

# CONCEPTUAL MITIGATION PLAN

## Hoover Property Stream Mitigation Site Lincoln, County, North Carolina

State Project No. 8.1811002  
T.I.P. Number R-617WM

Prepared for:

North Carolina Department of Transportation  
Project Development and Environmental Analysis Branch  
Raleigh, North Carolina



May 2003

## 1.0 PROPERTY DESCRIPTION

The Hoover Property Stream Mitigation Site is located in a rural area of Lincoln County near Crouse, North Carolina. The site consists of two tracts of land both owned by Ms. Sadie Hoover, of 4648 Crouse Road, Crouse, NC 28033. One tract totals 104.07 acres while the second tract totals 32 acres. Ms. Hoover's properties contain both sides of the proposed stream restoration site totaling approximately 2,100 linear feet of an Unnamed Tributary (UT) to Indian Creek. George Brown Road (SR 1180) forms the northern boundary for the parcel while Crouse Road (SR 1169) borders the parcel to the southwest. Indian Creek borders the parcel to the southeast (Figure 1). The UT to Indian Creek flows from the northwest to the southeast into Indian Creek. The USGS Hydrologic Unit is 03050102 (Catawba River Basin) and the NCDWQ Sub-basin number is 03-08-35. The site is located within a protected water Supply Watershed (WS-IV).

## 2.0 SITE FEATURES

The site contains an UT to Indian Creek that flows into Indian Creek and then into the Catawba River. Leonard Fork is located to the east across a wide floodplain and parallels the UT to Indian Creek. The site lies in a forested floodplain. The watershed for the UT to Indian Creek covers 2.75 square miles. The land uses within the watershed includes farms, forested land, secondary roads, and scattered residences. The primary crop in production next to the site is corn. The 1938 and 1981 aerials show that the potential restoration site area was an open pasture during those years. The aerials show that the UT to Indian Creek flowed through the pasture with the adjacent field in row crops. This field is presently managed as no-till corn. The floodplain has been allowed to develop into a hardwood forest. Tree species observed included: green ash (*Fraxinus pennsylvanica*), boxelder (*Acer negundo*), red maple (*Acer rubrum*), river birch (*Betula nigra*), sweet gum (*Liriodendron styraciflua*), and tulip poplar (*Liriodendron tulipifera*). Herbaceous vegetation includes rushes (*Juncus* sp.), sedges (*Carex* sp.), and jewelweed (*Impatiens capensis*). A number of exotic invasive plant species are also present and include Japanese honeysuckle (*Lonicera japonica*), multiflora rose (*Rosa multiflora*), privet (*Ligustrum sinense*), and Japanese stiltgrass (*Microstegium vimineum*).

## 3.0 SITE CONSTRAINTS

A review of the EDR report did not reveal any known occurrences of the presence or release of hazardous materials or wastes on the property. During site activities no evidence, such as distressed vegetation, unusual seeps or odors, or the presence of illegally or improperly disposed chemicals or hazardous wastes was observed. There are no records of occurrences for endangered or threatened species within the project area. No restrictive features such as power, sewer lines, buildings, or other structures were found that would inhibit mitigation efforts. There were no features on site that would restrict equipment access.

→ ELABORATE  
IN DRAFT  
FIG. 5/10/03

## 4.0 MITIGATION PROPOSAL

For this site, mitigation proposed includes restoration of the UT to Indian Creek on Ms. Sadie Hoover's property. The total length of stream proposed for restoration is approximately 2,100 linear feet. An additional 200 to 400 linear footage could be gained through restoration. The restoration along the UT to Indian Creek on Ms. Hoover's property starts below George Brown Road and will stop at the confluence with Indian Creek.

From cross-sectional data collected during the field visit, the channel is classified as a low sinuosity E channel. The banks along the upstream portion are fairly stable with a few problem spots. The banks of the channel downstream towards Indian Creek are highly unstable, severely eroded, and entrenched due to the influence of Indian Creek. The channel has low sinuosity; with only a few meander bends near areas where trees have fallen into the creek. The channel top width averages 11.5 feet and the mean depth averages 2 feet. The bankfull cross-sectional area ranges from 23.6 to 26.7 square feet, increasing closer to Indian Creek due to the backwater influence from Indian Creek.

A Priority 4 stream restoration is recommended for the upstream 1,000-foot portion of this site since the stream is in relatively stable condition. This recommendation is also partially due to the constraint of maintaining a 50-foot buffer from the edge of the Ms. Hoover's field to the top of the streambank. Ms. Hoover has stated that the conservation easement will not include her field and the restoration project should not affect her field. Throughout most of the project, a minimum 50 feet buffer will be attained. In other areas where the stream is currently close to the field, a 30 feet buffer will be provided on one side of the stream and 70+ feet of buffer on the other side. Throughout this section in-stream structures will be added for stability and to direct the flow away from the banks. Meanders will also be created as needed. There will be minimal land disturbance on the site upstream.

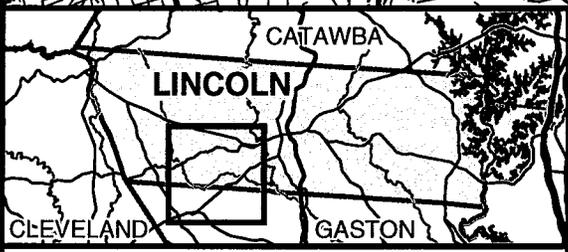
A Priority 2 is recommended for the lower 1,000-foot portion of the stream channel near Indian Creek due to the existing entrenched channel. The channel will be designed based upon an approved reference reach in the same vicinity and geographic region. Sinuosity would be increased and bankfull benches would be created where needed. Downstream there would be some disturbances to the surrounding forest area from construction of the new channel. In-stream structures would be installed to reduce erosion along the banks, provide bed stability, and to provide habitat. The culvert under George Brown Road (SR 1180) would act as a grade control upstream while Indian Creek would act as the downstream grade control point. The stream would have to be "stepped" down in this section to meet Indian Creek at the appropriate grade since Indian Creek itself, is entrenched. These two grade control points along with the field border would be the only constraints to the project.

The proposed buffer begins at the field border to the west (right) of the stream and includes the floodplain between the UT and Leonard Fork (Figure 1). Most of this floodplain is presently in good condition and would be impacted by the project mainly in the lower section with potential removal of invasive species throughout the site. Native vegetation will be planted along the entire stream to help stabilize the banks. Where excavation of a bankfull bench or meander is completed, native trees and shrubs will be planted. This floodplain buffer area currently includes 27.16 acres of preservation and/or restoration area. The preservation area for the buffer would include areas outside the limits of construction. The buffer restoration area would include the areas within the limits of construction.

## 5.0 PROJECT BENEFITS

Benefits of this project site include:

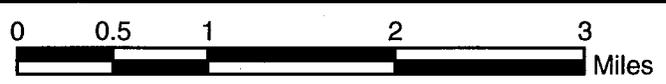
- Reducing sediment from streambank erosion sources;
- Improving water quality;
- Preserve significant floodplain habitat;
- Improving instream habitat; and
- Restoring stable geomorphic conditions of the stream.

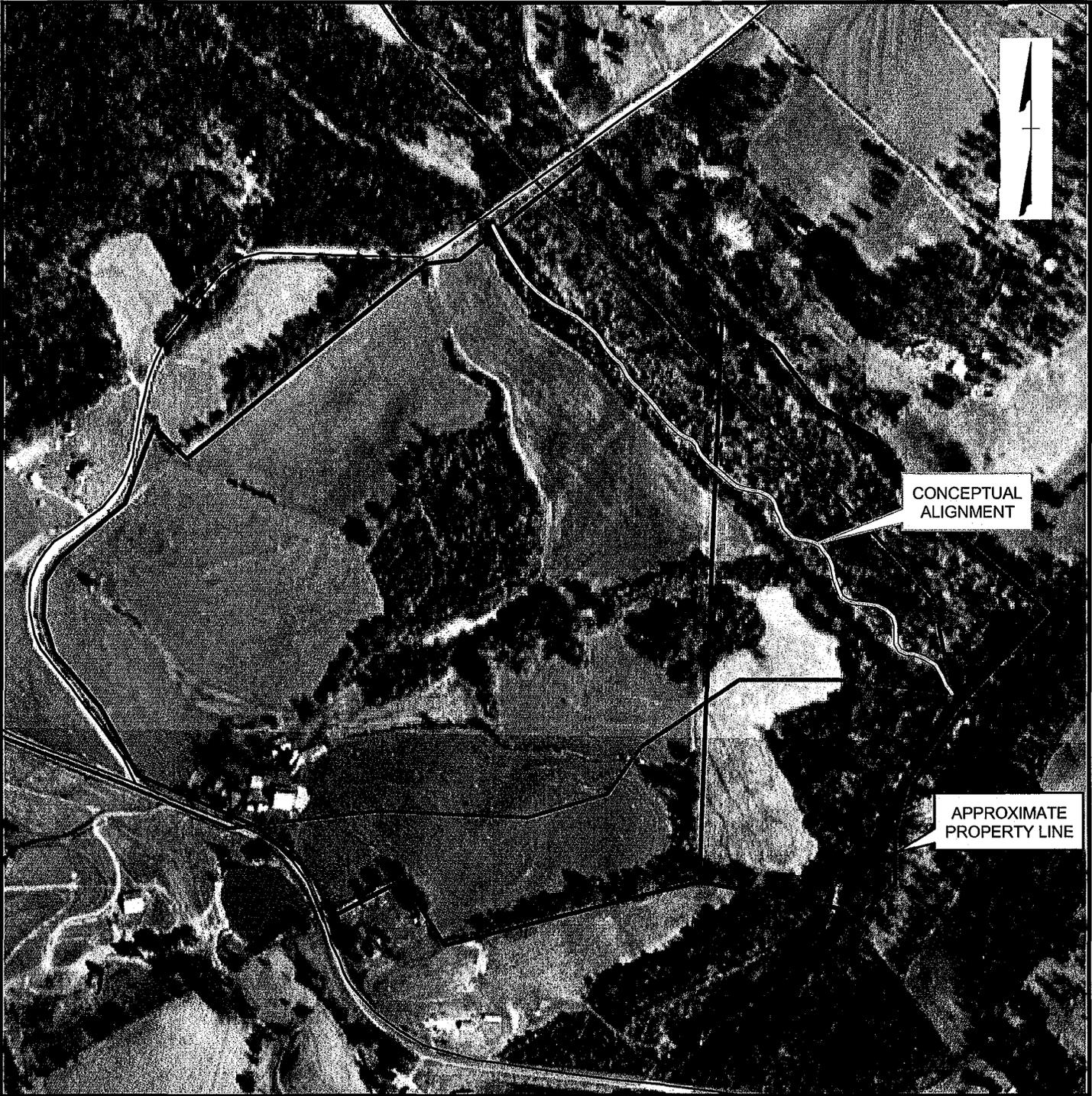


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**FIGURE 1  
 PROJECT LOCATION**

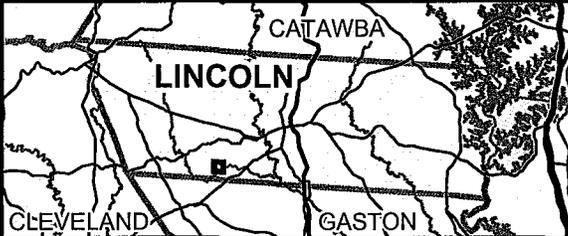
Hoover Property  
 Lincoln County





CONCEPTUAL ALIGNMENT

APPROXIMATE PROPERTY LINE



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## FIGURE 2 CONCEPTUAL PROPOSED STREAM

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