



OFFICE MEMORANDUM

DATE: May 14, 1980

TO: K. A. Allemeier
Engineer of Testing and Research

FROM: L. T. Ochler

SUBJECT: Investigation of Popout Problems on M 14
Research Project 80 TI-649, Research Report No. R-1143

This is in response to your request of March 10, 1980, concerning an evaluation to determine if the contaminants have affected the structural integrity of the pavement. In addition, a repair procedure has been prepared and is included herein.

The contaminated pavement is located between Napier Rd and I 275, a distance of approximately 5.8 miles. It involves Construction Projects 82102-08489 built in 1978, and 82102-08498 and 08499 built in 1979. Approximately 1.5 miles of Project 82102-08489 contains two-lane roadways and the remaining mileage consists of three-lane roadways. The pavement is a 9-in. thick, reinforced slab with joints spaced at 70 ft.

To obtain information on the extent of the contamination an inspection of the pavement was conducted. The inspection was made from the shoulder and only slabs in the traffic lane were inspected. Surface size and distribution were estimated but actual depth and diameter were measured on some holes when gaps in the traffic permitted close inspection.

On the basis of the inspection results, it is evident that the most contamination is on the eastbound roadway between Beck Rd and the C&O RR overpass (Area 3, Fig. 1). The remaining pavement west of the railroad overpass (Area 2, Fig. 1) is only moderately contaminated and the portion of pavement east of the railroad (Area 1, Fig. 1) is only slightly contaminated.

Most of the popouts are 1 in. or less in surface diameter with the largest one observed being 8 in. Nearly all holes are less than 2 in. deep and none over 3 in. deep were found. The contaminants were scattered throughout the pavement surface. For those square yards contaminated, a concentration of only one hole per square yard of pavement was most common, with only an occasional cluster of smaller sized holes noticed.

Based on this investigation, the effect of the contamination on the structural integrity of the pavement would appear to be insignificant. The survey results show the contaminants are mostly small in size and are widely dispersed throughout the pavement surface. It would be reasonable to assume that any contaminants that may be present below the surface would also be small in size and equally widely dispersed.

Repair Procedure

All surface areas containing soil particles shall be cleaned by use of high-pressure water and using hand tools, if necessary. The resulting holes shall be inspected to determine their actual maximum size. All holes over 1 in. deep and over 1 in. in diameter shall be marked for repair. In areas with clusters of holes, all holes shall be repaired regardless of size.

A "Set 45" mortar, manufactured by Set Products of Macedonia, Ohio, shall be used to repair the surface. The mortar shall be mixed one part water to six parts Set 45 by volume. The addition of extra aggregate to the mix will not be allowed.

In hot weather, the working time of the mortar may be as short as five minutes; therefore, the material must be mixed in small batches, then placed and finished immediately after mixing.

The holes to be repaired shall have clean, freshly exposed bonding surfaces and a nearly vertical periphery at least 1 in. deep. A lightweight chipping hammer should be sufficient for this operation. After the holes have been enlarged, they shall be cleaned with oil-free compressed air and inspected to ensure that all contaminants have been removed. If contaminants are still evident they shall be removed by chipping or high-pressure water cleaning. Immediately prior to placing the mortar, the repair surfaces shall be thoroughly wetted with clean water but no free-standing water will be allowed.

The mortar shall be placed, consolidated, and finished flush with the surrounding pavement surface.

Traffic shall not be allowed on the repair for at least 1-1/2 hours after the mortar has been placed.

TESTING AND RESEARCH DIVISION

Le Roy T. Oakley
Engineer of Research

LTO:JES:bf

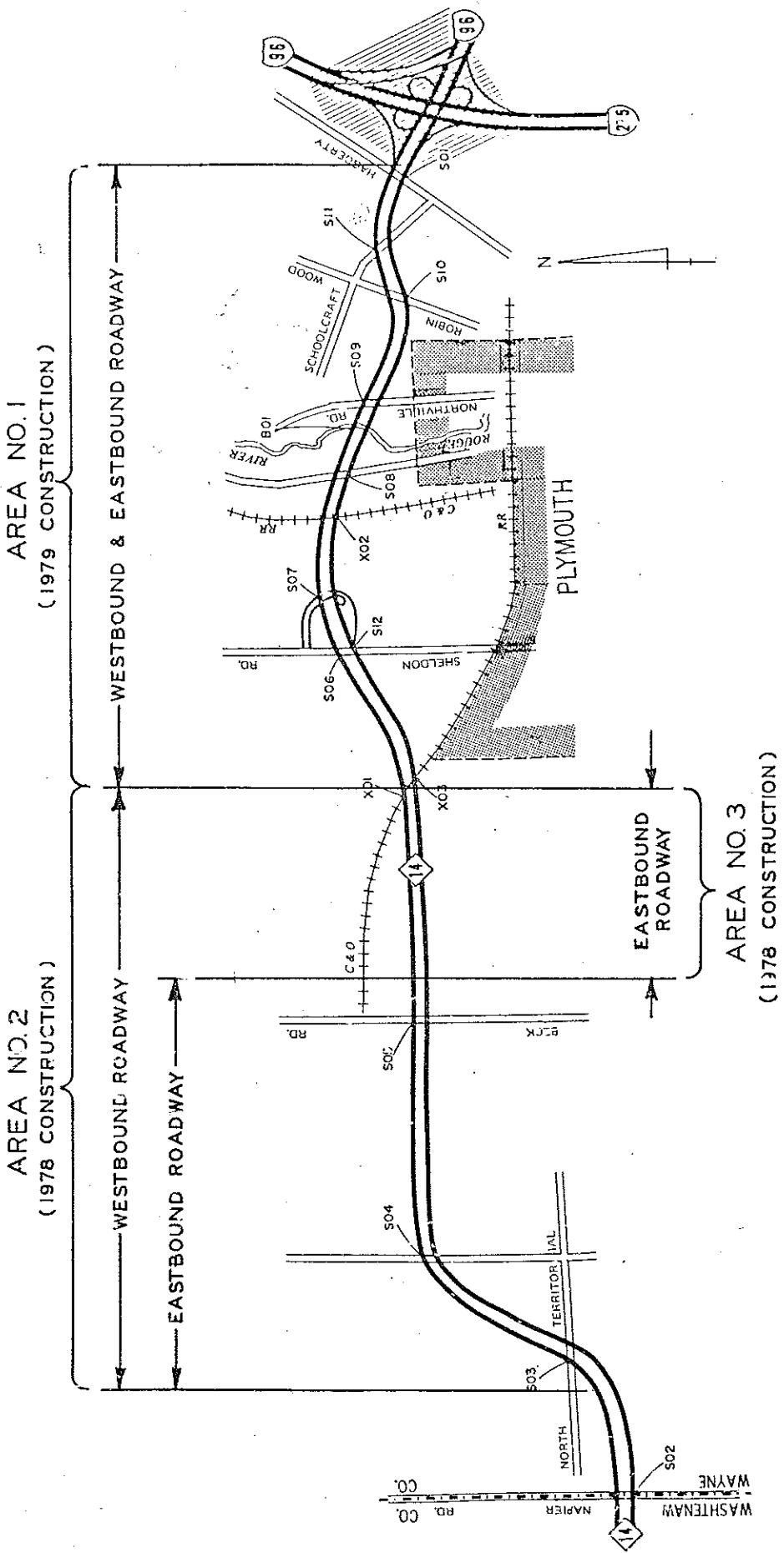


Figure 1. Areas with different degrees of contamination.