Full-Depth Reclamation
In-Place Recycling Presentation

Full-Depth Case Study – Williamson County, TN

By Dale Cronauer – Blount Construction
Case Study – Old Natchez Trace Rd

► Project – Old Natchez Trace Rd
► 4.20 Miles
► Old Hillsboro Rd to Sneed Rd
Spring 2013 – Williamson County Highway Superintendent Eddie Hood designated Old Natchez Trace on his construction schedule for a rehabilitation project. As Hood discussed the project with Collier Engineering, it became evident that just an ordinary asphalt overlay for this project would not be acceptable, due to the amount of base failures and need for shoulder work throughout the project.
In the Fall of 2013 Collier Engineering and Hawkins Partners applied an inventory and analysis process too identify the most efficient repair to do too this 4.20 mile section of Old Natchez Trace Road.
Issues...Stone Walls on a Historic Road
Issues... Landform – Tight Widths
Project Elements and Concerns

Maintain Public Safety

Improve Deteriorating Surface

Protect and enhance character defining features

Preserve low speed travel with natural traffic calming features

Historic artifacts in and around area

Best long term solution to long term problem with road
Existing Conditions
Environmental Impact

► Trucking with FDR –
38 Tanker Loads of Cement

Trucking with Conventional R & R –
1,365 Loads

THIS WILL ALSO IMPACT THE SURROUNDING STREETS
Time of Construction

Collier Engineering estimated that performing the necessary repairs per conventional methods of remove and replace would take five weeks of construction time.
Construction Time

Full Depth Reclamation would take approximately 10 working days.
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>ITEM DESCRIPTION</th>
<th>UNIT</th>
<th>QUANTITY</th>
<th>UNIT PRICE</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>304-01.02</td>
<td>CEMENT (SOIL CEMENT BASE)</td>
<td>TON</td>
<td>986</td>
<td>$139.00</td>
<td>$137,054.00</td>
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<tr>
<td>304-02.03</td>
<td>FULL DEPTH FLEXIBLE PAVEMENT RECLAMATION</td>
<td>B.Y.</td>
<td>49280</td>
<td>$3.75</td>
<td>$184,800.00</td>
</tr>
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**TOTAL FDR COST**

$321,854.00

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</thead>
<tbody>
<tr>
<td>303-00</td>
<td>4&quot; REMOVAL OF EXISTING FAILED AREAS (25% OF ROADWAY)</td>
<td>TON</td>
<td>2710</td>
<td>$10.00</td>
<td>$27,100.00</td>
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<tr>
<td>303-01</td>
<td>MINERAL AGGREGATE, TYPE A BASE, GRADING D</td>
<td>TON</td>
<td>25967</td>
<td>$12.00</td>
<td>$311,604.00</td>
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</table>

**CONVENTIONAL METHOD COST**

$338,704.00

**TOTAL SAVINGS USING FDR**

$16,850.00
After both scenarios were presented to the County, FDR was chosen as the right solution for this project. Highway Superintendent Eddie Hood and Collier Engineering’s Randy Carroll brought in Barry Wilder of the Portland Cement Association to assist with specs in putting the project out to bid.
Project Letting

The funds for this project required a 2014 completion of the roadwork.

Timing would be of the essence in getting the project awarded and off the ground before weather limitations in the late Fall.

Bid Advertisement was published on July 16th, 2014 with a deadline and bid opening of August 5th, 2014.
# ESTIMATED QUANTITIES

WILLIAMSON COUNTY HIGHWAY DEPARTMENT

<table>
<thead>
<tr>
<th>Item #</th>
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<th>Unit</th>
<th>Quantity</th>
<th>Unit Price</th>
<th>Total</th>
</tr>
</thead>
</table>
| 304-01.02 | Cement (Soil Cement Base) For
Dollars________
Cents, per ton | TON  | 986      |           |          |
| 304-02.03 | Full Depth Flexible Pavement Reclamation For
Dollars________
Cents, per sy | SY   | 49,280   |           |          |
| 712-01   | Traffic Control For
Dollars________
Cents, per sy | LS   | 1.0      |           |          |

**TOTAL BID** ______________________

Note: Before construction begins the Contractor shall submit a Job Mix Formula to be approved by the Engineer. The Contractor will be responsible for Quality Control Testing by a qualified testing firm for the FDR. Water will be included in other items bid for mixing, curing and dust control.

Company Name ____________________________________________________________
On September 8th, 2014 Williamson County awarded the Full Depth Reclamation of Old Natchez Trace Road to Blount Construction out of Marietta, GA.

A Pre-Construction conference was quickly arranged and the contractor proceeded with obtaining samples for a mix design.
GeoServices, LLC obtained samples and ran the design for the cement rate.

Gathering in place roadways samples and running designs in the laboratory to determine what application rate of cement to incorporate in the field are an important function. An approved, qualified, and experienced testing agency should be used. AASHTO accredited.
Full Depth Reclamation Compressive Strength Testing Results

Project Name: Old Natchez Trace Road FDR

GEOS Project Number: 32-141302

Report Date: 10/10/2014

<table>
<thead>
<tr>
<th>Compressive Strength Testing Results 7 Day Breaks</th>
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</thead>
<tbody>
<tr>
<td>Cement Content</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>8</td>
</tr>
</tbody>
</table>

Compressive Strength at Varying Cement Contents

GEOServices, LLC - 2561 Willow Point Way - Knoxville, TN 37931 - Phone: (865) 573-6130 Fax: (865) 573-6132
Construction

Blount Construction broke ground the third week in October of 2014.
Always expect challenges

- Every project has challenges that are not seen ahead or that will come up while construction takes place.

- The contractor was made aware of a requirement to have an archaeologist present from station 92+00 to 100+00.
Fortunately there were no ancient artifacts found in the roadway and construction proceeded without an issue.
Initial staking of the road as well as remarking center and edge lines are crucial in order to re-establish alignment.
Construction
Daily Testing is used to insure moisture, compaction, and spread rate are accurate in the field.
Construction

Water is essential during construction of a reclaimed base with portland cement. It should be incorporated during the initial mixing as well as during set up of the base to help cure the cement.
Construction
Paving Operation

The FDR took approximately 10 days from start to finish.

Afterwards, Williamson County placed the intermediate asphalt course and dressed the shoulders where necessary.
Paving
Project Completion

The coordination involved in the rehabilitation of the Old Natchez Trace Road from the beginning stages of the county’s due process of finding the right repair method, to preparing the project for bidding, to the construction work itself, was a tremendous success. A combination of all the effort, time, and work put into the project pays off with efficient means of the FDR process creating a long term solution for Williamson County.
“As Vice-President and Project Manager of Collier Engineering working on behalf of Williamson County I can say with confidence that our work experience with Blount Construction and our complete satisfaction of the final product has been a pleasurable experience.”

Randy Carroll, PE.
Thank you