

# Conceptual Restoration Plan

Barnhill Site  
Little Ivy Creek

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by  
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## **Introduction**

The purpose of this plan is to document for you, the landowner, those practices that we propose employing to restore or enhance the habitat value of the stream and its riparian zone 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 have 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 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 described in this plan. If something new comes up, it will be discussed with you and included in the workplan only if you agree in writing to the new practice.

## **Objective**

The overall objective of this work is to improve the habitat value of streams within Madison County. This is being funded by DOT to mitigate the general public for streams that were placed in culverts while building I-26. The biological value of these streams was lost to the public. By biological value we mean their ability to support trout and other fish populations, to support angling for these fish, to provide cover for wildlife and the many other benefits that streams provide to the public. Since we cannot replace the lost streams, we are trying to compensate the public by restoring or enhancing the biological value of streams in the county that have been degraded by various causes.

We are hoping to improve the habitat value of these streams by reducing erosion, altering the shape of the stream so that it is more stable, and improving fish habitat. We are also concerned with the riparian zone. That is the narrow strip of land on the sides of the stream. The width of this zone depends on the size of the stream. The riparian zone is important to trout streams because it provides the vegetation that shades the stream and keeps the water cold. This is very important in Madison County since many streams are at a relatively low elevation and, without shade, will warm to a point where they may not support trout. This vegetation is also vital to the stability of the banks. The root mass of the riparian vegetation holds the soil together even under high flows. These areas are also

important because they provide resting, travel and feeding habitat for many animal species. We are addressing improvements to streams by proposing enhancement measures for both the stream channel and the riparian zone.

Specific objectives for the Barnhill site are described in detail in the recommendations section below and are the following:

1. Place a series of rock veins along the outside of the bend to divert the water off of the bank and toward the middle of the channel.
2. Widen the flood plain along the lower end of the site where the creek has eroded the bank back to a vertical height of approximately 10 feet.
3. Where possible slope and vegetate the creek bank so that it is more resistant to flooding.
4. Plant native trees, bushes and ground cover that will stabilize the creek banks, shade the stream, and provide wildlife cover and food.
5. Establish a permanent easement boundary with an acceptable marking method.

## **Recommendations**

### **Channel Improvements**

This site is located entirely on a large bend in the Little Ivy Creek. The channel is a B type channel at this site; however, there is a well developed flood plain along parts of the outside bend. Most of the needs at this site involve stabilizing eroding banks associated with the outside of the large bend. We propose stabilizing this bank by constructing a series of rock veins through the bend (see the appendix for pictures of these structures). These will divert the water off of the eroding bank and toward the center of the channel. This type of structure also provides needed fish habitat along the reach.

Erosion along the lower end of the site and on the outside bend has created a 10 foot high vertical bank. We propose stabilizing this area by building out the floodplain along this bank using large rock. Rock would be placed to a height equal to the bankfull stage. Soil would be placed on this and vegetated to create a new floodplain. A similar area exists just upstream of the eroding site. These will be the two practices needed at this site. Both of the proposed practices will require a large amount of rock and heavy equipment. We will need to work out how to access the creek, move equipment through the site and deliver rock to the site as we develop the work plans.

### **Riparian Improvements**

The riparian vegetation at this site is in good to excellent condition. There is a wide riparian zone on one or both banks over most of the reach. The banks are well vegetated with both trees and non-woody types of vegetation. If bank sloping can be

done at this site it will help decrease the erosion that is presently occurring along the bend. However, in most cases it may damage the existing vegetation for the short-run. We need to discuss this aspect of the project and determine how to proceed.

#### Livestock Exclusion

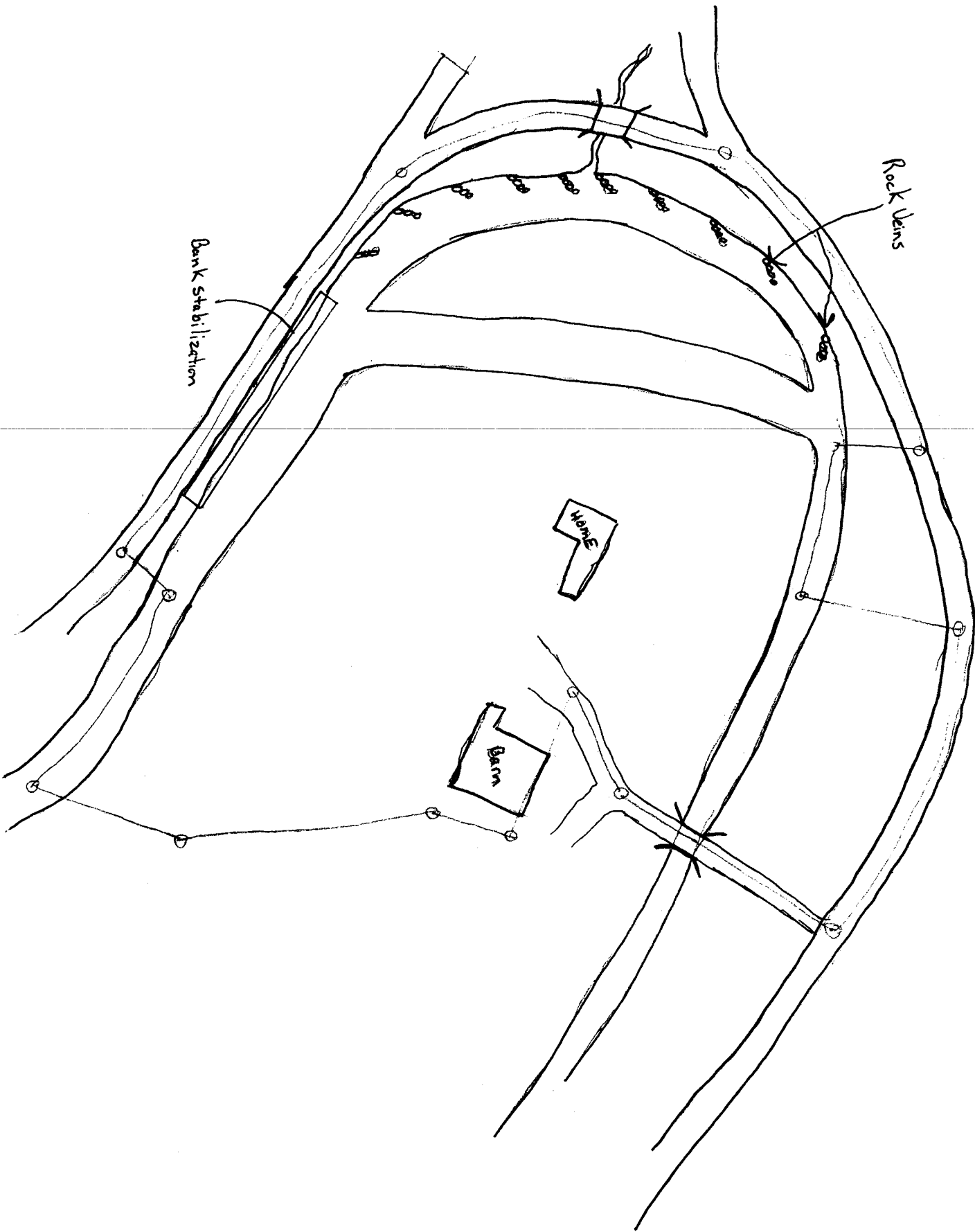
In our discussions of this site, it was determined that a fence along the stream was not required. This was determined based on the fact that there is no agricultural crops or livestock grown or maintained at the site. The landowner has no plans for these in the future. The site is too small for a significant crop field but could support a few horses or other livestock.

At most sites we prefer that the easement area be fenced. Since the easement will go with the property into the future, the fence acts as a clear indicator of its boundary. However, in some cases such as this, we can manage the area without a fence. We will require that the easement stipulate that in the future, if the WRC decides a fence is needed it can be constructed. This will be done if the adjoining land is being managed in such a way that it may negatively impact the natural area within the easement area. The easement boundary will also have to be demarcated with some type of boundary marker (sign, post or other). These ideas will have to be spelled out in the easement agreement.

# Appendix

## Contents:

1. Map of the site showing proposed activities and where they would be located.
  2. Cross section of Little Ivy Creek taken at the project site, showing the steep eroding bank on the right bank.
  3. Rock veins used to divert water off of an eroding bank. A method that may be used at this site.
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Bank Stabilization

Rock Weirs

Hole

Barn

Photo 1 & 2 show a rock vein used to protect an eroding section of stream bank. Rocks are stacked and pointed up stream at a 30° angle. This raises the stage of the water above the vein and since the mid-stream end of the vein is lower the water falls toward the middle of the stream. Photo 2 shows how the water level is higher upstream (to the right) of the rock vein.

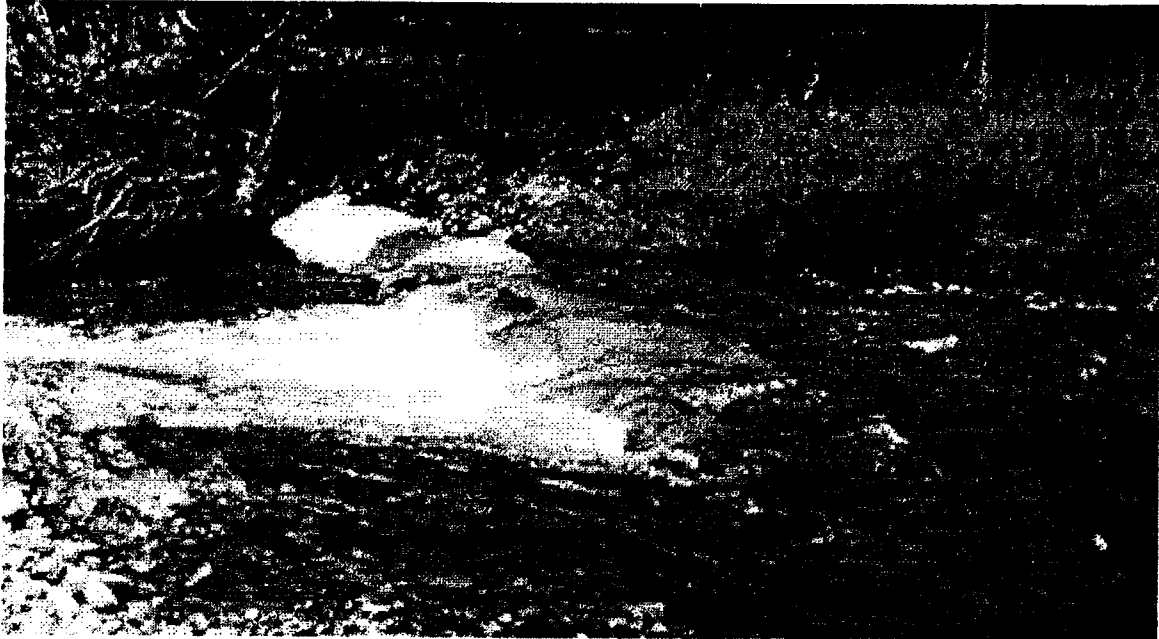


Photo 1.



Photo 2.