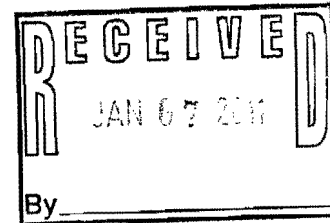




**SUMMIT ENGINEERING, INC.**

January 5, 2011

Mr. (b) (6)(b) (6)  
U.S. Army Corps of Engineers  
Eastern Kentucky Regulatory Office  
845 Sassafras Creek Road  
Sassafras, KY 41759



RE: Laurel Mountain Resources, LLC  
KDNR Permit No: 813-0345  
USACE ID # 200500408  
Construction Report

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On behalf of Laurel Mountain Resources, LLC, please find enclosed the Construction Report for a portion of the mitigation requirements related to the above-referenced project. This project involves the restoration and enhancement of Little Sue Branch of Big Caney Creek in Breathitt County, Kentucky as part of the Section 404 permitting process.

After you have reviewed the report, please notify me of any copies or additional information you may need for your records or for the distribution to other agencies. If you have any questions regarding this project or require any additional information, please contact me at (606) 432-1447 ext. 309 or e-mail me at [mhamilton@summit-engr.com](mailto:mhamilton@summit-engr.com).

Sincerely,

*Misty D. Hamilton*

Misty D. Hamilton  
Biologist

c: file  
Enclosures

January 2011

CONSTRUCTION REPORT  
LITTLE SUE BRANCH – REACH 11

Laurel Mountain Resources, LLC  
KDNR PERMIT NO. 813-0345 (formerly 813-0311)  
USACE ID # 200500408

Prepared for:

Laurel Mountain Resources, LLC  
1801 Watergap Road  
Prestonsburg, KY 41563

Prepared by:

Summit Engineering, Inc.  
131 Summit Drive  
Pikeville, KY 41501  
Telephone: (606) 432-1447

**LAUREL MOUNTAIN RESOURCES, LLC  
KDNR PERMIT NO. 813-0345 (formerly 813-0311)  
USACE ID # 200500408**

**LITTLE SUE BRANCH – REACH 11**

**1.0 Project Overview**

Laurel Mountain Resources, LLC (LMR) has been charged with performing remedial stream enhancement work as part of a compensatory mitigation package approved by the U.S. Army Corps of Engineers (COE) for KDNR Permit No. 813-0270 (transferred to KDNR Permit No. 813-0311 and then to KDNR Permit No. 813-0345), Corps ID No. 200500408. A detailed work plan for all mitigation was outlined in the Compensatory Mitigation Plan prepared by P & A Engineers and Consultants, Inc. of Louisa, Kentucky, dated February 23, 2005. The mitigation performed for Little Sue Branch (Reach 11) will serve to partially mitigate losses associated with this project.

In-kind mitigation for both temporary and permanent impacts will consist of an off-site stream restoration and enhancement project located in Little Sue Branch of Big Caney Creek of Quicksand Creek of the North Fork Kentucky River in Breathitt County, Kentucky. Stream enhancement was proposed for approximately 2,111 linear feet of Little Sue Branch. The mitigation project utilizes the East Kentucky Stream Assessment Protocol (EKSAP) to establish both the pre- and post-mitigation work stream function for impacted and mitigated stream reaches as applicable.

As part of the overall mitigation plan for KDNR Permit No. 813-0345 (formerly KDNR Permit No. 813-0311), LMR proposed the use of the East Kentucky Stream Assessment Protocol (EKSAP) to establish the pre and post-mitigation function for the restored stream. The pre-mitigation Ecological Integrity Unit (EIU) value of the stream is 1,329.93 based on EII scores calculated along the stream reach. The post-mitigation goal is to produce an EII rating of 0.90, resulting in an EIU value of 1,899.90, a net increase of 569.97 EIU's. The EIU gain for Little Sue Branch as proposed will serve to partially mitigate losses associated with this project.

Summit Engineering, Inc. (Summit) was contracted to perform inspection of field construction of the plan implemented as per the engineering designs of P & A Engineers and Consultants, Inc. Construction activities were conducted by R&R Excavating of Johnson County, Kentucky. After construction was complete, Summit personnel visited the site to inspect stream gradient, enhancements (pools, riffles, etc.), and other stream characteristics. After initial inspection, R & R Excavating made any changes required, Summit personnel conducted a final inspection, and construction was determined to be complete.

This report is being presented to document construction activities and to provide a plan for future monitoring activities for the duration of the period of liability. Portions of this report have been restated verbatim from the Compensatory Mitigation Plan to ensure accuracy.

**2.0 Goals of the Mitigation Project**

Following are the primary goals of restoration and enhancement within the mitigation reach:

- Riparian zone enhancement
- Establishment of riffle-run-pool sequences

### 3.0 Existing Site Description

Little Sue Branch is a second order intermittent / perennial tributary of Big Caney Creek and a regulated jurisdictional stream based on the presence of an ordinary high water mark. The stream has received substantial amounts of sediment from mining and logging activities, which have removed and replaced natural aquatic habitat. See the table below for RBP habitat score measured within the stream, along with Habitat Integrity sub-indices and EII scores. Specific conductivity was measured to be 95.3  $\mu\text{S}/\text{cm}$  at the time of site assessment (February 1, 2005), which resulted in a conductivity sub-index of 1.00 for the site.

Assessment Site	RBP Score	Existing EII Score
1	116	0.63

The RBP habitat evaluation for these sites showed the following trends:

- Epifaunal Substrate/Available Cover scores were in the sub-optimal range, indicating a 40 – 70% mix of stable habitat, well-suited for colonization potential.
- Sediment Deposition scores were in the marginal range, indicating moderate deposition of new gravel, sand, or fine sediment on old and new bars, with 30 – 50% of the bottom affected and moderate deposition in pools.
- Embeddedness scores were in the sub-optimal range, indicating that gravel, cobble, and boulder particles were 25 to 50% surrounded by fine sediment.
- Sediment Deposition scored in the marginal range, indicating moderate deposition of sediment within 30 to 50% of the stream channel.
- Bank Stability scores were in the marginal range, indicating moderately unstable banks with 30 to 60% of the reach affected by erosion and high erosion potential during floods.
- Vegetative Protection and Riparian Vegetative Zone Width scores in the marginal and sub-optimal ranges, indicating that the stream banks are at least 70% covered with native vegetation and that the riparian zone is greater than 6 meters wide.

The existing riparian zone of Little Sue Branch consisted of species such as American Beech (*Fagus grandifolia*), Red Maple (*Acer rubrum*), Red Oak (*Quercus borealis*), Tulip Poplar (*Liriodendron tulipifera*), White Oak (*Quercus alba*), American Hornbeam (*Carpinus caroliniana*), Mountain Magnolia (*Magnolia fraseri*), Flowering Dogwood (*Cornus florida*), Sycamore (*Platanus occidentalis*), Redbud (*Cercis canadensis*), American Elm (*Ulmus americana*), Box Elder (*Acer negundo*), Sweet Gum (*Liquidambar styraciflua*), Sourwood (*Oxydendrum arboreum*), Virginia Pine (*Pinus virginiana*), Hemlock (*Pinus canadensis*), Spicebush (*Lindera benzoin*), Umbrella Tree (*Magnolia tripetala*), Pawpaw Tree (*Asimina triloba*), Sugar Maple (*Acer saccharum*), and Sour Gum (*Nyssa sylvatica*). In addition, several non-native or invasive species were noted at the site, including Tree-of-Heaven (*Ailanthus altissima*) and multiflora rose (*Rosa multiflora*).

#### 4.0 Mitigation Work Plan

The mitigation plan proposed stream enhancement of 2,111 linear feet of stream in Little Sue Branch of Big Caney Creek (Reach 11), an intermittent / perennial tributary of Big Caney Creek. The pre-mitigation Ecological Integrity Unit (EIU) value of the stream is 1,329.93 based on EII scores calculated along the stream reach. The post-mitigation goal is to produce an EII rating of 0.90, resulting in an EIU value of 1,899.90, a net increase of 569.97 EIU's.

#### 4.1 Goals

The mitigation work plan contains the following guidelines and goals for stream restoration and enhancement:

- Channels will be enhanced in order to achieve more functional streams.
- The purpose of the rehabilitation of streams is to:
  - to add energy to the biological system
  - ensure stability of the riparian zone
  - improve the stream's ability to transport sediment through the system
- A combination of physical, biological, habitat, and hydraulic data will be utilized to develop recommendations regarding stream bank, streambed, and riparian revegetation and stabilization measures.
- Riparian wildlife habitat will be restored and enhanced.
- The riparian corridor will be restored to an aesthetically pleasing and functional condition.
- The creation of more pools and re-habilitation of existing pools is proposed throughout the mitigation areas. These pools will ease the flow of the stream thus reducing further degradation to the streambed and enhancing habitat areas. The redirection of water flow to eliminate mid-channel bars is another possible proposal for streambed stabilization. Additionally, the planting of vegetation along sections of the stream will be initiated to ensure streambed stabilization. Exact locations of such construction and plantings have not yet been determined. Streambed stabilization measures will be reassessed and confirmed during the final stream assessment.
- Aquatic habitat improvement will be the end result of the stream and floodplain restoration and stream bed stabilization measures proposed in this plan.
- Stream bank, streambed and adjacent floodplain stabilization will have an immediate and long-term impact upon reducing siltation. Stream bank vegetation will provide overhead and in-stream (nursery) cover, which will assist in regulating water temperatures, dissolved oxygen, and pH. Input of organic matter from the streamside vegetation will provide the basis for the aquatic food chain. Streambed stabilization measures, where used, will provide feeding and resting habitat.

#### 4.2 Riparian Zone Revegetation Plan

LMR will improve and/or restore the riparian zone by the planting of native riparian species to improve habitat and functional value of the affected stream segments. Riparian species listed in the Mitigation Work Plan are as follows:

Temporary Plants	Permanent Grasses	Legumes		Tree and Shrub Species
Foxtail Millet	Redtop	Ladino Clover	Kobe Lespedeza	River Birch
Oats	Bermuda Grass	Sweet Clover	Korean Lespedeza	Willow
Winter Rye or Wheat	Timothy	Birdsfoot Trefoil	Alfalfa	Sycamore
Annual Rye	Orchard Grass	White Clover	Appalow Lespedeza	American Elder
		Red Clover		

The stocking density will be at least 300 woody plants per acre, including volunteers. Species selection may vary, depending on seedling and/or seed availability at the time of planting.

#### 5.0 Completed Mitigation Work

Mitigation construction was conducted during the fall and winter of 2010 by R & R Excavating, with field visits and inspection conducted by Summit Engineering, Inc. personnel.

#### 5.1 Stream Bank Stabilization

A variety of bank stabilization measures were installed in conjunction with restoring stable grades for stream banks. The stabilization measures primarily utilized are commonly termed “bioengineering” materials, including native woody plants and natural biodegradable materials (rootwads, wood logs, rock etc.). These types of materials provide a soft, flexible and ecologically beneficial alternative to the more traditional engineering approaches to bank stabilization. The stream enhancement plan used the following types of materials to stabilize stream banks in areas where needed:

- Cribbing / Bank Revetment Logs to provide temporary (1-2 years) protection of exposed soils on regraded stream banks until woody and herbaceous plant covers are well established.
- Seeding of re-graded/disturbed stream banks with a seed mix comprised of a nurse crop of appropriate grasses and other herbaceous vegetation.

## 5.2 Natural Stream Enhancement Structures

The bank stabilization measures described above should also improve the quality of the stream habitat. Reducing the rate of bank erosion and sedimentation will improve water quality and stream bottom habitats. As woody vegetation becomes established on the banks and matures, it will serve to provide cover for aquatic organisms, shade the stream, thereby, maintaining lower water temperatures, and contribute particulate organic materials to the detrital food chain of the stream.

In addition to these habitat improvements, structural habitat improvement features have also been incorporated in the stream enhancement design and include the following structures:

- Boulder Clusters - Placement of boulders in the stream channel to diversify the stream bottom habitat and to provide controlled scour and depositional zones at appropriate locations in the stream channel.
- Single and Double Deflectors - Single and double log deflectors to maintain a narrow and deeper low flow channel cross section in wider sections of stream.
- Logs Sills - Log sills placed in the channel profile, shallow riffles, straight reaches and meanders are designed to create plunge pool formations below the structure. These structures are commonly constructed using a single log notched in the middle and placed within the channel. Typically log sills are anchored into place using steel rods.
- Step Pools - Steps were constructed within the stream channel to create zones in which sediment will be trapped in order to prevent sediment loading from occurring throughout the stream.
- Root Wads - Bank materials are installed to provide cover and to protect unstable banks by diverting rapidly flowing waters away from those areas more prone to erode. These materials are generally placed along the outside bend of a meander and anchored in place to prevent scouring behind or underneath them.
- Rock Riffles - Riffles will be created utilizing a mixture of one-half inch to three inch diameter stones made of local rock. The riffle bed will be first prepared with larger bedding stone being "worked-in" by backhoe bucket or "walked-in" by equipment treads or tires.

## 5.3 Riparian Zone

The riparian zones established along the stream extend 50 feet from the edge of the low flow channel on each side and consist of vegetative types observed within the existing riparian zone of Little Sue Branch and other native vegetation as indicated in the Compensatory Mitigation Plan. A continuous corridor of native grass, shrub, and tree communities was established along the stream channel. Groundcover was planted as soon as practical after stream bank construction, and consisted of an even mix of Annual Rye (*Secale cereale*), Virginia Wild Rye (*Elymus virginicus*), Deertongue Grass (*Dichanthelium clandestinum*), and Redtop (*Agrostis stolonifera*). Although some portions of the riparian zone have been severely disturbed, areas of little disturbance also exist. Construction activities were conducted in such a way as to retain as much of the existing vegetation in these areas as possible. In the disturbed areas, shrubs and trees will be planted in the next available planting season.

## 6.0 Success Criteria

During the final year of the five year monitoring period, LMR will perform a final investigation to demonstrate replacement of lost aquatic functional values. Project success will be based upon the achievement of the following criteria:

- Stream channel restoration
- Erosion control and bank stability
- Establishment of riparian vegetation

Should mitigated channel conditions indicate a loss or failure to attain projected increases of aquatic functional values, contingency plans will be employed to ensure replacement of all lost aquatic functional values.

Success standards for all on-site mitigation areas will be based upon attainment of the RBP habitat parameter values to be in-place at the end of the five year monitoring period. The total predicted RBP habitat values to be in-place at the end of the five year monitoring period are described in the table below. It will be acceptable for an individual habitat parameter to be less than predicted as long the resulting loss is offset by an unpredicted gain in one or more other parameters. Increase in RBP habitat value will be verified through field investigations.

The predicted RBP habitat parameter values for all mitigation areas at the end of the 30 year maturity period are predicted to be a result of the initial "lift" in aquatic values present at the end of the five year monitoring period.

Segment	Length	Existing		Post-Work (5 Years)		At Maturity (30 Years)		
		EII	EIUs	EII	EIUs	EII	EIUs	Net Gain
1	2,111	0.63	1,329.93	0.72	1,519.92	0.90	1,899.90	569.97

In addition, the Compensatory Mitigation Plan calls for the following mitigation success goals:

- Mitigation areas should show no signs of substantial erosion.
- Stream enhancement structures should be in-place and properly functioning.
- Determination of successful tree and shrub stocking of the revegetated area will utilize the following standards:
  - A minimum stocking density of 300 trees or trees and shrubs per acre determined with a statistical confidence of 90 percent.
  - Should unwanted invading non-native non-riparian vegetative species become prevalent within any area, they will be controlled or eliminated by mechanical or manual methods.
  - Volunteer native riparian vegetation will be encouraged.



## 7.0 Mitigation Monitoring Plan

Following completion of mitigation operations, LMR will begin a five year long annual monitoring and management plan. The monitoring and management plan will evaluate the success of the mitigation work and will allow for any necessary adjustments to assure success of the mitigation site.

Short term plans for all mitigation sites are limited to achieving the required improvement and/or attainment of performance standards and aquatic functions as described within this report.

### 7.1 Monitoring Methods

A monitoring program has been developed to determine the success of the compensatory mitigation. The monitoring will be directed toward the evaluation of primary activities accomplished throughout the mitigation project.

Visual observations will be made at all project sites. Recording methods used to determine success will include the following:

Item	Recording Method
Channel re-habilitation & construction	Cross-sectional and habitat surveys
Erosion control and bank stability	Longitudinal lateral photographs
Riparian vegetation	Photograph plots
Habitat Assessment	RBP assessment forms

Data gathering points will be field selected to provide a representative evaluation of each project site. These points will be marked and referenced in the field to allow for comparable results between inspections.

Monitoring records will be preserved and will be promptly reviewed after each field inspection. If it is determined that the goals and objectives have not met the parameters set, an assessment of the areas in question will be performed and appropriate action(s) will be taken to alleviate the problem. If necessary, the monitoring period and the number of data collection points will be adjusted accordingly.

### 7.2 Annual Reporting

LMR will submit annual mitigation monitoring reports to the USACE including the inspector's report, performance standards enforced, photographs and plan views of the monitoring stations, and notes on deficiencies observed or corrective measures taken to maintain successful function. These reports will be submitted no later than December 31<sup>st</sup> of the year following completion of mitigation measures.

LMR will evaluate the off-site mitigated streams using the USEPA's Rapid Bioassessment Protocol (RBP) High Gradient habitat form. LMR's mitigation efforts will be deemed successful if RBP scores improve as predicted.

Vegetative monitoring will also be completed. The following success measurements will be reported annually:

- Species composition (including density and percent cover)

- Top five dominant species per stratum
- Percent survival of trees and shrubs
- Stems/acre, trees and shrubs (planted and volunteer)

After mitigation phases are completed and not less than two years after the last augmented seeding and/or maintenance, LMR will submit documentation certifying that it has satisfied the requirements of its mitigation plan to the USACE. In no case will the monitoring period be more than five years.

The USACE will provide LMR with its concurrence, in writing, that the approved mitigation plan has been successful (concurrence will not be unreasonably withheld if all performance measures have been met).

Receipt of the USACE's concurrence, in writing, ends the monitoring period and LMR's responsibility for the mitigation areas.