

# Conceptual Restoration Plan

Racey Site  
Laxon Creek, Watauga County

by  
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Stream Mitigation Program  
NCWRC

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## **Introduction**

The purpose of this plan is to document those practices that we propose employing to restore or enhance approximately 1150 linear feet of Laxon Creek on your property. This plan gives you the opportunity to evaluate the scope of work that is being proposed and to provide a basis for discussion regarding the acceptability of the practices. Since we have been discussing these ideas with you from the beginning, we hope this plan will serve to put in black and white the general concepts to which you already agreed. If, however, something in this plan is new or unacceptable, we want to discuss it and work out any problems you may have.

Once you are satisfied with the basic ideas in this plan, the conservation easement will need to be written. The Department of Transportation (DOT), right-of-way personnel, will be working with the North Carolina Wildlife Resources Commission (WRC) to develop these agreements; however, the agreement will be between the landowner and the WRC. The WRC will hold the easement. A DOT crew will survey the conservation easement boundary for a legal easement description. Once the conservation easement document is written we will sit down with you to review the document. This is the point at which the landowner must decide to continue with the mitigation program or not. Once the easement is signed we will develop more in depth work plans and schedule a time when the work can be done. In general, nothing will be contained in the work plans that has not been mentioned in this plan. If something new develops, it will be discussed with you and included in the workplan only if you agree in writing to the new practice.

## **Existing conditions:**

Before your purchase of the property in the early 1990's, Laxon Creek was void of an established riparian buffer zone due to pastures along the stream (reference your personal photos of the property). Since your purchase of the property there has been some recovery of the riparian vegetation. However, problems still exist in the form of severely eroding banks at several locations, an over-wide channel in the lower third of the reach, and lack of fish habitat in some sections. Fish habitat is considered moderate in the upper sections of the stream and poor in the lower reaches at the confluence with the South Fork New River.

Based on stream survey data utilizing longitudinal profile and cross-sections, Laxon Creek through your property is classified as a C4 and F4 stream type. From station 0+00 to 6+87 the stream is an C4 type, slightly entrenched gravel channel. From station 6+87 to 11+50 at the South Fork New River, Laxon Creek is an F4 type, entrenched gravel channel.

## **Objectives**

1. Based on Regional Curve data and current survey data for the site, reestablish proper bankfull cross-sectional area and floodplain where necessary along Laxon Creek through your property.

2. Slope stream banks in appropriate areas so that they are more resistant to erosion during flooding.
3. Install rootwads, rock/log vanes or rock weirs to reduce erosion, narrow the water surface cross-section and provide long term bank stability and fish habitat.
4. Construct a stable stream crossing following Natural Resource Conservation Service Guidelines and with the use of a rock cross vane.
5. Plant native trees, bushes and ground cover that will provide long term bank stability, stream shading, and cover and food for wildlife.

**Recommendations**

**Channel Improvements:**

At some locations, we propose to construct a floodplain bench at the bankfull elevation to enhance and facilitate the natural meander of the stream. This will not involve filling the existing creek, but rather moving the slope of the stream bank back away from the water for approximately 3 to 5 feet. Above this floodplain the stream bank will be sloped to the top of the bank and vegetated. Bank stabilization measures at these sites could include rock vanes/weirs, log vanes and rootwad revetments. Rootwads will be installed in the bank in areas that the creek is meandering and presently causing erosion problems while rock vanes/weirs will be utilized on straight reaches. These structures will stabilize the bank and provide cover for fish. Bedrock is evident at a number of locations throughout this reach. Utilization of in-stream habitat improvement structures will be dependent on how much the bedrock limits our ability to anchor these structures.

In the lower sections of the stream in front of your home, we plan to install some rock vanes/weirs to narrow the channel, rebuilt a bankfull bench, and slope the banks where feasible. Also, a rock vane will be constructed near the confluence with the South Fork New River in order to reduce bank undercutting and to protect the large white oak tree.

Also, we propose to use some of the large riprap from stations 2+49 to 3+43 for our project (located above the ford). This riprap was placed in this area by the previous owners to stabilize the bank. We will remove some of these large rocks for construction of proposed rock vanes/weirs at other locations. Once some of the riprap is removed from this bank, it will be resloped and vegetated.

**Potential Restoration sites:**

- Station 80+00
- Stations 99+00 - 133+00
- Station 343+00 -360+00
- Station 640+00 - 750+00
- Station 750+00 - 900+00

**Recommended practice:**

- Rock vane or rock weir (Right bank)
- Rock vane, both banks, to redirect thalweg to center of stream, slope left bank
- Improve crossing to NRCS standards
- Reshape bank, consolidate channel, add 2 rock weirs, root wads
- Left bank sloping, make point bar

Station 833+00	Rock weir
Station 858+00-1041+00	Slope high bank along yard
Station 889+00	Rock weir
Station 936+00	Rock vane
Station 971+00	Rock vane on left bank at pool
Station 1041+00	Rock vane at start of high bank at yard
Station 1103+00	Rock vane
Station 1137+00	Rock vane/root wad to save tree and bank confluence with South Fork New River

Riparian Improvements:

The riparian zone at this site is in fair to poor shape. There is extensive non-woody vegetation (mostly fescue, blackberries and multi-flora rose) with a few trees located along your driveway and on the opposite bank across from your home. You have planted some trees along the channel to help with bank stability and shading. The current riparian zone does not provide adequate stream shading and the rooting depth of the existing vegetation is not deep enough to provide long-term bank stability. Lack of a dense root mass along the riparian zone contributes to bank failure and increased sedimentation.

We propose to improve the riparian zone at this site with a number of practices. Stream banks will be sloped to approximately a 2:1 slope. This will allow the water to move up the sloped surface rather than eroding a vertical bank. After the creek bank has been sloped it will be vegetated with sod mats removed from the existing bank and reseeded with native grasses/wildflowers. We will also plant short understory native woody species such as alder, silky willow, silky willow and button bush along the riparian zone. On the upper banks we will plant native trees that provide shade, bank stability and cover and food for wildlife. The species of trees used on the upper bank is open to the desires of the landowner. Any suggestions will be taken into consideration and utilized if possible.

Livestock Exclusion:

An important part of our stream mitigation plan is the exclusion of livestock from the riparian buffer of the stream. This plan does not include fencing of the riparian zone since livestock are not to be grazed in this area. It is your desire to return prior pasture into woodlands. However, if you or a future landowner wishes to graze this area, fencing will be required at the expense of the landowner to protect the streams riparian zone as part of the conservation easement for the project site.

Conservation Easement:

A condition of participating in this mitigation program is that you agree to place his stream riparian zone in a conservation easement. When you get this plan, we will have already talked about the easement line, and a proposed easement boundary should be marked on your property and on the attached map. Please walk this line and determine if the marked line will be satisfactory. If there are problems we can review the proposal and determine if the line can be altered. We have marked the line based on the size of the

stream, the predicted frequency of flooding, and the amount of land needed to provide a significant vegetative cover of the stream. Before we move to the next stage, which is developing the easement document, we need to be fairly firm on where the line will be because this line will be surveyed for a description used in the final document. If necessary, fence installation will follow this boundary line. Right-of-way access to the easement by WRC personnel will be stated in the agreement. The easement will be held by the WRC and the agreement will be between the landowner and the WRC. If you have specific concerns that you would like addressed in the easement agreement, please make note of them so that we can insure they are included in the agreement.

### **Summary**

Overall channel improvements to the site include stabilizing eroding banks, improving fish habitat, widening the bankfull width, developing a floodplain and replanting the riparian vegetation. With improved channel morphology this stream should remain stable and should no longer be a source of potential sediment. More extensive construction plans for the site will be developed once the conceptual plan is approved. All work will only be done if you agree in writing to the work and conservation easement

# Appendix

## **Contents:**

Map of the site.

Pictures of the site.

Longitudinal profile of the stream through the project site.

Cross sections of stream taken at the project site.

Bank profiles at high erosion sites.

Plan view of proposed work sites.

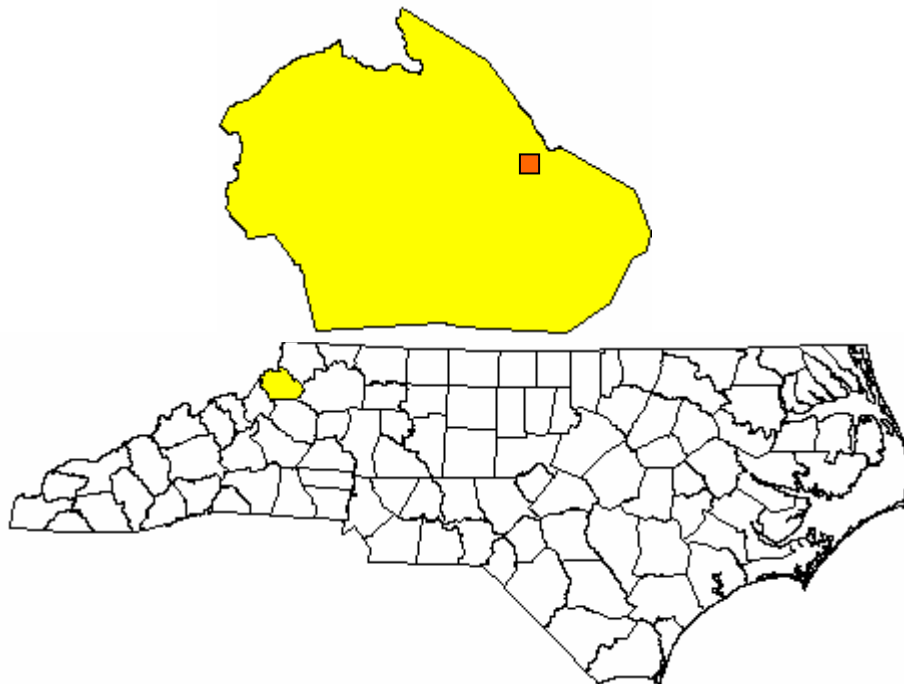
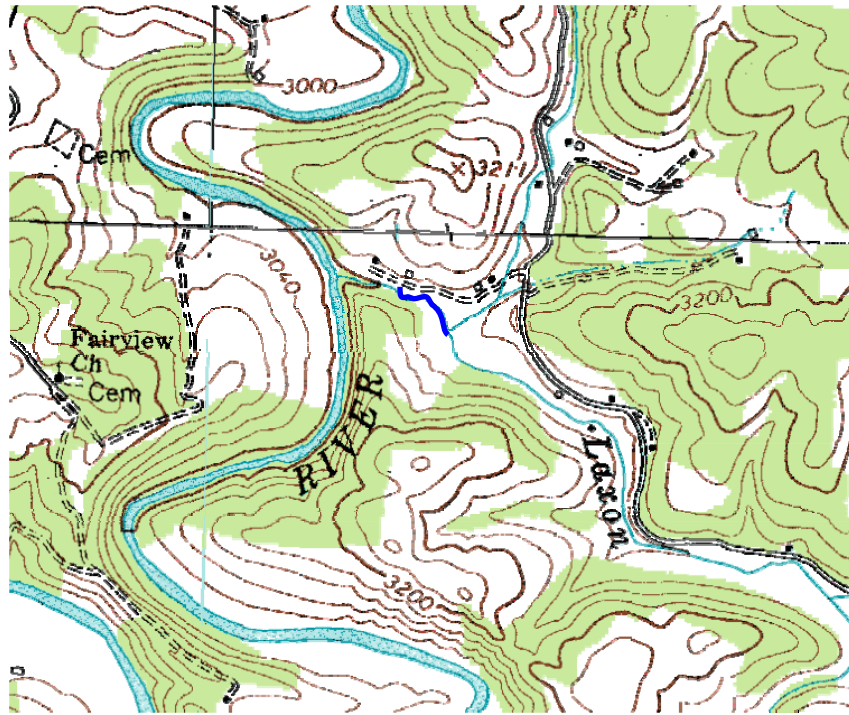
Plan view of typical structures planned for this project

Details of rootwads used for bank stabilization and fish cover.

Details of rock vanes and cross vanes used to divert water off of an eroding bank and to improve fish habitat.

Details of typical bank re-shaping

FIGURE 1. Racey mitigation site, Laxon Creek, Watauga County, 2001-2003.



**Racey Site, Laxon Creek, stream length 1150 feet.**



Existing riprap at stations 2+49 – 3+43 to be used to construct proposed rock vanes and cross vanes.



Typical riffle section in need of bank sloping.



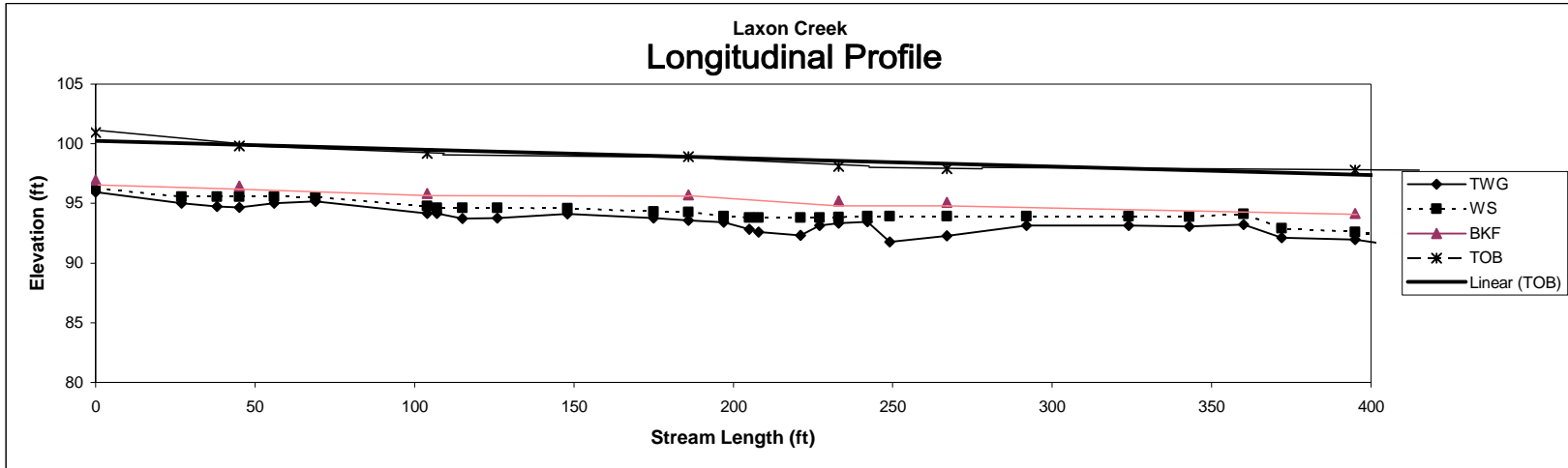
Braided and eroding channel section from stations 6+30 – 7+33



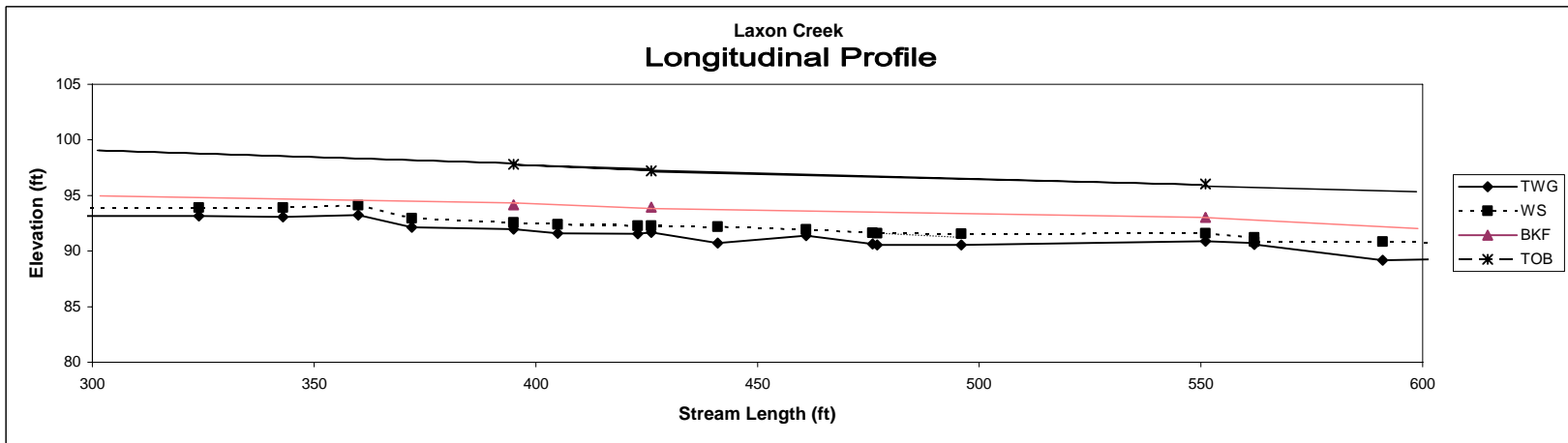
Eroding bank at station 1+86.



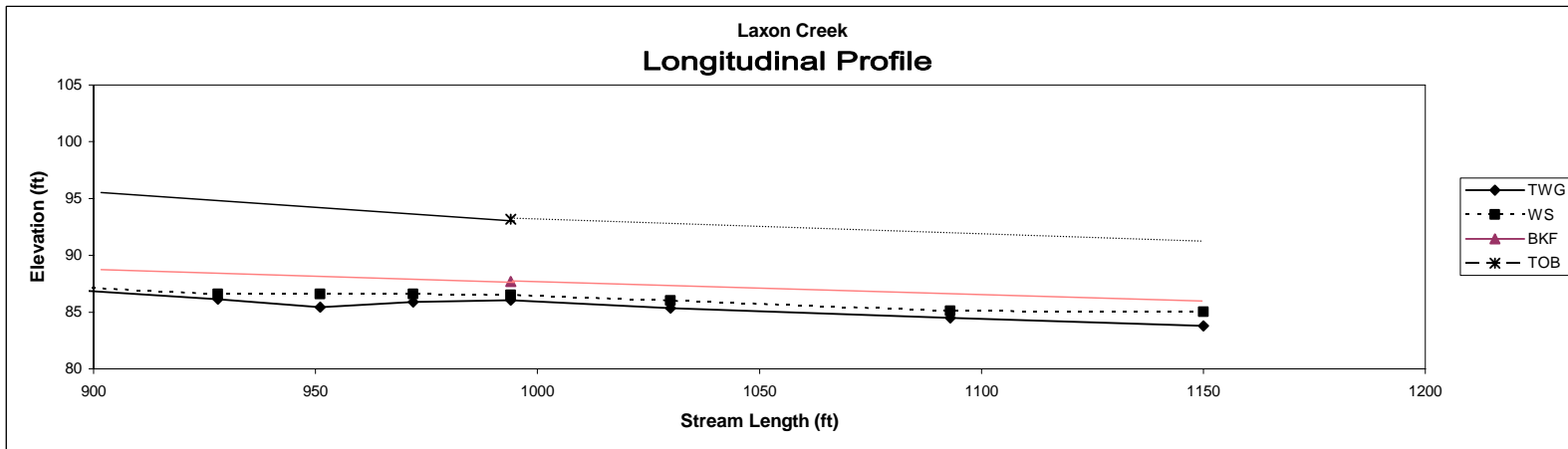
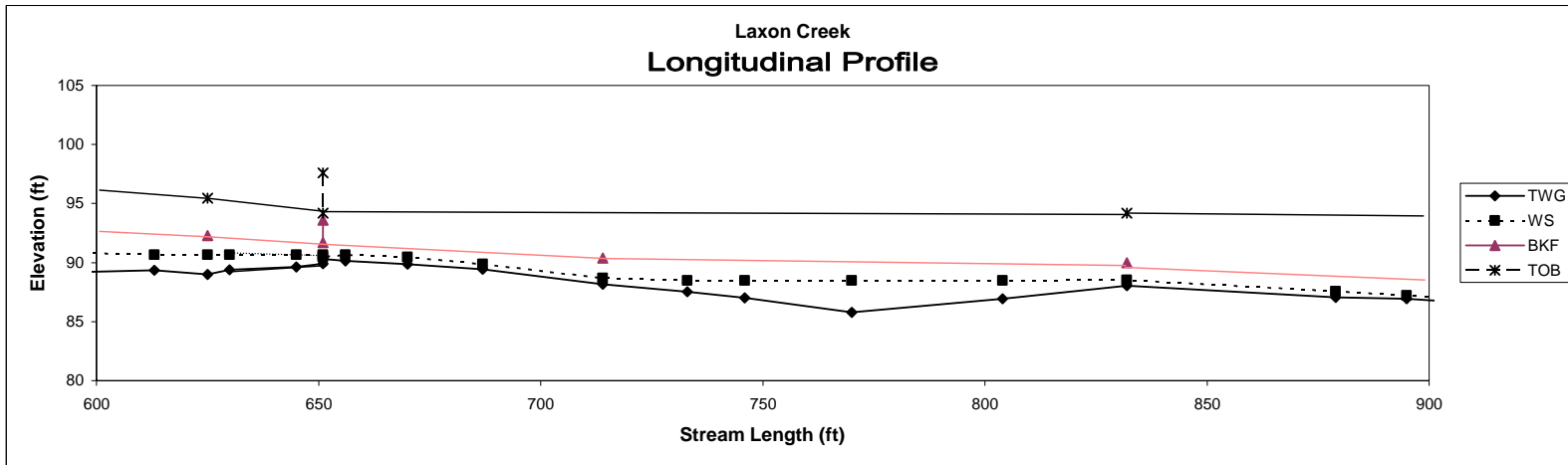
Landowner : **Fred Racey**  
 Project Site : **421 Mitigation**  
 Stream Name: **Laxon Creek**



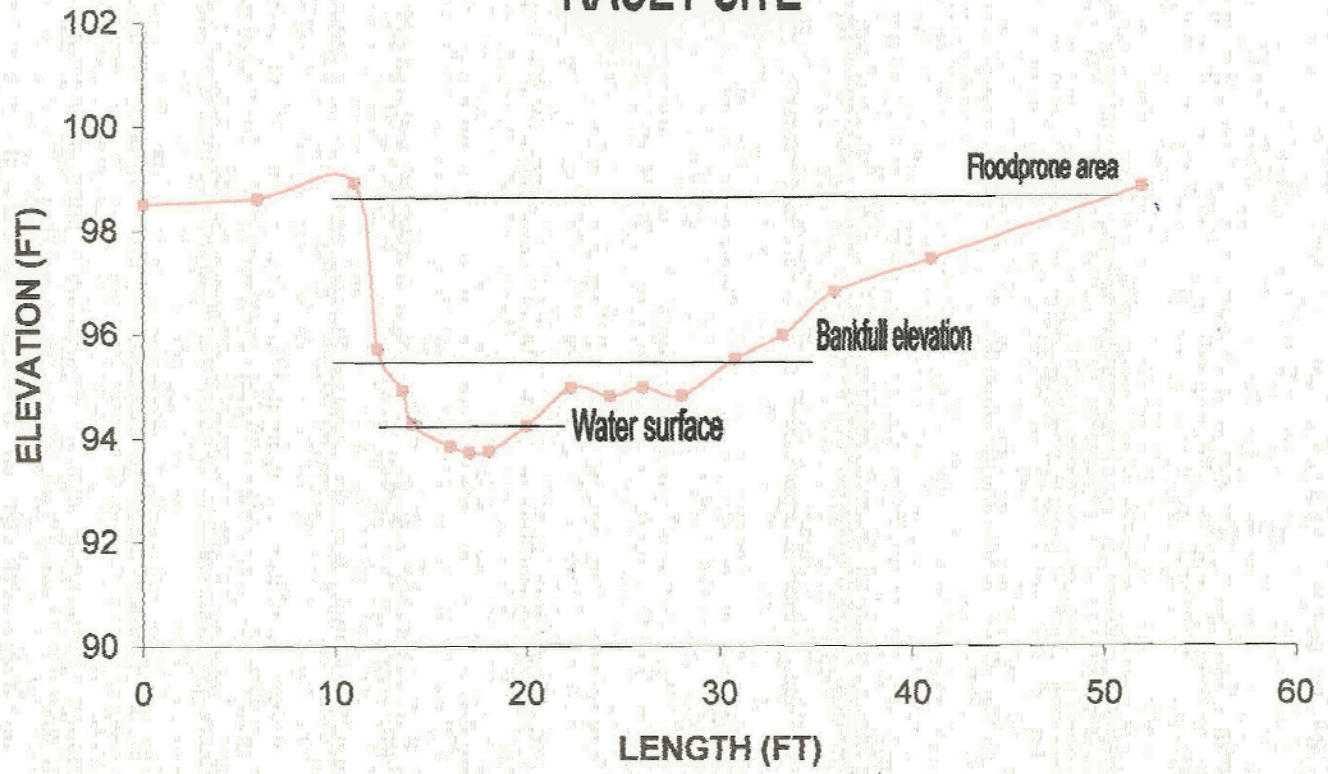
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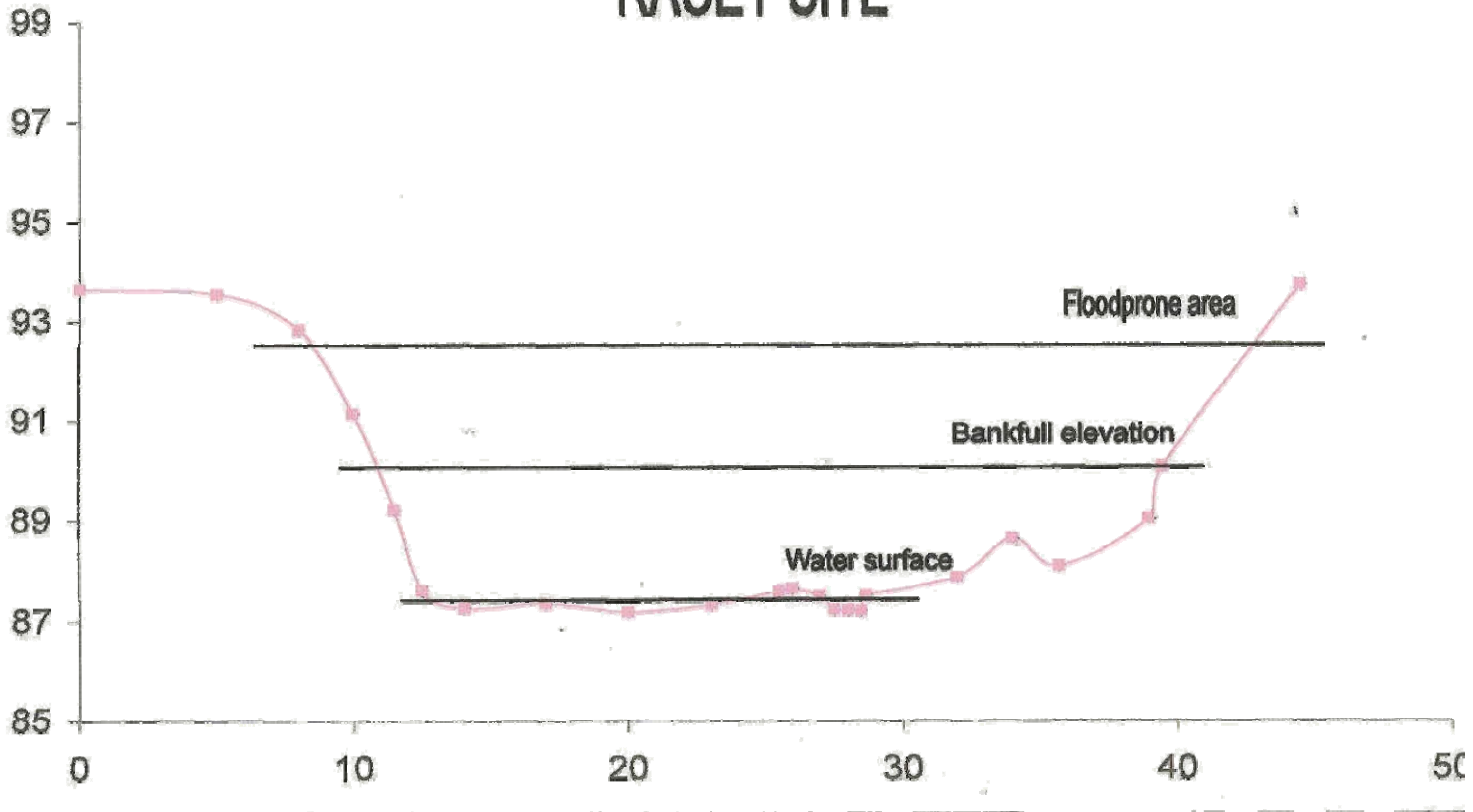
Landowner : **Fred Racey**  
 Project Site : **421 Mitigation**  
 Stream Name: **Laxon Creek**



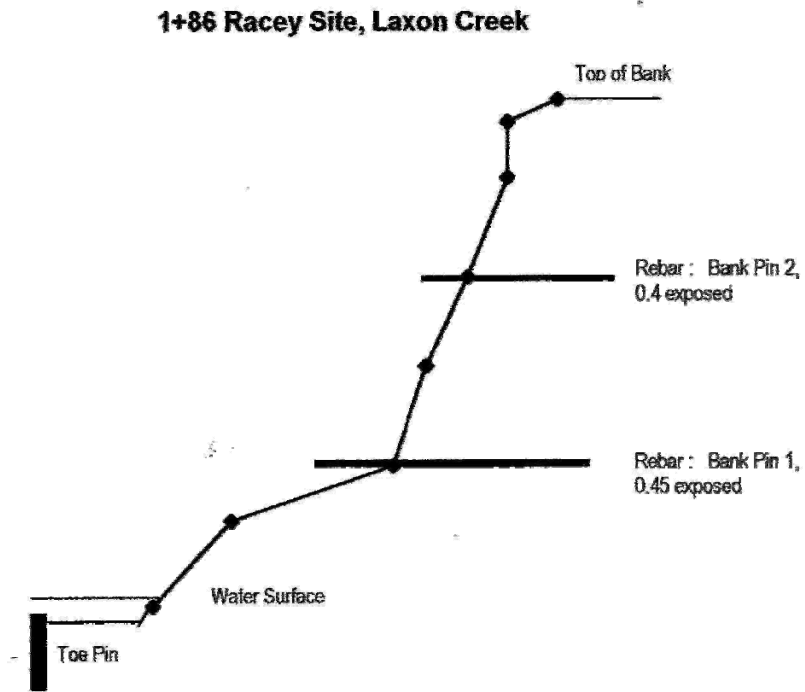
# XSEC2 1+86 Riffle RACEY SITE



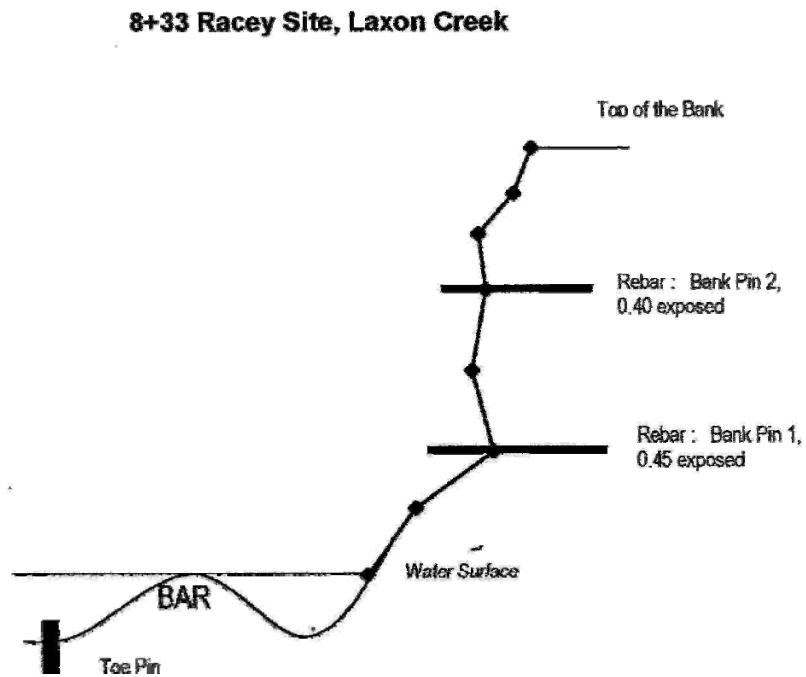
# XSEC7 8+79 Riffle RACEY SITE



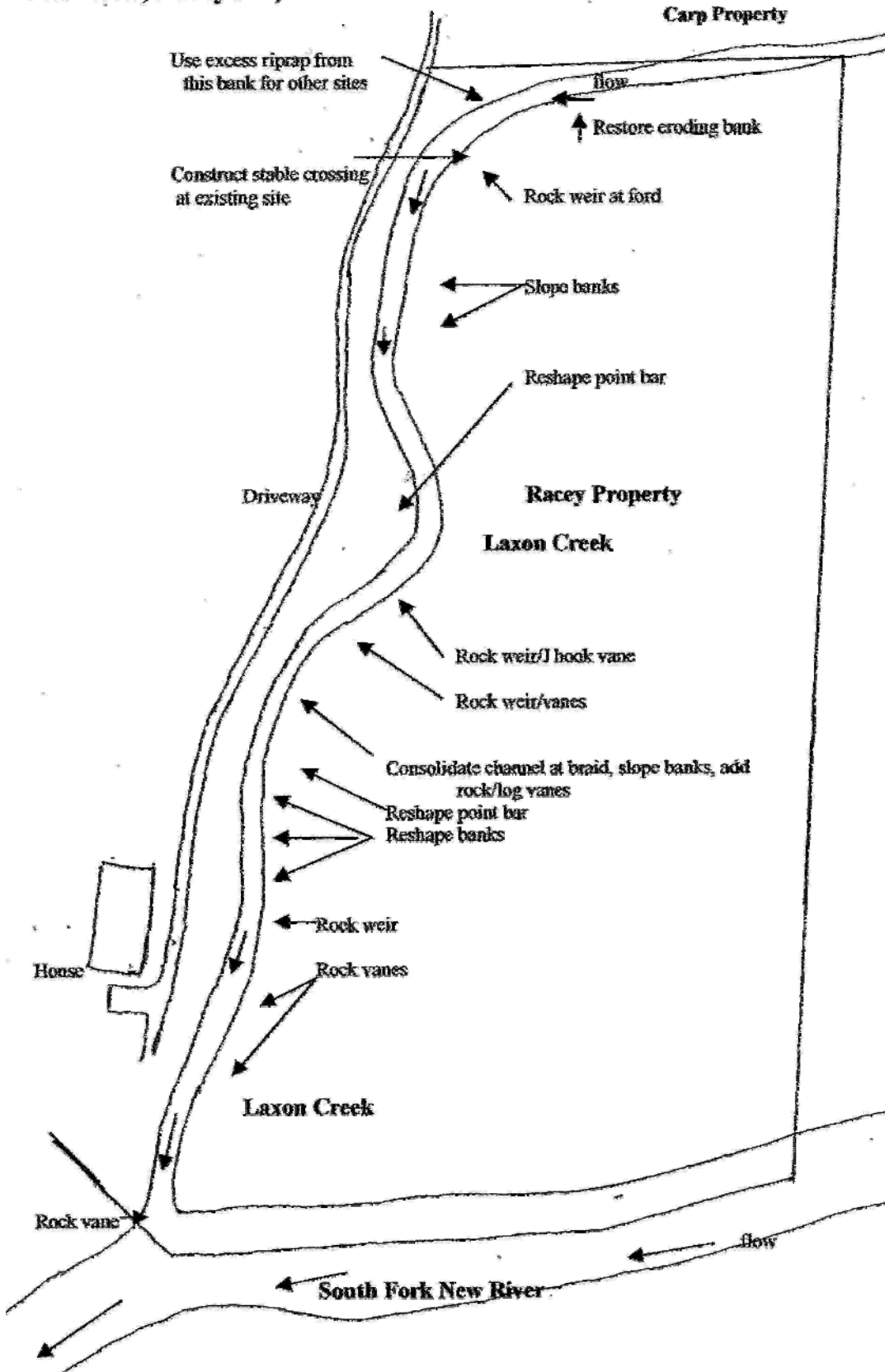
Racey Site - Bank Profile 1 taken on 1/6/00:



Racey Site - Bank Profile 2 taken on 1/6/00:

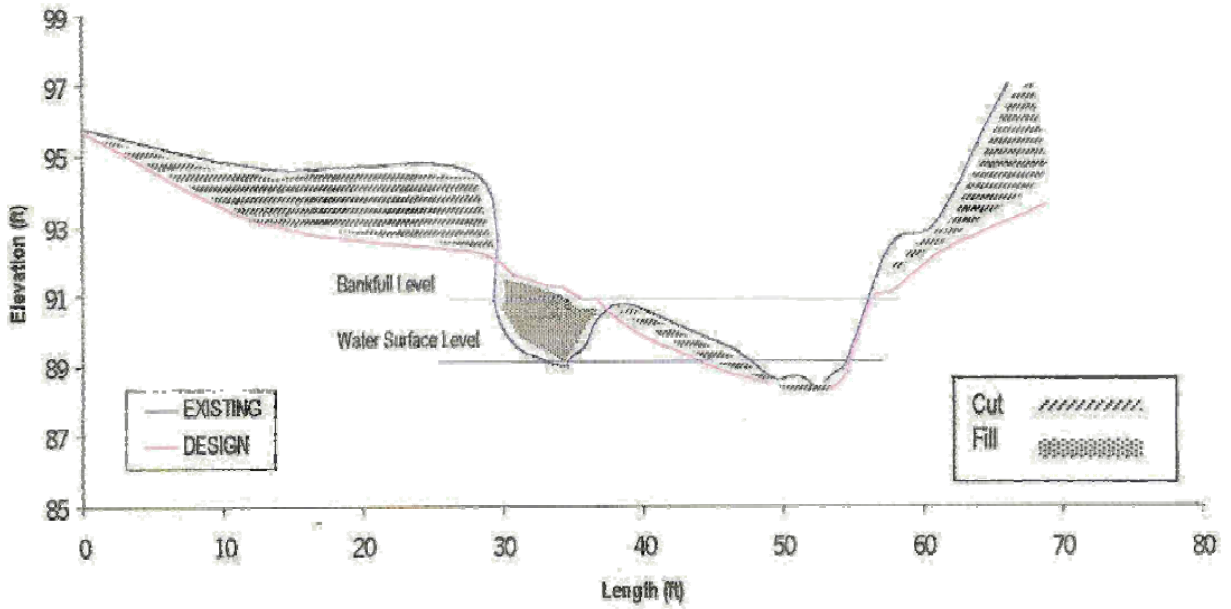


# Plan view, Racey site, Laxon Creek



# Racey Project Site

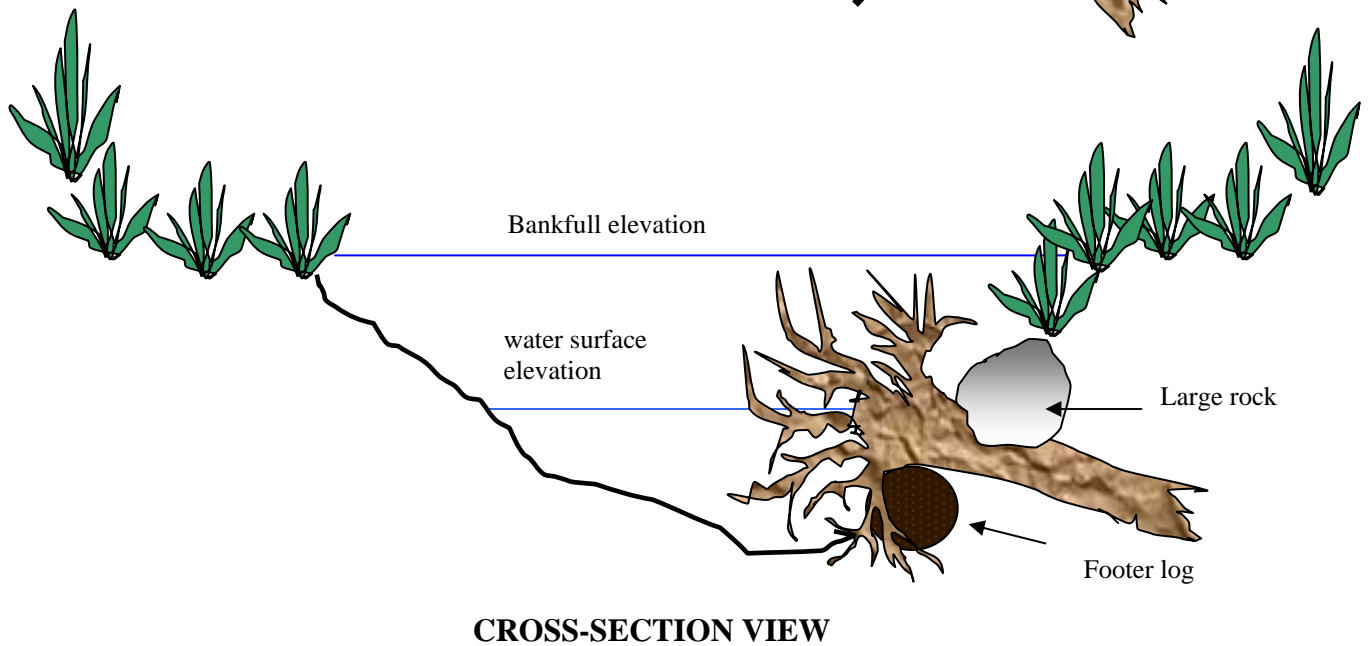
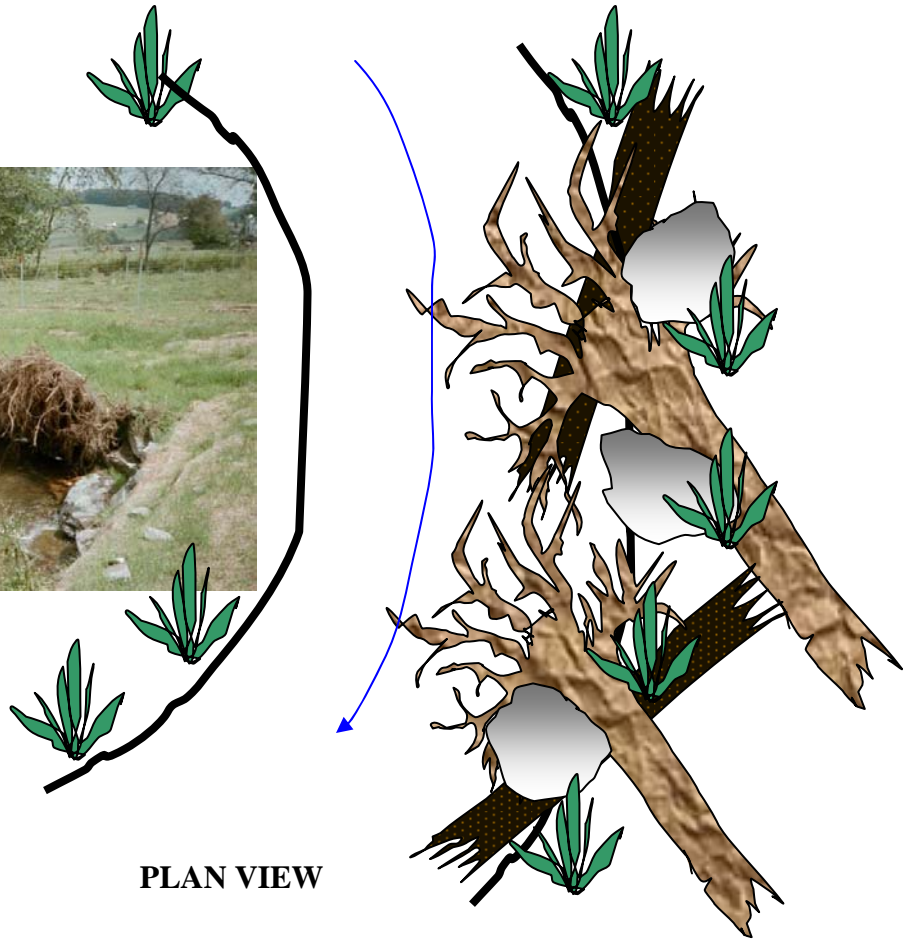
## Cross Section Showing Original & Proposed Cut/Fill



Two main cross sections of the stream that will be cut and filled as shown on the above diagram.



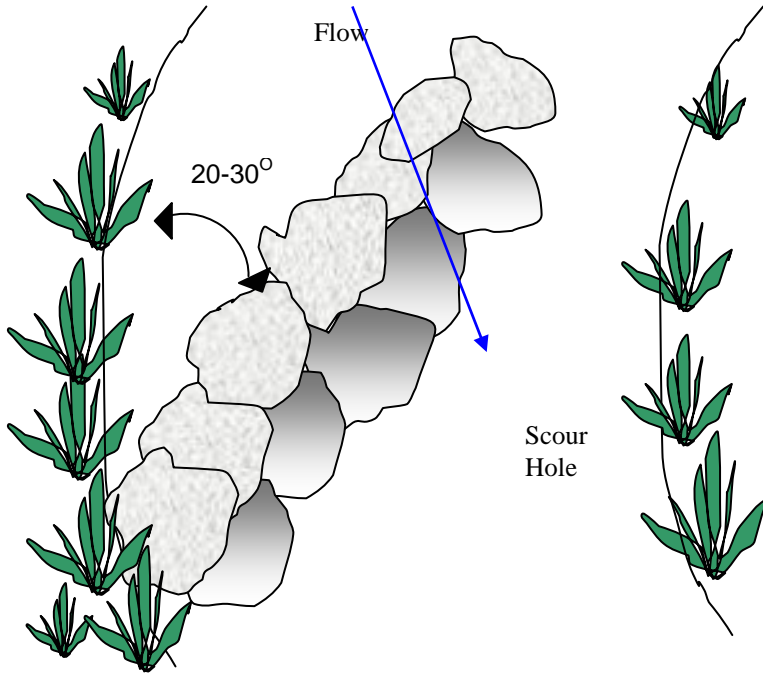
**Typical root wad structure** showing plan and cross section views. NOTE: Footer logs should be  $>8$ " diameter and installed below the streambed. Root wads should be 8-14 ft long and  $>10$ " diameter. Large boulders should be placed in gaps between root wads. Fill materials from the site should be placed behind the root wads and boulders, covered with an erosion control mat and seeded and trees planted on top of the bench.



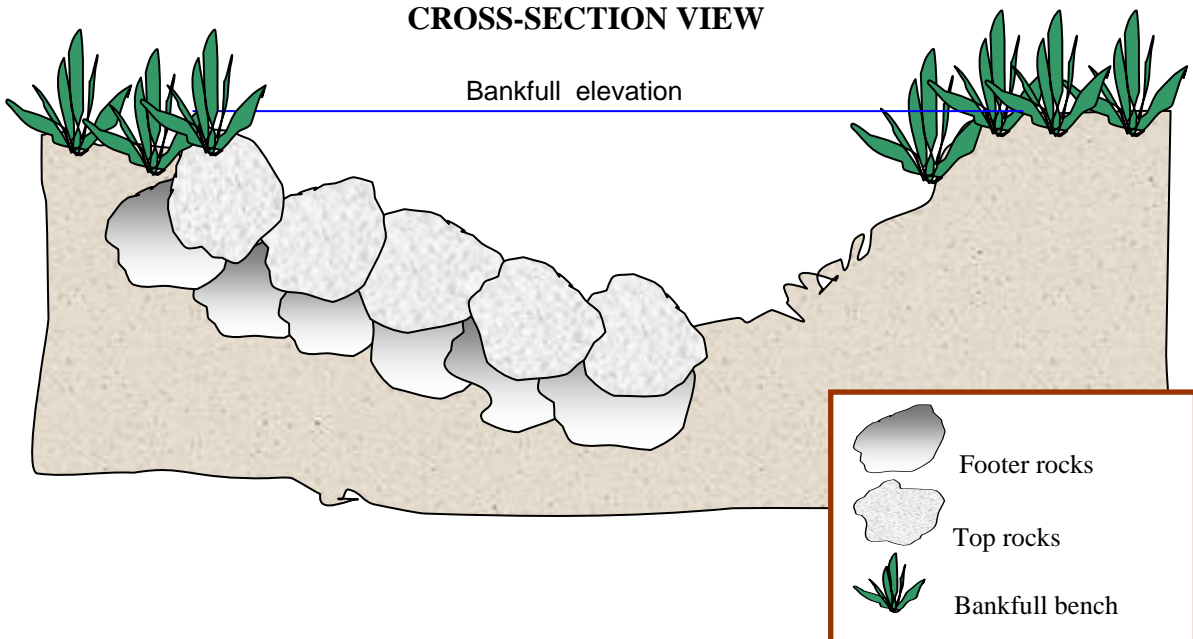


**Typical rock vane structure** showing plan and cross section views. NOTE: There should be no gaps between the rocks in the rock vane structure. The rock vane should have a 4 % to 12% slope from the top of bankfull or inner berm bench to streambed. Rock size should range from 4 cu ft. to 18 cu ft. Arm length will vary depending on size of stream.

**PLAN VIEW**



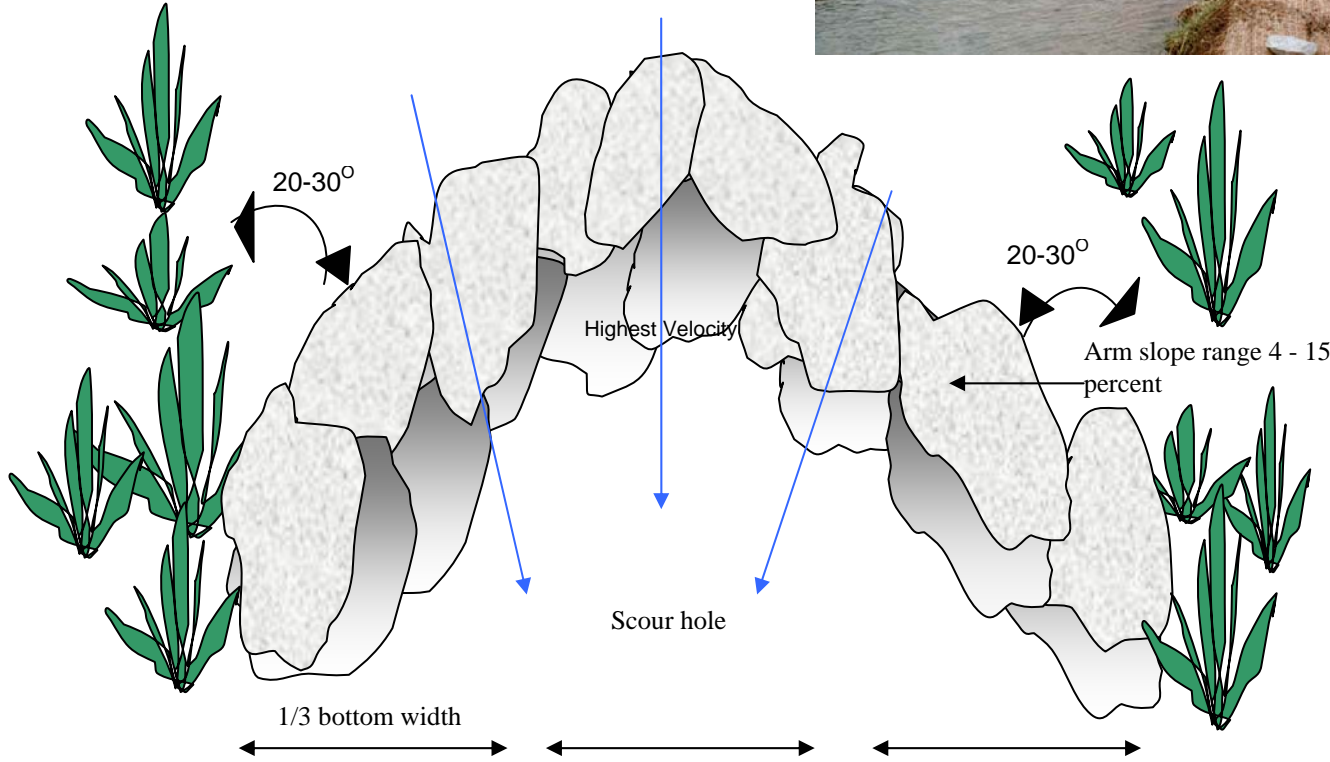
**CROSS-SECTION VIEW**



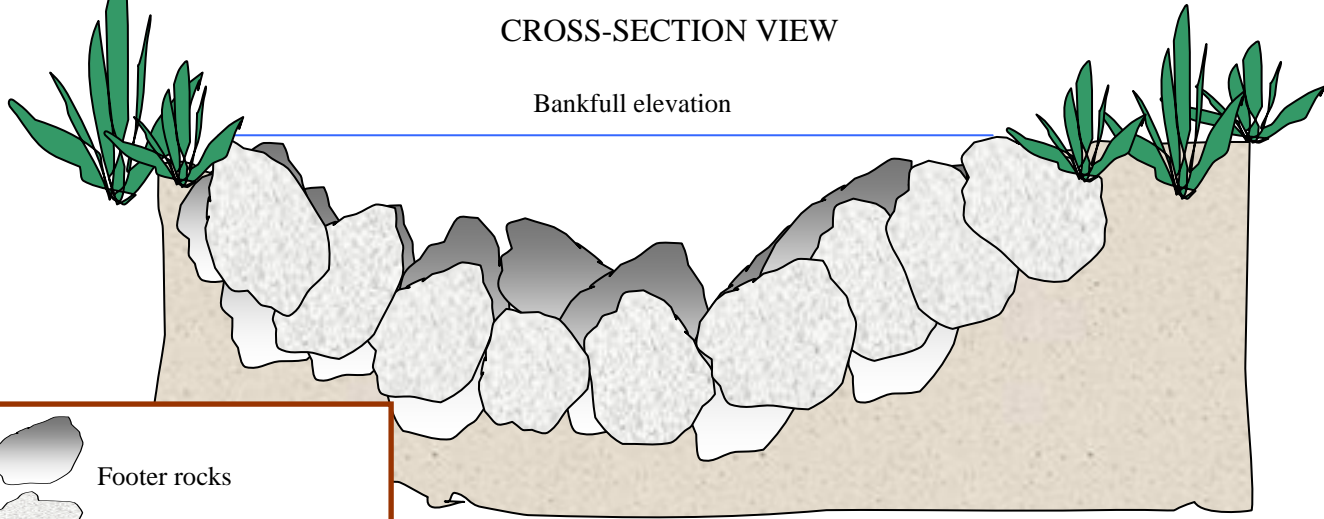
**Typical cross-vane** showing plan and cross-section views.  
 NOTE: There should be no gaps between the rocks in the cross-vane. Rock size should range from 4 cu ft. to 18 cu ft.






PLAN VIEW



CROSS-SECTION VIEW



	Footer rocks
	Top rocks
	Bankfull bench

**Typical bank grading and revegetation plan.**

