

## **APPENDIX A: PHOTOGRAPHS**

**General Photographs**



Air permeability apparatus control panel.  
Photo taken during permeability testing of Site 0, US-23 SB.



MDOT coring rig and technician during coring of Site 0, US-23 SB.



The void from the previous core is filled with a plug (lower right) and mortar while the current core is being taken. Photo taken at Site 1, US-23 SB.



Lower drilling unit used to core the pavement slabs at Site 2, US 23 SB.



A six-inch joint core is extracted after being drilled. Photo taken at Site 2, US-23 SB.



FWD Testing Machine from MDOT. Photo taken at Site 4A, US-23 SB.

**SITE 0**



Site 0: US-23 Southbound, Section A of MDOT Aggregate Study.  
Lower Unit of coring apparatus used to take six-inch core from pavement joint.



Site 0: US-23 Southbound, Section A of MDOT Aggregate Study.  
Void left from extraction of six-inch core from the pavement joint.



Site 0: US-23 SB, Section A of MDOT Aggregate Study. Six-inch core extracted from pavement joint. Petrographic analysis will be done on the six-inch core.



Site 0: US-23 SB, Section A of MDOT Aggregate Study. Four-inch core locations. Note the presence of shrinkage cracking in test slab.



Site 0: US-23 SB, Section A of MDOT Aggregate Study.  
Permeability testing using the air permeability field apparatus.



Site 0: US-23 SB, Section A of MDOT Aggregate Study.  
Coring process for the four-inch core used for permeability and linear traverse testing.



Site 0: US-23 SB, Section A of MDOT Aggregate Study.  
Four-inch core used for permeability and linear traverse testing.



Site 0: US-23 SB, Section A of MDOT Aggregate Study. Four-inch core used for compressive strength testing. Note the reinforcing steel in the upper portion of the core.

**SITE 1**



Site 1: US-23 SB, Section B of MDOT Aggregate Study.  
Permeability testing using the air permeability field apparatus.



Site 1: US-23 SB, Section B of MDOT Aggregate Study. Six-inch core extracted from pavement joint. Petrographic analysis will be done on the six-inch core.



Site 1: US-23 SB, Section B of MDOT Aggregate Study.  
Four-inch core used for permeability and linear traverse testing.

**SITE 2**



Site 2: US-23 SB, Section C of MDOT Aggregate Study. Six-inch core extracted from pavement joint. Petrographic analysis will be done on the six-inch core.



Site 2: US-23 SB, Section C of MDOT Aggregate Study. Surface of traveling lane. Note the popouts in the lower right corner.

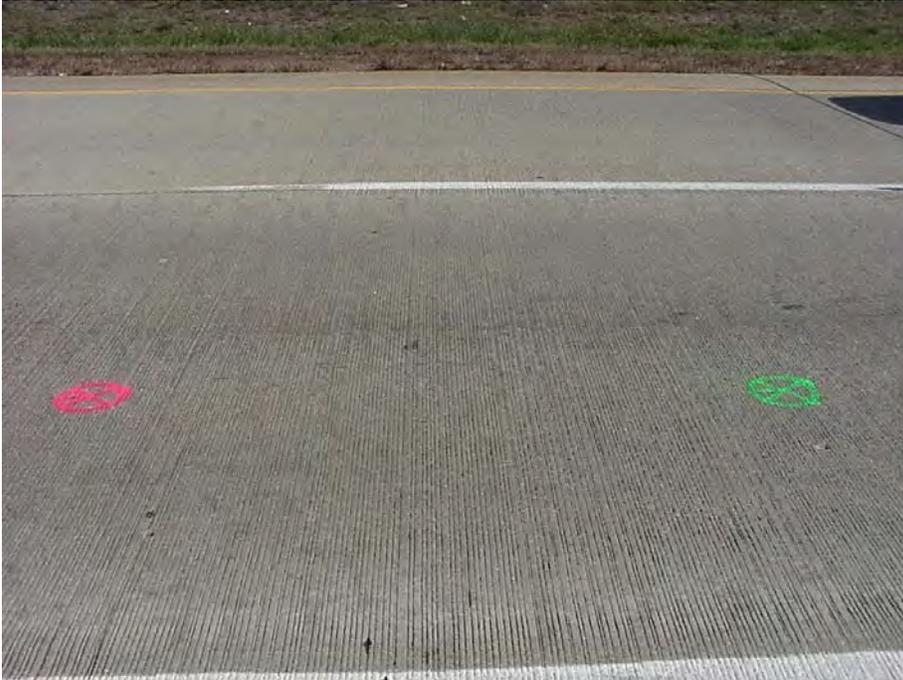


Site 2: US-23 SB, Section C of MDOT Aggregate Study. Surface of outside traveling lane including expansion joint. Note the excellent condition of the joint.



Site 2: US-23 SB, Section C of MDOT Aggregate Study. Four-inch core used for permeability and linear traverse testing.

**SITE 3**

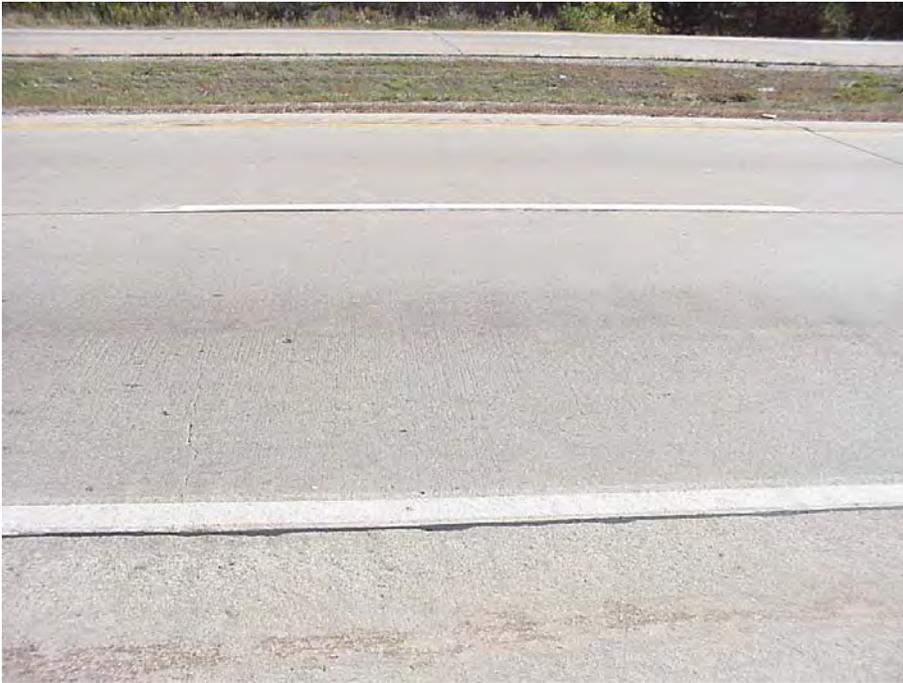


Site 3: US-23 SB, Section D of MDOT Aggregate Study. Surface of traveling lane showing the position of the cores taken to test compressive strength (green), permeability, and air void spacing (pink).



Site 3: US-23 SB, Section D of MDOT Aggregate Study. Surface of traveling lane showing the position of the six-inch cores. Note the shrinkage cracking throughout the site.

**SITE 4**



Site 4: US-23 SB, Sta 610+56. Surface of traveling lane showing transverse cracking, map cracking, and popouts.



Site 4: US-23 SB, Sta 610+56. Pavement surface and transverse joint. Note the seal of the transverse joint is failing.



Site 4: US-23 SB, Sta 610+56. Surface of traveling lane showing map cracking.

**SITE 4A**



Site 4A: US-23 SB; Starts @ Sta 176+36. Surface of traveling lane-showing Popouts.



Site 4A: US-23 SB; Starts @ Sta 176+36. Surface of traveling lane showing popouts.

**SITE 6**



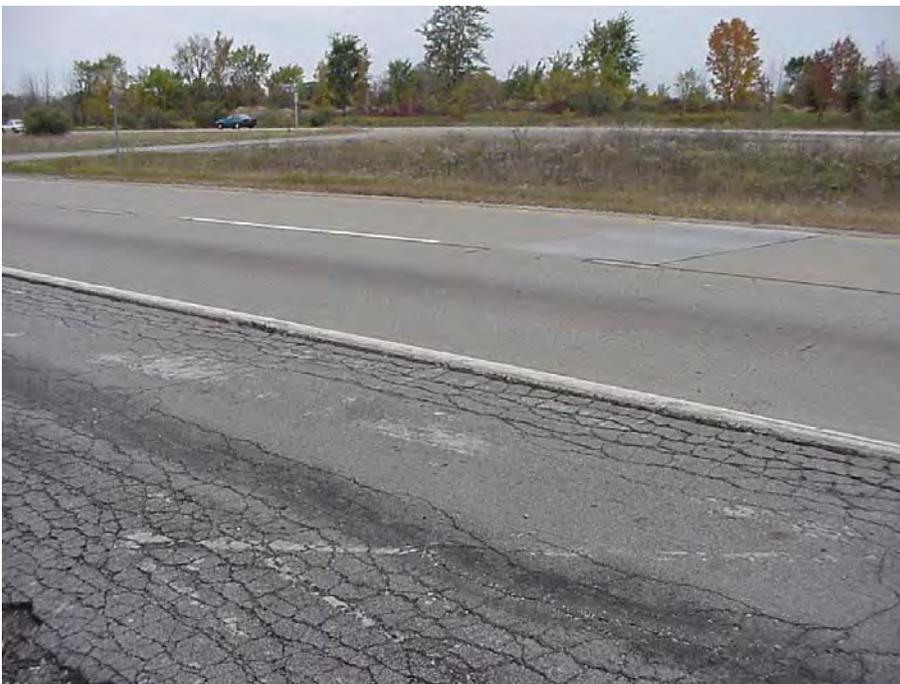
Site 6: I-69 EB, Sta 1534+93. View showing the pavement surface, bituminous shoulder and several concrete patches.



Site 6: I-69 EB, Sta 1534+93. View showing the pavement surface. Note the transverse crack (lower left) and the alligator cracking of the bituminous shoulder.



Site 6: I-69 EB, Sta 1534+93. View showing the pavement surface. Note the transverse crack, concrete patch, and the spalling at the lower right edge of the concrete patch.



Site 6: I-69 EB, Sta 1534+93. View showing the pavement surface. Note the vertical separation between the traveling lane and the bituminous shoulder.



Site 6: I-69 EB, Sta 1534+93. View showing a concrete patch. Note the expansion joint on the right side of the patch and the spalling at the upper right corner.

**SITE 14**



Site 14: M-81 EB. View showing the pavement surface, gravel shoulder and several joint repair patches.



Site 14: M-81 EB. View showing spalling at the end of a transverse crack.



Site 14: M-81 EB. View showing spalling along a severe transverse crack.



Site 14: M-81 EB. View showing the pavement surface, gravel shoulder, transverse cracks and several joint repair patches.

**SITE 19**



Site 19: M-53 NB @Station 520. Between 17<sup>th</sup> and 18<sup>th</sup> Mile road, view showing the cracking pattern near a transverse joint.



Site 19: M-53 NB @Station 520. Between 17<sup>th</sup> and 18<sup>th</sup> Mile road, view showing the cracking pattern near a transverse joint.



Site 19: M-53 NB @Station 520. Between 17<sup>th</sup> and 18<sup>th</sup> Mile road, view showing the cracking pattern near a transverse joint.



Site 19: M-53 NB @Station 520. Between 17<sup>th</sup> and 18<sup>th</sup> Mile road, view showing the cracking pattern near a transverse joint

**SITE 26A**



Site 26A: US-10 WB, Sta 137+08. View showing the cracking pattern pavement surface and loose particles.



Site 26A: US-10 WB, Sta 137+08. View showing the popouts, cracking pattern and spalling on the pavement. The spalling has already been patched with asphalt.



Site 26A: US-10 WB, Sta 137+08. View showing the spalling along the longitudinal joint which has been patched by asphalt. Lower right corner shows a view of expansion joint.



Site 26A: US-10 WB, Sta 137+08. View showing the transverse joint completely spalled and patched with asphalt.

**SITE 26B**



Site 26B: US-10 WB, Sta 137+08. View showing the cracking pattern pavement surface and completely spalled longitudinal joint.



Site 26B: US-10 WB, Sta 137+08. View showing the popouts, cracking pattern and loose particles.



Site 26B: US-10 WB, Sta 137+08. View showing spalling along the longitudinal joint which has been patched by asphalt.



Site 26B: US-10 WB, Sta 137+08. View showing the skewed joint. Also showing spalling at the corners of joint.

**SITE 27**



Site 27: US-10 WB, Sta 114+00. View showing the cracking pattern on pavement surface with breakup of the pavement.



Site 27: US-10 WB, Sta 114+00. View showing the Popouts, cracking pattern and spalled transverse joint.



Site 27: US-10 WB, Sta 114+00. View showing spalling along the transverse joint and coring locations for petrographic analysis.

**SITE 28**



Site 28: US-27 SB Starts @ Station 519+07, View showing the cracking pattern along the poorly done asphalt patching.



Site 28: US-27 SB Starts @ Station 519+07, View showing the cracking pattern along the transverse cracking.



Site 28: US-27 SB Starts @ Station 519+07, View showing the cracking pattern near the longitudinal joint.



Site 28: US-27 SB Starts @ Station 519+07, View showing the asphalt patching done on transverse joint.

**SITE 29**



Site 29: I-275 SB, View showing the cracking pattern pavement with white staining coming out of the cracks. Also showing poorly done asphalt patching.



Site 29: I-275 SB, View showing the cracking pattern and asphalt patching at the transverse joint.



Site 29: I-275 SB, View showing asphalt patching along the transverse joint and also the cracking pattern.



Site 29: I-275 SB, View showing cracking pattern with white exudate coming out of the cracks.



Site 29: I-275 SB, View showing the cracking pattern near the asphalt patching.



Site 29: I-275 SB, View showing the cracking pattern with white exudate coming out of the cracks (right side of the picture).