**FEDERAL HIGHWAY ADMINISTRATION, Federal Lands Highway**

**DAMAGE SURVEY REPORT**

*Title 23, Federal-Aid System/Federal Domain*

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**Applicant:** USDA Forest Service - Pisgah National Forest  
**County:** Transylvania  
**State:** NC  
**Inspection Date:** 01/20/2005

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**Location of Damage (Route No., Name of Road, Mile Post and Map Grid):** NFSR 5046, Lanning Ridge Rd., MP 0.10, MG 3B  
**ADT:** 35

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**Bridge Data:**  
**Road Data:**  
**Classification:** ML 3  
**Photographs #:** 5046-0.10-01, 5046-0.10-02, 5046-0.10-03, 5046-0.10-04, 5046-0.10-05, 5046-0.10-06

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**Type:** Concrete  
**Traveled Way Width:** 12'  
**Surface Type:** Concrete  
**Thickness:** 8"

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**Description and Cause of Damage:**  
Existing Bridge is a series of three 7' X 7' concrete box culverts side by side. They acted as a screen during high flow and collected logs and debris on the upstream side causing the bridge to be overtopped and scoured around. This debris jam backed up sediment for several hundred feet upstream and remains at a higher elevation than the existing deck today on the upstream side.

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**Scope/Description of Repair:**  
- Remove and dispose of as much upstream bedload and debris as possible.  
- Reconstruct north approach w/surfacing  
- Reconstruct concrete deck and wingwalls.  
- Armor north abutments and wingwalls with riprap  
- Seed disturbed areas

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**COST ESTIMATE for EMERGENCY REPAIRS**

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Unit</th>
<th>Item Description</th>
<th>Unit Price</th>
<th>Cost</th>
</tr>
</thead>
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**COST ESTIMATE for PERMANENT REPAIRS**

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Unit</th>
<th>Item Description</th>
<th>Unit Price</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>HR</td>
<td>Track Hoe</td>
<td>$200.00</td>
<td>$16,000</td>
</tr>
<tr>
<td>1000</td>
<td>CY</td>
<td>Remove and Dispose of bedload and debris (100')</td>
<td>$25.00</td>
<td>$25,000</td>
</tr>
<tr>
<td>250</td>
<td>TON</td>
<td>Place Select Borrow to reconstruct north approach fill</td>
<td>$35.00</td>
<td>$8,750</td>
</tr>
<tr>
<td>90</td>
<td>TON</td>
<td>Place aggregate on north approach fill - NCDOT ABC stone</td>
<td>$25.00</td>
<td>$2,250</td>
</tr>
<tr>
<td>40</td>
<td>CY</td>
<td>Structural Concrete to construct wingwalls and repair deck on north end</td>
<td>$750.00</td>
<td>$30,000</td>
</tr>
<tr>
<td>250</td>
<td>TON</td>
<td>Pit Run Riprap</td>
<td>$50.00</td>
<td>$12,500</td>
</tr>
<tr>
<td>220</td>
<td>SY</td>
<td>Geotextile Fabric</td>
<td>$8.00</td>
<td>$1,760</td>
</tr>
<tr>
<td>800</td>
<td>SY</td>
<td>Seed all disturbed areas</td>
<td>$5.00</td>
<td>$4,000</td>
</tr>
<tr>
<td>200</td>
<td>LF</td>
<td>Silt fence</td>
<td>$5.00</td>
<td>$1,000</td>
</tr>
<tr>
<td>1</td>
<td>LS</td>
<td>Mobilization</td>
<td>$5,000.00</td>
<td>$5,000</td>
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</tbody>
</table>

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**Proposed:**  
- Force Account  
- Contract  
**Total Emergency Repairs:** $116,260

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**COST ESTIMATE for TOTAL PERMANENT REPAIRS**

<table>
<thead>
<tr>
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**Proposed:**  
- Force Account  
- Contract  
**Total Permanent Repairs:** $116,260

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**Identify Betterment, if any, and provide justification**

- Preliminary Engineering: $17,439  
- Construction Engineering: $11,626  
- Right-of-Way  
- Other: Bonding 2.5%: $2,907  
**TOTAL ESTIMATED COST (Emergency and Permanent Repairs):** $148,232

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**Submitted By:** Lynn L. Hicks, Forest Engineer  
**Signature:** / X /  
**Date:** July 6, 2005

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**Reviewed By:**  
Eligible: Ineligible:  
**Signature:**  
**Date:**

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**Recommended By:**  
Eligible: Ineligible:  
**Signature:**  
**Date:**

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*Attach Supplemental Sheets if necessary*
### Location of Damage
- **Route No., Name of Road, Mile Post and Map Grid:** NFSR 5046, Lanning Ridge Rd., MP 0.10, MG 3B
- **ADT:** 35

### Bridge Data
- **Type:** Concrete
- **Traveled Way Width:** 12'
- **Surface Type:** Concrete
- **Thickness:** 8'
- **ID:** Unknown
- **Shoulder Width:** 0'
- **Pre-Storm Condition:** Good

### Description and Cause of Damage
- **Scope/Description of Repair:**
  - Remove and dispose of remaining sections of old structure (May have historic values - check w/ Archy)
  - Install new single lane, single span, 60’ concrete bridge (channel width), at a 4’ to 6’ higher deck elevation than the previous bridge.
  - Construct new approaches, w/surfacing, to match the new bridge elevation (ramp up).
  - Armor abutments and wingwalls with riprap
  - Seed disturbed areas

### COST ESTIMATE for EMERGENCY REPAIRS*

<table>
<thead>
<tr>
<th>Quantity</th>
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<th>Cost</th>
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### COST ESTIMATE for PERMANENT REPAIRS*

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<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>HR</td>
<td>Track Hoe</td>
<td>$200.00</td>
<td>$8,000</td>
</tr>
<tr>
<td>1</td>
<td>LS</td>
<td>Remove and Dispose of remaining sections of old bridge</td>
<td>$5,000.00</td>
<td>$5,000</td>
</tr>
<tr>
<td>500</td>
<td>CY</td>
<td>Remove and Dispose of as much upstream bedload and debris as possible</td>
<td>$25.00</td>
<td>$12,500</td>
</tr>
<tr>
<td>840</td>
<td>SF</td>
<td>Install new 60 foot span, single lane concrete bridge</td>
<td>$210.00</td>
<td>$176,400</td>
</tr>
<tr>
<td>300</td>
<td>CY</td>
<td>Place Select Borrow for Approach Fills</td>
<td>$10.00</td>
<td>$3,000</td>
</tr>
<tr>
<td>90</td>
<td>TON</td>
<td>Place aggregate to surface new approach fills - NCDOT ABC stone</td>
<td>$25.00</td>
<td>$2,250</td>
</tr>
<tr>
<td>300</td>
<td>TON</td>
<td>Class 2 Riprap (&gt;24&quot;)</td>
<td>$50.00</td>
<td>$15,000</td>
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<tr>
<td>200</td>
<td>SY</td>
<td>Geotextile Fabric</td>
<td>$6.00</td>
<td>$1,200</td>
</tr>
<tr>
<td>800</td>
<td>SY</td>
<td>Seed all disturbed areas</td>
<td>$5.00</td>
<td>$4,000</td>
</tr>
<tr>
<td>200</td>
<td>LF</td>
<td>Silt fence</td>
<td>$5.00</td>
<td>$1,000</td>
</tr>
<tr>
<td>1</td>
<td>LS</td>
<td>Mobilization</td>
<td>$5,000.00</td>
<td>$5,000</td>
</tr>
</tbody>
</table>

### Total Emergency Repairs
- **Proposed:** Force Account Contract X Total
- **Total Permanent Repairs**

### Identify Betterment, if any, and provide justification*
- Replacement of the existing triple box culvert with a bridge is a betterment. The economic analysis on the following page shows that the long-term benefits of the betterment outweigh the initial construction cost. The existing structure will have many recurring problems in the future, given the tremendous amount of bedload buildup in this unstable stream. Replacing with a single span bridge will avoid future reconstruction and reduce long-term resource impacts to fish & water.

### TOTAL ESTIMATED COST
- **Emergency and Permanent Repairs:** $308,945
- **Preliminary Engineering:** $36,347
- **Construction Engineering:** $24,231
- **Right-of-Way:** $6,058
- **TOTAL ESTIMATED COST**

### Submitted By
- **Name and Title:** Lynn L. Hicks, Forest Engineer
- **Signature:** / X / 
- **Date:** July 6, 2005

### Reviewed By
- **Name and Title:**
- **Signature:**
- **Date:**

### Recommended By
- **Name and Title:**
- **Signature:**
- **Date:**

*Attach Supplemental Sheets if necessary
**Location of Damage**
(Route No., Name of Road, Mile Post and Map Grid)

NFSR-5046, Lanning Ridge Rd., MP 0.10, MG 3B

**Sheet No:** 3 of 6

**DSR No:** 5046-0.10

**DSR No. NFNC 137-0.10**

Betterment Justification

Repair & Restore 3-cell box culvert vs. Upgrade to 60' span concrete bridge

<table>
<thead>
<tr>
<th>ITEM</th>
<th>REPAIR IN-KIND</th>
<th>BETTERMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Clean and Repair box culverts</td>
<td>Replace w/ Bridge</td>
</tr>
<tr>
<td>Track Hoe</td>
<td>HR 80 $200 $16,000</td>
<td>HR 40 $200 $8,000</td>
</tr>
<tr>
<td>Remove and Dispose of bedload and debris</td>
<td>CY 1000 $25 $25,000</td>
<td>CY 500 $25 $12,500</td>
</tr>
<tr>
<td>Place Select Borrow</td>
<td>TON 250 $35 $8,750</td>
<td>CY 300 $10 $3,000</td>
</tr>
<tr>
<td>Place aggregate - NCDOT ABC stone</td>
<td>TON 90 $25 $2,250</td>
<td>TON 90 $25 $2,250</td>
</tr>
<tr>
<td>Structural Concrete</td>
<td>CY 40 $750 $30,000</td>
<td></td>
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<tr>
<td>Pit Run Riprap</td>
<td>TON 250 $50 $12,500</td>
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<tr>
<td>Class 2 Riprap</td>
<td>TON 250 $40 $10,000</td>
<td>TON 200 $40 $8,000</td>
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<td>Geotextile Fabric</td>
<td>SY 220 $8 $1,760</td>
<td>SY 270 $8 $2,160</td>
</tr>
<tr>
<td>Seed all disturbed areas</td>
<td>SY 800 $5 $4,000</td>
<td>SY 800 $5 $4,000</td>
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<td>Silt fence</td>
<td>LF 200 $5 $1,000</td>
<td>LF 200 $5 $1,000</td>
</tr>
<tr>
<td>Mobilization</td>
<td>LS 1 $5,000 $5,000</td>
<td>LS 1 $5,000 $5,000</td>
</tr>
<tr>
<td>Remove and Dispose of remainder of old structure</td>
<td></td>
<td>SF 840 $210 $176,400</td>
</tr>
<tr>
<td>Install single lane, concrete bridge (60' X 14')</td>
<td></td>
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**TOTAL**

$116,260

$242,310

Cost to repair damage in the future (w/betterment)

Assume $2000 every 5 years for minor damage (bridge life = 50 years)

Bridge: $400(P/A, 7%, 50) = $5,520

$5,520

Cost to repair damage in the future (w/o betterment)

Assume major reconstruction in 5 - 10 years @ $150,000 (structure nearing design life)

Assume major channel cleaning & structural repair every 5 years due to unstable channel and restrictive nature of triple box culvert design at $25,000 / 5yr

In-Kind: $150,000(P/F, 7%, 5) + $25,000(P/F, 7%, 5,10,15,...,50) = $166,943

$166,943

**BENEFIT**

(Difference in future repair costs over equal life)

$161,423

**COST**

(Additional Cost to repair the site as a result of adding the betterment)

$126,050

**BENEFIT / COST**

1.281

**REMARKS**

Economic benefits exceed costs over the long-term. Also, the existing structure will have many problems in the future due to its restrictive nature in this unstable stream. A single-span bridge will reduce long-term impacts to water quality, fish, and other aquatic organisms.
Applicant: USDA Forest Service - Pisgah National Forest
County: Transylvania
State: NC
Inspection Date: 01/20/2005
Location of Damage (Route No., Name of Road, Mile Post and Map Grid)
NFSR-5046, Lanning Ridge Rd., MP 0.10, MG 3B

Flow Down stream below bridge

Flow North Abutment Scoured out

Flow Elevation of debris is higher than bridge

Debris and bedload upstream - stacked up against bridge
Applicant: USDA Forest Service - Pisgah National Forest
County: Transylvania
State: NC
Inspection Date: 01/20/2005
ADT: 35

Location of Damage (Route No., Name of Road, Mile Post and Map Grid)
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