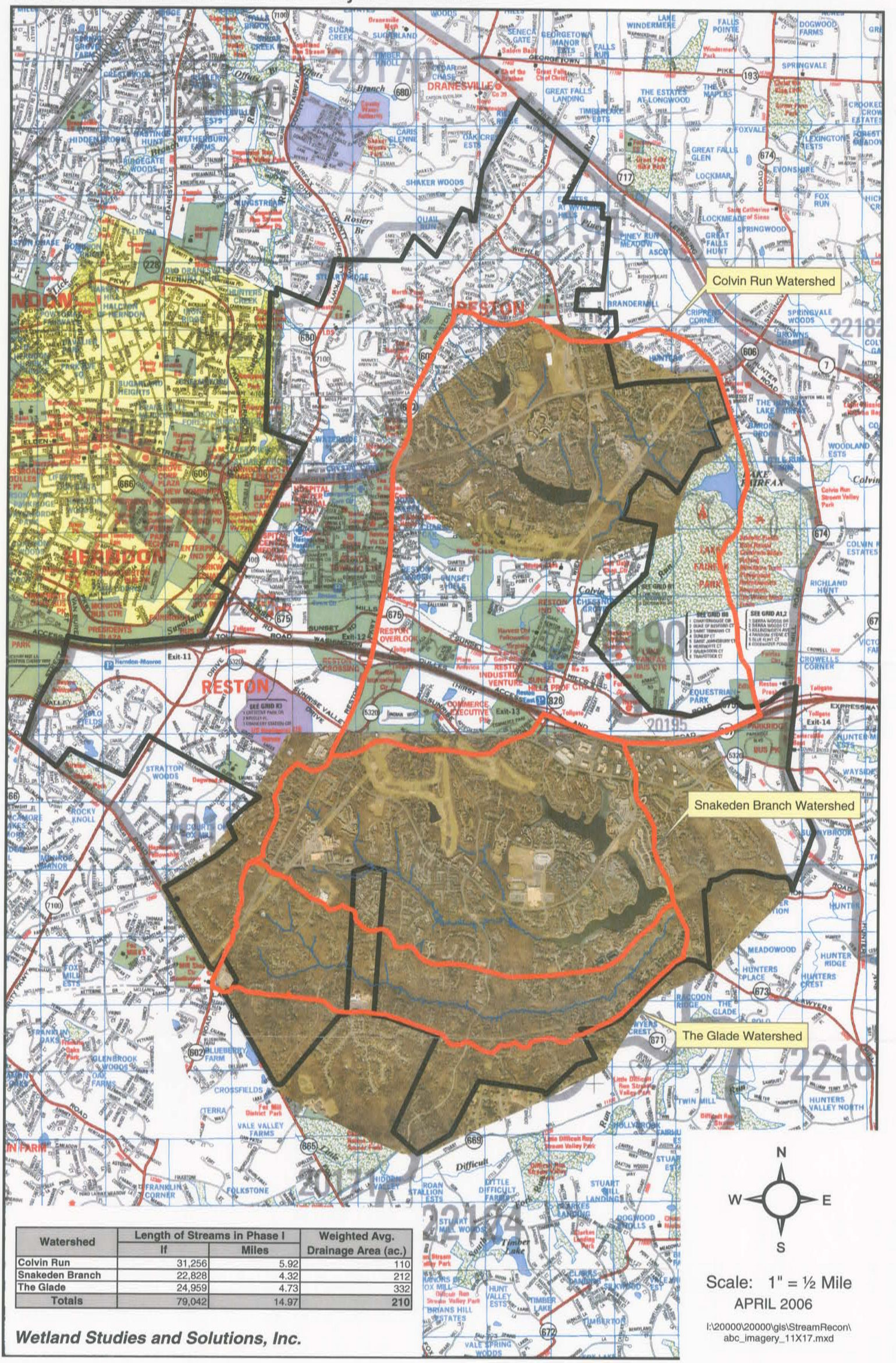
Northern Virginia Stream Restoration Bank
Reston Stream Restoration Project - Phase I



Watershed	Length of Streams in Phase I		Weighted Avg. Drainage Area (ac.)
	lf	Miles	
Colvin Run	31,256	5.92	110
Snakeden Branch	22,828	4.32	212
The Glade	24,959	4.73	332
Totals	79,042	14.97	210

Scale: 1" = ½ Mile

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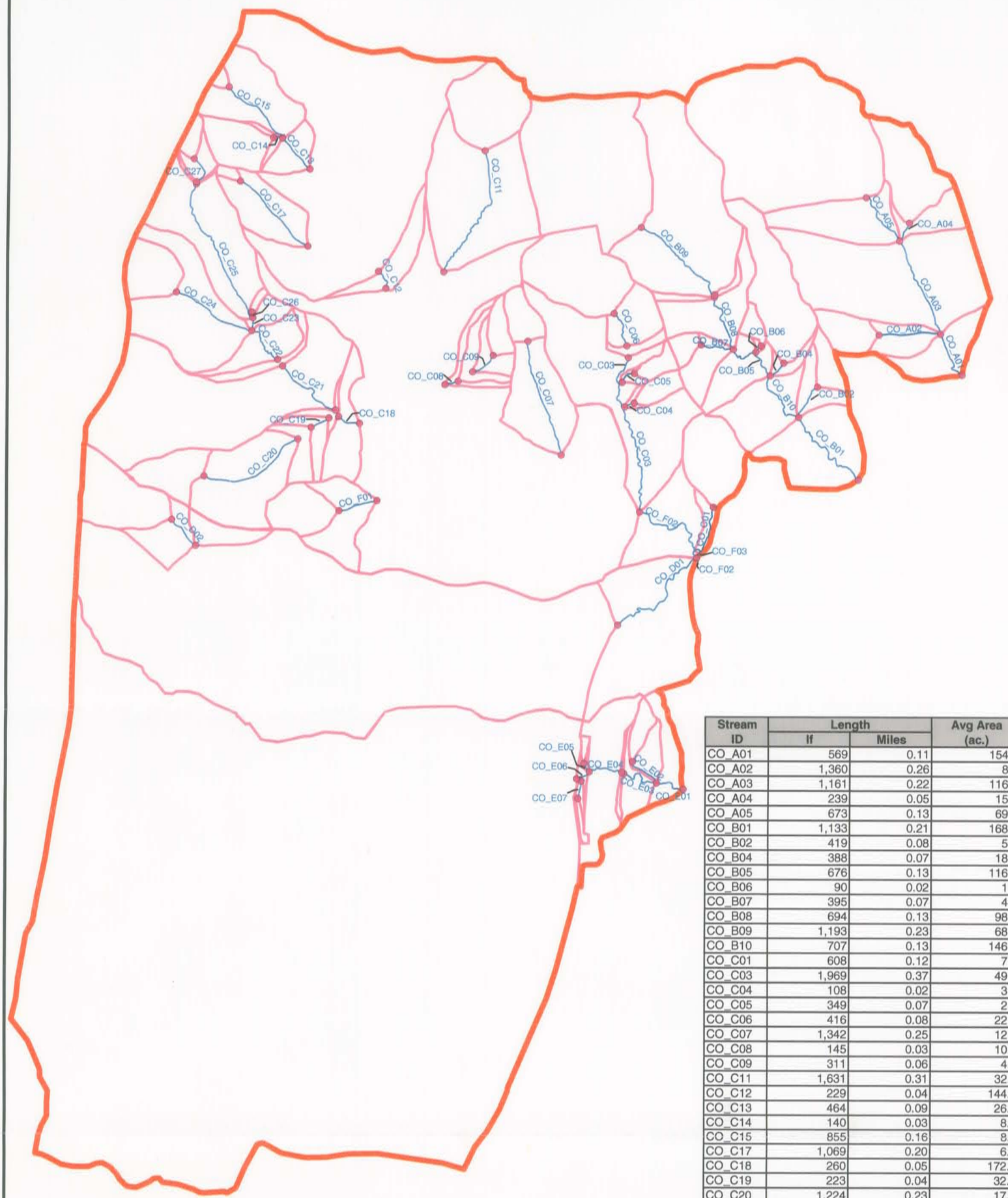
Exhibit 2:
Northern Virginia Stream Restoration Bank
Reston Stream Restoration Project - Phase I - Colvin Run



Stream ID	Length		Avg Area (ac.)
	lf	Miles	
CO_A01	569	0.11	154.0
CO_A02	1,360	0.26	8.1
CO_A03	1,161	0.22	116.7
CO_A04	239	0.05	15.7
CO_A05	673	0.13	69.6
CO_B01	1,133	0.21	168.9
CO_B02	419	0.08	5.6
CO_B04	388	0.07	18.5
CO_B05	676	0.13	116.1
CO_B06	90	0.02	1.9
CO_B07	395	0.07	4.6
CO_B08	694	0.13	98.3
CO_B09	1,193	0.23	68.4
CO_B10	707	0.13	146.3
CO_C01	608	0.12	7.2
CO_C03	1,969	0.37	49.4
CO_C04	108	0.02	3.1
CO_C05	349	0.07	2.7
CO_C06	416	0.08	22.8
CO_C07	1,342	0.25	12.3
CO_C08	145	0.03	10.6
CO_C09	311	0.06	4.5
CO_C11	1,631	0.31	32.0
CO_C12	229	0.04	144.8
CO_C13	464	0.09	26.6
CO_C14	140	0.03	8.2
CO_C15	855	0.16	8.2
CO_C17	1,069	0.20	6.3
CO_C18	260	0.05	172.1
CO_C19	223	0.04	32.9
CO_C20	1,224	0.23	17.6
CO_C21	850	0.16	103.2
CO_C22	518	0.10	68.1
CO_C23	144	0.03	30.8
CO_C24	974	0.18	20.1
CO_C25	1,764	0.33	16.8
CO_C26	64	0.01	0.6
CO_C27	338	0.06	3.1
CO_D01	1,449	0.27	256.4
CO_D02	447	0.08	19.2
CO_E01	341	0.06	696.4
CO_E02	386	0.07	4.0
CO_E03	520	0.10	685.8
CO_E04	396	0.07	675.2
CO_E05	114	0.02	0.6
CO_E06	170	0.03	665.6
CO_E07	199	0.04	0.9
CO_F01	436	0.08	12.5
CO_F02	1,109	0.21	690.6

Watershed	Length of Streams in Phase I		Weighted Avg. Drainage Area (ac.)
	lf	Miles	
Colvin Run	31,256	5.92	110
Snakeden Branch	22,828	4.32	212
The Glade	24,959	4.73	332
Totals	79,042	14.97	210

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0 0.25 0.5 Miles

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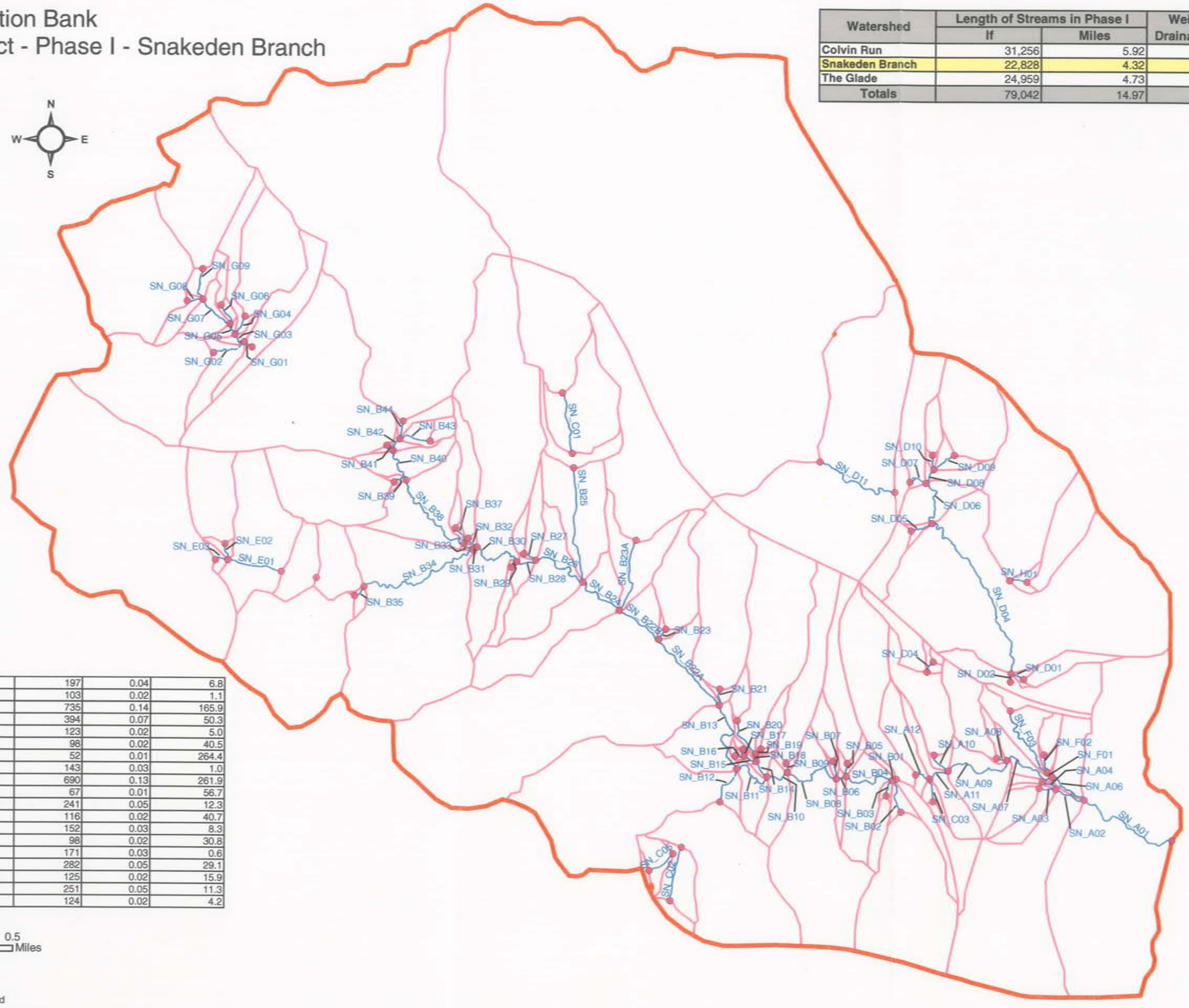
Exhibit 2:
Northern Virginia Stream Restoration Bank
Reston Stream Restoration Project - Phase I - Snakeden Branch

Watershed	Length of Streams in Phase I		Weighted Avg.
	lf	Miles	Drainage Area (ac.)
Colvin Run	31,256	5.92	110
Snakeden Branch	22,828	4.32	212
The Glade	24,959	4.73	332
Totals	79,042	14.97	210

Stream ID	Length		Avg Area (ac.)
	lf	Miles	
SN_A01	846	0.16	859.7
SN_A02	242	0.05	12.8
SN_A03	120	0.02	2.4
SN_A04	129	0.02	0.3
SN_A06	311	0.06	818.6
SN_A07	438	0.08	552.3
SN_A08	71	0.01	3.6
SN_A09	574	0.11	545.8
SN_A10	167	0.03	6.9
SN_A11	167	0.03	535.3
SN_A12	117	0.02	530.1
SN_B01	39	0.01	513.4
SN_B02	253	0.05	14.0
SN_B03	132	0.03	1.2
SN_B04	425	0.08	502.0
SN_B05	97	0.02	4.0
SN_B06	73	0.01	495.5
SN_B07	131	0.02	1.4
SN_B08	517	0.10	486.2
SN_B09	62	0.01	5.8
SN_B10	188	0.04	471.8
SN_B11	391	0.07	454.9
SN_B12	281	0.05	29.4
SN_B13	647	0.12	411.7
SN_B14	139	0.03	14.8
SN_B15	91	0.02	0.4
SN_B16	71	0.01	0.1
SN_B17	56	0.01	0.1
SN_B18	57	0.01	14.1
SN_B19	55	0.01	1.1
SN_B20	302	0.06	6.8
SN_B21	132	0.03	10.9
SN_B22	1,073	0.20	375.9
SN_B23	82	0.02	4.4
SN_B23A	564	0.11	15.3
SN_B24	406	0.08	332.4
SN_B25	846	0.16	20.2
SN_B26	521	0.10	302.5
SN_B27	99	0.02	1.3
SN_B28	158	0.03	297.2
SN_B29	64	0.01	0.8
SN_B30	445	0.08	284.4
SN_B31	36	0.01	270.1
SN_B32	89	0.02	2.5
SN_B33	95	0.02	169.9
SN_B34	1,036	0.20	88.1
SN_B35	102	0.02	15.4
SN_B37	168	0.03	0.4
SN_B38	810	0.15	166.2
SN_B39	118	0.02	8.7
SN_B40	277	0.05	153.1
SN_B41	79	0.02	83.4
SN_B42	104	0.02	68.2
SN_B43	232	0.04	1.0
SN_B44	133	0.03	66.3
SN_C01	453	0.09	12.0
SN_C02	401	0.08	2.6
SN_C03	176	0.03	2.2
SN_C04	85	0.02	0.3
SN_C05	212	0.04	0.9
SN_D01	92	0.02	1.7
SN_D02	59	0.01	257.1
SN_D04	1,506	0.29	226.9
SN_D05	161	0.03	2.2
SN_D06	401	0.08	197.2
SN_D07	164	0.03	184.3
SN_D08	93	0.02	9.0
SN_D09	197	0.04	6.8
SN_D10	103	0.02	1.1
SN_D11	735	0.14	165.9
SN_E01	394	0.07	50.3
SN_E02	123	0.02	5.0
SN_E03	98	0.02	40.5
SN_F01	52	0.01	264.4
SN_F02	143	0.03	1.0
SN_F03	690	0.13	261.9
SN_G01	67	0.01	56.7
SN_G02	241	0.05	12.3
SN_G03	116	0.02	40.7
SN_G04	152	0.03	8.3
SN_G05	98	0.02	30.8
SN_G06	171	0.03	0.6
SN_G07	282	0.05	29.1
SN_G08	125	0.02	15.9
SN_G09	251	0.05	11.3
SN_H01	124	0.02	4.2



0 0.25 0.5 Miles

Wetland Studies and Solutions, Inc.

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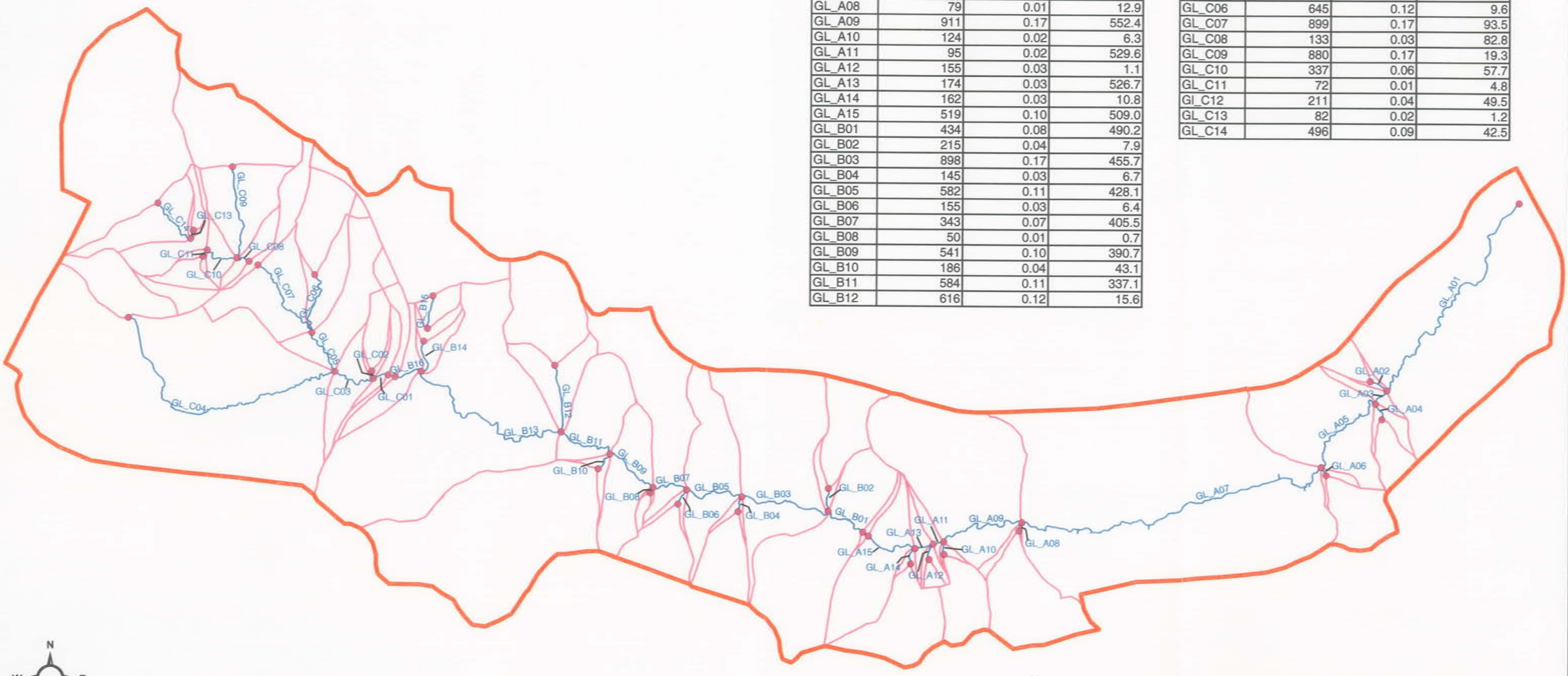
Exhibit 2:
Northern Virginia Stream Restoration Bank
Reston Stream Restoration Project - Phase I - The Glade

Stream ID	Length		Avg Area (ac.)
	lf	Miles	
GL_A01	2,565	0.49	738.3
GL_A02	175	0.03	2.3
GL_A03	172	0.03	705.3
GL_A04	165	0.03	3.9
GL_A05	1,019	0.19	690.3
GL_A06	84	0.02	7.0
GL_A07	3,372	0.64	627.4
GL_A08	79	0.01	12.9
GL_A09	911	0.17	552.4
GL_A10	124	0.02	6.3
GL_A11	95	0.02	529.6
GL_A12	155	0.03	1.1
GL_A13	174	0.03	526.7
GL_A14	162	0.03	10.8
GL_A15	519	0.10	509.0
GL_B01	434	0.08	490.2
GL_B02	215	0.04	7.9
GL_B03	898	0.17	455.7
GL_B04	145	0.03	6.7
GL_B05	582	0.11	428.1
GL_B06	155	0.03	6.4
GL_B07	343	0.07	405.5
GL_B08	50	0.01	0.7
GL_B09	541	0.10	390.7
GL_B10	186	0.04	43.1
GL_B11	584	0.11	337.1
GL_B12	616	0.12	15.6
GL_B13	1,897	0.36	286.3
GL_B14	334	0.06	24.1
GL_B15	301	0.06	21.0
GL_B16	258	0.05	232.3
GL_C01	132	0.02	226.3
GL_C02	68	0.01	3.1
GL_C03	465	0.09	216.4
GL_C04	2,759	0.52	47.0
GL_C05	471	0.09	117.6
GL_C06	645	0.12	9.6
GL_C07	899	0.17	93.5
GL_C08	133	0.03	82.8
GL_C09	880	0.17	19.3
GL_C10	337	0.06	57.7
GL_C11	72	0.01	4.8
Gl_C12	211	0.04	49.5
GL_C13	82	0.02	1.2
GL_C14	496	0.09	42.5



N
W E
S

0 0.25 0.5 Miles

Watershed	Length of Streams in Phase I		Weighted Avg. Drainage Area (ac.)
	lf	Miles	
Colvin Run	31,256	5.92	110
Snakeden Branch	22,828	4.32	212
The Glade	24,959	4.73	332
Totals	79,042	14.97	210

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TYPICAL DETAILS INDEX SHEET

NO.	SHEET TITLE
1.	INDEX SHEET
2.	CROSS VANE
3.	CROSS VANE - PHOTOS
4.	3 STEP CROSS VANE
5.	3 STEP CROSS VANE
6.	3 STEP CROSS VANE - PHOTOS
7.	J-HOOK
8.	J-HOOK - PHOTOS
9.	J-HOOK WITH SILL
10.	J-HOOK WITH SILL- PHOTOS
11.	2 STEP J-HOOK
12.	2 STEP J-HOOK
13.	2 STEP J-HOOK - PHOTOS
14.	STEP POOLS
15.	STEP POOLS - PHOTOS
16.	STEP POOL GRADE CONTROL AT SEWER LATERALS
17.	STEP POOL GRADE CONTROL AT SEWER LATERALS
18.	REINFORCED STREAM BED - RIFFLE SECTION
19.	REINFORCED STREAM BED - MEANDER SECTION
20	REINFORCED STREAM BED - PHOTOS
21.	MULTI-STAGE CHANNEL WITHIN EXISTING STREAMBANKS
22.	MULTI-STAGE CHANNEL WITHIN EXISTING STREAMBANKS - PHOTOS
23.	IMBRICATED RIPRAP
24.	IMBRICATED RIPRAP - PHOTOS
25.	COIR LOG WITH MATTING
26.	COIR LOG WITH MATTING - PHOTOS
27.	COIR BLOCK WALL
28.	COIR BLOCK TOE PROTECTION

NORTHERN VIRGINIA STREAM BANK
Fairfax County, Virginia

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Concept Plan

Detail Name: DETAIL INDEX (1/1)

Scale: NTS

Date: 03/2006

Sheet: 1 *of* 28

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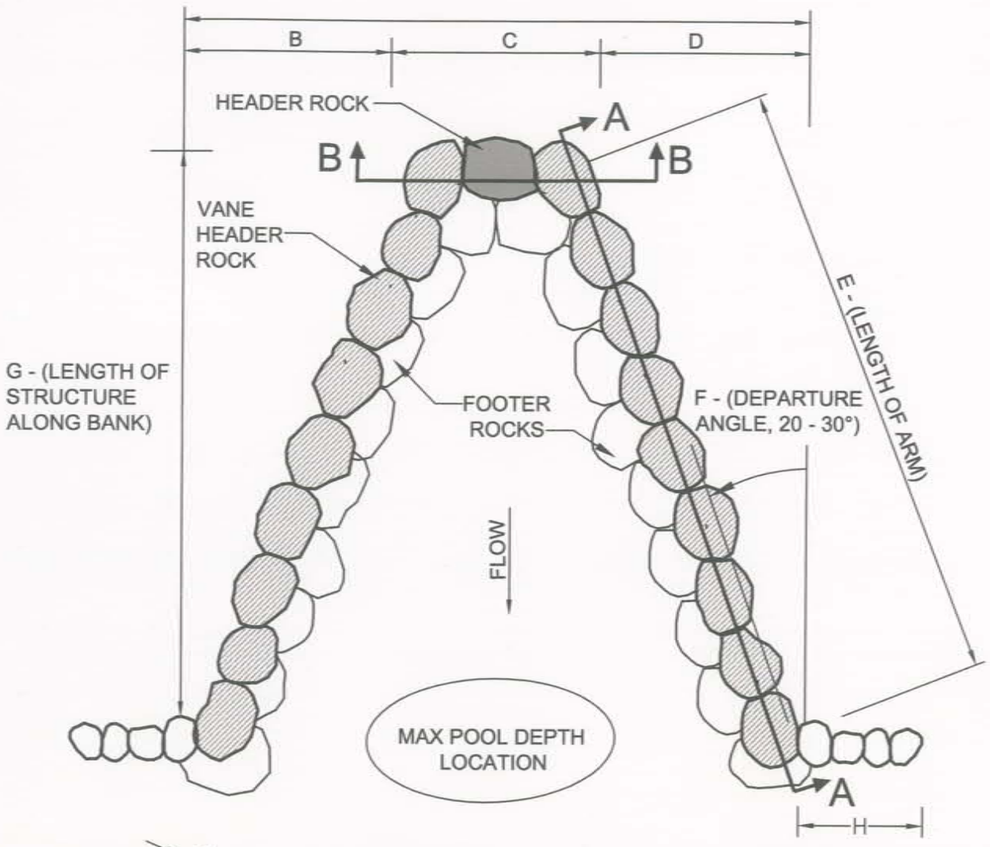
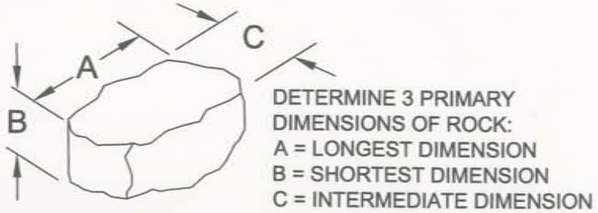
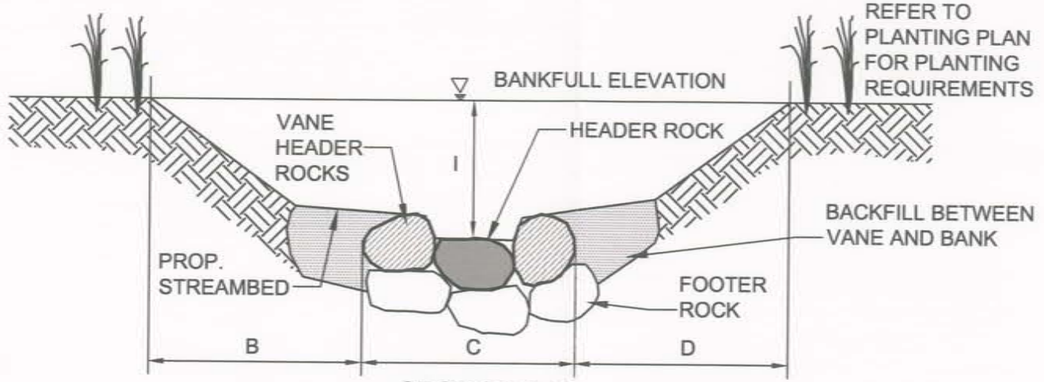
DETAIL 1 - CROSS VANE



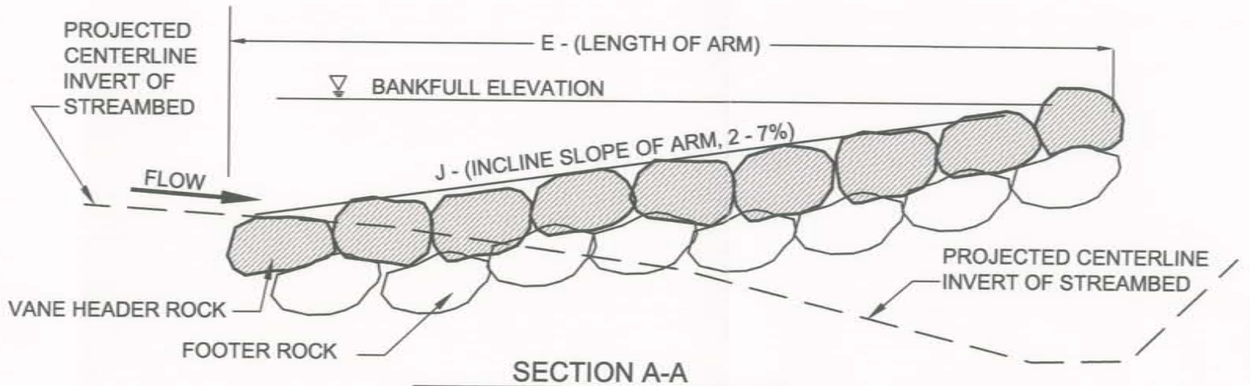


DETERMINE 3 PRIMARY DIMENSIONS OF ROCK:
A = LONGEST DIMENSION
B = SHORTEST DIMENSION
C = INTERMEDIATE DIMENSION

PLAN VIEW
NOT TO SCALE



SECTION B-B
NOT TO SCALE



SECTION A-A
NOT TO SCALE

STRUCTURE LOCATION		CROSS VANE DIMENSIONS									
PER CENTERLINE STATION		CROSS SECTION PARAMETER (FT)									
FROM	TO	A	B	C	D	E	F	G	H	I	J

NOTES:
1. ALL HEADER AND FOOTER ROCKS SHALL HAVE AN INTERMEDIATE DIMENSION OF AT LEAST 30 INCHES.
2. THE SILL ROCKS SHALL HAVE AN INTERMEDIATE DIMENSION OF AT LEAST 12".
3. TOP OF FRONT HEADER ROCK (S) SHALL BE PLACED AT PROPOSED STREAMBED INVERT.
4. BACKFILL BETWEEN VANES AND BANKS WITH SUBSTATE MATERIAL USED IN CHANNEL.

NORTHERN VIRGINIA STREAM BANK
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Concept Plan

Detail Name: CROSS VANE (1/2)
Scale: NTS
Date: 03/2006
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PHOTO 1. LOOKING UPSTREAM AT THE WEIR SECTION OF A CROSS VANE AT LOW FLOW.

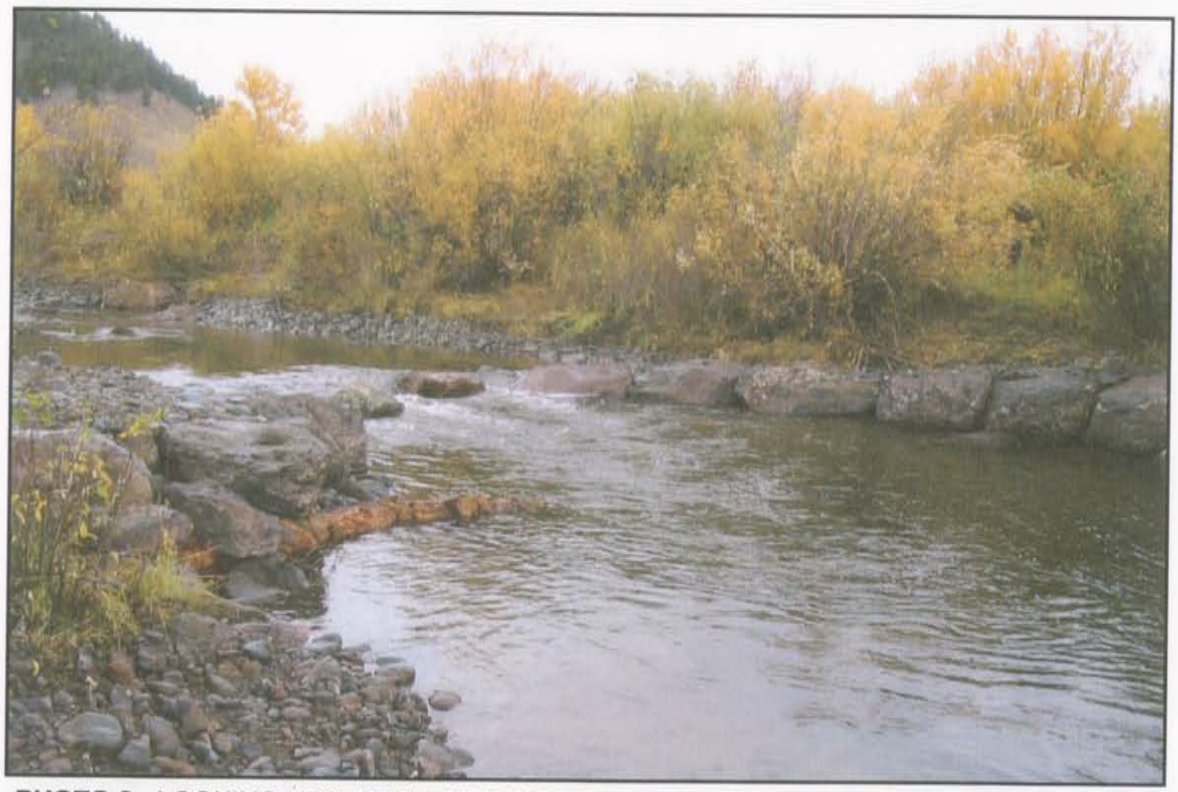

PHOTO 2. LOOKING UPSTREAM AT WATER FLOWING OVER THE WEIR SECTION OF A CROSS VANE AT LOW FLOW. VANE ARMS ARE SHOWN EXTENDING TO BANKFULL.

NORTHERN VIRGINIA STREAM BANK *Fairfax County, Virginia*		*Detail Name:* CROSS VANE (2/2)
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		Date: 03/2006 — *Sheet:* 3 *of* 28

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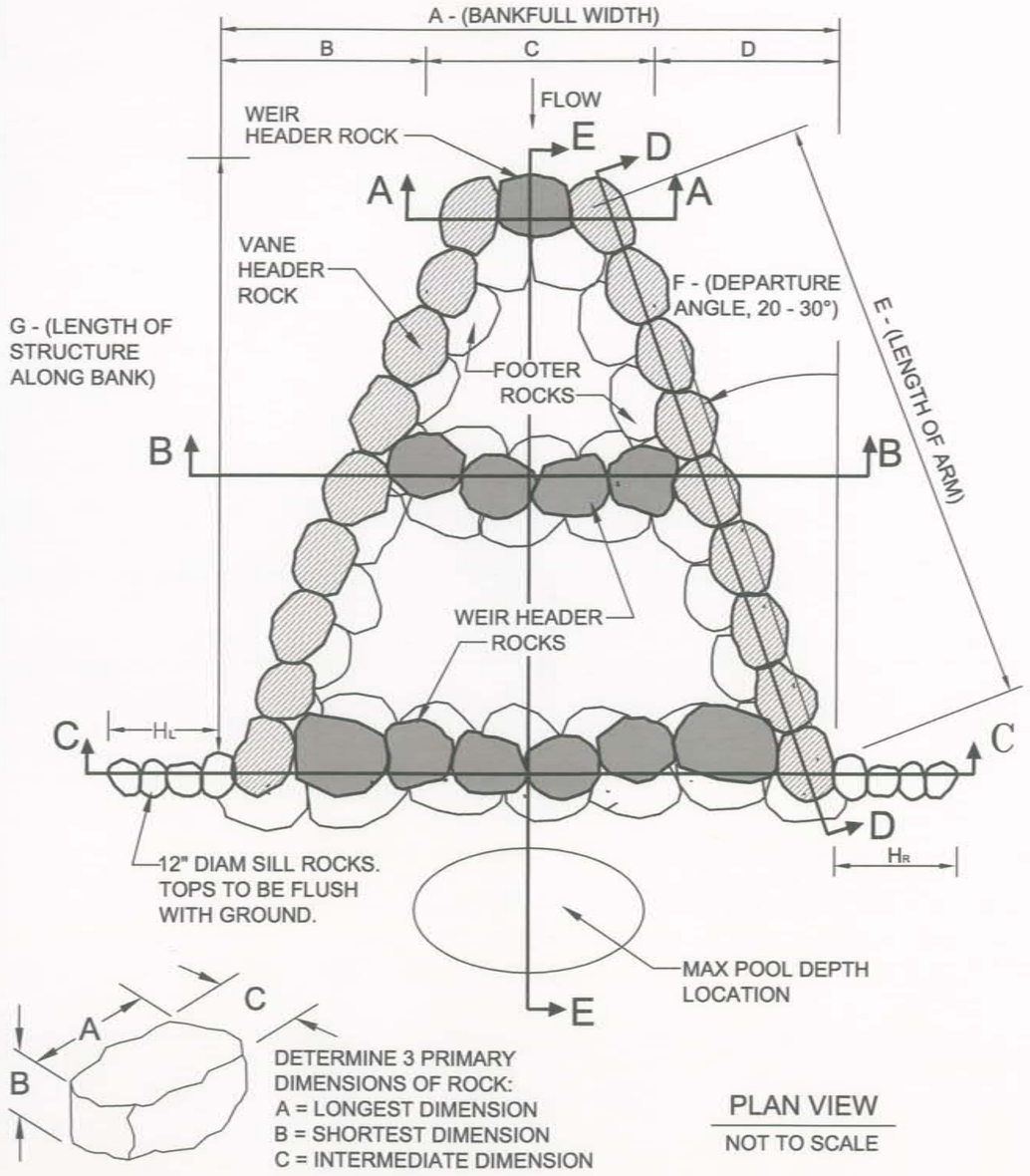
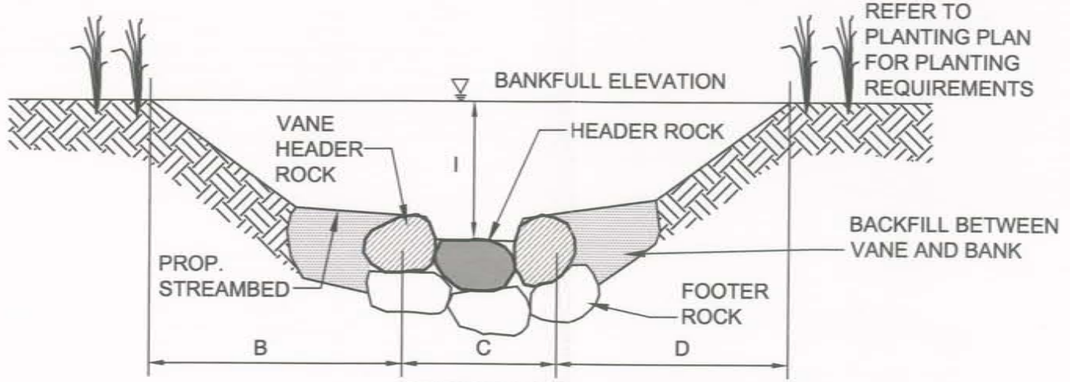
DETAIL 2.1 - 3 STEP CROSS VANE

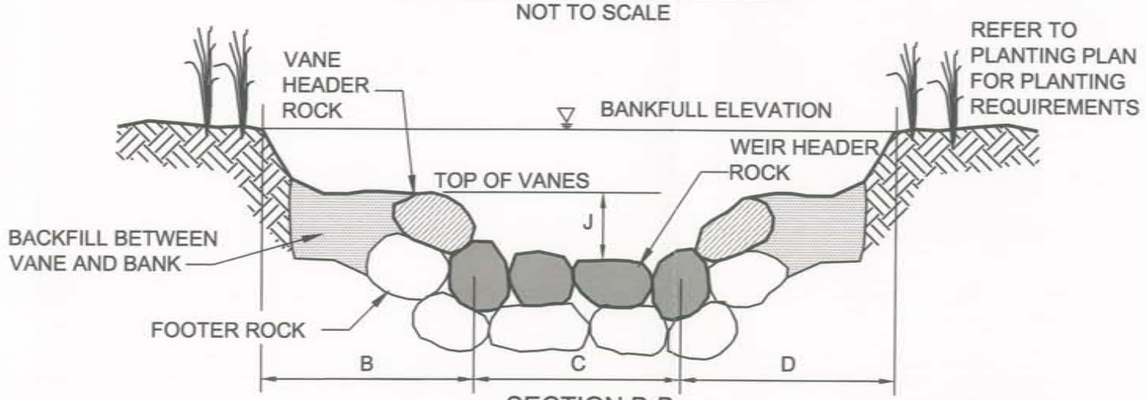


DETERMINE 3 PRIMARY DIMENSIONS OF ROCK:
A = LONGEST DIMENSION
B = SHORTEST DIMENSION
C = INTERMEDIATE DIMENSION

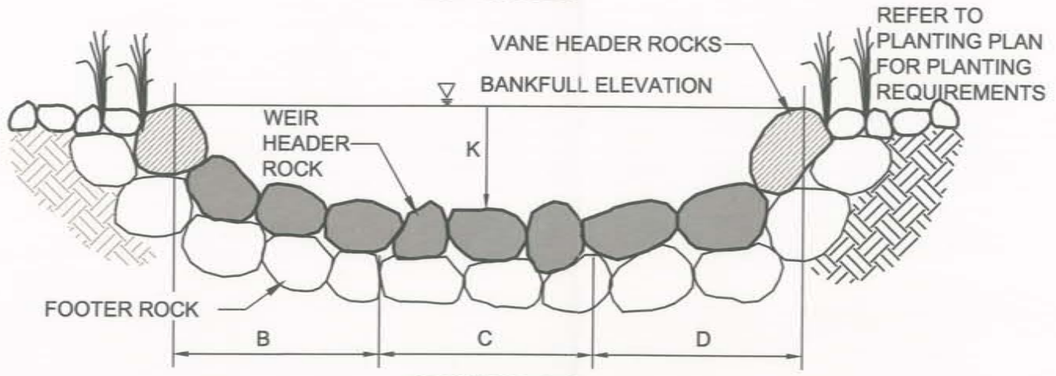
PLAN VIEW
NOT TO SCALE



SECTION A-A
NOT TO SCALE



SECTION B-B
NOT TO SCALE



SECTION C-C
NOT TO SCALE

NOTES:
1. ALL HEADER AND FOOTER ROCKS SHALL HAVE AN INTERMEDIATE DIMENSION OF AT LEAST 30".
2. THE SILL ROCKS SHALL HAVE AN INTERMEDIATE DIMENSION OF AT LEAST 12".
3. TOP OF FRONT HEADER ROCK(S) SHALL BE PLACED AT PROPOSED STREAMBED INVERT.
4. BACKFILL BETWEEN VANES AND BANKS WITH COBBLE SUBSTRATE MATERIAL USED IN CHANNEL.

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Concept Plan

Detail Name: 3-STEP CROSS VANE (1/3)
Scale: NTS
Date: 03/2006
Sheet: 4 of 28

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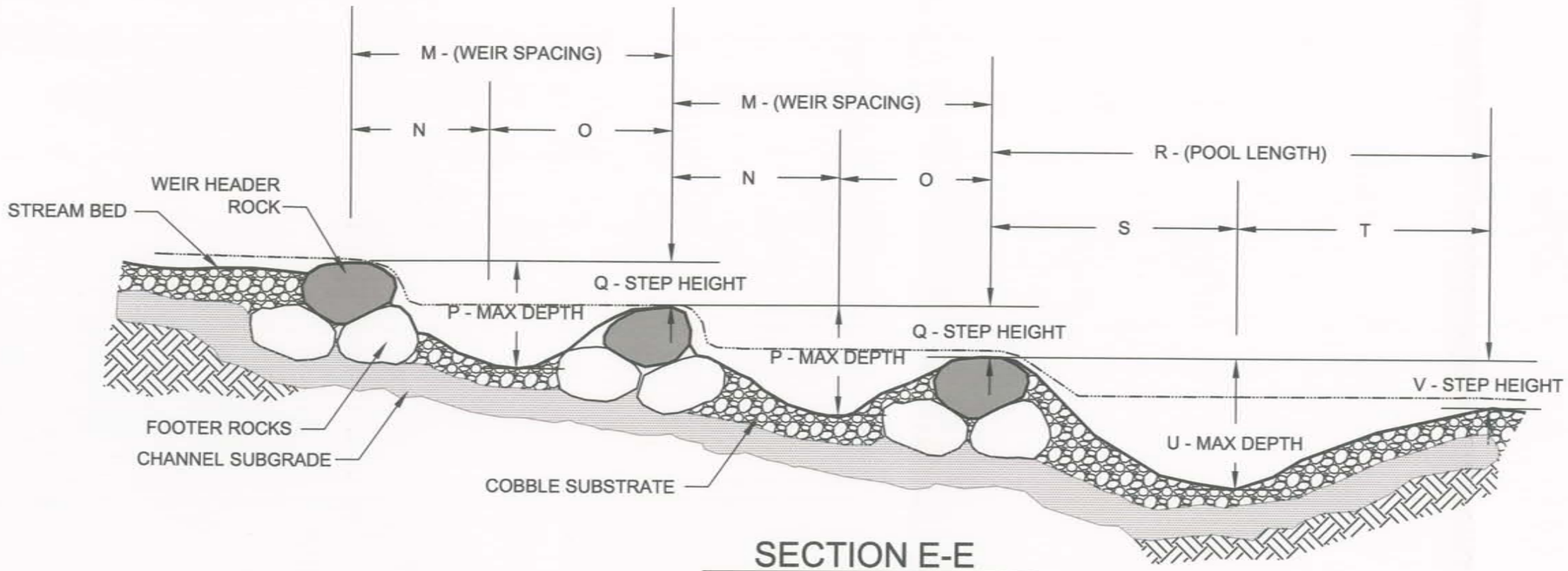
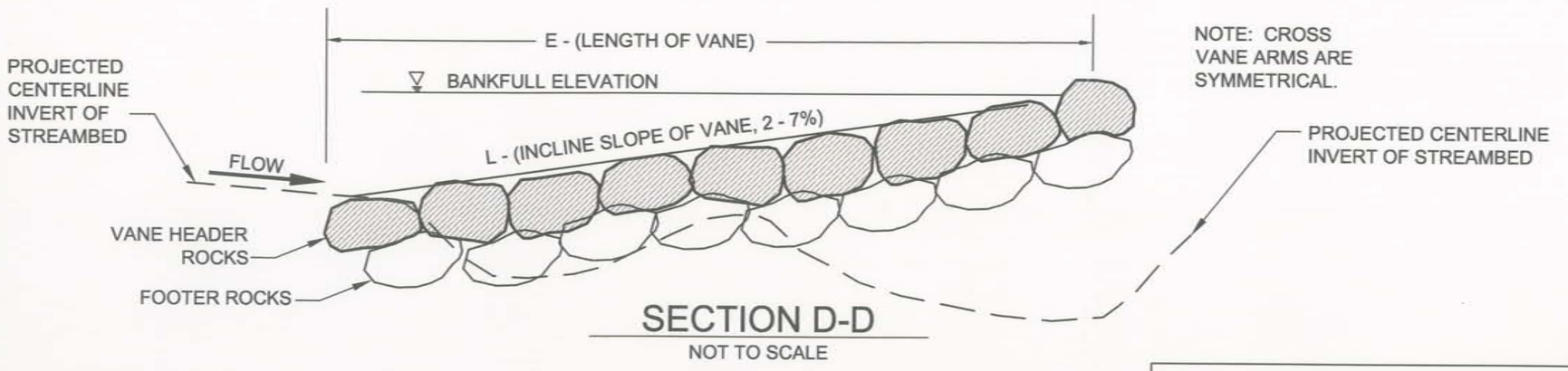
LOCATION		3-STEP CROSS VANE DIMENSIONS																					
CENTERLINE STATIONS		REFER TO 3-STEP CROSS VANE DETAILS																					
FROM	TO	A	B	C	D	E	F	G	H_L	H_R	I	J	K	L	M	N	O	P	Q	R	S	T	U	V

NOTE: ALL DIMENSIONS IN THE ABOVE TABLE ARE IN FEET, EXCEPT FOR THE INCLINE SLOPE VARIABLE, L, WHICH IS GIVEN AS A PERCENT SLOPE.



SECTION E-E

NOT TO SCALE



SECTION D-D

NOT TO SCALE

DETAIL 2.2 - 3 STEP CROSS VANE

NORTHERN VIRGINIA STREAM BANK *Fairfax County, Virginia*		*Detail Name:* 3-STEP CROSS VANE (2/3)
Wetland Studies and Solutions, Inc. *5300 Wellington Branch Drive, Suite 100* *Gainesville, Virginia 20155* *Phone 703.679.5600 Fax 703.679.5601*	*Concept Plan*	*Scale:* NTS *Date:* 03/2006 *Sheet:* 5 *of* 28

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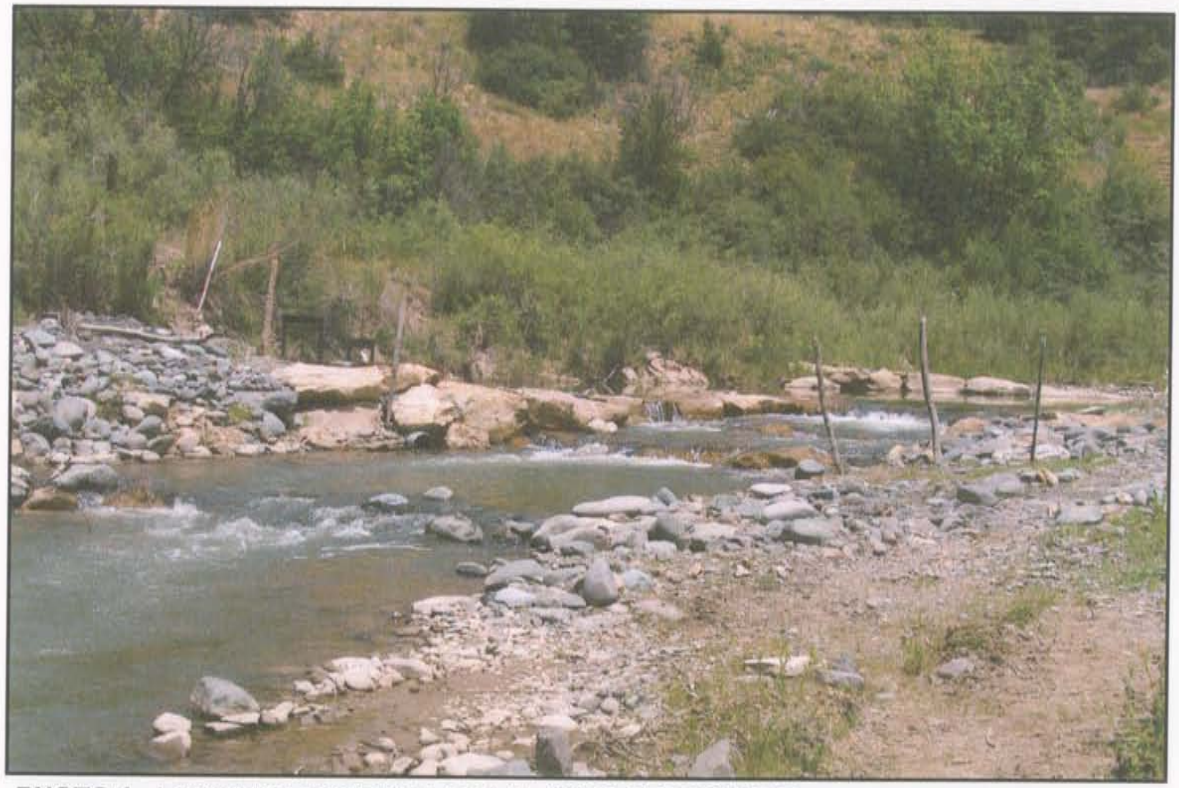

PHOTO 1. LOOKING UPSTREAM AT A 3 - STEP CROSS VANE .

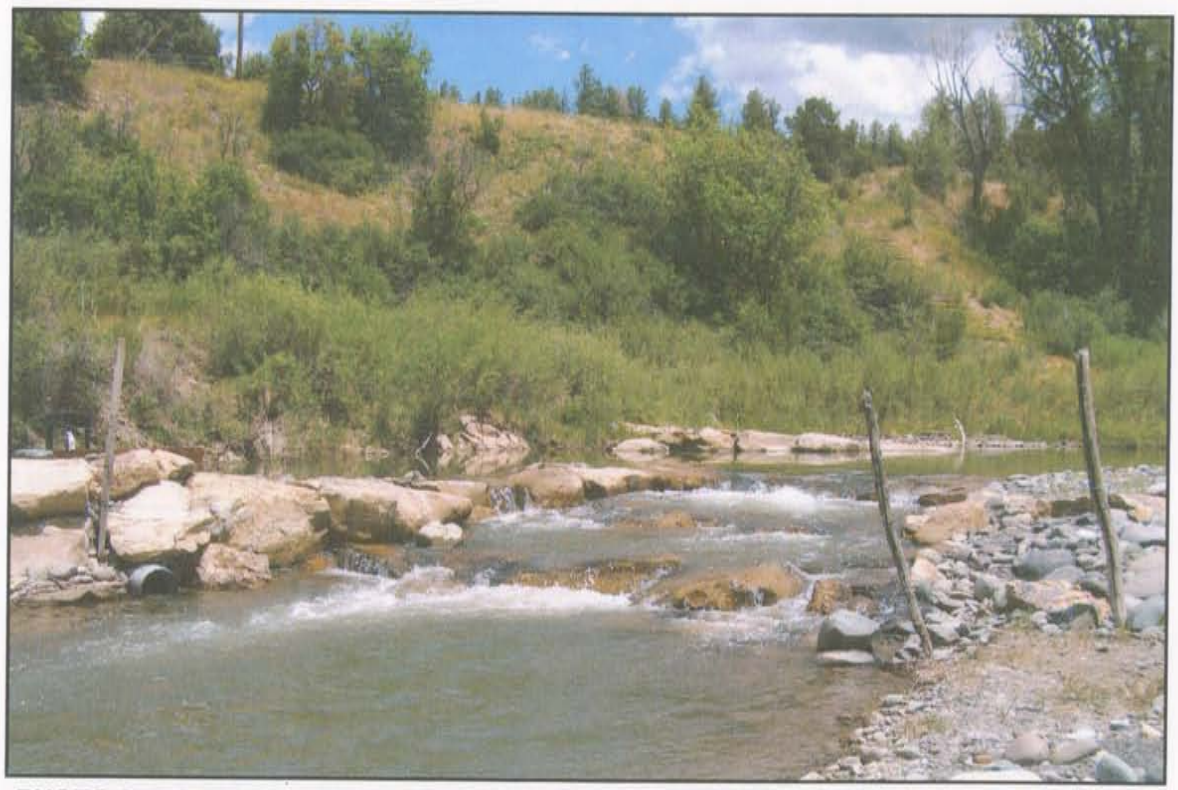

PHOTO 2. LOOKING UPSTREAM AT A 3 - STEP CROSS VANE .

NORTHERN VIRGINIA STREAM BANK *Fairfax County, Virginia*		*Detail Name:* 3-STEP CROSS VANE (3/3)
Wetland Studies and Solutions, Inc. *5300 Wellington Branch Drive, Suite 100* *Gainesville, Virginia 20155* *Phone 703.679.5600 Fax 703.679.5601*	*Concept Plan*	*Scale:* NTS
		Date: 03/2006 — *Sheet:* 6 *of* 28

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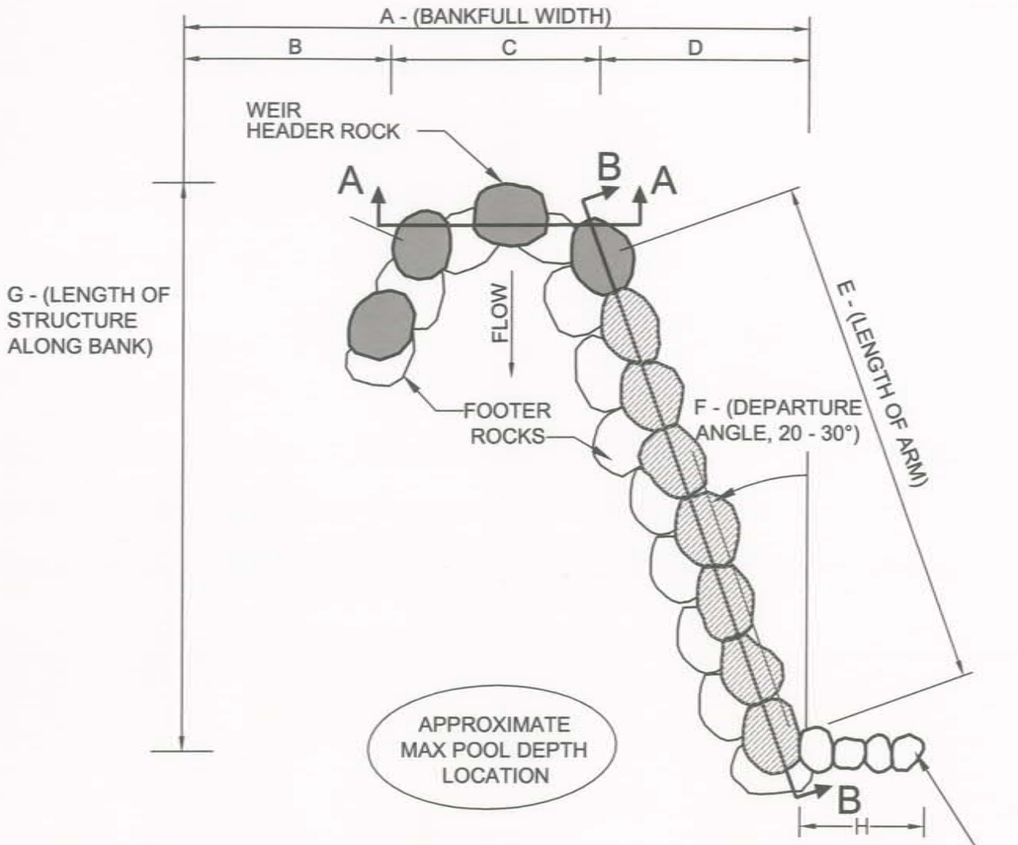
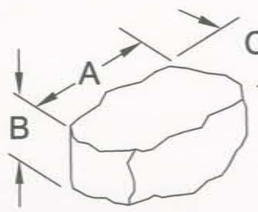
DETAIL 3 - J-HOOK

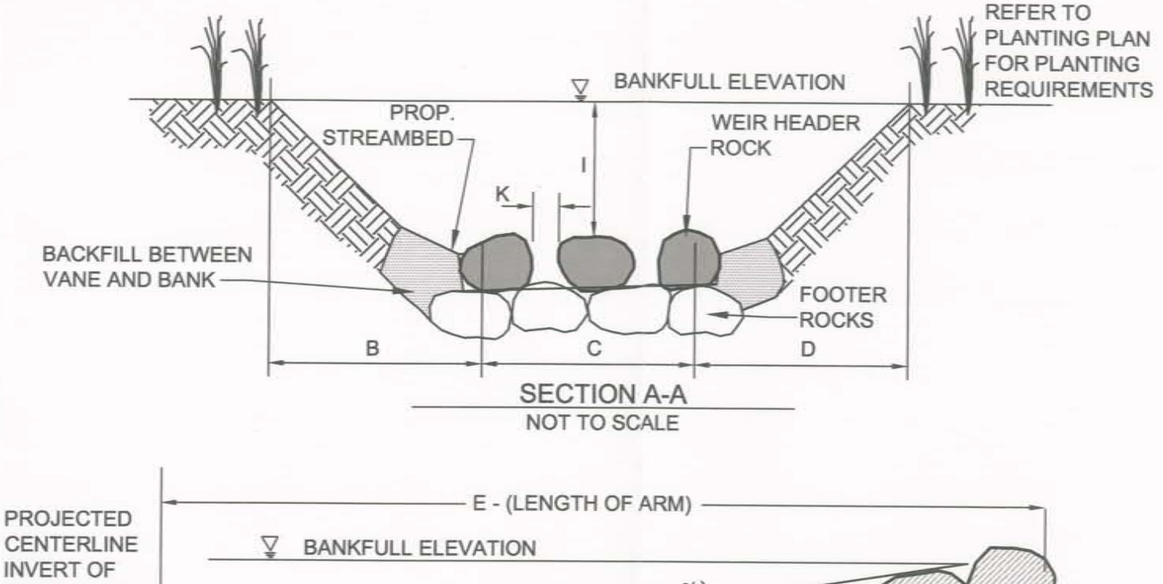




DETERMINE 3 PRIMARY
DIMENSIONS OF ROCK:
A = LONGEST DIMENSION
B = SHORTEST DIMENSION
C = INTERMEDIATE DIMENSION

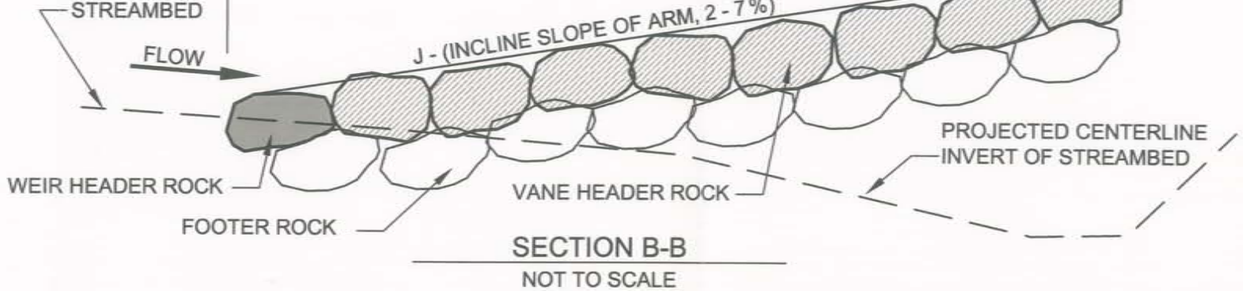
PLAN VIEW

NOT TO SCALE



SECTION A-A

NOT TO SCALE



SECTION B-B

NOT TO SCALE

STRUCTURE LOCATION		J-HOOK DIMENSIONS										
PER CENTERLINE STATION		CROSS SECTION PARAMETER (FT)										
FROM	TO	A	B	C	D	E	F	G	H	I	J	K

NOTES:
1. ALL HEADER AND FOOTER ROCKS SHALL HAVE AN INTERMEDIATE DIMENSION OF AT LEAST 30 INCHES.
2. THE SILL ROCKS SHALL HAVE AN INTERMEDIATE DIMENSION OF AT LEAST 12".
3. TOP OF FRONT HEADER ROCK (S) SHALL BE PLACED AT PROPOSED STREAMBED INVERT.
4. BACKFILL BETWEEN VANES AND BANKS WITH SUBSTATE MATERIAL USED IN CHANNEL.

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Concept Plan

Detail Name: J-HOOK (1/2)
Scale: NTS
Date: 03/2006
Sheet: 7 of 28

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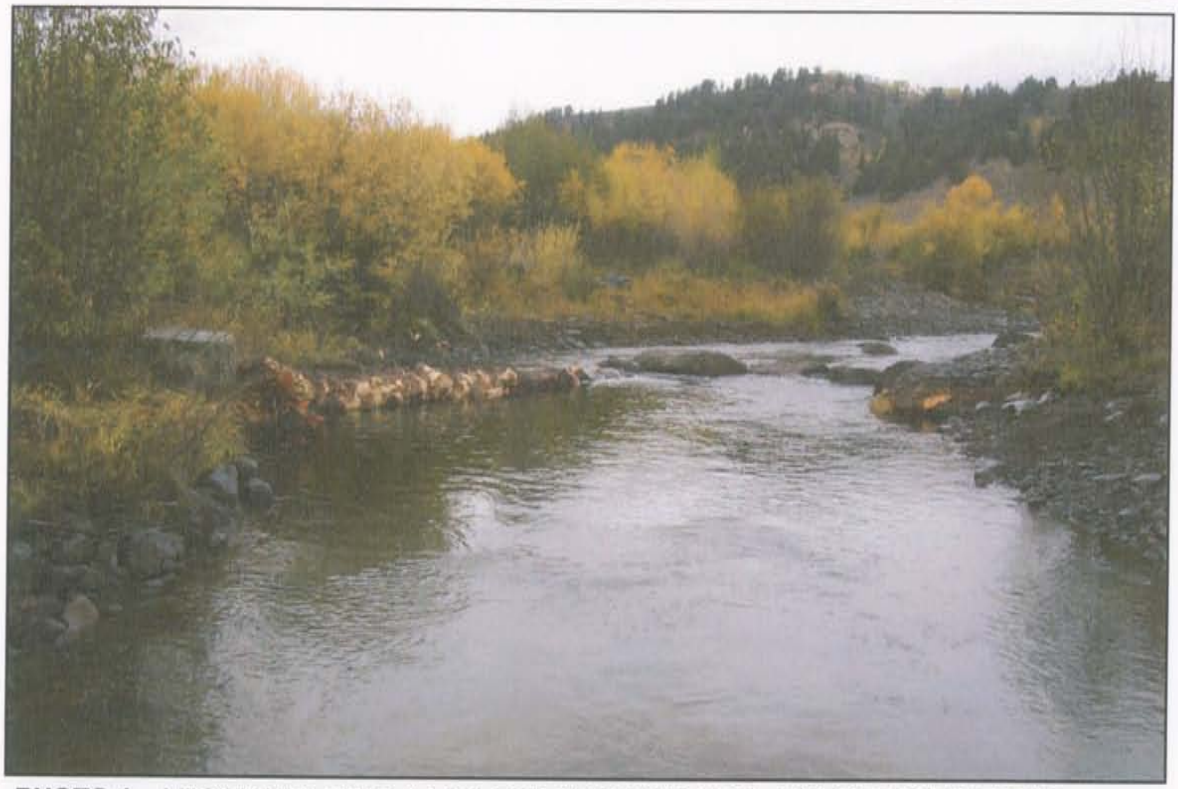

PHOTO 1. J-HOOK UTILIZING A LOG FOR THE VANE ARM. UNLESS CONDITIONS PERMIT J-HOOKS WILL BE CONSTRUCTED ENTIRELY OF ROCK.

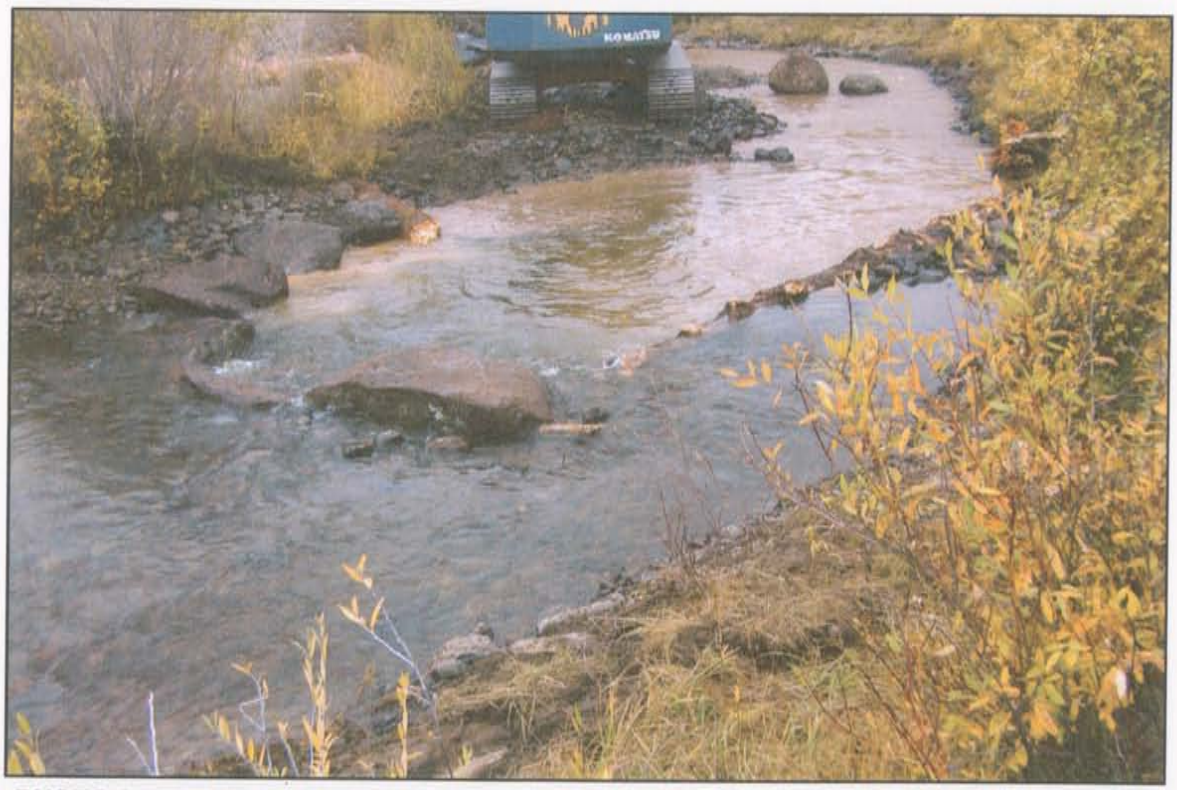

PHOTO 2. LOOKING DOWNSTREAM AT THE J-HOOK.

NORTHERN VIRGINIA STREAM BANK *Fairfax County, Virginia*		*Detail Name:* J-HOOK (2/2)	
Wetland Studies and Solutions, Inc. *5300 Wellington Branch Drive, Suite 100* *Gainesville, Virginia 20155* *Phone 703.679.5600 Fax 703.679.5601*	*Concept Plan*	*Scale:* NTS	
		Date: 03/2006	*Sheet:* 8 *of* 28

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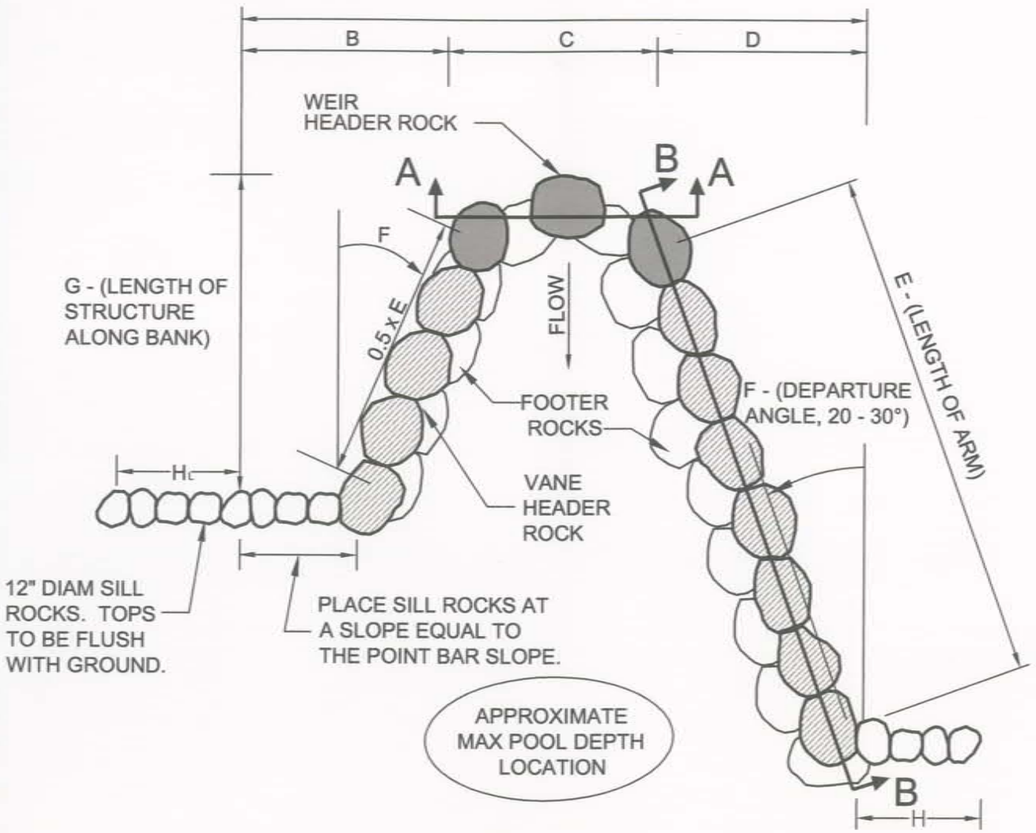
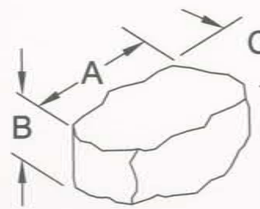
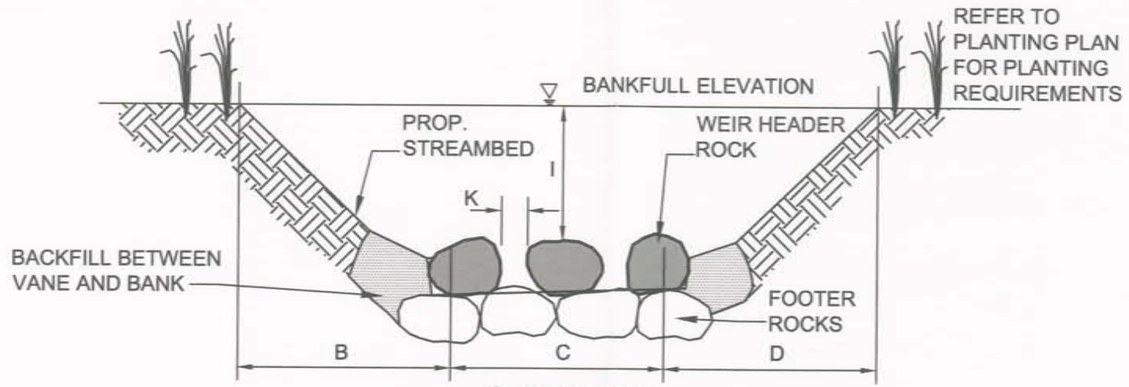
DETAIL 4 - J-HOOK WITH SILL



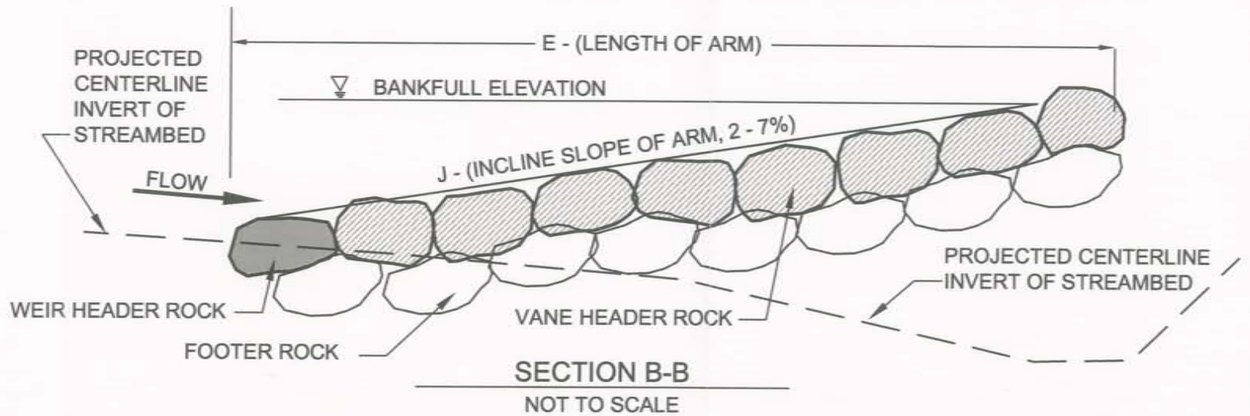


DETERMINE 3 PRIMARY
DIMENSIONS OF ROCK:
A = LONGEST DIMENSION
B = SHORTEST DIMENSION
C = INTERMEDIATE DIMENSION

PLAN VIEW
NOT TO SCALE



SECTION A-A
NOT TO SCALE



SECTION B-B
NOT TO SCALE

STRUCTURE LOCATION		J-HOOK DIMENSIONS										
PER CENTERLINE STATION		CROSS SECTION PARAMETER (FT)										
FROM	TO	A	B	C	D	E	F	G	H	I	J	K

NOTES:
1. ALL HEADER AND FOOTER ROCKS SHALL HAVE AN INTERMEDIATE DIMENSION OF AT LEAST 30 INCHES.
2. THE SILL ROCKS SHALL HAVE AN INTERMEDIATE DIMENSION OF AT LEAST 12".
3. TOP OF FRONT HEADER ROCK (S) SHALL BE PLACED AT PROPOSED STREAMBED INVERT.
4. BACKFILL BETWEEN VANES AND BANKS WITH SUBSTATE MATERIAL USED IN CHANNEL.

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Concept Plan

Detail Name: MODIFIED J-HOOK (1/2)
Scale: NTS
Date: 03/2006
Sheet: 9 *of* 28

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PHOTO 1. A J-HOOK WITH SILL PLACED IN A MEANDER TO PROTECT THE OUTER STREAMBANK AND TO HELP MAINTAIN THE STREAM'S RIFFLE/POOL SEQUENCE.

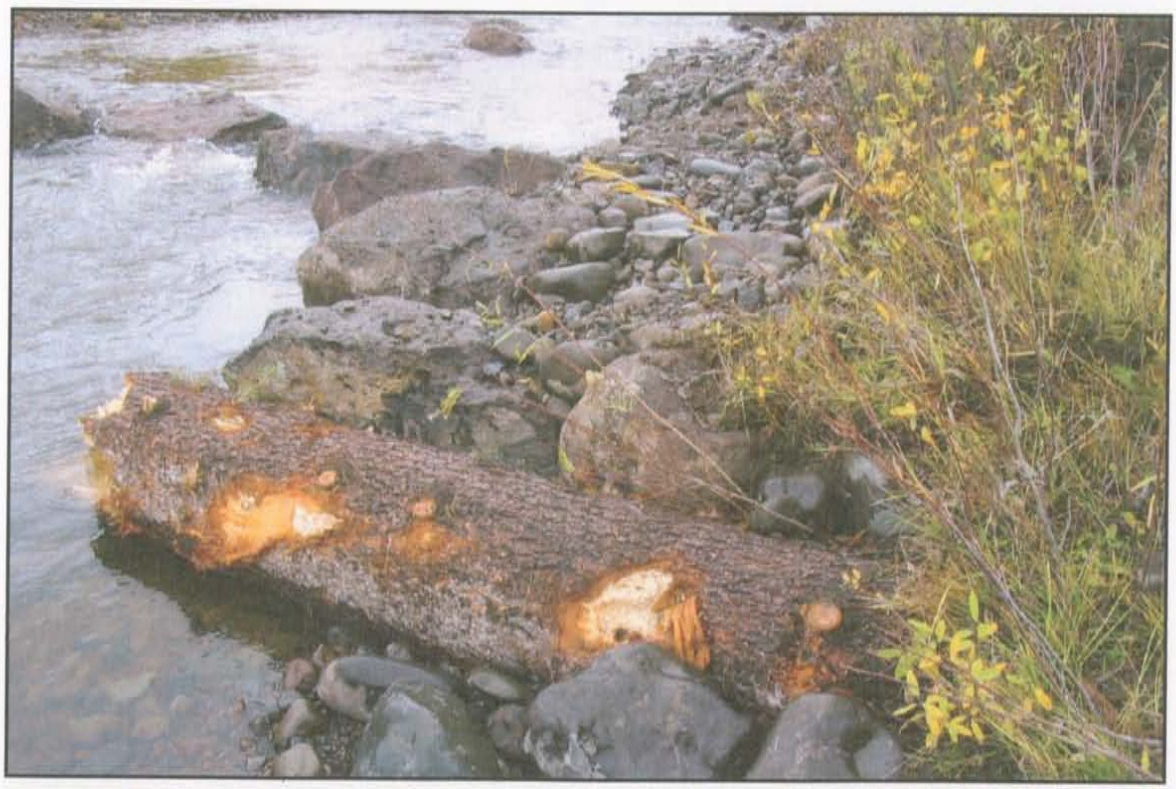

PHOTO 2. J-HOOK WITH A ROCK AND LOG SILL ON THE EXTENDING FROM THE "HOOK."

NORTHERN VIRGINIA STREAM BANK *Fairfax County, Virginia*		*Detail Name:* J-HOOK WITH SILL (2/2)
Wetland Studies and Solutions, Inc. *5300 Wellington Branch Drive, Suite 100* *Gainesville, Virginia 20155* *Phone 703.679.5600 Fax 703.679.5601*	*Concept Plan*	*Scale:* NTS *Date:* 03/2006 — *Sheet:* 10 *of* 28

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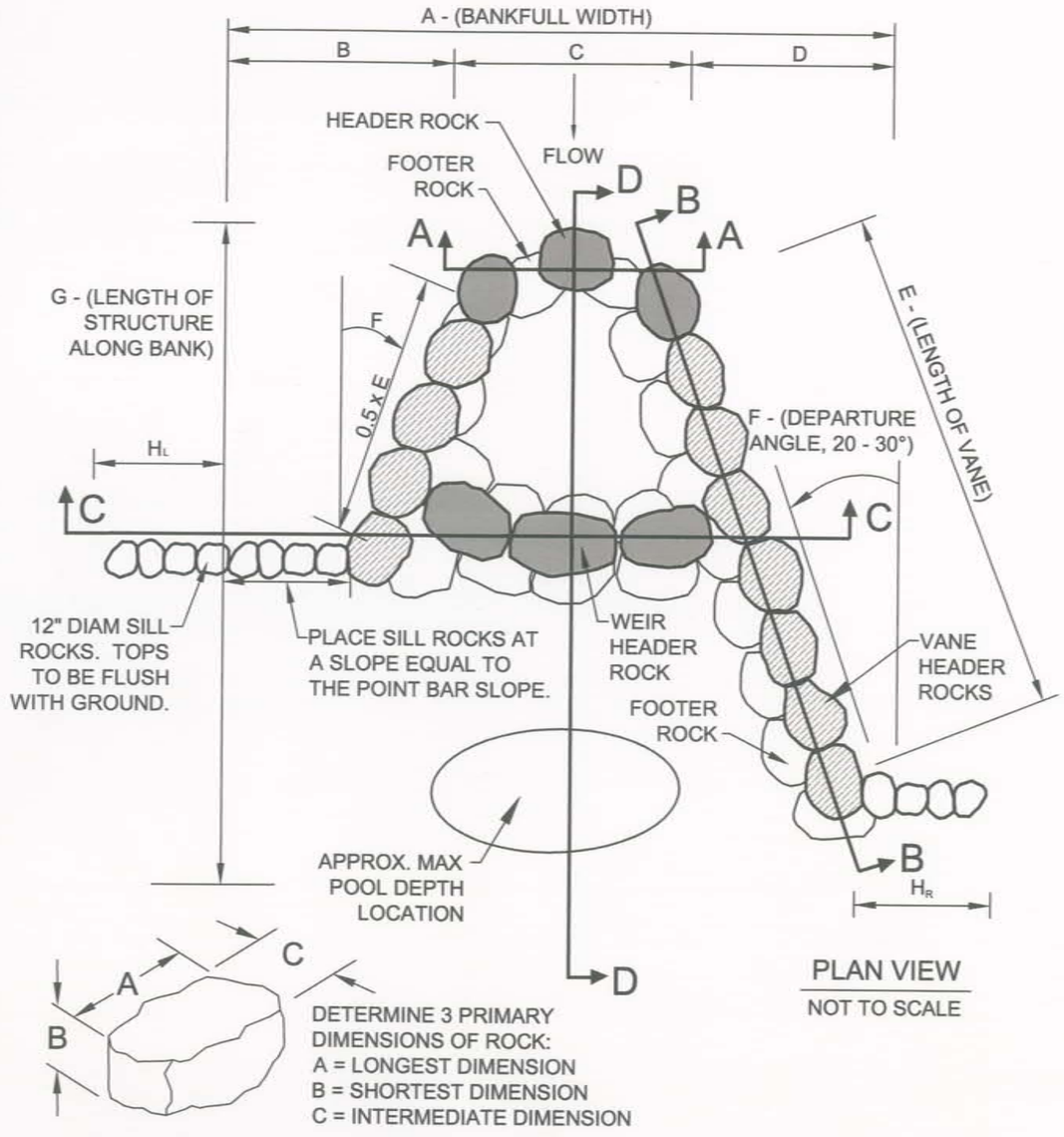
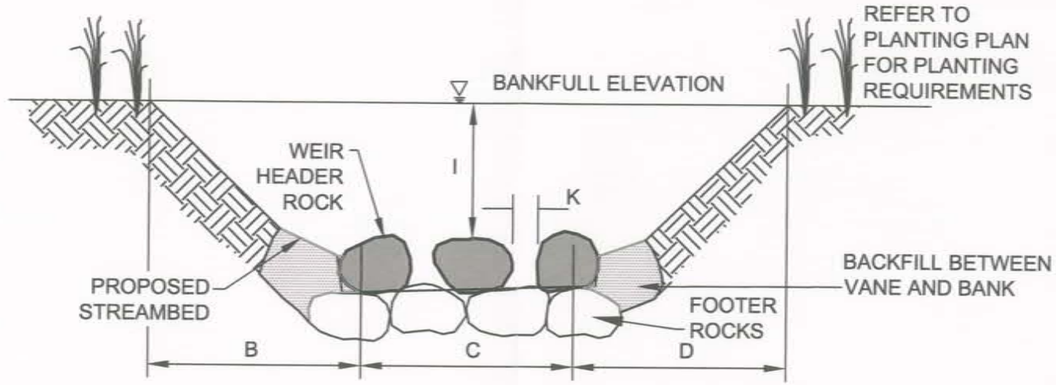
DETAIL 5.1 - 2 STEP J-HOOK

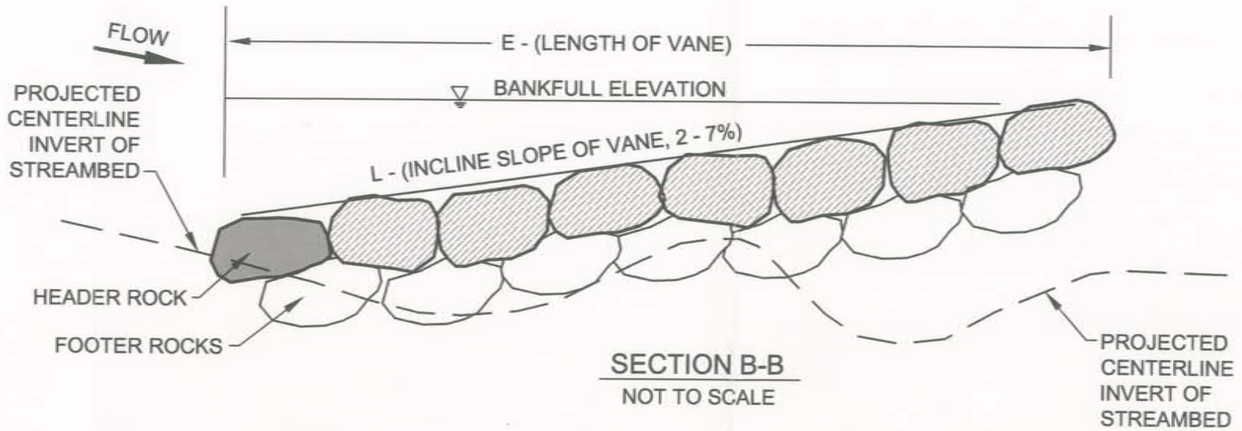


PLAN VIEW
NOT TO SCALE

DETERMINE 3 PRIMARY DIMENSIONS OF ROCK:
A = LONGEST DIMENSION
B = SHORTEST DIMENSION
C = INTERMEDIATE DIMENSION



SECTION A-A
NOT TO SCALE



SECTION B-B
NOT TO SCALE

NOTES:
1. ALL HEADER AND FOOTER ROCKS SHALL HAVE AN INTERMEDIATE DIMENSION OF AT LEAST 30".
2. THE SILL ROCKS SHALL HAVE AN INTERMEDIATE DIMENSION OF AT LEAST 12".
3. TOP OF FRONT HEADER ROCK(S) SHALL BE PLACED AT PROPOSED STREAMBED INVERT.
4. BACKFILL BETWEEN VANE AND BANK WITH COBBLE SUBSTRATE MATERIAL USED IN CHANNEL.

NORTHERN VIRGINIA STREAM BANK *Fairfax County, Virginia*		*Detail Name:* MODIFIED J-HOOK 2-STEP (1/3)
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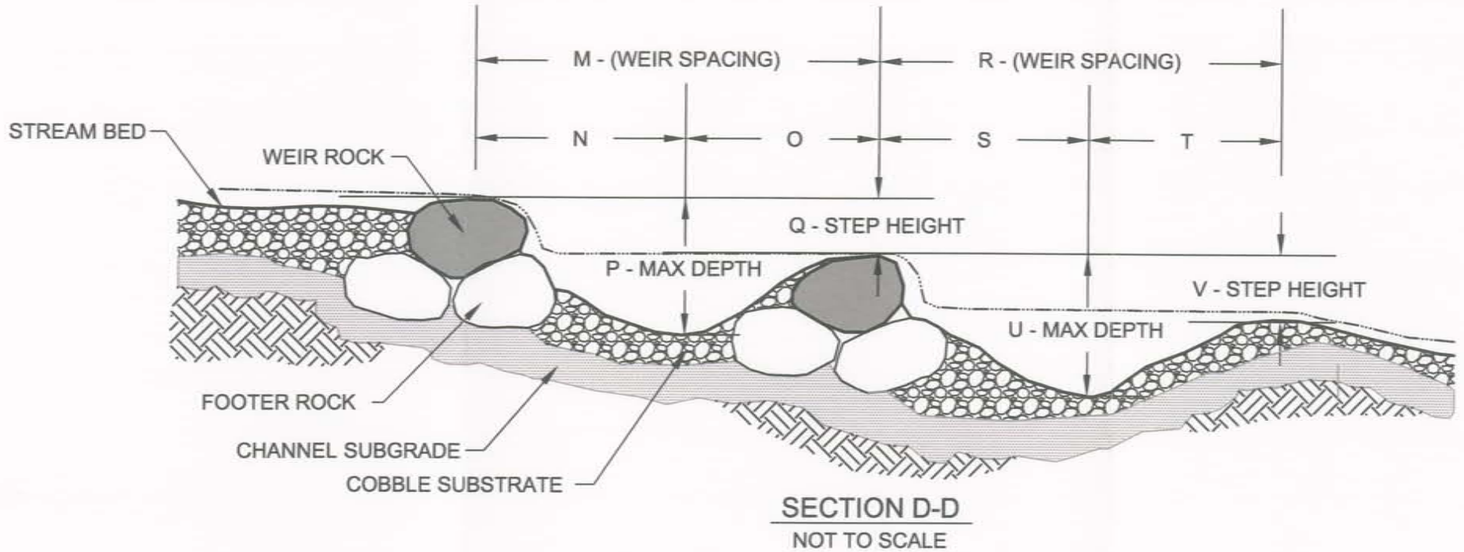
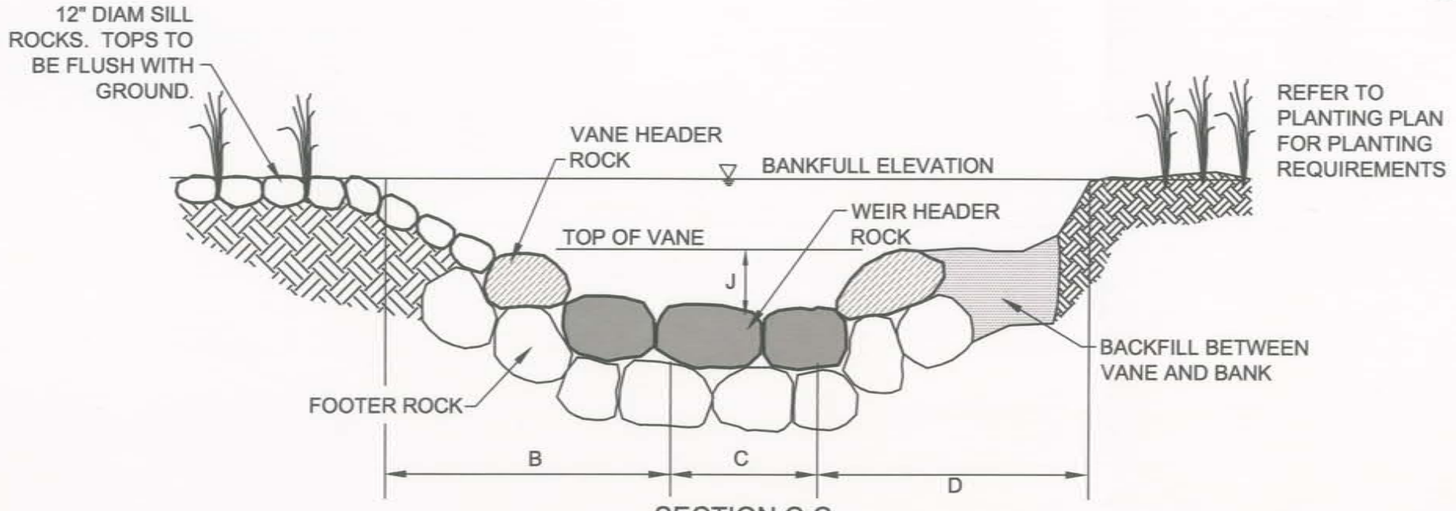
STRUCTURE LOCATION		MODIFIED J-HOOK DIMENSIONS																				
PER CENTERLINE STATION		CROSS SECTION PARAMETER (FT)																				
FROM	TO	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V



SECTION D-D

NOT TO SCALE



SECTION C-C

NOT TO SCALE

DETAIL 5.2 - 2 STEP J-HOOK

NORTHERN VIRGINIA STREAM BANK *Fairfax County, Virginia*		*Detail Name:* MODIFIED J-HOOK 2-STEP (2/3)
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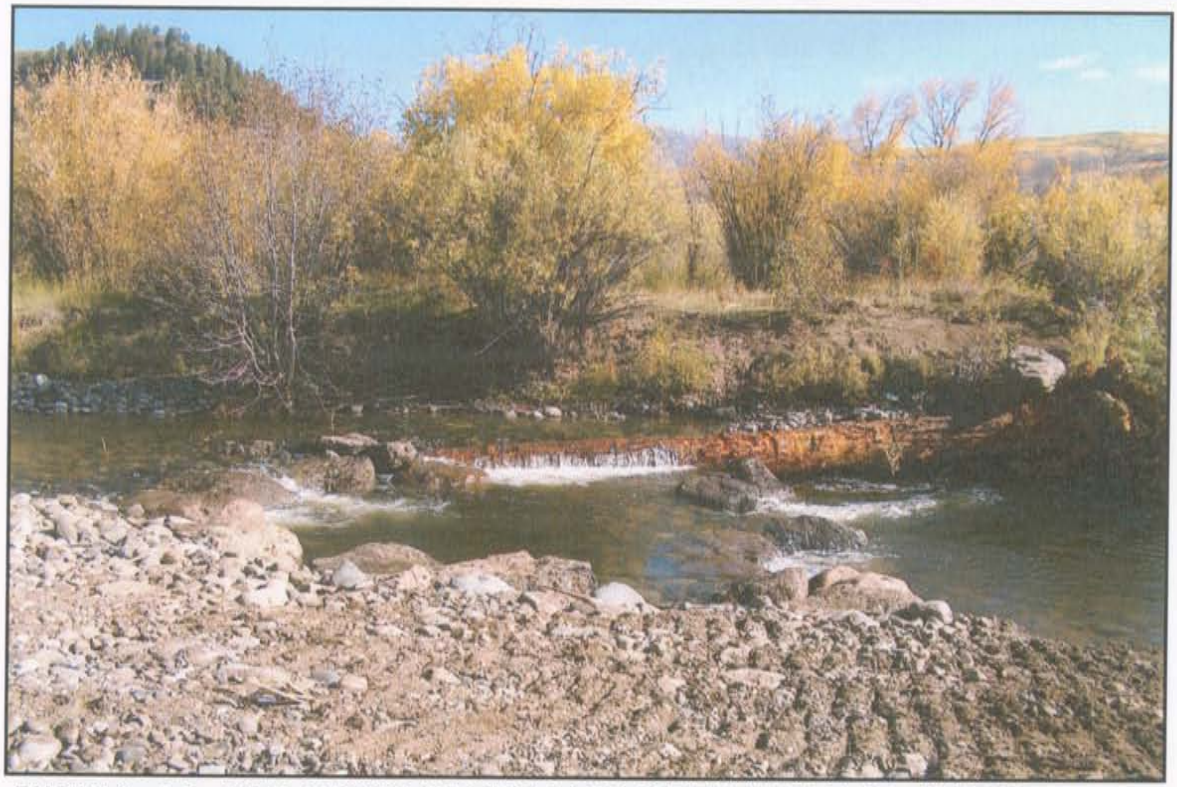

PHOTO 1. A 2 - STEP J-HOOK UTILIZING A LOG FOR THE VANE ARM. UNLESS CONDITIONS PERMIT J-HOOKS WILL BE CONSTRUCTED ENTIRELY OF ROCK.

PHOTO 2. LOOKING DOWNSTREAM AT THE 2-STEP J-HOOK.

NORTHERN VIRGINIA STREAM BANK *Fairfax County, Virginia*	*Detail Name:* 2-STEP J-HOOK (3/3)
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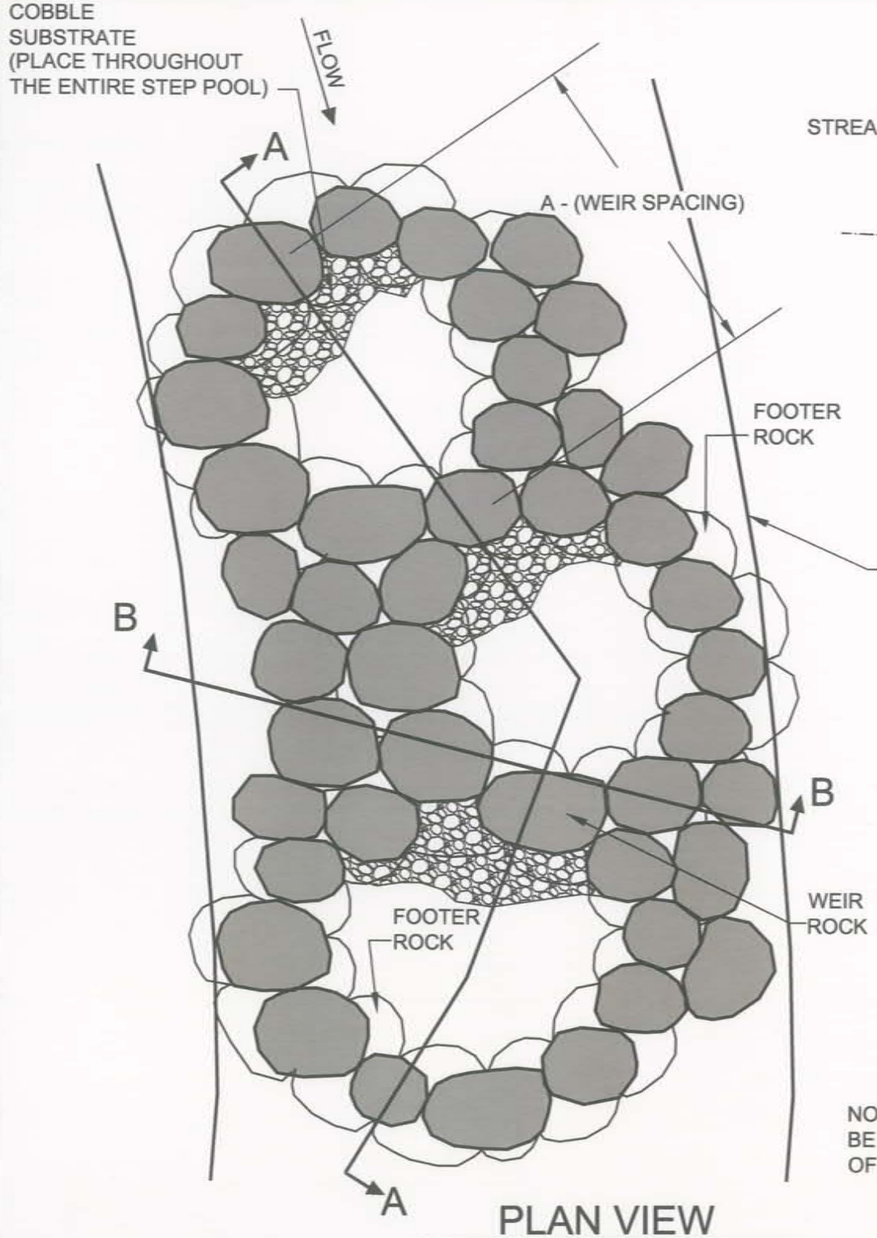
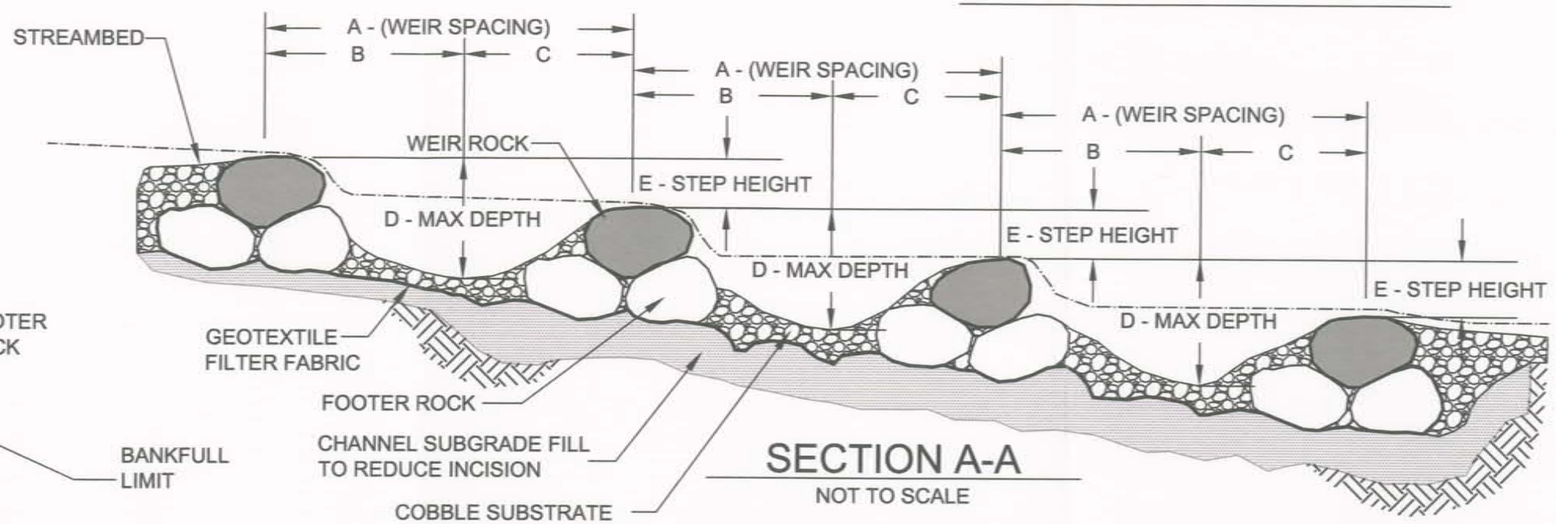
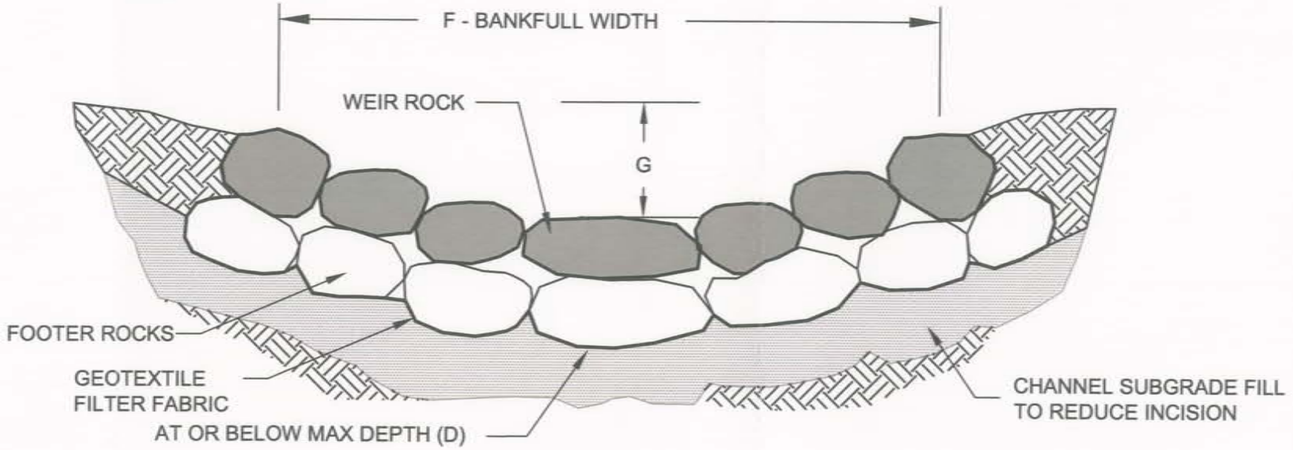
DETAIL 6 - STEP POOLS



PLAN VIEW
NOT TO SCALE



SECTION A-A
NOT TO SCALE



SECTION B-B
NOT TO SCALE

NOTE: THE STEP POOL SEQUENCE CAN BE CONSTRUCTED USING ANY NUMBER OF STEP POOLS.

STRUCTURE LOCATION		STEP POOL DIMENSIONS						
PER CENTERLINE STATION		PARAMETER (FT)						
FROM	TO	A	B	C	D	E	F	G

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Concept Plan

Detail Name: STEP POOLS (1/2)

Scale: NTS

Date: 03/2006

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PHOTO 1. LOOKING UPSTREAM AT STEP POOL SEQUENCE.

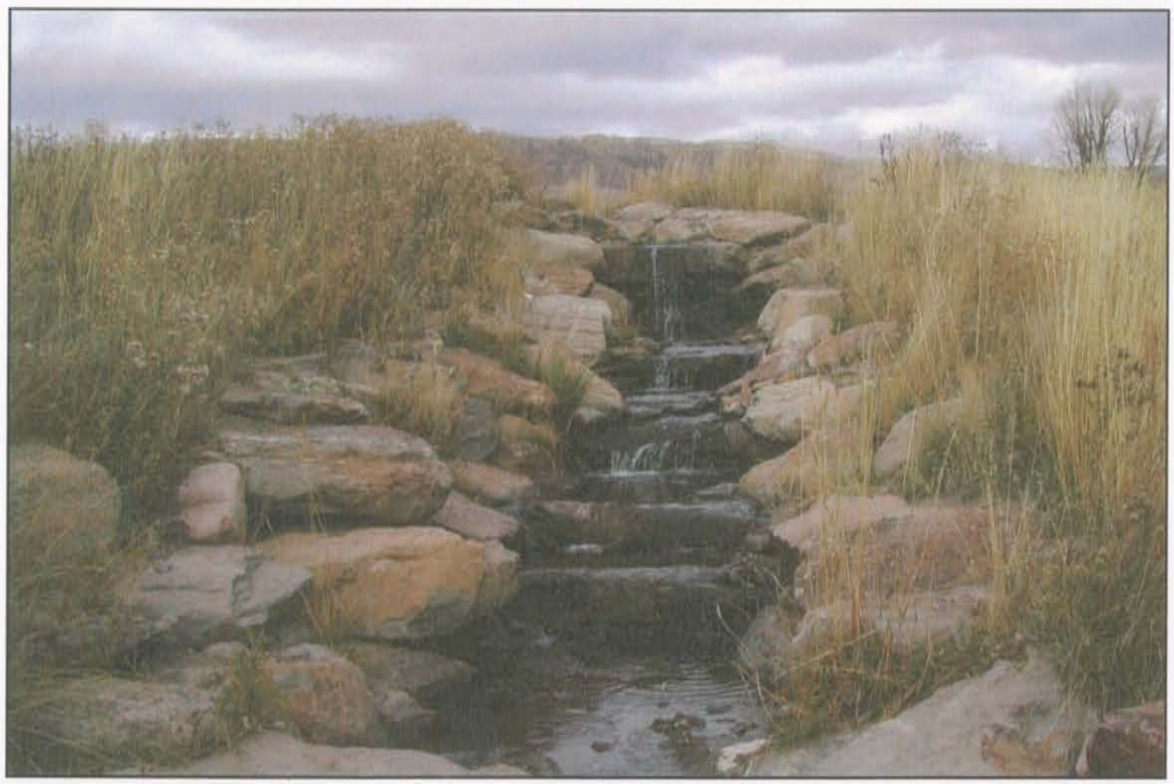

PHOTO 2. LOOKING UPSTREAM AT HIGH GRADIENT STEP POOL SEQUENCE.

NORTHERN VIRGINIA STREAM BANK *Fairfax County, Virginia*		*Detail Name:* STEP POOL (2/2)
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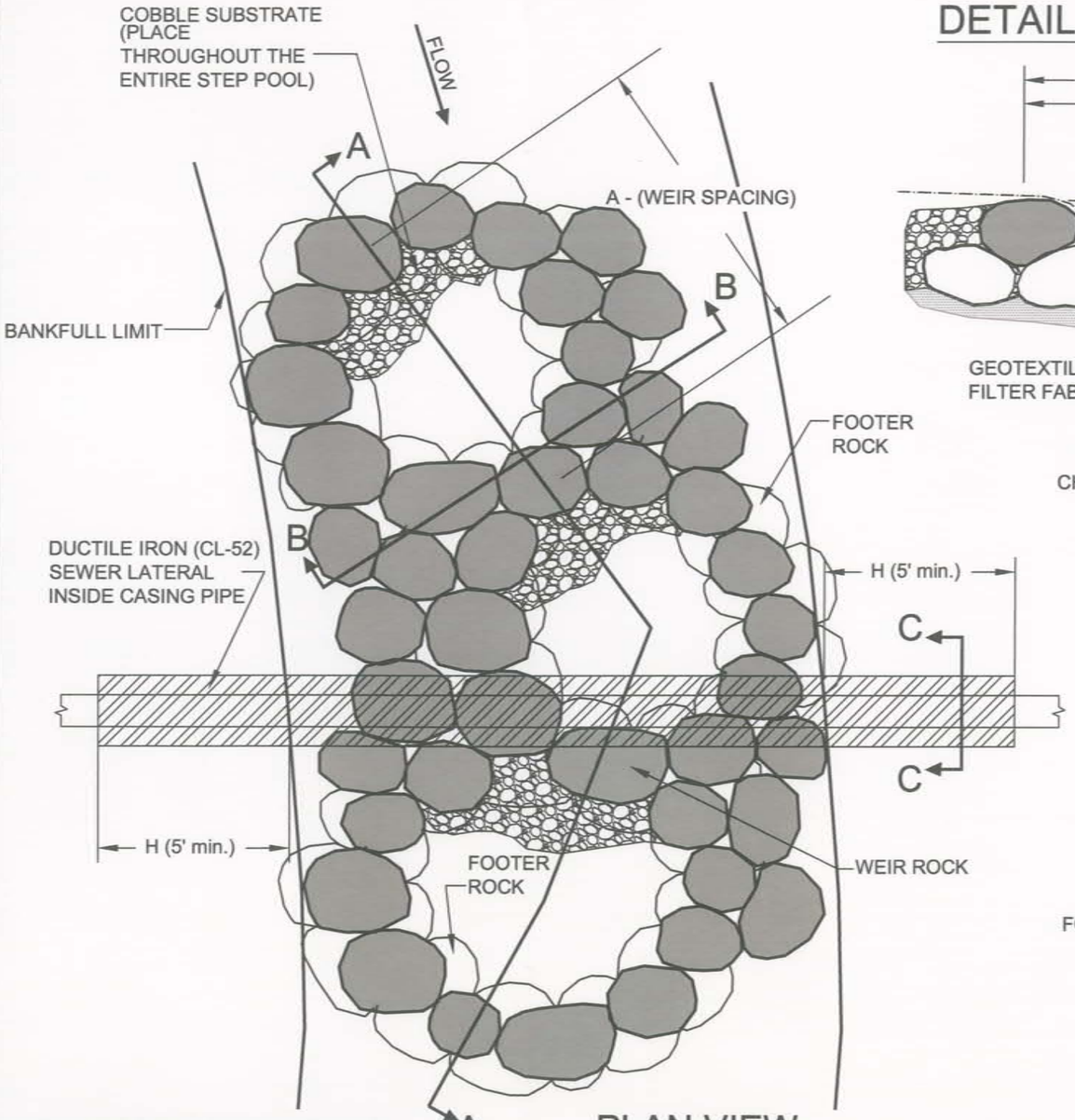
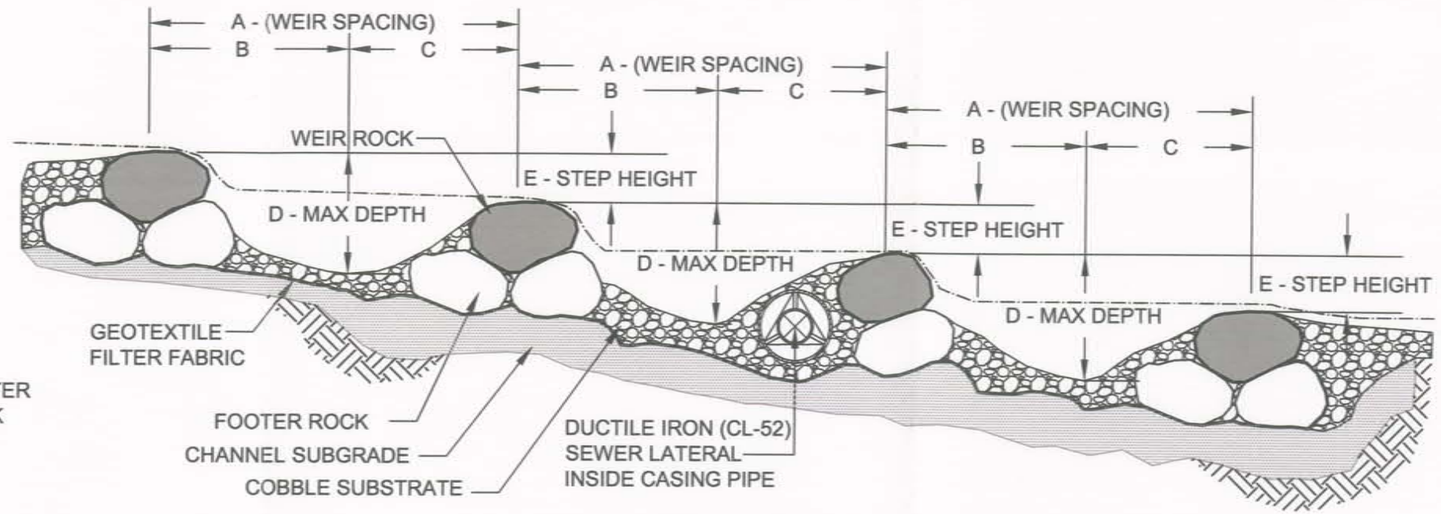
DETAIL 7.1 - STEP POOL GRADE CONTROL AT SEWER LATERALS

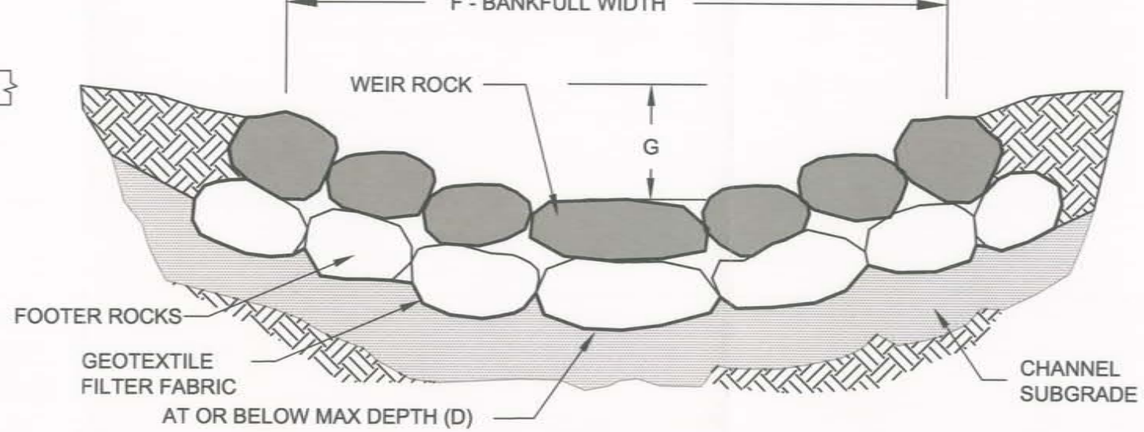


PLAN VIEW
NOT TO SCALE

NOTE: THE STEP POOL SEQUENCE CAN BE CONSTRUCTED USING ANY NUMBER OF STEP POOLS.



SECTION A-A
NOT TO SCALE



SECTION B-B
NOT TO SCALE

STRUCTURE LOCATION		STEP POOL DIMENSIONS							
PER CENTERLINE STATION		PARAMETER (FT)							
FROM	TO	A	B	C	D	E	F	G	H

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Concept Plan

Detail Name: STEP POOL GRADE CONTROL (1/2)
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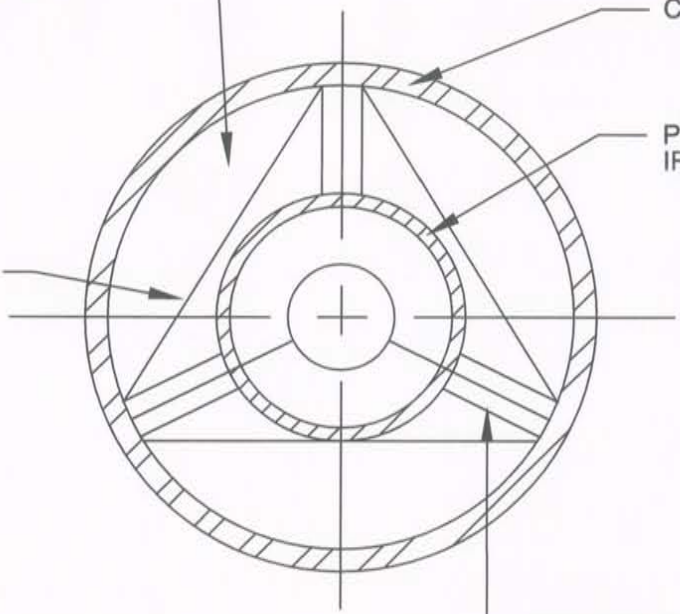

THE OAK CHOCK WITH 1" DEEP GROVES SHALL HAVE DIMENSIONS OF 4"x6"x18" AND BE PLACED 6' oc. 1" METAL BANDS ARE TO BE BOUND AND BOLTED IN CHOCK GROOVED AREAS.

CASING PIPE TO BE BLACK SEAMLESS STEEL WELDED (AWWA C-200) PIPE, MIN THICKNESS 3/8".

SEE PFM PL. 19-10 FOR PLACEMENT OF PIPE IN TRENCH

GROUT SPECIFICATIONS
ONE PART CEMENT AND FOUR PARTS CONCRETE SAND TO WHICH HAS BEEN ADDED "PASSOLITE" OR FLY ASH IN THE AMOUNT OF 1/2 LB. PER BAG OF CEMENT

SECTION C-C

NOT TO SCALE

NORTHERN VIRGINIA STREAM BANK *Fairfax County, Virginia*		*Detail Name:* STEP POOL GRADE CONTROL (2/2)
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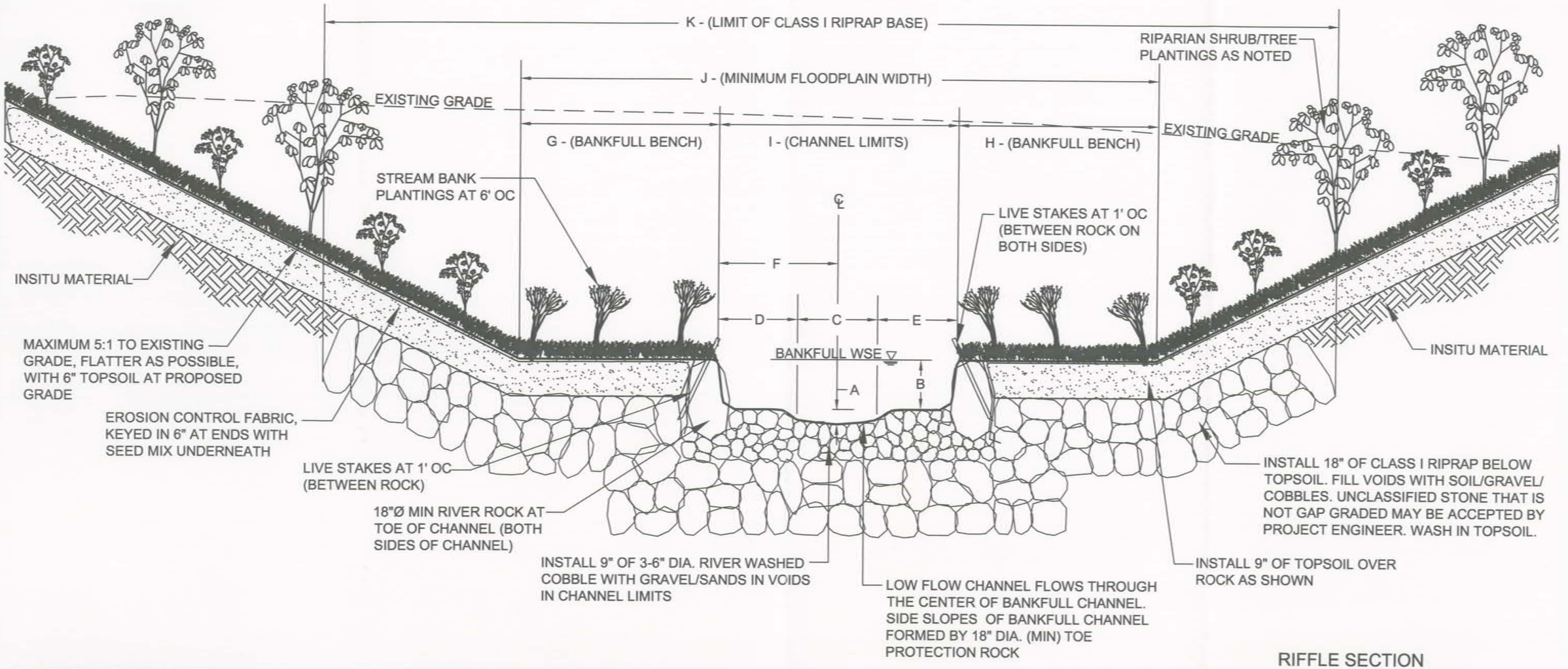
DETAIL 8.1 - REINFORCED STREAM BED, RIFFLE SECTION



STRUCTURE LOCATION		MODIFIED J-HOOK DIMENSIONS										
PER CENTERLINE STATION		CROSS SECTION PARAMETER (FT)										
FROM	TO	A	B	C	D	E	F	G	H	I	J	K

RIFFLE SECTION

ORIENTATION LOOKING DOWNSTREAM
NOT TO SCALE

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Concept Plan

Detail Name: REINFORCED STREAMBED (1/3)

Scale: NTS

Date: 03/2006

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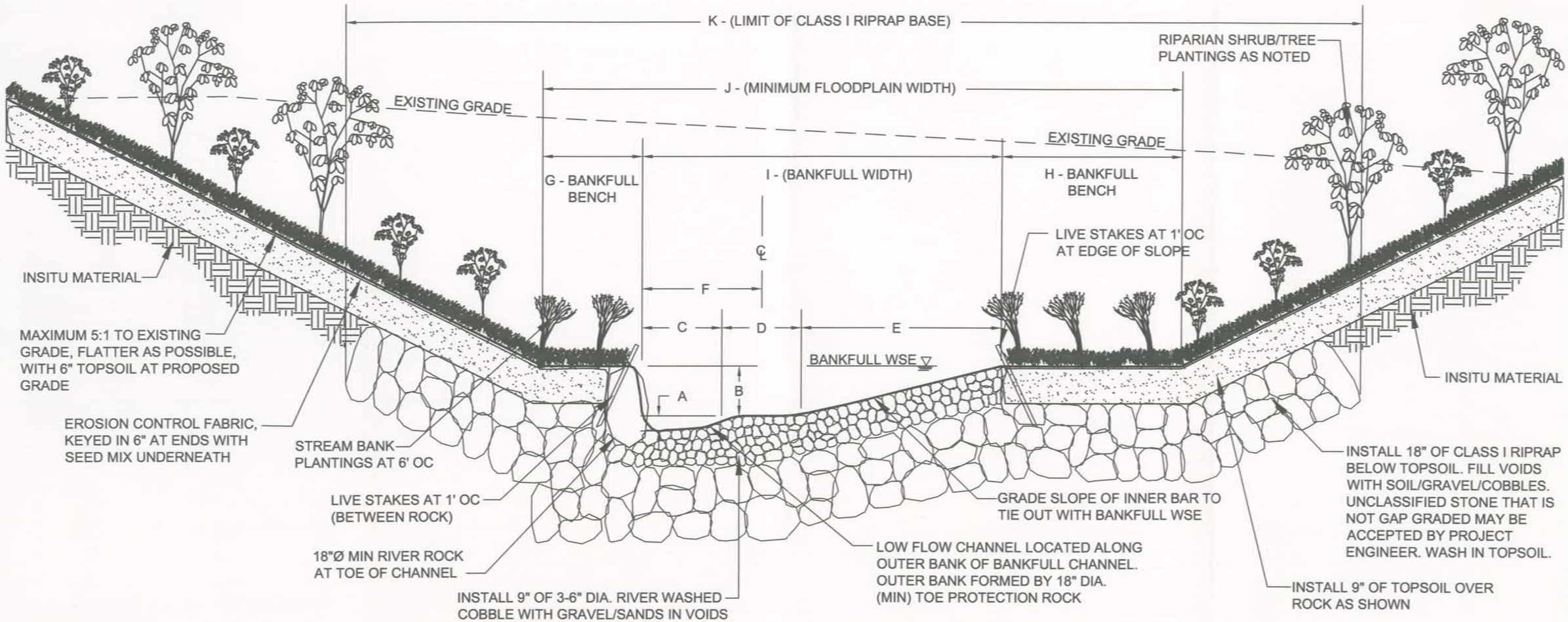
DETAIL 8.2 - REINFORCED STREAM BED, MEANDER SECTION



MEANDER SECTION

ORIENTATION LOOKING DOWNSTREAM
NOT TO SCALE

STRUCTURE LOCATION		MODIFIED J-HOOK DIMENSIONS										
PER CENTERLINE STATION		CROSS SECTION PARAMETER (FT)										
FROM	TO	A	B	C	D	E	F	G	H	I	J	K

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Detail Name: REINFORCED STREAMBED (2/3)

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PHOTO 1. REINFORCED STREAM BED WITH STABILIZATION AT CONFLUENCE.

PHOTO 2. LOOKING UPSTREAM AT REINFORCED STREAMBED.

NORTHERN VIRGINIA STREAM BANK *Fairfax County, Virginia*	*Detail Name:* REINFORCED STREAMBED (3/3)
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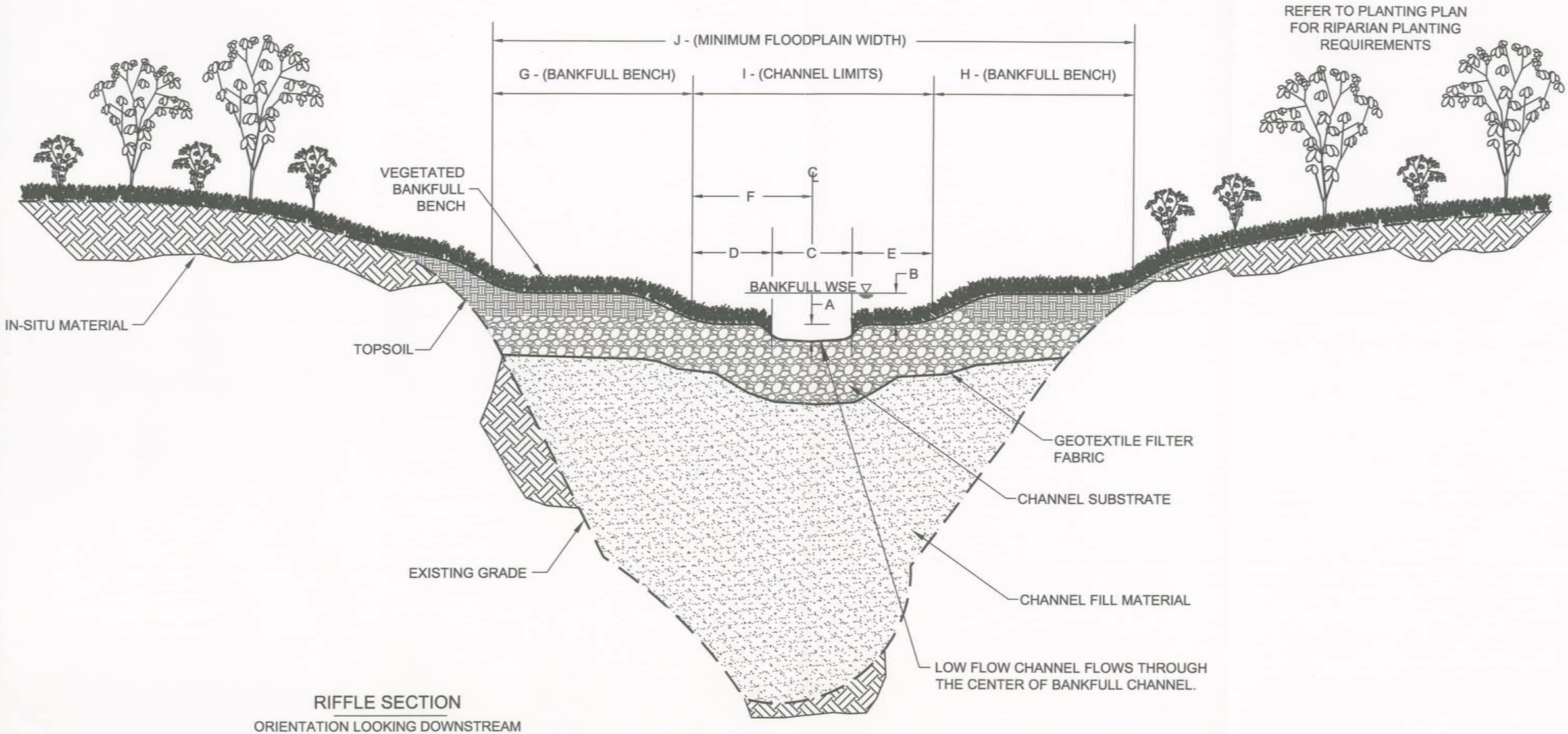
DETAIL 9 - MULTI-STAGE CHANNEL WITHIN EXISTING STREAMBANKS



RIFFLE SECTION

ORIENTATION LOOKING DOWNSTREAM
NOT TO SCALE

STRUCTURE LOCATION		MODIFIED J-HOOK DIMENSIONS									
PER CENTERLINE STATION		CROSS SECTION PARAMETER (FT)									
FROM	TO	A	B	C	D	E	F	G	H	I	J

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Concept Plan

Detail Name: MULTI-STAGE CHANNEL (1/2)

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PHOTO 1. MULTI-STAGE CHANNEL WITHIN EXISTING STREAMBANKS, POST-CONSTRUCTION.

NORTHERN VIRGINIA STREAM BANK *Fairfax County, Virginia*	*Detail Name:* MULTI-STAGE CHANNEL WITHIN EXISTING STREAMBANKS (2/2)
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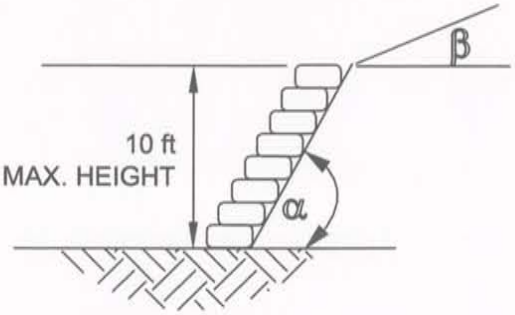
DETAIL 10 - IMBRICATED RIPRAP

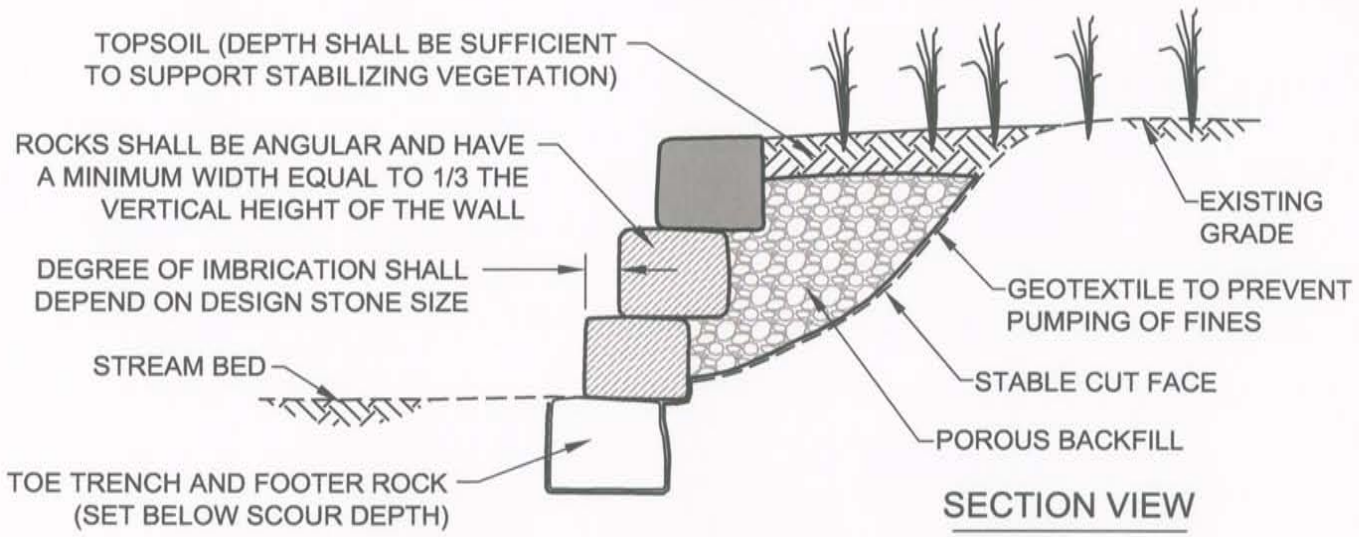


β =BACKFILL SLOPE ANGLE (2H:1V OR FLATTER BUT GREATER THAN 5.0%)

α =INCLINATION OF WALL FROM HORIZONTAL (1H:6V TO 1H:4V)

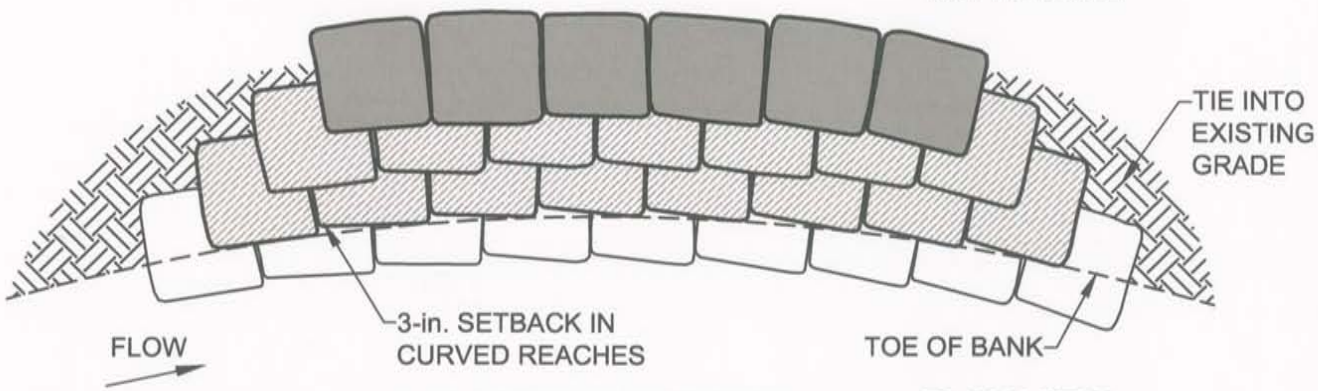
DEFINITION SKETCH

NOT TO SCALE



SECTION VIEW

NOT TO SCALE



PLAN VIEW

NOT TO SCALE

CONSTRUCTION NOTE:
STONE BLOCKS SHALL BE ROTATED INTO THE BANK DURING PLACEMENT SUCH THAT THE UPSTREAM BLOCKS OVERLAP THE DOWNSTREAM BLOCKS BY A MINIMUM OF 3 INCHES.

ADAPTED FROM MARYLAND'S WATERWAY CONSTRUCTION GUIDELINES

NORTHERN VIRGINIA STREAM BANK *Fairfax County, Virginia*	*Detail Name:* IMBRICATED RIPRAP (1/2)
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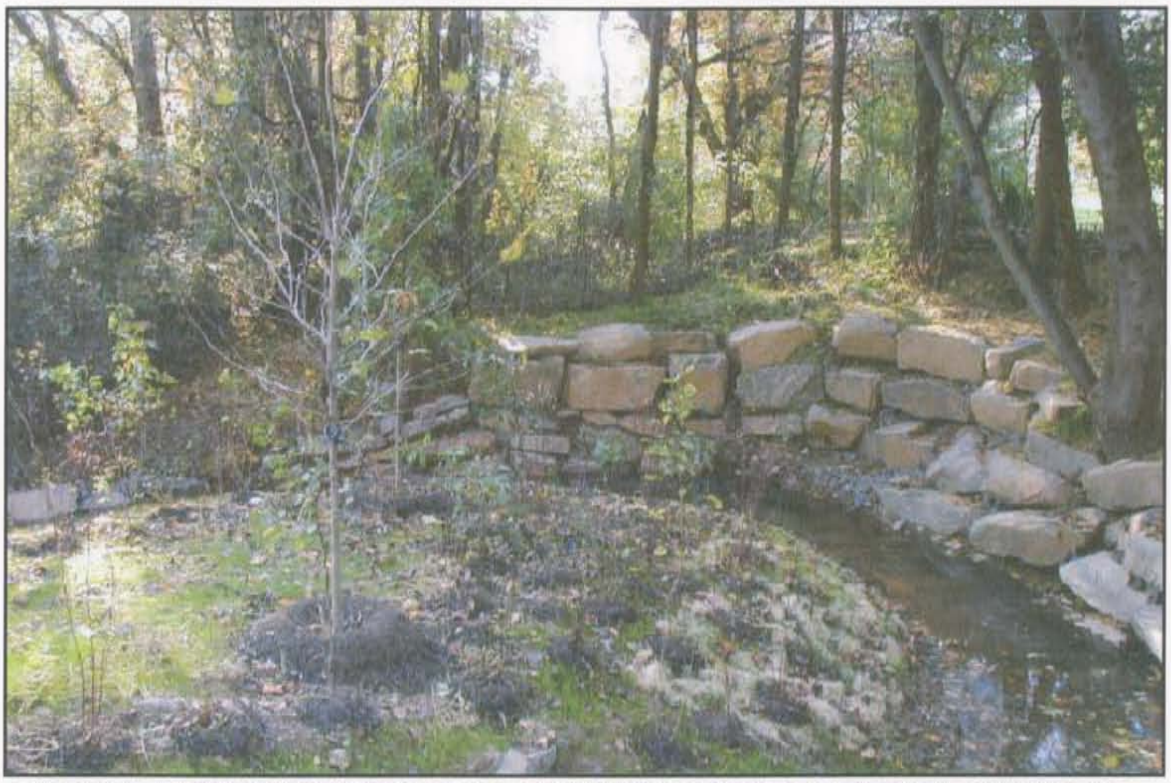

PHOTO 1. IMBRICATED RIPRAP ALONG THE MEANDER OF A PERENNIAL STREAM IN NORTHERN VIRGINIA.

PHOTO 2. IMBRICATED RIPRAP ALONG THE MEANDER OF A PERENNIAL STREAM IN NORTHERN VIRGINIA.

NORTHERN VIRGINIA STREAM BANK *Fairfax County, Virginia*	*Detail Name:* IMBRICATED RIPRAP (2/2)
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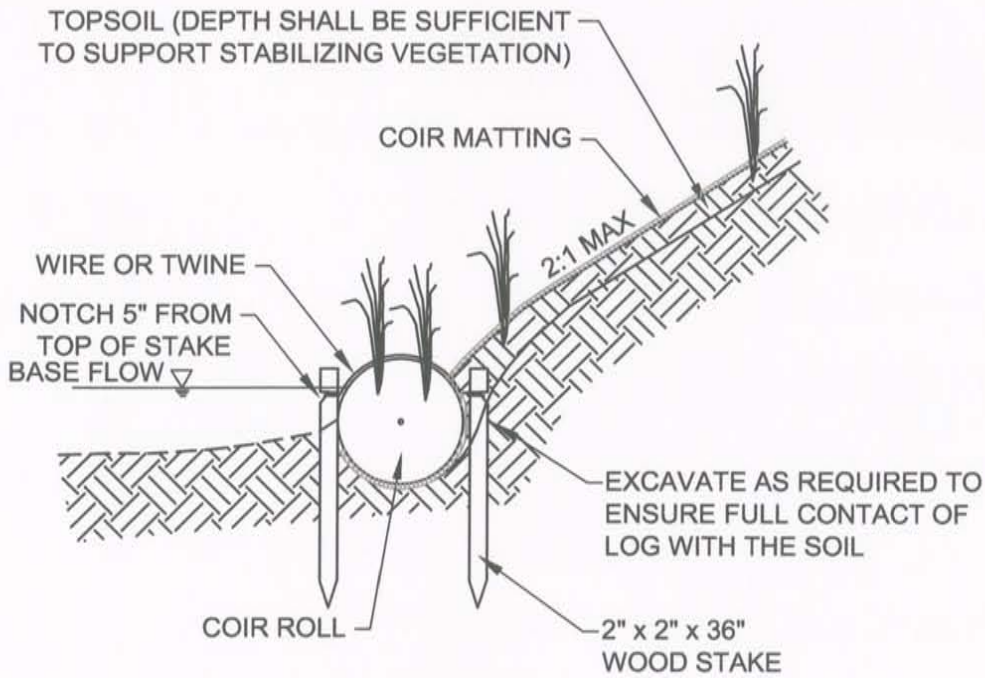
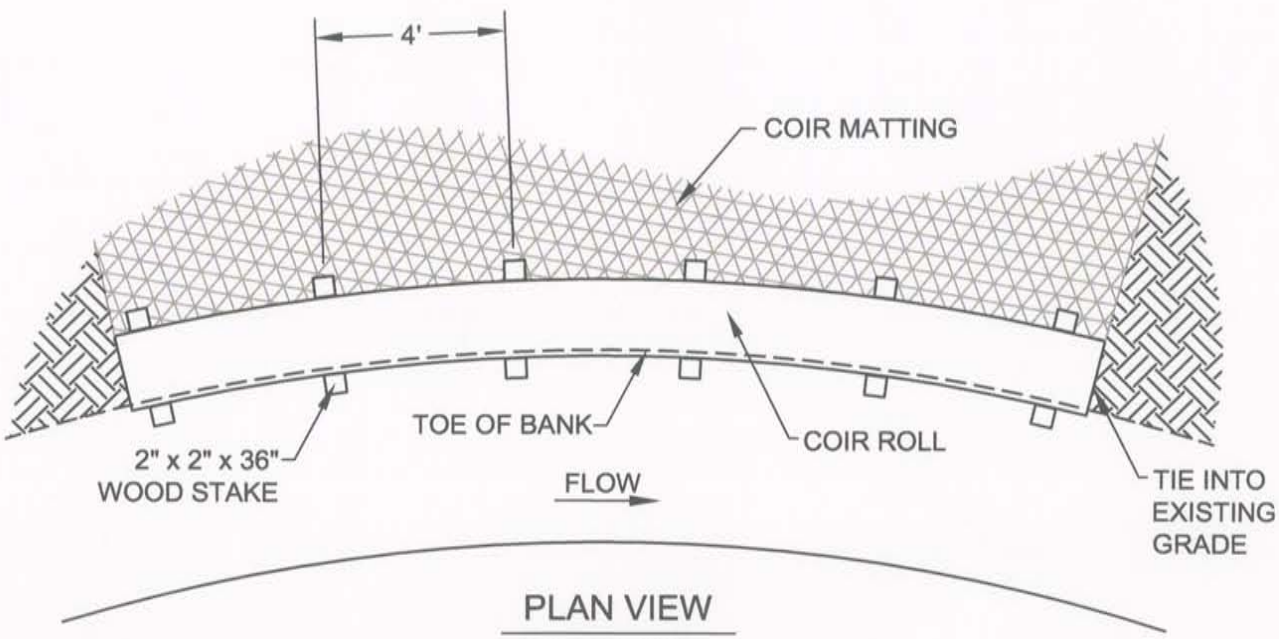
DETAIL 11 - COIR LOG WITH MATTING



SECTION VIEW

NOT TO SCALE



PLAN VIEW

NOT TO SCALE

NORTHERN VIRGINIA STREAM BANK *Fairfax County, Virginia*		*Detail Name:* COIR LOG WITH MATTING 1/2)
Wetland Studies and Solutions, Inc. *5300 Wellington Branch Drive, Suite 100* *Gainesville, Virginia 20155* *Phone 703.679.5600 Fax 703.679.5601*	*Concept Plan*	*Scale:* NTS *Date:* 03/2006 *Sheet:* 25 *of* 28

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PHOTO 1. COIR LOGS WITH MATTING PLACED ALONG THE RIGHT BANK OF THIS NORTHERN VIRGINIA STREAM.

PHOTO 2. A RECENTLY CONSTRUCTED STREAM RESTORATION PROJECT UTILIZING COIR LOGS WITH MATTING.

NORTHERN VIRGINIA STREAM BANK *Fairfax County, Virginia*	*Detail Name:* COIR LOG WITH MATTING (2/2)
Wetland Studies and Solutions, Inc. *5300 Wellington Branch Drive, Suite 100* *Gainesville, Virginia 20155* *Phone 703.679.5600 Fax 703.679.5601*	*Concept Plan*
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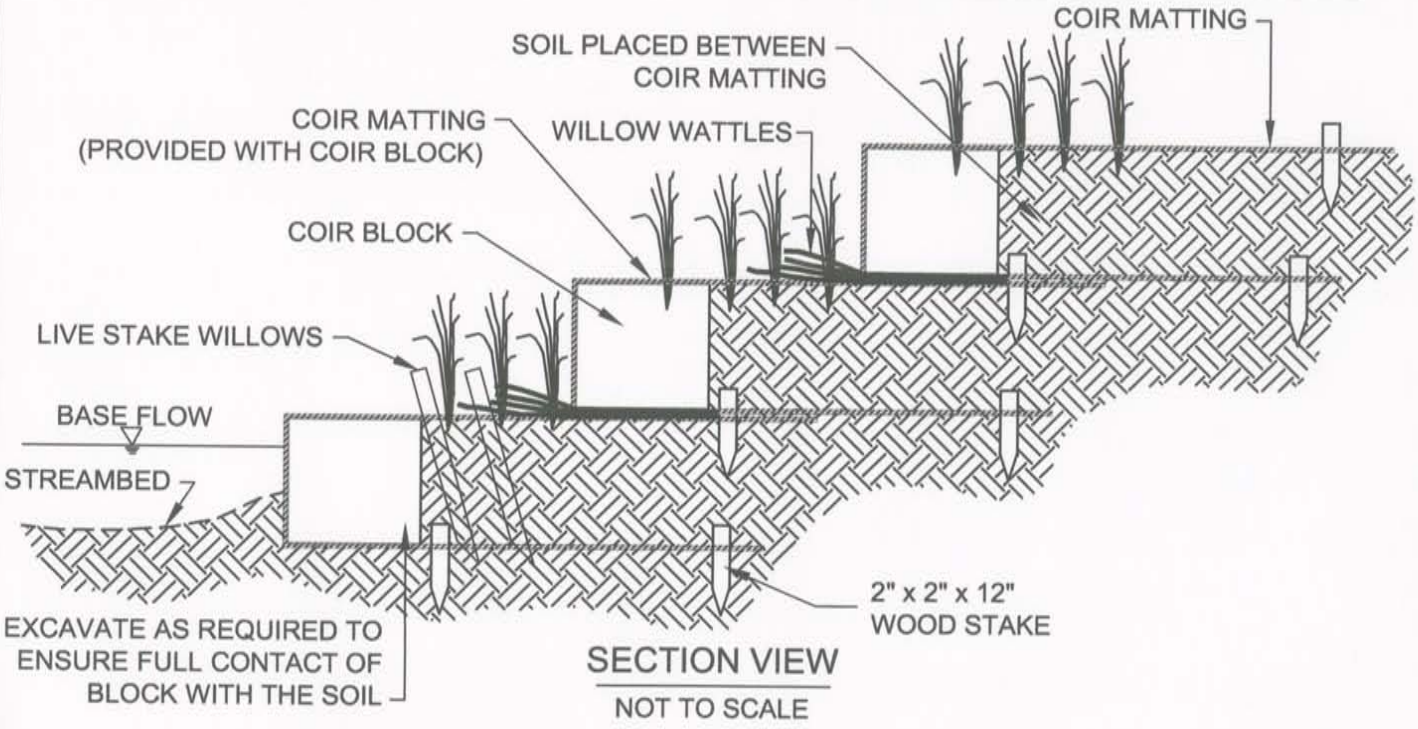
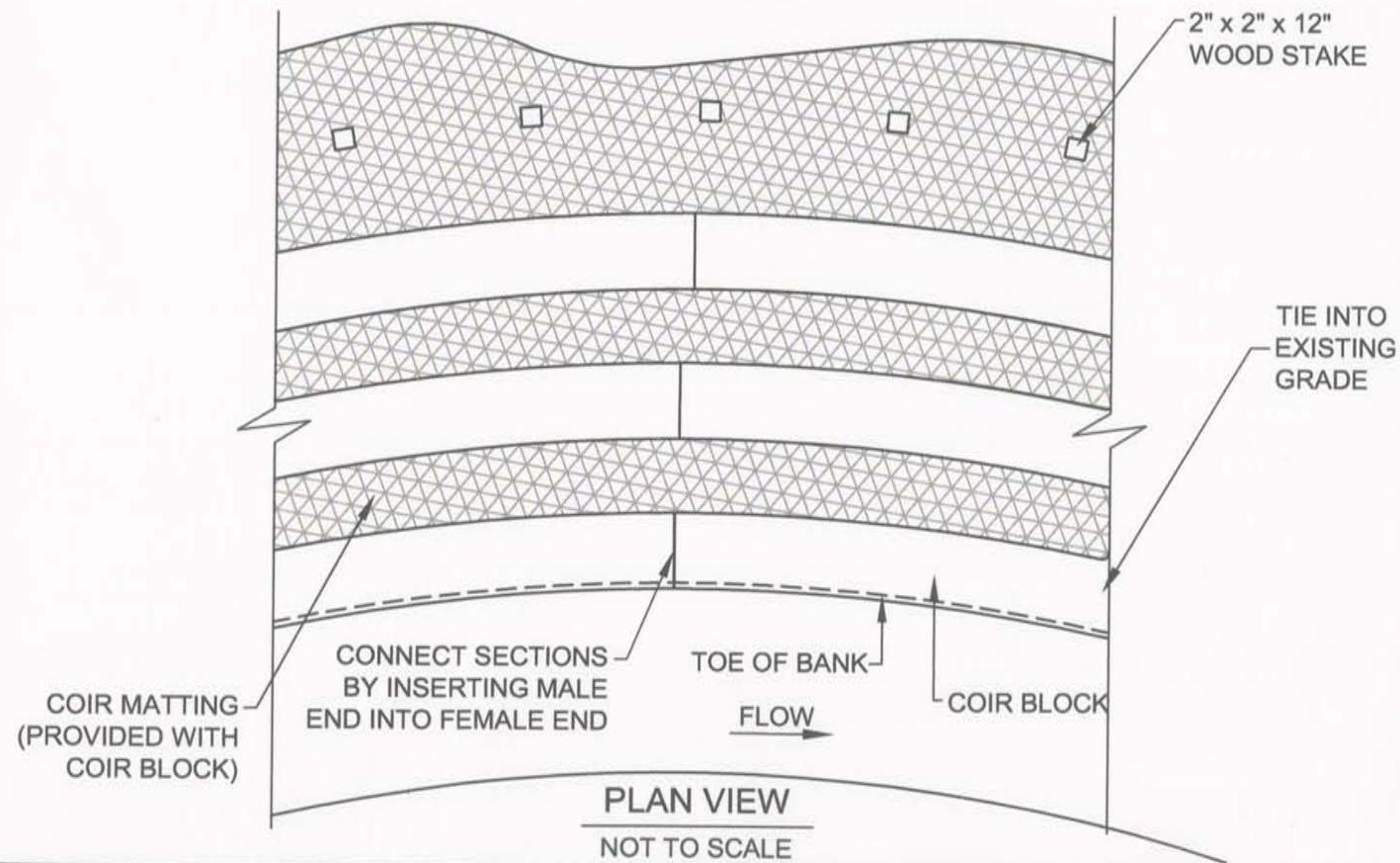
DETAIL 12.1 - COIR BLOCK WALL WITH MATTING



SECTION VIEW

NOT TO SCALE



PLAN VIEW

NOT TO SCALE

NORTHERN VIRGINIA STREAM BANK *Fairfax County, Virginia*		*Detail Name:* COIR BLOCK WALL WITH MATTING (1/2)
Wetland Studies and Solutions, Inc. *5300 Wellington Branch Drive, Suite 100* *Gainesville, Virginia 20155* *Phone 703.679.5600 Fax 703.679.5601*	*Concept Plan*	*Scale:* NTS *Date:* 03/2006 *Sheet:* 27 of 28

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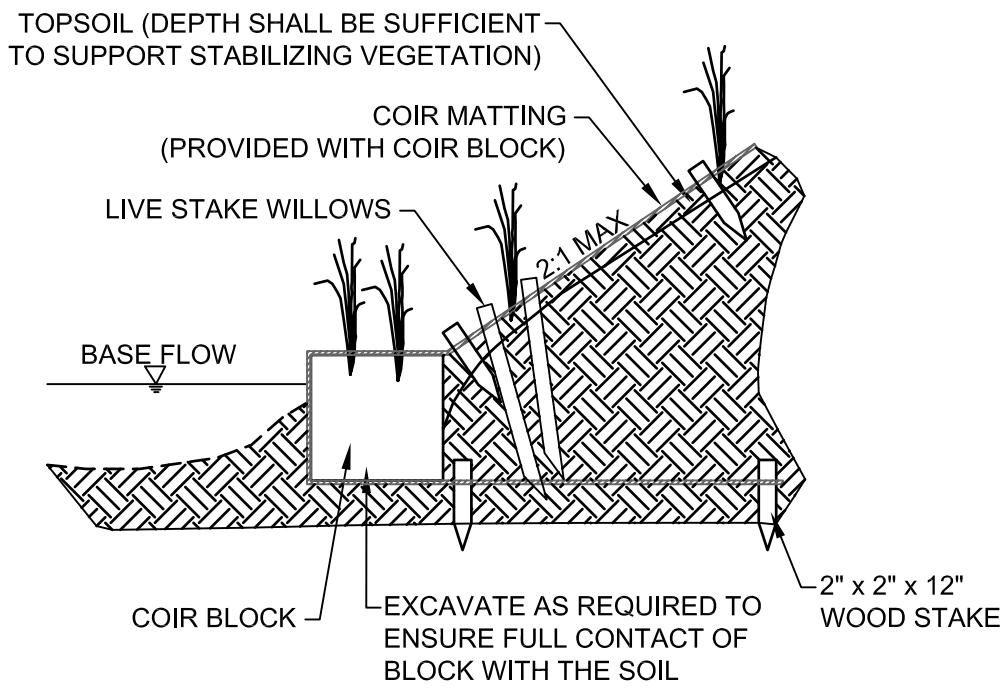
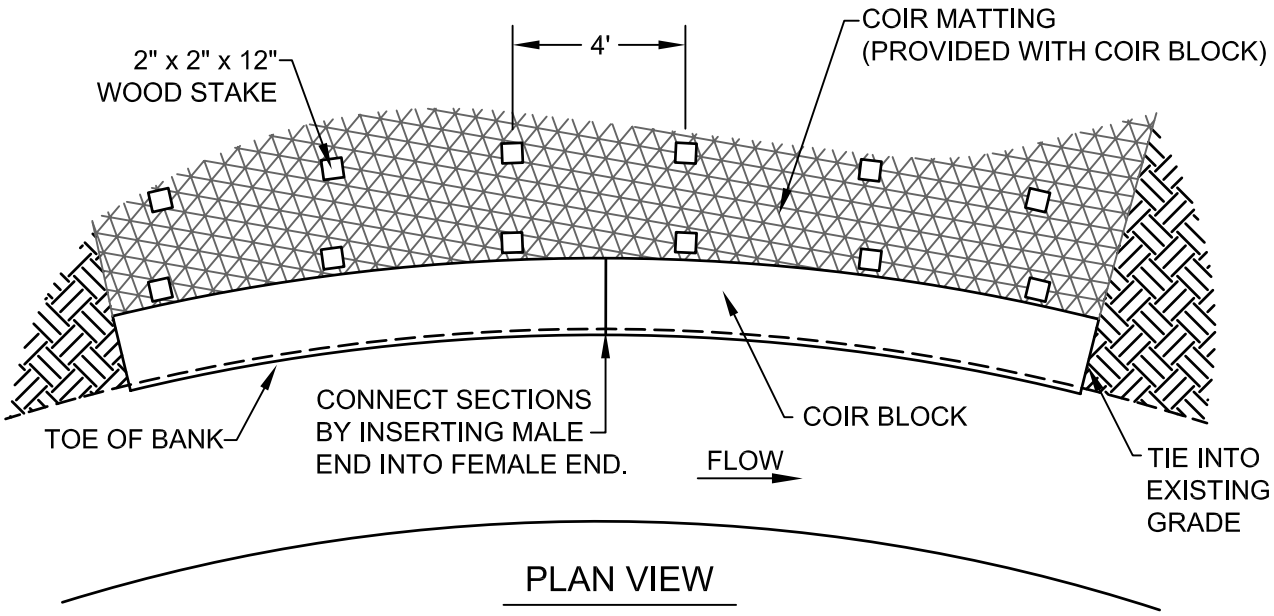
DETAIL 12.2 - COIR BLOCK SLOPE PROTECTION



SECTION VIEW

NOT TO SCALE



PLAN VIEW

NOT TO SCALE

NORTHERN VIRGINIA STREAM BANK

Concept Plan

Fairfax County, Virginia

Detail Name:

COIR BLOCK
SLOPE PROTECTION (2/2)

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Gainesville, Virginia 20155
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Scale: NTS

Date: 03/2006

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