

# City of Xenia Full Depth Reclamation

Construction - Case Study

## New Pavement for Aged Residential Streets

### The Challenge

In 2006, a number of streets within the City of Xenia, Ohio reached the end of their service lives. While the asphalt pavements performed well for over three decades, Ohio's fluctuating weather conditions and heavy traffic patterns led to major distress on some roads. These pavements required major rehabilitation or complete reconstruction.

Complete pavement reconstruction was a costly option, which would put strain on Xenia's limited budget for public works improvement. However, less costly repair techniques, including thin asphalt overlays, were not suitable due to the severity of the road damage. Thick structural asphalt overlays were also not suitable unless existing curbs and gutters were replaced and considerable work done to match or adjust existing residential driveways, roadway drainage structures and adjoining intersections.

***... The City of Xenia, Ohio needed a cost-effective, permanent solution to fix severely damaged roads.***



Residential streets in Xenia, Ohio were severely damaged & required repair



FDR & Soil Stabilization utilizing Calciment rebuilds Xenia, Ohio residential streets

### Executive Summary

- > A number of roads within the City of Xenia, Ohio had far surpassed their service life and required major rehabilitation
- > A quick and cost-effective solution was needed, as well as a method that would completely rehabilitate their streets
- > With past success of using Calciment for FDR jobs, the City of Xenia quickly decided this was the best solution
- > There was a 45% cost savings vs. using the remove & replace method
- > The asphalt was removed in this case and the existing base was then recycled
- > New asphalt was able to quickly be laid once Calciment was applied - keeping downtown to a minimum
- > Years after the project was finished, the roads still provided optimal performance

## Solution

The City of Xenia was looking for a quick, cost efficient method to completely replace the failed flexible pavement roadways.

Two options appeared viable:

- Remove and replace the existing flexible pavement, or
- Reclaim the existing pavement materials in-place using full-depth reclamation (FDR). Full depth reclamation also offered the opportunity to incorporate Calciment® to add strength and long life to the recycled flexible pavement.

Due to the success of past FDR jobs utilizing Calciment, the City of Xenia quickly determined this process would be less costly, quicker, and would provide the long-lasting quality results the city demanded. Plans and bid documents were prepared and the project was let for bid. Ray Hensley Construction, Inc. of Springfield, Ohio, an experienced company specializing in FDR and soil stabilization, was selected.

## Results

A quick review of project bid tabulations, summarized in Figure 1, shows the value that FDR with Calciment brought to the City of Xenia.

**Figure 1: Cost of base reclamation with Calciment or removal and replacement (per square yard)**

	Engineer's Estimate	Low Bidder	Average of 2 Low Bidders	
FDR of existing asphalt and granular base (12" deep with 6% LKD)	\$6.50	\$6.35	\$6.30	<b>45% Cost Savings Vs. Remove &amp; Replace</b>
Remove existing asphalt and granular base (13") and replace with new granular base (10")	\$8.33	\$13.00	\$14.25	

These projects were bid separately in Spring 2006, but the size and scope of the projects are very similar, allowing for a meaningful cost comparison. It is important to note that the cost figures shown in Figure 1 are for base construction only and do not include the cost of the asphalt surface course. In both cases, a 3" thick asphalt overlay was placed on the reconstructed base course.

In many FDR projects, the existing asphalt pavement is recycled with the underlying base material. In this case, however, the existing asphalt mat was removed prior to recycling. By removing the old 3" thick layer of asphalt and then recycling the existing base with Calciment, a new 3" layer of asphalt could be placed on the newly recycled base – allowing the new pavement to meet existing curbs and gutters, residential driveways, manholes and adjoining intersections.

In addition to being more cost effective, the speed of construction and high quality base material were also key successes of the project. "Public inconvenience is one of our major concerns during roadway repairs. When we have to completely reconstruct a residential street, we know that the residents and driving public will be effected. But we want to keep road closures and downtime to a minimum. With FDR, we have far fewer construction vehicles in our residential neighborhoods. No trucks are needed for hauling out the old pavement and bringing in the new aggregate base. The recycling process is very quick and residents can drive on the recycled base until the new asphalt surface course is placed." Stated Jim Jones, Xenia City Engineer

## Lasting Success!

FDR utilizing Calciment saved the city thousands of dollars and provided the lasting results they desired. In addition, FDR utilizing Calciment was four times faster than a complete reconstruct. Years after the project was finished the roads are still providing optimal performance!

*"When compared to pavement removal and replacement, full-depth reclamation with Calciment is quicker, less costly and gives us a better road."*

- Jim Jones, P.E., City Engineer - City of Xenia, Ohio