Research Report
KTC 96 - 10

EVALUATION OF SUPERIOR PERFORMING PORTLAND CEMENT CONCRETE PAVEMENTS IN KENTUCKY

by

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and

Federal Highway Administration
US Department of Transportation

May 10, 1996

Mr. Paul E. Toussaint
Division Administrator
Federal Highway Administration
330 West Broadway
Frankfort, Kentucky 40602-0536

SUBJECT: Implementation Statement KYHPR 94-156, "Evaluation of Superior Performing Portland Cement Concrete Pavements in Kentucky," NCP Code 4C1C

Dear Mr. Toussaint:

The vast majority of Portland cement concrete (PCC) pavements constructed in Kentucky during the past forty years have been confined to the Interstate and Parkway Systems. Initially, 78 percent of the 1,215-km (755-mi) Interstate System and 50 percent of the 1,040-km (646-mi) Parkway System was PCC pavement. Performance of PCC pavements, designed using 1960s and 1970s criteria, has varied considerably. However, substantial lengths of the original PCC pavements are still performing satisfactorily. Research Report KTC 96-10 entitled "Evaluation of Superior Performing Portland Cement Concrete Pavements in Kentucky," describes inventories and analyses undertaken during the course of this research study to determine if there are common factors which have contributed to the superior performance of certain sections of Kentucky's PCC pavements. An extensive inventory of Kentucky's interstate, parkway, and other primary routes was performed to determine locations of PCC sections over fifteen years old that had demonstrated excellent performance. Selection of PCC pavement sections for evaluation was based on longevity and traffic accumulations. Both on-site and laboratory evaluations were performed.

The primary distresses of these PCC pavements were transverse joint deterioration and joint faulting. Intermediate span transverse cracking, with occasional faulting, was observed to be the predominant type of PCC cracking. Common factors which would contribute positively to the outstanding performance of these PCC pavements were the concrete's high compressive strengths and high moduli of elasticity. Other factors determined during the evaluations would contribute negatively to any pavement's performance. These factors include very low California Bearing Ratios (CBR's) in both the dense-graded aggregate base and subgrade layers underlying the concrete pavement, relatively high amounts of minus 75μm (No. 200) sieve material in the dense-graded aggregate base, and high moisture contents and fairly low unconfined compressive strengths of the soil subgrade layer.

One task, Task F, was not performed by researchers due to time and budget constraints. The Study Advisory Committee (SAC) for this study recommended the study be extended to complete the task of evaluating adjacent PCC sections that had exhibited poor performance. Information from this task would have enhanced final conclusions and recommendations. Additionally, the SAC recommended that the researchers use the extension to:

- Incorporate data from the Kentucky Department of Highways' Pavement Management Group, including distress surveys, soil and design data,
- Backcast ESAL's from ADT and %TRUCK data -- this information is needed to effectively analyze pavement performance. The design CBR, pavement thickness design and design traffic should be used to determine when the pavements selected for study should have failed,
- For design purposes, drainage should be quantified in terms of the AASHTO drainage coefficient,
- Evaluate the workmanship of the pavement sections by the falling weight deflectometer (FWD) by determining the load transfer capabilities of selected pavement joints within the pavement sections studied.

The Kentucky Department of Highways concurs with the recommendations of the SAC and supports the efforts of the researchers to fully complete this study. However, current PCC pavement designs, including thicker PCC slabs, drainable bases, shorter joint spacings, skewed joints and improved joint-filler materials have contributed to improved joint quality and minimized intermediate span transverse cracking and faulting. Also, improved construction and inspection methods and adherence to presently accepted mix design and production parameters, including screening of potentially reactive aggregates, acceptance of pozzolanic materials and tighter standards on mix variations, have provided a more consistent product. It is conceivable that if present design, construction, and inspection processes had been in use in the 1960s and 1970s, an even higher percentage of the original PCC pavements would be performing satisfactorily with only minimum lengths requiring overlays or reconstruction. It is logical to expect that the improved design, construction and inspection methods of today will provide a consistent 30-year, or longer, pavement life with the only maintenance activities involving joint resealing and diamond grinding to restore surface smoothness and ride quality.

Sincerely,

J. M. Yowell, P.E.
State Highway Engineer

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16. Abstract

This research report describes a program of study directed at determining common factors which have contributed to the superior performances of selected sections of Portland cement concrete (PCC) pavements in Kentucky. The program involved an extensive survey of Kentucky's interstate, parkway and other primary routes to determine locations of PCC pavement sections greater than 15 years old that had performed satisfactorily with minimal maintenance. Twelve of the best performing PCC pavements with long service life and heavy traffic were selected for detailed evaluations. Initial designs were documented and a series of in-situ pavement tests were conducted including core drilling and materials sampling. Laboratory tests were conducted on the pavement samples to ascertain basic physical properties.

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EXECUTIVE SUMMARY

This research report describes a program of study directed at determining common factors which have contributed to the superior performances of selected sections of Portland cement concrete (PCC) pavements in Kentucky. This involved an extensive inventory of Kentucky's interstate, parkway, and other primary routes to determine locations of PCC pavement sections greater than 15 years old that had performed satisfactorily with minimal maintenance. Twelve of the best performing PCC pavements with long service and heavy traffic were selected for detailed evaluations. A series of in-situ pavement tests were conducted followed by core drilling and sampling pavement material. Laboratory tests were conducted on the pavement samples to ascertain basic physical properties. No evaluations were made of PCC pavements exhibiting poor performance.

The vast majority of the PCC pavements constructed in Kentucky during the past forty years is confined to the Interstate and Parkway systems. Initially, 78 percent of the 1,215-km (755-mi) Interstate system and 50 percent of the 1,040-km (646-mi) Parkway system was PCC pavement. These values have been significantly reduced in recent years as substantial mileage of PCC pavement has been overlain with asphaltic concrete. Nevertheless, 890 km (553 mi) of PCC existed in early 1994 on Kentucky's combined Interstate and Parkway systems, and only 93 km (58 mi) of the 890 km (553 mi) was reconstructed PCC pavement. Historically, PCC pavements have been selected infrequently for non-Interstate and non-Parkway routes in Kentucky. Although the performance of PCC pavements on Kentucky's Interstate and Parkway systems has varied considerably, substantial mileage of the original PCC pavements, designed from criteria in effect during the 1960s and 1970s, is performing satisfactorily. The primary source of PCC pavement distress observed was transverse joint deterioration and faulting. Intermediate span transverse cracking with occasional faulting was the only significant type of PCC cracking observed.

Based on the testing program, the only common factors which would contribute in a positive manner to the superior performance of the 12 PCC pavements were the high compressive strengths and moduli of elasticity of the PCC slabs. The values greatly exceed design criteria. The other common factors determined from the testing program would be expected to contribute in a negative manner; these being very low in-situ CBR values and high percentages of minus 75μm (No. 200 sieve) material in the dense graded aggregate (DGA) bases; and, high moisture contents, low in-situ CBR values and low unconfined compressive strengths of the underlying subgrades.

PCC pavement designs in common use today -- thicker PCC slabs, drainable bases, shorter joint spacings, skewed joints and improved joint-filler materials -- will contribute to improved joint quality and minimized intermediate span transverse cracking and faulting. Also, adherence to presently accepted mix design and production parameters including improved screening of potentially reactive aggregates, acceptance of pozzolanic materials and tighter standards on mix variations will provide a more consistent product. It is conceivable that if designs presently in use had been specified during the 1960s and 1970s, an even higher percentage of the original PCC pavements would be serving satisfactorily. It is logical to anticipate that the improved designs in common use today will provide a consistent 30-year or longer pavement life, with the only maintenance consisting of joint resealing and diamond grinding to restore surface smoothness and ride quality.

INTRODUCTION

The primary uses for Portland cement concrete (PCC) on high-type, heavy-duty pavements in Kentucky during the past forty years have been for the Interstate and Parkway systems. Approximately three-fourths of the Interstate system and one-half of the Parkway system were initially constructed with PCC wearing surfaces. These percentages have been significantly reduced in recent years as numerous PCC pavement sections developed distress or served their useful life and were subsequently overlain with a structural layer of asphaltic concrete (AC). It has been common practice during the past ten years to break and seat the PCC prior to overlaying with AC. A few of the PCC sections have been rubblized or removed prior to paving with AC. Only a small percentage of the PCC pavements have been replaced with PCC.

The uses of PCC on other Primary (mainly U.S.) routes have been infrequent and comprise a relatively small percentage of the high-traffic primary routes. The sections are generally fairly short in length and located in the vicinity of the larger urban areas, either approaches to or within the urban area. As these develop distress, or serve their useful life, the typical practice is to overlay with AC. The vast majority of the other primary routes has been initially AC and continues to be constructed with AC.

Few PCC pavement sections are presently being constructed in Kentucky. The contributing factors are quite complex. The early deterioration, particularly joints, of several PCC sections on the Interstate system and to a lesser extent on the Parkway system, influenced designers in the choice of pavement systems. However, several 15- to 30-year old, or older, PCC pavement sections still remain in service on major highways in Kentucky and have performed satisfactorily with minimal maintenance.

The objective of this study was to determine if there were identifiable factors common to these PCC pavements which had contributed to their superior performance on high-traffic primary routes in Kentucky. The findings should be useful for optimizing design practices when specifying PCC pavements.

PROCEDURE

The PCC pavement portions of the Interstate, Parkway, and other significant Primary routes were inventoried during 1993. Pertinent observations of physical conditions and performances were recorded. Photographs depicting typical conditions were taken.

Twelve test projects comprising the combination of the best performing, longest service and heaviest traffic PCC pavements were selected from the inventory for detailed evaluations. The projects included three Interstate sections, ranging from 25 to 33 years old, six Parkway sections, ranging from 22 to 31 years old, and three other Primary (U.S.) Route sections, ranging from 12 to 34 years old. A listing of the projects is contained in Table I and the locations are depicted in Figure 1.

Two sites were selected on each of the 12 test projects for coring, in-situ testing and sampling. The sites were chosen in areas where the pavement was in essentially perfect condition with no cracks, spalls or other types of distress. Due respect was given to select sites with adequate sight distance to ensure an increased margin of safety for the test crews.

Three tests were typically conducted at each site, or six for each project. The tests were at mid-span, 305 m (1000 ft) apart in the outside wheel path of the outside traveled lane, approximately 1070 mm (42 in.) from the outside shoulder. Therefore, one lane closure and flagging protection sufficed for all three tests at a site. The other site was chosen in the opposite direction of travel and required another lane closure sequence.

The same sequence of coring, in-situ testing and sampling was followed at each test location. The sequence was:

- Take 150-mm (6-in.) diameter core of PCC (ASTM C42) and measure thickness;
- Conduct in-situ CBR test (ASTM D4429) on base through core hole;
- Remove base material, place in sealed container for subsequent laboratory tests, and measure thickness of base;
- Conduct in-situ CBR test (ASTM D4429) on subgrade through core hole;
- Collect sample from the top 50 mm (2 in.) of the subgrade and place in sealed container for subsequent laboratory tests;
- Take Shelby tube sample of the subgrade for subsequent laboratory tests; and
- Fill holes with base material and PCC.

Care was taken during the coring process to minimize contamination of the base with water from the core barrel. The truck used as a test platform for the CBR tests weighed 9,525 kg (21,000 lb) and was supported on blocks. A 50-mm (2-in.) diameter piston was forced at a constant rate into the subject material while measuring the load and corresponding penetration. Views of typical pavement testing and sampling are shown in Figures 2 through 4.

PCC Pavements Sections Selected for Study

1 - I64 in Fayette County
2 - I75 in Laurel County
3 - I64 in Shelby County
4 - BG Parkway in Nelson County
5 - WKY Parkway in Hopkins County
6 - Pennyrile Parkway in Hopkins/Christain County
7 - Pennyrile Parkway in Hopkins County
8 - GR Parkway in Ohio County
9 - Audubon Parkway in Daviess County
10 - US 127 in Owen County
11 - US 27 in Pulaski County
12 - US 119 in Pike County

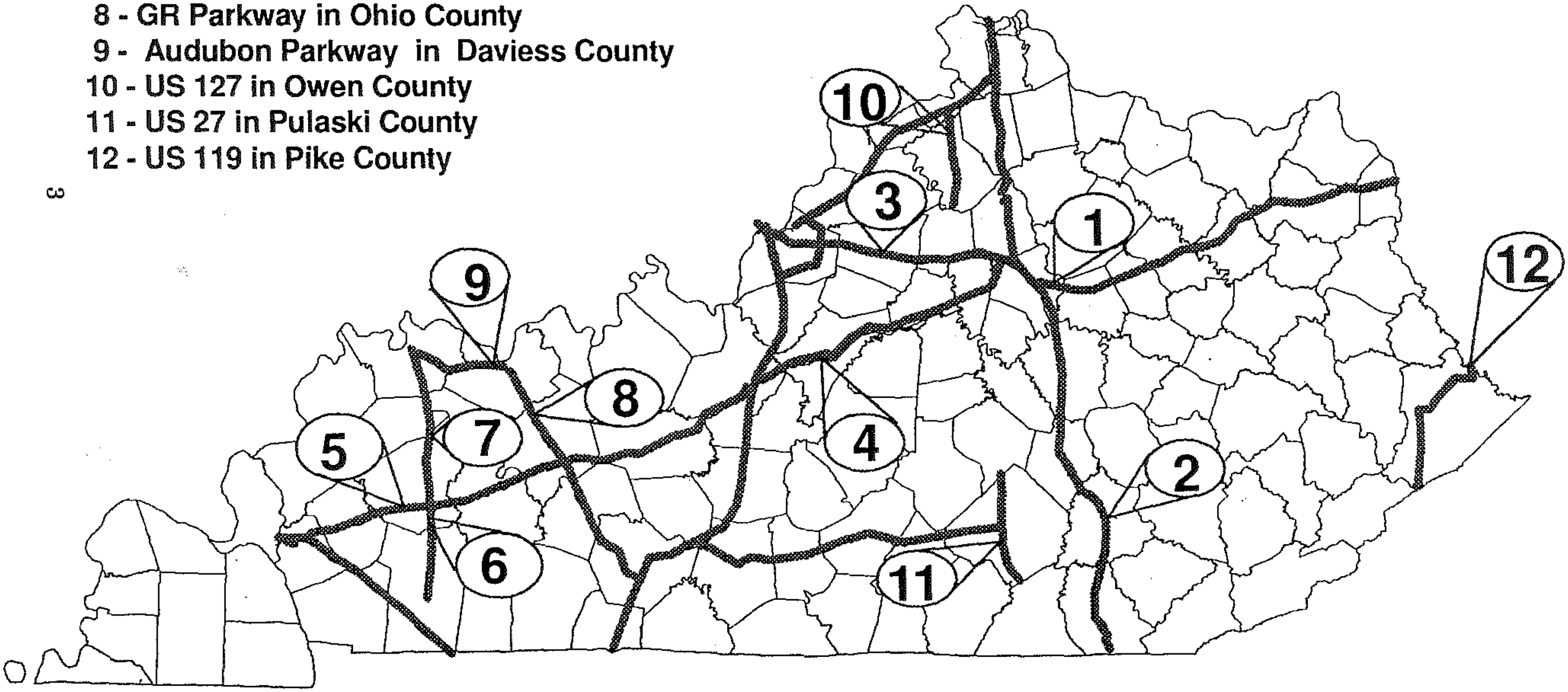

Figure 1. *Locations of PCC sections selected for evaluation.*

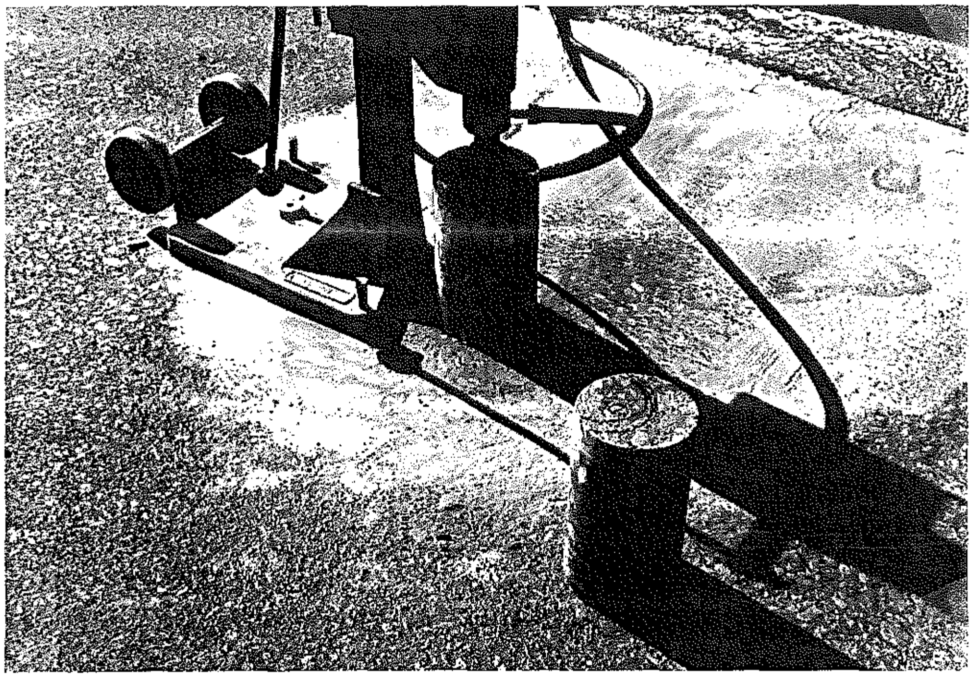

Figure 2. *Core samples were obtained from the PCC pavements.*

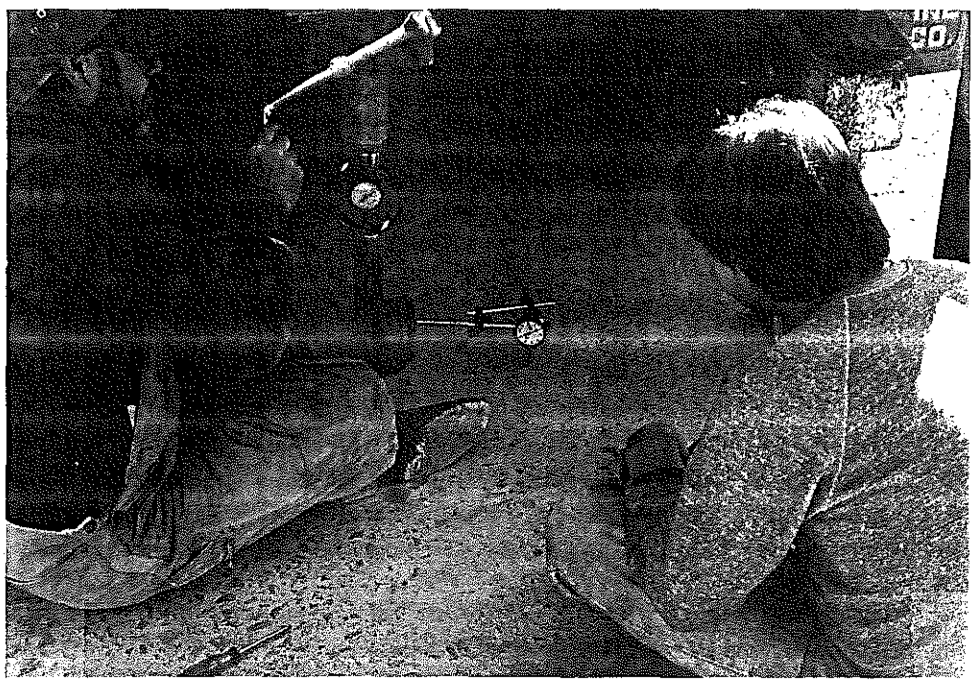

Figure 3. *In-situ California Bearing Ratio tests were performed on the surface of the dense graded aggregate base and the underlying soil subgrade.*

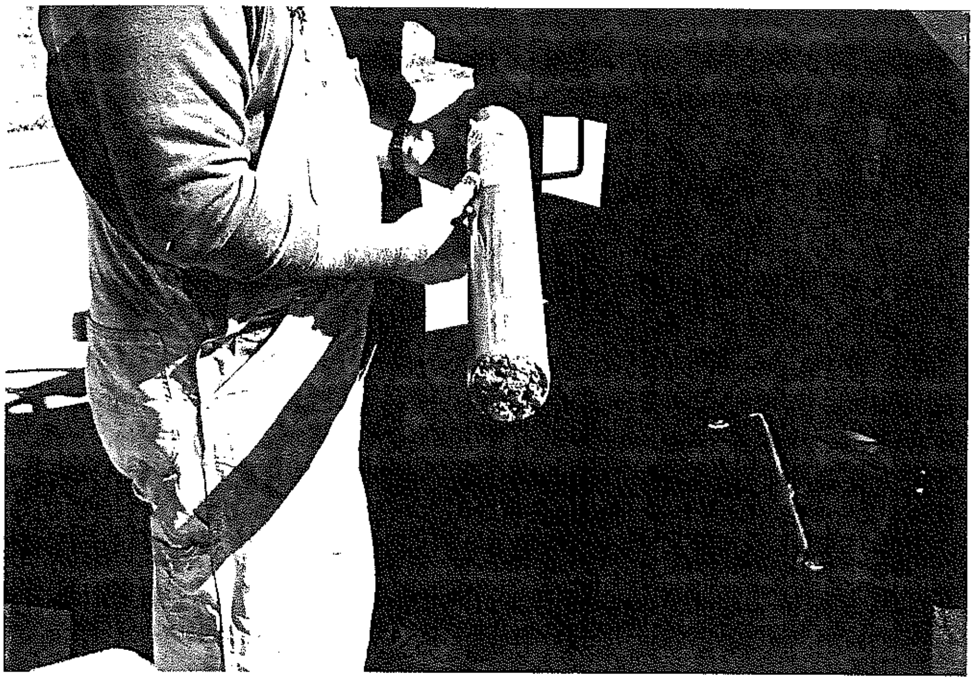

Figure 4. *Undisturbed soil subgrade samples were obtained for laboratory testing.*

Laboratory tests were conducted on the PCC cores, base samples, subgrade samples directly below the base, and subgrade tube samples. The specific tests and sequences were:

PCC Cores

- Core ends faced and capped with sulfur mortar (ASTM C617);
- Compressive strength tests conducted on four cores (ASTM C39); and,
- Static modulus of elasticity tests conducted on another two cores (ASTM C489);

Base Samples

- Moisture content tests conducted (ASTM D2216);
- Minus 75 μm (No. 200 sieve) material tests conducted (ASTM D1140); and,
- Plasticity indices tests conducted (ASTM D4318);

Disturbed Soil Subgrade Samples

- Moisture content tests conducted (ASTM D2216);

Undisturbed Soil Subgrade Samples

- Moisture content tests conducted (ASTM D2216);
- Wet densities of the undisturbed samples determined;
- Unconfined compressive strength tests conducted (ASTM D2166);
- Particle size analysis tests conducted (ASTM D422);
- Specific gravity tests conducted (ASTM D854);
- Plasticity indices tests conducted (ASTM D4318); and,
- Classification of soils performed (ASTM D2487).

DATA PRESENTATION AND FINDINGS

Inventory

The 1993 inventory of Kentucky's Interstate, Parkway, and other Primary routes indicated that the vast majority of the PCC pavements constructed during the past 40 years is confined to the Interstate and Parkway systems.

As noted in Table II, 78% of the 1,215 km (755-mi) Interstate system was originally PCC. Table III indicates that 50% of the 1,040 km (646-mi) Parkway system was originally PCC. These values have been significantly reduced in recent years as substantial mileage of PCC pavement has been overlain with asphaltic concrete (AC). Nevertheless, 890 km (553 mi) of PCC existed as of January 1994 on Kentucky's combined Interstate and Parkway systems, and only 93 km (58 mi) of this was reconstructed PCC pavement.

Appendix A contains information for pavement types by mileposts for each section of each Interstate highway in Kentucky. The left date indicates original construction and dates to the right of the slash marks indicate overlays or major rehabilitation activities. Appendix B contains similar data for the Parkway system.

PCC pavements have been selected infrequently for non-Interstate and non-Parkway routes in recent years. Most of the PCC pavements on these other Primary routes are fairly short in length and located either on approaches to or within urban areas.

Early Designs

The typical Interstate thickness design for the majority of the routes was 250 mm (10 in.) of PCC on 150-mm (6-in.) dense graded aggregate (DGA) base. The first few designs in the early 1960's had only 125 mm (5 in.) DGA base. Joint spacing was 15 m (50 ft) for limestone aggregate. The few sections containing gravel aggregate typically had 7.5-m (25-ft) joint spacing. Welded wire fabric was placed at the mid-depth of the slab. Joints were sawed at 90° to the direction of travel. Joints were sealed with hot-poured asphalt. Dowel bars were used for load transfer at the joints. Continuously reinforced concrete pavement was placed on a total of 13 km (8 mi) of I-71 and I-275; however, performance of the continuously reinforced concrete sections was considered to be inferior.

The typical Parkway thickness design was 225-mm (9-in.) PCC on 100-mm (4-in.) DGA base. Jointing and fabric details were the same as the Interstate designs.

Thickness designs for other Primary (US) routes were typically 200-mm (8-in.) PCC on 100-mm (4-in.) DGA base. Jointing and fabric details were the same as the designs for the Interstates and Parkways.

Later Designs and Actions

After 1976, joint spacings were reduced for new construction. A variable spacing was common, typically 3.7, 4.0, 5.2, 5.5 m (12, 13, 17, 18 ft), averaging about 4.6 m (15 ft). Welded wire fabric was not used. A 90° or a skewed joint pattern was used. Joint sealants were either hot-poured asphalt, neoprene or silicone.

Since 1982, several PCC pavements have been rehabilitated with edge drains. Normally joints were re-sawed and widened and sealed with silicone. Some sections had slabs or portions of slabs replaced during the edge drain installation and the re-jointing operation. Many of these pavements are approaching 30 years of service.

Substantial mileage of PCC pavements has been overlain with AC. Prior to 1982, the AC was placed directly on the PCC pavement. Reflective cracking at the joints was common in a few years. Since 1982, breaking and seating of the PCC pavement prior to overlay with AC has been the common practice.

The original 1,215-km (755-mi) Interstate system had 78% (953 km (592 mi)) of the mileage in PCC pavement. By January 1994, about 40% of that mileage had been overlain with AC, leaving 547 km (340 mi) with a PCC wearing surface.

The original 1,040-km (646-mi) Parkway system had 50% (523 km (325 mi)) of the mileage in PCC pavement. By January 1994, about 33% of that mileage had been overlain with AC, leaving 346 km (215 mi) with a PCC wearing surface.

Since 1991, approximately 32 km (20 mi) of PCC pavement has been diamond ground on I-65, I-75, I-275 and I-471. Ride quality has been substantially improved as a result of diamond grinding.

By January 1994, the average age of the PCC pavements on Kentucky's Interstate and Parkway systems at the time of an AC overlay had been 21 years. The weighted average for the Interstate system was 19.6 years and the Parkway system was 24.6 years. Table IV contains the average age of overlays for Interstates and Parkways that had overlays as of January 1994. With exception of I-71, most of the Interstate and Parkway PCC pavements served the 20-year design life before being overlaid.

The average age of the PCC pavements initially on Kentucky's Interstate and Parkway systems that were still in service as of January 1994 and had not required an overlay had been 24.0 years. The weighted average for the Interstate system was 22.2 years, which included sections of I-24, I-265, I-275, and I-471 constructed rather recently, and the Parkway system was 26.4 years. Table V contains the average age for the original Interstate and Parkway PCC pavements still in service as of January 1994. All had served the 20-year design life.

Recent Designs

Present design practices for PCC pavements have changed substantially from those used during the massive interstate/parkway construction phase of the 1960s and 1970s. Typical thickness design is 280 mm (11 in.) PCC, although the thickness can range from 255 mm (10 in.) for lightly traveled routes to 325 mm (13 in.) for heavy coal-haul routes.

Base thicknesses are typically 200 mm (8 in.), consisting of a 100-mm (4-in.) treated drainage layer over a 100-mm (4-in.) DGA base which has a lower percentage of minus 75

μm (No. 200 sieve) fines than previously used. Longitudinal drains are installed along the shoulder.

Distances between joints are random (variable), averaging about 4.5 m (15 ft) with a range of 3.5 m (12 ft) to 5.5 m (18 ft). Joints are typically skewed.

Welded wire fabric is not used. The PCC is non-reinforced. Dowel bars are still used for load transfer at the joints.

Neoprene is the typical choice for joint sealing for new construction and silicone is normally selected for joint repair.

Table VI shows the general comparison of the design details used during the 1960s and 1970s and those in the current use. The only common design parameter is the use of dowel bars at the joints for load transfer. All other basic design parameters have changed.

Pavement and Laboratory Tests

Table VII contains average values for each project for the pavement and laboratory tests. Appendix C contains more detailed information in summary form for each project including ranges of values. Individual test results on each sample are given in Appendix D.

PCC Pavement Cores

Thicknesses are very close to original designs. Average for the Interstate projects is 254 mm (10.0 in.); Parkway projects, 231 mm (9.1 in.); and the three U.S. route projects, 211 mm (8.3 in.). The range in values is small for the individual Interstate and Parkway projects.

Compressive strengths vary considerably ranging from 39.6 to 57.2 MPa (5,740 to 8,300 psi), while averaging 46.0 MPa (6,680 psi). These values greatly exceed the accepted design value of 24.1 MPa (3,500 psi).

Static modulus of elasticity values likewise vary considerably ranging from 25.7 to 35.0 GPa (3.73 to 5.08 million psi), while averaging 30.8 GPa (4.47 million psi). The average is commensurate with the average compressive strength value. An estimate of the modulus of elasticity (E) value may be obtained using the following accepted relationship:

$$E = 4.73 \sqrt{f'_{cyl}} \quad (\text{or } E = 57{,}000 \sqrt{f'_{cyl}})$$

where E is in GPa (or psi) and f'_{cyl} is the compressive strength in MPa (or psi) determined through standard tests. Inserting the average compressive strength value obtained from tests on the PCC cores of 46.0 MPa (6,680 psi) yields an estimated E value of 32.1 GPa (4.66 x 10^6 psi), close to the measured average of 30.8 GPa (4.47 x 10^6 psi).

Base Samples

The base material directly under the concrete is limestone dense graded aggregate on 11 of the projects, the only exception being a sandstone base on the US 119 (Pike County) project. Thicknesses are very close to original designs; averaging 150 mm (5.9 in.) for the Interstate projects, 100 mm (4.0 in.) for the Parkway projects and 94 mm (3.7 in.) for the three U.S. route projects.

In-situ CBR values ranges from 8 to 20 (excluding the sandstone base project) with an average of 13. These values are significantly lower than those assumed in structural design calculations.

Average moisture contents range from 4.7 to 9.3%, averaging 6.4%. These are typical for obtaining maximum compacted densities.

The minus 75 μm (No. 200 sieve) values range from 9.2 to 17.0%, averaging 12.2%. Current specifications limit this value to a maximum of 10%, with acceptable values between 2 and 10%. At the time these pavements were constructed, the specification was 12 to 15 %.

Disturbed Soil Subgrade Samples

The in-situ CBR values range from 2 to 9, (excluding the sandstone project) with an average of 4.0. This is the value most often assumed for design purposes at that time, but now would require subgrade modification prior to construction.

Moisture contents range from 13.8 to 26.3%, (excluding the sandstone project) with an average of 19.7%. The values are reasonably high and indicate subgrades in weakened conditions.

Undisturbed Soil Subgrade Samples

The unconfined compressive strengths of samples extracted from Shelby Tubes range from 92 to 280 kPa (13.4 to 40.6 psi) averaging 184 kPa (26.7 psi).

Moisture contents range from 13.3 to 28.0% (excluding the sandstone project) with an average of 19.0%. These are essentially the same as those obtained from samples directly below the base.

Wet densities vary considerably reflecting the influence of soil type, prevailing moisture content, and relative compaction.

The subgrade soils generally classify as clay with low plasticity (CL). On four projects, the soil type varies considerably at the different test sites. The sandstone project is an exception.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The objective of this research study was to determine common factors contributing to the superior performance of selected sections of PCC pavements in Kentucky. An extensive inventory of the highway system was conducted followed by selection of 12 projects for subsequent in-situ pavement and laboratory testing.

Performance of PCC pavements on Kentucky's Interstate and Parkway systems and other Primary routes has varied considerably; however, the majority has performed beyond their design lives. The primary source of PCC pavement distress observed was transverse joint deterioration and faulting. This combination generally results in substandard ride quality. The overall concrete quality is quite satisfactory, except in the vicinity of the distressed joints. Aggregate popouts and small alligator (or crazing) cracks were evident on several sections, but neither appears detrimental.

Intermediate span cracking was the only significant type of cracking observed. These were generally at mid-span or occasionally at third points. Faulting of intermediate span cracks was observed on a portion of the sections.

The basic design parameters, excepting pavement thickness, for the 12 projects selected for detailed evaluations were essentially the same -- dowel bars for joint load transfer, hot-poured asphalt joint filler, welded wire fabric reinforcement, 90° jointing pattern, 15-m (50-ft) joint spacing and DGA limestone base with high fines content.

PCC slab and DGA base thicknesses were common for the particular route classifications, i.e., 250-mm (10-in.) PCC/150-mm (6-in.) base for Interstates, 225-mm (9-in.) PCC/100-mm (4-in.) base for Parkways and 200-mm (8-in.) PCC/100-mm (4-in.) base for other Primary routes. Measurements of the extracted PCC cores and base thicknesses confirmed conformance to original design specifications.

The PCC compressive strengths and moduli of elasticity greatly exceeded design parameters for all projects. Obviously, this commonality would contribute in a positive manner to the superior performance of the pavements.

The moisture contents of the DGA bases were typical and therefore have no particular influence. However, the in-situ CBR values were very low and the minus 75 μm (No. 200 sieve) material values were very high; which would be expected to impact negatively to the superior performance of the pavements.

Subgrade moisture contents were quite high, in-situ CBR values low and unconfined compressive strengths low; which would contribute in a negative manner to the performance of the pavements. Present pavement designs would require subgrade modification prior to pavement construction for most of the sections evaluated.

Substantial mileage of the original PCC Interstate and Parkway designs is still performing satisfactorily. However, it is conceivable that if the design presently in use had been specified during the 1960s and 1970s, an even higher percentage of the original PCC pavements would be serving satisfactorily with minimum mileage requiring overlays or reconstruction except for geometric improvements. The designs in use today -- which presumably are superior to the designs for the 1960s and 1970s--have thicker PCC slabs, drainable bases, shorter joint spacings, skewed joints, and improved joint-filler materials. Also, certain mix design and production parameters have changed, such as improved screening of potentially reactive aggregates, acceptance of pozzolans and tighter standards on mix variations. It is logical to anticipate that the improved designs in common use today will provide a consistent 30-year or longer pavement life, with the only maintenance consisting of joint resealing and diamond grinding to restore surface smoothness and ride quality.

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TABLE I. PCC Pavement Sections Selected for Study

Route	County	Milepost	Date Constructed
Interstate 64	Fayette	82.32- 89.48	1963/87*
Interstate 75	Laurel	40.70-46.95	1969/84***
Interstate 64	Shelby	38.18-43.33	1961/84*
Bluegrass Parkway	Nelson	24.24-32.60	1965/84***
Western KY Parkway	Hopkins	25.64-35.50	1963
Pennyrile Parkway	Hopkins/Christian	22.48-29.91	1968/93***
Pennyrile Parkway	Hopkins	45.00-53.11	1968
Green River Parkway	Ohio	32.64-42.27	1972/87**
Audubon Parkway	Daviess	15.88-23.46	1970/87**
US 127	Owen	16.96-24.69	1973
US 27	Pulaski	10.48-15.46	1960
US 119	Pike	24.81-29.75	1982

* Edge Drains   ** Edge Drains and Joint Seals   *** Edge Drains, PCC Repairs, and Joint Seals

TABLE II. Kentucky Interstate Highway System, Initial and Present Pavement Types

KENTUCKY INTERSTATES - PAVEMENT TYPE (km [mi])							
	Initially			Presently			
Interstate	AC/DGA	FDAC	PCC	AC/DGA	AC/PCC	FDAC	PCC**
I-24	71 [44]	0	77 [48]	71 [44]	0	0	77 [48]
I-64	109 [68]	0	182 [113]	109 [68]	58 [36]	0	124 [77]
I-65	32 [20]	3 [2]	183 [114]	32 [20]	58 [36]	3 [2]	126 [78]
I-71	0	0	126 [78]	0	126 [78]	0	0
I-75	43 [27]	0	264 [164]	43 [27]	159 [99]	0	105 [65]
I-264	3 [2]	0	34 [21]	0	5 [3]	0	32 [20]
I-265	0	0	40 [25]	0	3 [2]	0	37 [23]
I-275	0	0	39 [24]	0	0	0	39 [24]
I-471	0	0	8 [5]	0	0	0	8 [5]
Total km [mi]	258 [161]	3 [2]	953 [592]	255 [159]	409 [254]	3 [2]	548 [340]
%	22%	0%	78%	21%	34%	0%	45%

*Multiply by ≈4.05 to convert to lane kilometers [miles]
**Includes 37 km (23 mi) [148 lane kilometers (92 lane miles)] of PCC Grinding
Includes 183 km (114 mi) [734 lane kilometers (456 lane miles)] of PCC Repairs — Prepared 1/94

TABLE III. Kentucky's Parkway Highway System, Initial and Present Pavement Types

KENTUCKY PARKWAYS - PAVEMENT TYPE (km [mi])*							
	Initially			Presently			
Parkway	AC/DGA	FDAC	PCC	AC/DGA	AC/PCC	FDAC	PCC**
Mountain***	51 [32]	0	69 [43]	51 [32]	63 [39]	0	6 [4]
Western KY	74 [46]	0	146 [91]	74 [46]	68 [42]	0	79 [49]
Bluegrass	56 [35]	0	56 [35]	56 [35]	23 [14]	0	34 [21]
Pennyrile	0	0	114 [71]	0	26 [16]	0	90 [56]
Aububon	0	0	37 [23]	0	0	0	37 [23]
Daniel Boone***	40 [25]	16 [10]	39 [24]	40 [25]	0	16 [10]	39 [24]
Green River	40 [25]	11 [7]	61 [38]	40 [25]	0	11 [7]	61 [38]
Jackson Purchase	84 [52]	0	0	84 [52]	0	0	0
Cumberland	56 [35]	87 [54]	0	56 [35]	0	87 [54]	0
Total km [mi]	401 [250]	114 [71]	522 [325]	401 [250]	180 [111]	114 [71]	346 [215]
%	39%	11%	50%	39%	17%	11%	33%

*Multiply miles by ≈3.9 to convert to lane kilometers [miles]
**Includes 154 km [96 mi] (618 lane kilometers [384 lane miles]) of PCC Repairs
***Portions are 2- and 3-lanes

Prepared 1/94

TABLE IV. Average Age (Years) of PCC Pavements at the Time of An Asphalt Overlay

Route	Kilometers [Miles]	Average Age at Overlay (Years)
I-64	58 [36]	21
I-65	58 [36]	21
I-71	126 [78]	15
I-75	159 [99]	22
I-264	5 [3]	21
I-265	3 [2]	30
Average for Interstates		19.6 years
MP	63 [39]	26
WKP	68 [42]	26
BGP	22 [14]	21
PRP	26 [16]	22
Average for Parkways		24.6 Years

TABLE V. Average Age (Years) of Original PCC Pavements Still in Service

Route	Kilometers [Miles]	Average Age (Years)
I-24*	77 [48]	17
I-64	113 [70]	25
I-65	72 [45]	27
I-75	93 [58]	27
I-264	13 [8]	24
I-265*	37 [23]	12
I-275*	32 [20]	14
I-471*	8 [5]	14
Average for Interstates		22.2 years
MP	6 [4]	32
WKP	85 [53]	31
BGP	34 [21]	29
PRP	88 [55]	27
AUDP	37 [23]	24
DBP	39 [24]	21
GRP	60 [37]	22
Average for Parkways		26.4 Years
*More recent construction		

TABLE VI. General Comparison of the Design Details for PCC Pavements Used During the 1960s and 1970s and Those in Common Use Today

Factor	1960s & 1970s	Currently
PCC Slab Thickness	200 mm (8 in.) Primary (standard) 225 mm (9 in.) Parkway (standard) 250 mm (10 in.) Interstate (standard)	250 mm to 325 mm (10 in. to 13 in.) (variable depending on traffic, etc.), 275 mm (11 in.) normal
Base Thickness	100 mm (4 in.) Primary (standard) 100 mm (4 in.) Parkway (standard) 125 mm to 150 mm (5 in. to 6 in. Interstate (standard)	200 mm (8 in.) (consisting of 100-mm (4-in.) drainable base and 100 mm (4 in.) of DGA)
Base Material	Dense graded aggregate (high % of fines)	Stabilized, drainable base on a DGA base (lower % of fines)
Joint Spacing	15.2 m (50 ft) for limestone aggregate (most) 7.6 m (25 ft) for gravel aggregate	Random (variable) spacing, averaging 4.6 m (15 ft)
Joint Pattern	90°	Skewed
Reinforcement	Welded wire fabric	None
Joint Filler	Hot-pour asphalt	Neoprene or Silicone
Joint Load Transfer	Dowel bars	Dowel bars
Mix Parameters	— —	More screening for potentially active aggregate, fly ash permitted
Mix Production	—	Tighter standards on mix variations

Table VII. Pavement and Laboratory Test Results

PROJECT IDENTIFICATION	AGE AT TEST (YEARS)	PORTLAND CEMENT CONCRETE CORES			DENSE GRADED AGGREGATE*			
		AVERAGE THICKNESS (mm) [in.]	AVERAGE COMPRESSIVE STRENGTH (MPa) [psi]	AVERAGE MODULUS OF ELASTICITY (GPa) [psi x 10^6]	AVERAGE THICKNESS (mm) [in.]	AVERAGE MOISTURE CONTENT (%)	AVERAGE IN-SITU CBR	AVERAGE MINUS NO. 200 SIEVE SIZE (%)
I-64; FAYETTE	32	250 [10.0]	51.2 [7,430]	35.0 [5.08]	155 [6.2]	6.1	20	10.6
I-75; LAUREL	26	250 [10.0]	40.0 [5,800]	31.2 [4.52]	135 [5.4]	6.1	12	9.2
I-64; SHELBY	34	250 [10.0]	47.0 [6,810]	31.2 [4.53]	150 [6.0]	6.2	16	10.4
BGP/NELSON	30	225 [9.0]	57.2 [8,300]	35.0 [5.08]	105 [4.2]	5.9	14	11.2
WKP/HOPKINS	32	230 [9.2]	48.7 [7,060]	32.2 [4.67]	108 [4.3]	7.9	9	12.7
PRP/HOPKINS & CHRISTIAN	27	230 [9.2]	48.7 [7,060]	30.2 [4.38]	88 [3.5]	4.7	11	12.4
PRP/HOPKINS	27	225 [9.0]	39.6 [5,750]	28.1 [4.07]	103 [4.1]	5.7	12	12.3
GRP/OHIO	23	225 [9.0]	45.4 [6,580]	31.6 [4.58]	103 [4.1]	5.4	17	10.6
AUP/DAVIESS	25	225 [9.0]	39.6 [5,740]	25.7 [3.73]	100 [4.0]	5.8	16	17.0
US127/OWEN	23	205 [8.2]	41.3 [5,990]	28.3 [4.10]	88 [3.5]	9.3	8	11.3
US27/PULASKI	35	188 [7.5]	51.3 [7,440]	33.4 [4.85]	93 [3.7]	8.1	9	12.1
US119/PIKE	13	230 [9.2]	42.3 [6,140]	27.9 [4.05]	98 [3.9]	5.6	24	16.9
RANGE	13 - 34	188 - 250 [7.5 - 10.0]	39.6 - 57.2 [5,740 - 8,300]	25.7 - 35.0 [3.73 - 5.08]	88 - 155 [3.5 - 6.2]	4.7 - 9.3	8- 24	9.2 - 17.0
AVERAGE	27	250 [10.0] Int. 228 [9.1] Pkwy 208 [8.3] US	46.1 [6,680]	30.8 [4.47]	5.9 Int. 4.0 Pkwy 3.7 US	6.4	14(13)**	12.2

* All base samples were non-plastic   ** Excluding sandstone base project

Table VII (Continued)

PROJECT IDENTIFICATION	SUBGRADE SAMPLES		SUBGRADE TUBE SAMPLES (0-175 mm) [0 to 7 in.]			
	AVERAGE MOISTURE CONTENT BELOW DGA (%)	AVERAGE IN-SITU CBR	AVERAGE MOISTURE CONTENT (%)	AVERAGE UNCONFINED STRENGTH (kPa) [psi]	AVERAGE WET DENSITY (kg/m^3) [pcf]	GENERAL SOIL CLASSIFICATION
I-64; FAYETTE	24.8	2	23.2	240.6 [34.9]	2,119 [132.3]	CL
I-75; LAUREL	15.5	3	15.1	157.2 [22.8]	2,223 [138.8]	VARIABLE
I-64; SHELBY	22.8	3	23.4	156.5 [22.7]	2,102 [131.2]	CL
BGP/NELSON	23.6	2	22.2	161.3 [23.4]	2,135 [133.3]	CL
WKP/HOPKINS	21.1	4	16.2	131.0 [19.0]	2,199 [137.3]	VARIABLE
PRP/HOPKINS & CHRISTIAN	14.8	4	18.3	233.0 [33.8]	2,191 [136.8]	CL
PRP/HOPKINS	15.2	6	15.0	248.2 [36.0]	2,211 [138.0]	CL
GRP/OHIO	13.8	7	11.4	200.6 [29.1]	2,223 [138.8]	VARIABLE
AUP/DAVIESS	14.5	9	13.3	279.9 [40.6]	2,182 [136.2]	CL
US127/OWEN	24.6	2	22.6	92.4 [13.4]	2,138 [133.5]	CL
US27/PULASKI	26.3	2	28.0	128.9 [18.7]	1,978 [123.5]	CH
US119/PIKE	8.1	13	9.8	NA	NA	SM-SC
RANGE	8.1 - 26.3	2 - 13	9.8 - 28.0	92.4 - 279.9 [13.4 - 40.6]	1,978 - 2,223 [123.5 - 138.8]	
AVERAGE	18.8 (19.7)**	4.8 (4.0)**	18.2 (19.0)**	184.1 [26.7]	2,154 [134.5]	

* All base samples were non-plastic ** Excluding sandstone base project

APPENDIX A

PAVEMENT TYPES FOR EACH SECTION OF EACH INTERSTATE HIGHWAY IN KENTUCKY AS OF DECEMBER 1993

INTERSTATE I-24 - PAVEMENT TYPE									
			Initially			Presently			
			AC	FDAC	PCC	AC/DGA	AC/PCC	FDAC	PCC
County	Mileposts	Dates	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]
McCracken	1.00-4.33	74/89	5.36 [3.33]			5.36 [3.33]			
"	4.33-10.32	78/90	9.64 [5.99]			9.64 [5.99]			
"	10.32-13.80	78/90	5.60 [3.48]			5.60 [3.48]			
"	13.80-16.16	78/90	3.80 [2.36]			3.80 [2.36]			
McCracken/Marshall	16.60-22.04	77/85/93	9.46EB [5.88]			9.46 [5.88EB]			
"	16.60-22.04	77/83/93	9.46WB [5.88]			9.46WB [5.88]			
Marshall	22.04-26.56	77/86	7.27 [4.52]			7.27 [4.52]			
"	26.56-27.55	79/90/93	1.59 [0.99]			1.59 [0.99]			
"	27.55-29.14	79/90/93	2.56 [1.59]			2.56 [1.59]			
Livingston	29.54-30.55	79/90/93	1.63 [1.01]			1.63 [1.01]			
"	30.55-33.88	80/91	5.36 [3.33]			5.36 [3.33]			
Lyon	33.88-39.51	79/87	9.06 [5.63]			9.06 [5.63]			
"	39.51-41.60	80/87	3.36 [2.09]			3.36 [2.09]			
"	41.60-45.20	80/87	5.79 [3.60]			5.79 [3.60]			
Lyon-Caldwell	45.20-55.63	80			16.78 [10.43]				16.78 [10.43]
Caldwell-Trigg	55.63-65.35	80*			15.64 [9.72]				15.64 [9.72]
Trigg-Christian	65.35-76.07	75/85**			17.25 [10.72]				17.25 [10.72]
Christian	76.07-85.56	75/85**			15.27 [9.49]				15.27 [9.49]
"	85.56-93.30	75/85**			12.45 [7.74]				12.45 [7.74]
Totals			70.47 [43.80]	0	77.39 [48.10]	70.47 [43.80]	0	0	77.39 [48.10]

*Edge Drains

**Edge Drains, PCC Repairs, Joint Seals

INTERSTATE I-64 - PAVEMENT TYPE									
			Initially			Presently			
			AC/DGA	FDAC	PCC	AC/DGA	AC/PCC	FDAC	PCC
County	Mileposts	Dates	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]
Jefferson	0.72-1.34	69/88*/94			1.00 [0.62]				1.00 [0.62]
"	1.97-2.06	70/82/94			0.14 [0.09]				0.14 [0.09]
"	2.25-3.26	71/88*/94			1.63 [1.01]				1.63 [1.01]
"	4.95-5.50	70/85			0.88 [0.55]		0.88 [0.55]		
"	5.50-6.45	70/84BS*			1.53 [0.95]		1.53 [0.95]		
"	6.45-8.20	68/84BS*			2.82 [1.75]		2.82 [1.75]		
"	8.20-9.46	70			2.03 [1.26]				2.03 [1.26]
"	9.46-12.58	69			5.02 [3.12]				5.02 [3.12]
"	12.58-14.89	64/89BS/94			3.12 [2.31]				3.12 [2.31]
"	14.89-18.86	64/88BS			6.39 [3.97]		6.39 [3.97]		
Jefferson/Shelby	18.86-25.09	61/84BS*			10.02 [6.23]		10.02 [6.23]		
Shelby	25.09-31.84	61/84BS*			10.86 [6.75]		10.86 [6.75]		
"	31.84-38.18	62/84 BS*			10.20 [6.34]		10.20 [6.34]		
"	38.18-43.33	61/84*			8.29 [5.15]				8.29 [5.15]
Shelby-Franklin	43.33-47.76	62/80/88			7.13 [4.43]		7.13 [4.43]		
Franklin	47.76-53.12	62/80/88			8.62 [5.36]		8.62 [5.36]		
"	53.12-57.90	62/85**			6.76 [4.20]				6.76 [4.20]
Franklin-Woodford	57.90-65.27	72/91*			11.86 [7.37]				11.86 [7.37]
Woodford-Scott	65.27-68.55	73/91*			5.28 [3.28]				5.28 [3.28]
Scott-Fayette	68.55-75.20	73/91*			10.70 [6.65]				10.70 [6.65]
I-64 combines with I-75 for approximately 9.25 km (5.75 mi) in Fayette County									
Fayette	80.95-82.32	81*			2.20 [1.37]				2.20 [1.37]
"	82.32-89.48	63/87*			11.16 [7.16]				11.16 [7.16]
Clark	89.48-94.23	63/73/84	7.64 [4.75]			7.64 [4.75]			
"	94.23-101.74	61/73/84	12.08 [7.51]			12.08 [7.51]			
"	101.74-104.26	61/73/84	4.05 [2.52]			4.05 [2.52]			
Montgomery	104.26-112.30	61/73/84	12.94 [8.04]			12.94 [8.04]			
Montgomery-Bath	112.30-123.02	68/84**			16.60 [10.32]				16.60 [10.32]
Bath	123.02-128.96	68/84**			9.56 [5.94]				9.56 [5.94]
Rowan	128.96-137.28	68/84**			13.39 [8.32]				13.39 [8.32]
"	137.28-146.10	69/84**			14.19 [8.82]				14.19 [8.82]
Rowan-Carter	146.10-154.22	69/82	13.07 [8.12]			13.07 [8.12]			
Carter	154.22-161.45	69/82	11.63 [7.23]			11.63 [7.23]			
"	161.45-168.50	68/82	11.34 [7.05]			11.34 [7.05]			
"	168.50-171.61	69/82	5.00 [3.11]			5.00 [3.11]			
"	171.61-180.81	73/82	14.80 [9.20]			14.80 [9.20]			
Boyd	180.81-185.47	64/81/90	7.50 [4.66]			7.50 [4.66] SAMI			
"	185.47-191.30	64/81/90	9.38 [5.83]			9.38 [5.83] SAMI			
	Totals		109.44 [68.02]	0	182.32 [113.31]	109.44 [68.02]	58.44 [36.32]	0	123.88 [76.99]

*Edge Drains
**Edge Drains, PCC Repairs, Joint Seals

INTERSTATE I-65 - PAVEMENT TYPE									
			Initially			Presently			
			AC/DGA	FDAC	PCC	AC/DGA	AC/PCC	FDAC	PCC
County	Mileposts	Dates	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]
Simpson	0.00-1.98	69/87*			3.19 [1.98]				3.19 [1.98]
"	1.98-12.81	65/87*			17.43 [10.83]				17.43 [10.83]
Simpson-Warren	12.81-22.35	65/82			15.35 [9.54]		15.35 [9.54]		
Warren	22.35-28.01	66/87*			9.11 [5.66]				9.11 [5.66]
"	28.01-33.00	66/87*			8.03 [4.99]				8.03 [4.99]
"	33.00-35.56	66/87*			4.12 [2.56]				4.12 [2.56]
"	35.56-42.61	69/87*			11.34 [7.05]				11.34 [7.05]
Warren/Edmonson/Barren	42.61-46.88	69/87*			6.87 [4.27]				6.87 [4.27]
Barren	46.88-51.90	68/87*			8.08 [5.02]				8.08 [5.02]
Barren-Hart	51.90-58.20	68/88BS			10.14 [6.30]		10.14 [6.30]		
Hart	58.20-61.20	67/87*			4.83 [3.00]				4.83 [3.00]
"	61.20-64.15	67/84	4.75 [2.95]			4.75 [2.95]			
"	64.15-70.41	65/84	10.07 [6.26]			10.07 [6.26]			
Hart-Larue	70.41-76.10	65/84	9.16 [5.69]			9.16 [5.69]			
Larue	76.10-78.66	63/84*BS			4.12 [2.56]		4.12 [2.56]		
Hardin	78.66-85.58	59/84*BS			11.13 [6.92]		11.13 [6.92]		
"	85.58-90.58	59/84*BS			8.05 [5.00]		8.05 [5.00]		
"	90.58-93.69	85/86	5.00 [3.11]			5.00 [3.11]			
"	93.69-95.12	84/86	2.30 [1.43]			2.30 [1.43]			
"	95.12-97.58	83/86/93		3.96 [2.46]				3.96 [2.46]	
"	97.58-101.98	83/86G			7.08 [4.40]				7.08 [4.40]
Hardin-Bullitt	101.98-103.57	85			2.56 [1.59]				2.56 [1.59]
Bullitt	103.57-105.18	85			2.59 [1.61]				2.59 [1.61]
"	105.18-107.26	85			3.35 [2.08]				3.35 [2.08]
"	107.26-110.71	87			5.55 [3.45]				5.55 [3.45]
"	110.71-115.82	87			8.22 [5.11]				8.22 [5.11]
"	115.82-118.68	86			4.60 [2.86]				4.60 [2.86]
"	118.68-121.38	86			4.34 [2.70]				4.34 [2.70]
"	121.38-123.18	86			2.90 [1.80]				2.90 [1.80]
Jefferson	123.18-126.12	87			4.73 [2.94]				4.73 [2.94]
"	126.12-127.57	87			2.33 [1.45]				2.33 [1.45]
Jefferson	127.57-128.13	89	0.90 [0.56]			0.90 [0.56]			
"	128.13-128.84	89			1.14 [0.71]				1.14 [0.71]
"	128.84-131.37	88			4.07 [2.53]				4.07 [2.53]
"	131.37-136.72	71/81/86			8.61 [5.35]		8.61 [5.35]		
	Totals		31.18 [20.00]	3.96 [2.46]	183.84 [114.26]	32.18 [20.00]	57.39 [35.67]	3.96 [2.46]	126.45 [78.59]

*Edge Drains

Note: New alignment Sta 90.58-131.37

INTERSTATE I-71 - PAVEMENT TYPE							
			Initially		Presently		
			AC/DGA	PCC	AC/DGA	AC/PCC	PCC
County	Mileposts	Dates	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]
Jefferson	0.08-1.75	67/88BS*		2.69 [1.67]		2.69 [1.67]	
"	1.75-5.55	68/88BS*		6.12 [3.80]		6.12 [3.80]	
"	5.55-9.06	68/84BS*		5.65 [3.51]		5.65 [3.51]	
Jefferson-Oldham	9.06-21.38	69/84BS*		20.10 [12.49]		20.10 [12.49]	
Oldham-Henry	21.38-27.71	69/84BS*		10.19 [6.33]		10.19 [6.33]	
Henry	27.71-37.18	69/84BS*		15.24 [9.47]		15.24 [9.47]	
Henry-Trimble-Carroll	37.18-44.08	68/82		11.10[6.90]**		11.10 [6.90]	
Carroll-Gallatin	44.08-56.67	68/84BS*		20.26 [12.59]		20.26 [12.59]	
Gallatin	56.67-61.77	68/82BS***		8.21 [5.10]		8.21 [5.10]	
"	61.77-69.89	68/82BS		13.07 [8.12]		13.07 [8.12]	
Boone	69.89-77.72	68/84BS*		12.60 [7.83]		12.60 [7.83]	
	Totals		0	125.22 [77.81]	0	125.22 [77.81]	0

*Edge Drains
**CRCP
***Research Test Section, Different Size Breaks

INTERSTATE I-75 - PAVEMENT TYPE							
			Initially		Presently		
			AC/DGA	PCC	AC/DGA	AC/PCC	PCC
County	Mileposts	Dates	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]
Whitley	0.00-0.48	62/84		0.77 [0.48NB]		0.77 [0.48NB]	
"	0.00-0.48	62/84**		0.77 [0.48SB]			0.77 [0.48SB]
"	0.48-3.68	62/84**		5.15 [3.20]			5.15 [3.20]
"	3.68-10.55	65/84**		11.06 [6.87]			11.06 [6.87]
"	10.55-15.46	66/84**		7.90 [4.91]			7.90 [4.91]
"	15.46-20.20	68/84**		7.63 [4.74]			7.63 [4.74]
"	20.20-21.88	68/84**/91BS		2.70 [1.68]		2.70 [1.68NB]	
"	21.88-23.38	68/84S*		2.41 [1.50]		2.41 [1.50NB]	
"	23.38-24.66	68/86BS*		2.06 [1.28]		2.06 [1.28NB]	
"	20.20-24.66	68/84**		7.18 [4.46SB]			7.18 [4.46SB]
Whitley-Laurel	24.66-28.85	68/84**		6.74 [4.19]			6.74 [4.19]
Laurel	28.85-34.40	69/84**/91G		8.93 [5.55]			8.93 [5.55G]
"	34.40-40.70	69/84**/91G		10.14 [6.30]			10.14 [6.30G]
"	40.70-46.95	69/84**		10.06 [6.25]			10.06 [6.25]
"	46.95-48.95	69/84**		3.22 [2.00]			3.22 [2.00]
"	48.95-50.77	69/84		2.93 [1.82]		2.93 [1.82]	
Rockcastle	50.77-55.80	69/78/90	8.10 [5.03]		8.10 [5.03]		
"	55.80-58.95	69/78/90	5.07 [3.15]		5.07 [3.15]		
"	58.95-62.01	68/78/90	4.92 [3.06]		4.92 [3.06]		
"	62.01-65.22	68/78/90	5.17 [3.21]		5.17 [3.21]		
"	65.22-68.31	68/88BS*		4.97 [3.09]		4.97 [3.09]	
"	68.31-70.20	67/88BS*		3.04 [1.89]		3.04 [1.89]	
Rockcastle-Madison	70.20-75.52	67/88BS*		8.56 [5.32]		8.56 [5.32]	
Madison	75.52-77.00	66/88BS*		2.38 [1.48]		2.38 [1.48]	
"	77.00-84.66	66/89BS*		12.33 [7.66]		12.33 [7.66]	
"	84.66-87.32	66/89BS*		4.28 [2.66]		4.28 [2.66]	
"	87.32-89.80	64/72/84	3.99 [2.48]		3.99 [2.48]		
"	89.80-97.54	62/72/84	12.46 [7.74]		12.46 [7.74]		
Fayette	97.54-100.32	63/72/84	4.47 [2.78]		4.47 [2.78]		
"	100.32-103.89	63/89*		5.75 [3.57]			5.75 [3.57]
"	103.89-110.25	64/89*		10.24 [6.36]			10.24 [6.36]
Fayette	110.25-111.82	81*/94		2.53 [1.57]			2.53 [1.57]
"	111.82-117.80	64/81		9.62 [5.98]		9.62 [5.98]	
Fayette-Scott	117.80-122.29	63/86*/92BS		7.23 [4.49]		7.23 [4.49]	
Scott	122.29-126.83	63/86*/92BS		7.31 [4.54]		7.31 [4.54]	
"	126.83-130.25	62/86*/93BS		5.50 [3.42]		5.50 [3.42]	
"	130.25-134.08	62/86*/93BS		6.16 [3.83]		6.16 [3.83]	
"	134.08-136.47	62/86*/94BS		3.85 [2.39]		3.85 [2.39]	
"	136.47-138.00	63/86*/94BS		2.46 [1.53]		2.46 [1.53]	
"	138.00-143.24	63/84*BS		8.43 [5.24]		8.43 [5.24]	
Grant	143.24-154.47	63/84*BS		18.07 [11.23]		18.07 [11.23]	

"	154.47-158.54	62/85*BS		6.55 [4.07]		6.55 [4.07]	
"	158.54-165.79	61/85*BS		11.67 [7.25]		11.67 [7.25]	
Grant-Kenton-Boone	165.79-173.50	61/78/85*BS		12.41 [7.71]		12.41 [7.71]	
Boone	173.50-179.20	61/78/86/ 93*BS		9.17 [5.70]		9.17 [5.70]	
"	179.20-180.00	61/78/86/89		1.29 [0.80]		1.29 [0.80]	
"	180.00-182.46	61/80/86BS/89		3.96 [2.46]		3.96 [2.46]	
"	182.46-183.18	62/80/85/93		1.16 [0.72]		1.16 [0.72]	
Boone-Kenton	183.18-184.72	78		2.48 [1.54]			2.48 [1.54]
Kenton	184.72-187.95	62/76/80/90/93		5.20 [3.23]		5.20 [3.23]	
"	187.95-191.20	90 (Temporary)***		5.23 [3.25]			5.23 [3.25]
	Totals		44.18 [27.45]	263.19 [163.54]	44.18 [27.45]	159.31 [98.99]	104.22 [64.76]

*Edge Drains

**Edge Drains, PCC Repairs, Joint Seals

***Presently being rebuilt with PCC on new alignment

INTERSTATE I-264 - PAVEMENT TYPE									
			Initially			Presently			
			AC/DGA	FDAC	PCC	AC/DGA	AC/PCC	FDAC	PCC
County	Mileposts	Dates	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]
Jefferson	0.00-0.48	68/88*/94**			0.77 [0.48]				0.77 [0.48]
"	0.48-1.89	68/87*			2.27 [1.41]				2.27 [1.41]
"	1.89-2.86	70/87*			1.58 [0.97]				1.58 [0.97]
"	2.86-3.78	70/87*			1.48 [0.92]				1.48 [0.92]
"	3.78-4.54	70/87*			1.22 [0.76]				1.22 [0.76]
"	4.54-5.96	70/87*			2.29 [1.42]				2.29 [1.42]
"	5.96-7.18	71/87*			1.96 [1.22]				1.96 [1.22]
"	7.18-8.03	73/87*			1.37 [0.85]				1.37 [0.85]
"	8.03-9.23	/90**			1.93 [1.20]				1.93 [1.20]
"	9.23-10.15	/90**			1.48 [0.92]				1.48 [0.92]
"	10.15-12.68	/90**			4.07 [2.53]				4.07 [2.53]
"	12.68-14.20	/93**			2.45 [1.52]				2.45 [1.52]
"	14.20-18.40	/93**			6.80 [4.20]***				6.80 [4.20]***
"	18.40-20.13	/94**	2.78 [1.73]						2.78 [1.73]
"	20.13-21.93	61/83*BS			2.90 [1.80]		2.90 [1.80]		
"	21.93-22.65	68/83*BS			1.16 [0.72]		1.16 [0.72]		
"	22.65-23.24	68/88*BS			0.95 [0.59]		0.95 [0.59]		
	Totals		2.78 [1.73]	0	34.62 [21.51]	0	5.01 [3.11]	0	32.40 [20.13]

*Edge Drains
**Replaced with PCC

INTERSTATE I-265 - PAVEMENT TYPE									
			Initially			Presently			
			AC/DGA	FDAC	PCC	AC/DGA	AC/PCC	FDAC	PCC
County	Mileposts	Dates	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]
Jefferson	10.25-11.46	85			1.95 [1.21]				1.95 [1.21]
"	11.46-13.92	86			3.96 [2.46]				3.96 [2.46]
"	13.92-15.66	87			2.80 [1.74]				2.80 [1.74]
"	15.66-18.80	87			5.05 [3.14]				5.05 [3.14]
"	18.80-23.26	87			7.18 [4.46]				7.18 [4.46]
"	23.26-25.35	69			3.36 [2.09]				3.36 [2.09]
"	25.35-26.84	61/91			2.40 [1.49]		2.40 [1.49]		
"	26.84-29.83	84			4.81 [2.99]				4.81 [2.99]
"	29.83-32.66	78			4.55 [2.83]				4.55 [2.83]
"	32.66-34.73	70			3.33 [2.07]				3.33 [2.07]
	Totals		0	0	39.40 [24.48]	0	2.40 [1.49]	0	37.00 [22.99]

INTERSTATE I-275 - PAVEMENT TYPE										
			Initially			Presently				
			AC/DGA	FDAC	PCC	AC/DGA	AC/PCC	FDAC	PCC	
County	Mileposts	Dates	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]	
Kenton	0.00-1.09	77/93			1.75 [1.09]*				1.75 [1.09]*	
Kenton-Boone	1.09-4.06	73/91***			4.78 [2.97]*WB				4.78 [2.97]*WB	
"	1.09-4.06	77			4.78 [2.97]EB				4.78 [2.97]EB	
Boone	4.06-7.15	77			4.97 [3.09]				4.97 [3.09]	
"	7.15-13.50	77			10.21 [6.35]				10.21 [6.35]	
Campbell	73.55-75.39	80/91G****			2.96 [1.84]				2.96 [1.84]	
"	75.39-77.22	80			2.95 [1.83]				2.95 [1.83]	
Campbell-Kenton	77.22-78.76	76			2.48 [1.54]				2.48 [1.54]	
Kenton	78.76-79.80	77			1.67 [1.04]				1.67 [1.04]	
"	79.80-82.48	77			4.31 [2.68]				4.31 [2.68]	
"	82.48-83.58	76/94			1.77 [1.10]				1.77 [1.10]	
"	83.58-83.78	77/94			0.32 [0.20]*				0.32 [0.20]*	
	Totals		0	0	38.19 [23.73]	0	0	0	38.19 [23.73]	

*CRCP
**PCC Reconstructed
***With Drainage Layer
****With Repairs and Joint Seals

INTERSTATE I-471 - PAVEMENT TYPE										
			Initially			Presently				
			AC/DGA	FDAC	PCC	AC/DGA	AC/PCC	FDAC	PCC	
County	Mileposts	Dates	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]	
Campbell	0.00-1.75	80/92G*			2.82 [1.75]				2.82 [1.75]G	
"	1.75-3.23	80/92G*			2.38 [1.48]				2.38 [1.48]G	
"	3.23-4.55	81/92G*			2.12 [1.32]				2.12 [1.32]G	
"	4.55-4.75	81			0.32 [0.20]				0.32 [0.20]	
	Totals		0	0	7.64 [4.75]	0	0	0	7.64 [4.75]	

*With Repairs and Joint Seals

APPENDIX B

PAVEMENT TYPES FOR EACH SECTION OF EACH PARKWAY HIGHWAY IN KENTUCKY AS OF DECEMBER 1993

MOUNTAIN PARKWAY - PAVEMENT TYPE							
			Initially		Presently		
			AC/DGA	PCC	AC/DGA	AC/PCC	PCC
County	Mileposts	Dates	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]
Clark	0.00-3.68	62		5.92 [3.68]			5.92 [3.68]
"	3.68-10.58	62/86BS*		11.10 [6.90]		11.10 [6.90]	
Clark-Powell	10.58-16.02	62/86BS*		8.75 [5.44]		8.75 [5.44]	
Powell	16.02-19.15	62/89BS*		5.04 [3.13]		5.04 [3.13]	
"	19.15-22.31	62/89BS*		5.09 [3.16]		5.09 [3.16]	
"	22.31-26.12	62/88BS*		6.13 [3.81]		6.13 [3.81]	
"	26.12-29.30	62/88BS*		5.12 [3.18]		5.12 [3.18]	
"	29.30-32.90	62/89BS*		5.83 [3.62]		5.83 [3.62]	
"	32.90-36.00	62/90BS*		4.96 [3.08]		4.96 [3.08]	
Wolfe	36.00-39.51	62/90BS*		5.65 [3.51]		5.65 [3.51]	
"	39.51-43.20	62/91BS*		5.94 [3.69]		5.94 [3.69]	
"	43.20-49.80	63/75/91	10.62 [6.60]		10.62 [6.60]		
"	49.80-55.43	63/75/92	9.06 [5.63]		9.06 [5.63]		
Wolfe-Morgan	55.43-59.50	63/75/88	6.55 [4.07]		6.55 [4.07]		
Morgan	59.50-63.08	63/75/89	5.76 [3.58]		5.76 [3.58]		
Magoffin	63.08-67.40	63/75/87	6.95 [4.32]		6.95 [4.32]		
"	67.40-71.65	63/75/88	6.84 [4.25]		6.84 [4.25]		
"	71.65-74.58	63/75/86	4.72 [2.93]		4.72 [2.93]		
"	74.58-75.63	63/75/85	1.69 [1.05]		1.69 [1.05]		
	Totals		52.19 [32.43]	69.52 [43.20]	52.19 [32.43]	63.60 [39.52]	5.92 [3.68]

*Edge Drains

WESTERN KENTUCKY PARKWAY - PAVEMENT TYPE							
			Initially		Presently		
			AC/DGA	PCC	AC/DGA	AC/PCC	PCC
County	Mileposts	Dates	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]
Lyon	0.00-3.70	79	5.95 [3.70]		5.95 [3.70]		
Lyon-Caldwell	9.74-14.85	63/73/89	8.22 [5.11]		8.22 [5.11]		
"	14.85-18.26	63/73/87/91	5.49 [3.41]		5.49 [3.41]		
"	18.26-21.15	63/75/88	4.65 [2.89]		4.65 [2.89]		
Caldwell-Hopkins	21.15-25.64	63/75/88	7.23 [4.49]		7.23 [4.49]		
Hopkins	25.64-35.50	63		15.87 [9.86]			15.87 [9.86]
"	35.50-43.42	63/89BS*		12.75 [7.92]		12.75 [7.92]WB	
"	35.50-43.42	63		12.75 [7.92]			12.75 [7.92]EB
Muhlenberg	43.42-49.96	63		10.53 [6.54]			10.53 [6.54]
"	49.96-54.90	63		7.95 [4.94]			7.95 [4.94]
"	54.90-58.85	63		6.36 [3.95]			6.36 [3.95]
"	58.85-65.68	63		10.99 [6.83]			10.99 [6.83]
Ohio	65.68-71.90	63/86BS*		10.01 [6.22]		10.01 [6.22]	
"	71.90-83.25	63/87BS*		18.27 [11.35]		18.27 [11.35]	
Ohio-Butler-Grayson	83.25-90.08	63/89BS*		10.99 [6.83]		10.99 [6.83]	
Grayson	90.08-95.15	63		8.16 [5.07]WB			8.16 [5.07]WB
"	90.08-95.15	63/91BS*		8.16 [5.07]EB		8.16 [5.07]EB	
"	95.15-100.25	63		8.21 [5.10]			8.21 [5.10]
"	100.25-103.95	63/89BS*		5.95 [3.70]WB		5.95 [3.70]WB	
"	100.25-103.95	63		5.95 [3.70]EB			5.95 [3.70]EB
"	103.95-105.88	63		3.11 [1.93]			3.11 [1.93]
"	105.88-109.05	63/92BS*		5.10 [3.17]WB		5.10 [3.17]WB	
"	109.05-110.50	63		2.33 [1.45]WB			5.10 [3.17]WB
"	110.50-112.75	63/92BS*		3.62 [2.25]WB		3.62 [2.25]WB	
"	112.75-114.80	63		3.30 [2.05]WB			3.30 [2.05]WB
"	114.80-116.83	63/93BS*		3.27 [2.03]WB		3.27 [2.03]WB	
"	105.88-107.80	63/93BS*		3.09 [1.92]EB		3.09 [1.92]EB	
"	107.80-110.50	63		4.35 [2.70]EB			4.35 [2.70]EB
"	110.50-112.65	63/93BS*		3.46 [2.15]EB		3.46 [2.15]EB	
Grayson	112.65-114.80	63		3.46 [2.15]EB			3.46 [2.15]EB
"	114.80-116.83	63/91BS*		3.27 [2.03]EB		3.27 [2.03]EB	
"	116.83-119.65	63/79/85/88	4.54 [2.82]		4.54 [2.82]		
Hardin	119.65-123.44	63/79/88	6.10 [3.79]		6.10 [3.79]		
"	123.44-136.07	63/79/89	20.33 [12.63]WB		20.33 [12.63]WB		
"	123.44-136.07	63/79/90	20.33 [12.63]EB		20.33 [12.63]EB		
"	136.07-136.80	86	1.17 [0.73]		1.17 [0.73]		
	Totals		73.40 [45.61]	146.76 [91.19]	73.40 [45.61]	68.51 [42.57]	78.25 [48.62]

*Edge Drains

BLUEGRASS PARKWAY - PAVEMENT TYPE							
			Initially		Presently		
			AC/DGA	PCC	AC/DGA	AC/PCC	PCC
County	Mileposts	Dates	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]
Hardin-Nelson	0.45-9.04	65/79/88/93	13.82 [8.59] EB		13.82 [8.59] EB		
Nelson	9.04-16.54	65/79/88/92	12.07 [7.50] EB		12.07 [7.50] EB		
"	16.54-24.24	65/79/88/92	12.39 [7.70] EB		12.39 [7.70] EB		
Hardin	0.45-4.90	65/79/88	7.16 [4.45] WB		7.16 [4.45] WB		
Hardin-Nelson	4.90-9.52	65/79/88/93	7.44 [4.62] WB		7.44 [4.62] WB		
Nelson	9.52-10.17	65/79/88/92	1.05 [0.65] WB		1.05 [0.65] WB		
"	10.17-16.54	65/79/88	10.25 [6.37] WB		10.25 [6.37] WB		
"	16.54-24.24	65/79/88	12.39 [7.70] WB		12.39 [7.70]WB		
Nelson	24.24-32.60	65/91**		13.46 [8.36]			13.46 [8.36]
"	32.60-34.91	65/91**		3.72 [2.31]			3.72 [2.31]
"	34.91-39.27	65		7.02 [4.36]			7.02 [4.36]
Washington	39.27-41.79	65/87BS*		4.06 [2.52]		4.06 [2.52]	
Washington-Anderson	41.79-47.69	65/85BS*		9.50 [5.90]		9.50 [5.90]	
Anderson	47.69-51.84	65/86BS*		6.68 [4.15]		6.68 [4.15]	
Anderson-Mercer	51.84-59.59	65		12.47 [7.75] EB			12.47 [7.75] EB
Anderson-Mercer	51.84-56.29	65		7.16 [4.45] WB			7.16 [4.45] WB
Anderson	56.29-59.59	65/93BS*		5.31 [3.30] WB		5.31 [3.30] WB	
Anderson-Woodford	59.59-71.13	65/82	18.57 [11.54] EB		18.57 [11.54] EB		
"	59.59-67.00	65/82/93	11.93 [7.41] WB		11.93 [7.41] WB		
Woodford	67.00-71.13	65/82/92	6.65 [4.13] WB		6.65 [4.13] WB		
	Totals		56.86 [35.33]	56.89 [35.35]	56.86 [35.33]	22.97 [14.27]	33.94 [21.09]

*Edge Drains
**Edge Drains, Repairs and Joint Seals

PENNYRILE PARKWAY - PAVEMENT TYPE							
			Initially		Presently		
			AC/DGA	PCC	AC/DGA	AC/PCC	PCC
County	Mileposts	Dates	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]
Christian	6.77-10.77	68		6.44 [4.00]			6.44 [4.00]
"	10.77-16.50	68		9.22 [5.73]			9.22 [5.73]
"	16.50-22.48	68		9.62 [5.98]			9.62 [5.98]
Christian-Hopkins	22.48-29.91	68/92***		11.96 [7.43]			11.96 [7.43]
Hopkins	29.91-32.94	63		4.88 [3.03] NB			4.88 [3.03] NB
"	29.91-31.36	63/90*		2.33 [1.45] SB		2.33 [1.45] SB	
"	31.36-32.94	63/90*		2.54 [1.58] SB		2.54 [1.58] SB	
"	32.94-37.07	63		6.65 [4.13] NB			6.65 [4.13] NB
"	32.94-35.55	63/90*		4.20 [2.61] SB		4.20 [2.61] SB	
"	35.55-37.07	63/90BS*		2.45 [1.52] SB		2.45 [1.52] SB	
"	37.07-41.00	63		6.32 [3.93]			6.32 [3.93]
"	41.00-45.00	63		6.44 [4.00]			6.44 [4.00]
"	45.00-53.11	68		13.05 [8.11]			13.05 [8.11]
Hopkins-Webster	53.11-61.84	69/87BS**/90		14.05 [8.73] NB		14.05 [8.73] NB	
"	53.11-61.84	69/92**		14.05 [8.73] SB		14.05 [8.73] SB	
Webster-Henderson	61.84-65.50	69/88BS*		5.89 [3.66]		5.89 [3.66]	
Henderson	65.50-70.35	69		7.81 [4.85]			7.81 [4.85]
"	70.35-78.25	68		12.71 [7.90]			12.71 [7.90]
	Totals		0	115.04 [71.48]	0	25.54 [15.87]	89.48 [55.60]

*Edge Drains
**Edge Drains and PCC Repairs
***Edge Drains, PCC Repairs, Joint Seals

AUDUBON PARKWAY - PAVEMENT TYPE							
			Initially		Presently		
			AC/DGA	PCC	AC/DGA	AC/PCC	PCC
County	Mileposts	Dates	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]
Henderson	0.00-8.75	70/87**		14.08 [8.75]			14.08 [8.75]
"	8.75-15.88	70/87**		11.47 [7.13]			11.47 [7.13]
Daviess	15.88-23.46	70/87**		12.20 [7.58]			12.20 [7.58]
	Totals		0	37.76 [23.46]	0	0	37.76 [23.46]
**Edge Drains and Joint Seals							

DANIEL BOONE PARKWAY - PAVEMENT TYPE								
			Initially			Presently		
			AC/DGA	FDAC	PCC	AC/DGA	FDAC	PCC
County	Mileposts	Dates	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]
Laurel	0.00-0.93	70/87**			1.50 [0.93]			1.50 [0.93]
"	0.93-8.80	71/87**			12.67 [7.87]			12.67 [7.87]
Laurel-Clay	8.80-15.00	71/79/93	9.98 [6.20]			9.98 [6.20]		
Clay	15.00-20.33	71/79/93	8.58 [5.33]			8.58 [5.33]		
"	20.33-35.08	74			23.74 [14.75]			23.74 [14.75]
Clay-Leslie	35.08-41.46	74/79/86		10.27 [6.38]			10.27 [6.38]	
Leslie	41.46-44.04	74/79/86		4.15 [2.58] EB			4.15 [2.58] EB	
"	41.46-44.04	74/79/82/86/91TL		4.15 [2.58] WB			4.15 [2.58] WB	
"	44.04-44.35	74***			0.50 [0.31]			0.50 [0.31]
"	44.35-45.37	74/86		1.64 [1.02]			1.64 [1.02]	
Leslie-Perry	45.37-59.09	74/86	22.08 [13.72]			22.08 [13.72]		
	Totals		40.64 [25.25]	16.06 [9.98]	38.40 [23.86]	40.64 [25.25]	16.06 [9.98]	38.40 [23.86]

*Edge Drains
**Edge Drains and Joint Seals
***Joint Seals

GREEN RIVER PARKWAY - PAVEMENT TYPE								
			Initially			Presently		
			AC/DGA	FDAC	PCC	AC/DGA	FDAC	PCC
County	Mileposts	Dates	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]
Warren	0.00-7.10	72/91		11.43 [7.10]			11.43 [7.10]	
"	7.10-17.80	72/90	17.22 [10.70]			17.22 [10.70]		
Warren-Butler	17.80-26.42	72/89	13.87 [8.62]			13.87 [8.62]		
Butler	26.42-32.64	72/88	10.01 [6.22]			10.01 [6.22]		
Butler-Ohio	32.64-42.27	72/87**			15.50 [9.63]			15.50 [9.63]
Ohio	42.27-52.60	72/87**			16.62 [10.33]			16.62 [10.33]
Ohio-Daviess	52.60-70.21	72/87**			28.34 [17.61]			28.34 [17.61]
	Totals		41.10 [25.54]	11.43 [7.10]	60.46 [37.57]	41.10 [25.54]	11.43 [7.10]	60.46 [37.57]

**Edge Drains and Joint Seals

JACKSON PURCHASE PARKWAY - PAVEMENT TYPE							
			Initially		Presently		
			AC/DGA	PCC	AC/DGA	AC/PCC	PCC
County	Mileposts	Dates	km [mi]	km [mi]	km [mi]	km [mi]	km [mi]
Fulton	0.00-2.48	68/85	3.99 [2.48]		3.99 [2.48]		
Fulton-Hickman	2.48-8.35	68/86/91	9.45 [5.87] NB		9.45 [5.87] NB		
Fulton	2.48-3.41	68/83/88	1.50 [0.93] SB		1.50 [0.93] SB		
Hickman	3.41-8.35	68/88	7.95 [4.94] SB		7.95 [4.94] SB		
Graves	8.35-13.64	68/88	8.51 [5.29]		8.51 [5.29]		
"	13.64-21.86	68/88	13.23 [8.22]		13.23 [8.22]		
"	21.86-25.40	62/67/83/88	5.70 [3.54]		5.70 [3.54]		
Graves-Marshall	25.40-39.92	68/92	23.37 [14.52] NB		23.37 [14.52] NB		
"	25.40-39.92	68/89	23.37 [14.52] SB		23.37 [14.52] SB		
Marshall	39.92-52.33	68/91	19.97 [12.41]		19.97 [12.41]		
	Totals		84.22 [52.33]	0	84.22 [52.33]	0	0

CUMBERLAND PARKWAY - PAVEMENT TYPE						
			Initially		Presently	
			AC/DGA	FDAC	AC/DGA	FDAC
County	Mileposts	Dates	km [mi]	km [mi]	km [mi]	km [mi]
Barren	0.00-8.17	72/93		13.15 [8.17]		13.15 [8.17]
"	8.17-16.00	72		12.60 [7.83]		12.60 [7.83]
Barren-Metcalfe	16.00-24.10	72		13.04 [8.10]		13.04 [8.10]
Metcalfe	24.10-33.36	72		14.90 [9.26]		14.90 [9.26]
"	33.36-36.16	73/81		4.51 [2.80]		4.51 [2.80]
Adair	36.16-43.02	73/79/87*		11.04 [6.86]		11.04 [6.86]
"	43.02-48.08	73/88*		8.14 [5.06]		8.14 [5.06]
"	48.08-53.89	73/89*		9.35 [5.81]		9.35 [5.81]
Adair-Russell	53.89-62.56	73	13.95 [8.67]		13.95 [8.67]	
Russell	62.56-71.34	73	14.13 [8.78] WB		14.13 [8.78] WB	
Russell	62.56-71.34	73/93	14.13 [8.78] EB		14.13 [8.78] EB	
Russell-Pulaski	71.34-76.55	74/92	8.38 [5.21] EB		8.38 [5.21] EB	
"	71.34-76.55	74	8.38 [5.21] WB		8.38 [5.21] WB	
Pulaski	76.55-84.31	74/91	12.49 [7.76] EB		12.49 [7.76] EB	
"	76.55-84.31	74/92	12.49 [7.76] WB		12.49 [7.76] WB	
"	84.31-88.55	74/91	6.83 [4.24]		6.83 [4.24]	
	Totals		55.78 [34.66]	86.73 [53.89]	55.78 [34.66]	86.73 [53.89]
*Polymer Seal						

APPENDIX C

SUMMARY DATA FOR PAVEMENT SECTIONS EVALUATED

PENNYRILE PARKWAY, HOPKINS COUNTY

- <u>PORTLAND CEMENT CONCRETE</u>
  - THICKNESS = 230 mm (229 to 235) [9.04 in. (9.00 to 9.25)]
  - COMPRESSIVE STRENGTH = 39.6 MPa (32.4 to 52.5) [5,750 psi (4,710 to 7,570)]
  - MODULUS OF ELASTICITY = 28.1 GPa (26.9 to 29.6) [4.07 x 10^6 (3.90 to 4.30)]
- <u>DENSE GRADED AGGREGATE (DGA) BASE</u>
  - THICKNESS = 104 mm (95 to114) [4.08 in. (3.75 to 4.50)]
  - MOISTURE CONTENT = 5.7% (3.5 to 7.1)
  - IN-SITU CBR = 12 (8 to 15)
  - MINUS 75-μm (NO. 200) SIEVE = 12.3% (9.8 to 14.2)
  - NON-PLASTIC
- <u>SUBGRADE SAMPLES</u>
  - MOISTURE CONTENT BELOW DGA = 15.2% (10.9 to 20.8)
  - IN-SITU CBR = 6 (2 to 12)
- <u>SUBGRADE TUBE SAMPLES</u>
  - MOISTURE CONTENT @ 0-178 mm (0-7 in.) = 15.0% (11.4 to 20.7)
  - UNCONFINED COMPRESSIVE STRENGTH = 248 KPa (123 to 419) [36.0 psi (17.9 to 60.8)]
  - WET DENSITY = 2,215 kg/m^3 (2,153 to 2,278) [138.0 pcf (134.1 to 141.9)]
  - GENERAL SOIL CLASSIFICATION = CL
- <u>GENERAL NOTES</u>
  - CONSTRUCTED 1968
  - RATED TO BE IN NEAR EXCELLENT CONDITION
  - NO SUBSEQUENT MAINTENANCE ACTIVITIES PERFORMED THROUGH JANUARY 1994

US 119, PIKE COUNTY

- PORTLAND CEMENT CONCRETE
  THICKNESS = 234 mm (222 to 254) [9.21 in. (8.75 to 10.00)]
  COMPRESSIVE STRENGTH = 42.3 MPa (37.6 to 48.1) [6,140 psi (5,460 to 6,980)]
  MODULUS OF ELASTICITY = 27.9 GPa (27.2 to 29.0) [4.05 x 10^6 (3.95 to 4.20)]
- DENSE GRADED AGGREGATE (DGA) BASE
  THICKNESS = 99 mm (83 to114) [3.88 in. (3.25 to 4.50)]
  MOISTURE CONTENT = 5.6% (3.4 to 8.2)
  IN-SITU CBR = 24 (13 to 48)
  MINUS 75-μm (NO. 200) SIEVE = 16.9% (14.2 to 20.5)
  NON-PLASTIC
- SUBGRADE SAMPLES
  MOISTURE CONTENT BELOW DGA = 8.1% (5.8 to 12.1)
  IN-SITU CBR = 13 (1 to 30)
- SUBGRADE TUBE SAMPLES
  MOISTURE CONTENT @ 0-178 mm (0-7 in.) = 9.8%
  GENERAL SOIL CLASSIFICATION = SM-SC
- GENERAL NOTES
  CONSTRUCTED 1982
  RATED TO BE IN EXCELLENT CONDITION
  VARIABLE JOINT SPACING

I-64, FAYETTE COUNTY

- PORTLAND CEMENT CONCRETE
  - THICKNESS = 254 mm (254 to 254) [10.00 in. (10.00 to 10.00)]
  - COMPRESSIVE STRENGTH = 51.2 MPa (47.7 to 58.5) [7,430 psi (6,920 to 8,490)]
  - MODULUS OF ELASTICITY = 35.0 GPa (33.1 to 37.6) [5.08 x 10^6 (4.80 to 5.45)]
- DENSE GRADED AGGREGATE (DGA) BASE
  - THICKNESS = 159 mm (152 to165) [6.25 in. (6.00 to 6.50)]
  - MOISTURE CONTENT = 6.1% (5.7 to 6.4)
  - IN-SITU CBR = 20 (13 to 27)
  - MINUS 75-μm (NO. 200) SIEVE = 10.6% (9.3 to 11.5)
  - NON-PLASTIC
- SUBGRADE SAMPLES
  - MOISTURE CONTENT BELOW DGA = 24.8% (18.8 to 30.1)
  - IN-SITU CBR = 2 (1 to 3)
- SUBGRADE TUBE SAMPLES
  - MOISTURE CONTENT @ 0-178 mm (0-7 in.) = 23.2% (19.6 to 27.2)
  - UNCONFINED COMPRESSIVE STRENGTH = 241 KPa (108 to 432) [34.9 psi (15.6 to 62.7)]
  - WET DENSITY = 2,124 kg/m^3 (2,066 to 2,175) [138.0 pcf (134.1 to 141.9)]
  - GENERAL SOIL CLASSIFICATION = CL
- GENERAL NOTES
  - CONSTRUCTED 1963
  - RATED TO BE IN EXCELLENT CONDITION
  - EDGE DRAINS INSTALLED IN 1987

I-75, FAYETTE COUNTY

- <u>PORTLAND CEMENT CONCRETE</u>
  - THICKNESS = 254 mm (254 to 254) [10.00 in. (10.00 to 10.00)]
  - COMPRESSIVE STRENGTH = 40.0 MPa (36.7 to 43.0) [5,800 psi (5,330 to 6,230)]
  - MODULUS OF ELASTICITY = 31.2 GPa (27.2 to 34.8) [4.52 x 10^6 (3.95 to 5.05)]
- <u>DENSE GRADED AGGREGATE (DGA) BASE</u>
  - THICKNESS = 137 mm (127 to140) [5.38 in. (5.00 to 5.50)]
  - MOISTURE CONTENT = 6.1% (5.4 to 7.4)
  - IN-SITU CBR = 12 (6 to 16)
  - MINUS 75-μm (NO. 200) SIEVE = 9.2% (6.5 to 12.0)
  - NON-PLASTIC
- <u>SUBGRADE SAMPLES</u>
  - MOISTURE CONTENT BELOW DGA = 15.5% (8.7 to 21.6)
  - IN-SITU CBR = 3 (1 to 5)
- <u>SUBGRADE TUBE SAMPLES</u>
  - MOISTURE CONTENT @ 0-178 mm (0-7 in.) = 15.1% (12.8 to 20.6)
  - UNCONFINED COMPRESSIVE STRENGTH = 157 KPa (73 to 241) [22.8 psi (10.6 to 34.9)]
  - WET DENSITY = 2,228 kg/m^3 (2,122 to 2,334) [138.8 pcf (132.2 to 145.4)]
  - GENERAL SOIL CLASSIFICATION = VARIABLE
- <u>GENERAL NOTES</u>
  - CONSTRUCTED 1969
  - RATED TO BE IN EXCELLENT CONDITION
  - EDGE DRAINS, PCC REPAIRS & JOINT SEALS 1984

I-64, SHELBY COUNTY

- PORTLAND CEMENT CONCRETE
  - THICKNESS = 254 mm (248 to 260) [10.00 in. (9.75 to 10.25)]
  - COMPRESSIVE STRENGTH = 47.0 MPa (39.1 to 55.4) [6,810 psi (5,670 to 8,030)]
  - MODULUS OF ELASTICITY = 31.2 GPa (27.9 to 34.8) [4.53 x 10^6 (4.05 to 5.05)]
- DENSE GRADED AGGREGATE (DGA) BASE
  - THICKNESS = 152 mm (140 to159) [6.00 in. (5.50 to 6.25)]
  - MOISTURE CONTENT = 6.2% (5.1 to 7.0)
  - IN-SITU CBR = 16 (6 to 27)
  - MINUS 75-μm (NO. 200) SIEVE = 10.4% (9.0 to 11.9)
  - NON-PLASTIC
- SUBGRADE SAMPLES
  - MOISTURE CONTENT BELOW DGA = 22.8% (18.8 to 25.2)
  - IN-SITU CBR = 3 (2 to 3)
- SUBGRADE TUBE SAMPLES
  - MOISTURE CONTENT @ 0-178 mm (0-7 in.) = 23.4% (17.9 to 27.8)
  - UNCONFINED COMPRESSIVE STRENGTH = 156 KPa (71 to 321) [22.7 psi (10.3 to 46.5)]
  - WET DENSITY = 2,106 kg/m^3 (2,050 to 2,174) [131.2 pcf (127.7 to 135.4)]
  - GENERAL SOIL CLASSIFICATION = CL
- GENERAL NOTES
  - CONSTRUCTED 1961
  - RATED TO BE IN NEAR EXCELLENT CONDITION
  - EDGE DRAINS INSTALLED IN 1984

US 27, PULASKI COUNTY

- PORTLAND CEMENT CONCRETE

  THICKNESS = 192 mm (1XX to 2XX) [7.54 in. (7.XX to 8.XX)]

  COMPRESSIVE STRENGTH = 51.3 MPa (44.9 to 57.4) [7,440 psi (6,510 to 8,320)]

  MODULUS OF ELASTICITY = 33.4 GPa (31.7 to 35.5) [4.85 x 10^6 (4.60 to 5.15)]
- DENSE GRADED AGGREGATE (DGA) BASE

  THICKNESS = 93 mm (64 to 102) [3.67 in. (2.50 to 4.00)]

  MOISTURE CONTENT = 8.1% (4.2 to 9.6)

  IN-SITU CBR = 9 (2 to 16)

  MINUS 75-μm (NO. 200) SIEVE = 12.1% (9.3 to 16.7)

  NON-PLASTIC
- SUBGRADE SAMPLES

  MOISTURE CONTENT BELOW DGA = 26.3% (25.2 to 27.4)

  IN-SITU CBR = 2 (0 to 4)
- SUBGRADE TUBE SAMPLES

  MOISTURE CONTENT @ 0-178 mm (0-7 in.) = 28.0% (20.6 to 31.9)

  UNCONFINED COMPRESSIVE STRENGTH = 129 KPa (110 to 176) [18.7 psi (15.9 to 25.6)]

  WET DENSITY = 1,982 kg/m^3 (1,885 to 2,042) [123.5 pcf (117.4 to 127.2)]

  GENERAL SOIL CLASSIFICATION = CH
- GENERAL NOTES

  CONSTRUCTED 1960

  RATED TO BE PERFORMING VERY WELL

  NO SUBSEQUENT MAINTENANCE ACTIVITIES PERFORMED THROUGH 1994

US 127, OWEN COUNTY

- PORTLAND CEMENT CONCRETE
  - THICKNESS = 208 mm (197 to 216) [8.17 in. (7.75 to 8.50)]
  - COMPRESSIVE STRENGTH = 41.3 MPa (34.0 to 50.5) [5,990 psi (4,930 to 7,330)]
  - MODULUS OF ELASTICITY = 28.3 GPa (27.9 to 28.6) [4.10 x 10^6 (4.05 to 4.15)]
- DENSE GRADED AGGREGATE (DGA) BASE
  - THICKNESS = 90 mm (76 to 121) [3.54 in. (3.00 to 4.75)]
  - MOISTURE CONTENT = 9.3% (6.8 to 13.2)
  - IN-SITU CBR = 8 (4 to 17)
  - MINUS 75-μm (NO. 200) SIEVE = 11.3% (9.4 to 12.9)
  - NON-PLASTIC
- SUBGRADE SAMPLES
  - MOISTURE CONTENT BELOW DGA = 24.6% (19.7 to 27.5)
  - IN-SITU CBR = 2 (1 to 4)
- SUBGRADE TUBE SAMPLES
  - MOISTURE CONTENT @ 0-178 mm (0-7 in.) = 22.6% (18.5 to 24.2)
  - UNCONFINED COMPRESSIVE STRENGTH = 92 KPa (59 to 121) [13.4 psi (8.6 to 17.6)]
  - WET DENSITY = 2,143 kg/m^3 (2,052 to 2,209) [133.5 pcf (127.8 to 137.6)]
  - GENERAL SOIL CLASSIFICATION = CL
- GENERAL NOTES
  - CONSTRUCTED 1973
  - RATED TO BE IN EXCELLENT CONDITION
  - NO SUBSEQUENT MAINTENANCE ACTIVITIES PERFORMED THROUGH JANUARY 1994

BLUEGRASS PARKWAY, NELSON COUNTY

- PORTLAND CEMENT CONCRETE
  - THICKNESS = 229 mm (222 to 235) [9.00 in. (8.75 to 9.25)]
  - COMPRESSIVE STRENGTH = 57.2 MPa (53.2 to 62.6) [8,300 psi (7,710 to 9,080)]
  - MODULUS OF ELASTICITY = 35.0 GPa (32.1 to 37.6) [5.08 x 10^6 (4.65 to 5.45)]
- DENSE GRADED AGGREGATE (DGA) BASE
  - THICKNESS = 106 mm (89 to 146) [4.17 in. (3.50 to 5.75)]
  - MOISTURE CONTENT = 5.9% (4.7 to 7.7)
  - IN-SITU CBR = 14 (11 to 19)
  - MINUS 75-μm (NO. 200) SIEVE = 11.2% (9.3 to 13.1)
  - NON-PLASTIC
- SUBGRADE SAMPLES
  - MOISTURE CONTENT BELOW DGA = 23.6% (19.5 to 27.4)
  - IN-SITU CBR = 2 (1 to 2)
- SUBGRADE TUBE SAMPLES
  - MOISTURE CONTENT @ 0-178 mm (0-7 in.) = 22.2% (19.5 to 26.5)
  - UNCONFINED COMPRESSIVE STRENGTH = 161 KPa (92 to 231) [23.4 psi (13.3 to 33.5)]
  - WET DENSITY = 2,140 kg/m^3 (2,133 to 2,164 [133.3 pcf (132.9 to 134.8)]
  - GENERAL SOIL CLASSIFICATION = CL
- GENERAL NOTES
  - CONSTRUCTED 1965
  - RATED TO BE IN EXCELLENT CONDITION
  - EDGE DRAINS, PCC REPAIRS & JOINT SEALS 1984

PENNYRILE PARKWAY, HOPKINS AND CHRISTIAN COUNTIES

- PORTLAND CEMENT CONCRETE
  - THICKNESS = 234 mm (229 to 241) [9.21 in. (9.00 to 9.50)]
  - COMPRESSIVE STRENGTH = 48.7 MPa (40.6 to 52.8) [7,060 psi (5,890 to 7,660)]
  - MODULUS OF ELASTICITY = 30.2 GPa (28.6 to 32.1) [4.38 x 10^6 (4.15 to 4.65)]
- DENSE GRADED AGGREGATE (DGA) BASE
  - THICKNESS = 90 mm (76 to 102) [3.54 in. (3.00 to 4.00)]
  - MOISTURE CONTENT = 4.7% (3.2 to 5.5)
  - IN-SITU CBR = 11 (7 to 14)
  - MINUS 75-μm (NO. 200) SIEVE = 12.4% (10.6 to 14.7)
  - NON-PLASTIC
- SUBGRADE SAMPLES
  - MOISTURE CONTENT BELOW DGA = 14.8% (11.8 to 17.7)
  - IN-SITU CBR = 4 (1 to 6)
- SUBGRADE TUBE SAMPLES
  - MOISTURE CONTENT @ 0-178 mm (0-7 in.) = 18.3% (12.3 to 21.5)
  - UNCONFINED COMPRESSIVE STRENGTH = 233 KPa (69 to 515) [33.8 psi (10.0 to 74.7)]
  - WET DENSITY = 2,196 kg/m^3 (2,143 to 2,300) [136.8 pcf (133.5 to 143.3)]
  - GENERAL SOIL CLASSIFICATION = CL
- GENERAL NOTES
  - CONSTRUCTED 1968
  - RATED TO BE IN EXCELLENT CONDITION
  - EDGE DRAINS, PCC REPAIR & JOINT SEALS 1993

AUDUBON PARKWAY, DAVIESS COUNTY

- PORTLAND CEMENT CONCRETE
  - THICKNESS = 229 mm (229 to 229) [9.00 in. (9.00 to 9.00)]
  - COMPRESSIVE STRENGTH = 39.6 MPa (35.0 to 45.0) [5,740 psi (5,080 to 6,530)]
  - MODULUS OF ELASTICITY = 25.7 GPa (24.8 to 26.5) [3.73 x 10^6 (3.60 to 3.85)]
- DENSE GRADED AGGREGATE (DGA) BASE
  - THICKNESS = 101 mm (95 to 102) [3.96 in. (3.75 to 4.00)]
  - MOISTURE CONTENT = 5.8% (4.9 to 6.8)
  - IN-SITU CBR = 16 (9 to 34)
  - MINUS 75-μm (NO. 200) SIEVE = 17.0% (14.8 to 18.9)
  - NON-PLASTIC
- SUBGRADE SAMPLES
  - MOISTURE CONTENT BELOW DGA = 14.5% (10.0 to 17.4)
  - IN-SITU CBR = 9 (5 to 15)
- SUBGRADE TUBE SAMPLES
  - MOISTURE CONTENT @ 0-178 mm (0-7 in.) = 13.3% (8.4 to 18.1)
  - UNCONFINED COMPRESSIVE STRENGTH = 280 KPa (153 to 345) [40.6 psi (22.2 to 50.1)]
  - WET DENSITY = 2,186 kg/m^3 (2,088 to 2,231) [136.2 pcf (130.1 to 139.0)]
  - GENERAL SOIL CLASSIFICATION = CL
- GENERAL NOTES
  - CONSTRUCTED 1970
  - RATED TO BE IN EXCELLENT CONDITION
  - EDGE DRAINS & JOINT SEALS 1987

GREEN RIVER PARKWAY, OHIO COUNTY

- PORTLAND CEMENT CONCRETE
  - THICKNESS = 230 mm (229 to 235) [9.04 in. (9.00 to 9.25)]
  - COMPRESSIVE STRENGTH = 45.4 MPa (40.8 to 52.3) [6,580 psi (5,920 to 7,580)]
  - MODULUS OF ELASTICITY = 31.6 GPa (30.3 to 33.1) [4.58 x 10^6 (4.40 to 4.80)]
- DENSE GRADED AGGREGATE (DGA) BASE
  - THICKNESS = 103 mm (89 to 114) [4.06 in. (3.50 to 4.50)]
  - MOISTURE CONTENT = 5.4% (3.5 to 7.1)
  - IN-SITU CBR = 17 (11 to 30)
  - MINUS 75-μm (NO. 200) SIEVE = 10.6% (8.9 to 16.0)
  - NON-PLASTIC
- SUBGRADE SAMPLES
  - MOISTURE CONTENT BELOW DGA = 13.8% (11.2 to 16.0)
  - IN-SITU CBR = 7 (3 to 13)
- SUBGRADE TUBE SAMPLES
  - MOISTURE CONTENT @ 0-178 mm (0-7 in.) = 11.4% (10.3 to 13.2)
  - UNCONFINED COMPRESSIVE STRENGTH = 201 KPa (158 to 243) [29.1 psi (22.9 to 35.2)]
  - WET DENSITY = 2,228 kg/m^3 (2,209 to 2,246) [138.8 pcf (137.6 to 139.9)]
  - GENERAL SOIL CLASSIFICATION = VARIABLE
- GENERAL NOTES
  - CONSTRUCTED 1972
  - RATED TO BE IN EXCELLENT CONDITION
  - EDGE DRAINS & JOINT SEALS 1987

WESTERN KENTUCKY PARKWAY, HOPKINS COUNTY

- PORTLAND CEMENT CONCRETE
  THICKNESS = 234 mm (229 to 235) [9.21 in. (9.00 to 9.25)]
  COMPRESSIVE STRENGTH = 48.7 MPa (43.4 to 51.8) [7,060 psi (6,290 to 7,520)]
  MODULUS OF ELASTICITY = 32.2 GPa (31.0 to 34.5) [4.67 x 10^6 (4.50 to 5.00)]
- DENSE GRADED AGGREGATE (DGA) BASE
  THICKNESS = 109 mm (95 to 121) [4.30 in. (3.75 to 4.75)]
  MOISTURE CONTENT = 7.9% (6.0 to 10.2)
  IN-SITU CBR = 9 (5 to 11)
  MINUS 75-μm (NO. 200) SIEVE = 12.7% (10.7 to 14.5)
  NON-PLASTIC
- SUBGRADE SAMPLES
  MOISTURE CONTENT BELOW DGA = 21.1% (15.7 to 27.5)
  IN-SITU CBR = 4 (2 to 5)
- SUBGRADE TUBE SAMPLES
  MOISTURE CONTENT @ 0-178 mm (0-7 in.) = 16.2% (12.1 to 20.7)
  UNCONFINED COMPRESSIVE STRENGTH = 131 KPa (36 to 197) [19.0 psi (5.3 to 28.6)]
  WET DENSITY = 2,204 kg/m^3 (2,143 to 2,284) [137.3 pcf (133.5 to 142.3)]
  GENERAL SOIL CLASSIFICATION = VARIABLE (mostly CL)
- GENERAL NOTES
  CONSTRUCTED 1963
  RATED TO BE IN EXCELLENT CONDITION
  NO SUBSEQUENT MAINTENANCE ACTIVITIES PERFORMED THROUGH JANUARY 1994

APPENDIX D

DETAILED TEST RESULTS FOR THE PAVEMENT SECTIONS EVALUATED

US 127, OWEN COUNTY

PORTLAND CEMENT CONCRETE CORES

SAMPLE ID	THICKNESS (mm) [in.]	COMPRESSIVE STRENGTH MPa [psi]	MODULUS OF ELASTICITY GPa [psi x 10^6]
127-21-1	213 [8.50]	50.5 [7,330]	27.9 [4.05]
127-21-2	206 [8.25]		
127-21-3	213 [8.50]	34.0 [4,930]	
127-23-1	200 [8.00]		
127-23-2	200 [8.00]	46.4 [6,730]	
127-23-3	194 [7.75]	34.3 [4,980]	28.6 [4.15]
AVERAGE	204 [8.17]	41.3 [5,990]	28.3 [4.10]

DENSE GRADED AGGREGATE BASE

SAMPLE ID	THICKNESS mm [in.]	MOISTURE CONTENT (%)	IN-SITU CBR	MINUS 75 μm (No. 200) SIEVE (%)	PLASTICITY INDEX
127-21-1	75 [3.00]	6.8	7	12.0	
127-21-2	81 [3.25]	12.3	4	12.3	
127-21-3	119 [4.75]	9.3	9	10.3	
127-23-1	100 [4.00]	13.2	17	9.4	
127-23-2	81 [3.25]	7.1	8	12.9	
127-23-3	75 [3.00]	6.9	4	11.0	
AVERAGE	89 [3.54]	9.3	8	11.3	

DISTURBED SUBGRADE SAMPLES

SAMPLE ID	MOISTURE CONTENT BELOW DGA (%)	IN-SITU CBR
127-21-1	26.3	2
127-21-2	29.1	1
127-21-3	27.5	2
127-23-1	25.0	4
127-23-2	20.2	3
127-23-3	19.7	2
AVERAGE	24.6	2

SUBGRADE TUBE SAMPLES

SAMPLE ID	DEPTH mm [in.]	MOISTURE CONTENT (%)	UNCONFINED COMPRESSIVE STRENGTH kPa [psi]	WET DENSITY kg/m³ [pcf]	ATTERBURG LIMITS LL	PL	PI	CLASS
127-21-1	0-150 [0-6]	24.0	121.3 [17.6]	2,047 [127.8]	40	20	20	CL
127-21-2	0-175 [0-7[	18.5	59.3 [8.6]	2,204 [137.6]	38	20	18	CL
127-21-3	0-175 [0-7]	24.2	68.9 [10.0]	2,130 [133.0]	37	20	17	CL
127-23-1	0-150 [0-6]	24.0	98.6 [14.3]	2,182 [136.2]	45	19	26	CL
127-23-2	175-350 [7-14]	30.2	133.1 [19.3]	2,076 [129.6]	37	20	17	CL
127-23-3	0-150 [0-6]	22.4	114.5 [16.6]	2,132 [133.1]	39	17	22	CL
AVERAGE		23.9	99.3 [14.4]	2,129 [132.9]	39	19	19	

US 27, PULASKI COUNTY

PORTLAND CEMENT CONCRETE CORES

SAMPLE ID	THICKNESS mm [in.]	COMPRESSIVE STRENGTH MPa [psi]	MODULUS OF ELASTICITY GPa [psi x 10^6]
27-14-1	181 [7.25]		
27-14-2	181 [7.25]	47.2 [6,840]	31.7 [4.60]
27-14-3	188 [7.50]	55.8 [8,100]	35.5 [5.15]
27-12-1	194 [7.75]		
27-12-2	194 [7.75]	44.9 [6,510]	
27-12-3	194 [7.75]	57.4 [8,320]	33.1 [4.80]
AVERAGE	188 [7.54]	51.3 [7,440]	33.4 [4.85]

DENSE GRADED AGGREGATE BASE

SAMPLE ID	THICKNESS mm [in.]	MOISTURE CONTENT (%)	IN-SITU CBR	MINUS 75μm (No. 200) SIEVE (%)	PLASTICITY INDEX
27-14-1	88 [3.50]	9.6	2	16.7	
27-14-2	100 [4.00]	9.5	9	11.3	
27-14-3	63 [2.50]	8.1	6	12.7	
27-12-1	100 [4.00]	8.7	10	10.5	
27-12-2	100 [4.00]	4.2	16	9.3	
27-12-3	100 [4.00]	8.3	12	12.0	
AVERAGE	92 [3.67]	8.1	9	12.1	

DISTURBED SUBGRADE SAMPLES

SAMPLE ID	MOISTURE CONTENT BELOW DGA (%)	IN-SITU CBR
27-14-1	27.4	2
27-14-2	27.4	2
27-14-3	26.2	0
27-12-1	26.4	2
27-12-2	25.2	3
27-12-3	25.2	4
AVERAGE	26.3	2

SUBGRADE TUBE SAMPLES

SAMPLE ID	DEPTH mm [in.]	MOISTURE CONTENT (%)	UNCONFINED COMPRESSIVE STRENGTH kPa [psi]	WET DENSITY kg/m^3 [pcf]	ATTERBURG LIMITS LL	PL	PI	CLASS
27-14-1	0-150 [0-6]	27.9	140.0 [20.3]	2,038 [127.2]	59	23	36	CH
27-14-1	150-300 [6-12]	27.7	210.3 [30.5]	2,006 [125.2]				
27-14-2	150-350 [6-14]	33.3	166.9 [24.2]	1,986 [124.0]	55	21	34	CH
27-14-3	0-150 [0-6]	31.8	112.4 [16.3]	1,941 [121.2]	66	22	44	CH
27-14-3	150-325 [6-13]	25.5	130.3 [18.9]	2,025 [126.4]				
27-12-1	0-150 [0-6]	27.8	109.6 [15.9]	2,012 [125.6]	52	19	33	CH
27-12-1	150-300 [6-12]	28.2	151.0 [21.9]	2,092 [130.6]				
27-12-2	75-250 [3-10]	31.9	107.6 [15.6]	1,881 [117.4]	67	30	37	CH
27-12-2	250-400 [10-16]	34.8	176.5 [25.6]	1,901 [118.7]				
27-12-2	400-575 [16-23]	25.8	171.7 [24.9]	1,991 [124.3]				
27-12-3	50-225 [2-9]	20.6	176.5 [25.6]	2,107 [125.9]	50	23	27	CH
27-12-3	225-375 [9-15]	35.8	313.7 [45.5]	1,929 [120.4]				
27-12-3	375-550 [15-22]	30.1	372.3 [54.0]	1,974 [123.2]				
AVERAGE		29.3	164.1 [23.8]	1,985 [123.9]	58	23	35	

BLUEGRASS PARKWAY, NELSON COUNTY

PORTLAND CEMENT CONCRETE CORES

SAMPLE ID	THICKNESS mm [in.]	COMPRESSIVE STRENGTH MPa [psi]	MODULUS OF ELASTICITY GPa [psi x 10^6]
BG-26-1	225 [9.00]	59.4 [8,620]	37.6 [5.45]
BG-26-2	225 [9.00]	53.7 [7,790]	32.1 [4.65]
BG-26-3	219 [8.75]		
BG-25-1	225 [9.00]	53.2 [7,710]	
BG-25-2	231 [9.25]	62.6 [9,080]	35.5 [5.15]
BG-25-3	225 [9.00]		
AVERAGE	225 [9.00]	57.2 [8,300]	35.0 [5.08]

DENSE GRADED AGGREGATE BASE

SAMPLE ID	THICKNESS mm [in.]	MOISTURE CONTENT (%)	IN-SITU CBR	MINUS 75μm (No. 200) SIEVE (%)	PLASTICITY INDEX
BG-26-1	100 [4.00]	6.1	12	13.1	
BG-26-2	144 [5.75]	4.7	12	11.0	
BG-26-3	88 [3.50]	5.0	19	11.3	
BG-25-1	88 [3.50]	5.3	12	10.0	
BG-25-2	112 [4.50]	7.7	17	9.3	
BG-25-3	94 [3.75]	6.4	11	12.4	
AVERAGE	104 [4.17]	5.9	14	11.2	

DISTURBED SUBGRADE SAMPLES

SAMPLE ID	MOISTURE CONTENT BELOW DGA (%)	IN-SITU CBR
BG-26-1	23.1	1
BG-26-2	19.5	2
BG-26-3	20.9	2
BG-25-1	23.4	1
BG-25-2	27.4	2
BG-25-3	27.1	2
AVERAGE	23.6	2

SUBGRADE TUBE SAMPLES

SAMPLE ID	DEPTH mm [in.]	MOISTURE CONTENT (%)	UNCONFINED COMPRESSIVE STRENGTH kPa [psi]	WET DENSITY kg/m^3 [pcf]	ATTERBURG LIMITS LL	PL	PI	CLASS
BG-26-1	0-175 [0-7]	26.5	231.0 [33.5]	2,129 [132.9]	46	21	25	CL
BG-26-2	0-150 [0-6]	21.3	130.3 [18.9]	2,132 [133.1]	39	18	21	CL
BG-26-3	0-175 [0-7]	22.3	91.7 [13.3]	2,130 [133.0]	41	20	21	CL
BG-25-1	0-175 [0-7]	21.6	228.9 [33.2]	2,129 [132.9]	44	20	24	CL
BG-25-2	175-325 [7-13]	19.1	293.0 [42.5]	2,186 [136.5]	42	20	22	CL
BG-25-3	0-175 [0-7]	19.5	126.2 [18.3]	2,159 [134.8]	41	21	20	CL
BG-25-3	175-325 [7-13]	32.9	84.8 [12.3]	2,094 [130.7]				
AVERAGE		23.3	169.6 [24.6]	2,137 [133.4]	42	20	22	

I-64, FAYETTE COUNTY

PORTLAND CEMENT CONCRETE CORES

SAMPLE ID	THICKNESS mm [in.]	COMPRESSIVE STRENGTH MPa [psi]	MODULUS OF ELASTICITY GPa [psi x 10^6]
64-84-1	250 [10.00]	47.7 [6,920]	
64-84-2	250 [10.00]	48.0 [6,960]	37.6 [5.45]
64-84-3	250 [10.00]		
64-86-1	250 [10.00]		
64-86-2	250 [10.00]	58.5 [8,490]	33.1 [4.80]
64-86-3	250 [10.00]	50.7 [7,360]	34.5 [5.00]
AVERAGE	250 [10.00]	51.2 [7,430]	35.0 [5.08]

DENSE GRADED AGGREGATE BASE

SAMPLE ID	THICKNESS mm [in.]	MOISTURE CONTENT (%)	IN-SITU CBR	MINUS 75μm (No. 200) SIEVE (%)	PLASTICITY INDEX
64-84-1		5.6	16	11.0	
64-84-2		5.9	27		
64-84-3		5.7	25	9.3	
64-86-1	150 [6.00]	6.5	19	11.5	
64-86-2	163 [6.50]	6.4	13	11.1	
64-86-3	156 [6.25]	6.4	19	10.0	
AVERAGE	156 [6.25]	6.1	20	10.6	

DISTURBED SUBGRADE SAMPLES

SAMPLE ID	MOISTURE CONTENT BELOW DGA (%)	IN-SITU CBR
64-84-1	21.1	2
64-84-2	18.8	3
64-84-3	27.7	2
64-86-1	24.0	3
64-86-2	30.1	1
64-86-3	26.9	2
AVERAGE	24.8	2

SUBGRADE TUBE SAMPLES

SAMPLE ID	DEPTH mm [in.]	MOISTURE CONTENT (%)	UNCONFINED COMPRESSIVE STRENGTH kPa [psi]	WET DENSITY kg/m^3 [pcf]	ATTERBURG LIMITS LL	PL	PI	CLASS
64-84-1	50-175 [2-7]	24.3	213.0 [30.9]	2,062 [128.7]	41	23	18	CL
64-84-2	0-175 [0-7]	19.6	432.3 [62.7]	2,170 [135.5]	40	22	18	CL
64-84-2	175-350 [7-14]	20.4	537.8 [78.0]	2,217 [138.4]				
64-84-3					46	22	24	CL
64-86-1	25-200 [1-8]	27.2	108.2 [15.6]	2,094 [130.7]	52	24	28	CL
64-86-2	100-300 [4-12]	20.9	121.3 [17.6]	2,190 [136.7]	38	20	18	CL
64-86-3	25-200 [1-8]	21.9	210.3 [30.5]	2,150 [134.2]	47	22	25	CL
AVERAGE		22.4	270.3 [39.2]	2,146 [134.0]	44	22	22	

AUDUBON PARKWAY, DAVIESS COUNTY

PORTLAND CEMENT CONCRETE CORES

SAMPLE ID	THICKNESS mm [in.]	COMPRESSIVE STRENGTH MPa [psi]	MODULUS OF ELASTICITY GPa [psi x 10^6]
AP-19-1	225 [9.00]		
AP-19-2	225 [9.00]	40.7 [5,900]	26.5 [3.85]
AP-19-3	225 [9.00]	35.0 [5,080]	
AP-21-1	225 [9.00]		
AP-21-2	225 [9.00]	45.0 [6,530]	24.8 [3.60]
AP-21-3	225 [9.00]	37.6 [5,460]	25.9 [3.75]
AVERAGE	225 [9.00]	39.6 [5,740]	25.7 [3.73]

DENSE GRADED AGGREGATE BASE

SAMPLE ID	THICKNESS mm [in.]	MOISTURE CONTENT (%)	IN-SITU CBR	MINUS 75 μm (No. 200) SIEVE (%)	PLASTICITY INDEX
AP-19-1	100 [4.00]	4.9	34	17.2	
AP-19-2	100 [4.00]	5.5	18	18.9	NP
AP-19-3	100 [4.00]	5.7	14	17.2	NP
AP-21-1	94 [3.75]	6.8	9	17.0	
AP-21-2	100 [4.00]	6.1	12	14.8	NP
AP-21-3	100 [4.00]	6.0	10	17.0	NP
AVERAGE	99 [3.96]	5.8	16	17.0	

DISTURBED SUBGRADE SAMPLES

SAMPLE ID	MOISTURE CONTENT BELOW DGA (%)	IN-SITU CBR
AP-19-1	10.0	15
AP-19-2	13.2	11
AP-19-3	15.8	6
AP-21-1	17.4	8
AP-21-2	13.3	5
AP-21-3	17.1	6
AVERAGE	14.5	9

SUBGRADE TUBE SAMPLES

SAMPLE ID	DEPTH mm [in.]	MOISTURE CONTENT (%)	UNCONFINED COMPRESSIVE STRENGTH kPa [psi]	WET DENSITY kg/m³ [pcf]	ATTERBURG LIMITS LL	PL	PI	CLASS
AP-19-1	0-175 [0-7]	8.4					NP	SM
AP-19-2	0-175 [0-7]	9.6			19	15	4	CL
AP-19-3	0-175 [0-7]	18.1	153.1 [22.2]	2,084 [130.1]	35	21	14	CL
AP-19-3	175-325 [7-13]	16.5	217.2 [31.5]	2,081 [129.9]				
AP-21-1	0-175 [0-7]	14.2	319.9 [46.4]	2,204 [137.6]	27	20	7	ML-CL
AP-21-1	175-325 [7-13]	15.4	329.6 [47.8]	2,177 [135.9]				
AP-21-1	325-500 [13-20]	18.7	201.3 [29.2]	2,177 [135.9]				
AP-21-2	0-7	14.2	345.1 [50.1]	2,227 [139.0]	28	20	8	CL
AP-21-2	7-13	13.2	244.8 [35.5]	2,283 [142.5]				
AP-21-3	0-7	15.5	299.9 [43.5]	2,214 [138.2]	30	19	11	CL
AP-21-3	7-13	13.3						
AVERAGE		14.3	264.1 [38.3]	2,180 [136.1]	28	19	9	

US 119, PIKE COUNTY

PORTLAND CEMENT CONCRETE CORES

SAMPLE ID	THICKNESS mm [in.]	COMPRESSIVE STRENGTH MPa [psi]	MODULUS OF ELASTICITY GPa [psi x 10^6]
119-27-1	219 [8.75]	-	
119-27-2	250 [10.00]	43.9 [6,360]	
119-27-3	238 [9.50]	37.6 [5,460]	29.0 [4.20]
119-28-1	225 [9.00]	48.1 [6,980]	27.2 [3.95]
119-28-2	213 [9.25]	39.7 [5,760]	27.6 [4.00]
119-28-3	219 [8.75]		
AVERAGE	230 [9.21]	42.3 [6,140]	27.9 [4.05]

DENSE GRADED AGGREGATE BASE

SAMPLE ID	THICKNESS mm [in.]	MOISTURE CONTENT (%)	IN-SITU CBR	MINUS 75μm (No. 200) SIEVE (%)	PLASTICITY INDEX
119-27-1	113 [4.50]	8.2	13	20.5	
119-27-2		7.8	33	17.9	
119-27-3		4.3	18	14.2	7.5
119-28-1	81 [3.25]	3.4	48	14.4	
119-28-2	113 [4.50]	4.8	16	17.5	NP
119-28-3	81 [3.25]	5.2	13	16.6	
AVERAGE	97 [3.88]	5.6	24	16.9	

DISTURBED SUBGRADE SAMPLES

SAMPLE ID	MOISTURE CONTENT BELOW DGA (%)	IN-SITU CBR
119-27-1	5.8	30
119-27-2		
119-27-3		
119-28-1	6.2	
119-28-2	8.1	7
119-28-3	12.1	1
AVERAGE	8.1	13

SUBGRADE TUBE SAMPLES

SAMPLE ID	DEPTH mm [in.]	MOISTURE CONTENT (%)	UNCONFINED COMPRESSIVE STRENGTH kPa [psi]	WET DENSITY kg/m^3 [pcf]	ATTERBURG LIMITS LL	PL	PI	CLASS
119-28-3	0-175 [0-7]	9.8			21	17	4	SM-SC

I-64, SHELBY COUNTY

PORTLAND CEMENT CONCRETE CORES

SAMPLE ID	THICKNESS mm [in.]	COMPRESSIVE STRENGTH MPa [psi]	MODULUS OF ELASTICITY GPa [psi x 10^6]
64-39-2	256 [10.25]	55.4 [8,030]	34.8 [5.05]
64-39-3	250 [10.00]	46.3 [6,720]	
64-40-1	250 [10.00]		
64-40-2	250 [10.00]	42.9 [6,220]	27.9 [4.05]
64-40-3	244 [9.75]	39.1 [5,670]	31.0 [4.50]
AVERAGE	250 [10.00]	47.0 [6,810]	31.2 [4.53]

DENSE GRADED AGGREGATE BASE

SAMPLE ID	THICKNESS (in.)	MOISTURE CONTENT (%)	IN-SITU CBR	MINUS 75μm (No. 200) SIEVE (%)	PLASTICITY INDEX
64-39-2	150 [6.00]	6.1	19	9.0	
64-39-3		5.1	27	10.1	
64-40-1	138 [5.50]	6.0	17	11.9	
64-40-2	156 [6.25]	7.0	11	9.7	
64-40-3	156 [6.25]	6.9	6	11.1	
AVERAGE	150 [6.00]	6.2	16	10.4	

DISTURBED SUBGRADE SAMPLES

SAMPLE ID	MOISTURE CONTENT BELOW DGA (%)	IN-SITU CBR
64-39-2	24.3	3
64-39-3		
64-40-1	18.8	3
64-40-2	25.2	2
64-40-3		
AVERAGE	22.8	3

SUBGRADE TUBE SAMPLES

SAMPLE ID	DEPTH mm [in.]	MOISTURE CONTENT (%)	UNCONFINED COMPRESSIVE STRENGTH kPa [psi]	WET DENSITY kg/m³ [pcf]	ATTERBURG LIMITS LL	PL	PI	CLASS
64-39-2	0-175 [0-7]	27.8	107.6 [15.6]	2,046 [127.7]	63	25	38	CH
64-39-3	0-175 [0-7]	17.9	320.6 [46.5]	2,169 [135.4]	29	21	8	CL
64-40-1	0-150 [0-6]	21.6	125.5 [18.2]	2,130 [133.0]	42	21	21	CL
64-40-1	150-325 [6-13]	22.2	197.2 [28.6]	2.134 [133.2]				
64-40-2	0-150 [0-6]	26.2	71.0 [10.3]	2,058 [128.5]	46	22	24	CL
64-40-2	150-325 [6-13]	24.0	169.6 [24.6]	2,126 [132.7]				
AVERAGE		23.3	165.5 [24.0]	2,111 [131.8]	45	22	23	

I-75, LAUREL COUNTY

PORTLAND CEMENT CONCRETE CORES

SAMPLE ID	THICKNESS mm [in.]	COMPRESSIVE STRENGTH MPa psi]	MODULUS OF ELASTICITY GPa psi x 10^6]
75-42-1	250 [10.00]	41.6 [6,040]	31.4 [4.55]
75-42-2	250 [10.00]	43.0 [6,230]	34.8 [5.05]
75-42-3	250 [10.00]		
75-44-1	250 [10.00]	36.7 [5,330]	27.2 [3.95]
75-44-2	250 [10.00]		
75-44-3	250 [10.00]		
75-44-4	250 [10.00]	38.6 [5,600]	
AVERAGE	250 [10.00]	40.0 [5,800]	31.2 [4.52]

DENSE GRADED AGGREGATE BASE

SAMPLE ID	THICKNESS mm [in.]	MOISTURE CONTENT (%)	IN-SITU CBR	MINUS 75μm (No. 200) SIEVE (%)	PLASTICITY INDEX
75-42-1	138 [5.50]	6.4	16	12.0	
75-42-2	138 [5.50]	5.7	16	10.7	
75-42-3	125 [5.00]	5.4	8	10.8	
75-44-1	138 [5.50]	5.6	9	9.2	
75-44-2	131 [5.25]	7.4	14	6.0	
75-44-3	138 [5.50]	5.8	6	6.5	
AVERAGE	134 [5.38]	6.1	12	9.2	

DISTURBED SUBGRADE SAMPLES

SAMPLE ID	MOISTURE CONTENT BELOW DGA (%)	IN-SITU CBR
75-42-1	15.5	4
75-42-2	14.5	3
75-42-3	16.3	2
75-44-1	16.1	4
75-44-2	8.7	5
75-44-3	21.6	1
AVERAGE	15.5	3

SUBGRADE TUBE SAMPLES

SAMPLE ID	DEPTH mm [in.]	MOISTURE CONTENT (%)	UNCONFINED COMPRESSIVE STRENGTH kPa [psi]	WET DENSITY kg/m^3 [pcf]	ATTERBURG LIMITS LL	PL	PI	CLASS
75-42-1	0-175 [0-7]	13.9			30	20	10	GC
75-42-1	175-350 [7-14]	11.5	105.5 [15.3]	2,361 [147.4]				
75-42-2	0-175 [0-7]	13.1	240.6 [34.9]	2,329 [145.4]	33	21	12	GC
75-42-2	175-275 [7-11]	12.0						
75-42-3	0-175 [0-7]	14.9			32	21	11	CL
75-42-3	175-350 [7-14]	16.0	224.1 [32.5]	2,219 [138.5]				
75-44-1	25-150 [1-6]	12.8			24	15	9	SC
75-44-2	BAG SAMPLE				19	14	5	SM-SC
75-44-3	25-175 [1-7]	20.6	73.1 [10.6]	2,118 [132.2]	31	18	13	CL
AVERAGE		14.4	160.6 [23.3]	2,257 [140.9]	28	18	10	

WESTERN KENTUCKY PARKWAY, HOPKINS COUNTY

PORTLAND CEMENT CONCRETE CORES

SAMPLE ID	THICKNESS mm [in.]	COMPRESSIVE STRENGTH MPa [psi]	MODULUS OF ELASTICITY GPa [psi x 10^6]
WKP-31-1	231 [9.25]		
WKP-31-2	225 [9.00]	48.3 [7,010]	34.5 [5.00]
WKP-31-3	231 [9.25]	43.4 [6,290]	
WKP-34-1	231 [9.25]	51.8 [7,520]	31.0 [4.50]
WKP-34-2	231 [9.25]	51.2 [7,430]	31.2 [4.52]
WKP-34-3	231 [9.25]		
AVERAGE	230 [9.21]	48.7 [7,060]	32.2 [4.67]

DENSE GRADED AGGREGATE BASE

SAMPLE ID	THICKNESS mm [in.]	MOISTURE CONTENT (%)	IN-SITU CBR	MINUS 75μm (No. 200) SIEVE (%)	PLASTICITY INDEX
WKP-31-1	100 [4.00]	8.0	10	12.7	NP
WKP-31-2	119 [4.75]	6.0	11	12.0	
WKP-31-3	106 [4.25]	6.6	9	14.5	NP
WKP-34-1		9.1	5	12.9	NP
WKP-34-2	94 [3.75]	10.1	8	13.4	NP
WKP-34-3	119 [4.75]	7.3	8	10.7	NP
AVERAGE	108 [4.30]	7.9	9	12.7	

DISTURBED SUBGRADE SAMPLES

SAMPLE ID	MOISTURE CONTENT BELOW DGA (%)	IN-SITU CBR
WKP-31-1	23.5	5
WKP-31-2	19.3	3
WKP-31-3	19.1	2
WKP-34-1	21.7	3
WKP-34-2	27.5	5
WKP-34-3	15.7	5
AVERAGE	21.1	4

SUBGRADE TUBE SAMPLES

SAMPLE ID	DEPTH mm [in.]	MOISTURE CONTENT (%)	UNCONFINED COMPRESSIVE STRENGTH kPa [psi]	WET DENSITY kg/m³ [pcf]	ATTERBURG LIMITS LL	PL	PI	CLASS
WKP-31-1	0-175 [0-7]	18.2	197.2 [28.6]	2,127 [135.3]	30	17	13	CL
WKP-31-1	175-300 [7-12]	15.9	215.1 [31.2]	2,169 [135.4]				
WKP-31-2	0-175 [0-7]	20.7	112.4 [16.3]	2,138 [133.5]	30	20	10	CL
WKP-31-2	175-325 [7-13]	16.6	59.3 [8.6]	2,177 [135.9]				
WKP-31-2	325-500 [13-20]	15.1	82.7 [12.0]	2,065 [128.9]				
WKP-31-3	0-175 [0-7]	13.3	93.8 [13.6]	2,185 [136.4]	28	16	12	SC
WKP-31-3	175-325 [7-13]	18.2	148.9 [21.6]	2,172 [135.6]				
WKP-31-3	325-475 [13-19]	16.3	249.6 [36.2]	2,278 [142.2]				
WKP-34-1	0-175 [0-7]	15.4	169.6 [24.6]	2,279 [142.3]	34	21	13	GC
WKP-34-2	0-175 [0-7]	12.1	178.6 [25.9]	2,223 [138.8]	31	19	12	CL
WKP-34-2	175-350 [7-14]	16.4	355.1 [51.5]	2,106 [131.5]				
WKP-34-2	350-500 [14-20]	21.9	119.3 [17.3]	2,033 [126.9]				
WKP-34-3	0-175 [0-7]	17.8	36.5 [5.3]		27	21	6	ML-CL
AVERAGE		16.8	155.1 [22.5]	2,166 [135.2]	30	19	11	

PENNYRILE PARKWAY, HOPKINS/CHRISTIAN COUNTIES

PORTLAND CEMENT CONCRETE CORES

SAMPLE ID	THICKNESS mm [in.]	COMPRESSIVE STRENGTH MPa [psi]	MODULUS OF ELASTICITY GPa [psi x 10^6]
PRP-25-1	225 [9.00]	49.5 [7,180]	28.6 [4.15]
PRP-25-2	231 [9.25]		
PRP-25-3	231 [9.25]	52.8 [7,660]	32.1 [4.65]
PRP-28-1	231 [9.25]	51.9 [7,530]	30.0 [4.35]
PRP-28-2	225 [9.00]	40.6 [5,890]	
PRP-28-3	238 [9.50]		
AVERAGE	230 [9.21]	48.7 [7,060]	30.2 [4.38]

DENSE GRADED AGGREGATE BASE

SAMPLE ID	THICKNESS mm [in.]	MOISTURE CONTENT (%)	IN-SITU CBR	MINUS 75μm (No. 200) SIEVE (%)	PLASTICITY INDEX
PRP-25-1	100 [4.00]	4.5	7	11.8	
PRP-25-2	94 [3.75]	5.0	11	13.4	
PRP-25-3	94 [3.75]	3.2	13	11.0	NP
PRP-28-1	88 [3.50]	5.1	9	10.6	2
PRP-28-2	81 [3.25]	5.5	14	12.6	NP
PRP-28-3	75 [3.00]	5.1	9	14.7	NP
AVERAGE	88 [3.54]	4.7	11	12.4	

DISTURBED SUBGRADE SAMPLES

SAMPLE ID	MOISTURE CONTENT BELOW DGA (%)	IN-SITU CBR
PRP-25-1	15.0	1
PRP-25-2	15.0	4
PRP-25-3	12.5	4
PRP-28-1	17.7	4
PRP-28-2	16.8	6
PRP-28-3	11.8	6
AVERAGE	14.8	4

SUBGRADE TUBE SAMPLES

SAMPLE ID	DEPTH mm [in.]	MOISTURE CONTENT (%)	UNCONFINED COMPRESSIVE STRENGTH kPa [psi]	WET DENSITY kg/m^3 [pcf]	ATTERBURG LIMITS LL	PL	PI	CLASS
PRP-25-1	0-175 [0-7]	21.5	160.0 [23.2]	2,194 [137.0]	39	17	22	CL
PRP-25-1	175-325 [7-13]	17.5	180.6 [26.2]	2,164 [135.1]				
PRP-25-2	100-275 [4-11]	14.9	240.6 [34.9]	2,228 [139.1]	29	18	11	CL
PRP-25-3	0-175 [0-7]	19.5	68.9 [10.0]	2,140 [133.6]	28	17	11	CL
PRP-25-3	175-325 [7-13]	17.1	41.4 [6.0]	2,118 [132.2]				
PRP-28-1	0-175 [0-7]	21.4	164.8 [23.9]	2,139 [133.5]	50	24	26	CL
PRP-28-1	175-325 [7-13]	24.3	281.3 [40.8]	2,223 [138.8]				
PRP-28-2	0-175 [0-7]	12.3	515.0 [74.7]	2,295 [143.3]	25	14	11	CL
PRP-28-3	125-275 [5-11]	20.4	247.5 [35.9]	2,146 [134.0]	31	18	13	SC
AVERAGE		18.8	211.0 [30.6]	2,183 [136.3]	34	18	16	

PENNYRILE PARKWAY, HOPKINS COUNTY

PORTLAND CEMENT CONCRETE CORES

SAMPLE ID	THICKNESS mm [in.]	COMPRESSIVE STRENGTH MPa [psi]	MODULUS OF ELASTICITY GPa [psi x 10^6]
PRP-47-1	225 [9.00]	32.5 [4,710]	29.6 [4.30]
PRP-47-2	225 [9.00]	38.3 [5,550]	27.6 [4.00]
PRP-47-3	231 [9.25]		
PRP-50-1	225 [9.00]		
PRP-50-2	225 [9.00]	52.2 [7,570]	26.9 [3.90]
PRP-50-3	225 [9.00]	35.7 [5,180]	
AVERAGE	226 [9.04]	39.6 [5,750]	28.1 [4.07]

DENSE GRADED AGGREGATE BASE

SAMPLE ID	THICKNESS (in.)	MOISTURE CONTENT (%)	IN-SITU CBR	MINUS 75μm (No. 200) SIEVE (%)	PLASTICITY INDEX
PRP-47-1	106 [4.25]	6.8	15	11.2	4
PRP-47-2	100 [4.00]	3.5	11	12.5	NP
PRP-47-3	94 [3.75]	6.3	11	9.8	NP
PRP-50-1	100 [4.00]	4.3	14	12.6	NP
PRP-50-2	100 [4.00]	6.0	8	14.2	
PRP-50-3	113 [4.50]	7.1	10	13.3	
AVERAGE	102 [4.08]	5.7	12	12.3	

DISTURBED SUBGRADE SAMPLES

SAMPLE ID	MOISTURE CONTENT BELOW DGA (%)	IN-SITU CBR
PRP-47-1	10.9	3
PRP-47-2	14.7	2
PRP-47-3	20.8	4
PRP-50-1	13.4	12
PRP-50-2	14.4	8
PRP-50-3	16.8	6
AVERAGE	15.2	6

SUBGRADE TUBE SAMPLES

SAMPLE ID	DEPTH mm [in.]	MOISTURE CONTENT (%)	UNCONFINED COMPRESSIVE STRENGTH kPa [psi]	WET DENSITY kg/m^3 [pcf]	ATTERBURG LIMITS LL	PL	PI	CLASS
PRP-47-1	0-175 [0-7]	20.7	123.4 [17.9]	2,158 [134.7]	35	19	16	CL
PRP-47-1	175-325 [7-13]	18.6	370.9 [53.8]	2,191 [136.8]				
PRP-47-1	325-500 [13-20]	16.6	240.6 [34.9]	2,102 [131.2]				
PRP-47-2	0-175 [0-7]	11.7	173.7 [25.2]	2,273 [141.9]	27	19	8	CL
PRP-47-3	0-175 [0-7]	14.9	144.1 [20.9]	2,185 [136.4]	63	21	42	CH
PRP-47-3	175-325 [7-13]	15.0	142.0 [20.6]	2,236 [139.6]				
PRP-50-1	0-175 [0-7]	11.4	362.0 [52.5]	2,225 [138.9]	30	19	11	CL
PRP-50-1	175-325 [7-13]	21.5	162.7 [23.6]	2,081 [129.9]				
PRP-50-2	0-175 [0-7]	18.2	265.5 [38.5]	2,148 [134.1]	29	19	10	CL
PRP-50-2	175-325 [7-13]	17.6	224.1 [32.5]	2,252 [140.6]				
PRP-50-3	0-175 [0-7]	13.2	419.2 [60.8]	2,271 [141.8]	30	18	12	CL
PRP-50-3	175-325 [7-13]	13.2	597.1 [86.6]	2,283 [142.5]				
PRP-50-3	325-500 [13-20]	14.3	444.0 [64.4]	2,308 [144.1]				
AVERAGE		15.9	282.0 [40.9]	2,209 [137.9]	36	19	17	

GREEN RIVER PARKWAY, OHIO COUNTY

PORTLAND CEMENT CONCRETE CORES

SAMPLE ID	THICKNESS mm [in.]	COMPRESSIVE STRENGTH MPa [psi]	MODULUS OF ELASTICITY GPa [psi x 10^6]
GRP-37-1	225 [9.00]	43.6 [6,320]	31.4 [4.55]
GRP-37-2	225 [9.00]	44.7 [6,480]	30.3 [4.40]
GRP-37-3	231 [9.25]		
GRP-39-1	225 [9.00]	40.8 [5,920]	
GRP-39-2	225 [9.00]	52.3 [7,580]	33.1 [4.80]
GRP-39-3	225 [9.00]		
AVERAGE	226 [9.04]	45.4 [6,580]	31.6 [4.58]

DENSE GRADED AGGREGATE BASE

SAMPLE ID	THICKNESS (in.)	MOISTURE CONTENT (%)	IN-SITU CBR	MINUS 75μm (No. 200) SIEVE (%)	PLASTICITY INDEX
GRP-37-1		3.5	30	9.0	NP
GRP-37-2	100 [4.00]	4.9	16	11.9	NP
GRP-37-3	88 [3.50]	4.3	17	8.9	
GRP-39-1		6.5	11	11.0	
GRP-39-2	113 [4.50]	6.3	16	12.5	
GRP-39-3	106 [4.25]	7.1	12	10.4	
AVERAGE	102 [4.06]	5.4	17	10.6	

DISTURBED SUBGRADE SAMPLES

SAMPLE ID	MOISTURE CONTENT BELOW DGA (%)	IN-SITU CBR
GRP-37-1	11.9	13
GRP-37-2	13.2	7
GRP-37-3	11.2	10
GRP-39-1	14.8	5
GRP-39-2	16.0	6
GRP-39-3	15.5	3
AVERAGE	13.8	7

SUBGRADE TUBE SAMPLES

SAMPLE ID	DEPTH mm [in.]	MOISTURE CONTENT (%)	UNCONFINED COMPRESSIVE STRENGTH kPa [psi]	WET DENSITY kg/m³ [pcf]	ATTERBURG LIMITS LL	PL	PI	CLASS
GRP-37-1	0-175 [0-7]	10.5			22	16	6	SM-SC
GRP-37-2	0-175 [0-7]	12.7					NP	SM
GRP-37-2	175-325 [7-13]	14.5						
GRP-37-2	325-500 [13-20]	16.6	126.2 [18.3]	2,119 [132.3]				
GRP-37-3	50-200 [2-8]	10.3					NP	SM
GRP-39-1	0-175 [0-7]	11.5	157.9 [22.9]	2,241 [139.9]	27	17	10	CL
GRP-39-1	175-325 [7-13]	13.0	185.5 [26.9]	2,246 [140.2]				
GRP-39-2	0-175 [0-7]	10.3			23	14	9	GC
GRP-39-2	175-325 [7-13]	14.3	157.9 [22.9]	2,172 [135.6]				
GRP-39-2	325-500 [13-20]	14.3	272.3 [39.5]	2,219 [138.5]				
GRP-39-3	0-175 [0-7]	13.2	242.7 [35.2]	2,204 [137.6]	25	18	7	SM-SC
GRP-39-3	175-325 [7-13]	10.1						
AVERAGE		12.8	190.3 [27.6]	2,201 [137.4]	24	16	8	