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EFFECTS OF INCENTIVE/DISINCENTIVE PROGRAM ON
PAVEMENT PERFORMANCE

presented by

Brent Charles Leverett

has been accepted towards fulfillment
of the requirements for the

Master of
Science

degree in

Civil Engineering

A handwritten signature in cursive script, appearing to read "John G. Balcer".

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EFFECTS OF INCENTIVE/DISINCENTIVE PROGRAM ON PAVEMENT PERFORMANCE

By

Brent Charles Leverett

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE

Civil Engineering

2008

ABSTRACT

EFFECTS OF INCENTIVE/DISINCENTIVE PROGRAM ON PAVEMENT PERFORMANCE

By

Brent Charles Leverett

The Michigan Department of Transportation (MDOT) has been using monetary incentive payments for many years to improve contractors' conformance with specifications and their overall workmanship. It is believed that incentive/disincentive (I/D) payments/penalties have a positive impact on the long-term pavement performance by extending its pavement life. However, these impacts have not been clearly determined. Therefore, the determination of the costs and benefits of the MDOT I/D program would be greatly beneficial. To explore whether or not the MDOT data files and records house the necessary data for the analyses, the project files and records of seventy-seven pavement projects constructed between 1994 and 2002 were examined. It was found that most project files and records are missing some data elements. Therefore, it was determined that ideal and comprehensive analyses of the costs and benefits of each specific pay item within the MDOT I/D program cannot be conducted. However, analyses based on the costs and benefits of the I/D program as a whole, can be conducted.

TO MY FAMILY AND FRIENDS

ACKNOWLEDGEMENTS

First and foremost, I would like to thank my advisor, Dr. Gilbert Baladi, for his patience, effort, and guidance during this study. I would also like to extend my thanks to the other members of my advisory committee, Dr. Karim Chatti and Dr. Syed Waqar Haider.

I would also like to thank the Michigan Department of Transportation (MDOT) for their financial support of the study. Thanks also to the MDOT research advisory panel including Mr. Dave Smiley, Mr. Robert Pena, and Mr. Benjamin Krom for all their valuable assistance. A special thanks also to MDOT employees Mrs. Julie Baldwin, Mr. Dan Sokolonicki, and Mr. Benjamin Gowell who were of great assistance in the data collection process.

Finally, a great deal of thanks is owed to my parents for their encouragement and support throughout my college career. Without them this thesis would not be possible.

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CHAPTER 1

INTRODUCTION

1.0 PROBLEM STATEMENT

The Michigan Department of Transportation (MDOT) has been using monetary incentive payments for many years to improve contractors' conformance with specifications and their overall workmanship. It was envisioned that incentive/disincentive (I/D) payments/penalties would have a positive impact on the long-term pavement performance by extending its expected life. However, these impacts have been neither quantified, nor qualified.

1.1 BACKGROUND

In the 1970s, the concept of incentive pay clauses for items that were exceptionally better than required by the specifications were adopted by various State Highway Agencies (SHAs). This new concept was complementary to that of disincentive pay clauses previously used. The envisioned benefits of incentive pay clauses include improved workmanship by encouraging contractors to apply appropriate quality control (QC) measures. The agencies rationale for pay incentives is that the additional cost to assure uniform QC practices will reduce future pavement rehabilitation and maintenance costs.

The main objective of disincentive pay clauses is for the SHAs to recoup part of the anticipated future costs that are likely to arise due to less than satisfactory material and ride qualities. For some highway projects and for a variety of reasons, QC measures are either absent or ineffective, which likely leads to less than satisfactory work. If the quality of such projects is not seriously deficient, it is not practical to require replacement

(reject the work item). Hence, the practical solution is to accept the work at a reduced price. Said price reduction is usually difficult to quantify at the time of execution. Better estimates of the agency costs due to substandard material quality can be determined after long-term pavement performance data are collected and analyzed.

The pay schedule for incentives/disincentives is a function of some of the established specification parameters (pay items). Current acceptance parameters of MDOT for concrete pavements include strength, air content, and slump and for HMA, density, air voids, and asphalt content (mix conformance) (9, 10). For a given pavement project, an example of the pay rate schedule for HMA material quality is enumerated below.

1. A negative 50 percent adjustment for the bituminous mixture unit price will be imposed if during initial base or leveling course mixture production any subplot value for pavement density is less than 90 percent.
2. A negative 25 percent adjustment for the bituminous mixture unit price will be imposed for either of the following pavement density conditions:
 - a) The lot average pavement density is less than 91 percent but equal to or greater than 90 percent.
 - b) The conditions of column 4 of the pavement density core table are satisfied.
The column states the minimum number of cores having density less than 91 percent for a given number of cores extracted from a lot.
3. A negative 10 percent adjustment for the bituminous mixture unit price will be imposed for either of the following pavement density conditions:

- a) The lot average pavement density is less than 92 percent but equal to or greater than 91 percent.
 - b) The conditions of column 3 of the pavement density core table are satisfied.
The column states the minimum number of cores having density less than 92 percent for a given number of cores extracted from a lot.
4. If during quality control testing a deviation occurs that requires production to be suspended and the contractor continues to operate, then the tonnage for that sublot and any subsequent tonnage will be subject to negative 25 percent adjustment for the bituminous mixture unit price until all measured parameters are within quality control tolerances.
5. If the lot average HMA density is more than 91 percent but less than 92 percent of the maximum theoretical density, the penalty is 10 percent of the bituminous mixture contract unit price.
6. The contractor will be paid an additional 6 percent of the bituminous mixture contract unit price if the lot average and lot cores meet all of the following criteria:
- a) The lot average pavement density is equal to or greater than 94 percent.
 - b) The conditions of column 2 of the pavement density core table are satisfied.
The column states the minimum number of cores having density equal to or greater than 92 percent and the minimum number of cores having density

equal to or greater than 94 percent for a given number of cores extracted from a lot.

- c) The mixture within the lot is not subject to any price adjustments for asphalt binder content, air voids, voids in mineral aggregate (VMA), or theoretical maximum density (TMD).

7. The contractor will be paid an additional 4 percent of the bituminous mixture contract unit price if all of the following criteria are met:

- a) The lot average absolute deviation from each measured parameter of the lot does not exceed the quality control running average tolerance.
- b) There are no laboratory test failures on the asphalt binder.
- c) The lot average VMA is equal to or greater than the minimum design value for the bituminous mixture as per the mix design criteria.

For MDOT to realize the full benefits of their I/D pay schedule, the specified I/D pay items (parameters) should relate to long-term pavement performance. The long-term pavement performance to be used in the analyses of the benefits is the pavement life in years between construction and the year when the pavement distress index (DI) reaches 50 distress points. Since there are numerous factors that adversely affect long-term pavement performance, such relationships are not easy to obtain on a project by project basis. Hence, data for a large number of projects both with and without I/D specifications must be collected and analyzed.

1.2 OBJECTIVES

The overall objective of the I/D study is to analyze the costs and benefits of the MDOT I/D program. Such analyses cannot be conducted unless the MDOT project files and records contain the necessary data elements to conduct the analyses. Hence, the study was divided into the following two phases:

Phase I - Data Search/Preliminary Assessment - The primary objective of Phase I of this study is to conduct an exploratory search to identify available data in the MDOT data files and project records and to perform preliminary data assessment to determine whether or not the available data would support analyses of the costs and benefits of the MDOT I/D program.

Phase II - Data Analyses - The objectives and activities of Phase II of this study will be developed, if and only if, the results of the Phase I study indicate that the MDOT data files and project records contain sufficient data to perform analyses of the costs and benefits of the I/D program.

1.3 RESEARCH PLAN

To accomplish the primary objective of the Phase I study, a research plan consisting of three tasks was developed. For convenience, the three tasks are presented below.

Task 1 – Review and Project Identification - The activities of the research team in this task are divided into two subtasks as follows:

Subtask 1-1 – Review - In this subtask, the research team will:

1. Review and summarize MDOT's historical use of pavement project incentives/disincentives and their parameters (pay items).
2. Identify the pay items for incentives/disincentives including payment schedules.
3. Compose a list of data elements that are necessary to conduct the analyses in Phase II of this study to determine the costs and benefits of the MDOT incentive/disincentive pay items. These data are envisioned to include:
 - a. The incentive/disincentive pay item.
 - b. The type of project (capital preventive maintenance (CPM), overlay, reconstruction, etc).
 - c. Historical (raw) distress data, including the last distress data before the project and at least four cycles of distress data since project completion.
 - d. The distress index (DI) and the remaining service life (RSL) that represents the distress data in item c above.
 - e. Traffic data before and after the project.
 - f. Any subsequent improvement actions after completion of the project in question.
 - g. Ride quality index.
 - h. Rut depth and/or longitudinal profile data.
 - i. Skid resistance data.

The necessary data listed above may be modified based on the results of items 1 and 2 above.

4. Using the MDOT compiled list of pavement projects with incentives/disincentives, conduct the following:
 - a. Eliminate from the list all projects that received only I/D for ride quality, which will be analyzed in Phase II.
 - b. Sort the project list by pavement type (composite, flexible, rigid). For each pavement type, sort the projects by type of work (rehabilitation, CPM, reconstruction, etc). This would create three independent lists, one for each pavement type.
5. Select randomly five pavement projects from each list for the data collection activities in subtask 1-2.

Subtask 1-2 – Data Collection

In this subtask, do the fifteen randomly selected projects of item 5 above, the research team will search the MDOT data files and project records to:

1. Identify the type of data contained in the files that are relevant to the analyses of the costs and benefits of the I/D program (Phase II).
2. Summarize all available data elements and identify the missing data elements.

Task 2 –Data Examination - In this task, the research team will determine whether or not the data obtained in subtask 1-2 are sufficient to conduct further analyses and to support the activities and the research plan (to be developed) for Phase II of this study. It is assumed herein that if the MDOT data files and project records of 70

percent or more of the projects contain sufficient data to support analyses of the costs and benefits of the I/D program, then the overall objective of the study can be satisfied. In this case, the objectives and research plan for the Phase II study will be developed. Otherwise, recommendations will be made regarding data collection for possible future analyses of the impacts of the I/D program on pavement performance.

It should be noted that the number of projects (fifteen) to be searched in Phase I is related to the available study budget and not necessarily any statistical analysis of the sample size.

Task 3 – Deliverables - Interim Report - Upon completion of task 2, the research team will submit to MDOT an interim report detailing the findings. The report will include a summary of the activities and findings of Phase I, the three lists of pavement projects with and without I/D specifications, and a determination of whether Phase II of the project can be executed.

1.4 THESIS LAYOUT

The materials in this thesis are presented in five chapters as follows:

Chapter 1 – Introduction

Chapter 2 – Literature Review

Chapter 3 – Data Collection

Chapter 4 – Research Plan – Phase II

Chapter 5 – Summary, Examples, Conclusions, & Recommendations

CHAPTER 2

LITERATURE REVIEW

2.0 INTRODUCTION

The highway sector in the USA and the rest of the world is perhaps the most conservative segment of the construction industry. Although highway contractors have implemented many new construction technologies, until recently, the contracting methods have basically remained the same. After the designs of highway projects were completed and approved, State Highway Agencies (SHAs) have traditionally awarded them to the lowest bidder. This approach while providing a level ground for contractors has its limitations. For example, sometimes, the method may not emphasize product quality and other factors that affect the long-term pavement performance.

Since the 1980's, rehabilitation, resurfacing, reconstruction, or restoration works have characterized the majority of the highway construction projects. These types of projects require a high-quality product and timely completion to minimize the negative impact (such as safety, traffic delays, and economic loss) to the traveling public. The above requirements and the limited available resources for highway construction and maintenance accelerated the search for alternatives to the traditional lowest bidder approach. Most SHAs modified their quality assurance (QA) programs and some included in the pavement project proposals, specifications for incentive/disincentive (I/D) pay adjustments. Over time the attributes of I/D programs used by SHAs have been expanded to include ride quality, early completion, material quality and so forth.

2.1 MDOT PRACTICE

In the beginning, the I/D provisions used by the Michigan Department of Transportation (MDOT) addressed extra payments/penalties for early or late finish of paving projects. In February 2000, MDOT completed an evaluation of the use of early completion clauses on 26 projects let and completed in 1998 and 1999. The average I/D pay amount for these 26 projects was \$18,500 (about 1.5% of the contract amount) and the average project user delay savings was estimated at \$610,500. Results of the evaluation indicated that 65% of the 26 projects were completed early, 12% were completed on time and 23% were completed late. MDOT found that the average completion time of pavement projects with early completion incentives was 19% less than similar projects without I/D provisions for early completion, although the contracts for the latter projects include an expedited schedule clause requiring the contractor to work a six calendar-day week (21).

Later, special I/D provisions for ride quality were included in MDOT project contracts, and even later, special I/D provisions for material quality (such as strength, air voids, asphalt content, aggregate gradation) were included (examples of these I/D provisions are included in Chapter 1). These special I/D provisions were dynamic in nature and they were often changed from one year to another. The special I/D provisions included specified acceptance levels, the pay scale and the pay items (21). The main objective of these special I/D provisions was to get the contracting community to employ different and innovative techniques to improve the paving operation, and therefore improve the long-term pavement performance. These efforts have precipitated the first performance based contract project for the rehabilitation of 5.5 mile long segment of M115 in Clare

County, Michigan and the replacement of the superstructure on two bridges. The project was let in 2007 and is scheduled for completion in late 2008 (27).

Like MDOT, other SHAs used I/D provisions and specifications to improve pavement performance. Their practices and the terminologies used in the provisions are summarized in the next section.

2.2 GENERAL PRACTICE

Most State Highway Agencies and Departments of Transportation (DOT), including MDOT, have used bonus payment systems or I/D programs for a number of years in order to improve project construction quality. The envisioned benefit of the I/D programs include improved workmanship by encouraging contractors to apply appropriate quality control (QC) measures. Most, if not all SHAs have learned from long-term experience that failure to satisfy material and construction specifications, in most cases, results in premature failure of some of the pavement components (19). Hence, since the late 1950's and early 1960's, SHAs became aware of the importance of developing and implementing quality assurance (QA) programs to ensure satisfactory or acceptable quality of materials and pavement construction. The contents of QA programs have evolved over time and currently most SHAs implement third or fourth generation QA programs. Some QA programs include QC components only, whereas others contain QC and independent assurance (IA) components. The process or procedures used in the implementation of QA programs vary substantially from one State Highway Agency (SHA) to another. Such variations are related to many issues including (16):

1. The number of factors or attributes and their levels used in the QC components of the QA program for acceptance purposes. For example, early finish, ride quality, material quality and so forth.
2. The test methods, frequencies, and sample locations included in the QC.
3. The levels of risks used for acceptance (no pay adjustment), rejection (no pay adjustment), and for incentives/disincentives (pay adjustment).
4. The I/D pay schedule or rates.
5. The outfit (whether a contractor or the agency) that conduct the QC tests and the method of verification of the test results.
6. The method by which the independent assurance component of the QA program is administered.

The above six issues are addressed in the National Cooperative Highway Research Program (NCHRP) Synthesis 346 (16) as follows: “The ways these issues have been addressed reflect the evolutionary process that the QA programs have undergone over the last thirty years.” Some of the major changes that have taken place emerged from title 23, part 637, Code of Federal Regulations (23 CFR 637), the Federal Highway Administration (FHWA) “Quality Assurance Procedures for Construction.” The 23 CFR 637 regulations that were adopted in 1995 require among many other construction related issues, that each SHA develop a QA program for the National Highway System under their jurisdiction.

In the NCHRP Synthesis 346, forty-five SHAs were surveyed regarding their I/D specifications, I/D pay items, and QA programs. Results of the survey are summarized below.

Regarding pay adjustment provisions for HMA (16):

- Thirty-nine SHAs use pay adjustment provisions
- Six SHAs use an accept/reject plan
- No single agency uses only incentive clauses, whereas nine agencies use only disincentive clauses, and thirty-two use both

Relative to the type of QA programs for hot-mix asphalt (HMA) (16):

- Two SHAs use material quality and methods provisions.
- Twenty-one SHAs use QA programs with the contractor controlling the quality and the agency performing the acceptance tests (QC).
- Twenty-five SHAs use QA programs with the contractor controlling the quality and the agency using contractor test results for acceptance.

For asphalt pavement reconstruction and rehabilitation projects, the attributes that are most often used by SHAs for QC and acceptance of HMA vary from one agency to another. Based on their responses to the NCHRP questionnaire, the numbers of agencies using the specified attributes for QC and acceptance are listed in Table 2.1 (16):

Table 2.1 Attributes used for QC and acceptance of HMA

Attributes	QC	Acceptance
Asphalt content	40	40
Gradation	43	33
Compaction	28	44
Aggregate fractured faces	25	23
Air voids	20	26
Voids in mineral aggregates	26	23
Voids filled with asphalt	19	13
Asphalt film thickness	13	22
Ride quality	16	39
**Based on responses from 44 SHAs		

Likewise, the SHAs were surveyed regarding Portland cement concrete pavements (PCCP). Their responses are summarized below.

Regarding pay adjustment clauses (16):

- Twenty-eight SHAs use I/D pay adjustment clauses
- Seventeen agencies use an accept/reject plan
- One agency uses only incentives, twelve use only disincentives, and sixteen use both

Regarding the PCCP QA programs (16):

- Fifteen agencies use material quality and methods provisions.
- Eleven agencies perform QC testing for acceptance.
- Sixteen agencies use QA programs with the contractor controlling the quality and the agency performing the acceptance tests (QC).
- Thirteen agencies use QA programs with the contractor controlling the quality and the agency using contractor test results for acceptance.

For concrete pavement reconstruction and rehabilitation, the attributes that are most often used by SHAs for QC and acceptance of PCCP vary from one agency to another. Based

on their responses to the NCHRP questionnaire, the numbers of agencies using the specified attributes for QC and acceptance are listed in Table 2.2 (16):

Table 2.2 Attributes used for QC and acceptance of PCCP

Attributes	QC	Acceptance
Air content	25	38
Thickness	14	36
Slump	24	33
Cylinder strength	18	31
Gradation	25	26
Beam strength	14	18
Water-cement ratio	12	16
Aggregate fractured faces	7	6
Sand equivalence	0	3
Permeability	0	3
Core strength	0	2
Ride quality	1	15
**Based on the responses of 40 SHAs		

In the 1970s, the concept of incentive pay clauses (pay adjustment) for product quality that was exceptionally better than the one required by the specifications arose amongst many SHAs. This concept was complementary to the disincentive pay clauses previously used for a product of which quality did not meet specifications (13). According to a research study conducted by the Oregon State Highway Division and Oregon State University in 1979, the Illinois Department of Transportation was the only agency to provide a bonus (incentive) payment for high quality and uniform work. Most SHAs applied a negative pay adjustment for construction and material qualities that did not meet the specifications (3). The incentive and disincentive payments encouraged contractors to apply appropriate QC measures to ensure that the finished product quality will equal to or exceed the specified quality levels.

The rationale of the SHAs for using incentive payments is that the small additional cost of good QC practices spent in advance is better than being faced with the anticipated future costs of poor quality construction, which may lead to premature failure of pavements, excessive maintenance repairs and possibly unsafe driving conditions (16). For example, from a statistical review of fifty pavement projects in California it was determined that the costs of projects with I/D specifications increased by approximately three percent. Analysis of the QC test data from these projects indicated that the increase in cost is more than compensated for by the projected reductions in future rehabilitation costs (2).

To this end, SHAs and Transportation Departments in the USA and in other countries use various terminologies in their I/D programs. For completion purposes and for the benefits of the reader, these terminologies are captured in the next section.

2.3 TERMINOLOGIES FOR I/D

The term incentive/disincentive (I/D) is not unique nor is it universal. Several terminologies have been used to express different I/D clauses. These include I/D, liquidated damages, and lane rentals. A contract provision that is called “disincentives” in one SHA might be called “liquidated damages” in another. Regardless of the terminology used, there is a basic and single principle included in every type of I/D clause.

Contractually, the clause states that the payment amount is contingent on variations in the outcomes. The simplest clause in a construction contract specifies the work to be performed and the price to be paid for it, leaving claims attributed to variations from the

uniquely specified outcomes to be settled through administrative or legal processes. Nevertheless, the various terminologies used are summarized below.

Incentives/disincentives (I/D)

Construction specifications containing I/D clauses are considered end-result specifications. End-result specifications require the contractor to take the entire responsibility for producing and placing a product. The SHAs responsibility is to either accept or reject the final product or to apply a price adjustment appropriate with the degree of compliance with the specifications (1, 5). The pay adjustments may include incentives, disincentives or both. For example, for late or early completion, the disincentive specification dictates a payment reduction, typically assessed on a per-day basis, for the tardy completion of construction or of some intermediate milestones. The incentive specification, on the other hand, dictates a bonus, also typically assessed on a per-day basis, for the early completion of construction or of some intermediate milestones. The specifications often set a cap on the size of the incentive payment, but not on the disincentive reduction. Since 1984, I/D specifications have been acceptable for all Federal Aid Highway projects. Currently, the FHWA suggests that the I/D amounts be based upon estimates of items such as traffic safety, traffic maintenance, and road user delay costs. The I/D specifications may include pay adjustment for material quality and for pavement smoothness (ride quality) (21). Examples of MDOT I/D specifications for material quality are provided in Chapter 1 of this report.

Liquidated Damages

Liquidated damages are equivalent to disincentive payments; they do not include incentive payments. In general, liquidated damages are related to administrative, engineering, supervisory, inspection costs, and other expenses that the agency incurs due, for example, to late project completion. Typically, liquidated damages do not consider the cost impact on the road users (21, 32). The most common type of liquidated damage specifications are disincentives for late project completion. A typical liquidated damages clause specifies that payment reduction be assessed on a per day basis. Finally, liquidated damages can be applied at interim milestones (15).

Lane Rentals

The lane rental concept was first developed and implemented by the British Department of Transport in 1983. The lane rental clause assesses a rental fee against the contractor, typically on a per-lane per-hour basis, for the length(s) of time that a contractor closes one or more lanes of an existing road. A fee based on the estimated hours of closure is incorporated into the contract specifications, so that if the work is completed on time the contractor will be paid the bid price. The user cost and/or the impacts of traffic redistribution due to traffic disruption form the basis for the lane rental fee (21, 25, 28). Typical projects in which lane rentals are often implemented include pavement joint repair, replacement of overhead signs, and paving (17).

Between 1984 and 1989 the British Department of Transport implemented lane rental contracts on 100 projects at a total contract price of \$500 million. They estimated that more than 2400 days of lane closure were saved compared to conventional contracts, which represents economic savings of approximately \$100 million. The total bonus cost

(incentive) was about \$16 million or 3.2 percent of the total contract price of the projects (4).

Lane rental has the highest potential for reducing lane occupancy during construction, especially on projects with high-traffic volumes. The Oklahoma Department of Transportation has adopted the “Construction Lane-mile Rentals” policy as common practice. The practice was initiated to reduce user delay by encouraging contractors to work during nonpeak hours and to minimize the length of work zone closures. Limiting the length of work zones increases the public’s acceptance of the work zone, because they no longer see miles of work zones without construction activity. Similarly, the Oregon Department of Transportation has a lane rental specification allowing lane rental in 15 minute increments, with charges as high as \$50,000 per lane per hour during peak use periods, with no fees during nighttime hours (15).

The Minnesota Department of Transportation (Mn/DOT) has also implemented the lane rental concept into a few of its pavement projects and the benefits of this concept as observed by field personnel include (11):

- Contractors were faster at taking down lane closures
- Contractors were required to think more about reducing contract time during the bidding process
- Inspectors saw a reduction in lane closures where no/minimal amount of work was being done
- Incentives for limited lane rentals encouraged contractors to reduce lane closure times

The most commonly used attributes in I/D, liquidated damages, and lane-rental programs are summarized below.

2.4 ATTRIBUTES OF I/D PROGRAMS

A given I/D program may include one or more categories of attributes. In general, the three categories used by most SHAs are early completion, ride quality and material quality. These are summarized below.

Early Completion

It has been determined that traffic volumes are continuing to rise on the majority of roads throughout the country. With the rising traffic volumes, highway capacities during peak hours of the day are nearing capacity. Disruption to the traffic flow due to road construction during these peak hours can cause high levels of user costs (delay, wear and tear, etc.). While the level of user costs is difficult to quantify, it is a national consensus that it needs to be reduced as much as possible. For early completion programs, SHAs set I/D payments in an attempt to reward the contractor with an amount that is equal to the benefit of early completion or the cost of delayed completion (18). In the summary of the NCHRP Project 20-7, it is stated that contractors and the highway agencies in favor of awarding early completion bonuses believe that the amount assessed against the contractor for late completion should equal that for early completion (21).

Ride Quality

The ride quality of a pavement can be defined as the level of ride comfort experienced by the passengers of a vehicle as it traverses the pavement at the posted speed limit.

Equipment such as the California profilograph, regular straightedge, profilometer, and rolling straightedge are most commonly used for measuring pavement smoothness or ride quality (23). Numerous studies from the Federal Highway Administration (FHWA), National Cooperative Highway Research Program (NCHRP), and the National Asphalt Pavement Association (NAPA) have found that pavements built smoother tend to last longer. The main reason is the effect of the dynamic loading caused by rougher pavements, which results in higher loads (22, 31).

The two most commonly used pavement roughness indices are the International Roughness Index (IRI) and Profilograph Index (PrI). The IRI can be calculated from the longitudinal pavement profile measured by any profiler calibrated to the outputs of the quarter car simulator. The PrI is based on profilograph measurements of a pavement longitudinal profile. Computer programs are then used to compute the PrI. The PrI is determined by counting the number of locations along a pavement section where the profile trace falls outside a specified limit. Both IRI and PrI are reported in units of inches/mile or meters/kilometer and are collected in either one or both of the wheelpaths within a pavement lane (26).

Some of the other smoothness indices used by SHAs include (26):

- RN: Ride Number (used by Florida and New Hampshire DOTs for HMA specifications)
- MRN: Mays Ride Number (used by Arizona and South Carolina DOTs)
- CSI: Cumulative Straightedge Index (used by North Carolina DOT for HMA specifications)

- RQI: Ride Quality Index (used by MDOT for both HMA and PCCP specifications)

The application of ride quality I/D specifications for either flexible or rigid pavements motivate the contractors to construct the pavement to a predetermined desired smoothness. Most SHAs use ride quality incentive specifications and virtually all SHAs require that the contractor either correct a pavement that doesn't meet a specified smoothness level or accept a pay reduction (disincentive). For the SHAs which do use ride quality I/D, pay adjustments generally take the form of either a lump-sum dollar amount for each lot, or a multiplier applied to the contract unit price paid for the paving material (24). The I/D payments for pavement smoothness in current specifications are based on subjective judgment. The extent to which they actually reflect cost benefits (or lack thereof) is unknown. It has been suggested that the I/D should be rationally based on the increase or decrease in future costs that will be incurred by the SHA and by the users over the life of the pavement (22). Further, most SHAs permit diamond grinding for correction of both PCC and HMA surfaces to achieve desired smoothness specifications, while others require full removal and replacement or additional overlay for correction of HMA pavement.

Material Quality

The primary goal of a highway quality assurance (QA) program is to produce pavements that will provide adequate service throughout their intended design lives with minimal maintenance. Therefore, several SHAs incorporate material quality I/D specifications into their construction contracts. Examples of the MDOT I/D specifications for material

quality are included in Chapter 1 of this report. The material quality I/D specifications vary amongst the SHAs and depend upon the pavement type (asphalt or concrete). Some of the most commonly used parameters include:

Asphalt pavements

- Density
- In-place air voids
- Asphalt content
- Aggregate gradation
- Voids in mineral aggregate (VMA)
- Thickness

Concrete pavements

- Thickness
- Air content
- Slump
- Strength
- Gradation
- Water-cement ratio

Most SHAs pay schedules express the material quality I/D payment amount as a percentage of a unit bid price and then multiplied by the appropriate quantity to obtain the amount by which the contractor's payment is increased or decreased. However, while this material quality pay adjustment approach to highway quality assurance is becoming more popular amongst SHAs, there still is not a consistency of practice regarding the

magnitude of pay adjustment judged appropriate for varying level of as-built quality.

Therefore, there is a need for a method to relate the as-built material quality to the actual pavement performance (31).

2.5 I/D ATTRIBUTES VERSUS PAVEMENT PERFORMANCE

To increase the benefits of the I/D program regarding material and ride quality, the specifications must be related to long-term pavement performance. Performance-related specifications (PRS) describe the desired level of material and construction factors that have been found to correlate with fundamental engineering properties that affect and predict long-term pavement performance (8). These factors are amenable to acceptance testing at the time of pavement construction. Performance-related specifications are difficult to develop, but offer the ideal parameters for I/D payments that results in the ultimate benefits to the agency by decreasing the life cycle cost (3, 30).

PRS are intended to identify the level of quality providing the best balance between cost and performance. Typical material parameters that can be used in performance-related specifications include air voids, asphalt content, density and strength. Presently, the use of performance-related specifications in the USA is limited. The NCHRP synthesis 212 reports that in 1995 several performance-related federal and state projects were underway and that only the New Jersey DOT has implemented PRS for PCC pavements only (14). Subsequent to the NCHRP report, several studies were initiated to develop PRS for asphalt concrete pavements. NCHRP and FHWA have funded a five-year study (Westrack) to develop PRS for asphalt concrete pavements using the Westrack facilities. The study, which was completed in February 2000 included PRS based on the HMA

volumetric factors only. Questions have been raised regarding the broad applicability of these PRS given that all performance data resulted only from the testing in Nevada. It is expected that future reports will resolve some of these issues. In the mean time, the use of Westrack-based PRS would require substantial field calibration (21). In discussions about the future directions of PRS, it was stated that PRS, when correctly applied, could identify the level of quality that provides the best balance between cost and performance and ensure the attainment of that level in the constructed pavements (20).

In Canada, the agencies that have implemented PRS include the highway departments of British Columbia, Alberta, Quebec, New Brunswick, Nova Scotia, Public Works and Government Services Canada, and the Department of National Defense. Most of the agencies with the exception of Quebec have only recently implemented a PRS system and are using it on a limited number of projects. In Quebec, PRS are included in all of their major pavement construction and rehabilitation contracts. Additionally, Quebec has indicated that it is very difficult to evaluate the effect of implementing PRS on the service life, construction costs, and maintenance requirements on the pavements. However, the general consensus is that the implementation of PRS have increased initial construction costs and reduced the variability in pavement construction, which would likely result in an increased pavement life and reduced maintenance costs (7).

2.6 OTHER CONTRACTING METHOD - WARRANTY SPECIFICATIONS

A warranty specification is a type of performance-based contract in which the SHA specifies pavement performance only and the contractor warrants the pavement for performance over a specific period of time (33). During the warranty period, the

contractor is responsible to repair, at their own expense, any pavement defects. This type of warranty assigns a large portion of the pavement performance risk to the contractor. Traditionally, within the United States construction contracts usually require the contractor to provide warranty for a pavement project for only one year after project completion although the design life of most pavements is much longer than one year. Therefore, SHAs are increasingly requesting longer term warranties (6).

Examples of the pavement performance thresholds for a five year warranty specification, used by the Indiana Department of Transportation include (29):

- IRI – 133 inches/mile
- Rut depth – 0.375 inches
- Surface friction number – average of 35 and no single section below 25
- Transverse cracking – Severity 2 as defined by Indiana DOT
- Longitudinal cracking – 18 ft per 500 ft pavement section

Warranty specifications usually specify performance over two to seven years and have been specified for up to twenty years. Some European highway agencies have been using asphalt pavement warranties for more than forty years, but they have been used sparingly in the United States. This is mainly due to the industry being reluctant to change and due to the severe legal restrictions that the Federal Government places on warranty use (29). However, the Wisconsin DOT has occasionally used a five-year asphalt pavement warranty program. After examination of case study data from their warranty program it was determined that the data shows a significant improvement in the quality of

construction when comparing ride and distress values for warranted and non-warranted pavement sections (12).

CHAPTER 3

DATA COLLECTION

3.0 INTRODUCTION AND BACKGROUND

The Michigan Department of Transportation (MDOT) has initiated an in-house study of the MDOT incentive/disincentive (I/D) program to determine its costs and benefits.

During the study, a list of 612 pavement projects was compiled (the majority of which have I/D specifications and have been constructed between 1990 and 2006). The information for the compiled list of projects were obtained from the following sources:

- A new software (called “Bridge”) that links various data files to identify each pavement project by its control section and job number.
- Conversations with various Regions, Cities and Transportation Service Centers (TSC) and MDOT personnel.

The MDOT list contained the following information:

- Key ID number related to the source of the information
- Control section
- Job number
- Route number
- Project beginning and ending mileposts
- Description of project location
- Type of work done
- Basis for I/D payments
- Year of construction

At the beginning of this study, the Michigan State University (MSU) research team divided the MDOT I/D project list into two groups. One group included all pavement projects that included ride quality I/D specifications. The second group included the rest of the pavement projects (few projects have no I/D specifications whereas the majority of the projects have material quality I/D specifications).

During the course of this study, the MSU research team randomly selected seventy-seven pavement projects from the MDOT list and requested from MDOT available project records and data files. These include the project contract proposal, the project financial files and the project distress data since construction (34 to 80). In addition, the research team used the MDOT projectwise software and viewed available microfilms to obtain additional data elements that are related to the analyses of the costs and benefits of the MDOT I/D program and to pavement performance. Results of the data collection search are presented in the next section.

Prior to the commencement of the data search of the seventy-seven pavement projects, the MSU research team compiled an initial list of data elements that are needed to conduct complete and comprehensive analyses of the costs and benefits of the MDOT I/D program. These data are listed below.

- The monetary size of the I/D
- The specifications as applied to the I/D (pay items)
- Quality assurance, quality control (QA/QC) test results as they relate to I/D
- The locations along the pavement project where I/D are applied

- The pavement's condition prior to improvement
- The type of fix (overlay, overlay with repair patching, etc.)
- Sufficient and reliable pavement condition (distress) data after project completion
- Sufficient and reliable ride quality data in term of the ride quality index (RQI)
- Traffic levels before and after the project completion
- Subsequent pavement fixes and routine maintenances and their associated costs since project completion, such as the data compiled by the current MDOT pavement performance study

The above data list will be used by the search team as a reference in its data collection activities.

3.1 PAVEMENT PROJECT DATA COLLECTION

The data collection activities was commenced when the research team started receiving from MDOT the requested data files and project records of the seventy-seven pavement projects and when access to the projectwise software was granted. Seventy-two project files were received from MDOT. The files of five pavement projects were not located by MDOT by the time when this thesis was written.

The seventy-two pavement project files and records were then examined. It was found that sixty-two project files contain I/D specifications whereas ten project files have no I/D specifications. Results of the data search are summarized below.

- ◆ The data files and project records of forty-four pavement projects with I/D specifications were found to have sufficient data to perform further analyses of the costs and benefits of the MDOT I/D program.
- ◆ The files and records of eleven pavement projects were not complete. Some of the records such as the financial records were missing or contained some relevant but unexplained data. For example, the financial record of the project contains incentive payments in different parts of the record without explaining the meaning or the differences between the parts.
- ◆ The files and records of four pavement projects without I/D specifications were found to have sufficient data to compare the projects to those with I/D specifications.
- ◆ The files and records of six pavement projects indicated that the type of fix was preventive maintenance; hence, for these six projects, no further project data were requested or collected.
- ◆ Seven pavement projects were recently constructed. Hence, no sufficient distress data are available to analyze long-term pavement performance. Hence, no further data were collected for these projects.
- ◆ The files and records of five pavement projects were not located in time to be included in thesis, summarizing the Phase I study.

Table 3.1 provides a generic list of the available and missing data elements. It should be noted that the available data elements in the table are those found in forty-four pavement projects. The data files and project records of the remaining eighteen projects were found to have some of the available data listed in Table 3.1. Further, all the available data

elements in the table were obtained from the MDOT files. The missing data elements, on the other hand, were not located in any of the files searched by the research team.

For the seventy-seven pavement projects, Table 3.2 provides a detailed list of all available data that were found in the MDOT data files and project records and are relevant to this study. As can be seen from the table, the data for most pavement projects include:

- Control section, job number, route number, and beginning and ending mile posts (descriptions of project limits), these data were used to link different data files related to the project history such as the distress data files.
- Year of construction, the data were and will be used to restart the clock on the distress index.
- Type of fix, the data will be used to compare one pavement project with I/D specifications to a comparable one without I/D specifications.
- The I/D pay specification (i.e., bituminous quality initiative, concrete quality initiative); the data will be used to compare the pavement type to that found in the PMS data and to match the project to a similar one without I/D specifications.
- Total paving cost and I/D payments; the data were and will be used to compute the rate of I/D payment/penalty per total paving material costs. Originally, it was proposed to normalize the I/D payments relative to project length, this however was inadequate because of the thickness of the pavement surface layer. The rate of I/D payment will be compared to the planned rate and will be used to compare the

performance of pavement projects having different I/D pay rates or no I/D specifications.

- I/D specification and pay rate schedule; the data will be used to identify the basis for I/D payment/penalty.
- Planned and placed quantities; the data will be used to indicate whether or not I/D payments are made along the full or partial length of the project.
- Historical and detailed distress data and distress index for each 0.1 mile of pavement along the project; the data will be used to determine the types of distress along the project, the distribution of DI, the average DI for the entire project, the remaining service life (RSL), and to estimate the pavement performance in term of pavement life.

For all seventy-two pavement projects, there are at least four missing data elements (see Table 3.1). The role of the missing data elements and their ramification relative to the analyses of the I/D program are addressed below.

- **QA/QC test results** - No QA/QC test results were found in any MDOT data files and project records. The ramification of these missing data is that certain type of analyses or information cannot be obtained. These include:
 1. The basis for I/D payments/penalties (such as density, asphalt content, air voids, etc.).
 2. The level at which the as-constructed material quality met the I/D specifications.
 3. The percent of the project or the number of lots or sublots that met the I/D specifications and received I/D payments/penalties.

4. The distribution of I/D payments/penalties and I/D pay schedule along the project.
5. The impact of the level of material quality on long-term pavement performance.

- **Reference location along the project where I/D payments/penalties were made –**

For any given pavement project with I/D specifications, the I/D payments/penalties may have been carried out in various scenarios as follows:

1. The extent of the I/D payments/penalties is along the entire length of the pavement project.
2. I/D payments are made along portions of the pavement projects.
3. I/D penalties were applied along portions of the pavement project.
4. I/D payments and penalties were made along different portions of the pavement project.

The lack of I/D payments/penalties reference location along the project prevents the analyses of the following issues:

1. The true impact of the I/D payments/penalties on long-term pavement performance of that portion of the project where I/D payments/penalties were applied.
2. The true I/D pay rate for that portion of the project where I/D payments/penalties were applied.
3. The impact of the true I/D pay rate on pavement performance.

The above consequences of the missing reference location of I/D payments/penalties can be partially alleviated by:

1. Calculating the rate of the actual I/D payments/penalties as percent of the paving material cost. The calculated I/D rate will always be less than the specified rate.

Higher calculated I/D rates may indicate one of the following scenarios:

- a) The entire pavement project or higher fraction of the project received incentive payments.
- b) Higher level of material quality was met.
- c) No disincentive penalties were applied.

Regardless which scenario is true, care must be taken as not to jump to early conclusions.

2. Calculating the average long-term pavement performance in term of pavement life for the entire pavement project.

3. Studying the impact of the calculated I/D rate on the average performance of the pavement project.

- **Basis for I/D payments** – While it is evident from the financial files that a material quality I/D payment/penalty has been made, it is unknown as to what pavement property qualified for I/D payment/penalty (i.e., density, air voids, VMA, etc.). The lack of this data is aggravated by the lack of the QA/QC test results discussed above. The consequence of the missing data is that one cannot conclude whether or not the specific (material property) basis for I/D payments/penalties should be included or excluded in the future from the I/D program.

- **Initial Ride Quality Index (RQI)** – For pavement projects with ride quality I/D specifications, the initial RQI for which I/D payment/penalty were made is not available in the MDOT data files and records. Hence, the impact of the RQI level on pavement performance cannot be determined. Further, one cannot determine whether or not the ride quality I/D pay rate needs to be adjusted to impact pavement performance more favorably. However, analyses based on the average pavement performance of ride quality I/D projects as compared to projects without ride quality I/D specifications can be conducted. It should be noted that for concrete pavement projects with ride quality I/D specifications, the contractor always has the option to grind the pavement surface to receive incentive payment.

In summary, the ramification of these findings is that complete and comprehensive costs-benefits analyses of each pay provision of the I/D specifications cannot be accomplished. However, the available data support the analyses of the costs and benefits of the I/D specifications as a whole (the I/D program) and perhaps, the effects of pavement type, fix type, and the I/D payment rates on the pavement life improvement of projects with I/D payments. Based on the findings of the Phase I study, a research plan for the Phase II study was developed and is detailed in Chapter 4 of this thesis. Examples of the data assessment are presented and discussed in Chapter 5 of this thesis.

Table 3.1 A summary of available and missing data elements

Desirable data for ideal analyses of the costs and benefits of the I/D program	Available data	Missing data
Project identification		
1. Control section	x	
2. Job number	x	
3. Route number	x	
4. Location description	x	
5. Pavement type	x	
6. Type and cost of fixes	x	
7. Year of construction	x	
8. BMP	x	
9. EMP	x	
Material		
1. Planned quantities	x	
2. Final or placed quantities	x	
3. Planned material cost	x	
4. Final material cost	x	
5. QC and/or QA test results		x
6. Reference location of I/D		x
7. Basis for I/D payments		x
8. Planned incentive (\$)	x	
9. Final paid incentive and penalty(\$)	x	
10. Rate for pay adjustment scale	x	
Ride Quality		
1. Initial ride quality index (RQI)		x
Traffic		
1. Traffic Data	x	
Pavement Performance Data		
1. Control section	x	
2. BMP and EMP	x	
3. Route number	x	
4. Pavement type	x	
5. Uniform sections (RSL)	x	
6. 0.1-mile DI before & after construction	x	
7. Raw distress data for each 0.1-mile	x	
8. RQI history	x	

Table 3.2 Available data for seventy-seven pavement projects

Project Information									
Year Built	Key ID #	CS	JN	Route	Limits Description of Project	Type of Work Done	CS/PR POB	CS/PR POE	Total Paving Cost
1997	3419	06073	32357	US-23	M-65 to Augres East City Limit	Resurfacing and Shoulders	0.000	6.300	\$901,232.03
1997	3420	06073	32358	US-23	East City Limit Augres to North Co Line	Resurfacing and Shoulders	6.300	17.800	\$1,457,072.13
1999	Strupulis	08032	45621	M-37	M-43 to Middleville	Bituminous Resurfacing and Shoulder	0.000	9.060	\$1,909,297.00
1996	2473	09032	34075	M-13	Wildier Road to I-75/M-13 connector	Bituminous Resurfacing and Shoulders	0.000	4.410	\$399,506.00
1997	1759	11017	38094	I-94 EB	M-140 to W of Co Road 687	Reconstruct and Overlay	5.875	6.603	\$1,361,705.96
1997	1295	11057	34507	US-31 Rel	US-31 Rel @ Matthew Road	Relocation Route Construction	8.888	9.844	\$201,826.02
1998	2072	11111	44788	I-196	L-94 to N County Line	Resurface, Mill and Pulverize	0.000	7.930	\$2,638,095.02
1998	4904	11112	38605	US-31	N of River Road to S of Naomi	Relocation Existing Route	14.100	17.800	\$615,188.27
2000	Strupulis	12033	45533	I-69	Indiana State Line to Warren Road	Reconstruction and Drainage	0.000	5.800	\$2,421,369.81
2000	Strupulis	12033	45877	I-69	Lake Warren Road to US-12	Reconstruct Existing Road	5.800	11.000	\$2,735,241.41
2002	Strupulis	12033	49921	I-69	US-12 to State Road	Reconstruct Existing Pavement	9.700	12.378	\$1,895,229.07
2002	Strupulis	13011	38086	M-37	Moshier Avenue to Beechfield Road	Resurface, Mill, and Pulverize	0.900	4.760	\$1,300,053.20
2002	Strupulis	13021	38091	M-60	East of West County Line to US-27	Resurface, Mill, and Pulverize	0.580	8.977	\$1,505,493.29
1998	1026	13031	34497	M-66	S Drive South Nthly to L Drive South	Bituminous Resurfacing	2.510	6.360	\$338,479.18
1999	Strupulis	13074	49029	I-69	L-94 to Eaton County Line	Unbonded Conc Overlay	1.000	8.820	\$725,088.00
1997	2957	18031	38620	US-27 BR	US-27 BR @ Colonville Road	Left Turn Lane and Widening for Ramp	1.700	2.000	\$87,952.65
1996	2937	18042	32325	M-61	US-27 to E County Line	Pulverize and Resurface	0.175	8.556	\$450,387.63
1996	3864	28052	35018	M-37	US-31/M-72 to NCL Traverse City	Reconstruct and Widen	0.081	8.010	\$135,482.56
1997	3865	28052	38617	M-37	US-31, M-37, & M-72 (Front Street)	Widen for center turn lane	0.000	0.081	\$9,348.56
1997	4242	39102	32377	M-89	W of 42 nd Street to E of Augusta Drive	Mill and Resurface	4.513	8.448	\$425,307.00
2000	Kind	41031	34693	M-37	S of Kraft NW to N of 60th St	Reconstruct Boulevard	4.251	7.231	\$1,614,197.05
1996	6555	41031	34695	M-37	S of 44th Street NW to N of 32 nd Street	Reconstruct Boulevard	8.393	10.698	\$1,169,224.17
1996	2476	41062	38175	M-11	Chicago Drive to US-131	Resurface, Mill and Pulverize	0.000	3.560	\$815,856.12
2001	Kind	41131	44778	US-131	S Kent County Line N to 76 th Street	Mill and Resurface	0.000	4.048	\$1,219,680.46
1994	2071	43021	32402	US-10	W. Lake Co Line to M-37	Bituminous Resurfacing	0.000	9.256	\$514,397.00
1997	1945	44011	39584	M-24	Brauer Road to I-69	Resurface, Mill and Pulverize	1.287	9.510	\$808,752.50
1999	6168	47065	28215	I-96	Chilson Road to W of Dorr Road	Reconstruction and add Lanes	4.050	5.460	\$2,237,343.53
1999	5232	63043	30157	M-59	At Squirrel Road, Auburn Hills	Construct New Interchange	3.305	3.354	\$827,206.83
1999	5232	63043	30157	M-59	At Squirrel Road, Auburn Hills	Construct New Interchange	3.305	3.354	\$1,701,265.83
2001	Wilson	74031	45847	M-19	Peck to Sandusky	Resurface, Mill, and Pulverize	7.360	18.607	\$1,282,774.66
1995	Kallio	75022	34057	US-2	W of Co Rd 432 to the Mackinac Co Line	Bituminous Resurfacing	13.686	25.909	\$893,157.09
2001	Wilson	79031	45850	M-15	Millington to Vassar	Bituminous Resurface and Bit Shoulder	4.349	9.996	\$644,809.74
1997	2917	82061	26748	US-12	Belleville Road - Lotz Road	Reconstruct Boulevard	2.790	5.260	\$1,592,633.25
1997	2917	82061	26748	US-12	Belleville Road - Lotz Road	Reconstruct Boulevard	5.260	5.740	\$1,592,633.25
1997	3225	82144	38108	M-102	Kelly Road to I-94	Resurface Mill and Pulverize	1.360	2.675	\$441,911.34
1998	1263	82194	36005	I-75	Fort Street to Grand Boulevard	Road and Shoulder Reconstruction	4.580	6.990	\$681,772.92
1998	1263	82194	36005	I-75	Fort Street to Grand Boulevard	Road and Shoulder Reconstruction	4.580	6.990	\$2,833,029.15
2000	1260	82291	44574	I-275 SB	Newburgh Road to Northline Road	Reconstruction South Bound Road	0.000	8.423	\$676,911.46
2002	Kirkby	83031	48338	US-131 BR	S of US-131/US-131BR int to SCL Cadillac	Grading & Dr Str, Bit Widen to 5 lanes, C&G	4.739	4.850	\$282,820.90
2002	Kirkby	83031	48338	US-131 BR	S of US-131/US-131BR int to SCL Cadillac	Grading & Dr Str, Bit Widen to 5 lanes, C&G	4.850	5.617	\$282,820.90
1998	1386	83033	33006	US-131 RL	S Cadillac to M-55	Relocate Existing Route	0.000	3.000	\$140,370.01
1997	4781	83033	33007	US-131 RL	N of M-115 to S of Boon Road	Bit construction & 2 new structures	3.000	8.450	\$2,510,868.78
1997	1477	83033	43613	US-131 RL	S Pole Road to N/ 36 Road	New Bridges	6.872	9.738	\$506,900.28
1998	1319	83052	37903	M-115	28 Road to E of Lake Mitchell Dr	Cold Milling and Resurfacing	8.850	17.300	\$704,647.61

Table 3.2 (cont'd)

Project Information		Incentive/Disincentive							Distress Data			Incentive (\$)					
CS	JN	I/D Pay Item	Spec.	Pay Rate/ Schedule	Planned Quantity (Ton - Flex, m2 - Rigid)	Placed Quantity (ton Flex; m2 - Rigid)	Planned Incentive (\$)	Paid I/D (\$)	1/10th mile DI Data	Detailed Distress Data	per project mile	Planned per Planned Quantity	Planned per Planned Quantity	Paid per Placed Quantity	percentage of Total Paving Cost	Planned quantity per mile	
06073	32357	Bituminous Quality Initiative	Folder	Folder	36622	40780.82	\$56,350.00	\$45,086.58	X	X	\$7,156.60	\$1.54	\$1.23	\$1.11	5.00%	5813.02	
06073	32358	Bituminous Quality Initiative	Folder	Folder	62179	66195.81	\$95,000.00	\$76,011.09	X	X	\$6,609.66	\$1.53	\$1.22	\$1.15	5.22%	5406.87	
08032	45621	Bit Quality Initiative	Folder	Folder	53710	56948.32	\$87,375.00	\$126,093.89	X	X	\$13,917.65	\$1.63	\$2.35	\$2.21	6.60%	5928.26	
09032	34075	Bituminous Quality Initiative	Folder	Folder	20252	20788.89	\$37,685.00	\$64,467.94	X	X	\$14,618.58	\$1.86	\$3.18	\$3.10	16.14%	4592.29	
11017	38094	Concrete Strength Adjustment	Folder	Folder	28359	23824.24	\$15,934.00	\$31,128.70	X	X	\$42,759.20	\$0.56	\$1.10	\$1.31	2.29%	38954.67	
11057	34507	Bituminous Quality Initiative	Folder	Folder	5625	6716.34	\$8,440.00	\$14,623.85	X	X	\$15,296.91	\$1.50	\$2.60	\$2.18	7.25%	5883.89	
11111	44788	Bituminous Quality Initiative	Folder	Folder	88050	83275.11	\$133,500.00	\$72,022.50	X	X	\$9,082.28	\$1.52	-\$0.82	-\$0.86	-2.73%	11103.40	
11112	38605	Bituminous Quality Initiative	Folder	Folder	21173	22282.99	\$25,052.00	\$47,988.96	X	X	\$12,969.99	\$1.18	\$2.27	\$2.15	7.80%	5722.43	
12033	45535	Concrete Quality Initiative	Folder	Folder	140609	138919.258	\$36,691.00	\$65,132.72	X	X	\$11,229.78	\$0.26	\$0.46	\$0.47	2.69%	24242.93	
12033	45877	Concrete Quality Initiative	Folder	Folder	155830	154983.994	\$77,936.00	\$65,132.72	X	X	\$12,525.52	\$0.50	\$0.42	\$0.42	2.38%	29967.31	
12033	49921	Concrete Quality Initiative	Folder	Folder	83636	84335.966	\$43,432.00	\$48,988.40	X	X	\$18,292.91	\$0.52	\$0.59	\$0.58	2.58%	31230.77	
13011	38086	Bit Quality Initiative	Folder	Folder	26940	32830.12	\$97,318.00	\$135,239.94	X	X	\$35,036.25	\$3.61	\$5.02	\$4.12	10.40%	6979.27	
13021	38091	Bit Quality Initiative	Folder	Folder	37149	37490.43	\$70,400.00	\$75,235.52	X	X	\$8,959.81	\$1.90	\$2.03	\$2.01	5.00%	4424.08	
13031	34497	Disincentive Bit Qual Initiative	Folder	Folder	14264	13495.98	\$22,431.00	\$15,606.46	X	X	\$4,053.63	\$1.57	-\$1.09	-\$1.16	-4.61%	3704.94	
13074	49029	Concrete Quality Initiative	Folder	Folder	23276	29093.52	\$110,000.00	\$59,424.11	X	X	\$7,598.99	\$4.73	\$2.55	\$2.05	8.20%	2976.47	
18031	38620	Disincentive Bituminous Mixture	Folder	Folder	3290	2979.25	\$5,774.00	-\$14,004.22	X	X	\$46,680.73	\$1.76	-\$4.26	-\$4.70	-15.92%	10966.67	
18042	32325	Bituminous Quality Initiative	Folder	Folder	21587	22317.92	\$33,381.00	\$47,803.67	X	X	\$5,703.81	\$1.55	\$2.21	\$2.14	10.61%	2575.71	
28052	35018	Bituminous Quality Initiative	Folder	Folder	5030	5522.49	\$8,526.00	\$5,653.06	X	X	\$7,754.54	\$1.70	\$1.12	\$1.02	4.17%	6899.86	
28052	38617	Bituminous Quality Initiative	Folder	Folder	321	359.56	\$740.00	\$0.00	X	X	\$0.00	\$2.31	\$0.00	\$0.00	0.00%	3962.96	
39102	32377	Bituminous Quality Initiative	Folder	Folder	15417	17430.98	\$25,231.00	\$24,699.79	X	X	\$6,276.95	\$1.64	\$1.60	\$1.42	5.81%	3917.92	
41031	34693	Bituminous	Folder	Folder	56735	46267.084	\$174,477.00	\$62,471.09	X	X	\$20,963.45	\$3.08	\$1.10	\$1.35	3.87%	19038.59	
41031	34693	Bit Quality Initiative	Folder	Folder	49101	51544.17	\$82,657.50	\$78,480.00	X	X	\$34,047.72	\$1.68	\$1.60	\$1.52	6.71%	21301.95	
41062	38175	Bituminous Quality Initiative	Folder	Folder	23300	25501.08	\$36,086.00	\$13,255.95	X	X	\$3,723.58	\$1.55	\$0.57	\$0.52	1.62%	6544.94	
41131	47778	Bituminous	Folder	Folder	25900	25822.78	\$24,537.00	\$60,055.31	X	X	\$14,846.80	\$0.95	\$2.32	\$2.33	4.92%	6402.97	
43021	32402	Incentive Bituminous Mixture 13A	Folder	Folder	21246	20906	13A ADJ	\$14,314.35	X	X	\$4,463.52	---	\$1.94	\$1.98	8.03%	2295.38	
44011	39584	Bituminous Quality Initiative	Folder	Folder	28321	30777.75	\$42,826.50	\$65,846.46	X	X	\$8,007.60	\$1.51	\$2.33	\$2.14	8.14%	3444.12	
47065	28215	Concrete Strength Initiative	Folder	Folder	160396	164115.54	Adjustment	\$71,031.01	X	X	\$50,376.60	---	\$0.44	\$0.43	3.17%	113756.03	
63043	30157	Bituminous Quality Initiative	Folder	Folder	8709	7619.52	\$22,110.00	\$19,272.86	X	X	\$77,401.04	\$2.54	\$2.21	\$2.53	6.71%	34975.90	
63043	30157	Conc Quality Initiative	Folder	Folder	58262	57549.88	\$22,012.00	\$36,247.89	X	X	\$145,573.86	\$0.38	\$0.62	\$0.63	2.13%	233983.94	
74031	48547	HMA	Folder	Folder	38202	35026.8	\$152,523.00	\$68,294.75	X	X	\$6,072.26	\$3.99	\$1.79	\$1.95	5.32%	3396.64	
75022	34057	HMA	Folder	Folder	50842	50313.18	QA ADJ	\$81,845.87	X	X	\$6,696.05	---	\$1.61	\$1.63	9.16%	4159.54	
79031	45850	HMA	Folder	Folder	22194	20223.5	\$85,302.00	\$57,602.57	X	X	\$10,200.56	\$3.84	\$2.60	\$2.85	8.93%	3930.23	
82061	26748	Bituminous Quality Initiative	Folder	Folder	59550	63615.5	\$95,607.00	\$46,440.55	X	X	\$18,801.84	\$1.61	\$0.78	\$0.73	2.92%	24109.31	
82061	26748	Bituminous Quality Initiative	Folder	Folder	59550	63615.5	\$95,607.00	\$46,440.55	X	X	\$96,751.15	\$1.61	\$0.78	\$0.73	2.92%	124662.50	
82144	38108	Bit Quality Initiative	Folder	Folder	13705	13294.23	\$20,780.00	\$13,309.59	X	X	\$10,121.36	\$1.52	\$0.97	\$1.00	3.01%	10422.05	
82194	36005	Bit Quality Initiative	Folder	Folder	16678	16886.9	\$10,329.00	-\$13,034.39	X	X	-\$5,408.46	\$0.62	-\$0.78	-\$0.77	-1.91%	6920.33	
82194	36005	Concrete Quality Initiative	Folder	Folder	108094	107511.3	\$43,291.00	\$60,832.80	X	X	\$25,241.83	\$4.00	\$0.56	\$0.57	2.15%	44852.28	
82291	44574	Bituminous Quality Initiative	Folder	Folder	18971	20626.55	\$31,500.00	\$63,229.00	X	X	\$7,506.71	\$1.66	\$3.33	\$3.07	9.34%	2252.29	
83031	48538	Bituminous - Disincentive	Folder	Folder	7084	7191.23	\$22,146.00	-\$35,400.28	X	X	-\$318,921.44	\$3.13	-\$5.00	-\$4.92	-12.52%	63819.82	
83031	48538	Bituminous - Disincentive	Folder	Folder	7084	7191.23	\$22,146.00	-\$35,400.28	X	X	-\$46,154.21	\$3.13	-\$5.00	-\$4.92	-12.52%	9235.98	
83033	33006	Bit Quality Initiative	Folder	Folder	5817	5957.98	\$10,940.00	\$12,646.35	X	X	\$4,215.45	\$1.88	\$2.17	\$2.12	9.01%	1939.00	
83033	33007	Bit Quality Initiative	Folder	Folder	99950	~~~~~	\$85,529.00	\$78,020.67	X	X	\$14,315.72	\$0.86	\$0.78	---	3.11%	18339.45	
83033	43613	Bituminous Quality Initiative	Folder	Folder	21375	19173.56	\$34,932.00	\$1,741.80	X	X	\$607.75	\$1.63	\$0.08	\$0.09	0.34%	7458.13	
83052	37903	Disincentive Bituminous Mixture	Folder	Folder	27737	28814	\$47,850.00	-\$6,158.52	X	X	-\$728.82	\$1.73	-\$0.22	-\$0.21	-0.87%	3282.49	

Table 3.2 (cont'd)

Project Information									
Year Built	Key ID #	CS	JN	Route	Limits Description of Project	Type of Work Done	CS/PR POB	CS/PR POE	Total Paving Cost
Pavement Projects Having No Incentive/Disincentive Specifications									
1995	Ramos	11015	29580	I-94	1/2 Mile 23 to 28	Concrete Paving	19.8	23.431	\$3,400,015.00
1994	Kind	41132	33805	US-31	I-96 Intersection to M-57	Pavement Patching	0.88	13.077	\$480,774.00
2000	1260	82291	44574	I-275 SB	Newburgh Road To Northline Road	Reconstruction South Bound Road	0	8.423	\$676,911.46
2001	6253	63192	34962	M-5	12 Mile Road to N of 14 Mile Road	New Route Construction	1.876	4.117	
Pavement Projects with Preventative Maintenance Fix Type									
2002	Kind	70024	60495	I-96 WB	96th Ave E 64th Ave	Multiple Course Micro-Surfacing	1.91	6.561	PM project
2002	Kind	70024	60265	I-196	64th Ave to 32nd Ave	Multiple Layer Micro Surfacing	6.61	10.618	PM project
2002	Kind	70081	60279	M-104	East of Kreuger Rd East to I-96	Coldmilling and Resurfacing	3.007	7.335	\$389,840.94
1999	Kallio	55022	45116	US-2/US-41	US-41 in Powers to Delta County Line	Bituminous Resurfacing	0.05	9.58	\$443,777.82
1999	4790	12022	47583	US-12	Lott Road to Quincy/Grange Road	Bituminous Overlay	2.166	5.226	\$152,318.79
1998	Kind	70023	38181	I-196	US-31 to I-196	Concrete Pavement Restoration	0.02	5.48	\$317,540.93
Pavement Projects Missing Some Data Elements									
1995	Kallio	75022	34057	US-2	W of Co Rd 432 to the Mackinac Co Line	Bituminous Resurfacing	13.686	25.909	\$893,157.09
2001	Strupulis	13032	39654	M-66	M-66 at Pennfield Road	Bituminous Intersection Improvement	4.44	4.76	
1999	4749	25402	46500	Stewart	ML King Boulevard to Saginaw St	Reconstruction	0	0.644	\$125,029.65
1996	3716	59051	32346	M-66	M-44 to Sheridan So Village Limit	Resurface and Pulverize	0	6.69	
1995	5773	77041	36541	M-136	Kilgore Road to Beard Road	Bituminous Surfacing and Minor Widening	3.98	8.8	
1997	Ramos	11017	32516	I-94	1/2 Mile 34 to 40	Concrete Paving	0.033	5.87	\$1,307,994.55
1997	Ramos	11017	32516	I-94	1/2 Mile 34 to 40	Concrete Paving	0	2.031	\$2,689,606.85
1999	2641	19033	33576	US-27 Rel	Clark Road To Chadwick Road	Construction of New Road	3.008	8.109	
2000	Kind	41064	33337	I-96	Thornapple River Drive to W of Whitney Dr	Reconstruction & Structure Widening	1.9	4.064	
1998	1260	82291	44574	I-275 SB	Newburgh Road To Northline Road	Reconstruction South Bound Road	0	8.423	\$4,428,293.38
2001	Kind	41131	53331	US-131	N of Pearl Street to Ann Street	Concrete Pavement Restoration	14.3	16.15	\$503,214.06
Pavement Projects - Project Files and Records Were Not Located									
1996	3716	34033	32346	M-66	M-44 to Sheridan So Village Limit	Resurface and Pulverize	0	9.278	
1996	6375	74032	40604	M-19	M-46 to North Sanilac County Line	Hot In Place Bituminous Recycling	0	18.105	
2001	Kind	41131	56955	US-131NB	N of 28th Street to Wealthy Street	Concrete Pavement	10.328	13.24	
2000	Kind	41133	52768	US-131NB	NB Ramps 14 Mi Road to 17 Mi Road	Concrete Joint Repair	0.635	3.25	
1997	1759	80023	38094	I-94 EB	M-140 to W of Co Road 687	Reconstruct and Overlay	0	2.273	
Pavement Projects that are too Recent(since 2002)									
2003	Wilson	79032	48599	M-15	Vassar to M-46	Resurface, Mill, and Pulverize	0.8	5.34	\$224,063.87
2003	Ramos	11015	60510	I-94	Exit 23 to the State Line	Bituminous Resurfacing	0	19.398	\$457,157.95
2004	Strupulis	13073	50776	I-69	J Drive South to A Drive North	Major Rehabilitation	7.8	12.97	\$786,995.68
2003	Kind	41063	74453	M-11	At Kalamazoo Avenue and Breton Avenue	Reconstruct Intersection	1.88	3.017	
2003	Strupulis	13073	50775	I-69	Girard Road To J Drive South	Concrete Reconstruction	0	7.91	
2003	Ramos	11112	38613	US-31 Rel	Exit 15 to Exit 24; Ex US-31 to Napier	Concrete Paving	12.188	21.752	
2004	Strupulis	13073	50776	I-69	J Drive South to A Drive North	Major Rehabilitation	7.8	12.97	\$2,641,409.40

Table 3.2 (cont'd)

Project Information		Incentive/Disincentive							Distress Data	
CS	JN	I/D Pay Item	Spec.	Pay Rate/ Schedule	Planned Quantity (Ton - Flex; m2 - Rigid)	Placed Quantity (ton - Flex; m2 - Rigid)	Planned Incentive (\$)	Paid I/D (\$)	1/10th mile DI Data	Detailed Distress Data
Pavement Projects Having No Incentive/Disincentive Specifications										
11015	29580	Concrete	Folder	Folder	200373	201545	~~~~~	~~~~~	X	X
41132	33805	Concrete	Folder	Folder	16868	17170.5	~~~~~	~~~~~	X	X
82291	44574	Concrete	Folder	Folder	18971	20626.55	~~~~~	~~~~~	X	X
63192	34962	Concrete	Folder	Folder			~~~~~	~~~~~	X	X
Pavement Projects with Preventative Maintenance Fix Type										
70024	60495	Bituminous - No Incentive		Preventative Maintenance project			~~~~~	~~~~~	X	X
70024	60265	Bituminous - No Incentive		Preventative Maintenance project			~~~~~	~~~~~	X	X
70081	60279	Bituminous - No Incentive	Folder	Folder	9960	9328.57	~~~~~	~~~~~	X	X
55022	45116	HMA - NO INCENTIVE/DISINCENTIVE	Folder	Folder	17473	17227.4			X	X
12022	47583	Disincentive Bituminous Mixture	Folder	Folder	5253	4812.6	\$1,303.95	-\$10,317.50	X	X
70023	38181	Concrete	Folder	Folder	5492	6756.19	~~~~~	~~~~~	X	X
Pavement Projects Missing Some Data Elements										
75022	34057	HMA	Folder	Folder	50842	50313.18		\$81,845.87		
13032	39654	Bit Quality Initiative	Folder	Folder	3727		\$13,227.00			
25402	46500	Disincentive Bit Density	Folder	Folder	3540		\$3,540.00			
59051	32346	Bituminous Quality Initiative	Folder	Folder	34839		\$54,528.00			
77041	36541	Incen Bit Mix 3B		No proposal or voucher summary in box(\$29604) from RC						
11017	32516	Bit Quality Initiative	Folder	Folder	64270	61293.32	\$1.00	\$137,981.38		
11017	32516	Concrete	Folder	Folder	159922	158822.7		63745.27		
19033	33576	Bituminous Quality Initiative		No Proposal				\$42,221.58		
41064	33337	Concrete	Folder	Folder	Need voucher summary for 33337					
82291	44574	Concrete Quality Initiative	Folder	Folder	229222	224956		\$121,610.12		
41131	53331	Concrete		No Proposal		6062.82				
Pavement Projects - Project Files and Records Were Not Located										
34033	32346	Bituminous Quality Initiative								
74032	40604	Disincent Bit Mix & Dens Control								
41131	56955	Concrete								
41133	52768	Concrete								
80023	38094	Bituminous Quality Initiative								
Pavement Projects that are too Recent(since 2002)										
79032	48599	HMA - Disincentive	Folder	Folder	7378		\$13,032.00	-\$30,771.08		
11015	60510	HMA - No Incentive	Folder	Folder						
13073	50776	HMA Quality Initiative	Folder	Folder	23649		\$34,641.00	\$40,710.74		
41063	74453	Concrete								
13073	50775	Concrete Quality Initiative								
11112	38613	Concrete								
13073	50776	Concrete Quality Initiative			170457		\$67,823.00	\$53,593.09		

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CHAPTER 4

RESEARCH PLAN - PHASE II

Based on the findings of the Phase I study (see Chapter 3), a research plan for the Phase II study was developed and is presented below. Examples of the proposed data analyses of the Phase II research plan are presented and discussed in Chapter 5 of this thesis.

4.0 OBJECTIVES OF THE PHASE II STUDY

Considering the stated ramifications of the missing project data, the objectives and research plan for Phase II were developed accordingly to achieve the best possible outcomes. The objective of Phase II is to conduct economic analyses of the MDOT I/D program as it relates to pavement materials (HMA and concrete) and ride quality. The analyses have two parts:

- a) Determine whether or not the I/D program impacts pavement performance (pavement life, ride quality and others).
- b) If the answer to item (a) above is positive, compare the extra cost of I/D payments to the benefit derived from improved pavement life. Otherwise, determine, if possible, the reasons for no such improvement.

To accomplish this objective, the findings of the Phase I Study were thoroughly examined and a research plan was designed and is presented below.

4.1 RESEARCH PLAN

To accomplish the objective of the Phase II study, a research plan consisting of the following five tasks was developed to evaluate the benefits (improvement in pavement life) and costs of the material and ride quality incentives.

Task 1 – Review and Project Identification

In this task, the research team will continue the Phase I literature review. The review will include Transportation Research Board (TRB) publications, National Cooperative Highway Research Program (NCHRP) reports, and telephone conversations with personnel of some State Highway Agencies (SHAs). The review will also include any new information regarding MDOT practices and the development of the I/D program.

Task 2 – Pavement Project List and Project Data

In this task, a list of MDOT pavement projects with and without I/D specifications that were constructed during 1994 to 2002 will be compiled. In addition, this list will include the pavement projects from the previous MDOT in-house I/D study and the current MDOT pavement performance study. These sources may be expanded if the project list is deemed insufficient. For each project, all available data will be obtained as listed in Table 3.1 from the appropriate MDOT sources.

Task 3 – Project Data Matrix

Table 4.1 represents a data matrix design for experimental investigation. Pavement projects with and without I/D specifications will be divided into two incentive categories pertaining to material quality and ride quality. For each incentive type, a pavement

project will be placed into the appropriate cell of Table 4.1 according to the following pavement project attributes:

- Functional Class: freeway and non-freeway
- Pavement Type: flexible, composite, jointed plain concrete pavement (JPCP), jointed reinforced concrete pavement (JRCP), and rubblized
- Pavement Fix Type: new and reconstruction, mill and fill, overlay, and others
- I/D Pay Rate: propose three rates per Table 4.1, and projects without I/D project provisions

The proposed breakdown of project attributes (Table 4.1) is preliminary and could be modified during the data search task. If this occurs, the data analyses described in Task 4 will be modified accordingly.

Task 4 – Data Analyses

In this task, the analyses will determine whether or not the I/D program significantly impacts pavement performance (pavement life). Projects with and without I/D specifications, per Table 4.1, will be analyzed by proper statistical methods. If the analysis finds a positive relationship, then economic analyses will be performed. Otherwise, an explanation (reason) of the findings will be provided.

Economic Analyses

If the results of the analyses indicate that incentives produce a significant improvement in pavement life, costs-benefits analyses will follow. The program benefit will be measured as the difference in years between the improvement in the pavement lives of all paired

pavement projects with and without I/D specifications. The incentive payment cost of the improvement will be normalized relative to the material cost for each individual project. The reason for the normalization is that various pavement projects have different lengths, different number of lanes, and different material thicknesses. For each pavement project without I/D specifications, the cost of the pavement life obtained is equal to one hundred percent of the material costs of that project. For each pavement project with I/D specifications, the I/D payment/penalty will be calculated as percent of the material cost of that project. The I/D program will then be evaluated using the following steps:

1. Use the distress index data and the MDOT pavement performance curve form to estimate the average pavement life of all projects with I/D specifications (PL1) and the average pavement life (PL2) of all projects without I/D specifications. Calculate the pavement life improvement (PLI) due to the I/D specifications as follows:

$$PLI = PL1 - PL2$$

2. Calculate the average yearly cost (AYC2) of PL2 as follows:

$$AYC2 = 100/PL2$$

3. Use the average I/D payments/penalties (AIP) in percent of the material costs of all pavement projects with I/D specifications to calculate the average costs per year (ACY1) of the PL1 as follows:

$$ACY1 = AIP/PLI$$

4. Compare ACY2 and ACY1

Depending on the results of the above analyses, the research team and the MDOT Research Advisory Panel (RAP) may jointly conduct separate analyses using the MDOT

Road Quality Forecasting System (RQFS) to evaluate the impact of the I/D program on the network.

Task 5 – Deliverables – Quarterly and Final Report

Throughout the duration of the Phase II study, the research team will submit quarterly progress reports to the MDOT RAP for their comments. The quarterly report will include:

- The accomplishments of the research team during the reporting quarter
- Significant findings
- Scheduled activities for the next quarter
- Project status

Upon completion of the Phase II study, the research team will submit a draft final report to members of the RAP for review, comments and subsequent acceptance. Upon receiving their comments, revise the final report and submit it to MDOT for acceptance. The final report will include:

- Complete lists of all collected data for all pavement projects (pavement projects with and without I/D specifications).
- Results of the data analyses
- Conclusions
- Recommendations regarding appropriate reform of the current I/D program and additional data needs to be retained in project files to perform the intended ideal and comprehensive analyses of the benefits and costs of MDOT's I/D program.

4.2 PROJECT BENEFITS

The expected results of this study should provide MDOT with the necessary evidence to modify the current practice regarding project data retention and retrieval. In general, the objectives of this study support the following goals of MDOT's Research Development and Technology Transfer Program:

- Specification Improvement
- Material quality
- Long-term pavement performance
- Research partnership

4.3 IMPLEMENTATION

The final report will provide a plan and suggested actions to assist MDOT with implementing the study findings.

4.4 EXAMPLES

Examples of the proposed data analyses of the Phase II research plan are presented and discussed in Chapter 5 of this report.

Table 4.1 Project data matrix for material and ride quality initiatives											
			Disincentive (% of paving cost)			Incentive (% of paving cost)			No I/D clauses		
Pavement		Fix Type	<-10	-10 to -5	>-5 to 0	>0 to 5	>5 to 10	>10			
Class	Type										
Freeway	Flexible	New or Rec.									
		Overlay									
		Mill & Fill									
		Others									
	Composite	Overlay									
		Mill & Fill									
		Others									
	Rigid	JPCP	New or Rec.								
			Overlay								
			Others								
		JRCP	New or Rec.								
			Overlay								
			Others								
	Rubblized	Overlay									
		Mill & Fill									
		Others									
Non-freeway	Flexible	New or Rec.									
		Overlay									
		Mill & Fill									
		Others									
	Composite	Overlay									
		Mill & Fill									
		Others									
	Rigid	JPCP	New or Rec.								
			Overlay								
			Others								
		JRCP	New or Rec.								
			Overlay								
			Others								
	Rubblized	Overlay									
		Mill & Fill									
		Others									

CHAPTER 5

SUMMARY, EXAMPLES, CONCLUSIONS AND RECOMMENDATIONS

5.0 SUMMARY OF THE FINDINGS OF PHASE I

Recall that the Phase I of the study consisted of exploratory efforts to identify the available data in the MDOT data files and project records that can be used to analyze the costs and benefits of the incentives/disincentives (I/D) program. The Phase I study began on the first of October 2007; the findings of the research team are summarized below:

1. A list of data elements that are necessary to conduct ideal and comprehensive analyses of the costs and benefits of the MDOT I/D program was compiled.
2. A search of the MDOT project and data files of seventy-seven pavement projects was conducted. Results of this search were summarized in Chapter 3, and can be seen in detail in Table 3.2.

As noted above, during the Phase I study, the research team requested and obtained from MDOT the files and records of seventy-seven pavement projects that were randomly selected from the MDOT compiled list of pavement projects with I/D specifications. The project files and records were then examined and available data was obtained. Based on the data elements of each pavement project, the project was placed in the appropriate cell of the project data matrix shown in Table 5.1. The number in each cell in the matrix indicates the number of pavement projects that were found during the Phase I of the study to have the appropriate data elements for that cell.

1. Introduction

2. Methods

3. Results

4. Discussion

5. Conclusion

6. References

7. Appendix

8. Acknowledgements

9. Author's address

10. Correspondence

11. Notes

12. References

13. Appendix

14. Acknowledgements

15. Author's address

16. Correspondence

Examination of the data in Table 5.1 indicates that of the seventy-seven pavement projects that were randomly selected from the MDOT I/D list, the research team found that:

1. The files and project records of forty-four pavement projects with I/D specifications contain the proper data elements to conduct further analyses of the costs and benefits of the I/D program.
2. The files and project records of only four pavement projects without I/D specifications contain the proper data elements that will support the comparison of their pavement performances to those of compatible projects with I/D specifications.

The main reason for the low number of pavement project without I/D specifications in Table 5.1 is that, during the Phase I study, the MSU research team concentrated its efforts on the MDOT list of pavement projects with I/D specifications. The four pavement projects in Table 5.1 without I/D specifications were included in the MDOT list. The MSU research team did not compile additional list of pavement projects without I/D specifications. Such list will be compiled during the Phase II of the study.

Table 5.1 Project data matrix for material and ride quality initiatives

			Disincentive (% of paving cost)			Incentive (% of paving cost)			No I/D clauses		
Pavement		Fix type	<-10	-10 to -5	>-5 to 0	>0 to 5	>5 to 10	>10			
Class	Type										
Freeway	Flexible	New or Rec.		1							
		Overlay									
		Mill & Fill				1					
		Others		1							
	Composite	Overlay				1		1			
		Mill & Fill					1	1			
		Others									
	Rigid	J P C P	New or Rec.					6			
			Overlay								
			Others								1
		J R C P	New or Rec.								3
			Overlay								
			Others								
Rubblized	Overlay										
	Mill & Fill										
	Others										
Non-freeway	Flexible	New or Rec.					2	3			
		Overlay					1	2			
		Mill & Fill									
		Others				1	2		1		
	Composite	Overlay		1		1		4			
		Mill & Fill					4	4	2		
		Others						1			
	Rigid	J P C P	New or Rec.								
			Overlay						1		
			Others								
		J R C P	New or Rec.					1			
			Overlay								
			Others								
	Rubblized	Overlay									
		Mill & Fill									
Others											

Based upon the available data elements (see Table 3.1) of the forty-eight pavement projects listed in Table 5.1, it was determined that ideal and comprehensive analyses of the costs and benefits for specific pay items of the I/D program cannot be accomplished. However, using the available data elements and a large pool of pavement projects, analyses of the costs and benefits of the I/D program as a whole can be conducted. Further, the effects of the I/D pay schedule (pay rate) on pavement performance may be assessed.

Two examples of such assessment and analyses are presented below. In the first example, the performances of two rigid pavement reconstruction projects (one with and one without I/D specifications) were compared. In the second example, the performances of six pavement projects that were subjected to similar fix type but different I/D pay schedule (rate) are compared.

5.1 EXAMPLE 1 – ASSESSMENT OF I/D PAYMENTS

In this example, the performances of two rigid pavement reconstruction projects (one with and one without I/D specifications) are compared. First, available historical (since reconstruction) distress data and distress indices for each 0.1 mile segment along each of the two projects were requested and obtained from the Pavement Management System (PMS) database of MDOT. Further, the weighted average historical DI values for each of the two pavement projects were requested and obtained from the MDOT pavement performance study files. Upon receiving the two sets of data from MDOT, the research team calculated the historical weighted average DI values for each pavement project using:

1. The beginning and ending mileposts (the project boundaries) found in the MDOT pavement performance study list.
2. The PMS detailed DI data, for the eastbound or northbound directions, within the above stated project boundaries.

Tables 5.2 and 5.3 provide a list of the historical detailed DI data obtained from the PMS database of MDOT and the calculated weighted average DI values for each pavement project. Other information that were obtained from the MDOT files and project records that are pertinent to the assessment of the effects of the I/D program are listed in Tables 5.4 and 5.5. For each of the two pavement projects, the information in the tables include:

- The pavement type; Table 5.4 for jointed reinforced concrete pavement (JRCP) and Table 5.5 for jointed plain concrete pavement (JPCP)
- The road number; I-94 and I-69
- The source of the information including the PMS database of MDOT, the file of the MDOT pavement performance study, the project list of the MDOT I/D study, the project proposal, and the project financial records
- The time in year for pavement reconstruction and distress data collection
- The beginning and ending mileposts (BMP and EMP)
- The project length

Table 5.2 Distress data for each 0.1 mile of the I-94 JRC project reconstructed in 1995; CS 11015, JN 29580 (from MDOT PMS distress data)

Year - Years after construction																					
1995 - 0				1997 - 2				1999 - 4				2003 - 8				2005 - 10					
BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI		
19.381	19.481	0.00	0.00	19.322	19.422	0.00	0.00	19.34	19.44	0.00	0.00	19.357	19.457	14.04	14.04	19.302	19.402	1.25	1.25		
19.481	19.581	0.00	0.00	19.422	19.522	0.00	0.00	19.44	19.54	0.75	0.75	19.457	19.557	15.38	15.38	19.402	19.502	0.77	0.77		
19.581	19.681	0.00	0.00	19.522	19.622	1.25	1.25	19.54	19.64	1.98	1.98	19.557	19.657	18.84	18.84	19.502	19.602	0.00	0.00		
19.681	19.825	0.00	0.00	19.622	19.764	0.53	0.37	19.64	19.783	3.27	2.28	19.657	19.757	18.29	18.29	19.602	19.702	0.25	0.25		
19.825	19.861	0.00	0.00	19.764	19.801	0.00	0.00	19.783	19.818	0.00	0.00	19.757	19.857	12.41	12.41	19.702	19.802	2.25	2.25		
19.861	20.053	0.00	0.00	19.801	19.992	0.52	0.27	19.818	20.012	4.09	2.11	19.857	19.957	15.14	15.14	19.802	19.902	4.45	4.45		
20.053	20.09	0.00	0.00	19.992	20.03	0.00	0.00	20.012	20.047	0.00	0.00	19.957	20.057	30.52	30.52	19.902	20.002	13.96	13.96		
20.09	20.19	0.00	0.00	20.03	20.13	0.00	0.00	20.047	20.147	0.94	0.94	20.057	20.157	21.38	21.38	20.002	20.102	6.20	6.20		
20.19	20.29	2.00	2.00	20.13	20.23	0.50	0.50	20.147	20.247	7.30	7.30	20.157	20.257	21.82	21.82	20.102	20.202	3.63	3.63		
20.29	20.39	0.00	0.00	20.23	20.33	0.00	0.00	20.247	20.347	2.75	2.75	20.257	20.357	14.48	14.48	20.202	20.302	0.25	0.25		
20.39	20.49	0.00	0.00	20.33	20.43	0.00	0.00	20.347	20.447	1.50	1.50	20.357	20.457	11.85	11.85	20.302	20.402	1.44	1.44		
20.49	20.59	0.00	0.00	20.43	20.53	0.00	0.00	20.447	20.547	1.75	1.75	20.457	20.557	12.04	12.04	20.402	20.502	2.96	2.96		
20.59	20.713	0.00	0.00	20.53	20.65	0.00	0.00	20.547	20.67	1.42	1.16	20.557	20.657	17.47	17.47	20.502	20.602	0.75	0.75		
20.713	20.726	0.00	0.00	20.65	20.666	0.00	0.00	20.67	20.683	0.00	0.00	20.657	20.757	21.07	21.07	20.602	20.702	12.47	12.47		
20.726	20.826	0.00	0.00	20.666	20.766	1.25	1.25	20.683	20.783	4.02	4.02	20.757	20.857	16.18	16.18	20.702	20.802	2.85	2.85		
20.826	20.926	0.00	0.00	20.766	20.866	0.00	0.00	20.783	20.883	3.38	3.38	20.857	20.957	13.98	13.98	20.802	20.902	3.17	3.17		
20.926	21.026	0.00	0.00	20.866	20.966	0.00	0.00	20.883	20.983	0.50	0.50	20.957	21.057	5.99	5.99	20.902	21.002	1.75	1.75		
21.026	21.126	0.00	0.00	20.966	21.066	0.00	0.00	20.983	21.083	0.00	0.00	21.057	21.157	13.56	13.56	21.002	21.102	3.94	3.94		
21.126	21.226	0.00	0.00	21.066	21.166	0.00	0.00	21.083	21.183	6.90	6.90	21.157	21.257	10.92	10.92	21.102	21.202	3.98	3.98		
21.226	21.326	0.00	0.00	21.166	21.266	0.00	0.00	21.183	21.283	1.98	1.98	21.257	21.357	11.23	11.23	21.202	21.302	2.67	2.67		
21.326	21.426	0.94	0.94	21.266	21.366	0.00	0.00	21.283	21.383	3.93	3.93	21.357	21.457	8.38	8.38	21.302	21.402	2.64	2.64		
21.426	21.526	0.75	0.75	21.366	21.466	1.50	1.50	21.383	21.483	3.16	3.16	21.457	21.557	12.38	12.38	21.402	21.502	0.66	0.66		
21.526	21.626	0.00	0.00	21.466	21.566	0.00	0.00	21.483	21.583	1.44	1.44	21.557	21.657	18.32	18.32	21.502	21.602	0.50	0.50		
21.626	21.726	0.00	0.00	21.566	21.666	0.50	0.50	21.583	21.683	0.98	0.98	21.657	21.757	20.21	20.21	21.602	21.702	0.25	0.25		
21.726	21.826	0.00	0.00	21.666	21.766	0.75	0.75	21.683	21.783	3.93	3.93	21.757	21.857	21.39	21.39	21.702	21.802	1.00	1.00		
21.826	21.926	0.00	0.00	21.766	21.866	0.00	0.00	21.783	21.883	4.52	4.52	21.857	21.957	20.41	20.41	21.802	21.902	2.49	2.49		
21.926	22.026	0.00	0.00	21.866	21.966	0.94	0.94	21.883	21.983	2.25	2.25	21.957	22.057	17.51	17.51	21.902	22.002	4.23	4.23		
22.026	22.126	0.00	0.00	21.966	22.066	0.50	0.50	21.983	22.083	6.16	6.16	22.057	22.157	12.21	12.21	22.002	22.102	3.65	3.65		
22.126	22.226	0.00	0.00	22.066	22.166	0.50	0.50	22.083	22.183	2.63	2.63	22.157	22.257	17.26	17.26	22.102	22.202	2.00	2.00		
22.226	22.326	0.00	0.00	22.166	22.266	1.00	1.00	22.183	22.283	10.6	10.6	22.257	22.357	21.06	21.06	22.202	22.302	6.17	6.17		
22.326	22.504	0.00	0.00	22.266	22.439	0.00	0.00	22.283	22.46	2.78	1.57	22.357	22.457	13.79	13.79	22.302	22.402	3.05	3.05		
22.504	22.526	0.00	0.00	22.439	22.462	0.00	0.00	22.46	22.481	0.00	0.00	22.457	22.557	9.70	9.70	22.402	22.502	4.77	4.77		
22.526	22.626	0.00	0.00	22.462	22.562	0.50	0.50	22.481	22.581	2.75	2.75	22.557	22.657	9.39	9.39	22.502	22.602	3.19	3.19		
22.626	22.726	0.00	0.00	22.562	22.662	0.50	0.50	22.581	22.681	0.94	0.94	22.657	22.757	12.47	12.47	22.602	22.702	3.75	3.75		
22.726	22.826	0.00	0.00	22.662	22.762	0.00	0.00	22.681	22.781	1.00	1.00	22.757	22.857	11.97	11.97	22.702	22.802	3.69	3.69		
22.826	22.926	0.00	0.00	22.762	22.862	1.50	1.50	22.781	22.881	0.94	0.94	22.857	22.957	15.60	15.60	22.802	22.902	1.25	1.25		
22.926	23.026	0.00	0.00	22.862	22.962	0.00	0.00	22.881	22.981	2.48	2.48	22.957	23.057	9.14	9.14	22.902	23.002	2.50	2.50		
23.026	23.126	0.00	0.00	22.962	23.062	0.00	0.00	22.981	23.081	0.50	0.50	23.057	23.157	15.15	15.15	23.002	23.102	1.50	1.50		
23.126	23.226	0.00	0.00	23.062	23.162	0.00	0.00	23.081	23.181	2.16	2.16	23.157	23.257	8.39	8.39	23.102	23.202	0.75	0.75		
23.226	23.326	0.00	0.00	23.162	23.262	1.05	1.05	23.181	23.281	1.05	1.05	23.257	23.377	6.48	5.40	23.202	23.353	2.65	1.75		
23.326	23.446	0.78	0.65	23.262	23.383	0.00	0.00	23.281	23.4	1.38	1.16	23.377	23.415	12.97	34.14						
Weighted Average DI			0.11					0.31				2.28				15.41				2.97	

Table 5.3 Distress data for each 0.1 mile of the I-69 JPCP project reconstructed in 2002; CS 12033, JN 49921 (from MDOT PMS distress data)

Year - Years after construction											
2003 - 1				2005 - 3				2007 - 5			
BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI
10.906	11.006	0.50	0.50	10.905	11.005	0.00	0.00	10.900	11.000	3.79	3.79
11.006	11.106	0.00	0.00	11.005	11.105	0.00	0.00	11.000	11.100	0.00	0.00
11.106	11.206	0.00	0.00	11.105	11.205	0.00	0.00	11.100	11.200	0.00	0.00
11.206	11.306	0.00	0.00	11.205	11.305	0.00	0.00	11.200	11.300	0.50	0.50
11.306	11.406	0.00	0.00	11.305	11.405	0.00	0.00	11.300	11.400	0.00	0.00
11.406	11.506	0.00	0.00	11.405	11.505	0.00	0.00	11.400	11.500	0.50	0.50
11.506	11.606	0.00	0.00	11.505	11.605	0.00	0.00	11.500	11.600	0.00	0.00
11.606	11.706	0.00	0.00	11.605	11.705	0.36	0.36	11.600	11.700	0.00	0.00
11.706	11.806	0.00	0.00	11.705	11.805	0.12	0.12	11.700	11.800	0.54	0.54
11.806	11.906	0.00	0.00	11.805	11.905	1.40	1.40	11.800	11.900	0.50	0.50
11.906	12.006	0.00	0.00	11.905	12.005	0.00	0.00	11.900	12.000	0.00	0.00
12.006	12.106	0.00	0.00	12.005	12.105	0.00	0.00	12.000	12.100	0.16	0.16
12.106	12.206	0.00	0.00	12.105	12.205	1.32	1.32	12.100	12.200	0.00	0.00
12.206	12.306	0.00	0.00	12.205	12.305	0.24	0.24	12.200	12.300	0.00	0.00
12.306	12.406	1.25	1.25	12.305	12.405	1.50	1.50	12.300	12.400	7.89	7.89
12.406	12.506	0.50	0.50	12.405	12.603	1.34	0.68	12.400	12.500	8.81	8.81
12.506	12.649	0.00	0.00	12.603	12.611	0.50	6.25	12.500	12.607	6.30	5.89
Weighted Average DI			0.125				0.668				1.681

- For each year, two weighted average distress indices between the given mileposts that were obtained from the MDOT pavement performance study and calculated by the research team using the MDOT PMS data.
- The I/D specifications
- The amount of incentive payment in terms of dollars and as percent of the paving material cost
- The type and years of maintenance and pavement preservation fixes that were taken after reconstruction

The data in Tables 5.4 and 5.5 indicate that the project boundaries (the beginning and ending mileposts) obtained from the pavement performance study do not change from one year to another. Whereas the project boundaries (the beginning and ending mileposts) obtained from the PMS distress data vary slightly from one year to another. Such variability and differences were expected and are normal. It is not possible to exactly identify the beginning and ending mileposts of the project from the videotape of each year. During the review of the videotape, the location reference data (the mileposts) are estimated from the videotape.

Nevertheless, the variability in the beginning and ending mileposts caused insignificant differences between the weighted average DI data obtained from the MDOT pavement performance study and the calculated weighted average DI using the PMS detailed DI data along the projects. A thorough discussion with members of the MDOT Research Advisory Panel (RAP) of this study was held regarding the source of the data to be used to study the pavement performance. It was decided to use the weighted average DI values

from the MDOT pavement performance study list after comparing the values with the calculated weighted average DI values using the PMS distress data and distress indices.

The financial record of the 2002 JPCP reconstruction project located along Interstate 69 and listed in Table 5.5 indicates that the project contractor received \$49,988.40 or 2.58 percent of the paving material costs as extra payment for concrete quality initiative. The data for the 1995 JRCPP pavement reconstruction project (see Table 5.4) located along Interstate 94 indicate that no I/D specifications or payments were included in the project proposal or in the financial record. The performances of the two pavement projects were compared based on the weighted average DI data listed in Tables 5.4 and 5.5 that were obtained from the MDOT pavement performance study data files. Although the two projects have different pavement types, their performances were compared for the following reasons:

1. The two pavements are concrete and were designed for twenty year pavement performance period. That is the design life (DL) of each of the two pavement sections is 20 years.

Table 5.4 Summary of the weighted average DI for the I-94 JRCP project reconstructed in 1995; CS 11015, JN 29580

Data source	Year	BMP	EMP	Project length (miles)	Weighted average DI	I/D	Maintenance/ rehabilitation since construction
MDOT- pavement performance study	1995	19.381	23.353	3.972	0.1		2003 & 2004 - Concrete pavement repair 2004 - Diamond grinding
	1997	19.381	23.353	3.972	0.4		
	1999	19.381	23.353	3.972	2.7		
	2003	19.381	23.353	3.972	15.1		
	2005	19.381	23.353	3.972	2.9		
MDOT- PMS distress data	1995	19.38	23.45	4.07	0.11		
	1997	19.32	23.38	4.06	0.31		
	1999	19.34	23.4	4.06	2.28		
	2003	19.36	23.42	4.06	15.41		
	2005	19.3	23.35	4.05	2.97		
MDOT- I/D project list		19.80	23.431	3.631			
Financial records							

Table 5.5 Summary of the weighted average DI for the I-69 JPCP project reconstructed in 2002; CS 12033, JN 49921

Data source	Year	BMP	EMP	Project length (miles)	Weighted average DI	I/D	Maintenance/ rehabilitation since construction
MDOT- pavement performance study	2003	10.976	12.603	1.627	0.1		
	2005	10.976	12.603	1.627	0.5		
	2007	10.976	12.603	1.627	1.627		
MDOT-PMS distress data	2003	11.006	12.649	1.643	0.125		
	2005	11.001	12.611	1.61	0.668		
	2007	11.00	12.607	1.607	1.681		
MDOT - I/D project list		9.7	12.378	2.678		Concrete Quality Initiative	
Financial records						Concrete Quality Initiative - \$48,988.40 – 2.58% (% of paving cost)	

2. The pool of projects investigated in the Phase I study did not include any JRCP with I/D specifications or JPCP without I/D specifications. This is mainly due to the fact that, in the Phase I study, the seventy-seven pavement projects that were randomly selected by the research team from the MDOT list of I/D pavement projects did not include any JRCP project with I/D specifications or JPCP projects without I/D specifications.
3. As stated in the research plan for the Phase II study (see Chapter 4), one of the proposed analyses consists of comparison of all pavement projects, with and without I/D specifications, regardless of the pavement type.

Figure 5.1 depicts the average DI values (listed in Tables 5.4 and 5.5) obtained from the MDOT pavement performance study for each of the two rigid pavement projects plotted as a function of time since reconstruction. The data in the figure indicate that the average DI value for the JRCP project along I-94 (solid squares):

- a) Increases from 0.1 to 15.1 in eight years after construction.
- b) Decreases from 15.1 to 2.9 between the eighth and the tenth year after reconstruction.

The improvement in the average DI value is due to the pavement rehabilitation actions listed in Table 5.4 (concrete pavement repair and diamond grinding) and stated in the figure, which were undertaken between 8 and 10 years after reconstruction.

Figure 5.1 also shows the average DI values for the JPCP project along I-69 (solid triangles) plotted against time since reconstruction. It can be seen from the figure that about six years after construction, the average DI of the JRCP project is significantly

higher than that for the JPCP project. It can also be seen that the rate of deterioration of the JRCPP project is much higher than that of the JPCP project.

In order to estimate the pavement life of each of the two rigid pavement reconstruction projects, two methods were employed:

1. The best fit curves between the average DI and time (T) in year were obtained using polynomial functions. The resulting correlation equations are stated below:

For the I-94 JRCPP project $DI = 0.3001(T)^2 - 0.532(T) + 0.1314$ (1)

For the I-69 JPCPP project $DI = 0.0909(T)^2 - 0.1635(T) + 0.1726$ (2)

Equations 1 and 2 were used to estimate the lives of the I-94 and I-69 rigid pavement reconstruction projects, respectively. This was accomplished by solving each equation for the time “T” for which the DI value equal to fifty distress points (the MDOT DI threshold value defining pavement life (PL)). Further, the remaining service life (RSL) of each pavement project was calculated by subtracting the number of years between reconstruction and the last distress survey year (or the pavement surface age) from the estimated pavement life. Table 5.6 provides the estimated PL and RSL for both pavement projects using Equations 1 and 2.

2. For each pavement project, the best fit curve of the data was obtained by MDOT using the MDOT revised logistical growth model. The model was then used to estimate the PL and the RSL of each rigid pavement reconstruction project. These values are also listed in Table 5.6

It is evident from the PL and RSL values listed in Table 5.6 that the JPCP project along I-69 has performed much better than the JRCP project along I-94. Indeed, the JRCP project has been subjected to some fixing whereas the JPCP project has not. Certainly, many factors affect the performance of both pavement projects. However, traffic is not one of them because both pavement projects were designed to accommodate the projected traffic for a 20 year period. The other factors affecting the performance of both projects include:

1. **Pavement Type** – JPCP and JRCP, in this department, one should expect that the JRCP would perform better than the JPCP. However, this is not the case for those two projects.
2. **Incentive Payments** - The contractor of the JPCP received incentive payment while no incentive payments were scheduled or paid to the JRCP contractor. Incentive payment implies that the parameters of the JPCP pavement are equal to or exceed the specifications. Hence, one should expect better pavement performance.

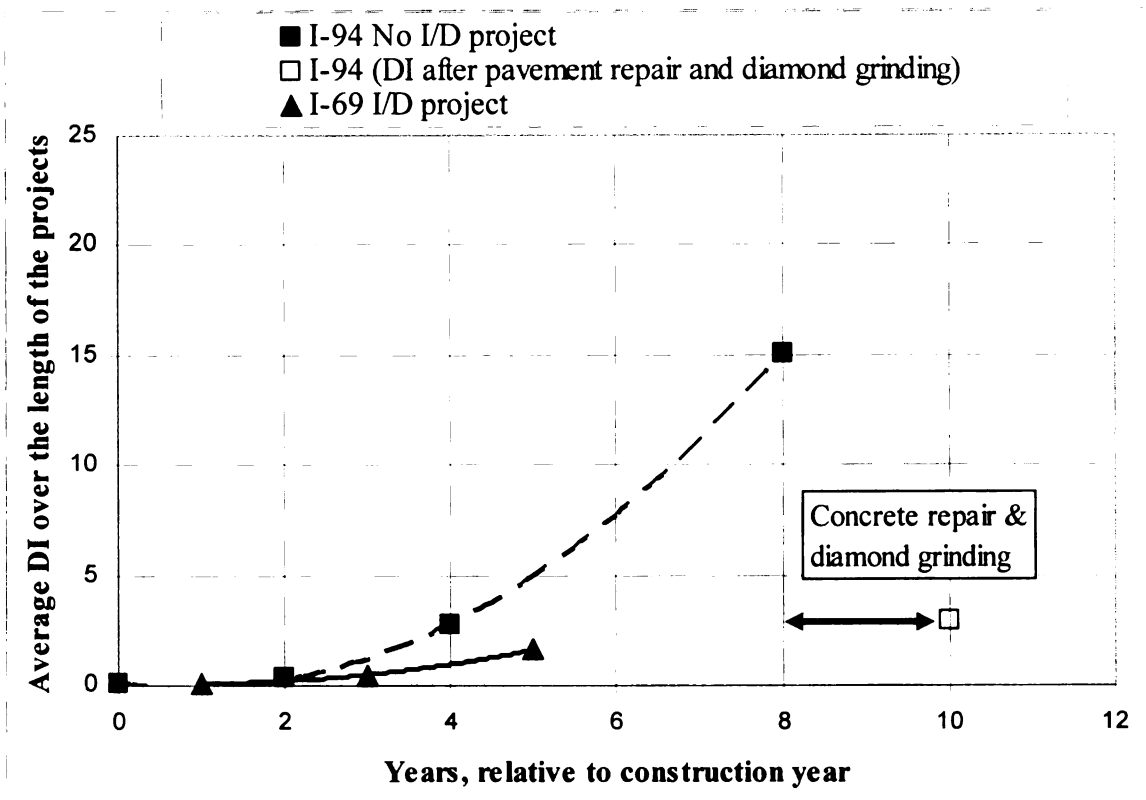


Figure 5.1 The average DI of two rigid pavement projects versus time after construction

Table 5.6 Predicted pavement life and remaining service life

Source	I-69 I/D project		I-94 No I/D project	
	Best fit polynomial equation	MDOT revised logistical growth model	Best fit polynomial equation	MDOT revised logistical growth model
Pavement life (years)	24.33	22.1	13.81	11.04
Remaining service life (years)	19.33	17.1	5.81	3.04

The two scenarios above should not lead to any conclusion regarding the effect of the I/D program on pavement performance or pavement longevity. Much larger pool of pavement projects must be analyzed first, before any conclusion can be made. The analyses of the

performance of the two pavement projects in this section should be handled as an example of the analyses to be conducted on much larger pool of projects in the Phase II study. It should not be regarded as analyses of the benefits and costs of the I/D program.

5.2 EXAMPLE 2 – ASSESSMENT OF I/D PAY RATE

In this example, the performances of six jointed plain concrete pavement (JPCP) reconstruction projects, containing I/D specifications, and with different I/D pay rates (as percentage of paving material cost) are compared. A summary of the six projects can be seen in Table 5.7.

Table 5.7 Summary of JPCP reconstruction pavement projects

Project designation	Route	Control section	Job number	Year constructed	I/D rate (%)
1	I-75	82194	36005	1998	2.15
2	I-94	11017	38094	1997	2.29
3	I-69	12033	45877	2000	2.38
4	I-69	12033	49921	2002	2.58
5	I-69	12033	45535	2000	2.69
6	I-75	47065	28215	1999	3.18

First, available historical (since reconstruction) distress data and distress indices for each 0.1 mile segment along each of the six projects were requested and obtained from the Pavement Management System (PMS) database of MDOT. Further, the weighted average DI for each of the six pavement projects was requested and obtained from the MDOT pavement performance study files. As in Example 1, upon receiving the two sets of data from MDOT, the research team calculated the weighted average DI for each pavement project using:

1. The beginning and ending mileposts (the project boundaries) found in the MDOT pavement performance study list.
2. The PMS detailed DI data within each project boundaries.

Tables 5.8 to 5.12 provide a list of the historical detailed DI data obtained from the PMS database of MDOT and the calculated weighted average DI for each pavement project.

Other information that were obtained from the MDOT files and project records that are pertinent to the assessment of the effects of the I/D program are listed in Tables 5.13 to 5.17. For each of the six pavement projects, the information in the tables include:

- The pavement type; All 6 projects are jointed plain concrete pavements (JPCP)
- The road number; I-75, I-94, and I-69
- The source of the information including the PMS database of MDOT, the file of the MDOT pavement performance study, the data file of the MDOT I/D study, the project proposal, and the project financial records
- The time in year for pavement reconstruction and distress data collection
- The beginning and ending mileposts (BMP and EMP)
- The project length
- The weighted average distress index (DI) between the given mileposts
- The I/D specifications
- The amount of incentive payment in terms of dollars and as percent of the paving material cost
- The type and years of maintenance and pavement preservation fixes that were taken after reconstruction

It should be noted that, the distress data from the PMS database and the summary of the weighted average DI values for the I-69 project (CS 12033 JN 49921), which was also part of Example 1, are provided in Tables 5.3 and 5.5, respectively.

As was noticed in Example 1, there is minor variability between the project boundaries (beginning and ending mileposts) from one year to another in the PMS distress data.

Whereas, the project boundaries listed in the MDOT pavement performance study files do not change from one year to another. These project boundaries can be seen in Table 5.5 and in Tables 5.13 to 5.17 for each of the six pavement projects. Again, after discussions with the MDOT Research Advisory Panel (RAP) regarding this variability, it was decided to use the average DI values from the MDOT pavement performance study rather than the calculated weighted average DI values from the PMS distress data.

Table 5.8 Distress data for each 0.1 mile of the I-75 JPCP project reconstructed in 1998; CS 82194, JN 36005(from MDOT PMS distress data)

Year - Years after construction															
1999 – 1				2001 - 3				2003 – 5				2005 - 7			
BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI
4.799	4.899	0.00	0.00	4.794	4.894	0.75	0.75	4.800	4.900	0.75	0.75	4.773	4.873	15.06	15.06
4.899	4.999	0.00	0.00	4.894	4.994	0.58	0.58	4.900	5.000	0.50	0.50	4.873	4.973	6.69	6.69
4.999	5.099	0.00	0.00	4.994	5.094	0.00	0.00	5.000	5.100	0.00	0.00	4.973	5.073	1.44	1.44
5.099	5.199	0.00	0.00	5.094	5.194	0.00	0.00	5.100	5.200	0.00	0.00	5.073	5.173	0.00	0.00
5.199	5.299	0.16	0.16	5.194	5.294	1.80	1.80	5.200	5.300	2.21	2.21	5.173	5.273	3.10	3.10
5.299	5.399	0.50	0.50	5.294	5.394	0.00	0.00	5.300	5.400	0.00	0.00	5.273	5.373	0.88	0.88
5.399	5.499	0.00	0.00	5.394	5.494	0.00	0.00	5.400	5.500	0.00	0.00	5.373	5.473	0.00	0.00
5.499	5.599	0.00	0.00	5.494	5.594	0.00	0.00	5.500	5.600	0.00	0.00	5.473	5.573	0.00	0.00
5.599	5.699	0.00	0.00	5.594	5.694	1.05	1.05	5.600	5.700	0.00	0.00	5.573	5.673	0.00	0.00
5.699	5.799	0.00	0.00	5.694	5.794	0.00	0.00	5.700	5.800	0.00	0.00	5.673	5.773	0.00	0.00
5.799	5.899	0.00	0.00	5.794	5.894	1.75	1.75	5.800	5.900	0.00	0.00	5.773	5.873	0.94	0.94
5.899	5.999	0.00	0.00	5.894	5.994	0.00	0.00	5.900	6.000	0.00	0.00	5.873	5.973	0.00	0.00
5.999	6.099	0.00	0.00	5.994	6.094	0.75	0.75	6.000	6.100	0.00	0.00	5.973	6.073	2.33	2.33
6.099	6.199	0.00	0.00	6.094	6.194	0.00	0.00	6.100	6.200	0.00	0.00	6.073	6.173	0.50	0.50
6.199	6.299	0.00	0.00	6.194	6.294	0.00	0.00	6.200	6.300	0.00	0.00	6.173	6.273	0.48	0.48
6.299	6.399	0.00	0.00	6.294	6.394	0.75	0.75	6.300	6.400	0.00	0.00	6.273	6.373	0.00	0.00
6.399	6.598	0.00	0.00	6.394	6.494	0.75	0.75	6.400	6.500	1.05	1.05	6.373	6.475	0.49	0.48
				6.494	6.650	0.00	0.00	6.500	6.642	0.00	0.00	6.475	6.507	3.44	10.74
												6.507	6.668	0.00	0.00
Weighted Average DI			0.039				0.454				0.251				2.244

Table 5.9 Distress data for each 0.1 mile of the I-69 JPCP project reconstructed in 2000; CS 12033, JN 45877 (from MDOT PMS distress data)

Year - Years after construction															
2001 - 1				2003 - 3				2005 - 5				2007 - 7			
BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI
5.8	5.9	0.00	0.00	5.806	5.906	0.00	0.00	5.805	5.905	0.00	0.00	5.8	5.9	0.50	0.50
5.9	6	0.00	0.00	5.906	6.006	0.00	0.00	5.905	6.005	0.00	0.00	5.9	6	0.50	0.50
6	6.1	0.00	0.00	6.006	6.106	0.00	0.00	6.005	6.105	0.00	0.00	6	6.1	0.00	0.00
6.1	6.2	0.00	0.00	6.106	6.206	0.00	0.00	6.105	6.205	0.24	0.24	6.1	6.2	0.00	0.00
6.2	6.3	0.00	0.00	6.206	6.306	0.00	0.00	6.205	6.305	0.00	0.00	6.2	6.3	0.50	0.50
6.3	6.4	0.00	0.00	6.306	6.406	0.00	0.00	6.305	6.405	0.20	0.20	6.3	6.4	0.00	0.00
6.4	6.5	0.00	0.00	6.406	6.506	0.00	0.00	6.405	6.505	0.00	0.00	6.4	6.5	1.88	1.88
6.5	6.6	0.00	0.00	6.506	6.606	0.00	0.00	6.505	6.605	0.00	0.00	6.5	6.6	1.67	1.67
6.6	6.7	0.00	0.00	6.606	6.706	0.00	0.00	6.605	6.705	0.00	0.00	6.6	6.7	0.00	0.00
6.7	6.8	0.00	0.00	6.706	6.806	0.00	0.00	6.705	6.805	0.00	0.00	6.7	6.8	0.00	0.00
6.8	6.9	0.00	0.00	6.806	6.906	0.00	0.00	6.805	6.905	0.00	0.00	6.8	6.9	0.00	0.00
6.9	7	0.00	0.00	6.906	7.006	0.00	0.00	6.905	7.005	0.00	0.00	6.9	7	0.00	0.00
7	7.1	0.00	0.00	7.006	7.106	0.00	0.00	7.005	7.105	0.50	0.50	7	7.1	0.00	0.00
7.1	7.2	0.00	0.00	7.106	7.206	0.00	0.00	7.105	7.205	0.40	0.40	7.1	7.2	0.94	0.94
7.2	7.3	0.00	0.00	7.206	7.306	0.00	0.00	7.205	7.305	0.00	0.00	7.2	7.3	0.00	0.00
7.3	7.4	0.00	0.00	7.306	7.406	0.00	0.00	7.305	7.405	0.00	0.00	7.3	7.4	0.08	0.08
7.4	7.5	0.00	0.00	7.406	7.506	0.00	0.00	7.405	7.505	0.00	0.00	7.4	7.5	0.12	0.12
7.5	7.6	0.00	0.00	7.506	7.606	0.00	0.00	7.505	7.605	0.00	0.00	7.5	7.6	0.00	0.00
7.6	7.7	0.00	0.00	7.606	7.706	0.00	0.00	7.605	7.705	0.00	0.00	7.6	7.7	0.00	0.00
7.7	7.8	0.00	0.00	7.706	7.806	0.00	0.00	7.705	7.805	0.00	0.00	7.7	7.8	0.00	0.00
7.8	7.9	0.00	0.00	7.806	7.906	0.00	0.00	7.805	7.905	0.00	0.00	7.8	7.9	0.00	0.00
7.9	8	0.00	0.00	7.906	8.006	0.00	0.00	7.905	8.005	0.00	0.00	7.9	8	0.50	0.50
8	8.1	0.00	0.00	8.006	8.106	0.00	0.00	8.005	8.105	0.00	0.00	8	8.1	0.00	0.00
8.1	8.2	0.00	0.00	8.106	8.206	0.00	0.00	8.105	8.205	0.00	0.00	8.1	8.2	0.00	0.00
8.2	8.3	0.00	0.00	8.206	8.306	0.00	0.00	8.205	8.305	0.00	0.00	8.2	8.3	0.00	0.00

Table 5.9 (cont'd).

Year - Years after construction																	
2001 - 1				2003 - 3				2005 - 5				2007 - 7					
BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI		
8.3	8.4	0.00	0.00	8.306	8.406	0.00	0.00	8.305	8.405	0.00	0.00	8.3	8.4	0.50	0.50		
8.4	8.5	0.00	0.00	8.406	8.506	0.00	0.00	8.405	8.505	0.00	0.00	8.4	8.5	0.00	0.00		
8.5	8.6	0.00	0.00	8.506	8.606	0.00	0.00	8.505	8.605	0.00	0.00	8.5	8.6	0.00	0.00		
8.6	8.7	0.00	0.00	8.606	8.706	0.00	0.00	8.605	8.705	0.00	0.00	8.6	8.7	1.44	1.44		
8.7	8.8	0.00	0.00	8.706	8.806	0.00	0.00	8.705	8.805	0.00	0.00	8.7	8.8	3.50	3.50		
8.8	8.9	0.00	0.00	8.806	8.906	0.00	0.00	8.805	8.905	0.00	0.00	8.8	8.9	0.00	0.00		
8.9	9	0.00	0.00	8.906	9.006	0.00	0.00	8.905	9.005	0.00	0.00	8.9	9	0.00	0.00		
9	9.1	0.00	0.00	9.006	9.106	0.00	0.00	9.005	9.105	0.00	0.00	9	9.1	0.24	0.24		
9.1	9.2	0.00	0.00	9.106	9.206	0.00	0.00	9.105	9.205	0.00	0.00	9.1	9.2	0.00	0.00		
9.2	9.3	0.00	0.00	9.206	9.306	0.00	0.00	9.205	9.305	0.00	0.00	9.2	9.3	0.50	0.50		
9.3	9.4	0.00	0.00	9.306	9.406	0.00	0.00	9.305	9.405	0.00	0.00	9.3	9.4	0.00	0.00		
9.4	9.5	0.00	0.00	9.406	9.506	1.00	1.00	9.405	9.505	0.00	0.00	9.4	9.5	0.00	0.00		
9.5	9.6	0.00	0.00	9.506	9.606	0.00	0.00	9.505	9.605	0.00	0.00	9.5	9.6	0.00	0.00		
9.6	9.7	0.00	0.00	9.606	9.706	0.00	0.00	9.605	9.705	0.00	0.00	9.6	9.7	0.00	0.00		
9.7	9.8	0.00	0.00	9.706	9.806	0.00	0.00	9.705	9.805	0.00	0.00	9.7	9.8	0.50	0.50		
9.8	9.9	0.00	0.00	9.806	9.906	0.00	0.00	9.805	9.905	0.24	0.24	9.8	9.9	0.50	0.50		
9.9	10	0.00	0.00	9.906	10.006	0.00	0.00	9.905	10.005	0.00	0.00	9.9	10	0.12	0.12		
10	10.1	0.00	0.00	10.006	10.106	0.00	0.00	10.005	10.105	0.50	0.50	10	10.1	0.00	0.00		
10.1	10.2	0.00	0.00	10.106	10.206	0.00	0.00	10.105	10.205	0.12	0.12	10.1	10.2	0.16	0.16		
10.2	10.3	0.00	0.00	10.206	10.306	0.00	0.00	10.205	10.305	0.32	0.32	10.2	10.3	0.00	0.00		
10.3	10.4	0.00	0.00	10.306	10.406	0.00	0.00	10.305	10.405	0.00	0.00	10.3	10.4	0.00	0.00		
10.4	10.5	0.00	0.00	10.406	10.506	0.00	0.00	10.405	10.505	0.00	0.00	10.4	10.5	0.00	0.00		
10.5	10.6	0.00	0.00	10.506	10.606	0.00	0.00	10.505	10.605	0.00	0.00	10.5	10.6	0.00	0.00		
10.6	10.7	0.00	0.00	10.606	10.706	0.00	0.00	10.605	10.705	0.40	0.40	10.6	10.7	0.00	0.00		
10.7	10.809	0.00	0.00	10.706	10.806	0.00	0.00	10.705	10.805	0.00	0.00	10.7	10.8	0.00	0.00		
Weighted Average DI			0					0.02					0.0584				0.283

Table 5.10 Distress data for each 0.1 mile of the I-69 JPCP project reconstructed in 2000; CS 12033, JN 45535 (from MDOT PMS distress data)

Year - Years after construction															
2001 - 1				2003 - 3				2005 - 5				2007 - 7			
BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI
0.000	0.100	0.00	0.00	0.006	0.106	0.00	0.00	0.005	0.105	0.00	0.00	0.000	0.100	0.00	0.00
0.100	0.200	0.00	0.00	0.106	0.206	0.00	0.00	0.105	0.205	0.00	0.00	0.100	0.200	0.00	0.00
0.200	0.300	0.00	0.00	0.206	0.306	0.00	0.00	0.205	0.305	0.00	0.00	0.200	0.300	0.00	0.00
0.300	0.400	0.00	0.00	0.306	0.406	0.00	0.00	0.305	0.405	0.00	0.00	0.300	0.400	0.00	0.00
0.400	0.500	0.00	0.00	0.406	0.506	0.00	0.00	0.405	0.505	0.00	0.00	0.400	0.500	0.00	0.00
0.500	0.600	0.00	0.00	0.506	0.606	0.00	0.00	0.505	0.605	0.00	0.00	0.500	0.600	0.50	0.50
0.600	0.700	0.00	0.00	0.606	0.706	0.00	0.00	0.605	0.705	0.00	0.00	0.600	0.700	0.50	0.50
0.700	0.800	0.00	0.00	0.706	0.806	0.00	0.00	0.705	0.805	0.00	0.00	0.700	0.800	0.00	0.00
0.800	0.900	0.00	0.00	0.806	0.906	0.00	0.00	0.805	0.905	0.12	0.12	0.800	0.900	0.50	0.50
0.900	1.000	0.00	0.00	0.906	1.006	0.00	0.00	0.905	1.005	0.16	0.16	0.900	1.000	0.50	0.50
1.000	1.100	0.00	0.00	1.006	1.106	0.00	0.00	1.005	1.105	0.76	0.76	1.000	1.100	0.50	0.50
1.100	1.200	0.00	0.00	1.106	1.206	0.00	0.00	1.105	1.205	0.12	0.12	1.100	1.200	0.50	0.50
1.200	1.300	0.00	0.00	1.206	1.306	0.00	0.00	1.205	1.305	0.24	0.24	1.200	1.300	0.00	0.00
1.300	1.400	0.00	0.00	1.306	1.406	0.00	0.00	1.305	1.405	0.32	0.32	1.300	1.400	0.00	0.00
1.400	1.500	0.00	0.00	1.406	1.506	0.00	0.00	1.405	1.505	0.72	0.72	1.400	1.500	0.00	0.00
1.500	1.600	0.00	0.00	1.506	1.606	0.00	0.00	1.505	1.605	0.24	0.24	1.500	1.600	0.00	0.00
1.600	1.700	0.00	0.00	1.606	1.706	0.00	0.00	1.605	1.705	0.56	0.56	1.600	1.700	0.52	0.52
1.700	1.800	0.00	0.00	1.706	1.806	0.00	0.00	1.705	1.805	0.00	0.00	1.700	1.800	0.00	0.00
1.800	1.900	0.00	0.00	1.806	1.906	0.00	0.00	1.805	1.905	0.00	0.00	1.800	1.900	0.00	0.00
1.900	2.000	0.00	0.00	1.906	2.006	0.00	0.00	1.905	2.005	0.00	0.00	1.900	2.000	0.00	0.00
2.000	2.100	0.00	0.00	2.006	2.106	0.00	0.00	2.005	2.105	0.00	0.00	2.000	2.100	0.50	0.50
2.100	2.200	0.00	0.00	2.106	2.206	0.00	0.00	2.105	2.205	0.00	0.00	2.100	2.200	0.00	0.00
2.200	2.300	0.00	0.00	2.206	2.306	0.00	0.00	2.205	2.305	0.12	0.12	2.200	2.300	0.00	0.00
2.300	2.400	0.00	0.00	2.306	2.406	0.94	0.94	2.305	2.405	0.84	0.84	2.300	2.400	0.04	0.04
2.400	2.500	0.00	0.00	2.406	2.506	0.00	0.00	2.405	2.505	0.00	0.00	2.400	2.500	0.00	0.00
2.500	2.600	0.00	0.00	2.506	2.606	0.00	0.00	2.505	2.605	0.00	0.00	2.500	2.600	0.00	0.00

Table 5.10 (cont'd).

Year - Years after construction															
2001 - 1				2003 - 3				2005 - 5				2007 - 7			
BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI
2.600	2.700	0.00	0.00	2.606	2.706	0.00	0.00	2.605	2.705	0.50	0.50	2.600	2.700	0.00	0.00
2.700	2.800	0.00	0.00	2.706	2.806	0.00	0.00	2.705	2.805	0.00	0.00	2.700	2.800	0.00	0.00
2.800	2.900	0.00	0.00	2.806	2.906	0.00	0.00	2.805	2.905	0.00	0.00	2.800	2.900	0.00	0.00
2.900	3.000	0.00	0.00	2.906	3.006	0.00	0.00	2.905	3.005	0.00	0.00	2.900	3.000	0.00	0.00
3.000	3.100	0.00	0.00	3.006	3.106	0.00	0.00	3.005	3.105	0.00	0.00	3.000	3.100	0.00	0.00
3.100	3.200	0.00	0.00	3.106	3.206	0.00	0.00	3.105	3.205	0.16	0.16	3.100	3.200	0.00	0.00
3.200	3.300	0.00	0.00	3.206	3.306	0.00	0.00	3.205	3.305	0.00	0.00	3.200	3.300	0.00	0.00
3.300	3.400	0.00	0.00	3.306	3.406	0.00	0.00	3.305	3.405	0.32	0.32	3.300	3.400	0.00	0.00
3.400	3.500	0.00	0.00	3.406	3.506	0.00	0.00	3.405	3.505	0.44	0.44	3.400	3.500	0.00	0.00
3.500	3.600	0.00	0.00	3.506	3.606	0.00	0.00	3.505	3.605	0.64	0.64	3.500	3.600	0.00	0.00
3.600	3.700	0.00	0.00	3.606	3.706	0.00	0.00	3.605	3.705	0.16	0.16	3.600	3.700	0.00	0.00
3.700	3.800	0.00	0.00	3.706	3.806	0.00	0.00	3.705	3.805	0.32	0.32	3.700	3.800	0.00	0.00
3.800	3.900	0.00	0.00	3.806	3.906	0.00	0.00	3.805	3.905	0.12	0.12	3.800	3.900	0.00	0.00
3.900	4.000	0.00	0.00	3.906	4.006	0.00	0.00	3.905	4.005	0.00	0.00	3.900	4.000	0.00	0.00
4.000	4.100	0.00	0.00	4.006	4.106	0.00	0.00	4.005	4.105	0.16	0.16	4.000	4.100	0.00	0.00
4.100	4.200	0.00	0.00	4.106	4.206	0.00	0.00	4.105	4.205	0.00	0.00	4.100	4.200	0.00	0.00
4.200	4.300	0.00	0.00	4.206	4.306	0.00	0.00	4.205	4.305	0.00	0.00	4.200	4.300	0.00	0.00
4.300	4.400	0.00	0.00	4.306	4.406	0.00	0.00	4.305	4.405	0.00	0.00	4.300	4.400	0.00	0.00
4.400	4.500	0.00	0.00	4.406	4.506	0.00	0.00	4.405	4.505	0.00	0.00	4.400	4.500	0.00	0.00
4.500	4.600	0.00	0.00	4.506	4.606	0.00	0.00	4.505	4.605	0.00	0.00	4.500	4.600	0.00	0.00
4.600	4.700	0.00	0.00	4.606	4.706	0.00	0.00	4.605	4.705	0.00	0.00	4.600	4.700	0.00	0.00
4.700	4.800	0.00	0.00	4.706	4.806	0.00	0.00	4.705	4.805	0.00	0.00	4.700	4.800	0.00	0.00
4.800	4.900	0.00	0.00	4.806	4.906	0.00	0.00	4.805	4.905	0.16	0.16	4.800	4.900	2.00	2.00
4.900	5.000	0.00	0.00	4.906	5.006	0.00	0.00	4.905	5.005	0.00	0.00	4.900	5.000	0.00	0.00
5.000	5.100	0.00	0.00	5.006	5.106	0.00	0.00	5.005	5.105	0.00	0.00	5.000	5.100	0.00	0.00
5.100	5.200	0.00	0.00	5.106	5.206	0.00	0.00	5.105	5.205	0.00	0.00	5.100	5.200	0.94	0.94

Table 5.10 (cont'd).

Year - Years after construction																	
2001 - 1				2003 - 3				2005 - 5				2007 - 7					
BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI		
5.200	5.300	0.00	0.00	5.206	5.306	0.00	0.00	5.205	5.305	0.00	0.00	5.200	5.300	0.04	0.04		
5.300	5.400	0.00	0.00	5.306	5.406	0.00	0.00	5.305	5.405	0.00	0.00	5.300	5.400	0.00	0.00		
5.400	5.500	0.00	0.00	5.406	5.506	0.00	0.00	5.405	5.505	0.00	0.00	5.400	5.500	0.00	0.00		
5.500	5.600	0.00	0.00	5.506	5.606	0.50	0.50	5.505	5.605	2.00	2.00	5.500	5.600	6.97	6.97		
5.600	5.700	0.00	0.00	5.606	5.706	0.00	0.00	5.605	5.705	0.00	0.00	5.600	5.700	0.00	0.00		
5.700	5.800	0.00	0.00	5.706	5.806	0.00	0.00	5.705	5.805	0.00	0.00	5.700	5.800	0.00	0.00		
Weighted Average DI			0.00					0.025				0.158				0.241	

Table 5.11 Distress data for each 0.1 mile of the I-75 JPCP project reconstructed in 1999; CS 47065, JN 28215 (from MDOT PMS distress data)

Year - Years after construction															
1999 - 0				2001 - 2				2003 - 4				2005 - 6			
BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI
5.671	5.771	0.00	0.00	5.600	5.700	0.00	0.00	5.600	5.700	3.69	3.69	5.600	5.700	9.38	9.38
5.771	5.871	0.00	0.00	5.700	5.800	2.50	2.50	5.700	5.800	8.75	8.75	5.700	5.800	23.68	23.68
5.871	5.971	0.00	0.00	5.800	5.900	1.50	1.50	5.800	5.900	7.75	7.75	5.800	5.900	20.32	20.32
5.971	6.071	0.00	0.00	5.900	6.000	1.00	1.00	5.900	6.000	5.25	5.25	5.900	6.000	16.63	16.63
6.071	6.264	0.00	0.00	6.000	6.100	0.00	0.00	6.000	6.100	6.50	6.50	6.000	6.100	10.11	10.11
6.264	6.302	0.00	0.00	6.100	6.200	3.00	3.00	6.100	6.200	2.00	2.00	6.100	6.200	14.13	14.13
6.302	6.402	0.00	0.00	6.200	6.300	0.75	0.75	6.200	6.300	8.66	8.66	6.200	6.300	19.80	19.80
6.402	6.502	0.00	0.00	6.300	6.400	0.00	0.00	6.300	6.400	12.75	12.75	6.300	6.400	30.93	30.93
6.502	6.602	0.00	0.00	6.400	6.500	1.50	1.50	6.400	6.500	12.94	12.94	6.400	6.500	25.54	25.54
6.602	6.702	0.00	0.00	6.500	6.600	0.00	0.00	6.500	6.600	6.00	6.00	6.500	6.600	18.80	18.80
6.702	6.802	0.00	0.00	6.600	6.700	0.50	0.50	6.600	6.700	8.00	8.00	6.600	6.700	25.82	25.82
6.802	6.902	0.00	0.00	6.700	6.800	0.00	0.00	6.700	6.800	7.75	7.75	6.700	6.800	26.17	26.17
6.902	7.002	0.00	0.00	6.800	6.900	0.00	0.00	6.800	6.900	4.00	4.00	6.800	6.900	23.50	23.50
7.002	7.102	0.00	0.00	6.900	7.000	0.00	0.00	6.900	7.000	2.50	2.50	6.900	7.000	21.32	21.32
7.102	7.202	0.00	0.00	7.000	7.100	3.00	3.00	7.000	7.100	11.50	11.50	7.000	7.100	25.96	25.96
7.202	7.302	0.00	0.00	7.100	7.200	2.25	2.25	7.100	7.200	15.13	15.13	7.100	7.200	25.83	25.83
7.302	7.402	0.00	0.00	7.200	7.300	0.25	0.25	7.200	7.300	11.88	11.88	7.200	7.300	21.67	21.67
7.402	7.502	0.00	0.00	7.300	7.400	0.00	0.00	7.300	7.400	7.75	7.75	7.300	7.400	16.33	16.33
7.502	7.602	0.00	0.00	7.400	7.500	0.75	0.75	7.400	7.500	1.50	1.50	7.400	7.500	4.69	4.69
7.602	7.702	0.00	0.00	7.500	7.600	0.00	0.00	7.500	7.600	6.75	6.75	7.500	7.600	22.26	22.26
7.702	7.802	0.00	0.00	7.600	7.700	0.00	0.00	7.600	7.700	3.25	3.25	7.600	7.700	21.83	21.83
7.802	7.902	0.16	0.16	7.700	7.800	11.50	11.50	7.700	7.800	6.00	6.00	7.700	7.800	17.24	17.24
7.902	8.002	0.00	0.00	7.800	7.900	6.00	6.00	7.800	7.900	21.68	21.68	7.800	7.900	26.23	26.23
8.002	8.102	0.00	0.00	7.900	8.000	2.75	2.75	7.900	8.000	10.75	10.75	7.900	8.000	22.95	22.95
8.102	8.202	0.00	0.00	8.000	8.100	9.75	9.75	8.000	8.100	18.10	18.10	8.000	8.100	24.05	24.05

Table 5.11 (cont'd)

Year - Years after construction															
1999 - 0				2001 - 2				2003 - 4				2005 - 6			
BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI
8.202	8.302	0.00	0.00	8.100	8.200	8.00	8.00	8.100	8.200	15.94	15.94	8.100	8.200	21.00	21.00
8.302	8.402	1.00	1.00	8.200	8.300	3.75	3.75	8.200	8.300	19.44	19.44	8.200	8.300	23.55	23.55
8.402	8.502	0.00	0.00	8.300	8.400	0.00	0.00	8.300	8.400	8.94	8.94	8.300	8.400	19.78	19.78
8.502	8.602	0.00	0.00	8.400	8.500	1.00	1.00	8.400	8.500	2.50	2.50	8.400	8.500	15.40	15.40
8.602	8.702	0.00	0.00	8.500	8.600	3.50	3.50	8.500	8.600	11.94	11.94	8.500	8.600	23.22	23.22
8.702	8.802	0.00	0.00	8.600	8.700	1.00	1.00	8.600	8.700	11.00	11.00	8.600	8.700	22.67	22.67
8.802	8.902	0.00	0.00	8.700	8.800	0.00	0.00	8.700	8.800	9.69	9.69	8.700	8.800	20.21	20.21
8.902	9.002	0.00	0.00	8.800	8.900	0.00	0.00	8.800	8.900	4.00	4.00	8.800	8.900	18.25	18.25
9.002	9.102	0.00	0.00	8.900	9.000	0.00	0.00	8.900	9.000	11.00	11.00	8.900	9.000	19.71	19.71
9.102	9.202	1.00	1.00	9.000	9.100	0.00	0.00	9.000	9.100	5.69	5.69	9.000	9.100	13.69	13.69
				9.100	9.200	1.75	1.75	9.100	9.200	4.44	4.44	9.100	9.200	15.05	15.05
Weighted Average DI				1.833				8.761							20.214

Table 5.12 Distress data for each 0.1 mile of the I-94 JPCP project reconstructed in 1997; CS 11017, JN 38094 (from MDOT PMS distress data)

Year - Years after construction															
1999 - 2				2001 - 4				2003 - 6				2005 - 8			
BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI	BMP	EMP	DI	Weighted DI
5.617	5.717	0.32	0.32	5.603	5.703	0.00	0.00	5.605	5.705	0.66	0.66	5.602	5.702	0.50	0.50
5.717	5.817	0.16	0.16	5.703	5.803	0.00	0.00	5.705	5.805	0.00	0.00	5.702	5.802	0.00	0.00
5.817	5.917	0.16	0.16	5.803	5.903	0.00	0.00	5.805	5.905	0.00	0.00	5.802	5.902	1.69	1.69
5.917	6.017	0.00	0.00	5.903	6.003	0.00	0.00	5.905	6.005	0.00	0.00	5.902	6.002	0.50	0.50
6.017	6.117	0.00	0.00	6.003	6.103	0.00	0.00	6.005	6.105	0.00	0.00	6.002	6.102	0.00	0.00
6.117	6.217	0.00	0.00	6.103	6.203	0.00	0.00	6.105	6.205	0.16	0.16	6.102	6.202	2.28	2.28
6.217	6.317	0.00	0.00	6.203	6.303	0.00	0.00	6.205	6.305	0.00	0.00	6.202	6.302	5.64	5.64
6.317	6.417	0.00	0.00	6.303	6.403	0.00	0.00	6.305	6.405	0.00	0.00	6.302	6.402	4.36	4.36
6.417	6.590	1.07	0.62	6.403	6.503	0.75	0.75	6.405	6.505	0.75	0.75	6.402	6.599	12.55	6.37
Weighted Average DI			0.140				0.083				0.174				2.371
															10.467

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Table 5.13 Summary of the weighted average DI for the I-75 JPCP project reconstructed in 1998; CS 82194, JN 36005

Data source	Year	BMP	EMP	Project length (miles)	Weighted average DI	I/D	Maintenance/rehabilitation since construction
MDOT-pavement performance study	1999	4.8	6.598	1.798	0.0		
	2001	4.8	6.598	1.798	0.5		
	2003	4.8	6.598	1.798	0.3		
	2005	4.8	6.598	1.798	0.6		
MDOT-PMS distress data	1999	4.799	6.598	1.799	0.039		
	2001	4.794	6.65	1.856	0.454		
	2003	4.8	6.642	1.842	0.251		
	2005	4.773	6.668	1.895	2.244		
MDOT - I/D project list		4.58	6.99	2.41		Concrete Quality Initiative	
Financial records						Concrete Quality Initiative - \$60,832.80 – 2.15% (% of paving cost)	

Table 5.14 Summary of the weighted average DI for the I-94 JPCP project reconstructed in 1997; CS 11017, JN 38094

Data source	Year	BMP	EMP	Project length (miles)	Weighted average DI	I/D	Maintenance/rehabilitation since construction
MDOT-pavement performance study	1999	5.617	6.503	0.886	0.196		
	2001	5.617	6.503	0.886	0.085		
	2003	5.617	6.503	0.886	0.2		
	2005	5.617	6.503	0.886	1.8		
	2007	5.617	6.503	0.886	7.354		
MDOT-PMS distress data	1999	5.617	6.59	0.973	0.14		
	2001	5.603	6.503	0.9	0.083		
	2003	5.605	6.505	0.9	0.174		
	2005	5.602	6.599	0.997	2.371		
	2007	5.616	6.516	0.9	10.467		
MDOT - I/D project list		5.875	6.603	0.728		Concrete Strength Adjustment	
Financial records						Concrete Strength Adjustment - \$31,128.70 – 2.29% (% of paving cost)	

Table 5.15 Summary of the weighted average DI for the I-69 JPCP project reconstructed in 2000; CS 12033, JN 45877

Data source	Year	BMP	EMP	Project length (miles)	Weighted average DI	I/D	Maintenance/rehabilitation since construction
MDOT-pavement performance study	2001	5.8	10.809	5.009	0		
	2003	5.8	10.809	5.009	0		
	2005	5.8	10.809	5.009	0.1		
	2007	5.8	10.809	5.009	0.283		
MDOT-PMS distress data	2001	5.8	10.809	5.009	0		
	2003	5.806	10.806	5.0	0.02		
	2005	5.805	10.805	5.0	0.058		
	2007	5.8	10.8	5.0	0.283		
MDOT - I/D project list		5.8	11.0	5.2		Concrete Quality Initiative	
Financial records						Concrete Quality Initiative - \$65,132.72 – 2.38% (% of paving cost)	

Table 5.16 Summary of the weighted average DI for the I-69 JPCP project reconstructed in 2000; CS 12033, JN 45535

Data source	Year	BMP	EMP	Project length (miles)	Weighted average DI	I/D	Maintenance/rehabilitation since construction
MDOT-pavement performance study	2001	0.006	5.8	5.794	0		
	2003	0.006	5.8	5.794	0		
	2005	0.006	5.8	5.794	0.2		
	2007	0.006	5.8	5.794	0.2		
MDOT-PMS distress data	2001	0	5.8	5.8	0		
	2003	0	5.806	5.806	0.025		
	2005	0	5.805	5.805	0.158		
	2007	0	5.8	5.8	0.241		
MDOT - I/D project list		0	5.8	5.8		Concrete Quality Initiative	
Financial records						Concrete Quality Initiative - \$65,132.72 – 2.69% (% of paving cost)	

Table 5.17 Summary of the weighted average DI for the I-75 JPCP project reconstructed in 1999; CS 47065, JN 28215

Data source	Year	BMP	EMP	Project length (miles)	Weighted average DI	I/D	Maintenance/rehabilitation since construction
MDOT-pavement performance study	1999	5.671	9.2	3.529	0.063		2005 - Concrete pavement repair & diamond grinding
	2001	5.671	9.2	3.529	1.827		
	2003	5.671	9.2	3.529	8.69		
	2005	5.671	9.2	3.529	20.297		
MDOT-PMS distress data	1999	5.671	9.202	3.531	0.062		
	2001	5.6	9.2	3.6	1.836		
	2003	5.6	9.2	3.6	8.885		
	2005	5.6	9.2	3.6	20.361		
MDOT- I/D project list		4.05	5.46	1.41		Concrete Strength Initiative	
Financial records						Concrete Strength Initiative - \$71,031.01 – 3.18% (% of paving cost)	

As indicated in Table 5.5 and in Tables 5.13 to 5.17, each of the six JPCP pavement reconstruction projects contained I/D specifications and received varying levels of I/D payment. The I/D pay rates for the six projects ranged from 2.15 to 3.18 percent, which was computed as a percentage of the total paving material cost. The amount of I/D payment received by the contractor and the paving material cost for each project were obtained from the project financial records.

The performances of the six pavement projects were compared based on the weighted average DI data listed in Table 5.5, and in Tables 5.13 to 5.17 that were obtained from the MDOT pavement performance study data files. The performances of the six projects were compared to assess whether or not the I/D pay rate impacts pavement performance.

Figure 5.2 depicts the average DI values (listed in Table 5.5, and in Tables 5.13 to 5.17) for the six rigid pavement projects plotted as a function of time since reconstruction. The data in the figure indicates that:

- a) The I-75 pavement project with the highest I/D pay rate (3.18 percent) has the highest rate of deterioration. The average DI increased from 0.06 to 20.36 in 6 years after construction.
- b) The I-75 pavement project with the lowest I/D pay rate (2.15 percent) has a significantly low rate of deterioration. The average DI increased from 0.0 to 0.6 in 7 years after reconstruction.
- c) From all six projects, the I/D pay rate appears to have no effect on pavement performance.
- d) For the pavement projects designated 1, 3 and 5 in Table 5.18, there is an insignificant change in the average DI over time since reconstruction. The average DI values for each of the three projects range between 0 and 0.6 in 7 years after reconstruction as can be seen in Figure 5.3.

As in Example 1, in order to estimate the pavement life (PL) of each of the six JPCP reconstruction projects, two methods were employed:

1. The best fit curves between the average DI and time (T) in year were obtained using polynomial functions. The resulting correlation equations are listed in Table 5.18: Equations 3 through 8 were used to estimate the pavement life of each of the six JPCP reconstruction projects. This was accomplished by solving for the time “T” in the

equations for which the DI equal to fifty distress points (the MDOT DI threshold value defining PL). Additionally, the remaining service life (RSL) of each pavement project was calculated by subtracting the number of years between reconstruction and the last distress survey year (or the pavement surface age) from the estimated PL. It should be noted that Equations 2 and 6 are the same polynomial function. This is because the same I-69 pavement project was used in both examples. For the I-75 pavement project with an I/D pay rate of 2.15 percent, the average DI obtained from the MDOT pavement performance study files for the third year after reconstruction was considered an outlier (see Figure 5.3) and hence it was ignored. After eliminating the third year DI data, the best fit polynomial function was obtained and is included as Equation 3 in Table 5.18.

Table 5.18 Best fit polynomial equations for the six pavement projects

Project designation	Route	I/D Pay rate (%)	Equation	Eq #
1	I-75	2.15	$DI = 0.0159(T)^2 + 0.0315(T) - .0526$	3
2	I-94	2.29	$DI = 0.2288(T)^2 - 1.0292(T) + 0.5515$	4
3	I-69	2.38	$DI = 0.0114(T)^2 - 0.044(T) + 0.0318$	5
4	I-69	2.58	$DI = 0.0909(T)^2 - 0.1635(T) + 0.1726$	6
5	I-69	2.69	$DI = 0.0029(T)^2 - 0.0239(T) + 0.0445$	7
6	I-75	3.18	$DI = 0.6152(T)^2 - 0.3129(T) + 0.0452$	8

- For each pavement project, the best fit curve of the data was obtained using the MDOT revised logistical growth model. The model was then used to estimate the PL and the RSL of each rigid pavement reconstruction project.

The estimated values of the PL and RSL for the six JPCP pavement projects, calculated from Equations 3 through 8 and from the MDOT revised logistical growth model, can be seen in Table 5.19. It should be noted that, in the Phase II study, only the MDOT revised logistical growth model will be used to estimate the lives of the pavement projects.

However, this model was not part of the Phase I study. Nevertheless, it is evident from the PL and RSL values listed in Table 5.19 that the polynomial functions overestimated these values. Hence, the PL values obtained from the MDOT revised logistical growth model was plotted against the I/D pay rate, as shown in Figure 5.4. After examination of the data shown in the figure, it was decided to label the data point with an I/D pay rate of 3.18 as an outlier. The remaining data were then used to generate the best fit exponential function, which is stated in the figure. It can be seen from the figure that, in general, the higher the I/D pay rate, the higher is the estimated PL. This observation must be viewed with extreme caution. The reasons are:

1. The small range of the I/D pay rate of the six projects.
2. The small pool of pavement projects used in the comparison.

The above scenarios indicate that a definitive conclusion regarding the effect of the I/D pay rate on pavement performance cannot be made. This is similar to the conclusion reached from Example 1. The analyses of the two examples should be viewed as an example of the analyses to be conducted on a much larger pool of projects in the Phase II study.

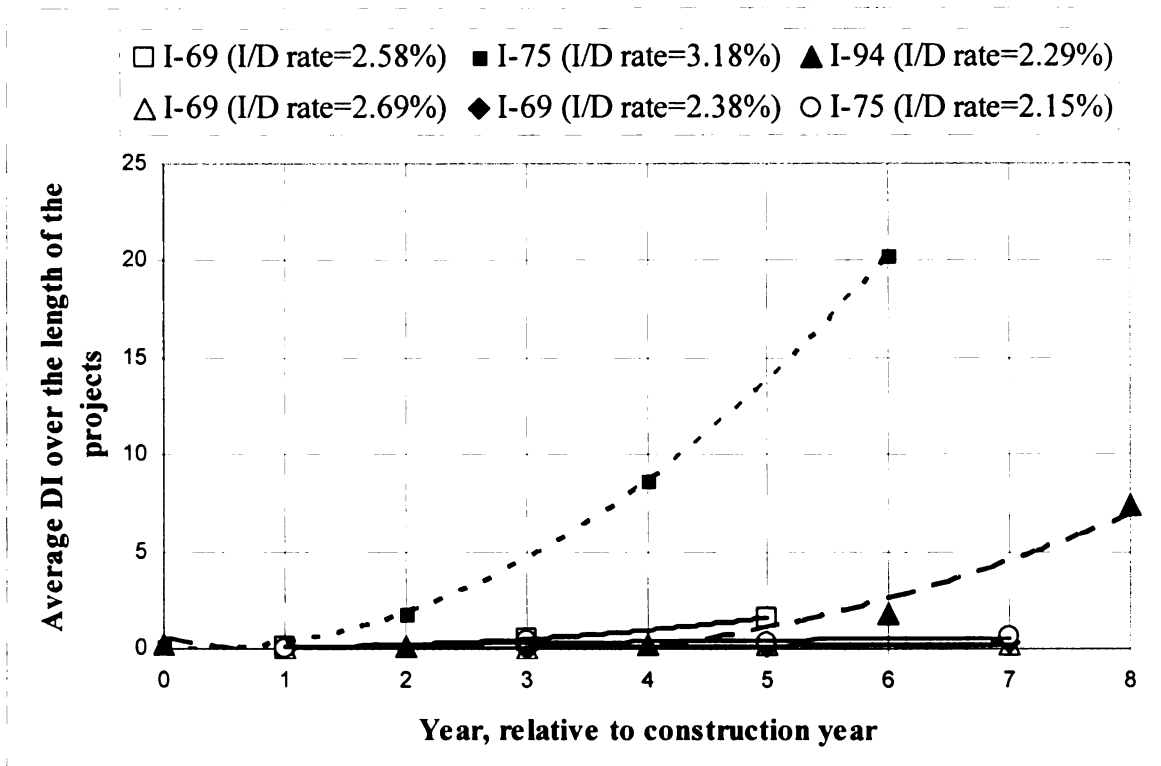


Figure 5.2 DI comparison of six JPCP pavement projects

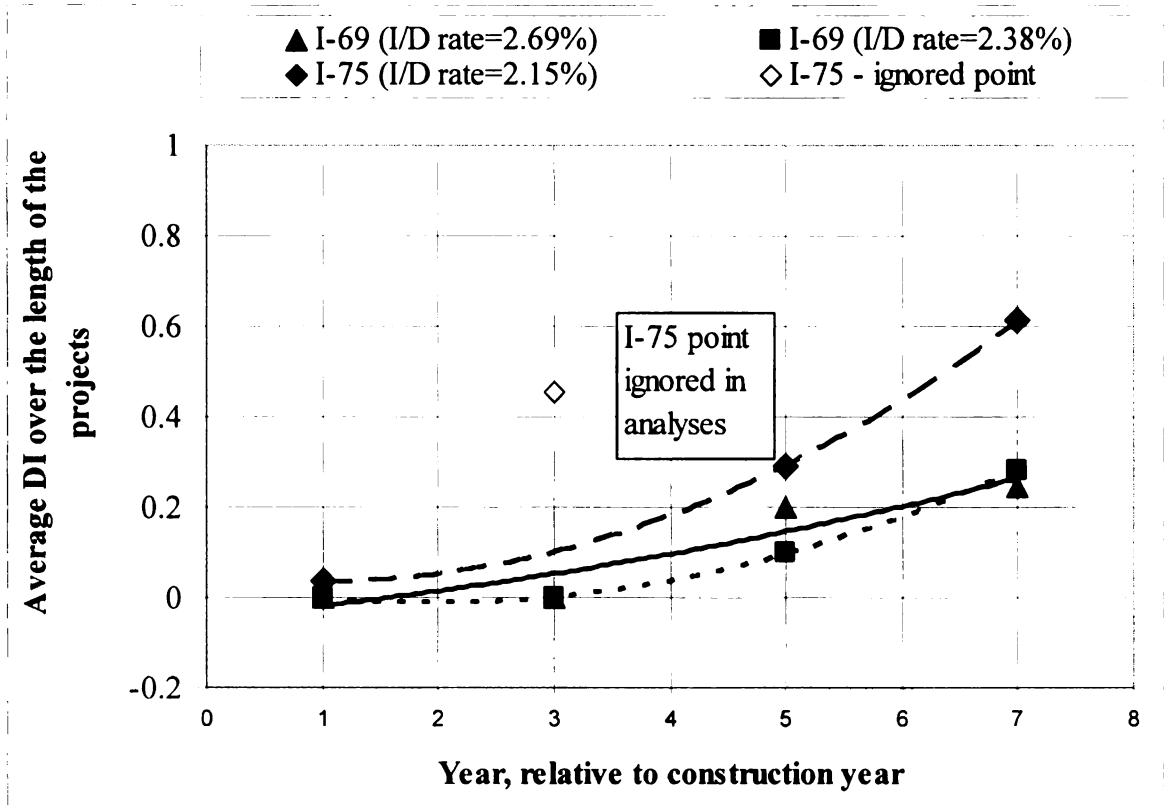


Figure 5.3 DI comparison of three JPCP pavement projects

Table 5.19 Predicted pavement life and remaining service life of six JPCP reconstruction projects

	Route (CS,JN)	I-75 (82194, 36005)	I-94 (11017, 38094)	I-69 (12033, 45877)	I-69 (12033, 49921)	I-69 (12033, 45535)	I-75 (47065, 28215)
Project designation		1	2	3	4	5	6
I/D rate (%)		2.15	2.29	2.38	2.58	2.69	3.18
Best fit polynomial equation	Pavement life (years)	55.12	17.12	68.16	24.33	135.43	9.27
	Remaining service life (years)	48.12	9.12	61.16	19.33	128.43	3.27
MDOT revised logistical growth model	Pavement life (years)	14.6	11.9	23.6	22.1	50.2	9.8
	Remaining service life (years)	7.6	3.9	16.6	17.1	43.2	3.8

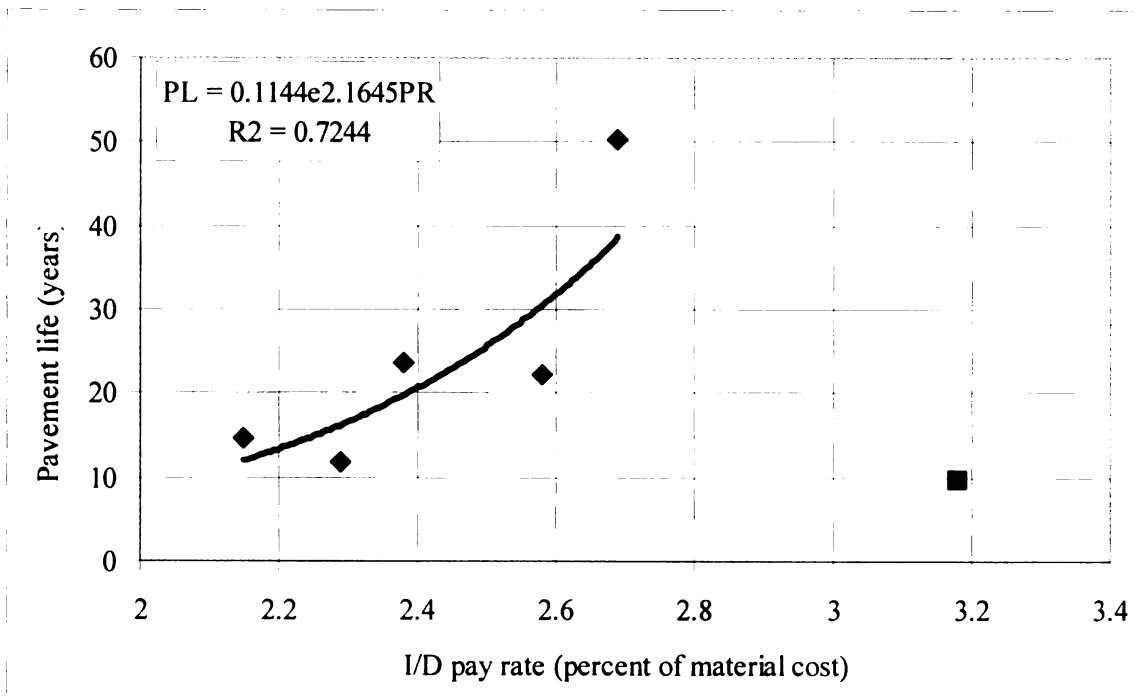


Figure 5.4 Pavement life estimated from MDOT revised logistical growth model vs. I/D pay rate

5.3 CONCLUSIONS

Based upon the pavement project data collected in the Phase I study and the assessment of Examples 1 and 2, the following conclusions were drawn:

1. Ideal and comprehensive analyses of the cost and benefits of each specific pay item within the MDOT I/D program cannot be conducted.
2. Analyses can be conducted on the costs and benefits of the I/D program as a whole. This includes analyses based on pavement type, fix type, and the I/D pay rate.
3. As listed in Table 3.1, the MDOT project files contain missing data elements including:
 - a. QC/QA test results
 - b. Reference location along project where I/D payments were made
 - c. I/D pay item (which material property received I/D)
 - d. Initial ride quality index (RQI) – RQI for which I/D was paid

5.4 RECOMMENDATIONS

Based on the findings of the Phase I study the research team strongly recommends the following changes be made:

1. Create computerized data files, accessible to all users, in which all data elements of each pavement project can be imported to. This should allow the users to access all data and conduct the desired analyses at his/her desk.

2. Collect and store within the computerized data files, all the necessary data elements listed in Table 3.1. Including the following data elements, which are currently missing from the project files:
 - a. QA/QC test results
 - b. Reference location along project where I/D payments were made
 - c. I/D pay item (which material property received I/D)
 - d. Initial ride quality index (RQI) – RQI for which I/D was paid
3. Convert the existing location reference system (mileposts and road number) to a geographical information based system (GIS). This would eliminate the slight difference in project boundaries (beginning and ending mileposts) from one survey year to another.
4. Enable the projects within the computer database to be linked by the location reference system. This would allow for all projects relevant to a pavement section to be accessible when searched by location reference system (mileposts and road number).
5. Convert the current I/D pay specifications which only concern the surface paving materials to I/D specifications which include the entire pavement system.

Appendix A

MDOT Pavement Performance Study Data

Table A1 The pavement performance study data for seven rigid pavement reconstruction projects

Project Identification	Region	Route	Control Section	Job Number	BMP	EMP	Length	Opened	Location	Distress Index						
										1995	1997	1999	2001	2003	2005	2007
254	Southwest	I-94 EB	11015	29580	19.381	23.353	3.972	1995	W of Red Arrow Highway to M-63	0.096	0.362	2.734		15.09	2.947	
254	Southwest	I-94 WB	11015	29580	19.432	23.391	3.959	1995	W of Red Arrow Highway to M-63	0.196	0.338	1.012	3.804	17.2	2.3	
15N	Metro	I-75 NB	82194	36005	4.8	6.598	1.798	1998	M-85 to Clark Street			0.037	0.456	0.293	0.612	
15S	Metro	I-75 SB	82194	36005	4.714	6.583	1.869	1998	M-85 to Clark Street			0.886	0.108			
17E	Southwest	I-94 EB	11017	38094	5.617	6.503	0.886	1998	W of M-140 to M-140			0.196	0.085	0.2	1.8	7.354
43N	Southwest	I-69 NB	12033	45877	5.8	10.81	5.009	2000	N of Warren Road to Centennial Road				0	0	0.1	0.283
43S	Southwest	I-69 SB	12033	45877	5.8	11	5.196	2000	N of Warren Road to Centennial Road				0	0	0.055	0.322
55	Southwest	I-69 NB	12033	49921	10.98	12.6	1.627	2002	1.6 miles S US-12 to US-12					0.1	0.5	1.627
55	Southwest	I-69 SB	12033	49921	11	12.6	1.601	2002	1.6 miles S US-12 to US-12					0	0.298	0.972
41N	Southwest	I-69 NB	12033	45535	0.006	5.8	5.794	2000	MI/IN State Line to N of Warren Road				0	0	0.2	0.246
41S	Southwest	I-69 SB	12033	45535	0.196	5.8	5.604	2000	MI/IN State Line to N of Warren Road				0.013	0.1	0.249	0.418
5	University	I-96 EB	47065	28215	5.671	9.2	3.529	1997	Chilson Road to Dorr Road			0.063	1.827	8.69	20.3	
5	University	I-96 WB	47065	28215	5.623	9.223	3.6	1998	Chilson Road to Dorr Road			0.354	0.105	1.744	5.214	

Table A1 (cont'd)

Project Identification	Region	Route	Control Section	Job Number	Average IRI (inches/mile)					Average Rut Depth (inch)					Maintenance Costs (2007 \$ Per Lane-mile)					
					1999	2001	2003	2005	2007	1999	2001	2003	2005	2007	Cycle 1	Year	Age	Cycle 2	Year	Age
254	Southwest	I-94 EB	11015	29580											121,859.99	2003	8	60,465.80	2004	9
254	Southwest	I-94WB	11015	29580											121,859.99	2003	8	60,465.80	2004	9
15N	Metro	I-75 NB	82194	36005		111.1	84.82	96.24	95.35	0.17	0.036	0.069	0.158		24,779.02	2008	10			
15S	Metro	I-75 SB	82194	36005	116.5	103.2		96.8	86.5	0.165		0.069	0.161		24,779.02	2008	10			
17E	Southwest	I-94 EB	11017	38094	87.38	106	100.8	105.1	119	0.164	0.028	0.025	0.134							
43N	Southwest	I-69 NB	12033	45877		84	72.94	64.28	69.78	0.165	0.025	0.025	0.142							
43S	Southwest	I-69 SB	12033	45877		87.9	74	65.63	65.57	0.169	0.024	0.021	0.147							
55	Southwest	I-69 NB	12033	49921																
55	Southwest	I-69 SB	12033	49921																
41N	Southwest	I-69 NB	12033	45535		87.98	77.75	66.05	72.53	0.162	0.03	0.023	0.133							
41S	Southwest	I-69 SB	12033	45535		85.74	77.55	66.86	71.42	0.174	0.024	0.021	0.15							
5	University	I-96 EB	47065	28215											112,713.22	2005	8			
5	University	I-96 WB	47065	28215											112,713.22	2005	8			

**For the maintenance costs, all pre-2007 costs were brought into 2007 dollars based on the Producer Price Index for Highway and Street Construction

Appendix B

MDOT PMS Distress Index (DI) Data

Table B1 The MDOT 1993 pavement DI data for control section 11015 along I-94 EB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=93-07-09 TAPE BMP=00.001		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.029	5011993	7	0.29	0	0	<--- Normalized
	2	0.029	0.164	5011993	2	1.35	1	5.0222	<--- Normalized
	3	0.164	0.193	5011993	7	0.29	0	0	<--- Normalized
	4	0.193	0.293	5011993	2	1	1	7.59	<---
	5	0.293	0.393	5011993	2	1	1	0.64	<---
	6	0.393	0.493	5011993	2	1	1	3.56	<---
	7	0.493	0.593	5011993	2	1	1	0.28	<---
	8	0.593	0.693	5011993	2	1	1	3.13	<---
	9	0.693	0.793	5011993	2	1	1	2.96	<---
	10	0.793	0.893	5011993	2	1	1	4.51	<---
	11	0.893	0.993	5011993	2	1	1	4.54	<---
	12	0.993	1.093	5011993	2	1	1	1.92	<---
	13	1.093	1.193	5011993	2	1	1	2.58	<---
	14	1.193	1.293	5011993	2	1	1	1.64	<---
	15	1.293	1.393	5011993	2	1	1	2.32	<---
	16	1.393	1.493	5011993	2	1	1	1.64	<---
	17	1.493	1.667	5011993	2	1.74	1	3.7299	<--- Normalized
	18	1.667	1.703	5011993	7	0.36	0	0	<--- Normalized
	19	1.703	1.803	5011993	2	1	1	5.81	<---
	20	1.803	1.903	5011993	2	1	1	2.64	<---
	21	1.903	2.003	5011993	2	1	1	1.2	<---
	22	2.003	2.103	5011993	2	1	1	0.96	<---
	23	2.103	2.203	5011993	2	1	1	0.18	<---
	24	2.203	2.303	5011993	2	1	1	0.74	<---
	25	2.303	2.403	5011993	2	1	1	6.08	<---
	26	2.403	2.503	5011993	2	1	1	2.48	<---
	27	2.503	2.603	5011993	2	1	1	2.24	<---
	28	2.603	2.703	5011993	2	1	1	2.06	<---
	29	2.703	2.803	5011993	2	1	1	1.32	<---
	30	2.803	2.903	5011993	2	1	1	1.12	<---
	31	2.903	3.003	5011993	2	1	1	0.32	<---
	32	3.003	3.103	5011993	2	1	1	0.24	<---
	33	3.103	3.203	5011993	2	1	1	0.48	<---
	34	3.203	3.303	5011993	2	1	1	0	<---
	35	3.303	3.403	5011993	2	1	1	0.32	<---
	36	3.403	3.503	5011993	2	1	1	0.48	<---
	37	3.503	3.603	5011993	2	1	1	1.32	<---
	38	3.603	3.703	5011993	2	1	1	1.72	<---
	39	3.703	3.803	5011993	2	1	1	3.12	<---
	40	3.803	3.903	5011993	2	1	1	2.46	<---
	41	3.903	4.003	5011993	2	1	1	2.5	<---
	42	4.003	4.103	5011993	2	1	1	3.68	<---

Table B1 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=93-07-09 TAPE BMP=00.001		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	43	4.103	4.203	5011993	2	1	1	0.26	<---
	44	4.203	4.303	5011993	2	1	1	0.48	<---
	45	4.303	4.403	5011993	2	1	1	0.56	<---
	46	4.403	4.503	5011993	2	1	1	1.56	<---
	47	4.503	4.603	5011993	2	1	1	0.98	<---
	48	4.603	4.703	5011993	2	1	1	0.72	<---
	49	4.703	4.803	5011993	2	1	1	1.28	<---
	50	4.803	4.903	5011993	2	1	1	1.48	<---
	51	4.903	5.003	5011993	2	1	1	0.88	<---
	52	5.003	5.103	5011993	2	1	1	1.24	<---
	53	5.103	5.203	5011993	2	1	1	0.72	<---
	54	5.203	5.303	5011993	2	1	1	0	<---
	55	5.303	5.403	5011993	2	1	1	0.18	<---
	56	5.403	5.503	5011993	2	1	1	0.1	<---
	57	5.503	5.603	5011993	2	1	1	0.16	<---
	58	5.603	5.703	5011993	2	1	1	0.08	<---
	59	5.703	5.803	5011993	2	1	1	0	<---
	60	5.803	5.903	5011993	2	1	1	0	<---
	61	5.903	6.003	5011993	2	1	1	0.88	<---
	62	6.003	6.103	5011993	2	1	1	0	<---
	63	6.103	6.203	5011993	2	1	1	0	<---
	64	6.203	6.303	5011993	2	1	1	0	<---
	65	6.303	6.403	5011993	2	1	1	0	<---
	66	6.403	6.503	5011993	2	1	1	0	<---
	67	6.503	6.603	5011993	2	1	1	0	<---
	68	6.603	6.703	5011993	2	1	1	0	<---
	69	6.703	6.803	5011993	2	1	1	0.08	<---
	70	6.803	6.903	5011993	2	1	1	0.44	<---
	71	6.903	7.003	5011993	2	1	1	0.56	<---
	72	7.003	7.103	5011993	2	1	1	0.08	<---
	73	7.103	7.203	5011993	2	1	1	0	<---
	74	7.203	7.303	5011993	2	1	1	0.16	<---
	75	7.303	7.403	5011993	2	1	1	0	<---
	76	7.403	7.503	5011993	2	1	1	0.5	<---
	77	7.503	7.603	5011993	2	1	1	0	<---
	78	7.603	7.703	5011993	2	1	1	0	<---
	79	7.703	7.803	5011993	2	1	1	0	<---
	80	7.803	7.903	5011993	2	1	1	0	<---
	81	7.903	8.049	5011993	2	1.46	1	0.8973	<--- Normalized
	82	8.049	8.079	5011993	7	0.3	0	0	<--- Normalized
	83	8.079	8.179	5011993	2	1	1	3.05	<---
	84	8.179	8.279	5011993	2	1	1	0.48	<---

Table B1 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=93-07-09 TAPE BMP=00.001		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	85	8.279	8.435	5011993	2	1.56	1	1.2372	<--- Normalized
	86	8.435	8.462	5011993	7	0.27	0	0	<--- Normalized
	87	8.462	8.562	5011993	2	1	1	2.09	<---
	88	8.562	8.662	5011993	2	1	1	0.84	<---
	89	8.662	8.762	5011993	2	1	1	0.8	<---
	90	8.762	8.862	5011993	2	1	1	0.16	<---
	91	8.862	8.962	5011993	2	1	1	0.94	<---
	92	8.962	9.062	5011993	2	1	1	1.52	<---
	93	9.062	9.162	5011993	2	1	1	0.48	<---
	94	9.162	9.262	5011993	2	1	1	1.12	<---
	95	9.262	9.362	5011993	2	1	1	0.96	<---
	96	9.362	9.462	5011993	2	1	1	1.2	<---
	97	9.462	9.562	5011993	2	1	1	0.8	<---
	98	9.562	9.662	5011993	2	1	1	0.74	<---
	99	9.662	9.762	5011993	2	1	1	0.48	<---
	100	9.762	9.862	5011993	2	1	1	0.64	<---
	101	9.862	9.962	5011993	2	1	1	0	<---
	102	9.962	10.062	5011993	2	1	1	1.06	<---
	103	10.062	10.162	5011993	2	1	1	0.24	<---
	104	10.162	10.262	5011993	2	1	1	1.76	<---
	105	10.262	10.362	5011993	2	1	1	2.16	<---
	106	10.362	10.462	5011993	2	1	1	4.54	<---
	107	10.462	10.562	5011993	2	1	1	2.8	<---
	108	10.562	10.662	5011993	2	1	1	1.58	<---
	109	10.662	10.762	5011993	2	1	1	1.36	<---
	110	10.762	10.862	5011993	2	1	1	2.04	<---
	111	10.862	10.962	5011993	2	1	1	2	<---
	112	10.962	11.062	5011993	2	1	1	1.38	<---
	113	11.062	11.162	5011993	2	1	1	0.36	<---
	114	11.162	11.262	5011993	2	1	1	1.24	<---
	115	11.262	11.362	5011993	2	1	1	0	<---
	116	11.362	11.462	5011993	2	1	1	0.3	<---
	117	11.462	11.562	5011993	2	1	1	0.82	<---
	118	11.562	11.662	5011993	2	1	1	0	<---
	119	11.662	11.762	5011993	2	1	1	0.56	<---
	120	11.762	11.862	5011993	2	1	1	0.76	<---
	121	11.862	11.972	5011993	2	1.1	1	2.3	<--- Normalized
	122	11.972	12.022	5011993	7	0.5	0	0	<--- Normalized
	123	12.022	12.122	5011993	2	1	1	1.21	<---
	124	12.122	12.222	5011993	2	1	1	0	<---
	125	12.222	12.322	5011993	2	1	1	0	<---
	126	12.322	12.422	5011993	2	1	1	0	<---

Table B1 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=93-07-09 TAPE BMP=00.001		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	127	12.422	12.522	5011993	2	1	1	1.76	<---
	128	12.522	12.622	5011993	2	1	1	2.94	<---
	129	12.622	12.722	5011993	2	1	1	3.08	<---
	130	12.722	12.822	5011993	2	1	1	2.8	<---
	131	12.822	12.932	5011993	2	1.1	1	4.7545	<--- Normalized
	132	12.932	12.964	5011993	7	0.32	0	0	<--- Normalized
	133	12.964	13.064	5011993	2	1	1	3.85	<---
	134	13.064	13.164	5011993	2	1	1	0.96	<---
	135	13.164	13.264	5011993	2	1	1	2.08	<---
	136	13.264	13.364	5011993	2	1	1	1.92	<---
	137	13.364	13.464	5011993	2	1	1	1.56	<---
	138	13.464	13.651	5011993	2	1.87	1	3.2995	<--- Normalized
	139	13.651	13.657	5011993	7	0.06	0	0	<--- Normalized
	140	13.657	13.757	5011993	2	1	1	5.37	<---
	141	13.757	13.857	5011993	2	1	1	2.64	<---
	142	13.857	13.957	5011993	2	1	1	1.4	<---
	143	13.957	14.057	5011993	2	1	1	2.24	<---
	144	14.057	14.157	5011993	2	1	1	3.28	<---
	145	14.157	14.257	5011993	2	1	1	2.36	<---
	146	14.257	14.357	5011993	2	1	1	3.6	<---
	147	14.357	14.457	5011993	2	1	1	3.4	<---
	148	14.457	14.557	5011993	2	1	1	2.88	<---
	149	14.557	14.657	5011993	2	1	1	2.46	<---
	150	14.657	14.757	5011993	2	1	1	2.26	<---
	151	14.757	14.857	5011993	2	1	1	1.68	<---
	152	14.857	14.957	5011993	2	1	1	2.16	<---
	153	14.957	15.057	5011993	2	1	1	2.48	<---
	154	15.057	15.157	5011993	2	1	1	1.6	<---
	155	15.157	15.257	5011993	2	1	1	2.32	<---
	156	15.257	15.357	5011993	2	1	1	3.22	<---
	157	15.357	15.457	5011993	2	1	1	1.76	<---
	158	15.457	15.557	5011993	2	1	1	3.08	<---
	159	15.557	15.657	5011993	2	1	1	1.72	<---
	160	15.657	15.757	5011993	2	1	1	0.32	<---
	161	15.757	15.857	5011993	2	1	1	0.84	<---
	162	15.857	15.957	5011993	2	1	1	1.72	<---
	163	15.957	16.057	5011993	2	1	1	0.48	<---
	164	16.057	16.157	5011993	2	1	1	0.56	<---
	165	16.157	16.257	5011993	2	1	1	0	<---
	166	16.257	16.357	5011993	2	1	1	0.16	<---
	167	16.357	16.457	5011993	2	1	1	0.4	<---
	168	16.457	16.557	5011993	2	1	1	0.24	<---

Table B1 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=93-07-09 TAPE BMP=00.001		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	169	16.557	16.657	5011993	2	1	1	0.24	<---
	170	16.657	16.757	5011993	2	1	1	0.1	<---
	171	16.757	16.857	5011993	2	1	1	0.56	<---
	172	16.857	16.957	5011993	2	1	1	1.36	<---
	173	16.957	17.057	5011993	2	1	1	2.24	<---
	174	17.057	17.157	5011993	2	1	1	1.44	<---
	175	17.157	17.257	5011993	2	1	1	0	<---
	176	17.257	17.357	5011993	2	1	1	0.16	<---
	177	17.357	17.457	5011993	2	1	1	0.16	<---
	178	17.457	17.557	5011993	2	1	1	0.16	<---
	179	17.557	17.657	5011993	2	1	1	0.08	<---
	180	17.657	17.757	5011993	2	1	1	2.14	<---
	181	17.757	17.857	5011993	2	1	1	1.32	<---
	182	17.857	17.957	5011993	2	1	1	0.48	<---
	183	17.957	18.057	5011993	2	1	1	0.82	<---
	184	18.057	18.157	5011993	2	1	1	0.24	<---
	185	18.157	18.257	5011993	2	1	1	0.8	<---
	186	18.257	18.357	5011993	2	1	1	0.74	<---
	187	18.357	18.457	5011993	2	1	1	1.6	<---
	188	18.457	18.557	5011993	2	1	1	0.4	<---
	189	18.557	18.657	5011993	2	1	1	0	<---
	190	18.657	18.757	5011993	2	1	1	0.64	<---
	191	18.757	18.868	5011993	2	1.11	1	1.234	<--- Normalized
	192	18.868	18.897	5011993	7	0.29	0	0	<--- Normalized
	193	18.897	18.997	5011993	2	1	1	3.17	<---
	194	18.997	19.097	5011993	2	1	1	0.86	<---
	195	19.097	19.197	5011993	2	1	1	0.1	<---
	196	19.197	19.331	5011993	2	1.34	1	1.552	<--- Normalized
I-94, CS 11015 JN 29580 BMP: 19.381 EMP: 23.353	197	19.331	19.431	5011993	1	1	1	42.21	<---
	198	19.431	19.531	5011993	1	1	1	42.4	<---
	199	19.531	19.631	5011993	1	1	1	97.13	<---
	200	19.631	19.772	5011993	1	1.41	1	40.34	<--- Normalized
	201	19.772	19.808	5011993	7	0.36	0	0	<--- Normalized
	202	19.808	20.001	5011993	1	1.93	1	43.55	<--- Normalized
	203	20.001	20.038	5011993	7	0.37	0	0	<--- Normalized
	204	20.038	20.138	5011993	1	1	1	50.02	<---
	205	20.138	20.238	5011993	1	1	1	30.99	<---
	206	20.238	20.338	5011993	1	1	1	19.07	<---
	207	20.338	20.438	5011993	1	1	1	24.66	<---
	208	20.438	20.538	5011993	1	1	1	23.92	<---
	209	20.538	20.66	5011993	1	1.22	1	32.85	<--- Normalized
	210	20.66	20.673	5011993	7	0.13	0	0	<--- Normalized

Table B1 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=93-07-09 TAPE BMP=00.001		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-94, CS 11015 JN 29580, BMP: 19.381 EMP: 23.353	211	20.673	20.773	5011993	1	1	1	53.85	<---
	212	20.773	20.873	5011993	1	1	1	22.44	<---
	213	20.873	20.973	5011993	1	1	1	29.39	<---
	214	20.973	21.073	5011993	1	1	1	45.55	<---
	215	21.073	21.173	5011993	1	1	1	35.79	<---
	216	21.173	21.273	5011993	1	1	1	28.41	<---
	217	21.273	21.373	5011993	1	1	1	46.47	<---
	218	21.373	21.473	5011993	1	1	1	24.37	<---
	219	21.473	21.573	5011993	1	1	1	21.54	<---
	220	21.573	21.673	5011993	1	1	1	25.49	<---
	221	21.673	21.773	5011993	1	1	1	39.04	<---
	222	21.773	21.873	5011993	1	1	1	25.44	<---
	223	21.873	21.973	5011993	1	1	1	30.28	<---
	224	21.973	22.073	5011993	1	1	1	25.98	<---
	225	22.073	22.173	5011993	1	1	1	31.04	<---
	226	22.173	22.273	5011993	1	1	1	27.26	<---
	227	22.273	22.427	5011993	1	1.54	1	24.28	<--- Normalized
	228	22.427	22.428	5011993	3	0.01	1	193	<--- Normalized
	229	22.428	22.449	5011993	1	0.21	1	71.38	<--- Normalized
	230	22.449	22.471	5011993	7	0.22	0	0	<--- Normalized
	231	22.471	22.571	5011993	1	1	1	39.06	<---
	232	22.571	22.671	5011993	1	1	1	19.43	<---
	233	22.671	22.771	5011993	1	1	1	35.65	<---
	234	22.771	22.871	5011993	1	1	1	30.39	<---
	235	22.871	22.971	5011993	1	1	1	25.66	<---
	236	22.971	23.071	5011993	1	1	1	19.56	<---
	237	23.071	23.171	5011993	1	1	1	26.16	<---
	238	23.171	23.271	5011993	1	1	1	28.1	<---
	239	23.271	23.386	5011993	1	1.15	1	23.06	<--- Normalized

Table B2 The MDOT 1995 pavement DI data for control section 11015 along I-94 EB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=95-12-10 TAPE BMP=00.000		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0.008	0.049	5011995	7	0.41	0	0	<--- Normalized
	2	0.049	0.184	5011995	2	1.35	1	16.541	<--- Normalized
	3	0.184	0.213	5011995	7	0.29	0	0	<--- Normalized
	4	0.213	0.313	5011995	2	1	1	70.66	<---
	5	0.313	0.413	5011995	2	1	1	27.71	<---
	6	0.413	0.513	5011995	2	1	1	23.25	<---
	7	0.513	0.613	5011995	2	1	1	8.14	<---
	8	0.613	0.713	5011995	2	1	1	15.68	<---
	9	0.713	0.813	5011995	2	1	1	38.66	<---
	10	0.813	0.913	5011995	2	1	1	56.49	<---
	11	0.913	1.013	5011995	2	1	1	56.53	<---
	12	1.013	1.113	5011995	2	1	1	26.02	<---
	13	1.113	1.213	5011995	2	1	1	29.61	<---
	14	1.213	1.313	5011995	2	1	1	49.1	<---
	15	1.313	1.413	5011995	2	1	1	48.49	<---
	16	1.413	1.513	5011995	2	1	1	21.04	<---
	17	1.513	1.689	5011995	2	1.76	1	14.523	<--- Normalized
	18	1.689	1.725	5011995	7	0.36	0	0	<--- Normalized
	19	1.725	1.825	5011995	2	1	1	63.65	<---
	20	1.825	1.925	5011995	2	1	1	27.49	<---
	21	1.925	2.025	5011995	2	1	1	15.18	<---
	22	2.025	2.125	5011995	2	1	1	5.97	<---
	23	2.125	2.225	5011995	2	1	1	3.62	<---
	24	2.225	2.325	5011995	2	1	1	18.99	<---
	25	2.325	2.425	5011995	2	1	1	37.43	<---
	26	2.425	2.525	5011995	2	1	1	18.38	<---
	27	2.525	2.625	5011995	2	1	1	4.2	<---
	28	2.625	2.725	5011995	2	1	1	4.79	<---
	29	2.725	2.825	5011995	2	1	1	6.44	<---
	30	2.825	2.925	5011995	2	1	1	7.52	<---
	31	2.925	3.025	5011995	2	1	1	6.22	<---
	32	3.025	3.125	5011995	2	1	1	3.62	<---
	33	3.125	3.225	5011995	2	1	1	2.24	<---
	34	3.225	3.325	5011995	2	1	1	6.3	<---
	35	3.325	3.425	5011995	2	1	1	7.14	<---
	36	3.425	3.525	5011995	2	1	1	5.08	<---
	37	3.525	3.625	5011995	2	1	1	1.9	<---
	38	3.625	3.725	5011995	2	1	1	3.8	<---
	39	3.725	3.825	5011995	2	1	1	3.52	<---
	40	3.825	3.925	5011995	2	1	1	1.22	<---
	41	3.925	4.025	5011995	2	1	1	1.78	<---
	42	4.025	4.125	5011995	2	1	1	0.08	<---

Table B2 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=95-12-10 TAPE BMP=00.000		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	43	4.125	4.225	5011995	2	1	1	0.8	<---
	44	4.225	4.325	5011995	2	1	1	1.12	<---
	45	4.325	4.425	5011995	2	1	1	0.08	<---
	46	4.425	4.525	5011995	2	1	1	3.12	<---
	47	4.525	4.625	5011995	2	1	1	2.08	<---
	48	4.625	4.725	5011995	2	1	1	0.72	<---
	49	4.725	4.825	5011995	2	1	1	1.06	<---
	50	4.825	4.925	5011995	2	1	1	0.56	<---
	51	4.925	5.025	5011995	2	1	1	2.18	<---
	52	5.025	5.125	5011995	2	1	1	0.98	<---
	53	5.125	5.225	5011995	2	1	1	2.8	<---
	54	5.225	5.325	5011995	2	1	1	2.38	<---
	55	5.325	5.425	5011995	2	1	1	1.36	<---
	56	5.425	5.525	5011995	2	1	1	0.1	<---
	57	5.525	5.625	5011995	2	1	1	0.26	<---
	58	5.625	5.725	5011995	2	1	1	0.34	<---
	59	5.725	5.825	5011995	2	1	1	0.2	<---
	60	5.825	5.925	5011995	2	1	1	0.18	<---
	61	5.925	6.025	5011995	2	1	1	4.2	<---
	62	6.025	6.125	5011995	2	1	1	5.08	<---
	63	6.125	6.225	5011995	2	1	1	0.9	<---
	64	6.225	6.325	5011995	2	1	1	0.46	<---
	65	6.325	6.425	5011995	2	1	1	0.16	<---
	66	6.425	6.525	5011995	2	1	1	0.6	<---
	67	6.525	6.625	5011995	2	1	1	0	<---
	68	6.625	6.725	5011995	2	1	1	0.48	<---
	69	6.725	6.825	5011995	2	1	1	1.6	<---
	70	6.825	6.925	5011995	2	1	1	0.8	<---
	71	6.925	7.025	5011995	2	1	1	0.4	<---
	72	7.025	7.125	5011995	2	1	1	0.4	<---
	73	7.125	7.225	5011995	2	1	1	0.5	<---
	74	7.225	7.325	5011995	2	1	1	1.68	<---
	75	7.325	7.425	5011995	2	1	1	0	<---
	76	7.425	7.525	5011995	2	1	1	1.32	<---
	77	7.525	7.625	5011995	2	1	1	0	<---
	78	7.625	7.725	5011995	2	1	1	0.18	<---
	79	7.725	7.825	5011995	2	1	1	0.88	<---
	80	7.825	7.925	5011995	2	1	1	5.52	<---
	81	7.925	8.082	5011995	2	1.57	1	6.6306	<--- Normalized
	82	8.082	8.112	5011995	7	0.3	0	0	<--- Normalized
	83	8.112	8.212	5011995	2	1	1	2.41	<---
	84	8.212	8.312	5011995	2	1	1	0.84	<---

Table B2 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=95-12-10 TAPE BMP=00.000		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	85	8.312	8.468	5011995	2	1.56	1	2.8782	<--- Normalized
	86	8.468	8.495	5011995	7	0.27	0	0	<--- Normalized
	87	8.495	8.595	5011995	2	1	1	6.17	<---
	88	8.595	8.695	5011995	2	1	1	0.08	<---
	89	8.695	8.795	5011995	2	1	1	0.86	<---
	90	8.795	8.895	5011995	2	1	1	5.64	<---
	91	8.895	8.995	5011995	2	1	1	8.88	<---
	92	8.995	9.095	5011995	2	1	1	5.75	<---
	93	9.095	9.195	5011995	2	1	1	2.44	<---
	94	9.195	9.295	5011995	2	1	1	3.06	<---
	95	9.295	9.395	5011995	2	1	1	1.92	<---
	96	9.395	9.495	5011995	2	1	1	5.98	<---
	97	9.495	9.595	5011995	2	1	1	6.9	<---
	98	9.595	9.695	5011995	2	1	1	12.92	<---
	99	9.695	9.795	5011995	2	1	1	2.76	<---
	100	9.795	9.895	5011995	2	1	1	2.92	<---
	101	9.895	9.995	5011995	2	1	1	2.32	<---
	102	9.995	10.095	5011995	2	1	1	4.56	<---
	103	10.095	10.195	5011995	2	1	1	2.92	<---
	104	10.195	10.295	5011995	2	1	1	1.52	<---
	105	10.295	10.395	5011995	2	1	1	1.2	<---
	106	10.395	10.495	5011995	2	1	1	1.34	<---
	107	10.495	10.595	5011995	2	1	1	1.64	<---
	108	10.595	10.695	5011995	2	1	1	1.04	<---
	109	10.695	10.795	5011995	2	1	1	1.52	<---
	110	10.795	10.895	5011995	2	1	1	2.88	<---
	111	10.895	10.995	5011995	2	1	1	2.16	<---
	112	10.995	11.095	5011995	2	1	1	2.2	<---
	113	11.095	11.195	5011995	2	1	1	1.12	<---
	114	11.195	11.295	5011995	2	1	1	5.44	<---
	115	11.295	11.395	5011995	2	1	1	1.02	<---
	116	11.395	11.495	5011995	2	1	1	5.03	<---
	117	11.495	11.595	5011995	2	1	1	7.94	<---
	118	11.595	11.695	5011995	2	1	1	3.64	<---
	119	11.695	11.795	5011995	2	1	1	0.52	<---
	120	11.795	11.895	5011995	2	1	1	0.96	<---
	121	11.895	12.011	5011995	2	1.16	1	2.8534	<--- Normalized
	122	12.011	12.061	5011995	7	0.5	0	0	<--- Normalized
	123	12.061	12.161	5011995	2	1	1	6.05	<---
	124	12.161	12.261	5011995	2	1	1	2.46	<---
	125	12.261	12.361	5011995	2	1	1	3.36	<---
	126	12.361	12.461	5011995	2	1	1	1.5	<---

Table B2 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=95-12-10 TAPE BMP=00.000		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	127	12.461	12.561	5011995	2	1	1	6.94	<---
	128	12.561	12.661	5011995	2	1	1	4.14	<---
	129	12.661	12.761	5011995	2	1	1	2.12	<---
	130	12.761	12.861	5011995	2	1	1	2.94	<---
	131	12.861	12.973	5011995	2	1.12	1	10.973	<--- Normalized
	132	12.973	13.005	5011995	7	0.32	0	0	<--- Normalized
	133	13.005	13.105	5011995	2	1	1	8.08	<---
	134	13.105	13.205	5011995	2	1	1	0	<---
	135	13.205	13.305	5011995	2	1	1	0.16	<---
	136	13.305	13.405	5011995	2	1	1	0.5	<---
	137	13.405	13.505	5011995	2	1	1	0.16	<---
	138	13.505	13.693	5011995	2	1.88	1	2.3883	<--- Normalized
	139	13.693	13.699	5011995	7	0.06	0	0	<--- Normalized
	140	13.699	13.799	5011995	2	1	1	2.43	<---
	141	13.799	13.899	5011995	2	1	1	2.74	<---
	142	13.899	13.999	5011995	2	1	1	0.52	<---
	143	13.999	14.099	5011995	2	1	1	0.16	<---
	144	14.099	14.199	5011995	2	1	1	0.24	<---
	145	14.199	14.299	5011995	2	1	1	0.08	<---
	146	14.299	14.399	5011995	2	1	1	0.56	<---
	147	14.399	14.499	5011995	2	1	1	0.1	<---
	148	14.499	14.599	5011995	2	1	1	0.8	<---
	149	14.599	14.699	5011995	2	1	1	2.32	<---
	150	14.699	14.799	5011995	2	1	1	3.56	<---
	151	14.799	14.899	5011995	2	1	1	1.2	<---
	152	14.899	14.999	5011995	2	1	1	1.34	<---
	153	14.999	15.099	5011995	2	1	1	1.08	<---
	154	15.099	15.199	5011995	2	1	1	2.96	<---
	155	15.199	15.299	5011995	2	1	1	1.44	<---
	156	15.299	15.399	5011995	2	1	1	0.74	<---
	157	15.399	15.499	5011995	2	1	1	0.26	<---
	158	15.499	15.599	5011995	2	1	1	0.32	<---
	159	15.599	15.699	5011995	2	1	1	1.04	<---
	160	15.699	15.799	5011995	2	1	1	0.1	<---
	161	15.799	15.899	5011995	2	1	1	0.1	<---
	162	15.899	15.999	5011995	2	1	1	0.88	<---
	163	15.999	16.099	5011995	2	1	1	1.98	<---
	164	16.099	16.199	5011995	2	1	1	0	<---
	165	16.199	16.299	5011995	2	1	1	0.16	<---
	166	16.299	16.399	5011995	2	1	1	2.98	<---
	167	16.399	16.499	5011995	2	1	1	0.98	<---
	168	16.499	16.599	5011995	2	1	1	1.36	<---

Table B2 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=95-12-10 TAPE BMP=00.000		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-94, CS 11015 JN 29580 BMP: 19.381 EMP: 23.353	169	16.599	16.699	5011995	2	1	1	1.04	<---
	170	16.699	16.799	5011995	2	1	1	1.22	<---
	171	16.799	16.899	5011995	2	1	1	0.66	<---
	172	16.899	16.999	5011995	2	1	1	0	<---
	173	16.999	17.099	5011995	2	1	1	0.08	<---
	174	17.099	17.199	5011995	2	1	1	1.12	<---
	175	17.199	17.299	5011995	2	1	1	0.4	<---
	176	17.299	17.399	5011995	2	1	1	0.34	<---
	177	17.399	17.499	5011995	2	1	1	0.4	<---
	178	17.499	17.599	5011995	2	1	1	1.62	<---
	179	17.599	17.699	5011995	2	1	1	0	<---
	180	17.699	17.799	5011995	2	1	1	0	<---
	181	17.799	17.899	5011995	2	1	1	0.96	<---
	182	17.899	17.999	5011995	2	1	1	0.88	<---
	183	17.999	18.099	5011995	2	1	1	1.68	<---
	184	18.099	18.199	5011995	2	1	1	0.16	<---
	185	18.199	18.299	5011995	2	1	1	0.56	<---
	186	18.299	18.399	5011995	2	1	1	0.32	<---
	187	18.399	18.499	5011995	2	1	1	0.8	<---
	188	18.499	18.599	5011995	2	1	1	0.16	<---
	189	18.599	18.699	5011995	2	1	1	0.74	<---
	190	18.699	18.799	5011995	2	1	1	0.24	<---
	191	18.799	18.92	5011995	2	1.21	1	2.091	<--- Normalized
	192	18.92	18.949	5011995	7	0.29	0	0	<--- Normalized
	193	18.949	19.049	5011995	2	1	1	3.65	<---
	194	19.049	19.149	5011995	2	1	1	0.48	<---
	195	19.149	19.249	5011995	2	1	1	2.03	<---
	196	19.249	19.381	5011995	2	1.32	1	2.515	<--- Normalized
I-94, CS 11015 JN 29580 BMP: 19.381 EMP: 23.353	197	19.381	19.481	5011995	1	1	1	0	<---
	198	19.481	19.581	5011995	1	1	1	0	<---
	199	19.581	19.681	5011995	1	1	1	0	<---
	200	19.681	19.825	5011995	1	1.44	1	0	<--- Normalized
	201	19.825	19.861	5011995	7	0.36	0	0	<--- Normalized
	202	19.861	20.053	5011995	1	1.92	1	0	<--- Normalized
	203	20.053	20.09	5011995	7	0.37	0	0	<--- Normalized
	204	20.09	20.19	5011995	1	1	1	0	<---
	205	20.19	20.29	5011995	1	1	1	2	<---
	206	20.29	20.39	5011995	1	1	1	0	<---
	207	20.39	20.49	5011995	1	1	1	0	<---
	208	20.49	20.59	5011995	1	1	1	0	<---
	209	20.59	20.713	5011995	1	1.23	1	0	<--- Normalized
	210	20.713	20.726	5011995	7	0.13	0	0	<--- Normalized

Table B2 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=95-12-10 TAPE BMP=00.000		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-94, CS 11015 JN 29580 BMP: 19.381 EMP: 23.353	211	20.726	20.826	5011995	1	1	1	0	<---
	212	20.826	20.926	5011995	1	1	1	0	<---
	213	20.926	21.026	5011995	1	1	1	0	<---
	214	21.026	21.126	5011995	1	1	1	0	<---
	215	21.126	21.226	5011995	1	1	1	0	<---
	216	21.226	21.326	5011995	1	1	1	0	<---
	217	21.326	21.426	5011995	1	1	1	0.94	<---
	218	21.426	21.526	5011995	1	1	1	0.75	<---
	219	21.526	21.626	5011995	1	1	1	0	<---
	220	21.626	21.726	5011995	1	1	1	0	<---
	221	21.726	21.826	5011995	1	1	1	0	<---
	222	21.826	21.926	5011995	1	1	1	0	<---
	223	21.926	22.026	5011995	1	1	1	0	<---
	224	22.026	22.126	5011995	1	1	1	0	<---
	225	22.126	22.226	5011995	1	1	1	0	<---
	226	22.226	22.326	5011995	1	1	1	0	<---
	227	22.326	22.504	5011995	1	1.78	1	0	<--- Normalized
	228	22.504	22.526	5011995	7	0.22	0	0	<--- Normalized
	229	22.526	22.626	5011995	1	1	1	0	<---
	230	22.626	22.726	5011995	1	1	1	0	<---
	231	22.726	22.826	5011995	1	1	1	0	<---
	232	22.826	22.926	5011995	1	1	1	0	<---
	233	22.926	23.026	5011995	1	1	1	0	<---
	234	23.026	23.126	5011995	1	1	1	0	<---
	235	23.126	23.226	5011995	1	1	1	0	<---
	236	23.226	23.326	5011995	1	1	1	0	<---
	237	23.326	23.446	5011995	1	1.2	1	0.7833	<--- Normalized

Table B3 The MDOT 1997 pavement DI data for control section 11015 along I-94 EB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=97-12-12 TAPE BMP=00.000		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.021	5011997	7	0.21	0	0	<--- Normalized
	2	0.021	0.155	5011997	2	1.34	1	6.7463	<--- Normalized
	3	0.155	0.186	5011997	7	0.31	0	0	<--- Normalized
	4	0.186	0.286	5011997	2	1	1	1.46	<---
	5	0.286	0.386	5011997	2	1	1	0.86	<---
	6	0.386	0.486	5011997	2	1	1	0.9	<---
	7	0.486	0.586	5011997	2	1	1	0.88	<---
	8	0.586	0.686	5011997	2	1	1	1	<---
	9	0.686	0.786	5011997	2	1	1	1.62	<---
	10	0.786	0.886	5011997	2	1	1	2.08	<---
	11	0.886	0.986	5011997	2	1	1	2.54	<---
	12	0.986	1.086	5011997	2	1	1	1.46	<---
	13	1.086	1.186	5011997	2	1	1	1.14	<---
	14	1.186	1.286	5011997	2	1	1	0.7	<---
	15	1.286	1.386	5011997	2	1	1	0	<---
	16	1.386	1.486	5011997	2	1	1	0	<---
	17	1.486	1.657	5011997	2	1.71	1	0.807	<--- Normalized
	18	1.657	1.695	5011997	7	0.38	0	0	<--- Normalized
	19	1.695	1.795	5011997	2	1	1	4.36	<---
	20	1.795	1.895	5011997	2	1	1	3.3	<---
	21	1.895	1.995	5011997	2	1	1	2.06	<---
	22	1.995	2.095	5011997	2	1	1	5.5	<---
	23	2.095	2.195	5011997	2	1	1	0.9	<---
	24	2.195	2.295	5011997	2	1	1	2	<---
	25	2.295	2.395	5011997	2	1	1	0.2	<---
	26	2.395	2.495	5011997	2	1	1	0.9	<---
	27	2.495	2.595	5011997	2	1	1	1	<---
	28	2.595	2.695	5011997	2	1	1	0.5	<---
	29	2.695	2.795	5011997	2	1	1	0.6	<---
	30	2.795	2.895	5011997	2	1	1	0.92	<---
	31	2.895	2.995	5011997	2	1	1	2.66	<---
	32	2.995	3.095	5011997	2	1	1	0.76	<---
	33	3.095	3.195	5011997	2	1	1	0.3	<---
	34	3.195	3.295	5011997	2	1	1	0.7	<---
	35	3.295	3.395	5011997	2	1	1	0.4	<---
	36	3.395	3.495	5011997	2	1	1	1.1	<---
	37	3.495	3.595	5011997	2	1	1	0.3	<---
	38	3.595	3.695	5011997	2	1	1	0.5	<---
	39	3.695	3.795	5011997	2	1	1	1.3	<---
	40	3.795	3.895	5011997	2	1	1	0.6	<---
	41	3.895	3.995	5011997	2	1	1	0.2	<---
	42	3.995	4.095	5011997	2	1	1	0.1	<---

Table B3 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=97-12-12 TAPE BMP=00.000		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	43	4.095	4.195	5011997	2	1	1	0.1	<---
	44	4.195	4.295	5011997	2	1	1	0.1	<---
	45	4.295	4.395	5011997	2	1	1	0.1	<---
	46	4.395	4.495	5011997	2	1	1	0	<---
	47	4.495	4.595	5011997	2	1	1	0.1	<---
	48	4.595	4.695	5011997	2	1	1	0.2	<---
	49	4.695	4.795	5011997	2	1	1	5.86	<---
	50	4.795	4.895	5011997	2	1	1	4.3	<---
	51	4.895	4.995	5011997	2	1	1	0.8	<---
	52	4.995	5.095	5011997	2	1	1	0.4	<---
	53	5.095	5.195	5011997	2	1	1	0.6	<---
	54	5.195	5.295	5011997	2	1	1	0.5	<---
	55	5.295	5.395	5011997	2	1	1	1.95	<---
	56	5.395	5.495	5011997	2	1	1	0.4	<---
	57	5.495	5.595	5011997	2	1	1	1.3	<---
	58	5.595	5.695	5011997	2	1	1	0.96	<---
	59	5.695	5.795	5011997	2	1	1	1.7	<---
	60	5.795	5.895	5011997	2	1	1	1.2	<---
	61	5.895	5.995	5011997	2	1	1	1.5	<---
	62	5.995	6.095	5011997	2	1	1	2	<---
	63	6.095	6.195	5011997	2	1	1	0.9	<---
	64	6.195	6.295	5011997	2	1	1	0.1	<---
	65	6.295	6.395	5011997	2	1	1	0	<---
	66	6.395	6.495	5011997	2	1	1	0	<---
	67	6.495	6.595	5011997	2	1	1	0	<---
	68	6.595	6.695	5011997	2	1	1	0	<---
	69	6.695	6.795	5011997	2	1	1	0	<---
	70	6.795	6.895	5011997	2	1	1	0	<---
	71	6.895	6.995	5011997	2	1	1	0.1	<---
	72	6.995	7.095	5011997	2	1	1	3.76	<---
	73	7.095	7.195	5011997	2	1	1	4.2	<---
	74	7.195	7.295	5011997	2	1	1	4.28	<---
	75	7.295	7.395	5011997	2	1	1	3.38	<---
	76	7.395	7.495	5011997	2	1	1	0	<---
	77	7.495	7.595	5011997	2	1	1	1.76	<---
	78	7.595	7.695	5011997	2	1	1	3.6	<---
	79	7.695	7.795	5011997	2	1	1	1.82	<---
	80	7.795	7.895	5011997	2	1	1	0.4	<---
	81	7.895	8.039	5011997	2	1.44	1	0.2083	<--- Normalized
	82	8.039	8.071	5011997	7	0.32	0	0	<--- Normalized
	83	8.071	8.171	5011997	2	1	1	0.1	<---
	84	8.171	8.271	5011997	2	1	1	0.7	<---

Table B3 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=97-12-12 TAPE BMP=00.000		
		7	194	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	85	8.271	8.425	5011997	2	1.54	1	1	<--- Normalized
	86	8.425	8.454	5011997	7	0.29	0	0	<--- Normalized
	87	8.454	8.554	5011997	2	1	1	0	<---
	88	8.554	8.654	5011997	2	1	1	0	<---
	89	8.654	8.754	5011997	2	1	1	1.88	<---
	90	8.754	8.854	5011997	2	1	1	1.08	<---
	91	8.854	8.954	5011997	2	1	1	2.2	<---
	92	8.954	9.054	5011997	2	1	1	0.3	<---
	93	9.054	9.154	5011997	2	1	1	0.2	<---
	94	9.154	9.254	5011997	2	1	1	0.8	<---
	95	9.254	9.354	5011997	2	1	1	2.4	<---
	96	9.354	9.454	5011997	2	1	1	0.4	<---
	97	9.454	9.554	5011997	2	1	1	1.34	<---
	98	9.554	9.654	5011997	2	1	1	0.1	<---
	99	9.654	9.754	5011997	2	1	1	1.2	<---
	100	9.754	9.854	5011997	2	1	1	4.5	<---
	101	9.854	9.954	5011997	2	1	1	3.24	<---
	102	9.954	10.054	5011997	2	1	1	1.2	<---
	103	10.054	10.154	5011997	2	1	1	5.08	<---
	104	10.154	10.254	5011997	2	1	1	2.9	<---
	105	10.254	10.354	5011997	2	1	1	0.2	<---
	106	10.354	10.454	5011997	2	1	1	0.1	<---
	107	10.454	10.554	5011997	2	1	1	2.84	<---
	108	10.554	10.654	5011997	2	1	1	0.84	<---
	109	10.654	10.754	5011997	2	1	1	1.84	<---
	110	10.754	10.854	5011997	2	1	1	1.86	<---
	111	10.854	10.954	5011997	2	1	1	3.1	<---
	112	10.954	11.054	5011997	2	1	1	1	<---
	113	11.054	11.154	5011997	2	1	1	3.84	<---
	114	11.154	11.254	5011997	2	1	1	0.7	<---
	115	11.254	11.354	5011997	2	1	1	0.3	<---
	116	11.354	11.454	5011997	2	1	1	3.74	<---
	117	11.454	11.554	5011997	2	1	1	0.5	<---
	118	11.554	11.654	5011997	2	1	1	0.9	<---
	119	11.654	11.754	5011997	2	1	1	2.24	<---
	120	11.754	11.854	5011997	2	1	1	0.36	<---
	121	11.854	11.962	5011997	2	1.08	1	0.1852	<--- Normalized
	122	11.962	12.014	5011997	7	0.52	0	0	<--- Normalized
	123	12.014	12.114	5011997	2	1	1	2.1	<---
	124	12.114	12.214	5011997	2	1	1	3.86	<---
	125	12.214	12.314	5011997	2	1	1	3.16	<---
	126	12.314	12.414	5011997	2	1	1	2.48	<---

Table B3 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=97-12-12 TAPE BMP=00.000		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	127	12.414	12.514	5011997	2	1	1	4.28	<---
	128	12.514	12.614	5011997	2	1	1	0.5	<---
	129	12.614	12.714	5011997	2	1	1	0.4	<---
	130	12.714	12.814	5011997	2	1	1	2.28	<---
	131	12.814	12.923	5011997	2	1.09	1	1.3394	<--- Normalized
	132	12.923	12.955	5011997	7	0.32	0	0	<--- Normalized
	133	12.955	13.055	5011997	2	1	1	3.6	<---
	134	13.055	13.155	5011997	2	1	1	0.1	<---
	135	13.155	13.255	5011997	2	1	1	0.2	<---
	136	13.255	13.355	5011997	2	1	1	0.4	<---
	137	13.355	13.455	5011997	2	1	1	1.32	<---
	138	13.455	13.641	5011997	2	1.86	1	1.0108	<--- Normalized
	139	13.641	13.648	5011997	7	0.07	0	0	<--- Normalized
	140	13.648	13.748	5011997	2	1	1	0.7	<---
	141	13.748	13.848	5011997	2	1	1	4.18	<---
	142	13.848	13.948	5011997	2	1	1	2.96	<---
	143	13.948	14.048	5011997	2	1	1	5.02	<---
	144	14.048	14.148	5011997	2	1	1	2.92	<---
	145	14.148	14.248	5011997	2	1	1	6.1	<---
	146	14.248	14.348	5011997	2	1	1	3.98	<---
	147	14.348	14.448	5011997	2	1	1	0.6	<---
	148	14.448	14.548	5011997	2	1	1	0.1	<---
	149	14.548	14.648	5011997	2	1	1	0.7	<---
	150	14.648	14.748	5011997	2	1	1	0.6	<---
	151	14.748	14.848	5011997	2	1	1	0.9	<---
	152	14.848	14.948	5011997	2	1	1	0.4	<---
	153	14.948	15.048	5011997	2	1	1	1.2	<---
	154	15.048	15.148	5011997	2	1	1	1	<---
	155	15.148	15.248	5011997	2	1	1	0.2	<---
	156	15.248	15.348	5011997	2	1	1	0.2	<---
	157	15.348	15.448	5011997	2	1	1	0.4	<---
	158	15.448	15.548	5011997	2	1	1	0.1	<---
	159	15.548	15.648	5011997	2	1	1	0.18	<---
	160	15.648	15.748	5011997	2	1	1	0.7	<---
	161	15.748	15.848	5011997	2	1	1	1.5	<---
	162	15.848	15.948	5011997	2	1	1	1.04	<---
	163	15.948	16.048	5011997	2	1	1	0.4	<---
	164	16.048	16.148	5011997	2	1	1	0	<---
	165	16.148	16.248	5011997	2	1	1	0	<---
	166	16.248	16.348	5011997	2	1	1	0.6	<---
	167	16.348	16.448	5011997	2	1	1	1.74	<---
	168	16.448	16.548	5011997	2	1	1	0.1	<---

Table B3 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=97-12-12 TAPE BMP=00.000		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	169	16.548	16.648	5011997	2	1	1	1.96	<---
	170	16.648	16.748	5011997	2	1	1	2.18	<---
	171	16.748	16.848	5011997	2	1	1	0.82	<---
	172	16.848	16.948	5011997	2	1	1	0	<---
	173	16.948	17.048	5011997	2	1	1	0.4	<---
	174	17.048	17.148	5011997	2	1	1	0	<---
	175	17.148	17.248	5011997	2	1	1	0.3	<---
	176	17.248	17.348	5011997	2	1	1	0.74	<---
	177	17.348	17.448	5011997	2	1	1	0.8	<---
	178	17.448	17.548	5011997	2	1	1	0.4	<---
	179	17.548	17.648	5011997	2	1	1	0	<---
	180	17.648	17.748	5011997	2	1	1	0.08	<---
	181	17.748	17.848	5011997	2	1	1	0	<---
	182	17.848	17.948	5011997	2	1	1	0	<---
	183	17.948	18.048	5011997	2	1	1	0.1	<---
	184	18.048	18.148	5011997	2	1	1	0.2	<---
	185	18.148	18.248	5011997	2	1	1	0.26	<---
	186	18.248	18.348	5011997	2	1	1	1.52	<---
	187	18.348	18.448	5011997	2	1	1	2.12	<---
	188	18.448	18.548	5011997	2	1	1	0.28	<---
	189	18.548	18.648	5011997	2	1	1	3.9	<---
	190	18.648	18.748	5011997	2	1	1	0.4	<---
	191	18.748	18.86	5011997	2	1.12	1	0.75	<--- Normalized
	192	18.86	18.891	5011997	7	0.31	0	0	<--- Normalized
	193	18.891	18.991	5011997	2	1	1	0.2	<---
	194	18.991	19.091	5011997	2	1	1	0.64	<---
	195	19.091	19.191	5011997	2	1	1	4.04	<---
	196	19.191	19.322	5011997	2	1.31	1	1.069	<--- Normalized
I-94, CS 11015 JN 29580 BMP: 19.381 EMP: 23.353	197	19.322	19.422	5011997	1	1	1	0	<---
	198	19.422	19.522	5011997	1	1	1	0	<---
	199	19.522	19.622	5011997	1	1	1	1.25	<---
	200	19.622	19.764	5011997	1	1.42	1	0.528	<--- Normalized
	201	19.764	19.801	5011997	7	0.37	0	0	<--- Normalized
	202	19.801	19.992	5011997	1	1.91	1	0.524	<--- Normalized
	203	19.992	20.03	5011997	7	0.38	0	0	<--- Normalized
	204	20.03	20.13	5011997	1	1	1	0	<---
	205	20.13	20.23	5011997	1	1	1	0.5	<---
	206	20.23	20.33	5011997	1	1	1	0	<---
	207	20.33	20.43	5011997	1	1	1	0	<---
	208	20.43	20.53	5011997	1	1	1	0	<---
	209	20.53	20.65	5011997	1	1.2	1	0	<--- Normalized
	210	20.65	20.666	5011997	7	0.16	0	0	<--- Normalized

Table B3 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=97-12-12 TAPE BMP=00.000		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-94, CS 11015 JN 29580 BMP: 19.381 EMP: 23.353	211	20.666	20.766	5011997	1	1	1	1.25	<---
	212	20.766	20.866	5011997	1	1	1	0	<---
	213	20.866	20.966	5011997	1	1	1	0	<---
	214	20.966	21.066	5011997	1	1	1	0	<---
	215	21.066	21.166	5011997	1	1	1	0	<---
	216	21.166	21.266	5011997	1	1	1	0	<---
	217	21.266	21.366	5011997	1	1	1	0	<---
	218	21.366	21.466	5011997	1	1	1	1.5	<---
	219	21.466	21.566	5011997	1	1	1	0	<---
	220	21.566	21.666	5011997	1	1	1	0.5	<---
	221	21.666	21.766	5011997	1	1	1	0.75	<---
	222	21.766	21.866	5011997	1	1	1	0	<---
	223	21.866	21.966	5011997	1	1	1	0.94	<---
	224	21.966	22.066	5011997	1	1	1	0.5	<---
	225	22.066	22.166	5011997	1	1	1	0.5	<---
	226	22.166	22.266	5011997	1	1	1	1	<---
	227	22.266	22.439	5011997	1	1.73	1	0	<--- Normalized
	228	22.439	22.462	5011997	7	0.23	0	0	<--- Normalized
	229	22.462	22.562	5011997	1	1	1	0.5	<---
	230	22.562	22.662	5011997	1	1	1	0.5	<---
	231	22.662	22.762	5011997	1	1	1	0	<---
	232	22.762	22.862	5011997	1	1	1	1.5	<---
	233	22.862	22.962	5011997	1	1	1	0	<---
	234	22.962	23.062	5011997	1	1	1	0	<---
	235	23.062	23.162	5011997	1	1	1	0	<---
	236	23.162	23.262	5011997	1	1	1	1.05	<---
	237	23.262	23.383	5011997	1	1.21	1	0	<--- Normalized

Table B4 The MDOT 1999 pavement DI data for control section 11015 along I-94 EB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=99-06-19 TAPE BMP=00.001		
		7	194	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.014	5011999	7	0.14	0	0	<--- Normalized
	2	0.014	0.124	5011999	2	1.1	2	3.2818	<--- Normalized
	3	0.124	0.143	5011999	2	0.19	1	5.1579	<--- Normalized
	4	0.143	0.151	5011999	1	0.08	1	0	<--- Normalized
	5	0.151	0.18	5011999	7	0.29	0	0	<--- Normalized
	6	0.18	0.187	5011999	1	0.07	1	0	<--- Normalized
	7	0.187	0.287	5011999	2	1	1	4.4	<---
	8	0.287	0.387	5011999	2	1	1	3.66	<---
	9	0.387	0.487	5011999	2	1	1	3.76	<---
	10	0.487	0.587	5011999	2	1	1	3.76	<---
	11	0.587	0.687	5011999	2	1	1	2.12	<---
	12	0.687	0.787	5011999	2	1	1	1.2	<---
	13	0.787	0.887	5011999	2	1	1	2.28	<---
	14	0.887	0.987	5011999	2	1	1	3.44	<---
	15	0.987	1.087	5011999	2	1	1	4	<---
	16	1.087	1.187	5011999	2	1	1	2.14	<---
	17	1.187	1.287	5011999	2	1	1	3.88	<---
	18	1.287	1.387	5011999	2	1	1	1.04	<---
	19	1.387	1.487	5011999	2	1	1	4.08	<---
	20	1.487	1.656	5011999	2	1.69	1	4.6686	<--- Normalized
	21	1.656	1.691	5011999	7	0.35	0	0	<--- Normalized
	22	1.691	1.791	5011999	2	1	1	5	<---
	23	1.791	1.891	5011999	2	1	1	1.52	<---
	24	1.891	1.991	5011999	2	1	1	1.7	<---
	25	1.991	2.091	5011999	2	1	1	2.07	<---
	26	2.091	2.191	5011999	2	1	1	0.2	<---
	27	2.191	2.291	5011999	2	1	1	0.88	<---
	28	2.291	2.391	5011999	2	1	1	1.14	<---
	29	2.391	2.491	5011999	2	1	1	1.66	<---
	30	2.491	2.591	5011999	2	1	1	1.9	<---
	31	2.591	2.691	5011999	2	1	1	0.6	<---
	32	2.691	2.791	5011999	2	1	1	2.28	<---
	33	2.791	2.891	5011999	2	1	1	2.76	<---
	34	2.891	2.991	5011999	2	1	1	4.44	<---
	35	2.991	3.091	5011999	2	1	1	3.94	<---
	36	3.091	3.191	5011999	2	1	1	0.46	<---
	37	3.191	3.291	5011999	2	1	1	2.28	<---
	38	3.291	3.391	5011999	2	1	1	0.52	<---
	39	3.391	3.491	5011999	2	1	1	0.4	<---
	40	3.491	3.591	5011999	2	1	1	1.6	<---
	41	3.591	3.691	5011999	2	1	1	0.7	<---
	42	3.691	3.791	5011999	2	1	1	1.04	<---

Table B4 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=99-06-19 TAPE BMP=00.001		
		7	194	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	43	3.791	3.891	5011999	2	1	1	0.18	<---
	44	3.891	3.991	5011999	2	1	1	0.48	<---
	45	3.991	4.091	5011999	2	1	1	2.16	<---
	46	4.091	4.191	5011999	2	1	1	0.64	<---
	47	4.191	4.291	5011999	2	1	1	2	<---
	48	4.291	4.391	5011999	2	1	1	2.24	<---
	49	4.391	4.491	5011999	2	1	1	1.44	<---
	50	4.491	4.591	5011999	2	1	1	0.64	<---
	51	4.591	4.691	5011999	2	1	1	2.88	<---
	52	4.691	4.791	5011999	2	1	1	1.6	<---
	53	4.791	4.891	5011999	2	1	1	1.72	<---
	54	4.891	4.991	5011999	2	1	1	2.5	<---
	55	4.991	5.091	5011999	2	1	1	3.08	<---
	56	5.091	5.191	5011999	2	1	1	2.76	<---
	57	5.191	5.291	5011999	2	1	1	1.8	<---
	58	5.291	5.391	5011999	2	1	1	0.84	<---
	59	5.391	5.491	5011999	2	1	1	1.28	<---
	60	5.491	5.591	5011999	2	1	1	0.16	<---
	61	5.591	5.691	5011999	2	1	1	0.84	<---
	62	5.691	5.791	5011999	2	1	1	1.28	<---
	63	5.791	5.891	5011999	2	1	1	1.28	<---
	64	5.891	5.991	5011999	2	1	1	2.88	<---
	65	5.991	6.091	5011999	2	1	1	2	<---
	66	6.091	6.191	5011999	2	1	1	1.04	<---
	67	6.191	6.291	5011999	2	1	1	1.6	<---
	68	6.291	6.391	5011999	2	1	1	0	<---
	69	6.391	6.491	5011999	2	1	1	0.96	<---
	70	6.491	6.591	5011999	2	1	1	1.68	<---
	71	6.591	6.691	5011999	2	1	1	2.88	<---
	72	6.691	6.791	5011999	2	1	1	1.76	<---
	73	6.791	6.891	5011999	2	1	1	0.4	<---
	74	6.891	6.991	5011999	2	1	1	1.6	<---
	75	6.991	7.091	5011999	2	1	1	3.7	<---
	76	7.091	7.191	5011999	2	1	1	3.08	<---
	77	7.191	7.291	5011999	2	1	1	4.86	<---
	78	7.291	7.391	5011999	2	1	1	2.6	<---
	79	7.391	7.491	5011999	2	1	1	3.56	<---
	80	7.491	7.591	5011999	2	1	1	2.96	<---
	81	7.591	7.691	5011999	2	1	1	0.04	<---
	82	7.691	7.791	5011999	2	1	1	0.56	<---
	83	7.791	7.891	5011999	2	1	1	0.26	<---
	84	7.891	8.045	5011999	2	1.54	1	1.5195	<--- Normalized

Table B4 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=99-06-19 TAPE BMP=00.001		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	85	8.045	8.075	5011999	7	0.3	0	0	<--- Normalized
	86	8.075	8.175	5011999	2	1	1	2.48	<---
	87	8.175	8.275	5011999	2	1	1	1.52	<---
	88	8.275	8.431	5011999	2	1.56	1	3.9936	<--- Normalized
	89	8.431	8.458	5011999	7	0.27	0	0	<--- Normalized
	90	8.458	8.558	5011999	2	1	1	1.45	<---
	91	8.558	8.658	5011999	2	1	1	0.56	<---
	92	8.658	8.758	5011999	2	1	1	2.72	<---
	93	8.758	8.858	5011999	2	1	1	2.96	<---
	94	8.858	8.958	5011999	2	1	1	2.28	<---
	95	8.958	9.058	5011999	2	1	1	3.12	<---
	96	9.058	9.158	5011999	2	1	1	2.08	<---
	97	9.158	9.258	5011999	2	1	1	3.04	<---
	98	9.258	9.358	5011999	2	1	1	1.92	<---
	99	9.358	9.458	5011999	2	1	1	1.88	<---
	100	9.458	9.558	5011999	2	1	1	0.76	<---
	101	9.558	9.658	5011999	2	1	1	1.6	<---
	102	9.658	9.758	5011999	2	1	1	0.24	<---
	103	9.758	9.858	5011999	2	1	1	0.16	<---
	104	9.858	9.958	5011999	2	1	1	1.76	<---
	105	9.958	10.058	5011999	2	1	1	0.56	<---
	106	10.058	10.158	5011999	2	1	1	3.76	<---
	107	10.158	10.258	5011999	2	1	1	1.92	<---
	108	10.258	10.358	5011999	2	1	1	2.4	<---
	109	10.358	10.458	5011999	2	1	1	2.24	<---
	110	10.458	10.558	5011999	2	1	1	3.48	<---
	111	10.558	10.658	5011999	2	1	1	3.16	<---
	112	10.658	10.758	5011999	2	1	1	0.8	<---
	113	10.758	10.858	5011999	2	1	1	1.48	<---
	114	10.858	10.958	5011999	2	1	1	0.6	<---
	115	10.958	11.058	5011999	2	1	1	0.4	<---
	116	11.058	11.158	5011999	2	1	1	0.4	<---
	117	11.158	11.258	5011999	2	1	1	1.6	<---
	118	11.258	11.358	5011999	2	1	1	3.84	<---
	119	11.358	11.458	5011999	2	1	1	2.72	<---
	120	11.458	11.558	5011999	2	1	1	3.44	<---
	121	11.558	11.658	5011999	2	1	1	1.92	<---
	122	11.658	11.758	5011999	2	1	1	1.52	<---
	123	11.758	11.858	5011999	2	1	1	1.04	<---
	124	11.858	11.973	5011999	2	1.15	1	2.2261	<--- Normalized
	125	11.973	12.022	5011999	7	0.49	0	0	<--- Normalized
	126	12.022	12.122	5011999	2	1	1	4.54	<---

Table B4 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=99-06-19 TAPE BMP=00.001		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	127	12.122	12.222	5011999	2	1	1	1.7	<---
	128	12.222	12.322	5011999	2	1	1	0.36	<---
	129	12.322	12.422	5011999	2	1	1	2.08	<---
	130	12.422	12.522	5011999	2	1	1	5.72	<---
	131	12.522	12.622	5011999	2	1	1	3.36	<---
	132	12.622	12.722	5011999	2	1	1	4	<---
	133	12.722	12.822	5011999	2	1	1	3.04	<---
	134	12.822	12.929	5011999	2	1.07	1	0.4486	<--- Normalized
	135	12.929	12.934	5011999	1	0.05	1	0	<--- Normalized
	136	12.934	12.966	5011999	7	0.32	0	0	<--- Normalized
	137	12.966	12.97	5011999	1	0.04	1	0	<--- Normalized
	138	12.97	13.07	5011999	2	1	1	1.12	<---
	139	13.07	13.17	5011999	2	1	1	2.64	<---
	140	13.17	13.27	5011999	2	1	1	4.16	<---
	141	13.27	13.37	5011999	2	1	1	2.08	<---
	142	13.37	13.47	5011999	2	1	1	3.16	<---
	143	13.47	13.654	5011999	2	1.84	1	4.4946	<--- Normalized
	144	13.654	13.659	5011999	7	0.05	0	0	<--- Normalized
	145	13.659	13.759	5011999	2	1	1	6.81	<---
	146	13.759	13.859	5011999	2	1	1	4.16	<---
	147	13.859	13.959	5011999	2	1	1	4.56	<---
	148	13.959	14.059	5011999	2	1	1	5.76	<---
	149	14.059	14.159	5011999	2	1	1	5.64	<---
	150	14.159	14.259	5011999	2	1	1	4.76	<---
	151	14.259	14.359	5011999	2	1	1	6	<---
	152	14.359	14.459	5011999	2	1	1	4.16	<---
	153	14.459	14.559	5011999	2	1	1	4.68	<---
	154	14.559	14.659	5011999	2	1	1	3.2	<---
	155	14.659	14.759	5011999	2	1	1	3.56	<---
	156	14.759	14.859	5011999	2	1	1	2.88	<---
	157	14.859	14.959	5011999	2	1	1	3.16	<---
	158	14.959	15.059	5011999	2	1	1	5.2	<---
	159	15.059	15.159	5011999	2	1	1	4.4	<---
	160	15.159	15.259	5011999	2	1	1	3.64	<---
	161	15.259	15.359	5011999	2	1	1	3.88	<---
	162	15.359	15.459	5011999	2	1	1	3	<---
	163	15.459	15.559	5011999	2	1	1	4.12	<---
	164	15.559	15.659	5011999	2	1	1	2.92	<---
	165	15.659	15.759	5011999	2	1	1	4.84	<---
	166	15.759	15.859	5011999	2	1	1	3.24	<---
	167	15.859	15.959	5011999	2	1	1	6.04	<---
	168	15.959	16.059	5011999	2	1	1	3.8	<---

Table B4 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=99-06-19 TAPE BMP=00.001		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-94, CS 11015 JN 29580 BMP: 19.381 EMP: 23.353	169	16.059	16.159	5011999	2	1	1	4	<---
	170	16.159	16.259	5011999	2	1	1	6.24	<---
	171	16.259	16.359	5011999	2	1	1	2.8	<---
	172	16.359	16.459	5011999	2	1	1	2.56	<---
	173	16.459	16.559	5011999	2	1	1	3.32	<---
	174	16.559	16.659	5011999	2	1	1	1.96	<---
	175	16.659	16.759	5011999	2	1	1	3.88	<---
	176	16.759	16.859	5011999	2	1	1	3.36	<---
	177	16.859	16.959	5011999	2	1	1	5.08	<---
	178	16.959	17.059	5011999	2	1	1	4.6	<---
	179	17.059	17.159	5011999	2	1	1	4.96	<---
	180	17.159	17.259	5011999	2	1	1	5.12	<---
	181	17.259	17.359	5011999	2	1	1	3.36	<---
	182	17.359	17.459	5011999	2	1	1	3.08	<---
	183	17.459	17.559	5011999	2	1	1	2.88	<---
	184	17.559	17.659	5011999	2	1	1	3.32	<---
	185	17.659	17.759	5011999	2	1	1	3.76	<---
	186	17.759	17.859	5011999	2	1	1	3.36	<---
	187	17.859	17.959	5011999	2	1	1	3.04	<---
	188	17.959	18.059	5011999	2	1	1	3.44	<---
	189	18.059	18.159	5011999	2	1	1	3.76	<---
	190	18.159	18.259	5011999	2	1	1	4.8	<---
	191	18.259	18.359	5011999	2	1	1	4	<---
	192	18.359	18.459	5011999	2	1	1	3.28	<---
	193	18.459	18.559	5011999	2	1	1	3.92	<---
	194	18.559	18.659	5011999	2	1	1	4.72	<---
	195	18.659	18.759	5011999	2	1	1	4	<---
	196	18.759	18.878	5011999	2	1.19	1	4.22	<--- Normalized
	197	18.878	18.906	5011999	7	0.28	0	0	<--- Normalized
	198	18.906	19.006	5011999	2	1	1	6.83	<---
	199	19.006	19.106	5011999	2	1	1	5.36	<---
	200	19.106	19.206	5011999	2	1	1	3.52	<---
	201	19.206	19.34	5011999	2	1.34	1	7.42	<--- Normalized
	202	19.34	19.44	5011999	1	1	1	0	<---
	203	19.44	19.54	5011999	1	1	1	0.75	<---
	204	19.54	19.64	5011999	1	1	1	1.98	<---
	205	19.64	19.783	5011999	1	1.43	1	3.27	<--- Normalized
	206	19.783	19.818	5011999	7	0.35	0	0	<--- Normalized
	207	19.818	20.012	5011999	1	1.94	1	4.09	<--- Normalized
	208	20.012	20.047	5011999	7	0.35	0	0	<--- Normalized
	209	20.047	20.147	5011999	1	1	1	0.94	<---
	210	20.147	20.247	5011999	1	1	1	7.3	<---

Table B4 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=99-06-19 TAPE BMP=00.001		
		7	194	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-94, CS 11015 JN 29S80 BMP: 19.381 EMP: 23.353	211	20.247	20.347	5011999	1	1	1	2.75	<---
	212	20.347	20.447	5011999	1	1	1	1.5	<---
	213	20.447	20.547	5011999	1	1	1	1.75	<---
	214	20.547	20.67	5011999	1	1.23	1	1.423	<--- Normalized
	215	20.67	20.683	5011999	7	0.13	0	0	<--- Normalized
	216	20.683	20.783	5011999	1	1	1	4.02	<---
	217	20.783	20.883	5011999	1	1	1	3.38	<---
	218	20.883	20.983	5011999	1	1	1	0.5	<---
	219	20.983	21.083	5011999	1	1	1	0	<---
	220	21.083	21.183	5011999	1	1	1	6.9	<---
	221	21.183	21.283	5011999	1	1	1	1.98	<---
	222	21.283	21.383	5011999	1	1	1	3.93	<---
	223	21.383	21.483	5011999	1	1	1	3.16	<---
	224	21.483	21.583	5011999	1	1	1	1.44	<---
	225	21.583	21.683	5011999	1	1	1	0.98	<---
	226	21.683	21.783	5011999	1	1	1	3.93	<---
	227	21.783	21.883	5011999	1	1	1	4.52	<---
	228	21.883	21.983	5011999	1	1	1	2.25	<---
	229	21.983	22.083	5011999	1	1	1	6.16	<---
	230	22.083	22.183	5011999	1	1	1	2.63	<---
	231	22.183	22.283	5011999	1	1	1	10.6	<---
	232	22.283	22.46	5011999	1	1.77	1	2.78	<--- Normalized
	233	22.46	22.481	5011999	7	0.21	0	0	<--- Normalized
	234	22.481	22.581	5011999	1	1	1	2.75	<---
	235	22.581	22.681	5011999	1	1	1	0.94	<---
	236	22.681	22.781	5011999	1	1	1	1	<---
	237	22.781	22.881	5011999	1	1	1	0.94	<---
	238	22.881	22.981	5011999	1	1	1	2.48	<---
	239	22.981	23.081	5011999	1	1	1	0.5	<---
	240	23.081	23.181	5011999	1	1	1	2.16	<---
	241	23.181	23.281	5011999	1	1	1	1.05	<---
	242	23.281	23.4	5011999	1	1.19	1	1.3782	<--- Normalized

Table B5 The MDOT 2003 pavement DI data for control section 11015 along I-94 EB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S107-Y2003 TAPE BMP=00.000		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.007	4132003	2	0.07	1	16.143	<--- Normalized
	2	0.007	0.059	4132003	1	0.52	1	12.02	<--- Normalized
	3	0.059	0.182	4132003	2	1.23	1	5.236	<--- Normalized
	4	0.182	0.226	4132003	1	0.44	1	8	<--- Normalized
	5	0.226	0.326	4132003	2	1	1	17.31	<---
	6	0.326	0.426	4132003	2	1	1	2.9	<---
	7	0.426	0.526	4132003	2	1	1	4.93	<---
	8	0.526	0.626	4132003	2	1	1	3.61	<---
	9	0.626	0.726	4132003	2	1	1	3.95	<---
	10	0.726	0.826	4132003	2	1	1	2.62	<---
	11	0.826	0.926	4132003	2	1	1	0.2	<---
	12	0.926	1.026	4132003	2	1	1	0.08	<---
	13	1.026	1.126	4132003	2	1	1	0.5	<---
	14	1.126	1.226	4132003	2	1	1	0.61	<---
	15	1.226	1.326	4132003	2	1	1	1.17	<---
	16	1.326	1.426	4132003	2	1	1	5.06	<---
	17	1.426	1.526	4132003	2	1	1	1.39	<---
	18	1.526	1.692	4132003	2	1.66	1	10.482	<--- Normalized
	19	1.692	1.729	4132003	1	0.37	1	170.98	<--- Normalized
	20	1.729	1.829	4132003	2	1	1	9.93	<---
	21	1.829	1.929	4132003	2	1	1	2.88	<---
	22	1.929	2.029	4132003	2	1	1	1.54	<---
	23	2.029	2.129	4132003	2	1	1	9.54	<---
	24	2.129	2.229	4132003	2	1	1	6.93	<---
	25	2.229	2.329	4132003	2	1	1	13.12	<---
	26	2.329	2.429	4132003	2	1	1	11.32	<---
	27	2.429	2.529	4132003	2	1	1	10.2	<---
	28	2.529	2.629	4132003	2	1	1	13.54	<---
	29	2.629	2.729	4132003	2	1	1	6.1	<---
	30	2.729	2.829	4132003	2	1	1	3.51	<---
	31	2.829	2.929	4132003	2	1	1	9.82	<---
	32	2.929	3.029	4132003	2	1	1	9.46	<---
	33	3.029	3.129	4132003	2	1	1	9.06	<---
	34	3.129	3.229	4132003	2	1	1	6.9	<---
	35	3.229	3.329	4132003	2	1	1	10.65	<---
	36	3.329	3.429	4132003	2	1	1	11.6	<---
	37	3.429	3.529	4132003	2	1	1	7.8	<---
	38	3.529	3.629	4132003	2	1	1	11.36	<---
	39	3.629	3.729	4132003	2	1	1	11.22	<---
	40	3.729	3.829	4132003	2	1	1	9.98	<---
	41	3.829	3.929	4132003	2	1	1	7.28	<---
	42	3.929	4.029	4132003	2	1	1	1.4	<---

Table B5 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S107-Y2003 TAPE BMP=00.000		
		7	194	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	43	4.029	4.129	4132003	2	1	1	1.68	<---
	44	4.129	4.229	4132003	2	1	1	1.92	<---
	45	4.229	4.329	4132003	2	1	1	2.44	<---
	46	4.329	4.429	4132003	2	1	1	2.98	<---
	47	4.429	4.529	4132003	2	1	1	2.94	<---
	48	4.529	4.629	4132003	2	1	1	2.93	<---
	49	4.629	4.729	4132003	2	1	1	1.56	<---
	50	4.729	4.829	4132003	2	1	1	3.88	<---
	51	4.829	4.929	4132003	2	1	1	2.44	<---
	52	4.929	5.029	4132003	2	1	1	3.48	<---
	53	5.029	5.129	4132003	2	1	1	5.23	<---
	54	5.129	5.229	4132003	2	1	1	0.6	<---
	55	5.229	5.329	4132003	2	1	1	0.96	<---
	56	5.329	5.429	4132003	2	1	1	1	<---
	57	5.429	5.529	4132003	2	1	1	0.48	<---
	58	5.529	5.629	4132003	2	1	1	1.32	<---
	59	5.629	5.729	4132003	2	1	1	0.46	<---
	60	5.729	5.829	4132003	2	1	1	0.36	<---
	61	5.829	5.929	4132003	2	1	1	0.72	<---
	62	5.929	6.029	4132003	2	1	1	0.8	<---
	63	6.029	6.129	4132003	2	1	1	0.68	<---
	64	6.129	6.229	4132003	2	1	1	1.76	<---
	65	6.229	6.329	4132003	2	1	1	0	<---
	66	6.329	6.429	4132003	2	1	1	0.6	<---
	67	6.429	6.529	4132003	2	1	1	0.2	<---
	68	6.529	6.629	4132003	2	1	1	0	<---
	69	6.629	6.729	4132003	2	1	1	2.44	<---
	70	6.729	6.829	4132003	2	1	1	1.04	<---
	71	6.829	6.929	4132003	2	1	1	1.13	<---
	72	6.929	7.029	4132003	2	1	1	1.66	<---
	73	7.029	7.129	4132003	2	1	1	1.14	<---
	74	7.129	7.229	4132003	2	1	1	1.54	<---
	75	7.229	7.403	4132003	2	1.74	1	1.345	<--- Normalized
	76	7.403	7.503	4132003	2	1	2	1.56	<---
	77	7.503	7.603	4132003	2	1	2	0.16	<---
	78	7.603	7.703	4132003	2	1	2	3.48	<---
	79	7.703	7.803	4132003	2	1	2	3.68	<---
	80	7.803	8.002	4132003	2	1.99	2	2.915	<--- Normalized
	81	8.002	8.158	4132003	2	1.56	3	3.577	<--- Normalized
	82	8.158	8.304	4132003	2	1.46	2	0.247	<--- Normalized
	83	8.304	8.458	4132003	2	1.54	1	4.052	<--- Normalized
	84	8.458	8.486	4132003	1	0.28	1	238.036	<--- Normalized

Table B5 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S107-Y2003 TAPE BMP=00.000		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	85	8.486	8.586	4132003	2	1	1	4	<---
	86	8.586	8.686	4132003	2	1	1	3.2	<---
	87	8.686	8.786	4132003	2	1	1	1.36	<---
	88	8.786	8.886	4132003	2	1	1	1.6	<---
	89	8.886	8.986	4132003	2	1	1	9.92	<---
	90	8.986	9.086	4132003	2	1	1	10.64	<---
	91	9.086	9.186	4132003	2	1	1	5.66	<---
	92	9.186	9.286	4132003	2	1	1	8.84	<---
	93	9.286	9.386	4132003	2	1	1	12.51	<---
	94	9.386	9.486	4132003	2	1	1	5.96	<---
	95	9.486	9.586	4132003	2	1	1	8	<---
	96	9.586	9.686	4132003	2	1	1	10.19	<---
	97	9.686	9.786	4132003	2	1	1	10.5	<---
	98	9.786	9.886	4132003	2	1	1	8.25	<---
	99	9.886	9.986	4132003	2	1	1	8.82	<---
	100	9.986	10.086	4132003	2	1	1	8	<---
	101	10.086	10.186	4132003	2	1	1	8.7	<---
	102	10.186	10.286	4132003	2	1	1	10.32	<---
	103	10.286	10.386	4132003	2	1	1	32.5	<---
	104	10.386	10.486	4132003	2	1	1	12.22	<---
	105	10.486	10.586	4132003	2	1	1	13.79	<---
	106	10.586	10.686	4132003	2	1	1	10.38	<---
	107	10.686	10.786	4132003	2	1	1	10.58	<---
	108	10.786	10.886	4132003	2	1	1	8	<---
	109	10.886	10.986	4132003	2	1	1	8.56	<---
	110	10.986	11.086	4132003	2	1	1	10.19	<---
	111	11.086	11.186	4132003	2	1	1	8.8	<---
	112	11.186	11.286	4132003	2	1	1	10.36	<---
	113	11.286	11.386	4132003	2	1	1	9.75	<---
	114	11.386	11.486	4132003	2	1	1	10	<---
	115	11.486	11.586	4132003	2	1	1	9.05	<---
	116	11.586	11.686	4132003	2	1	1	8.25	<---
	117	11.686	11.786	4132003	2	1	1	8.5	<---
	118	11.786	11.886	4132003	2	1	1	7.8	<---
	119	11.886	11.999	4132003	2	1.13	1	2.5575	<--- Normalized
	120	11.999	12.049	4132003	1	0.5	1	84.94	<--- Normalized
	121	12.049	12.149	4132003	2	1	1	6.07	<---
	122	12.149	12.249	4132003	2	1	1	8.92	<---
	123	12.249	12.349	4132003	2	1	1	9.6	<---
	124	12.349	12.449	4132003	2	1	1	13.36	<---
	125	12.449	12.549	4132003	2	1	1	8.8	<---
	126	12.549	12.649	4132003	2	1	1	0.88	<---

Table B5 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S107-Y2003 TAPE BMP=00.000		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	127	12.649	12.749	4132003	2	1	1	8.38	<---
	128	12.749	12.849	4132003	2	1	1	7.28	<---
	129	12.849	12.955	4132003	2	1.06	1	4.7075	<--- Normalized
	130	12.955	12.996	4132003	1	0.41	1	1.2195	<--- Normalized
	131	12.996	13.096	4132003	2	1	1	4.92	<---
	132	13.096	13.196	4132003	2	1	1	2.64	<---
	133	13.196	13.296	4132003	2	1	1	3.36	<---
	134	13.296	13.396	4132003	2	1	1	2.44	<---
	135	13.396	13.496	4132003	2	1	1	2.6	<---
	136	13.496	13.596	4132003	2	1	1	0	<---
	137	13.596	13.696	4132003	2	1	1	10.42	<---
	138	13.696	13.796	4132003	2	1	1	3.8	<---
	139	13.796	13.896	4132003	2	1	1	4	<---
	140	13.896	13.996	4132003	2	1	1	3.28	<---
	141	13.996	14.096	4132003	2	1	1	4.52	<---
	142	14.096	14.196	4132003	2	1	1	3.84	<---
	143	14.196	14.296	4132003	2	1	1	4.04	<---
	144	14.296	14.396	4132003	2	1	1	3.54	<---
	145	14.396	14.496	4132003	2	1	1	2.14	<---
	146	14.496	14.596	4132003	2	1	1	2.08	<---
	147	14.596	14.696	4132003	2	1	1	3.82	<---
	148	14.696	14.796	4132003	2	1	1	2.92	<---
	149	14.796	14.896	4132003	2	1	1	3	<---
	150	14.896	14.996	4132003	2	1	1	1.96	<---
	151	14.996	15.096	4132003	2	1	1	2.76	<---
	152	15.096	15.196	4132003	2	1	1	3.72	<---
	153	15.196	15.296	4132003	2	1	1	5.32	<---
	154	15.296	15.396	4132003	2	1	1	4.56	<---
	155	15.396	15.496	4132003	2	1	1	3.1	<---
	156	15.496	15.596	4132003	2	1	1	2.76	<---
	157	15.596	15.696	4132003	2	1	1	3.56	<---
	158	15.696	15.796	4132003	2	1	1	3.84	<---
	159	15.796	15.896	4132003	2	1	1	3.88	<---
	160	15.896	15.996	4132003	2	1	1	3.85	<---
	161	15.996	16.096	4132003	2	1	1	3.02	<---
	162	16.096	16.196	4132003	2	1	1	3.99	<---
	163	16.196	16.296	4132003	2	1	1	2.59	<---
	164	16.296	16.396	4132003	2	1	1	4.57	<---
	165	16.396	16.496	4132003	2	1	1	2.26	<---
	166	16.496	16.596	4132003	2	1	1	4.29	<---
	167	16.596	16.696	4132003	2	1	1	7.17	<---
	168	16.696	16.796	4132003	2	1	1	8	<---

Table B5 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S107-Y2003 TAPE BMP=00.000		
		7	194	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	169	16.796	16.896	4132003	2	1	1	11.44	<---
	170	16.896	16.996	4132003	2	1	1	11.84	<---
	171	16.996	17.096	4132003	2	1	1	11.94	<---
	172	17.096	17.196	4132003	2	1	1	11.64	<---
	173	17.196	17.296	4132003	2	1	1	11.8	<---
	174	17.296	17.396	4132003	2	1	1	11.94	<---
	175	17.396	17.496	4132003	2	1	1	12.92	<---
	176	17.496	17.596	4132003	2	1	1	11.84	<---
	177	17.596	17.696	4132003	2	1	1	11.85	<---
	178	17.696	17.796	4132003	2	1	1	3.76	<---
	179	17.796	17.896	4132003	2	1	1	2.76	<---
	180	17.896	17.996	4132003	2	1	1	1.12	<---
	181	17.996	18.096	4132003	2	1	1	8.36	<---
	182	18.096	18.196	4132003	2	1	1	4.96	<---
	183	18.196	18.296	4132003	2	1	1	5.32	<---
	184	18.296	18.396	4132003	2	1	1	0	<---
	185	18.396	18.496	4132003	2	1	1	0.08	<---
	186	18.496	18.596	4132003	2	1	1	2.08	<---
	187	18.596	18.696	4132003	2	1	1	0	<---
	188	18.696	18.896	4132003	2	2	1	2.36	<--- Normalized
	189	18.896	18.925	4132003	1	0.29	1	46.241	<--- Normalized
	190	18.925	19.025	4132003	2	1	1	16.12	<---
	191	19.025	19.125	4132003	2	1	1	9.36	<---
	192	19.125	19.225	4132003	2	1	1	8.75	<---
	193	19.225	19.357	4132003	2	1.32	1	8.106	<--- Normalized
I-94, CS 11015 JN 29580 BMP: 19.381 EMP: 23.353	194	19.357	19.457	4132003	1	1	1	14.04	<---
	195	19.457	19.557	4132003	1	1	1	15.38	<---
	196	19.557	19.657	4132003	1	1	1	19.84	<---
	197	19.657	19.757	4132003	1	1	1	18.29	<---
	198	19.757	19.857	4132003	1	1	1	12.41	<---
	199	19.857	19.957	4132003	1	1	1	15.14	<---
	200	19.957	20.057	4132003	1	1	1	30.52	<---
	201	20.057	20.157	4132003	1	1	1	21.38	<---
	202	20.157	20.257	4132003	1	1	1	21.82	<---
	203	20.257	20.357	4132003	1	1	1	14.48	<---
	204	20.357	20.457	4132003	1	1	1	11.85	<---
	205	20.457	20.557	4132003	1	1	1	12.04	<---
	206	20.557	20.657	4132003	1	1	1	17.47	<---
	207	20.657	20.757	4132003	1	1	1	21.07	<---
	208	20.757	20.857	4132003	1	1	1	16.18	<---
	209	20.857	20.957	4132003	1	1	1	13.98	<---
	210	20.957	21.057	4132003	1	1	1	5.99	<---

Table B5 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S107-Y2003 TAPE BMP=00.000		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-94, CS 11015 JN 29580 BMP: 19.381 EMP: 23.353	211	21.057	21.157	4132003	1	1	1	13.56	<---
	212	21.157	21.257	4132003	1	1	1	10.92	<---
	213	21.257	21.357	4132003	1	1	1	11.23	<---
	214	21.357	21.457	4132003	1	1	1	8.38	<---
	215	21.457	21.557	4132003	1	1	1	12.38	<---
	216	21.557	21.657	4132003	1	1	1	18.32	<---
	217	21.657	21.757	4132003	1	1	1	20.21	<---
	218	21.757	21.857	4132003	1	1	1	21.39	<---
	219	21.857	21.957	4132003	1	1	1	20.41	<---
	220	21.957	22.057	4132003	1	1	1	17.51	<---
	221	22.057	22.157	4132003	1	1	1	12.21	<---
	222	22.157	22.257	4132003	1	1	1	17.26	<---
	223	22.257	22.357	4132003	1	1	1	21.06	<---
	224	22.357	22.457	4132003	1	1	1	13.79	<---
	225	22.457	22.557	4132003	1	1	1	9.7	<---
	226	22.557	22.657	4132003	1	1	1	9.39	<---
	227	22.657	22.757	4132003	1	1	1	12.47	<---
	228	22.757	22.857	4132003	1	1	1	11.97	<---
	229	22.857	22.957	4132003	1	1	1	15.6	<---
	230	22.957	23.057	4132003	1	1	1	9.14	<---
	231	23.057	23.157	4132003	1	1	1	15.15	<---
	232	23.157	23.257	4132003	1	1	1	8.39	<---
	233	23.257	23.377	4132003	1	1.2	1	6.4833	<--- Normalized
	234	23.377	23.415	4132003	1	0.38	2	12.974	<--- Normalized

Table B6 The MDOT 2005 pavement DI data for control section 11015 along I-94 EB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S111-Y2005 TAPE BMP=00.000		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.033	4162005	1	0.33	1	3.0303	<--- Normalized
	2	0.033	0.155	4162005	2	1.22	1	6.959	<--- Normalized
	3	0.155	0.199	4162005	1	0.44	1	0.7273	<--- Normalized
	4	0.199	0.299	4162005	2	1	1	0	<---
	5	0.299	0.399	4162005	2	1	1	0	<---
	6	0.399	0.499	4162005	2	1	1	0	<---
	7	0.499	0.599	4162005	2	1	1	0	<---
	8	0.599	0.699	4162005	2	1	1	0	<---
	9	0.699	0.799	4162005	2	1	1	0	<---
	10	0.799	0.899	4162005	2	1	1	0	<---
	11	0.899	0.999	4162005	2	1	1	0	<---
	12	0.999	1.099	4162005	2	1	1	0	<---
	13	1.099	1.199	4162005	2	1	1	0.48	<---
	14	1.199	1.299	4162005	2	1	1	3.18	<---
	15	1.299	1.399	4162005	2	1	1	3.62	<---
	16	1.399	1.499	4162005	2	1	1	4.06	<---
	17	1.499	1.665	4162005	2	1.66	1	7.4277	<--- Normalized
	18	1.665	1.701	4162005	1	0.36	1	57.972	<--- Normalized
	19	1.701	1.801	4162005	2	1	1	4.16	<---
	20	1.801	1.901	4162005	2	1	1	3.6	<---
	21	1.901	2.001	4162005	2	1	1	3.7	<---
	22	2.001	2.101	4162005	2	1	1	5.52	<---
	23	2.101	2.201	4162005	2	1	1	4.12	<---
	24	2.201	2.301	4162005	2	1	1	4	<---
	25	2.301	2.401	4162005	2	1	1	3.08	<---
	26	2.401	2.501	4162005	2	1	1	3.34	<---
	27	2.501	2.601	4162005	2	1	1	3.72	<---
	28	2.601	2.701	4162005	2	1	1	3.06	<---
	29	2.701	2.801	4162005	2	1	1	0	<---
	30	2.801	2.901	4162005	2	1	1	0	<---
	31	2.901	3.001	4162005	2	1	1	0.52	<---
	32	3.001	3.101	4162005	2	1	1	4.72	<---
	33	3.101	3.201	4162005	2	1	1	0.96	<---
	34	3.201	3.301	4162005	2	1	1	0	<---
	35	3.301	3.401	4162005	2	1	1	0	<---
	36	3.401	3.501	4162005	2	1	1	0	<---
	37	3.501	3.601	4162005	2	1	1	0	<---
	38	3.601	3.701	4162005	2	1	1	0	<---
	39	3.701	3.801	4162005	2	1	1	6	<---
	40	3.801	3.901	4162005	2	1	1	1.84	<---
	41	3.901	4.001	4162005	2	1	1	5.88	<---
	42	4.001	4.101	4162005	2	1	1	4.16	<---

Table B6 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S111-Y2005 TAPE BMP=00.000		
		7	194	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	43	4.101	4.201	4162005	2	1	1	4.56	<---
	44	4.201	4.301	4162005	2	1	1	6.96	<---
	45	4.301	4.401	4162005	2	1	1	7.04	<---
	46	4.401	4.501	4162005	2	1	1	1.84	<---
	47	4.501	4.601	4162005	2	1	1	5.08	<---
	48	4.601	4.701	4162005	2	1	1	2.96	<---
	49	4.701	4.801	4162005	2	1	1	3.04	<---
	50	4.801	4.901	4162005	2	1	1	5.71	<---
	51	4.901	5.001	4162005	2	1	1	4.47	<---
	52	5.001	5.101	4162005	2	1	1	7.68	<---
	53	5.101	5.201	4162005	2	1	1	2.08	<---
	54	5.201	5.301	4162005	2	1	1	3.1	<---
	55	5.301	5.401	4162005	2	1	1	1.88	<---
	56	5.401	5.501	4162005	2	1	1	2.73	<---
	57	5.501	5.601	4162005	2	1	1	2.11	<---
	58	5.601	5.701	4162005	2	1	1	4.98	<---
	59	5.701	5.801	4162005	2	1	1	6.78	<---
	60	5.801	5.901	4162005	2	1	1	1.08	<---
	61	5.901	6.001	4162005	2	1	1	1.56	<---
	62	6.001	6.101	4162005	2	1	1	3.68	<---
	63	6.101	6.201	4162005	2	1	1	1.76	<---
	64	6.201	6.301	4162005	2	1	1	3.8	<---
	65	6.301	6.401	4162005	2	1	1	3.17	<---
	66	6.401	6.501	4162005	2	1	1	0.56	<---
	67	6.501	6.601	4162005	2	1	1	2.52	<---
	68	6.601	6.701	4162005	2	1	1	6.8	<---
	69	6.701	6.801	4162005	2	1	1	5.44	<---
	70	6.801	6.901	4162005	2	1	1	3.08	<---
	71	6.901	7.001	4162005	2	1	1	3.14	<---
	72	7.001	7.101	4162005	2	1	1	2.56	<---
	73	7.101	7.201	4162005	2	1	1	1.42	<---
	74	7.201	7.301	4162005	2	1	1	2.22	<---
	75	7.301	7.401	4162005	2	1	1	0.92	<---
	76	7.401	7.501	4162005	2	1	1	0	<---
	77	7.501	7.601	4162005	2	1	1	0.68	<---
	78	7.601	7.701	4162005	2	1	1	2.71	<---
	79	7.701	7.801	4162005	2	1	1	2	<---
	80	7.801	7.901	4162005	2	1	1	2.24	<---
	81	7.901	8.04	4162005	2	1.39	1	0.4604	<--- Normalized
	82	8.04	8.074	4162005	1	0.34	1	0.4706	<--- Normalized
	83	8.074	8.174	4162005	2	1	1	1	<---
	84	8.174	8.274	4162005	2	1	1	0	<---

Table B6 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S111-Y2005 TAPE BMP=00.000		
		7	194	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	85	8.274	8.374	4162005	2	1	1	0	<---
	86	8.374	8.474	4162005	2	1	1	4.36	<---
	87	8.474	8.574	4162005	2	1	1	0	<---
	88	8.574	8.674	4162005	2	1	1	0	<---
	89	8.674	8.774	4162005	2	1	1	0	<---
	90	8.774	8.874	4162005	2	1	1	3.84	<---
	91	8.874	8.974	4162005	2	1	1	1.6	<---
	92	8.974	9.074	4162005	2	1	1	4.56	<---
	93	9.074	9.174	4162005	2	1	1	4.88	<---
	94	9.174	9.274	4162005	2	1	1	8.52	<---
	95	9.274	9.374	4162005	2	1	1	6.5	<---
	96	9.374	9.474	4162005	2	1	1	9.8	<---
	97	9.474	9.574	4162005	2	1	1	7.52	<---
	98	9.574	9.674	4162005	2	1	1	10.8	<---
	99	9.674	9.774	4162005	2	1	1	7.76	<---
	100	9.774	9.874	4162005	2	1	1	2.28	<---
	101	9.874	9.974	4162005	2	1	1	5.64	<---
	102	9.974	10.074	4162005	2	1	1	5.72	<---
	103	10.074	10.174	4162005	2	1	1	4.32	<---
	104	10.174	10.274	4162005	2	1	1	5.56	<---
	105	10.274	10.374	4162005	2	1	1	6.84	<---
	106	10.374	10.474	4162005	2	1	1	12.25	<---
	107	10.474	10.574	4162005	2	1	1	13	<---
	108	10.574	10.674	4162005	2	1	1	6.12	<---
	109	10.674	10.774	4162005	2	1	1	10.36	<---
	110	10.774	10.874	4162005	2	1	1	6.18	<---
	111	10.874	10.974	4162005	2	1	1	6.26	<---
	112	10.974	11.074	4162005	2	1	1	7.76	<---
	113	11.074	11.174	4162005	2	1	1	8.44	<---
	114	11.174	11.274	4162005	2	1	1	7.88	<---
	115	11.274	11.374	4162005	2	1	1	5.72	<---
	116	11.374	11.474	4162005	2	1	1	3.6	<---
	117	11.474	11.574	4162005	2	1	1	6.08	<---
	118	11.574	11.674	4162005	2	1	1	6.08	<---
	119	11.674	11.774	4162005	2	1	1	3.58	<---
	120	11.774	11.952	4162005	2	1.78	1	1.2191	<--- Normalized
	121	11.952	12.024	4162005	1	0.72	1	1.3889	<--- Normalized
	122	12.024	12.124	4162005	2	1	1	23.16	<---
	123	12.124	12.224	4162005	2	1	1	18	<---
	124	12.224	12.324	4162005	2	1	1	5.56	<---
	125	12.324	12.424	4162005	2	1	1	0	<---
	126	12.424	12.524	4162005	2	1	1	0	<---

Table B6 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S111-Y2005 TAPE BMP=00.000		
		7	194	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	127	12.524	12.624	4162005	2	1	1	0	<---
	128	12.624	12.724	4162005	2	1	1	0	<---
	129	12.724	12.919	4162005	2	1.95	1	0	<--- Normalized
	130	12.919	12.958	4162005	1	0.39	1	0	<--- Normalized
	131	12.958	13.058	4162005	2	1	1	0	<---
	132	13.058	13.158	4162005	2	1	1	0	<---
	133	13.158	13.258	4162005	2	1	1	1.44	<---
	134	13.258	13.358	4162005	2	1	1	3.8	<---
	135	13.358	13.458	4162005	2	1	1	0.84	<---
	136	13.458	13.641	4162005	2	1.83	1	1.0546	<--- Normalized
	137	13.641	13.647	4162005	1	0.06	1	33.333	<--- Normalized
	138	13.647	13.747	4162005	2	1	1	1.05	<---
	139	13.747	13.847	4162005	2	1	1	0	<---
	140	13.847	13.947	4162005	2	1	1	0	<---
	141	13.947	14.047	4162005	2	1	1	0	<---
	142	14.047	14.147	4162005	2	1	1	1.44	<---
	143	14.147	14.247	4162005	2	1	1	0	<---
	144	14.247	14.347	4162005	2	1	1	0	<---
	145	14.347	14.447	4162005	2	1	1	0	<---
	146	14.447	14.547	4162005	2	1	1	1.28	<---
	147	14.547	14.647	4162005	2	1	1	3.4	<---
	148	14.647	14.747	4162005	2	1	1	4.08	<---
	149	14.747	14.847	4162005	2	1	1	1.16	<---
	150	14.847	14.947	4162005	2	1	1	0.48	<---
	151	14.947	15.047	4162005	2	1	1	0	<---
	152	15.047	15.147	4162005	2	1	1	0	<---
	153	15.147	15.247	4162005	2	1	1	2.72	<---
	154	15.247	15.347	4162005	2	1	1	0.08	<---
	155	15.347	15.447	4162005	2	1	1	0	<---
	156	15.447	15.547	4162005	2	1	1	0	<---
	157	15.547	15.647	4162005	2	1	1	0	<---
	158	15.647	15.747	4162005	2	1	1	1.48	<---
	159	15.747	15.847	4162005	2	1	1	0	<---
	160	15.847	15.947	4162005	2	1	1	1.32	<---
	161	15.947	16.047	4162005	2	1	1	0	<---
	162	16.047	16.147	4162005	2	1	1	1	<---
	163	16.147	16.247	4162005	2	1	1	0	<---
	164	16.247	16.347	4162005	2	1	1	5.78	<---
	165	16.347	16.447	4162005	2	1	1	8.37	<---
	166	16.447	16.547	4162005	2	1	1	11.06	<---
	167	16.547	16.647	4162005	2	1	1	13.62	<---
	168	16.647	16.747	4162005	2	1	1	14	<---

Table B6 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S111-Y2005 TAPE BMP=00.000		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	169	16.747	16.847	4162005	2	1	1	7.6	<---
	170	16.847	16.947	4162005	2	1	1	5.64	<---
	171	16.947	17.047	4162005	2	1	1	9.96	<---
	172	17.047	17.147	4162005	2	1	1	8.88	<---
	173	17.147	17.247	4162005	2	1	1	9.72	<---
	174	17.247	17.347	4162005	2	1	1	9.36	<---
	175	17.347	17.447	4162005	2	1	1	4.48	<---
	176	17.447	17.547	4162005	2	1	1	9.24	<---
	177	17.547	17.647	4162005	2	1	1	6.24	<---
	178	17.647	17.747	4162005	2	1	1	3.92	<---
	179	17.747	17.847	4162005	2	1	1	5.28	<---
	180	17.847	17.947	4162005	2	1	1	2.8	<---
	181	17.947	18.047	4162005	2	1	1	2.92	<---
	182	18.047	18.147	4162005	2	1	1	3.2	<---
	183	18.147	18.247	4162005	2	1	1	6.16	<---
	184	18.247	18.347	4162005	2	1	1	5.2	<---
	185	18.347	18.447	4162005	2	1	1	9.04	<---
	186	18.447	18.547	4162005	2	1	1	4.8	<---
	187	18.547	18.647	4162005	2	1	1	4.12	<---
	188	18.647	18.843	4162005	2	1.96	1	6.429	<--- Normalized
	189	18.843	18.873	4162005	1	0.3	1	18.467	<--- Normalized
	190	18.873	18.973	4162005	2	1	1	10.27	<---
	191	18.973	19.073	4162005	2	1	1	4.28	<---
	192	19.073	19.173	4162005	2	1	1	7.9	<---
	193	19.173	19.302	4162005	2	1.29	1	9.016	<--- Normalized
I-94, CS 11015 JN 29580 BMP: 19.381 EMP: 23.353	194	19.302	19.402	4162005	1	1	1	1.25	<---
	195	19.402	19.502	4162005	1	1	1	0.77	<---
	196	19.502	19.602	4162005	1	1	1	0	<---
	197	19.602	19.702	4162005	1	1	1	0.25	<---
	198	19.702	19.802	4162005	1	1	1	2.25	<---
	199	19.802	19.902	4162005	1	1	1	4.45	<---
	200	19.902	20.002	4162005	1	1	1	13.96	<---
	201	20.002	20.102	4162005	1	1	1	6.2	<---
	202	20.102	20.202	4162005	1	1	1	3.63	<---
	203	20.202	20.302	4162005	1	1	1	0.25	<---
	204	20.302	20.402	4162005	1	1	1	1.44	<---
	205	20.402	20.502	4162005	1	1	1	2.96	<---
	206	20.502	20.602	4162005	1	1	1	0.75	<---
	207	20.602	20.702	4162005	1	1	1	12.47	<---
	208	20.702	20.802	4162005	1	1	1	2.85	<---
	209	20.802	20.902	4162005	1	1	1	3.17	<---
	210	20.902	21.002	4162005	1	1	1	1.75	<---

Table B6 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S111-Y2005 TAPE BMP=00.000		
		7	I94	EB	11015		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-94, CS 11015 JN 29580 BMP: 19.381 EMP: 23.353	211	21.002	21.102	4162005	1	1	1	3.94	<---
	212	21.102	21.202	4162005	1	1	1	3.98	<---
	213	21.202	21.302	4162005	1	1	1	2.67	<---
	214	21.302	21.402	4162005	1	1	1	2.64	<---
	215	21.402	21.502	4162005	1	1	1	0.66	<---
	216	21.502	21.602	4162005	1	1	1	0.5	<---
	217	21.602	21.702	4162005	1	1	1	0.25	<---
	218	21.702	21.802	4162005	1	1	1	1	<---
	219	21.802	21.902	4162005	1	1	1	2.49	<---
	220	21.902	22.002	4162005	1	1	1	4.23	<---
	221	22.002	22.102	4162005	1	1	1	3.65	<---
	222	22.102	22.202	4162005	1	1	1	2	<---
	223	22.202	22.302	4162005	1	1	1	6.17	<---
	224	22.302	22.402	4162005	1	1	1	3.05	<---
	225	22.402	22.502	4162005	1	1	1	4.77	<---
	226	22.502	22.602	4162005	1	1	1	3.19	<---
	227	22.602	22.702	4162005	1	1	1	3.75	<---
	228	22.702	22.802	4162005	1	1	1	3.69	<---
	229	22.802	22.902	4162005	1	1	1	1.25	<---
	230	22.902	23.002	4162005	1	1	1	2.5	<---
	231	23.002	23.102	4162005	1	1	1	1.5	<---
	232	23.102	23.202	4162005	1	1	1	0.75	<---
	233	23.202	23.353	4162005	1	1.51	1	2.649	<--- Normalized

Table B7 The MDOT 1999 pavement DI data for control section 82194 along I-75 NB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=99-38-05 TAPE BMP=00.000		
		9	I75	NB	82194		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.1	5011999	3	1	1	5.94	<---
	2	0.1	0.2	5011999	3	1	1	15.47	<---
	3	0.2	0.3	5011999	3	1	1	15.32	<---
	4	0.3	0.4	5011999	3	1	1	18.14	<---
	5	0.4	0.5	5011999	3	1	1	14.21	<---
	6	0.5	0.6	5011999	3	1	1	11	<---
	7	0.6	0.7	5011999	3	1	1	8	<---
	8	0.7	0.8	5011999	3	1	1	9.93	<---
	9	0.8	0.9	5011999	3	1	1	13	<---
	10	0.9	1.034	5011999	3	1.34	1	26.388	<--- Normalized
	11	1.034	1.089	5011999	7	0.55	0	0	<--- Normalized
	12	1.089	1.189	5011999	3	1	1	13.24	<---
	13	1.189	1.289	5011999	3	1	1	5.98	<---
	14	1.289	1.389	5011999	3	1	1	2.42	<---
	15	1.389	1.489	5011999	3	1	1	1.18	<---
	16	1.489	1.589	5011999	3	1	1	4.76	<---
	17	1.589	1.689	5011999	3	1	1	1.05	<---
	18	1.689	1.789	5011999	3	1	1	4.55	<---
	19	1.789	1.889	5011999	3	1	1	0.42	<---
	20	1.889	1.989	5011999	3	1	1	2.6	<---
	21	1.989	2.089	5011999	3	1	1	5.53	<---
	22	2.089	2.204	5011999	3	1.15	1	6.1478	<--- Normalized
	23	2.204	2.243	5011999	7	0.39	0	0	<--- Normalized
	24	2.243	2.341	5011999	3	0.98	1	3.1735	<--- Normalized
	25	2.341	2.396	5011999	7	0.55	0	0	<--- Normalized
	26	2.396	2.496	5011999	3	1	1	9.43	<---
	27	2.496	2.6	5011999	3	1.04	1	3.2596	<--- Normalized
	28	2.6	2.689	5011999	3	0.89	2	5.5056	<--- Normalized
	29	2.689	4.326	5011999	7	16.37	0	0	<--- Normalized
	30	4.326	4.327	5011999	2	0.01	2	105	<--- Normalized
	31	4.327	4.444	5011999	3	1.17	1	0.8974	<--- Normalized

Table B7 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=99-38-05 TAPE BMP=00.000		
		9	175	NB	82194		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	32	4.444	4.599	5011999	7	1.55	0	0	<--- Normalized
	33	4.599	4.699	5011999	1	1	1	0	<---
	34	4.699	4.799	5011999	1	1	1	0	<---
I-75, CS 82194 JN 36005 BMP: 4.8 EMP: 6.598	35	4.799	4.899	5011999	1	1	1	0	<---
	36	4.899	4.999	5011999	1	1	1	0	<---
	37	4.999	5.099	5011999	1	1	1	0	<---
	38	5.099	5.199	5011999	1	1	1	0	<---
	39	5.199	5.299	5011999	1	1	1	0.16	<---
	40	5.299	5.399	5011999	1	1	1	0.5	<---
	41	5.399	5.499	5011999	1	1	1	0	<---
	42	5.499	5.599	5011999	1	1	1	0	<---
	43	5.599	5.699	5011999	1	1	1	0	<---
	44	5.699	5.799	5011999	1	1	1	0	<---
	45	5.799	5.899	5011999	1	1	1	0	<---
	46	5.899	5.999	5011999	1	1	1	0	<---
	47	5.999	6.099	5011999	1	1	1	0	<---
	48	6.099	6.199	5011999	1	1	1	0	<---
	49	6.199	6.299	5011999	1	1	1	0	<---
	50	6.299	6.399	5011999	1	1	1	0	<---
	51	6.399	6.598	5011999	1	1.99	1	0	<--- Normalized
	52	6.598	6.764	5011999	2	1.66	1	1.205	<--- Normalized
	53	6.764	6.864	5011999	2	1	2	0	<---
	54	6.864	6.964	5011999	2	1	2	1.6	<---
	55	6.964	7.064	5011999	2	1	2	1.1	<---
	56	7.064	7.164	5011999	2	1	2	8.76	<---
	57	7.164	7.286	5011999	2	1.22	2	15.672	<--- Normalized
	58	7.286	7.386	5011999	2	1	1	10.57	<---
	59	7.386	7.486	5011999	2	1	1	13.03	<---
	60	7.486	7.586	5011999	2	1	1	7.65	<---
	61	7.586	7.74	5011999	2	1.54	1	4.416	<--- Normalized
	62	7.74	8.477	5011999	8	7.37	0	0	<--- Normalized

Table B8 The MDOT 2001 pavement DI data for control section 82194 along I-75 NB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S270-Y2001 TAPE BMP=00.000		
		9	I75	NB	82194		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.1	6212001	3	1	1	8.48	<---
	2	0.1	0.2	6212001	3	1	1	12.82	<---
	3	0.2	0.3	6212001	3	1	1	11.53	<---
	4	0.3	0.4	6212001	3	1	1	4.68	<---
	5	0.4	0.5	6212001	3	1	1	2.5	<---
	6	0.5	0.6	6212001	3	1	1	0	<---
	7	0.6	0.7	6212001	3	1	1	1.04	<---
	8	0.7	0.8	6212001	3	1	1	0	<---
	9	0.8	0.9	6212001	3	1	1	1.98	<---
	10	0.9	1.092	6212001	3	1.92	1	10.948	<--- Normalized
	11	1.092	1.145	6212001	1	0.53	1	0	<--- Normalized
	12	1.145	1.245	6212001	3	1	1	15.03	<---
	13	1.245	1.345	6212001	3	1	1	8.98	<---
	14	1.345	1.445	6212001	3	1	1	7.9	<---
	15	1.445	1.545	6212001	3	1	1	11.02	<---
	16	1.545	1.645	6212001	3	1	1	11.23	<---
	17	1.645	1.745	6212001	3	1	1	6.67	<---
	18	1.745	1.845	6212001	3	1	1	14.24	<---
	19	1.845	1.945	6212001	3	1	1	4.83	<---
	20	1.945	2.045	6212001	3	1	1	13.1	<---
	21	2.045	2.145	6212001	3	1	1	8.72	<---
	22	2.145	2.258	6212001	3	1.13	1	7.3982	<--- Normalized
	23	2.258	2.298	6212001	1	0.4	1	11.875	<--- Normalized
	24	2.298	2.396	6212001	3	0.98	1	14.194	<--- Normalized
	25	2.396	2.452	6212001	1	0.56	1	18.643	<--- Normalized
	26	2.452	2.552	6212001	3	1	1	9.98	<---
	27	2.552	2.743	6212001	3	1.91	1	9.932	<--- Normalized
	28	2.743	2.843	6212001	1	1	1	0	<---
	29	2.843	2.943	6212001	1	1	1	0	<---
	30	2.943	3.043	6212001	1	1	1	0.5	<---
	31	3.043	3.143	6212001	1	1	1	0.75	<---
	32	3.143	3.243	6212001	1	1	1	1.55	<---
	33	3.243	3.343	6212001	1	1	1	0.5	<---
	34	3.343	3.443	6212001	1	1	1	0	<---
	35	3.443	3.543	6212001	1	1	1	0	<---
	36	3.543	3.643	6212001	1	1	1	0.5	<---
	37	3.643	3.743	6212001	1	1	1	2	<---
	38	3.743	3.843	6212001	1	1	1	0	<---
	39	3.843	3.943	6212001	1	1	1	0.98	<---
	40	3.943	4.043	6212001	1	1	1	0.98	<---
	41	4.043	4.143	6212001	1	1	1	0	<---
	42	4.143	4.243	6212001	1	1	1	0	<---

Table B8 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S270-Y2001 TAPE BMP=00.000		
		9	I75	NB	82194		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	43	4.243	4.377	6212001	1	1.34	1	0.7836	<--- Normalized
	44	4.377	4.494	6212001	3	1.17	1	0.641	<--- Normalized
	45	4.494	4.594	6212001	1	1	1	44	<---
	46	4.594	4.694	6212001	1	1	1	35.55	<---
	47	4.694	4.794	6212001	1	1	1	0	<---
I-75, CS 82194 JN 36005 BMP: 4.8 EMP: 6.598	48	4.794	4.894	6212001	1	1	1	0.75	<---
	49	4.894	4.994	6212001	1	1	1	0.58	<---
	50	4.994	5.094	6212001	1	1	1	0	<---
	51	5.094	5.194	6212001	1	1	1	0	<---
	52	5.194	5.294	6212001	1	1	1	1.8	<---
	53	5.294	5.394	6212001	1	1	1	0	<---
	54	5.394	5.494	6212001	1	1	1	0	<---
	55	5.494	5.594	6212001	1	1	1	0	<---
	56	5.594	5.694	6212001	1	1	1	1.05	<---
	57	5.694	5.794	6212001	1	1	1	0	<---
	58	5.794	5.894	6212001	1	1	1	1.75	<---
	59	5.894	5.994	6212001	1	1	1	0	<---
	60	5.994	6.094	6212001	1	1	1	0.75	<---
	61	6.094	6.194	6212001	1	1	1	0	<---
	62	6.194	6.294	6212001	1	1	1	0	<---
	63	6.294	6.394	6212001	1	1	1	0.75	<---
	64	6.394	6.494	6212001	1	1	1	0.75	<---
	65	6.494	6.65	6212001	1	1.56	1	0	<--- Normalized
	66	6.65	6.75	6212001	3	1	1	3.49	<---
	67	6.75	6.85	6212001	3	1	1	5.75	<---
	68	6.85	6.95	6212001	3	1	1	0.75	<---
	69	6.95	7.05	6212001	3	1	1	6.08	<---
	70	7.05	7.15	6212001	3	1	1	6.2	<---
	71	7.15	7.25	6212001	3	1	1	14.43	<---
	72	7.25	7.35	6212001	3	1	1	11.67	<---
	73	7.35	7.45	6212001	3	1	1	4.92	<---
	74	7.45	7.55	6212001	3	1	1	4.35	<---
	75	7.55	7.65	6212001	3	1	1	6.32	<---
	76	7.65	7.75	6212001	3	1	1	1.3	<---
	77	7.75	7.85	6212001	3	1	1	0	<---
	78	7.85	7.95	6212001	3	1	1	0.1	<---
	79	7.95	8.05	6212001	3	1	1	0	<---
	80	8.05	8.15	6212001	3	1	1	1.5	<---
	81	8.15	8.307	6212001	3	1.57	1	0	<--- Normalized
	82	8.307	8.489	6212001	1	1.82	1	0	<--- Normalized

Table B9 The MDOT 2003 pavement DI data for control section 82194 along I-75 NB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S139-Y2003 TAPE BMP=00.000		
		9	I75	NB	82194		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.1	5142003	1	1	1	0	<---
	2	0.1	0.2	5142003	1	1	1	2.52	<---
	3	0.2	0.3	5142003	1	1	1	0	<---
	4	0.3	0.4	5142003	1	1	1	0	<---
	5	0.4	0.5	5142003	1	1	1	0	<---
	6	0.5	0.6	5142003	1	1	1	0	<---
	7	0.6	0.7	5142003	1	1	1	0	<---
	8	0.7	0.8	5142003	1	1	1	0	<---
	9	0.8	0.9	5142003	1	1	1	0	<---
	10	0.9	1	5142003	1	1	1	0	<---
	11	1	1.1	5142003	1	1	1	0	<---
	12	1.1	1.2	5142003	1	1	1	1	<---
	13	1.2	1.3	5142003	1	1	1	0	<---
	14	1.3	1.4	5142003	1	1	1	0	<---
	15	1.4	1.5	5142003	1	1	1	0	<---
	16	1.5	1.6	5142003	1	1	1	0	<---
	17	1.6	1.7	5142003	1	1	1	0	<---
	18	1.7	1.8	5142003	1	1	1	0	<---
	19	1.8	1.9	5142003	1	1	1	1	<---
	20	1.9	2	5142003	1	1	1	0.5	<---
	21	2	2.1	5142003	1	1	1	0	<---
	22	2.1	2.2	5142003	1	1	1	3.43	<---
	23	2.2	2.3	5142003	1	1	1	7.48	<---
	24	2.3	2.4	5142003	1	1	1	2	<---
	25	2.4	2.5	5142003	1	1	1	0.5	<---
	26	2.5	2.6	5142003	1	1	1	2.98	<---
	27	2.6	2.7	5142003	1	1	1	1.52	<---
	28	2.7	2.8	5142003	1	1	1	5.93	<---
	29	2.8	2.9	5142003	1	1	1	4.28	<---
	30	2.9	3	5142003	1	1	1	4.28	<---
	31	3	3.1	5142003	1	1	1	2.71	<---
	32	3.1	3.2	5142003	1	1	1	7	<---
	33	3.2	3.3	5142003	1	1	1	0.5	<---
	34	3.3	3.4	5142003	1	1	1	1.25	<---
	35	3.4	3.5	5142003	1	1	1	7.52	<---
	36	3.5	3.6	5142003	1	1	1	16.91	<---
	37	3.6	3.7	5142003	1	1	1	14.095	<---
	38	3.7	3.8	5142003	1	1	1	8.93	<---
	39	3.8	3.9	5142003	1	1	1	0.75	<---
	40	3.9	4	5142003	1	1	1	4.68	<---
	41	4	4.1	5142003	1	1	1	7.47	<---
	42	4.1	4.2	5142003	1	1	1	1.92	<---

Table B9 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S139-Y2003 TAPE BMP=00.000		
		9	I75	NB	82194		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	43	4.2	4.3	5142003	1	1	1	2.75	<---
	44	4.3	4.4	5142003	1	1	1	10.29	<---
	45	4.4	4.5	5142003	1	1	1	2.81	<---
	46	4.5	4.6	5142003	1	1	1	20.17	<---
	47	4.6	4.7	5142003	1	1	1	19.17	<---
	48	4.7	4.8	5142003	1	1	1	6.24	<---
I-75, CS 82194 JN 36005 BMP: 4.8 EMP: 6.598	49	4.8	4.9	5142003	1	1	1	0.75	<---
	50	4.9	5	5142003	1	1	1	0.5	<---
	51	5	5.1	5142003	1	1	1	0	<---
	52	5.1	5.2	5142003	1	1	1	0	<---
	53	5.2	5.3	5142003	1	1	1	2.21	<---
	54	5.3	5.4	5142003	1	1	1	0	<---
	55	5.4	5.5	5142003	1	1	1	0	<---
	56	5.5	5.6	5142003	1	1	1	0	<---
	57	5.6	5.7	5142003	1	1	1	0	<---
	58	5.7	5.8	5142003	1	1	1	0	<---
	59	5.8	5.9	5142003	1	1	1	0	<---
	60	5.9	6	5142003	1	1	1	0	<---
	61	6	6.1	5142003	1	1	1	0	<---
	62	6.1	6.2	5142003	1	1	1	0	<---
	63	6.2	6.3	5142003	1	1	1	0	<---
	64	6.3	6.4	5142003	1	1	1	0	<---
	65	6.4	6.5	5142003	1	1	1	1.05	<---
	66	6.5	6.642	5142003	1	1.42	1	0	<--- Normalized
	67	6.642	6.743	5142003	2	1.01	1	19.891	<--- Normalized
	68	6.743	6.843	5142003	2	1	2	30.74	<---
	69	6.843	6.943	5142003	2	1	2	10.56	<---
	70	6.943	7.043	5142003	2	1	2	7.46	<---
	71	7.043	7.15	5142003	2	1.07	2	8.869	<--- Normalized
	72	7.15	7.25	5142003	2	1	1	23.82	<---
	73	7.25	7.35	5142003	2	1	1	15.18	<---
	74	7.35	7.45	5142003	2	1	1	10.7	<---
	75	7.45	7.55	5142003	2	1	1	16.68	<---
	76	7.55	7.65	5142003	2	1	1	12.12	<---
	77	7.65	7.75	5142003	2	1	1	7.43	<---
	78	7.75	7.929	5142003	2	1.79	1	3.453	<--- Normalized
	79	7.929	8.113	5142003	2	1.84	2	2.266	<--- Normalized
	80	8.113	8.301	5142003	2	1.88	1	6.681	<--- Normalized
	81	8.301	8.473	5142003	1	1.72	1	0.291	<--- Normalized

Table B10 The MDOT 2005 pavement DI data for control section 82194 along I-75 NB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S185-Y2005 TAPE BMP=00.000		
		9	I75	NB	82194		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.1	7072005	1	1	1	0.94	<---
	2	0.1	0.2	7072005	1	1	1	0.5	<---
	3	0.2	0.3	7072005	1	1	1	0	<---
	4	0.3	0.4	7072005	1	1	1	1.5	<---
	5	0.4	0.5	7072005	1	1	1	0.5	<---
	6	0.5	0.6	7072005	1	1	1	0.5	<---
	7	0.6	0.7	7072005	1	1	1	1	<---
	8	0.7	0.8	7072005	1	1	1	0.5	<---
	9	0.8	0.9	7072005	1	1	1	0.16	<---
	10	0.9	1	7072005	1	1	1	0.5	<---
	11	1	1.1	7072005	1	1	1	1	<---
	12	1.1	1.2	7072005	1	1	1	1	<---
	13	1.2	1.3	7072005	1	1	1	1.5	<---
	14	1.3	1.4	7072005	1	1	1	0.5	<---
	15	1.4	1.5	7072005	1	1	1	0.5	<---
	16	1.5	1.6	7072005	1	1	1	0	<---
	17	1.6	1.7	7072005	1	1	1	0.5	<---
	18	1.7	1.8	7072005	1	1	1	0	<---
	19	1.8	1.9	7072005	1	1	1	1	<---
	20	1.9	2	7072005	1	1	1	0	<---
	21	2	2.1	7072005	1	1	1	0.94	<---
	22	2.1	2.2	7072005	1	1	1	0.5	<---
	23	2.2	2.3	7072005	1	1	1	0.5	<---
	24	2.3	2.4	7072005	1	1	1	3.62	<---
	25	2.4	2.5	7072005	1	1	1	2.44	<---
	26	2.5	2.631	7072005	1	1.31	1	0	<--- Normalized
	27	2.631	2.731	7072005	1	1	2	0.5	<---
	28	2.731	2.831	7072005	1	1	2	2.12	<---
	29	2.831	2.931	7072005	1	1	2	3.84	<---
	30	2.931	3.031	7072005	1	1	2	2	<---
	31	3.031	3.131	7072005	1	1	2	0	<---
	32	3.131	3.231	7072005	1	1	2	9.44	<---
	33	3.231	3.331	7072005	1	1	2	2.74	<---
	34	3.331	3.431	7072005	1	1	2	4	<---
	35	3.431	3.531	7072005	1	1	2	5.25	<---
	36	3.531	3.631	7072005	1	1	2	4.93	<---
	37	3.631	3.773	7072005	1	1.42	2	11.12	<--- Normalized
	38	3.773	3.873	7072005	1	1	1	5.64	<---
	39	3.873	3.973	7072005	1	1	1	1.66	<---
	40	3.973	4.073	7072005	1	1	1	2.29	<---
	41	4.073	4.173	7072005	1	1	1	1.11	<---
	42	4.173	4.273	7072005	1	1	1	1.54	<---

Table B10 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S185-Y2005 TAPE BMP=00.000		
		9	I75	NB	82194		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	43	4.273	4.373	7072005	1	1	1	3	<---
	44	4.373	4.473	7072005	1	1	1	3.54	<---
	45	4.473	4.573	7072005	1	1	1	3.91	<---
	46	4.573	4.673	7072005	1	1	1	17.44	<---
	47	4.673	4.773	7072005	1	1	1	14.23	<---
I-75, CS 82194 JN 36005 BMP: 4.8 EMP: 6.598	48	4.773	4.873	7072005	1	1	1	15.06	<---
	49	4.873	4.973	7072005	1	1	1	6.69	<---
	50	4.973	5.073	7072005	1	1	1	1.44	<---
	51	5.073	5.173	7072005	1	1	1	0	<---
	52	5.173	5.273	7072005	1	1	1	3.1	<---
	53	5.273	5.373	7072005	1	1	1	0.88	<---
	54	5.373	5.473	7072005	1	1	1	0	<---
	55	5.473	5.573	7072005	1	1	1	0	<---
	56	5.573	5.673	7072005	1	1	1	0	<---
	57	5.673	5.773	7072005	1	1	1	0	<---
	58	5.773	5.873	7072005	1	1	1	0.94	<---
	59	5.873	5.973	7072005	1	1	1	0	<---
	60	5.973	6.073	7072005	1	1	1	2.33	<---
	61	6.073	6.173	7072005	1	1	1	0.5	<---
	62	6.173	6.273	7072005	1	1	1	0.48	<---
	63	6.273	6.373	7072005	1	1	1	0	<---
	64	6.373	6.475	7072005	1	1.02	1	0.4902	<--- Normalized
	65	6.475	6.507	7072005	3	0.32	1	3.4375	<--- Normalized
	66	6.507	6.668	7072005	1	1.61	1	0	<--- Normalized
	67	6.668	6.768	7072005	3	1	1	13.34	<---
	68	6.768	6.868	7072005	3	1	1	17.84	<---
	69	6.868	6.968	7072005	3	1	1	9.63	<---
	70	6.968	7.068	7072005	3	1	1	6.06	<---
	71	7.068	7.168	7072005	3	1	1	7.09	<---
	72	7.168	7.268	7072005	3	1	1	9.64	<---
	73	7.268	7.368	7072005	3	1	1	8.34	<---
	74	7.368	7.468	7072005	3	1	1	8	<---
	75	7.468	7.568	7072005	3	1	1	12.72	<---
	76	7.568	7.668	7072005	3	1	1	5.12	<---
	77	7.668	7.768	7072005	3	1	1	5.82	<---
	78	7.768	7.868	7072005	3	1	1	4.84	<---
	79	7.868	7.968	7072005	3	1	1	1.74	<---
	80	7.968	8.068	7072005	3	1	1	6.36	<---
	81	8.068	8.168	7072005	3	1	1	7.74	<---
	82	8.168	8.327	7072005	3	1.59	1	3.4277	<--- Normalized
	83	8.327	8.499	7072005	1	1.72	1	0	<--- Normalized

Table B11 The MDOT 1999 pavement DI data for control section 11017 along I-94 NB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=99-07-02 TAPE BMP=00.000		
		5	I94	EB	11017		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.1	5011999	3	1	1	24.42	<---
	2	0.1	0.2	5011999	3	1	1	31.75	<---
	3	0.2	0.3	5011999	3	1	1	13.86	<---
	4	0.3	0.4	5011999	3	1	1	17.46	<---
	5	0.4	0.5	5011999	3	1	1	19.25	<---
	6	0.5	0.6	5011999	3	1	1	14.82	<---
	7	0.6	0.7	5011999	3	1	1	15.13	<---
	8	0.7	0.897	5011999	3	1.97	1	14.284	<--- Normalized
	9	0.897	0.997	5011999	1	1	1	10.12	<---
	10	0.997	1.097	5011999	1	1	1	11.13	<---
	11	1.097	1.197	5011999	1	1	1	6.74	<---
	12	1.197	1.297	5011999	1	1	1	7.93	<---
	13	1.297	1.397	5011999	1	1	1	9.31	<---
	14	1.397	1.497	5011999	1	1	1	15.42	<---
	15	1.497	1.597	5011999	1	1	1	10.5	<---
	16	1.597	1.697	5011999	1	1	1	5.92	<---
	17	1.697	1.797	5011999	1	1	1	6.2	<---
	18	1.797	1.897	5011999	1	1	1	5.19	<---
	19	1.897	1.997	5011999	1	1	1	17.2	<---
	20	1.997	2.097	5011999	1	1	1	19.61	<---
	21	2.097	2.197	5011999	1	1	1	9.26	<---
	22	2.197	2.297	5011999	1	1	1	14.23	<---
	23	2.297	2.397	5011999	1	1	1	9.56	<---
	24	2.397	2.497	5011999	1	1	1	5.21	<---
	25	2.497	2.597	5011999	1	1	1	0	<---
	26	2.597	2.697	5011999	1	1	1	0.16	<---
	27	2.697	2.797	5011999	1	1	1	3.04	<---
	28	2.797	2.897	5011999	1	1	1	2.05	<---
	29	2.897	2.997	5011999	1	1	1	2.55	<---
	30	2.997	3.097	5011999	1	1	1	6.97	<---
	31	3.097	3.197	5011999	1	1	1	6.89	<---
	32	3.197	3.297	5011999	1	1	1	3.4	<---
	33	3.297	3.397	5011999	1	1	1	4.3	<---
	34	3.397	3.497	5011999	1	1	1	2.64	<---
	35	3.497	3.597	5011999	1	1	1	1.69	<---
	36	3.597	3.697	5011999	1	1	1	0.75	<---
	37	3.697	3.797	5011999	1	1	1	1.98	<---
	38	3.797	3.897	5011999	1	1	1	6.3	<---
	39	3.897	3.997	5011999	1	1	1	24.07	<---
	40	3.997	4.097	5011999	1	1	1	8.2	<---
	41	4.097	4.197	5011999	1	1	1	6.97	<---
	42	4.197	4.297	5011999	1	1	1	4.08	<---

Table B11 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=99-07-02 TAPE BMP=00.000		
		5	I94	EB	11017		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	43	4.297	4.397	5011999	1	1	1	9.6	<---
	44	4.397	4.497	5011999	1	1	1	9.04	<---
	45	4.497	4.597	5011999	1	1	1	17.31	<---
	46	4.597	4.697	5011999	1	1	1	8.41	<---
	47	4.697	4.797	5011999	1	1	1	6.47	<---
	48	4.797	4.897	5011999	1	1	1	0.94	<---
	49	4.897	4.997	5011999	1	1	1	5.42	<---
	50	4.997	5.097	5011999	1	1	1	15.19	<---
	51	5.097	5.197	5011999	1	1	1	26.17	<---
	52	5.197	5.297	5011999	1	1	1	23.86	<---
	53	5.297	5.397	5011999	1	1	1	20.73	<---
	54	5.397	5.59	5011999	1	1.93	1	20.902	<--- Normalized
	55	5.59	5.617	5011999	7	0.27	0	0	<--- Normalized
I-94, CS 11017 JN 38094 BMP: 5.617 EMP: 6.503	56	5.617	5.717	5011999	1	1	1	0.32	<---
	57	5.717	5.817	5011999	1	1	1	0.16	<---
	58	5.817	5.917	5011999	1	1	1	0.16	<---
	59	5.917	6.017	5011999	1	1	1	0	<---
	60	6.017	6.117	5011999	1	1	1	0	<---
	61	6.117	6.217	5011999	1	1	1	0	<---
	62	6.217	6.317	5011999	1	1	1	0	<---
	63	6.317	6.417	5011999	1	1	1	0	<---
	64	6.417	6.59	5011999	1	1.73	1	1.069	<--- Normalized
	65	6.59	6.609	5011999	7	0.19	0	0	<--- Normalized

Table B12 The MDOT 2001 pavement DI data for control section 11017 along I-94 NB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S336-Y2001 TAPE BMP=00.000		
		5	I94	EB	11017		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.1	8032001	3	1	1	38.93	<---
	2	0.1	0.2	8032001	3	1	1	36.67	<---
	3	0.2	0.3	8032001	3	1	1	10.555	<---
	4	0.3	0.4	8032001	3	1	1	14.37	<---
	5	0.4	0.5	8032001	3	1	1	15.56	<---
	6	0.5	0.6	8032001	3	1	1	15.63	<---
	7	0.6	0.7	8032001	3	1	1	11.065	<---
	8	0.7	0.8	8032001	3	1	1	17.815	<---
	9	0.8	0.903	8032001	3	1.03	1	11.422	<--- Normalized
	10	0.903	1.003	8032001	1	1	1	33.66	<---
	11	1.003	1.103	8032001	1	1	1	32.56	<---
	12	1.103	1.203	8032001	1	1	1	31.17	<---
	13	1.203	1.303	8032001	1	1	1	34.09	<---
	14	1.303	1.403	8032001	1	1	1	33.26	<---
	15	1.403	1.503	8032001	1	1	1	35.71	<---
	16	1.503	1.603	8032001	1	1	1	30.56	<---
	17	1.603	1.703	8032001	1	1	1	26.87	<---
	18	1.703	1.803	8032001	1	1	1	26.99	<---
	19	1.803	1.903	8032001	1	1	1	29.51	<---
	20	1.903	2.003	8032001	1	1	1	34.53	<---
	21	2.003	2.103	8032001	1	1	1	27.09	<---
	22	2.103	2.203	8032001	1	1	1	23.91	<---
	23	2.203	2.303	8032001	1	1	1	25.24	<---
	24	2.303	2.403	8032001	1	1	1	21.27	<---
	25	2.403	2.503	8032001	1	1	1	7.54	<---
	26	2.503	2.603	8032001	1	1	1	4.96	<---
	27	2.603	2.703	8032001	1	1	1	10.43	<---
	28	2.703	2.803	8032001	1	1	1	5.57	<---
	29	2.803	2.903	8032001	1	1	1	4.52	<---
	30	2.903	3.003	8032001	1	1	1	8.99	<---
	31	3.003	3.103	8032001	1	1	1	19.73	<---
	32	3.103	3.203	8032001	1	1	1	16.06	<---
	33	3.203	3.303	8032001	1	1	1	18.82	<---
	34	3.303	3.403	8032001	1	1	1	21.43	<---
	35	3.403	3.503	8032001	1	1	1	11.21	<---
	36	3.503	3.603	8032001	1	1	1	8.21	<---
	37	3.603	3.703	8032001	1	1	1	4.55	<---
	38	3.703	3.803	8032001	1	1	1	15.62	<---
	39	3.803	3.903	8032001	1	1	1	14.8	<---
	40	3.903	4.003	8032001	1	1	1	30.2	<---
	41	4.003	4.103	8032001	1	1	1	26.27	<---
	42	4.103	4.203	8032001	1	1	1	25.27	<---

Table B12 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S336-Y2001 TAPE BMP=00.000		
		5	I94	EB	11017		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-94, CS 11017 JN 38094 BMP: 5.617 EMP: 6.503	43	4.203	4.303	8032001	1	1	1	18.05	<---
	44	4.303	4.403	8032001	1	1	1	28.57	<---
	45	4.403	4.503	8032001	1	1	1	26.6	<---
	46	4.503	4.603	8032001	1	1	1	32.85	<---
	47	4.603	4.703	8032001	1	1	1	28.46	<---
	48	4.703	4.803	8032001	1	1	1	21.64	<---
	49	4.803	4.903	8032001	1	1	1	13.63	<---
	50	4.903	5.003	8032001	1	1	1	19.39	<---
	51	5.003	5.103	8032001	1	1	1	32.42	<---
	52	5.103	5.203	8032001	1	1	1	33.65	<---
	53	5.203	5.303	8032001	1	1	1	34.41	<---
	54	5.303	5.403	8032001	1	1	1	28.36	<---
	55	5.403	5.503	8032001	1	1	1	30.3	<---
	56	5.503	5.603	8032001	1	1	1	16.3	<---
	57	5.603	5.703	8032001	1	1	1	0	<---
	58	5.703	5.803	8032001	1	1	1	0	<---
	59	5.803	5.903	8032001	1	1	1	0	<---
	60	5.903	6.003	8032001	1	1	1	0	<---
	61	6.003	6.103	8032001	1	1	1	0	<---
	62	6.103	6.203	8032001	1	1	1	0	<---
	63	6.203	6.303	8032001	1	1	1	0	<---
	64	6.303	6.403	8032001	1	1	1	0	<---
	65	6.403	6.503	8032001	1	1	1	0.75	<---
	66	6.503	6.611	8032001	1	1.08	1	10.602	<--- Normalized

Table B13 The MDOT 2003 pavement DI data for control section 11017 along I-94 NB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S106-Y2003 TAPE BMP=00.000		
		5	I94	EB	11017		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.1	4132003	2	1	1	0	<---
	2	0.1	0.2	4132003	2	1	1	16.205	<---
	3	0.2	0.3	4132003	2	1	1	14.22	<---
	4	0.3	0.4	4132003	2	1	1	15.36	<---
	5	0.4	0.5	4132003	2	1	1	20.68	<---
	6	0.5	0.6	4132003	2	1	1	18.69	<---
	7	0.6	0.7	4132003	2	1	1	24.22	<---
	8	0.7	0.8	4132003	2	1	1	22.27	<---
	9	0.8	0.905	4132003	2	1.05	1	15.033	<--- Normalized
	10	0.905	1.005	4132003	1	1	1	29.09	<---
	11	1.005	1.105	4132003	1	1	1	25.93	<---
	12	1.105	1.205	4132003	1	1	1	24.49	<---
	13	1.205	1.305	4132003	1	1	1	30.75	<---
	14	1.305	1.405	4132003	1	1	1	26.33	<---
	15	1.405	1.505	4132003	1	1	1	30.41	<---
	16	1.505	1.605	4132003	1	1	1	23.34	<---
	17	1.605	1.705	4132003	1	1	1	23.86	<---
	18	1.705	1.805	4132003	1	1	1	21.26	<---
	19	1.805	1.905	4132003	1	1	1	24.25	<---
	20	1.905	2.005	4132003	1	1	1	29.07	<---
	21	2.005	2.105	4132003	1	1	1	22.5	<---
	22	2.105	2.205	4132003	1	1	1	20.22	<---
	23	2.205	2.305	4132003	1	1	1	20.45	<---
	24	2.305	2.405	4132003	1	1	1	15.3	<---
	25	2.405	2.505	4132003	1	1	1	6.44	<---
	26	2.505	2.605	4132003	1	1	1	3.42	<---
	27	2.605	2.705	4132003	1	1	1	8.04	<---
	28	2.705	2.805	4132003	1	1	1	8.97	<---
	29	2.805	2.905	4132003	1	1	1	9.17	<---
	30	2.905	3.005	4132003	1	1	1	8.72	<---
	31	3.005	3.105	4132003	1	1	1	16.16	<---
	32	3.105	3.205	4132003	1	1	1	16.08	<---
	33	3.205	3.305	4132003	1	1	1	13.98	<---
	34	3.305	3.405	4132003	1	1	1	15.48	<---
	35	3.405	3.505	4132003	1	1	1	11.31	<---
	36	3.505	3.605	4132003	1	1	1	6.41	<---
	37	3.605	3.705	4132003	1	1	1	5.99	<---
	38	3.705	3.805	4132003	1	1	1	10.1	<---
	39	3.805	3.905	4132003	1	1	1	13.52	<---
	40	3.905	4.005	4132003	1	1	1	24.8	<---
	41	4.005	4.105	4132003	1	1	1	23.24	<---
	42	4.105	4.205	4132003	1	1	1	24.19	<---

Table B13 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S106-Y2003 TAPE BMP=00.000		
		5	I94	EB	11017		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-94, CS 11017 JN 38094 BMP: 5.617 EMP: 6.503	43	4.205	4.305	4132003	1	1	1	22.34	<---
	44	4.305	4.405	4132003	1	1	1	22.58	<---
	45	4.405	4.505	4132003	1	1	1	26.58	<---
	46	4.505	4.605	4132003	1	1	1	25.63	<---
	47	4.605	4.705	4132003	1	1	1	27.33	<---
	48	4.705	4.805	4132003	1	1	1	23.35	<---
	49	4.805	4.905	4132003	1	1	1	15.99	<---
	50	4.905	5.005	4132003	1	1	1	18.46	<---
	51	5.005	5.105	4132003	1	1	1	24.73	<---
	52	5.105	5.205	4132003	1	1	1	22.47	<---
	53	5.205	5.305	4132003	1	1	1	23.28	<---
	54	5.305	5.405	4132003	1	1	1	24.43	<---
	55	5.405	5.505	4132003	1	1	1	18.32	<---
	56	5.505	5.605	4132003	1	1	1	15.83	<---
	57	5.605	5.705	4132003	1	1	1	0.66	<---
	58	5.705	5.805	4132003	1	1	1	0	<---
	59	5.805	5.905	4132003	1	1	1	0	<---
	60	5.905	6.005	4132003	1	1	1	0	<---
	61	6.005	6.105	4132003	1	1	1	0	<---
	62	6.105	6.205	4132003	1	1	1	0.16	<---
	63	6.205	6.305	4132003	1	1	1	0	<---
	64	6.305	6.405	4132003	1	1	1	0	<---
	65	6.405	6.505	4132003	1	1	1	0.75	<---
	66	6.505	6.612	4132003	1	1.07	1	1.5514	<--- Normalized

Table B14 The MDOT 2005 pavement DI data for control section 11017 along I-94 NB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S111-Y2005 TAPE BMP=00.000		
		5	I94	EB	11017		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.01	4162005	3	0.1	1	0	<--- Normalized
	2	0.01	0.438	4162005	8	4.28	0	0	<--- Normalized
	3	0.438	0.538	4162005	3	1	1	18.88	<---
	4	0.538	0.638	4162005	3	1	1	21.915	<---
	5	0.638	0.738	4162005	3	1	1	23.21	<---
	6	0.738	0.902	4162005	3	1.64	1	25.366	<--- Normalized
	7	0.902	1.002	4162005	1	1	1	19.3	<---
	8	1.002	1.102	4162005	1	1	1	28.8	<---
	9	1.102	1.202	4162005	1	1	1	31.3	<---
	10	1.202	1.302	4162005	1	1	1	37.98	<---
	11	1.302	1.402	4162005	1	1	1	33.48	<---
	12	1.402	1.502	4162005	1	1	1	31.87	<---
	13	1.502	1.602	4162005	1	1	1	27.61	<---
	14	1.602	1.702	4162005	1	1	1	23.6	<---
	15	1.702	1.802	4162005	1	1	1	29.39	<---
	16	1.802	1.902	4162005	1	1	1	31.1	<---
	17	1.902	2.002	4162005	1	1	1	33.76	<---
	18	2.002	2.102	4162005	1	1	1	29.76	<---
	19	2.102	2.202	4162005	1	1	1	25.1	<---
	20	2.202	2.302	4162005	1	1	1	23	<---
	21	2.302	2.402	4162005	1	1	1	26.12	<---
	22	2.402	2.502	4162005	1	1	1	9.96	<---
	23	2.502	2.602	4162005	1	1	1	7.35	<---
	24	2.602	2.702	4162005	1	1	1	11.09	<---
	25	2.702	2.802	4162005	1	1	1	10.22	<---
	26	2.802	2.902	4162005	1	1	1	14.27	<---
	27	2.902	3.002	4162005	1	1	1	15.06	<---
	28	3.002	3.102	4162005	1	1	1	18.93	<---
	29	3.102	3.202	4162005	1	1	1	17.88	<---
	30	3.202	3.302	4162005	1	1	1	18.85	<---
	31	3.302	3.402	4162005	1	1	1	21.5	<---
	32	3.402	3.502	4162005	1	1	1	14.02	<---
	33	3.502	3.602	4162005	1	1	1	11.01	<---
	34	3.602	3.702	4162005	1	1	1	9.04	<---
	35	3.702	3.802	4162005	1	1	1	14.76	<---
	36	3.802	3.902	4162005	1	1	1	15.85	<---
	37	3.902	4.002	4162005	1	1	1	24.42	<---
	38	4.002	4.102	4162005	1	1	1	22.72	<---
	39	4.102	4.202	4162005	1	1	1	26.77	<---
	40	4.202	4.302	4162005	1	1	1	27.37	<---
	41	4.302	4.402	4162005	1	1	1	29.27	<---
	42	4.402	4.502	4162005	1	1	1	32.55	<---

Table B14 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S111-Y2005 TAPE BMP=00.000		
		5	I94	EB	11017		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	43	4.502	4.602	4162005	1	1	1	29.43	<---
	44	4.602	4.702	4162005	1	1	1	34.46	<---
	45	4.702	4.802	4162005	1	1	1	29.11	<---
	46	4.802	4.902	4162005	1	1	1	19.55	<---
	47	4.902	5.002	4162005	1	1	1	24.89	<---
	48	5.002	5.102	4162005	1	1	1	27.01	<---
	49	5.102	5.202	4162005	1	1	1	22.82	<---
	50	5.202	5.302	4162005	1	1	1	28.84	<---
	51	5.302	5.402	4162005	1	1	1	27.06	<---
	52	5.402	5.502	4162005	1	1	1	24.02	<---
	53	5.502	5.602	4162005	1	1	1	15.1	<---
I-94, CS 11017 JN 38094 BMP: 5.617 EMP: 6.503	54	5.602	5.702	4162005	1	1	1	0.5	<---
	55	5.702	5.802	4162005	1	1	1	0	<---
	56	5.802	5.902	4162005	1	1	1	1.69	<---
	57	5.902	6.002	4162005	1	1	1	0.5	<---
	58	6.002	6.102	4162005	1	1	1	0	<---
	59	6.102	6.202	4162005	1	1	1	2.28	<---
	60	6.202	6.302	4162005	1	1	1	5.64	<---
	61	6.302	6.402	4162005	1	1	1	4.36	<---
	62	6.402	6.599	4162005	1	1.97	1	12.553	<--- Normalized

Table B15 The MDOT 2007 pavement DI data for control section 11017 along I-94 NB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections			
		5	I94	EB	11017		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.1	5/10/2007	3	1	1	16.03	-
	2	0.1	0.2	5/10/2007	3	1	1	17.47	-
	3	0.2	0.3	5/10/2007	3	1	1	22.26	-
	4	0.3	0.4	5/10/2007	3	1	1	32.64	-
	5	0.4	0.5	5/10/2007	3	1	1	24.95	-
	6	0.5	0.6	5/10/2007	3	1	1	21.04	-
	7	0.6	0.7	5/10/2007	3	1	1	16.06	-
	8	0.7	0.898	5/10/2007	3	1.98	1	18.96	Normalized
	9	0.898	0.998	5/10/2007	1	1	1	7.24	-
	10	0.998	1.098	5/10/2007	1	1	1	3.91	-
	11	1.098	1.198	5/10/2007	1	1	1	20.84	-
	12	1.198	1.298	5/10/2007	1	1	1	6.73	-
	13	1.298	1.398	5/10/2007	1	1	1	0.98	-
	14	1.398	1.498	5/10/2007	1	1	1	1.05	-
	15	1.498	1.598	5/10/2007	1	1	1	1.8	-
	16	1.598	1.698	5/10/2007	1	1	1	1.05	-
	17	1.698	1.798	5/10/2007	1	1	1	6.71	-
	18	1.798	1.898	5/10/2007	1	1	1	3.54	-
	19	1.898	1.998	5/10/2007	1	1	1	4.82	-
	20	1.998	2.098	5/10/2007	1	1	1	2.48	-
	21	2.098	2.198	5/10/2007	1	1	1	3.21	-
	22	2.198	2.298	5/10/2007	1	1	1	0.98	-
	23	2.298	2.398	5/10/2007	1	1	1	6.93	-
	24	2.398	2.498	5/10/2007	1	1	1	13.32	-
	25	2.498	2.598	5/10/2007	1	1	1	21.37	-
	26	2.598	2.698	5/10/2007	1	1	1	30.82	-
	27	2.698	2.798	5/10/2007	1	1	1	16.2	-
	28	2.798	2.898	5/10/2007	1	1	1	3.13	-
	29	2.898	2.998	5/10/2007	1	1	1	17.91	-
	30	2.998	3.098	5/10/2007	1	1	1	9.08	-
	31	3.098	3.198	5/10/2007	1	1	1	8.4	-
	32	3.198	3.298	5/10/2007	1	1	1	21.23	-
	33	3.298	3.398	5/10/2007	1	1	1	5.6	-
	34	3.398	3.498	5/10/2007	1	1	1	1.73	-
	35	3.498	3.598	5/10/2007	1	1	1	3.61	-
	36	3.598	3.698	5/10/2007	1	1	1	9.32	-
	37	3.698	3.798	5/10/2007	1	1	1	12.25	-
	38	3.798	3.898	5/10/2007	1	1	1	4.88	-
	39	3.898	3.998	5/10/2007	1	1	1	14.09	-
	40	3.998	4.098	5/10/2007	1	1	1	9.26	-
	41	4.098	4.198	5/10/2007	1	1	1	4.19	-
	42	4.198	4.298	5/10/2007	1	1	1	14.28	-

Table B15 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections			
		5	I94	EB	11017		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	43	4.298	4.398	5/10/2007	1	1	1	14.74	-
	44	4.398	4.498	5/10/2007	1	1	1	3.46	-
	45	4.498	4.598	5/10/2007	1	1	1	4	-
	46	4.598	4.698	5/10/2007	1	1	1	1.25	-
	47	4.698	4.798	5/10/2007	1	1	1	4.47	-
	48	4.798	4.898	5/10/2007	1	1	1	0.5	-
	49	4.898	4.998	5/10/2007	1	1	1	7.44	-
	50	4.998	5.098	5/10/2007	1	1	1	10.69	-
	51	5.098	5.198	5/10/2007	1	1	1	14.7	-
	52	5.198	5.298	5/10/2007	1	1	1	11.3	-
	53	5.298	5.398	5/10/2007	1	1	1	8.88	-
	54	5.398	5.498	5/10/2007	1	1	1	6.12	-
	55	5.498	5.598	5/10/2007	1	1	1	5.02	-
I-94, CS 11017 JN 38094 BMP: 5.617 EMP: 6.503	56	5.598	5.698	5/10/2007	1	1	1	13.7	-
	57	5.698	5.798	5/10/2007	1	1	1	18.44	-
	58	5.798	5.898	5/10/2007	1	1	1	24.96	-
	59	5.898	5.998	5/10/2007	1	1	1	4	-
	60	5.998	6.098	5/10/2007	1	1	1	1.75	-
	61	6.098	6.198	5/10/2007	1	1	1	1.94	-
	62	6.198	6.298	5/10/2007	1	1	1	0.5	-
	63	6.298	6.398	5/10/2007	1	1	1	0.5	-
	64	6.398	6.514	5/10/2007	1	1.16	1	1.08	Normalized
	65	6.514	6.616	5/10/2007	1	1.02	2	98.23	Normalized

Table B16 The MDOT 2001 pavement DI data for control section 12033 along I-69 NB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S339-Y2001 TAPE BMP=00.000		
		5	I69	NB	12033		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-69, CS 12033 JN 45535 BMP: 0.006 EMP: 5.8	1	0	0.1	8042001	1	1	1	0	<---
	2	0.1	0.2	8042001	1	1	1	0	<---
	3	0.2	0.3	8042001	1	1	1	0	<---
	4	0.3	0.4	8042001	1	1	1	0	<---
	5	0.4	0.5	8042001	1	1	1	0	<---
	6	0.5	0.6	8042001	1	1	1	0	<---
	7	0.6	0.7	8042001	1	1	1	0	<---
	8	0.7	0.8	8042001	1	1	1	0	<---
	9	0.8	0.9	8042001	1	1	1	0	<---
	10	0.9	1	8042001	1	1	1	0	<---
	11	1	1.1	8042001	1	1	1	0	<---
	12	1.1	1.2	8042001	1	1	1	0	<---
	13	1.2	1.3	8042001	1	1	1	0	<---
	14	1.3	1.4	8042001	1	1	1	0	<---
	15	1.4	1.5	8042001	1	1	1	0	<---
	16	1.5	1.6	8042001	1	1	1	0	<---
	17	1.6	1.7	8042001	1	1	1	0	<---
	18	1.7	1.8	8042001	1	1	1	0	<---
	19	1.8	1.9	8042001	1	1	1	0	<---
	20	1.9	2	8042001	1	1	1	0	<---
	21	2	2.1	8042001	1	1	1	0	<---
	22	2.1	2.2	8042001	1	1	1	0	<---
	23	2.2	2.3	8042001	1	1	1	0	<---
	24	2.3	2.4	8042001	1	1	1	0	<---
	25	2.4	2.5	8042001	1	1	1	0	<---
	26	2.5	2.6	8042001	1	1	1	0	<---
	27	2.6	2.7	8042001	1	1	1	0	<---
	28	2.7	2.8	8042001	1	1	1	0	<---
	29	2.8	2.9	8042001	1	1	1	0	<---
	30	2.9	3	8042001	1	1	1	0	<---
	31	3	3.1	8042001	1	1	1	0	<---
	32	3.1	3.2	8042001	1	1	1	0	<---
	33	3.2	3.3	8042001	1	1	1	0	<---
	34	3.3	3.4	8042001	1	1	1	0	<---
	35	3.4	3.5	8042001	1	1	1	0	<---
	36	3.5	3.6	8042001	1	1	1	0	<---
	37	3.6	3.7	8042001	1	1	1	0	<---
	38	3.7	3.8	8042001	1	1	1	0	<---
	39	3.8	3.9	8042001	1	1	1	0	<---
	40	3.9	4	8042001	1	1	1	0	<---
	41	4	4.1	8042001	1	1	1	0	<---
	42	4.1	4.2	8042001	1	1	1	0	<---

Table B16 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S339-Y2001 TAPE BMP=00.000		
		5	169	NB	12033		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-69, CS 12033 JN 45535 BMP: 0.006 EMP: 5.8	43	4.2	4.3	8042001	1	1	1	0	<---
	44	4.3	4.4	8042001	1	1	1	0	<---
	45	4.4	4.5	8042001	1	1	1	0	<---
	46	4.5	4.6	8042001	1	1	1	0	<---
	47	4.6	4.7	8042001	1	1	1	0	<---
	48	4.7	4.8	8042001	1	1	1	0	<---
	49	4.8	4.9	8042001	1	1	1	0	<---
	50	4.9	5	8042001	1	1	1	0	<---
	51	5	5.1	8042001	1	1	1	0	<---
	52	5.1	5.2	8042001	1	1	1	0	<---
	53	5.2	5.3	8042001	1	1	1	0	<---
	54	5.3	5.4	8042001	1	1	1	0	<---
	55	5.4	5.5	8042001	1	1	1	0	<---
	56	5.5	5.6	8042001	1	1	1	0	<---
	57	5.6	5.7	8042001	1	1	1	0	<---
	58	5.7	5.8	8042001	1	1	1	0	<---
	59	5.8	5.9	8042001	1	1	1	0	<---
	60	5.9	6	8042001	1	1	1	0	<---
I-69, CS 12033 JN 45877 BMP: 5.8 EMP: 10.81	61	6	6.1	8042001	1	1	1	0	<---
	62	6.1	6.2	8042001	1	1	1	0	<---
	63	6.2	6.3	8042001	1	1	1	0	<---
	64	6.3	6.4	8042001	1	1	1	0	<---
	65	6.4	6.5	8042001	1	1	1	0	<---
	66	6.5	6.6	8042001	1	1	1	0	<---
	67	6.6	6.7	8042001	1	1	1	0	<---
	68	6.7	6.8	8042001	1	1	1	0	<---
	69	6.8	6.9	8042001	1	1	1	0	<---
	70	6.9	7	8042001	1	1	1	0	<---
	71	7	7.1	8042001	1	1	1	0	<---
	72	7.1	7.2	8042001	1	1	1	0	<---
	73	7.2	7.3	8042001	1	1	1	0	<---
	74	7.3	7.4	8042001	1	1	1	0	<---
	75	7.4	7.5	8042001	1	1	1	0	<---
	76	7.5	7.6	8042001	1	1	1	0	<---
	77	7.6	7.7	8042001	1	1	1	0	<---
	78	7.7	7.8	8042001	1	1	1	0	<---
	79	7.8	7.9	8042001	1	1	1	0	<---
	80	7.9	8	8042001	1	1	1	0	<---
	81	8	8.1	8042001	1	1	1	0	<---
	82	8.1	8.2	8042001	1	1	1	0	<---
	83	8.2	8.3	8042001	1	1	1	0	<---
	84	8.3	8.4	8042001	1	1	1	0	<---

Table B15 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S339-Y2001 TAPE BMP=00.000		
		5	I69	NB	12033		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-69, CS 12033 JN 45877 BMP: 5.8 EMP: 10.81	85	8.4	8.5	8042001	1	1	1	0	<---
	86	8.5	8.6	8042001	1	1	1	0	<---
	87	8.6	8.7	8042001	1	1	1	0	<---
	88	8.7	8.8	8042001	1	1	1	0	<---
	89	8.8	8.9	8042001	1	1	1	0	<---
	90	8.9	9	8042001	1	1	1	0	<---
	91	9	9.1	8042001	1	1	1	0	<---
	92	9.1	9.2	8042001	1	1	1	0	<---
	93	9.2	9.3	8042001	1	1	1	0	<---
	94	9.3	9.4	8042001	1	1	1	0	<---
	95	9.4	9.5	8042001	1	1	1	0	<---
	96	9.5	9.6	8042001	1	1	1	0	<---
	97	9.6	9.7	8042001	1	1	1	0	<---
	98	9.7	9.8	8042001	1	1	1	0	<---
	99	9.8	9.9	8042001	1	1	1	0	<---
	100	9.9	10	8042001	1	1	1	0	<---
	101	10	10.1	8042001	1	1	1	0	<---
	102	10.1	10.2	8042001	1	1	1	0	<---
	103	10.2	10.3	8042001	1	1	1	0	<---
	104	10.3	10.4	8042001	1	1	1	0	<---
	105	10.4	10.5	8042001	1	1	1	0	<---
	106	10.5	10.6	8042001	1	1	1	0	<---
	107	10.6	10.7	8042001	1	1	1	0	<---
	108	10.7	10.809	8042001	1	1.09	1	0	<--- Normalized
	109	10.809	10.872	8042001	3	0.63	1	6.222	<--- Normalized
	110	10.872	10.972	8042001	1	1	1	104.09	<---
	111	10.972	11.072	8042001	1	1	1	29.58	<---
I-69, CS 12033 JN 49921 BMP: 10.98 EMP: 12.6	112	11.072	11.172	8042001	1	1	1	35.15	<---
	113	11.172	11.272	8042001	1	1	1	37.21	<---
	114	11.272	11.372	8042001	1	1	1	33.84	<---
	115	11.372	11.472	8042001	1	1	1	53.85	<---
	116	11.472	11.572	8042001	1	1	1	40.23	<---
	117	11.572	11.672	8042001	1	1	1	35.26	<---
	118	11.672	11.772	8042001	1	1	1	31.66	<---
	119	11.772	11.872	8042001	1	1	1	27.68	<---
	120	11.872	11.972	8042001	1	1	1	20.78	<---
	121	11.972	12.072	8042001	1	1	1	29.705	<---
	122	12.072	12.172	8042001	1	1	1	25.02	<---
	123	12.172	12.272	8042001	1	1	1	56.93	<---
	124	12.272	12.413	8042001	1	1.41	1	42.851	<--- Normalized
	125	12.413	12.455	8042001	3	0.42	1	8.3214	<--- Normalized
	126	12.455	12.616	8042001	1	1.61	1	29.435	<--- Normalized

Table B16 The MDOT 2003 pavement DI data for control section 12033 along I-69 NB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S101-Y2003 TAPE BMP=00.000		
		5	I69	NB	12033		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.006	4102003	2	0.06	1	24.167	<--- Normalized
I-69, CS 12033 JN 45535 BMP: 0.006 EMP: 5.8	2	0.006	0.106	4102003	1	1	1	0	<---
	3	0.106	0.206	4102003	1	1	1	0	<---
	4	0.206	0.306	4102003	1	1	1	0	<---
	5	0.306	0.406	4102003	1	1	1	0	<---
	6	0.406	0.506	4102003	1	1	1	0	<---
	7	0.506	0.606	4102003	1	1	1	0	<---
	8	0.606	0.706	4102003	1	1	1	0	<---
	9	0.706	0.806	4102003	1	1	1	0	<---
	10	0.806	0.906	4102003	1	1	1	0	<---
	11	0.906	1.006	4102003	1	1	1	0	<---
	12	1.006	1.106	4102003	1	1	1	0	<---
	13	1.106	1.206	4102003	1	1	1	0	<---
	14	1.206	1.306	4102003	1	1	1	0	<---
	15	1.306	1.406	4102003	1	1	1	0	<---
	16	1.406	1.506	4102003	1	1	1	0	<---
	17	1.506	1.606	4102003	1	1	1	0	<---
	18	1.606	1.706	4102003	1	1	1	0	<---
	19	1.706	1.806	4102003	1	1	1	0	<---
	20	1.806	1.906	4102003	1	1	1	0	<---
	21	1.906	2.006	4102003	1	1	1	0	<---
	22	2.006	2.106	4102003	1	1	1	0	<---
	23	2.106	2.206	4102003	1	1	1	0	<---
	24	2.206	2.306	4102003	1	1	1	0	<---
	25	2.306	2.406	4102003	1	1	1	0.94	<---
	26	2.406	2.506	4102003	1	1	1	0	<---
	27	2.506	2.606	4102003	1	1	1	0	<---
	28	2.606	2.706	4102003	1	1	1	0	<---
	29	2.706	2.806	4102003	1	1	1	0	<---
	30	2.806	2.906	4102003	1	1	1	0	<---
	31	2.906	3.006	4102003	1	1	1	0	<---
	32	3.006	3.106	4102003	1	1	1	0	<---
	33	3.106	3.206	4102003	1	1	1	0	<---
	34	3.206	3.306	4102003	1	1	1	0	<---
	35	3.306	3.406	4102003	1	1	1	0	<---
	36	3.406	3.506	4102003	1	1	1	0	<---
	37	3.506	3.606	4102003	1	1	1	0	<---
	38	3.606	3.706	4102003	1	1	1	0	<---
	39	3.706	3.806	4102003	1	1	1	0	<---
	40	3.806	3.906	4102003	1	1	1	0	<---
	41	3.906	4.006	4102003	1	1	1	0	<---
	42	4.006	4.106	4102003	1	1	1	0	<---

Table B16 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S101-Y2003 TAPE BMP=00.000		
		5	I69	NB	12033		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-69, CS 12033 JN 45535 BMP: 0.006 EMP: 5.8	43	4.106	4.206	4102003	1	1	1	0	<---
	44	4.206	4.306	4102003	1	1	1	0	<---
	45	4.306	4.406	4102003	1	1	1	0	<---
	46	4.406	4.506	4102003	1	1	1	0	<---
	47	4.506	4.606	4102003	1	1	1	0	<---
	48	4.606	4.706	4102003	1	1	1	0	<---
	49	4.706	4.806	4102003	1	1	1	0	<---
	50	4.806	4.906	4102003	1	1	1	0	<---
	51	4.906	5.006	4102003	1	1	1	0	<---
	52	5.006	5.106	4102003	1	1	1	0	<---
	53	5.106	5.206	4102003	1	1	1	0	<---
	54	5.206	5.306	4102003	1	1	1	0	<---
	55	5.306	5.406	4102003	1	1	1	0	<---
	56	5.406	5.506	4102003	1	1	1	0	<---
	57	5.506	5.606	4102003	1	1	1	0.5	<---
	58	5.606	5.706	4102003	1	1	1	0	<---
	59	5.706	5.806	4102003	1	1	1	0	<---
I-69, CS 12033 JN 45877 BMP: 5.8 EMP: 10.81	60	5.806	5.906	4102003	1	1	1	0	<---
	61	5.906	6.006	4102003	1	1	1	0	<---
	62	6.006	6.106	4102003	1	1	1	0	<---
	63	6.106	6.206	4102003	1	1	1	0	<---
	64	6.206	6.306	4102003	1	1	1	0	<---
	65	6.306	6.406	4102003	1	1	1	0	<---
	66	6.406	6.506	4102003	1	1	1	0	<---
	67	6.506	6.606	4102003	1	1	1	0	<---
	68	6.606	6.706	4102003	1	1	1	0	<---
	69	6.706	6.806	4102003	1	1	1	0	<---
	70	6.806	6.906	4102003	1	1	1	0	<---
	71	6.906	7.006	4102003	1	1	1	0	<---
	72	7.006	7.106	4102003	1	1	1	0	<---
	73	7.106	7.206	4102003	1	1	1	0	<---
	74	7.206	7.306	4102003	1	1	1	0	<---
	75	7.306	7.406	4102003	1	1	1	0	<---
	76	7.406	7.506	4102003	1	1	1	0	<---
	77	7.506	7.606	4102003	1	1	1	0	<---
	78	7.606	7.706	4102003	1	1	1	0	<---
	79	7.706	7.806	4102003	1	1	1	0	<---
	80	7.806	7.906	4102003	1	1	1	0	<---
	81	7.906	8.006	4102003	1	1	1	0	<---
	82	8.006	8.106	4102003	1	1	1	0	<---
	83	8.106	8.206	4102003	1	1	1	0	<---
	84	8.206	8.306	4102003	1	1	1	0	<---

Table B16 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S101-Y2003 TAPE BMP=00.000		
		5	169	NB	12033		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-69, CS 12033 JN 45877 BMP: 5.8 EMP: 10.81	85	8.306	8.406	4102003	1	1	1	0	<---
	86	8.406	8.506	4102003	1	1	1	0	<---
	87	8.506	8.606	4102003	1	1	1	0	<---
	88	8.606	8.706	4102003	1	1	1	0	<---
	89	8.706	8.806	4102003	1	1	1	0	<---
	90	8.806	8.906	4102003	1	1	1	0	<---
	91	8.906	9.006	4102003	1	1	1	0	<---
	92	9.006	9.106	4102003	1	1	1	0	<---
	93	9.106	9.206	4102003	1	1	1	0	<---
	94	9.206	9.306	4102003	1	1	1	0	<---
	95	9.306	9.406	4102003	1	1	1	0	<---
	96	9.406	9.506	4102003	1	1	1	1	<---
	97	9.506	9.606	4102003	1	1	1	0	<---
	98	9.606	9.706	4102003	1	1	1	0	<---
	99	9.706	9.806	4102003	1	1	1	0	<---
	100	9.806	9.906	4102003	1	1	1	0	<---
	101	9.906	10.006	4102003	1	1	1	0	<---
	102	10.006	10.106	4102003	1	1	1	0	<---
	103	10.106	10.206	4102003	1	1	1	0	<---
	104	10.206	10.306	4102003	1	1	1	0	<---
	105	10.306	10.406	4102003	1	1	1	0	<---
	106	10.406	10.506	4102003	1	1	1	0	<---
	107	10.506	10.606	4102003	1	1	1	0	<---
	108	10.606	10.706	4102003	1	1	1	0	<---
	109	10.706	10.806	4102003	1	1	1	0	<---
	110	10.806	10.906	4102003	1	1	1	0	<---
I-69, CS 12033 JN 49921 BMP: 10.98 EMP: 12.6	111	10.906	11.006	4102003	1	1	1	0.5	<---
	112	11.006	11.106	4102003	1	1	1	0	<---
	113	11.106	11.206	4102003	1	1	1	0	<---
	114	11.206	11.306	4102003	1	1	1	0	<---
	115	11.306	11.406	4102003	1	1	1	0	<---
	116	11.406	11.506	4102003	1	1	1	0	<---
	117	11.506	11.606	4102003	1	1	1	0	<---
	118	11.606	11.706	4102003	1	1	1	0	<---
	119	11.706	11.806	4102003	1	1	1	0	<---
	120	11.806	11.906	4102003	1	1	1	0	<---
	121	11.906	12.006	4102003	1	1	1	0	<---
	122	12.006	12.106	4102003	1	1	1	0	<---
	123	12.106	12.206	4102003	1	1	1	0	<---
	124	12.206	12.306	4102003	1	1	1	0	<---
	125	12.306	12.406	4102003	1	1	1	1.25	<---
	126	12.406	12.506	4102003	1	1	1	0.5	<---
	127	12.506	12.649	4102003	1	1.43	1	0	<--- Normalized

Table B17 The MDOT 2005 pavement DI data for control section 12033 along I-69 NB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S106-Y2005 TAPE BMP=00.000		
		5	I69	NB	12033		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.005	4122005	3	0.05	1	45	<--- Normalized
I-69, CS 12033 JN 45535 BMP: 0.006 EMP: 5.8	2	0.005	0.105	4122005	1	1	1	0	<---
	3	0.105	0.205	4122005	1	1	1	0	<---
	4	0.205	0.305	4122005	1	1	1	0	<---
	5	0.305	0.405	4122005	1	1	1	0	<---
	6	0.405	0.505	4122005	1	1	1	0	<---
	7	0.505	0.605	4122005	1	1	1	0	<---
	8	0.605	0.705	4122005	1	1	1	0	<---
	9	0.705	0.805	4122005	1	1	1	0	<---
	10	0.805	0.905	4122005	1	1	1	0.12	<---
	11	0.905	1.005	4122005	1	1	1	0.16	<---
	12	1.005	1.105	4122005	1	1	1	0.76	<---
	13	1.105	1.205	4122005	1	1	1	0.12	<---
	14	1.205	1.305	4122005	1	1	1	0.24	<---
	15	1.305	1.405	4122005	1	1	1	0.32	<---
	16	1.405	1.505	4122005	1	1	1	0.72	<---
	17	1.505	1.605	4122005	1	1	1	0.24	<---
	18	1.605	1.705	4122005	1	1	1	0.56	<---
	19	1.705	1.805	4122005	1	1	1	0	<---
	20	1.805	1.905	4122005	1	1	1	0	<---
	21	1.905	2.005	4122005	1	1	1	0	<---
	22	2.005	2.105	4122005	1	1	1	0	<---
	23	2.105	2.205	4122005	1	1	1	0	<---
	24	2.205	2.305	4122005	1	1	1	0.12	<---
	25	2.305	2.405	4122005	1	1	1	0.84	<---
	26	2.405	2.505	4122005	1	1	1	0	<---
	27	2.505	2.605	4122005	1	1	1	0	<---
	28	2.605	2.705	4122005	1	1	1	0.5	<---
	29	2.705	2.805	4122005	1	1	1	0	<---
	30	2.805	2.905	4122005	1	1	1	0	<---
	31	2.905	3.005	4122005	1	1	1	0	<---
	32	3.005	3.105	4122005	1	1	1	0	<---
	33	3.105	3.205	4122005	1	1	1	0.16	<---
	34	3.205	3.305	4122005	1	1	1	0	<---
	35	3.305	3.405	4122005	1	1	1	0.32	<---
	36	3.405	3.505	4122005	1	1	1	0.44	<---
	37	3.505	3.605	4122005	1	1	1	0.64	<---
	38	3.605	3.705	4122005	1	1	1	0.16	<---
	39	3.705	3.805	4122005	1	1	1	0.32	<---
	40	3.805	3.905	4122005	1	1	1	0.12	<---
	41	3.905	4.005	4122005	1	1	1	0	<---
	42	4.005	4.105	4122005	1	1	1	0.16	<---

Table B17 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S106-Y2005 TAPE BMP=00.000		
		5	I69	NB	12033		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-69, CS 12033 JN 45535 BMP: 0.006 EMP: 5.8	43	4.105	4.205	4122005	1	1	1	0	<---
	44	4.205	4.305	4122005	1	1	1	0	<---
	45	4.305	4.405	4122005	1	1	1	0	<---
	46	4.405	4.505	4122005	1	1	1	0	<---
	47	4.505	4.605	4122005	1	1	1	0	<---
	48	4.605	4.705	4122005	1	1	1	0	<---
	49	4.705	4.805	4122005	1	1	1	0	<---
	50	4.805	4.905	4122005	1	1	1	0.16	<---
	51	4.905	5.005	4122005	1	1	1	0	<---
	52	5.005	5.105	4122005	1	1	1	0	<---
	53	5.105	5.205	4122005	1	1	1	0	<---
	54	5.205	5.305	4122005	1	1	1	0	<---
	55	5.305	5.405	4122005	1	1	1	0	<---
	56	5.405	5.505	4122005	1	1	1	0	<---
	57	5.505	5.605	4122005	1	1	1	2	<---
	58	5.605	5.705	4122005	1	1	1	0	<---
	59	5.705	5.805	4122005	1	1	1	0	<---
I-69, CS 12033 JN 45877 BMP: 5.8 EMP: 10.81	60	5.805	5.905	4122005	1	1	1	0	<---
	61	5.905	6.005	4122005	1	1	1	0	<---
	62	6.005	6.105	4122005	1	1	1	0	<---
	63	6.105	6.205	4122005	1	1	1	0.24	<---
	64	6.205	6.305	4122005	1	1	1	0	<---
	65	6.305	6.405	4122005	1	1	1	0.2	<---
	66	6.405	6.505	4122005	1	1	1	0	<---
	67	6.505	6.605	4122005	1	1	1	0	<---
	68	6.605	6.705	4122005	1	1	1	0	<---
	69	6.705	6.805	4122005	1	1	1	0	<---
	70	6.805	6.905	4122005	1	1	1	0	<---
	71	6.905	7.005	4122005	1	1	1	0	<---
	72	7.005	7.105	4122005	1	1	1	0.5	<---
	73	7.105	7.205	4122005	1	1	1	0.4	<---
	74	7.205	7.305	4122005	1	1	1	0	<---
	75	7.305	7.405	4122005	1	1	1	0	<---
	76	7.405	7.505	4122005	1	1	1	0	<---
	77	7.505	7.605	4122005	1	1	1	0	<---
	78	7.605	7.705	4122005	1	1	1	0	<---
	79	7.705	7.805	4122005	1	1	1	0	<---
	80	7.805	7.905	4122005	1	1	1	0	<---
	81	7.905	8.005	4122005	1	1	1	0	<---
	82	8.005	8.105	4122005	1	1	1	0	<---
	83	8.105	8.205	4122005	1	1	1	0	<---
	84	8.205	8.305	4122005	1	1	1	0	<---

Table B17 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S106-Y2005 TAPE BMP=00.000		
		5	I69	NB	12033		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-69, CS 12033 JN 45877 BMP: 5.8 EMP: 10.81	85	8.305	8.405	4122005	1	1	1	0	<---
	86	8.405	8.505	4122005	1	1	1	0	<---
	87	8.505	8.605	4122005	1	1	1	0	<---
	88	8.605	8.705	4122005	1	1	1	0	<---
	89	8.705	8.805	4122005	1	1	1	0	<---
	90	8.805	8.905	4122005	1	1	1	0	<---
	91	8.905	9.005	4122005	1	1	1	0	<---
	92	9.005	9.105	4122005	1	1	1	0	<---
	93	9.105	9.205	4122005	1	1	1	0	<---
	94	9.205	9.305	4122005	1	1	1	0	<---
	95	9.305	9.405	4122005	1	1	1	0	<---
	96	9.405	9.505	4122005	1	1	1	0	<---
	97	9.505	9.605	4122005	1	1	1	0	<---
	98	9.605	9.705	4122005	1	1	1	0	<---
	99	9.705	9.805	4122005	1	1	1	0	<---
	100	9.805	9.905	4122005	1	1	1	0.24	<---
	101	9.905	10.005	4122005	1	1	1	0	<---
	102	10.005	10.105	4122005	1	1	1	0.5	<---
	103	10.105	10.205	4122005	1	1	1	0.12	<---
	104	10.205	10.305	4122005	1	1	1	0.32	<---
	105	10.305	10.405	4122005	1	1	1	0	<---
	106	10.405	10.505	4122005	1	1	1	0	<---
	107	10.505	10.605	4122005	1	1	1	0	<---
	108	10.605	10.705	4122005	1	1	1	0.4	<---
	109	10.705	10.805	4122005	1	1	1	0	<---
	110	10.805	10.905	4122005	1	1	1	0.16	<---
I-69, CS 12033 JN 49921 BMP: 10.98 EMP: 12.6	111	10.905	11.005	4122005	1	1	1	0	<---
	112	11.005	11.105	4122005	1	1	1	0	<---
	113	11.105	11.205	4122005	1	1	1	0	<---
	114	11.205	11.305	4122005	1	1	1	0	<---
	115	11.305	11.405	4122005	1	1	1	0	<---
	116	11.405	11.505	4122005	1	1	1	0	<---
	117	11.505	11.605	4122005	1	1	1	0	<---
	118	11.605	11.705	4122005	1	1	1	0.36	<---
	119	11.705	11.805	4122005	1	1	1	0.12	<---
	120	11.805	11.905	4122005	1	1	1	1.4	<---
	121	11.905	12.005	4122005	1	1	1	0	<---
	122	12.005	12.105	4122005	1	1	1	0	<---
	123	12.105	12.205	4122005	1	1	1	1.32	<---
	124	12.205	12.305	4122005	1	1	1	0.24	<---
	125	12.305	12.405	4122005	1	1	1	1.5	<---
	126	12.405	12.603	4122005	1	1.98	1	1.3434	<--- Normalized
	127	12.603	12.611	4122005	3	0.08	1	0.5	<--- Normalized

Table B18 The MDOT 2007 pavement DI data for control section 12033 along I-69 NB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections			
		5	I69	NB	12033		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-69, CS 12033 JN 45535 BMP: 0.006 EMP: 5.8	1	0	0.1	5/7/2007	1	1	1	0	-
	2	0.1	0.2	5/7/2007	1	1	1	0	-
	3	0.2	0.3	5/7/2007	1	1	1	0	-
	4	0.3	0.4	5/7/2007	1	1	1	0	-
	5	0.4	0.5	5/7/2007	1	1	1	0	-
	6	0.5	0.6	5/7/2007	1	1	1	0.5	-
	7	0.6	0.7	5/7/2007	1	1	1	0.5	-
	8	0.7	0.8	5/7/2007	1	1	1	0	-
	9	0.8	0.9	5/7/2007	1	1	1	0.5	-
	10	0.9	1	5/7/2007	1	1	1	0.5	-
	11	1	1.1	5/7/2007	1	1	1	0.5	-
	12	1.1	1.2	5/7/2007	1	1	1	0.5	-
	13	1.2	1.3	5/7/2007	1	1	1	0	-
	14	1.3	1.4	5/7/2007	1	1	1	0	-
	15	1.4	1.5	5/7/2007	1	1	1	0	-
	16	1.5	1.6	5/7/2007	1	1	1	0	-
	17	1.6	1.7	5/7/2007	1	1	1	0.52	-
	18	1.7	1.8	5/7/2007	1	1	1	0	-
	19	1.8	1.9	5/7/2007	1	1	1	0	-
	20	1.9	2	5/7/2007	1	1	1	0	-
	21	2	2.1	5/7/2007	1	1	1	0.5	-
	22	2.1	2.2	5/7/2007	1	1	1	0	-
	23	2.2	2.3	5/7/2007	1	1	1	0	-
	24	2.3	2.4	5/7/2007	1	1	1	0.04	-
	25	2.4	2.5	5/7/2007	1	1	1	0	-
	26	2.5	2.6	5/7/2007	1	1	1	0	-
	27	2.6	2.7	5/7/2007	1	1	1	0	-
	28	2.7	2.8	5/7/2007	1	1	1	0	-
	29	2.8	2.9	5/7/2007	1	1	1	0	-
	30	2.9	3	5/7/2007	1	1	1	0	-
	31	3	3.1	5/7/2007	1	1	1	0	-
	32	3.1	3.2	5/7/2007	1	1	1	0	-
	33	3.2	3.3	5/7/2007	1	1	1	0	-
	34	3.3	3.4	5/7/2007	1	1	1	0	-
	35	3.4	3.5	5/7/2007	1	1	1	0	-
	36	3.5	3.6	5/7/2007	1	1	1	0	-
	37	3.6	3.7	5/7/2007	1	1	1	0	-
	38	3.7	3.8	5/7/2007	1	1	1	0	-
	39	3.8	3.9	5/7/2007	1	1	1	0	-
	40	3.9	4	5/7/2007	1	1	1	0	-
	41	4	4.1	5/7/2007	1	1	1	0	-
	42	4.1	4.2	5/7/2007	1	1	1	0	-

Table B18 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections			
		5	I69	NB	12033		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-69, CS 12033 JN 45535 BMP: 0.006 EMP: 5.8	43	4.2	4.3	5/7/2007	1	1	1	0	-
	44	4.3	4.4	5/7/2007	1	1	1	0	-
	45	4.4	4.5	5/7/2007	1	1	1	0	-
	46	4.5	4.6	5/7/2007	1	1	1	0	-
	47	4.6	4.7	5/7/2007	1	1	1	0	-
	48	4.7	4.8	5/7/2007	1	1	1	0	-
	49	4.8	4.9	5/7/2007	1	1	1	2	-
	50	4.9	5	5/7/2007	1	1	1	0	-
	51	5	5.1	5/7/2007	1	1	1	0	-
	52	5.1	5.2	5/7/2007	1	1	1	0.94	-
	53	5.2	5.3	5/7/2007	1	1	1	0.04	-
	54	5.3	5.4	5/7/2007	1	1	1	0	-
	55	5.4	5.5	5/7/2007	1	1	1	0	-
	56	5.5	5.6	5/7/2007	1	1	1	6.965	-
	57	5.6	5.7	5/7/2007	1	1	1	0	-
	58	5.7	5.8	5/7/2007	1	1	1	0	-
I-69, CS 12033 JN 45877 BMP: 5.8 EMP: 10.81	59	5.8	5.9	5/7/2007	1	1	1	0.5	-
	60	5.9	6	5/7/2007	1	1	1	0.5	-
	61	6	6.1	5/7/2007	1	1	1	0	-
	62	6.1	6.2	5/7/2007	1	1	1	0	-
	63	6.2	6.3	5/7/2007	1	1	1	0.5	-
	64	6.3	6.4	5/7/2007	1	1	1	0	-
	65	6.4	6.5	5/7/2007	1	1	1	1.88	-
	66	6.5	6.6	5/7/2007	1	1	1	1.67	-
	67	6.6	6.7	5/7/2007	1	1	1	0	-
	68	6.7	6.8	5/7/2007	1	1	1	0	-
	69	6.8	6.9	5/7/2007	1	1	1	0	-
	70	6.9	7	5/7/2007	1	1	1	0	-
	71	7	7.1	5/7/2007	1	1	1	0	-
	72	7.1	7.2	5/7/2007	1	1	1	0.94	-
	73	7.2	7.3	5/7/2007	1	1	1	0	-
	74	7.3	7.4	5/7/2007	1	1	1	0.08	-
	75	7.4	7.5	5/7/2007	1	1	1	0.12	-
	76	7.5	7.6	5/7/2007	1	1	1	0	-
	77	7.6	7.7	5/7/2007	1	1	1	0	-
	78	7.7	7.8	5/7/2007	1	1	1	0	-
	79	7.8	7.9	5/7/2007	1	1	1	0	-
	80	7.9	8	5/7/2007	1	1	1	0.5	-
	81	8	8.1	5/7/2007	1	1	1	0	-
	82	8.1	8.2	5/7/2007	1	1	1	0	-
	83	8.2	8.3	5/7/2007	1	1	1	0	-
	84	8.3	8.4	5/7/2007	1	1	1	0.5	-

Table B18 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections			
		5	I69	NB	12033		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-69, CS 12033 JN 45877 BMP: 5.8 EMP: 10.81	85	8.4	8.5	5/7/2007	1	1	1	0	-
	86	8.5	8.6	5/7/2007	1	1	1	0	-
	87	8.6	8.7	5/7/2007	1	1	1	1.44	-
	88	8.7	8.8	5/7/2007	1	1	1	3.5	-
	89	8.8	8.9	5/7/2007	1	1	1	0	-
	90	8.9	9	5/7/2007	1	1	1	0	-
	91	9	9.1	5/7/2007	1	1	1	0.24	-
	92	9.1	9.2	5/7/2007	1	1	1	0	-
	93	9.2	9.3	5/7/2007	1	1	1	0.5	-
	94	9.3	9.4	5/7/2007	1	1	1	0	-
	95	9.4	9.5	5/7/2007	1	1	1	0	-
	96	9.5	9.6	5/7/2007	1	1	1	0	-
	97	9.6	9.7	5/7/2007	1	1	1	0	-
	98	9.7	9.8	5/7/2007	1	1	1	0.5	-
	99	9.8	9.9	5/7/2007	1	1	1	0.5	-
	100	9.9	10	5/7/2007	1	1	1	0.12	-
	101	10	10.1	5/7/2007	1	1	1	0	-
	102	10.1	10.2	5/7/2007	1	1	1	0.16	-
	103	10.2	10.3	5/7/2007	1	1	1	0	-
	104	10.3	10.4	5/7/2007	1	1	1	0	-
	105	10.4	10.5	5/7/2007	1	1	1	0	-
	106	10.5	10.6	5/7/2007	1	1	1	0	-
	107	10.6	10.7	5/7/2007	1	1	1	0	-
	108	10.7	10.8	5/7/2007	1	1	1	0	-
	109	10.8	10.9	5/7/2007	1	1	1	0	-
	110	10.9	11	5/7/2007	1	1	1	3.79	-
I-69, CS 12033 JN 49921 BMP: 10.98 EMP: 12.6	111	11	11.1	5/7/2007	1	1	1	0	-
	112	11.1	11.2	5/7/2007	1	1	1	0	-
	113	11.2	11.3	5/7/2007	1	1	1	0.5	-
	114	11.3	11.4	5/7/2007	1	1	1	0	-
	115	11.4	11.5	5/7/2007	1	1	1	0.5	-
	116	11.5	11.6	5/7/2007	1	1	1	0	-
	117	11.6	11.7	5/7/2007	1	1	1	0	-
	118	11.7	11.8	5/7/2007	1	1	1	0.54	-
	119	11.8	11.9	5/7/2007	1	1	1	0.5	-
	120	11.9	12	5/7/2007	1	1	1	0	-
	121	12	12.1	5/7/2007	1	1	1	0.16	-
	122	12.1	12.2	5/7/2007	1	1	1	0	-
	123	12.2	12.3	5/7/2007	1	1	1	0	-
	124	12.3	12.4	5/7/2007	1	1	1	7.89	-
	125	12.4	12.5	5/7/2007	1	1	1	8.81	-
	126	12.5	12.607	5/7/2007	1	1.07	1	6.297	Normalized

Table B19 The MDOT 1999 pavement DI data for control section 47065 along I-96 EB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=99-32-08 TAPE BMP=00.000		
		8	I96	EB	47065		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.1	5011999	1	1	1	1.07	<---
	2	0.1	0.2	5011999	1	1	1	0	<---
	3	0.2	0.3	5011999	1	1	1	0.5	<---
	4	0.3	0.4	5011999	1	1	1	1.14	<---
	5	0.4	0.5	5011999	1	1	1	0.72	<---
	6	0.5	0.6	5011999	1	1	1	0.98	<---
	7	0.6	0.7	5011999	1	1	1	0	<---
	8	0.7	0.8	5011999	1	1	1	0.75	<---
	9	0.8	0.926	5011999	1	1.26	1	0	<--- Normalized
	10	0.926	1.026	5011999	1	1	2	0	<---
	11	1.026	1.13	5011999	1	1.04	2	0	<--- Normalized
	12	1.13	1.23	5011999	1	1	3	0	<---
	13	1.23	1.33	5011999	1	1	3	0	<---
	14	1.33	1.475	5011999	1	1.45	3	0	<--- Normalized
	15	1.475	1.482	5011999	7	0.07	0	0	<--- Normalized
	16	1.482	1.582	5011999	1	1	3	0	<---
	17	1.582	1.682	5011999	1	1	3	0.75	<---
	18	1.682	1.782	5011999	1	1	3	0	<---
	19	1.782	1.882	5011999	1	1	3	0	<---
	20	1.882	1.982	5011999	1	1	3	0	<---
	21	1.982	2.082	5011999	1	1	3	0	<---
	22	2.082	2.182	5011999	1	1	3	0.16	<---
	23	2.182	2.282	5011999	1	1	3	0	<---
	24	2.282	2.382	5011999	1	1	3	0	<---
	25	2.382	2.482	5011999	1	1	3	0	<---
	26	2.482	2.582	5011999	1	1	3	0.48	<---
	27	2.582	2.712	5011999	1	1.3	3	0.1231	<--- Normalized
	28	2.712	2.759	5011999	1	0.47	2	0	<--- Normalized
	29	2.759	2.859	5011999	1	1	1	0	<---
	30	2.859	2.959	5011999	1	1	1	0	<---
	31	2.959	3.059	5011999	1	1	1	0	<---
	32	3.059	3.159	5011999	1	1	1	0	<---
	33	3.159	3.259	5011999	1	1	1	0	<---
	34	3.259	3.359	5011999	1	1	1	0.64	<---
	35	3.359	3.459	5011999	1	1	1	2.5	<---
	36	3.459	3.559	5011999	1	1	1	0	<---
	37	3.559	3.659	5011999	1	1	1	0	<---
	38	3.659	3.759	5011999	1	1	1	0	<---
	39	3.759	3.859	5011999	1	1	1	0.16	<---
	40	3.859	3.959	5011999	1	1	1	0	<---
	41	3.959	4.059	5011999	1	1	1	1.21	<---
	42	4.059	4.159	5011999	1	1	1	0	<---

Table B19 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=99-32-08 TAPE BMP=00.000		
		8	I96	EB	47065		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	43	4.159	4.259	5011999	1	1	1	0	<---
	44	4.259	4.359	5011999	1	1	1	0	<---
	45	4.359	4.459	5011999	1	1	1	0.75	<---
	46	4.459	4.559	5011999	1	1	1	0.75	<---
	47	4.559	4.659	5011999	1	1	1	0	<---
	48	4.659	4.845	5011999	1	1.86	1	1.4677	<--- Normalized
	49	4.845	4.871	5011999	7	0.26	0	0	<--- Normalized
	50	4.871	4.971	5011999	1	1	1	0	<---
	51	4.971	5.071	5011999	1	1	1	1	<---
	52	5.071	5.171	5011999	1	1	1	0	<---
	53	5.171	5.271	5011999	1	1	1	0	<---
	54	5.271	5.371	5011999	1	1	1	0	<---
	55	5.371	5.471	5011999	1	1	1	0	<---
	56	5.471	5.571	5011999	1	1	1	0.75	<---
	57	5.571	5.671	5011999	1	1	1	0.75	<---
I-96, CS 47065 JN 28215 BMP: 5.671 EMP: 9.2	58	5.671	5.771	5011999	1	1	1	0	<---
	59	5.771	5.871	5011999	1	1	1	0	<---
	60	5.871	5.971	5011999	1	1	1	0	<---
	61	5.971	6.071	5011999	1	1	1	0	<---
	62	6.071	6.264	5011999	1	1.93	1	0	<--- Normalized
	63	6.264	6.302	5011999	7	0.38	0	0	<--- Normalized
	64	6.302	6.402	5011999	1	1	1	0	<---
	65	6.402	6.502	5011999	1	1	1	0	<---
	66	6.502	6.602	5011999	1	1	1	0	<---
	67	6.602	6.702	5011999	1	1	1	0	<---
	68	6.702	6.802	5011999	1	1	1	0	<---
	69	6.802	6.902	5011999	1	1	1	0	<---
	70	6.902	7.002	5011999	1	1	1	0	<---
	71	7.002	7.102	5011999	1	1	1	0	<---
	72	7.102	7.202	5011999	1	1	1	0	<---
	73	7.202	7.302	5011999	1	1	1	0	<---
	74	7.302	7.402	5011999	1	1	1	0	<---
	75	7.402	7.502	5011999	1	1	1	0	<---
	76	7.502	7.602	5011999	1	1	1	0	<---
	77	7.602	7.702	5011999	1	1	1	0	<---
	78	7.702	7.802	5011999	1	1	1	0	<---
	79	7.802	7.902	5011999	1	1	1	0.16	<---
	80	7.902	8.002	5011999	1	1	1	0	<---
	81	8.002	8.102	5011999	1	1	1	0	<---
	82	8.102	8.202	5011999	1	1	1	0	<---
	83	8.202	8.302	5011999	1	1	1	0	<---
	84	8.302	8.402	5011999	1	1	1	1	<---

Table B19 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=99-32-08 TAPE BMP=00.000		
		8	I96	EB	47065		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-96, CS 47065 JN 28215 BMP: 5.671 EMP: 9.2	85	8.402	8.502	5011999	1	1	1	0	<---
	86	8.502	8.602	5011999	1	1	1	0	<---
	87	8.602	8.702	5011999	1	1	1	0	<---
	88	8.702	8.802	5011999	1	1	1	0	<---
	89	8.802	8.902	5011999	1	1	1	0	<---
	90	8.902	9.002	5011999	1	1	1	0	<---
	91	9.002	9.102	5011999	1	1	1	0	<---
	92	9.102	9.202	5011999	1	1	1	1	<---
	93	9.202	9.302	5011999	1	1	1	0	<---
	94	9.302	9.402	5011999	1	1	1	0	<---
	95	9.402	9.502	5011999	1	1	1	0.16	<---
	96	9.502	9.602	5011999	1	1	1	0	<---
	97	9.602	9.702	5011999	1	1	1	0	<---
	98	9.702	9.802	5011999	1	1	1	0	<---
	99	9.802	9.902	5011999	1	1	1	1.07	<---
	100	9.902	10.002	5011999	1	1	1	0	<---
	101	10.002	10.102	5011999	1	1	1	0	<---
	102	10.102	10.202	5011999	1	1	1	0	<---
	103	10.202	10.302	5011999	1	1	1	0	<---
	104	10.302	10.402	5011999	1	1	1	0.16	<---
	105	10.402	10.502	5011999	1	1	1	0	<---
	106	10.502	10.602	5011999	1	1	1	0	<---
	107	10.602	10.702	5011999	1	1	1	0	<---
	108	10.702	10.802	5011999	1	1	1	0	<---
	109	10.802	10.902	5011999	1	1	1	0	<---
	110	10.902	11.002	5011999	1	1	1	0.16	<---
	111	11.002	11.102	5011999	1	1	1	0	<---
	112	11.102	11.202	5011999	1	1	1	0	<---
	113	11.202	11.302	5011999	1	1	1	0	<---
	114	11.302	11.402	5011999	1	1	1	1.21	<---
	115	11.402	11.502	5011999	1	1	1	0	<---
	116	11.502	11.602	5011999	1	1	1	1.8	<---
	117	11.602	11.702	5011999	1	1	1	0.16	<---
	118	11.702	11.837	5011999	1	1.35	1	1.548	<--- Normalized
	119	11.837	11.869	5011999	7	0.32	0	0	<--- Normalized
	120	11.869	11.969	5011999	1	1	1	0.75	<---
	121	11.969	12.069	5011999	1	1	1	0	<---
	122	12.069	12.169	5011999	1	1	1	0.32	<---
	123	12.169	12.269	5011999	1	1	1	0.48	<---
	124	12.269	12.369	5011999	1	1	1	0	<---
	125	12.369	12.469	5011999	1	1	1	0	<---
	126	12.469	12.569	5011999	1	1	1	0	<---

Table B19 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=99-32-08 TAPE BMP=00.000		
		8	I96	EB	47065		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	127	12.569	12.669	5011999	1	1	1	0.16	<---
	128	12.669	12.769	5011999	1	1	1	0	<---
	129	12.769	12.869	5011999	1	1	1	0.32	<---
	130	12.869	12.969	5011999	1	1	1	0	<---
	131	12.969	13.069	5011999	1	1	1	0.16	<---
	132	13.069	13.169	5011999	1	1	1	0	<---
	133	13.169	13.269	5011999	1	1	1	0	<---
	134	13.269	13.369	5011999	1	1	1	0	<---
	135	13.369	13.469	5011999	1	1	1	0	<---
	136	13.469	13.569	5011999	1	1	1	0.94	<---
	137	13.569	13.669	5011999	1	1	1	0	<---
	138	13.669	13.769	5011999	1	1	1	0.32	<---
	139	13.769	13.869	5011999	1	1	1	28.42	<---
	140	13.869	13.969	5011999	1	1	1	37.94	<---
	141	13.969	14.098	5011999	1	1.29	1	17.721	<--- Normalized
	142	14.098	14.116	5011999	3	0.18	1	0.889	<--- Normalized
	143	14.116	14.144	5011999	7	0.28	0	0	<--- Normalized
	144	14.144	14.16	5011999	3	0.16	1	4.125	<--- Normalized
	145	14.16	14.277	5011999	1	1.17	1	20.137	<--- Normalized
	146	14.277	14.291	5011999	3	0.14	1	37.429	<--- Normalized
	147	14.291	14.294	5011999	7	0.03	0	0	<--- Normalized

Table B20 The MDOT 2001 pavement DI data for control section 47065 along I-96 EB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S325-Y2001 TAPE BMP=00.000		
		8	196	EB	47065		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.1	7262001	1	1	1	2.25	<---
	2	0.1	0.2	7262001	1	1	1	0	<---
	3	0.2	0.3	7262001	1	1	1	0.25	<---
	4	0.3	0.4	7262001	1	1	1	0	<---
	5	0.4	0.5	7262001	1	1	1	1.69	<---
	6	0.5	0.6	7262001	1	1	1	0	<---
	7	0.6	0.7	7262001	1	1	1	0.75	<---
	8	0.7	0.8	7262001	1	1	1	0.75	<---
	9	0.8	0.9	7262001	1	1	1	0.25	<---
	10	0.9	1	7262001	1	1	1	0	<---
	11	1	1.1	7262001	1	1	1	0	<---
	12	1.1	1.2	7262001	1	1	1	0	<---
	13	1.2	1.3	7262001	1	1	1	1.73	<---
	14	1.3	1.4	7262001	1	1	1	1.25	<---
	15	1.4	1.5	7262001	1	1	1	5.69	<---
	16	1.5	1.6	7262001	1	1	1	0	<---
	17	1.6	1.7	7262001	1	1	1	0	<---
	18	1.7	1.8	7262001	1	1	1	0	<---
	19	1.8	1.9	7262001	1	1	1	0	<---
	20	1.9	2	7262001	1	1	1	0	<---
	21	2	2.1	7262001	1	1	1	0	<---
	22	2.1	2.2	7262001	1	1	1	0.75	<---
	23	2.2	2.3	7262001	1	1	1	0.25	<---
	24	2.3	2.4	7262001	1	1	1	0	<---
	25	2.4	2.5	7262001	1	1	1	0.75	<---
	26	2.5	2.6	7262001	1	1	1	0	<---
	27	2.6	2.7	7262001	1	1	1	0	<---
	28	2.7	2.8	7262001	1	1	1	0	<---
	29	2.8	2.9	7262001	1	1	1	0	<---
	30	2.9	3	7262001	1	1	1	0	<---
	31	3	3.1	7262001	1	1	1	0	<---
	32	3.1	3.2	7262001	1	1	1	2	<---
	33	3.2	3.3	7262001	1	1	1	4.25	<---
	34	3.3	3.4	7262001	1	1	1	2.8	<---
	35	3.4	3.5	7262001	1	1	1	1	<---
	36	3.5	3.6	7262001	1	1	1	0	<---
	37	3.6	3.7	7262001	1	1	1	1.69	<---
	38	3.7	3.8	7262001	1	1	1	0	<---
	39	3.8	3.9	7262001	1	1	1	0	<---
	40	3.9	4	7262001	1	1	1	0	<---
	41	4	4.1	7262001	1	1	1	0	<---
	42	4.1	4.2	7262001	1	1	1	0	<---

Table B20 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S325-Y2001 TAPE BMP=00.000		
		8	I96	EB	47065		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-96, CS 47065 JN 28215 BMP: 5.671 EMP: 9.2	43	4.2	4.3	7262001	1	1	1	0	<---
	44	4.3	4.4	7262001	1	1	1	0	<---
	45	4.4	4.5	7262001	1	1	1	0	<---
	46	4.5	4.6	7262001	1	1	1	0	<---
	47	4.6	4.7	7262001	1	1	1	0	<---
	48	4.7	4.8	7262001	1	1	1	1.99	<---
	49	4.8	4.9	7262001	1	1	1	0	<---
	50	4.9	5	7262001	1	1	1	0	<---
	51	5	5.1	7262001	1	1	1	0	<---
	52	5.1	5.2	7262001	1	1	1	1.5	<---
	53	5.2	5.3	7262001	1	1	1	0.75	<---
	54	5.3	5.4	7262001	1	1	1	0.08	<---
	55	5.4	5.5	7262001	1	1	1	0.75	<---
	56	5.5	5.6	7262001	1	1	1	2.25	<---
	57	5.6	5.7	7262001	1	1	1	0	<---
	58	5.7	5.8	7262001	1	1	1	2.5	<---
	59	5.8	5.9	7262001	1	1	1	1.5	<---
	60	5.9	6	7262001	1	1	1	1	<---
	61	6	6.1	7262001	1	1	1	0	<---
	62	6.1	6.2	7262001	1	1	1	3	<---
	63	6.2	6.3	7262001	1	1	1	0.75	<---
	64	6.3	6.4	7262001	1	1	1	0	<---
	65	6.4	6.5	7262001	1	1	1	1.5	<---
	66	6.5	6.6	7262001	1	1	1	0	<---
	67	6.6	6.7	7262001	1	1	1	0.5	<---
	68	6.7	6.8	7262001	1	1	1	0	<---
	69	6.8	6.9	7262001	1	1	1	0	<---
	70	6.9	7	7262001	1	1	1	0	<---
	71	7	7.1	7262001	1	1	1	3	<---
	72	7.1	7.2	7262001	1	1	1	2.25	<---
	73	7.2	7.3	7262001	1	1	1	0.25	<---
	74	7.3	7.4	7262001	1	1	1	0	<---
	75	7.4	7.5	7262001	1	1	1	0.75	<---
	76	7.5	7.6	7262001	1	1	1	0	<---
	77	7.6	7.7	7262001	1	1	1	0	<---
	78	7.7	7.8	7262001	1	1	1	11.5	<---
	79	7.8	7.9	7262001	1	1	1	6	<---
	80	7.9	8	7262001	1	1	1	2.75	<---
	81	8	8.1	7262001	1	1	1	9.75	<---
	82	8.1	8.2	7262001	1	1	1	8	<---
	83	8.2	8.3	7262001	1	1	1	3.75	<---
	84	8.3	8.4	7262001	1	1	1	0	<---

Table B20 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S325-Y2001 TAPE BMP=00.000		
		8	I96	EB	47065		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-96, CS 47065 JN 28215 BMP: 5.671 EMP: 9.2	85	8.4	8.5	7262001	1	1	1	1	<---
	86	8.5	8.6	7262001	1	1	1	3.5	<---
	87	8.6	8.7	7262001	1	1	1	1	<---
	88	8.7	8.8	7262001	1	1	1	0	<---
	89	8.8	8.9	7262001	1	1	1	0	<---
	90	8.9	9	7262001	1	1	1	0	<---
	91	9	9.1	7262001	1	1	1	0	<---
	92	9.1	9.2	7262001	1	1	1	1.75	<---
	93	9.2	9.3	7262001	1	1	1	0	<---
	94	9.3	9.4	7262001	1	1	1	0	<---
	95	9.4	9.5	7262001	1	1	1	0	<---
	96	9.5	9.6	7262001	1	1	1	0	<---
	97	9.6	9.7	7262001	1	1	1	0	<---
	98	9.7	9.8	7262001	1	1	1	0.75	<---
	99	9.8	9.9	7262001	1	1	1	0	<---
	100	9.9	10	7262001	1	1	1	0	<---
	101	10	10.1	7262001	1	1	1	0	<---
	102	10.1	10.2	7262001	1	1	1	0	<---
	103	10.2	10.3	7262001	1	1	1	0	<---
	104	10.3	10.4	7262001	1	1	1	0	<---
	105	10.4	10.5	7262001	1	1	1	0	<---
	106	10.5	10.6	7262001	1	1	1	0	<---
	107	10.6	10.7	7262001	1	1	1	0	<---
	108	10.7	10.8	7262001	1	1	1	0	<---
	109	10.8	10.9	7262001	1	1	1	0	<---
	110	10.9	11	7262001	1	1	1	0	<---
	111	11	11.1	7262001	1	1	1	0	<---
	112	11.1	11.2	7262001	1	1	1	0	<---
	113	11.2	11.3	7262001	1	1	1	0	<---
	114	11.3	11.4	7262001	1	1	1	0.58	<---
	115	11.4	11.5	7262001	1	1	1	3	<---
	116	11.5	11.6	7262001	1	1	1	0	<---
	117	11.6	11.7	7262001	1	1	1	0	<---
	118	11.7	11.8	7262001	1	1	1	6.09	<---
	119	11.8	11.9	7262001	1	1	1	0	<---
	120	11.9	12	7262001	1	1	1	0	<---
	121	12	12.1	7262001	1	1	1	0.5	<---
	122	12.1	12.2	7262001	1	1	1	0	<---
	123	12.2	12.3	7262001	1	1	1	0.5	<---
	124	12.3	12.4	7262001	1	1	1	0	<---
	125	12.4	12.5	7262001	1	1	1	1	<---
	126	12.5	12.6	7262001	1	1	1	0.5	<---

Table B20 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S325-Y2001 TAPE BMP=00.000		
		8	I96	EB	47065		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	127	12.6	12.7	7262001	1	1	1	0.5	<---
	128	12.7	12.8	7262001	1	1	1	2	<---
	129	12.8	12.9	7262001	1	1	1	2	<---
	130	12.9	13	7262001	1	1	1	2.5	<---
	131	13	13.1	7262001	1	1	1	0.5	<---
	132	13.1	13.2	7262001	1	1	1	0	<---
	133	13.2	13.3	7262001	1	1	1	0.75	<---
	134	13.3	13.4	7262001	1	1	1	0	<---
	135	13.4	13.5	7262001	1	1	1	0	<---
	136	13.5	13.66	7262001	1	1.6	1	0.3125	<--- Normalized
	137	13.66	13.668	7262001	3	0.08	1	0	<--- Normalized
	138	13.668	13.768	7262001	1	1	1	38.17	<---
	139	13.768	13.868	7262001	1	1	1	44.86	<---
	140	13.868	13.991	7262001	1	1.23	1	18.049	<--- Normalized
	141	13.991	14.055	7262001	3	0.64	1	18.484	<--- Normalized
	142	14.055	14.168	7262001	1	1.13	1	23.867	<--- Normalized
	143	14.168	14.182	7262001	3	0.14	1	33.357	<--- Normalized
	144	14.182	14.211	7262001	1	0.29	1	37.862	<--- Normalized
	145	14.211	14.224	7262001	3	0.13	1	53.923	<--- Normalized
	146	14.224	14.293	7262001	1	0.69	1	26.493	<--- Normalized

Table B21 The MDOT 2003 pavement DI data for control section 47065 along I-96 EB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S170-Y2003 TAPE BMP=00.000		
		8	I96	EB	47065		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.1	6012003	1	1	1	0.75	<---
	2	0.1	0.2	6012003	1	1	1	0.5	<---
	3	0.2	0.3	6012003	1	1	1	0.16	<---
	4	0.3	0.4	6012003	1	1	1	1.75	<---
	5	0.4	0.5	6012003	1	1	1	1	<---
	6	0.5	0.6	6012003	1	1	1	2.44	<---
	7	0.6	0.7	6012003	1	1	1	0	<---
	8	0.7	0.8	6012003	1	1	1	0.25	<---
	9	0.8	0.9	6012003	1	1	1	2.38	<---
	10	0.9	1	6012003	1	1	1	0.49	<---
	11	1	1.1	6012003	1	1	1	0.94	<---
	12	1.1	1.2	6012003	1	1	1	0	<---
	13	1.2	1.3	6012003	1	1	1	0.75	<---
	14	1.3	1.4	6012003	1	1	1	1.52	<---
	15	1.4	1.5	6012003	1	1	1	3.94	<---
	16	1.5	1.6	6012003	1	1	1	4.85	<---
	17	1.6	1.7	6012003	1	1	1	4.5	<---
	18	1.7	1.8	6012003	1	1	1	0.5	<---
	19	1.8	1.9	6012003	1	1	1	7.82	<---
	20	1.9	2	6012003	1	1	1	6.32	<---
	21	2	2.1	6012003	1	1	1	3.16	<---
	22	2.1	2.2	6012003	1	1	1	1.5	<---
	23	2.2	2.3	6012003	1	1	1	0.75	<---
	24	2.3	2.4	6012003	1	1	1	1.25	<---
	25	2.4	2.5	6012003	1	1	1	4.16	<---
	26	2.5	2.6	6012003	1	1	1	2.44	<---
	27	2.6	2.7	6012003	1	1	1	5.66	<---
	28	2.7	2.8	6012003	1	1	1	8.32	<---
	29	2.8	2.9	6012003	1	1	1	1.5	<---
	30	2.9	3	6012003	1	1	1	4.5	<---
	31	3	3.1	6012003	1	1	1	14.48	<---
	32	3.1	3.2	6012003	1	1	1	5.41	<---
	33	3.2	3.3	6012003	1	1	1	6.1	<---
	34	3.3	3.4	6012003	1	1	1	7.73	<---
	35	3.4	3.5	6012003	1	1	1	10.34	<---
	36	3.5	3.6	6012003	1	1	1	3.5	<---
	37	3.6	3.7	6012003	1	1	1	4.36	<---
	38	3.7	3.8	6012003	1	1	1	1.66	<---
	39	3.8	3.9	6012003	1	1	1	1	<---
	40	3.9	4	6012003	1	1	1	5.66	<---
	41	4	4.1	6012003	1	1	1	0	<---
	42	4.1	4.2	6012003	1	1	1	0.5	<---

Table B21 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S170-Y2003 TAPE BMP=00.000		
		8	196	EB	47065		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-96, CS 47065 JN 28215 BMP: 5.671 EMP: 9.2	43	4.2	4.3	6012003	1	1	1	0.5	<---
	44	4.3	4.4	6012003	1	1	1	2.06	<---
	45	4.4	4.5	6012003	1	1	1	0	<---
	46	4.5	4.6	6012003	1	1	1	0	<---
	47	4.6	4.7	6012003	1	1	1	0.5	<---
	48	4.7	4.8	6012003	1	1	1	0.5	<---
	49	4.8	4.9	6012003	1	1	1	23.37	<---
	50	4.9	5	6012003	1	1	1	0.82	<---
	51	5	5.1	6012003	1	1	1	0	<---
	52	5.1	5.2	6012003	1	1	1	0	<---
	53	5.2	5.3	6012003	1	1	1	1.25	<---
	54	5.3	5.4	6012003	1	1	1	1.25	<---
	55	5.4	5.5	6012003	1	1	1	2.08	<---
	56	5.5	5.6	6012003	1	1	1	3.75	<---
	57	5.6	5.7	6012003	1	1	1	3.69	<---
	58	5.7	5.8	6012003	1	1	1	8.75	<---
	59	5.8	5.9	6012003	1	1	1	7.75	<---
	60	5.9	6	6012003	1	1	1	5.25	<---
	61	6	6.1	6012003	1	1	1	6.5	<---
	62	6.1	6.2	6012003	1	1	1	2	<---
	63	6.2	6.3	6012003	1	1	1	8.66	<---
	64	6.3	6.4	6012003	1	1	1	12.75	<---
	65	6.4	6.5	6012003	1	1	1	12.94	<---
	66	6.5	6.6	6012003	1	1	1	6	<---
	67	6.6	6.7	6012003	1	1	1	8	<---
	68	6.7	6.8	6012003	1	1	1	7.75	<---
	69	6.8	6.9	6012003	1	1	1	4	<---
	70	6.9	7	6012003	1	1	1	2.5	<---
	71	7	7.1	6012003	1	1	1	11.5	<---
	72	7.1	7.2	6012003	1	1	1	15.13	<---
	73	7.2	7.3	6012003	1	1	1	11.88	<---
	74	7.3	7.4	6012003	1	1	1	7.75	<---
	75	7.4	7.5	6012003	1	1	1	1.5	<---
	76	7.5	7.6	6012003	1	1	1	6.75	<---
	77	7.6	7.7	6012003	1	1	1	3.25	<---
	78	7.7	7.8	6012003	1	1	1	6	<---
	79	7.8	7.9	6012003	1	1	1	21.68	<---
	80	7.9	8	6012003	1	1	1	10.75	<---
	81	8	8.1	6012003	1	1	1	18.1	<---
	82	8.1	8.2	6012003	1	1	1	15.94	<---
	83	8.2	8.3	6012003	1	1	1	19.44	<---
	84	8.3	8.4	6012003	1	1	1	8.94	<---

Table B21 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S170-Y2003 TAPE BMP=00.000		
		8	I96	EB	47065		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-96, CS 47065 JN 28215 BMP: 5.671 EMP: 9.2	85	8.4	8.5	6012003	1	1	1	2.5	<---
	86	8.5	8.6	6012003	1	1	1	11.94	<---
	87	8.6	8.7	6012003	1	1	1	11	<---
	88	8.7	8.8	6012003	1	1	1	9.69	<---
	89	8.8	8.9	6012003	1	1	1	4	<---
	90	8.9	9	6012003	1	1	1	11	<---
	91	9	9.1	6012003	1	1	1	5.69	<---
	92	9.1	9.2	6012003	1	1	1	4.44	<---
	93	9.2	9.3	6012003	1	1	1	5.5	<---
	94	9.3	9.4	6012003	1	1	1	0	<---
	95	9.4	9.5	6012003	1	1	1	1	<---
	96	9.5	9.6	6012003	1	1	1	0	<---
	97	9.6	9.7	6012003	1	1	1	0	<---
	98	9.7	9.8	6012003	1	1	1	0	<---
	99	9.8	9.9	6012003	1	1	1	0	<---
	100	9.9	10	6012003	1	1	1	0	<---
	101	10	10.1	6012003	1	1	1	0	<---
	102	10.1	10.2	6012003	1	1	1	0	<---
	103	10.2	10.3	6012003	1	1	1	0	<---
	104	10.3	10.4	6012003	1	1	1	0	<---
	105	10.4	10.5	6012003	1	1	1	0	<---
	106	10.5	10.6	6012003	1	1	1	0	<---
	107	10.6	10.7	6012003	1	1	1	0	<---
	108	10.7	10.8	6012003	1	1	1	0	<---
	109	10.8	10.9	6012003	1	1	1	0	<---
	110	10.9	11	6012003	1	1	1	0	<---
	111	11	11.1	6012003	1	1	1	0	<---
	112	11.1	11.2	6012003	1	1	1	0	<---
	113	11.2	11.3	6012003	1	1	1	0.5	<---
	114	11.3	11.4	6012003	1	1	1	2.25	<---
	115	11.4	11.5	6012003	1	1	1	2.5	<---
	116	11.5	11.6	6012003	1	1	1	4.93	<---
	117	11.6	11.7	6012003	1	1	1	0	<---
	118	11.7	11.8	6012003	1	1	1	0.5	<---
	119	11.8	11.9	6012003	1	1	1	5.94	<---
	120	11.9	12	6012003	1	1	1	0	<---
	121	12	12.1	6012003	1	1	1	0	<---
	122	12.1	12.2	6012003	1	1	1	1	<---
	123	12.2	12.3	6012003	1	1	1	0	<---
	124	12.3	12.4	6012003	1	1	1	0.5	<---
	125	12.4	12.5	6012003	1	1	1	0	<---
	126	12.5	12.6	6012003	1	1	1	1	<---

Table B21 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S170-Y2003 TAPE BMP=00.000		
		8	I96	EB	47065		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	127	12.6	12.7	6012003	1	1	1	1.5	<---
	128	12.7	12.8	6012003	1	1	1	1	<---
	129	12.8	12.9	6012003	1	1	1	2.5	<---
	130	12.9	13	6012003	1	1	1	3.5	<---
	131	13	13.1	6012003	1	1	1	2.5	<---
	132	13.1	13.2	6012003	1	1	1	1.5	<---
	133	13.2	13.3	6012003	1	1	1	0	<---
	134	13.3	13.4	6012003	1	1	1	1.44	<---
	135	13.4	13.5	6012003	1	1	1	0	<---
	136	13.5	13.6	6012003	1	1	1	1	<---
	137	13.6	13.755	6012003	1	1.55	1	0.645	<--- Normalized
	138	13.755	13.763	6012003	2	0.08	1	4	<--- Normalized
	139	13.763	13.863	6012003	1	1	1	45.29	<---
	140	13.863	13.963	6012003	1	1	1	54.04	<---
	141	13.963	14.085	6012003	1	1.22	1	18.566	<--- Normalized
	142	14.085	14.148	6012003	2	0.63	1	23.651	<--- Normalized
	143	14.148	14.265	6012003	1	1.17	1	22.214	<--- Normalized
	144	14.265	14.272	6012003	2	0.07	1	26.429	<--- Normalized

Table B22 The MDOT 2005 pavement DI data for control section 47065 along I-96 EB

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S102-Y2005 TAPE BMP=00.000		
		8	I96	EB	47065		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	1	0	0.1	4/11/2005	1	1	1	2.7	<---
	2	0.1	0.2	4/11/2005	1	1	1	2.49	<---
	3	0.2	0.3	4/11/2005	1	1	1	1.16	<---
	4	0.3	0.4	4/11/2005	1	1	1	1	<---
	5	0.4	0.5	4/11/2005	1	1	1	0.75	<---
	6	0.5	0.6	4/11/2005	1	1	1	2.63	<---
	7	0.6	0.7	4/11/2005	1	1	1	0	<---
	8	0.7	0.8	4/11/2005	1	1	1	0.25	<---
	9	0.8	0.9	4/11/2005	1	1	1	1.26	<---
	10	0.9	1	4/11/2005	1	1	1	2.53	<---
	11	1	1.1	4/11/2005	1	1	1	1.69	<---
	12	1.1	1.2	4/11/2005	1	1	1	0	<---
	13	1.2	1.3	4/11/2005	1	1	1	0.75	<---
	14	1.3	1.4	4/11/2005	1	1	1	2.5	<---
	15	1.4	1.5	4/11/2005	1	1	1	7.5	<---
	16	1.5	1.6	4/11/2005	1	1	1	1	<---
	17	1.6	1.7	4/11/2005	1	1	1	0	<---
	18	1.7	1.8	4/11/2005	1	1	1	0.75	<---
	19	1.8	1.9	4/11/2005	1	1	1	0	<---
	20	1.9	2	4/11/2005	1	1	1	0	<---
	21	2	2.1	4/11/2005	1	1	1	0	<---
	22	2.1	2.2	4/11/2005	1	1	1	0	<---
	23	2.2	2.3	4/11/2005	1	1	1	0.94	<---
	24	2.3	2.4	4/11/2005	1	1	1	0.08	<---
	25	2.4	2.5	4/11/2005	1	1	1	0	<---
	26	2.5	2.6	4/11/2005	1	1	1	0.94	<---
	27	2.6	2.7	4/11/2005	1	1	1	0	<---
	28	2.7	2.8	4/11/2005	1	1	1	0.94	<---
	29	2.8	2.9	4/11/2005	1	1	1	0.75	<---
	30	2.9	3	4/11/2005	1	1	1	0	<---
	31	3	3.1	4/11/2005	1	1	1	0.75	<---
	32	3.1	3.2	4/11/2005	1	1	1	0.83	<---
	33	3.2	3.3	4/11/2005	1	1	1	13.1	<---
	34	3.3	3.4	4/11/2005	1	1	1	8.84	<---
	35	3.4	3.5	4/11/2005	1	1	1	2.27	<---
	36	3.5	3.6	4/11/2005	1	1	1	0.94	<---
	37	3.6	3.7	4/11/2005	1	1	1	6.38	<---
	38	3.7	3.8	4/11/2005	1	1	1	0.75	<---
	39	3.8	3.9	4/11/2005	1	1	1	0	<---
	40	3.9	4	4/11/2005	1	1	1	0	<---
	41	4	4.1	4/11/2005	1	1	1	0	<---
	42	4.1	4.2	4/11/2005	1	1	1	1.73	<---

Table B22 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S102-Y2005 TAPE BMP=00.000		
		8	I96	EB	47065		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	43	4.2	4.3	4112005	1	1	1	0	<---
	44	4.3	4.4	4112005	1	1	1	1.18	<---
	45	4.4	4.5	4112005	1	1	1	0.94	<---
	46	4.5	4.6	4112005	1	1	1	0	<---
	47	4.6	4.7	4112005	1	1	1	1.16	<---
	48	4.7	4.8	4112005	1	1	1	0.75	<---
	49	4.8	4.9	4112005	1	1	1	16.64	<---
	50	4.9	5	4112005	1	1	1	0.16	<---
	51	5	5.1	4112005	1	1	1	0	<---
	52	5.1	5.2	4112005	1	1	1	0.75	<---
	53	5.2	5.3	4112005	1	1	1	2.49	<---
	54	5.3	5.4	4112005	1	1	1	1.44	<---
	55	5.4	5.5	4112005	1	1	1	0	<---
	56	5.5	5.6	4112005	1	1	1	4.36	<---
I-96, CS 47065 JN 28215 BMP: 5.671 EMP: 9.2	57	5.6	5.7	4112005	1	1	1	9.38	<---
	58	5.7	5.8	4112005	1	1	1	23.68	<---
	59	5.8	5.9	4112005	1	1	1	20.32	<---
	60	5.9	6	4112005	1	1	1	16.63	<---
	61	6	6.1	4112005	1	1	1	10.11	<---
	62	6.1	6.2	4112005	1	1	1	14.13	<---
	63	6.2	6.3	4112005	1	1	1	19.8	<---
	64	6.3	6.4	4112005	1	1	1	30.93	<---
	65	6.4	6.5	4112005	1	1	1	25.54	<---
	66	6.5	6.6	4112005	1	1	1	18.8	<---
	67	6.6	6.7	4112005	1	1	1	25.82	<---
	68	6.7	6.8	4112005	1	1	1	26.17	<---
	69	6.8	6.9	4112005	1	1	1	23.5	<---
	70	6.9	7	4112005	1	1	1	21.32	<---
	71	7	7.1	4112005	1	1	1	25.96	<---
	72	7.1	7.2	4112005	1	1	1	25.83	<---
	73	7.2	7.3	4112005	1	1	1	21.67	<---
	74	7.3	7.4	4112005	1	1	1	16.33	<---
	75	7.4	7.5	4112005	1	1	1	4.69	<---
	76	7.5	7.6	4112005	1	1	1	22.26	<---
	77	7.6	7.7	4112005	1	1	1	21.83	<---
	78	7.7	7.8	4112005	1	1	1	17.24	<---
	79	7.8	7.9	4112005	1	1	1	26.23	<---
	80	7.9	8	4112005	1	1	1	22.95	<---
	81	8	8.1	4112005	1	1	1	24.05	<---
	82	8.1	8.2	4112005	1	1	1	21	<---
	83	8.2	8.3	4112005	1	1	1	23.55	<---
	84	8.3	8.4	4112005	1	1	1	19.78	<---

Table B22 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S102-Y2005 TAPE BMP=00.000		
		8	I96	EB	47065		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
I-96, CS 47065 JN 28215 BMP: 5.671 EMP: 9.2	85	8.4	8.5	4112005	1	1	1	15.4	<---
	86	8.5	8.6	4112005	1	1	1	23.22	<---
	87	8.6	8.7	4112005	1	1	1	22.67	<---
	88	8.7	8.8	4112005	1	1	1	20.21	<---
	89	8.8	8.9	4112005	1	1	1	18.25	<---
	90	8.9	9	4112005	1	1	1	19.71	<---
	91	9	9.1	4112005	1	1	1	13.69	<---
	92	9.1	9.2	4112005	1	1	1	15.05	<---
	93	9.2	9.3	4112005	1	1	1	2.75	<---
	94	9.3	9.4	4112005	1	1	1	0	<---
	95	9.4	9.5	4112005	1	1	1	0	<---
	96	9.5	9.6	4112005	1	1	1	0	<---
	97	9.6	9.7	4112005	1	1	1	0	<---
	98	9.7	9.8	4112005	1	1	1	0	<---
	99	9.8	9.9	4112005	1	1	1	0	<---
	100	9.9	10	4112005	1	1	1	0	<---
	101	10	10.1	4112005	1	1	1	0	<---
	102	10.1	10.2	4112005	1	1	1	0	<---
	103	10.2	10.3	4112005	1	1	1	0	<---
	104	10.3	10.4	4112005	1	1	1	0	<---
	105	10.4	10.5	4112005	1	1	1	0	<---
	106	10.5	10.6	4112005	1	1	1	0	<---
	107	10.6	10.7	4112005	1	1	1	0	<---
	108	10.7	10.8	4112005	1	1	1	0	<---
	109	10.8	10.9	4112005	1	1	1	0	<---
	110	10.9	11	4112005	1	1	1	0	<---
	111	11	11.1	4112005	1	1	1	0	<---
	112	11.1	11.2	4112005	1	1	1	0	<---
	113	11.2	11.3	4112005	1	1	1	0	<---
	114	11.3	11.4	4112005	1	1	1	0	<---
	115	11.4	11.5	4112005	1	1	1	2.94	<---
	116	11.5	11.6	4112005	1	1	1	3	<---
	117	11.6	11.7	4112005	1	1	1	0	<---
	118	11.7	11.8	4112005	1	1	1	1.48	<---
	119	11.8	11.9	4112005	1	1	1	3.52	<---
	120	11.9	12	4112005	1	1	1	0	<---
	121	12	12.1	4112005	1	1	1	0	<---
	122	12.1	12.2	4112005	1	1	1	1	<---
	123	12.2	12.3	4112005	1	1	1	0	<---
	124	12.3	12.4	4112005	1	1	1	0.5	<---
	125	12.4	12.5	4112005	1	1	1	0.5	<---
	126	12.5	12.6	4112005	1	1	1	0	<---

Table B22 (cont'd)

Project	Count	Region	Route	Direction	CS	Number of 0.1 mile sections	TAPE ID=S102-Y2005 TAPE BMP=00.000		
		8	I96	EB	47065		Survey Lane	DI	Normalized to 0.1 mile DI values
		BMP	EMP	Survey Date	Pav't Type				
	127	12.6	12.7	4112005	1	1	1	0	<---
	128	12.7	12.8	4112005	1	1	1	0.5	<---
	129	12.8	12.9	4112005	1	1	1	3.5	<---
	130	12.9	13	4112005	1	1	1	4.5	<---
	131	13	13.1	4112005	1	1	1	2	<---
	132	13.1	13.2	4112005	1	1	1	0	<---
	133	13.2	13.3	4112005	1	1	1	0.94	<---
	134	13.3	13.4	4112005	1	1	1	1.94	<---
	135	13.4	13.5	4112005	1	1	1	0	<---
	136	13.5	13.6	4112005	1	1	1	0	<---
	137	13.6	13.719	4112005	1	1.19	1	0.420	<--- Normalized
	138	13.719	13.819	4112005	3	1	1	13.25	<---
	139	13.819	13.919	4112005	3	1	1	11.78	<---
	140	13.919	14.019	4112005	3	1	1	13.99	<---
	141	14.019	14.119	4112005	3	1	1	17.04	<---
	142	14.119	14.255	4112005	3	1.36	1	12.471	<--- Normalized

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