#581

Joint Legislative Committee on Performance Evaluation and Expenditure Review (PEER)

Report to
the Mississippi Legislature

Mississippi Department of Transportation: A Review of Departmental Accountability and Transparency

Although the Mississippi Department of Transportation should improve its accountability and transparency, it has been proactive in taking steps in the right direction, including documenting some of its decisionmaking processes and assessing the state's needs regarding highway construction and maintenance.

MDOT conducts a well-developed assessment to show its transportation system needs; however, MDOT has not yet fully developed performance measures for all of its system goals so that system-wide progress can be tracked over time. In terms of efficiency, MDOT has some efficiency-related indicators; however, relative to other states, MDOT has room for improvement in measuring departmental efficiency. The best measures of internal efficiency would focus on operations under MDOT's control.

MDOT has no department-wide effort to analyze its workforce in relation to its current and future workload. However, MDOT is in the process of creating and refining measures to track workload information for its 195 professional engineers. MDOT struggles to recruit and retain engineers due to the salary level being significantly less than what an engineer would earn at a private firm. As a result, MDOT contracts out many engineering functions due to lack of personnel or lack of in-house specialized skill sets (e. g., bridge design). According to MDOT staff and various studies, contracting out engineering work always costs more than performing those functions in-house.

MDOT collects most of the data needed in order to select and prioritize projects based on need. However, in some cases, MDOT was unable to document the selection and prioritization process used in the past to justify projects on its prioritized lists. MDOT has begun using decisionmaking software for new capacity projects that could provide a well-documented system for its selection and prioritization processes; however, the department has not established a timeline for using this software or other tools (e. g., matrices) that includes a disciplined way of accounting for both quantitative and qualitative elements in the decisionmaking process for prioritizing all types of projects. Also, MDOT's five-year plan does not provide sufficient transparency to show how projects change from year to year.

January 6, 2014

PEER: The Mississippi Legislature's Oversight Agency

The Mississippi Legislature created the Joint Legislative Committee on Performance Evaluation and Expenditure Review (PEER Committee) by statute in 1973. A joint committee, the PEER Committee is composed of seven members of the House of Representatives appointed by the Speaker and seven members of the Senate appointed by the Lieutenant Governor. Appointments are made for four-year terms, with one Senator and one Representative appointed from each of the U. S. Congressional Districts and three at-large members appointed from each house. Committee officers are elected by the membership, with officers alternating annually between the two houses. All Committee actions by statute require a majority vote of four Representatives and four Senators voting in the affirmative.

Mississippi's constitution gives the Legislature broad power to conduct examinations and investigations. PEER is authorized by law to review any public entity, including contractors supported in whole or in part by public funds, and to address any issues that may require legislative action. PEER has statutory access to all state and local records and has subpoena power to compel testimony or the production of documents.

PEER provides a variety of services to the Legislature, including program evaluations, economy and efficiency reviews, financial audits, limited scope evaluations, fiscal notes, special investigations, briefings to individual legislators, testimony, and other governmental research and assistance. The Committee identifies inefficiency or ineffectiveness or a failure to accomplish legislative objectives, and makes recommendations for redefinition, redirection, redistribution and/or restructuring of Mississippi government. As directed by and subject to the prior approval of the PEER Committee, the Committee's professional staff executes audit and evaluation projects obtaining information and developing options for consideration by the Committee. The PEER Committee releases reports to the Legislature, Governor, Lieutenant Governor, and the agency examined.

The Committee assigns top priority to written requests from individual legislators and legislative committees. The Committee also considers PEER staff proposals and written requests from state officials and others.

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January 6, 2014

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Members of the Mississippi State Legislature

On January 6, 2014, the PEER Committee authorized release of the report entitled **Mississippi Department of Transportation: A Review of Departmental Accountability and Transparency**.

Representative Ray Rogers, Chair

This report does not recommend increased funding or additional staff.

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Executive Summary

Introduction

Studies show that the funding available for transportation is not sufficient to meet Mississippi's highway, road, and bridge needs. In light of the increasing need for expenditures to repair or maintain the state's roads and bridges, MDOT must be as accountable, transparent, and efficient as possible with the funding it receives.

National data shows that transportation system needs exceed the funding allocated and state data indicates that the same is true in Mississippi.

- MDOT allocates approximately $150 million annually to pavement projects, but estimates that an estimated $1 billion would be needed to repair pavement to an acceptable condition and $400 million would be needed annually to maintain pavement in good condition.
- MDOT allocates from $50 million to $80 million annually to bridge projects, but estimates that $2.7 billion would be needed to repair or replace bridges and $200 million annually would enable replacement of all currently deficient bridges in a timely manner and guarantee maintenance and repair of all bridges in the state system.

MDOT's Operating Environment

Mississippi's Transportation Governance Model

State departments of transportation employ various types of governance models. Most state departments of transportation are governed by a secretary, commissioner, or director, as well as a policymaking board or commission, which is the model that governs MDOT. However, Mississippi's model is unique in that its transportation commissioners are elected. Consequently, MDOT's decisions or the decisions of its commissioners are susceptible to political influence.

According to research, states can limit political influence on transportation policy through certain best practices (e.g., avoiding geographic representation by commissioners). PEER also contends that sufficient transparency in decisionmaking would help reduce political influence or the appearance of political influence by assuring stakeholders that decisions are data-driven rather than being politically driven.

MDOT's Staff Resources and Equipment

Eighty-six percent of MDOT's 3,460 employees work in MDOT's maintenance and construction programs. MDOT's maintenance program activities are primarily performed by in-house staff. MDOT's construction program activities are performed by contractors who are responsible for actual construction, in-house staff who perform various activities (e. g., planning, design, right-of-way acquisition), and contracted staff who perform a portion of MDOT's engineer work.

Of its 3,460 employees, MDOT has 195 engineers with the Professional Engineer credential and an additional 83 engineers-in-training who work under the supervision of the professional engineers. Many of MDOT's professional engineers perform administrative and oversight duties rather than working on projects (e. g., performing road or bridge design work). Engineers-in-training comprise thirty percent of MDOT's engineering staff and represent a relatively inexperienced group of engineers.

According to the State Auditor's Property Division, MDOT's heavy equipment inventory includes over 7,000 vehicles and other equipment. Of that, according to MDOT, its roadworking inventory includes 1,257 pieces of equipment, including 645 tractors.

Senate Bill 2917, 2012 Regular Session, mandated a moratorium on vehicle purchases for FY 2013 and a fleet reduction of two percent per year from July 1, 2012, to June 30, 2016, by all agencies with more than fifty vehicles. Subsequently, MDOT officials contracted with a consulting firm to review its equipment management processes and systems. The consultant's report was due to be released in mid-December 2013.*

* On December 20, 2013, PEER staff received a copy of the Dye Management Group's report, "Equipment Management Review: Final Recommendation Report." PEER will provide members of the Legislature with an analytical summary of the report as soon as practicable. **[NOTE: The Dye Management Group report and the PEER analytical summary are now available.]**

Comparison of MDOT's Budget to Those of Other State Transportation Departments

Comparison with Contiguous States' Receipts

MDOT's total receipts for FY 2012 were approximately $1.3 billion. Of the group of states including Mississippi and its contiguous states, this was the second lowest amount. Departments of transportation in the contiguous states had receipts ranging from approximately $1 billion in Arkansas to approximately $2 billion in Tennessee. All five states received a similar ratio of federal, state, and other sources for FY 2012.

Comparison with Contiguous States' Disbursements

For FY 2011, Mississippi disbursements per mile were below the median in all four program areas: capital outlay (road and bridge), maintenance, administration, and enforcement. Also, the percentage of funds Mississippi distributed among the four program areas did not appear out of line with other states. Thus, PEER's analysis showed that Mississippi is not an outlier in terms of amounts disbursed per mile or the percentage of funds disbursed among the four categories.

How MDOT Spends Its Money

For FY 2013, seventy-two percent of MDOT's expenditures (approximately $794 million) were for the construction program, which consists of both pre-construction and construction activities. Of construction program expenditures, new capacity and system preservation and maintenance project activities accounted for $499 million.

Comparison of MDOT and Other State Departments of Transportation on Measuring System Performance and Efficiency

Accountability for Performance

MDOT conducts a well-developed needs assessment to show its transportation system needs and has established broad goals for system performance, which are generally the same across states. However, MDOT has fallen behind other states by not fully developing and reporting on performance measures for each of its system goals.

Regarding regularly reported measures of system performance, state departments of transportation annually report data related to bridge conditions, road conditions,

and fatalities to the Federal Highway Administration. This data allows for studying trends and making comparisons on three important measures of system performance that relate to MDOT's safety and maintenance/preservation goals. For two of the three measures, Mississippi has improved its performance at a faster rate than contiguous states.

- From 1992 to 2010, Mississippi showed more progress than its contiguous states in decreasing its percentage of deficient bridges. In 2010, Mississippi performed better than the national average on bridge conditions.
- For 2004 to 2009, Mississippi followed the national trend showing a relatively consistent percentage of roadways in mediocre or poor condition across those years. Compared to its contiguous states, Mississippi is in the middle for its road conditions.
- Mississippi's rate of highway traffic fatalities and the rates of contiguous states have historically been above the national average. However, from 1993 to 2010, Mississippi showed more progress in decreasing its highway traffic fatalities than did its contiguous states.

Regarding other performance measurement and reporting, a 2011 report by the Pew Center on the States and the Rockefeller Foundation rated Mississippi as one of nineteen states "trailing behind" other states in measuring transportation system performance in six key areas (e. g., safety, jobs and commerce, mobility, access, environmental stewardship, and infrastructure preservation). MDOT has not made sufficient progress in fully implementing its performance measures for each of its system-wide goals so that system-wide progress can be tracked over time.

Also, although MDOT's 2013 stewardship agreement with the Federal Highway Administration outlines performance measures for MDOT's construction program, these measures are in the initial stages of development.

Accountability for Efficiency

MDOT has some efficiency-related measures, but they are limited in determining the efficiency of departmental operations. Relative to other states, MDOT has room for improvement in measuring its own efficiency. The best measures of efficiency would focus on operations under MDOT's control.

MDOT's Decisionmaking Process for Ensuring Efficiency and Management of Workload

MDOT's Accountability for Its Staff in Relation to Workload

While individual divisions (e. g., Maintenance) may evaluate staffing in relation to workload needs, MDOT has no department-wide effort to analyze its workforce in relation to its current and future workload. Such an analysis would include determining the department's optimal size and the most efficient combination of full-time employees, temporary workers, and contract services to achieve MDOT's mission.

How MDOT Accounts for Its Engineering Staff

MDOT provided PEER with project workload information that accounts for roughly 7.6% of its in-house engineers. The primary concern is that the majority of engineers' workload is not tracked. Therefore, PEER could not verify, with MDOT official documentation, whether the department is utilizing its in-house engineering resources efficiently.

MDOT spent approximately $42.7 million in FY 2010 to outsource engineering functions, $47.5 million in FY 2011, and $48.5 million in FY 2012.

How MDOT Justifies Continuing to Outsource Engineering Functions

MDOT struggles to recruit and retain engineers on its staff due to the position's salary level being significantly less than what an engineer could earn at a private firm. Thus MDOT lacks personnel available to complete projects or personnel with specialized skill sets (e. g., bridge design). To complete the projects, MDOT must outsource to gain the particular skills needed, which increases engineering costs because the per-hour rate for contracted engineering services is higher than the in-house rate.

MDOT's Bridge Division needs outsourced consultants most frequently because MDOT lacks sufficient in-house skills necessary to complete complex bridge-related tasks. As federal mandates increase (for example, more rigorous bridge inspections), MDOT Bridge Division leadership believes that its outsourcing needs will also increase. A potential concern is that MDOT would not be able to monitor those contracts effectively.

How MDOT Determines Whether an Engineering Function Should Be Contracted Out

In FY 2012, 78% of MDOT's forms requesting consultant services justified the request on the basis of a lack of personnel resources needed to complete the project in a timely manner. However, MDOT does not have a formal written process to determine if and when a project should be contracted out based on the personnel available. When MDOT makes the decision to outsource, it is difficult to determine what factors are considered and what information is used to make that decision.

Based on PEER's estimates, MDOT could save approximately $21.8 million per year in engineer consultant costs by recruiting skilled professional engineers and offering them a salary comparable to that available in the private sector.

MDOT's Process for Selecting and Prioritizing Construction and Maintenance Projects

How MDOT's Priorities Have Changed and the Effects of the Change

According to MDOT, many of the state's older bridges have become deficient and roads that were built as part of the 1987 highway program have begun to need "new life." Because in the past MDOT funds were expended heavily for road expansion and because a system preservation budget has not historically been included as part of the state's plan to build roads and replace bridges, MDOT's priorities and funding have shifted away from new capacity projects to system preservation projects (e. g., overlays, bridge replacements). For FY 2015, MDOT estimates that system preservation projects will account for 73.8 percent (approximately $415 million) of its construction program budget.

As a result of the shift in funds to system preservation and the high cost of construction, MDOT has a "backlog" of 77 new capacity projects on its prioritized list totaling approximately $3.5 billion in construction costs. Because funds are not sufficient to complete these projects in a timely manner, MDOT will likely have to absorb the sunk costs of work conducted on some of those projects that will not be used (e. g., environmental studies).

Effectiveness and Transparency of MDOT's Processes for Project Selection and Prioritization

MDOT collects most of the data needed in order to select and prioritize projects in the most efficient manner (i. e., based on need). However, in some cases, MDOT was unable to document the selection and prioritization process used in the past (i. e., prior to 2012) to justify projects on its prioritized lists. MDOT has begun using decisionmaking software for new capacity projects that could provide a well-documented system for its selection and prioritization processes; however, the department has not established a timeline for using this software or other tools (e. g., matrices) that includes a disciplined way of accounting for both quantitative and qualitative elements in the decisionmaking process for prioritizing all types of projects. Also, MDOT's five-year plan does not provide sufficient transparency to show how projects change from year to year.

MDOT's H.E.L.P. Program and Its Impact on Future Debt Service Requirements

Since January 2005, the Transportation Commission has entered into interlocal agreements with six local governments to finance and accelerate highway projects by bond issues through the Highway Enhancement through Local Partnerships (H.E.L.P.) Program under the statutory authority of MISS. CODE ANN. Section 61-5-8 (1972). MDOT does not maintain proper documentation of the evaluation and selection process for this program as required by law. In addition, MDOT does not conduct a cost-benefit analysis to determine whether the issuance of H.E.L.P. bonds is both cost beneficial and feasible to the state. By entering into these interlocal agreements, MDOT has obligated the state to debt service requirements that could impact the state's future ability to construct and maintain needed highway projects.

Recommendations

1. In order to increase transparency of its decisionmaking and to help ensure an efficient distribution of resources, MDOT should place a greater emphasis on its performance measurement efforts. Specifically, MDOT should:

   a. decide on performance measures for each of its seven system goals, set performance targets, and begin to monitor annual progress toward those goals;

b. determine and implement the best reporting tools to communicate its progress (e. g., online dashboard, as part of its annual report); and,

c. eventually, use its performance indicators to help drive decisionmaking in all aspects of the department, including budgeting, project prioritization, and allocation of staff.

2. As part of its effort to increase accountability for resources, MDOT should establish and report measures of efficiency. Specifically, MDOT should:

   a. review its stewardship and oversight agreement and identify indicators of efficiency (e. g., on-time and on-budget indicators);

   b. review other states' measures of efficiency (including those listed in this report) to determine the best measures for MDOT to use in demonstrating efficiency of its internal operations and begin tracking those measures;

   c. in order to provide a more comprehensive measure of cost per mile, refine its cost per mile information to include all pre-construction and actual construction costs, rather than specific components;

   d. in order to compare its project costs to those of other states, consider conducting a study similar to that done by Washington State to show:

      i. all-inclusive costs for completed roadway projects around the nation or within the region;

      ii. all-inclusive costs for typical roadway projects in Mississippi; and,

      iii. where possible, how Mississippi's costs compare to those of other states.

3. In order to optimize utilization of professional staff, MDOT's Human Resources Department should conduct a department-wide workforce planning initiative (similar to that of GDOT, described on page 54 and in Appendix J, page 129) that would result in a determination of optimal staff size and skill sets based on anticipated workload.

4. Once MDOT's staffing needs have been objectively determined through a workforce planning study, MDOT should conduct a cost-benefit analysis to determine which staffing option is more beneficial: (1) increasing or maintaining critical in-house skills through the addition of PINs and selected pay increases; or (2) contracting out for needed skills. If MDOT determines that building in-house skills is more beneficial, then the department should propose

to the Legislature the inclusion of sufficient funds in MDOT's personal services budget to allow for needed PIN increases or salary increases for staff with complex and critical skill sets. The increases could be paid for through a reduction in the amount of dollars needed for contracts.

5. Taking into account the efforts of other state departments of transportation to address the efficiency of staff, MDOT should consider the following areas of analysis for every MDOT division and district:
   - staff development strategies, including:
     - confirming personnel's understanding and agreement with MDOT's mission and how MDOT's workforce should coincide with that mission;
     - identifying the job qualifications necessary to perform required functions;
     - determining whether the personnel holding positions possess the necessary qualifications/skills;
     - developing typically outsourced personnel skills (i. e., engineering); and,
     - in situations in which it is necessary, reorganizing and transferring personnel to other positions;
   - succession planning, including:
     - identifying which job functions will remain constant and which will change (and a plan to handle changing job functions);
     - forecasting staffing needs (based on past project data and future project plans);
     - determining what staffing adjustments need to be made as a result of forecasted needs; and,
     - using a resource similar to the ACCESS-based database used by New Mexico DOT's Human Resources department. The ACCESS database allowed New Mexico to plan for succession and track more than 200 attributes of personnel (see Appendix I, page 126);
   - knowledge management, including:
     - determining what skills are available in-house and how MDOT is affected if that skill is no longer available;
     - identifying MDOT's critical skill positions;

- determining how many of the persons in those critical skill positions are eligible for retirement in the next five years and the next ten years; and,
- determining and planning how MDOT will react if a critical skill position suddenly becomes vacant voluntarily.

Knowledge management would be similar to the efforts of the Virginia Department of Transportation. VDOT began its knowledge management program after the significant loss of critical in-house knowledge. Its program covered VDOT in its entirety and allowed VDOT to manage job-related knowledge within its organization (see Appendix I, page 126);

- cross-training, including:
  - training personnel who were originally hired to perform one job function with the skills necessary to complete additional functions, contingent on feasibility and proposed benefits of cross-training an individual in a particular position;
- reorganization/transfer of skills, including:
  - analyzing department-wide resources to determine where that skill would best benefit the organization and best fulfill MDOT's mission; and,
  - creating incentives to current engineers for obtaining the needed skill set.

6. MDOT should utilize a uniform method to track its professional engineers' active projects and tasks. A uniform method would help to increase the transparency needed to show that its professional staff is being held accountable for work performed and decisions regarding workload for professional staff are based on a comprehensive look at staff utilization and schedules. PEER recommends capturing this information in a system such as the "Active Project" software program used by MDOT's Materials Division for its geotechnical engineers.

7. To help ensure the most efficient use of its in-house and contracted engineering staff, MDOT should create a checklist that divisions and districts would follow to confirm and justify their proposed need to hire an engineering consultant. A knowledge management system similar to what the Virginia Department of Transportation has would allow division or district heads to know what skill sets are available in-house, regardless of that person's physical location. If the lack of available personnel

is the justification for outsourcing, the requesting division should have access to the knowledge management system so that it can provide documentation to show that the skill sets are not available to complete the assignment.

A uniform scheduling system for all professional staff (as described in recommendation #6) would allow the requesting division or district to determine whether in-house staff can complete the project in a timely manner.

Some components of the checklist should include answers to, or documentation for, the following conditions:

- Regardless of their position or departmental placement within MDOT, which current MDOT personnel are qualified to complete this project/skill/function required?
- Why can the above-named staff not complete the assignment?
- Can any workload realignments or adjustments (independent of personnel's district or division affiliation) take place to free a qualified engineer (or personnel) to complete this necessary project/skill/function?
- What is the time frame/due date by which this project must be completed?
- If the due date were amended, could an in-house engineer complete the project/skill/function?
- How feasible would it be to amend a due date if it were to result in cost savings for the department?
- How would extending the due date of this project (to cut cost) hurt department-wide business?

8. In order to increase its transparency in decision-making regarding bridge projects, MDOT should establish a written policy for selecting and prioritizing bridge projects based primarily on the Significance Index Model (SIM). Any future decisions that deviate from using the SI rating as the basis for selecting the bridge project should include written justification for selecting those projects that are spread on the commission minutes.

9. MDOT should revise its five-year schedule of proposed projects to increase transparency. Specifically, MDOT should:

    - place its schedule online with the ability to query based on the various elements of the

project (e. g., by planned begin date, by program);

- include *all* projects MDOT plans to complete within the five-year period;
- clearly demonstrate how projects have changed; and,
- include a brief description of the data used to select the project (e. g., SI value, PCR/other pavement data, year of need).

10. Given that funds are limited for new capacity projects and that the process for allocating money to new capacity projects is presently not sufficiently transparent, the Legislature should amend MISS. CODE ANN. Section 65-3-97 (5) (a) (i) (1972) to require that MDOT submit a detailed description of the criteria and analyses used by MDOT staff to determine any re-prioritization of new capacity projects to the Transportation Commission for inclusion as an attachment to its minutes. The Transportation Commission should ensure that the specific reasons for the reprioritization are spread upon its minutes and that all supporting documentation provided by MDOT staff is included as an attachment to the minutes. The commission should make all such criteria and analyses available to the public upon request.

11. MDOT should establish a timeline for allocating maintenance funds based primarily on statewide need so that pavement maintenance funds can be directed to the highways with the highest needs. In the interim, MDOT should document its method for transitioning to this needs-based allocation, including the method for the transition percentages used in allocating funds to districts. For example, MDOT could state that all districts will receive an allocation that is within ten percent of its needs-based allocation (i. e., based on the Accountability and MDOT Maintenance Operations [AMMO] system) by FY 2015, within five percent by FY 2016, and within less than five percent by FY 2017.

12. To provide a more objective, accountable, and documented system for project selection and prioritization, MDOT's Planning Division should develop a written plan and procedures for using Decision Lens (decision-making software) or any other prioritization tools to account for quantitative and qualitative elements and have them ready for use in its project selection and prioritization processes in FY 2015.

13. The Legislature should amend MISS. CODE ANN. Section 65-1-8 (1972) to provide that from and after

July 1, 2014, the Mississippi Transportation Commission shall not enter into interlocal agreements that indebt the state to finance local highway construction projects.

14. Regarding the pending consultant's report on MDOT's equipment, the PEER Committee should provide members of the Legislature with a summary detailing the consultant's findings, recommendations, and implementation strategy as soon as practicable following the release of the consultant's report.*

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Mississippi Department of Transportation: A Review of Departmental Accountability and Transparency

Introduction

Authority

The PEER Committee reviewed the accountability and transparency of the Mississippi Department of Transportation (MDOT). The Committee acted in accordance with MISS. CODE ANN. Section 5-3-51 et seq.

Problem Statement

PEER staff received two letters of concern from legislators regarding the accountability and transparency of MDOT's operations. Previous PEER reports (reports #414 and #520 at www.peer.state.ms.us) have highlighted issues regarding the management of the state's 1987 Four-Lane Highway Program and Vision 21 Program.[1]

Studies show that the funding available for transportation is not sufficient to meet Mississippi's highway, road, and bridge needs. In light of the increasing need for expenditures to repair or maintain the state's roads and bridges, MDOT must be as accountable, transparent, and efficient as possible with the funding it receives.

[1]The 1987 Four-Lane Highway Program was created through legislation passed during the 1987 Regular Session of the Mississippi Legislature. MDOT's goal at the inception of the program was that every Mississippian would be linked to a four-lane highway within thirty miles or thirty minutes. The legislation required the highways to be built in three phases, based primarily on vehicle count and road capacity. Through legislation passed in the 2002 Regular Session, the Legislature made extensive modifications to the 1987 Four-Lane Highway Program, resulting in what MDOT refers to as its Vision 21 Program. Vision 21 is a "pay-as-you-go" program that upgrades existing highways or builds new highways where they are needed.

Purpose and Scope

In performing this review, PEER sought to answer the following questions:

- What is MDOT's operating environment?
- How does MDOT's budget compare to those of other state transportation departments and how does MDOT use its funds?
- How does MDOT compare with other state departments of transportation in measuring system performance and how does MDOT hold itself accountable in terms of efficiency?
- Does MDOT have a rational decisionmaking process to ensure efficiency in its management of staff workload?
- Does MDOT have an effective and transparent process for selecting and prioritizing projects based on objective rating systems and statewide data?
- What is the H.E.L.P. Program and what is its impact on MDOT's future debt service requirements?

Method

In conducting this review, PEER:

- reviewed relevant sections of state and federal laws;
- interviewed MDOT staff;
- interviewed staff of other state departments of transportation;
- attended MDOT's budget hearing and other relevant meetings;
- reviewed documentation provided by MDOT staff;
- reviewed relevant literature regarding state transportation governance models;
- reviewed literature on performance measurement of state departments of transportation; and,
- reviewed comparative studies of state departments of transportation.

Background

This chapter includes:

- statutory authority, responsibilities, and goals of the Mississippi Transportation Commission and the Mississippi Department of Transportation;
- MDOT's FY 2013 revenues and expenditures; and,
- the status of national and state transportation system and funding.

Statutory Authority, Responsibilities, and Goals of the Mississippi Transportation Commission and the Department of Transportation

MISS. CODE ANN. Sections 65-1-3 through 65-1-9 (1972) establish the Mississippi Transportation Commission as the governing body for the Mississippi Department of Transportation and give it authority to appoint an Executive Director to carry out the day-to-day operations of the department subject to the commission's orders and directions. MISS. CODE ANN. Section 65-1-2 (1972) establishes the Mississippi Department of Transportation. MDOT has identified seven goals for transportation in the state (e. g., safety).

Statutory Authority and Responsibility of the Mississippi Transportation Commission

MISS. CODE ANN. Sections 65-1-3 through 65-1-9 (1972) establish the Mississippi Transportation Commission as the governing body for the Mississippi Department of Transportation and give it authority to appoint an Executive Director to carry out the day-to-day operation of the department subject to the commission's orders and directions.

According to MISS. CODE ANN. Section 65-1-8 (1) (1972), the commission members, one elected from each of the three Supreme Court districts of the state, are responsible for carrying out the following general powers, duties, and responsibilities:

> *(a) To coordinate and develop a comprehensive, balanced transportation policy for the State of Mississippi;*
>
> *(b) To promote the coordinated and efficient use of all available and future modes of transportation;*
>
> *(c) To make recommendations to the Legislature regarding alterations or*

modifications in any existing transportation policies;

(d) To study means of encouraging travel and transportation of goods by the combination of motor vehicle and other modes of transportation;

(e) To take such actions as are necessary and proper to discharge its duties pursuant to the provisions of Chapter 496, Laws of 1992, and any other provision of law;

(f) To receive and provide for the expenditure of any funds made available to it by the Legislature, the federal government or any other source.

See Exhibit 1, page 5, for a map of the Transportation Commission districts.

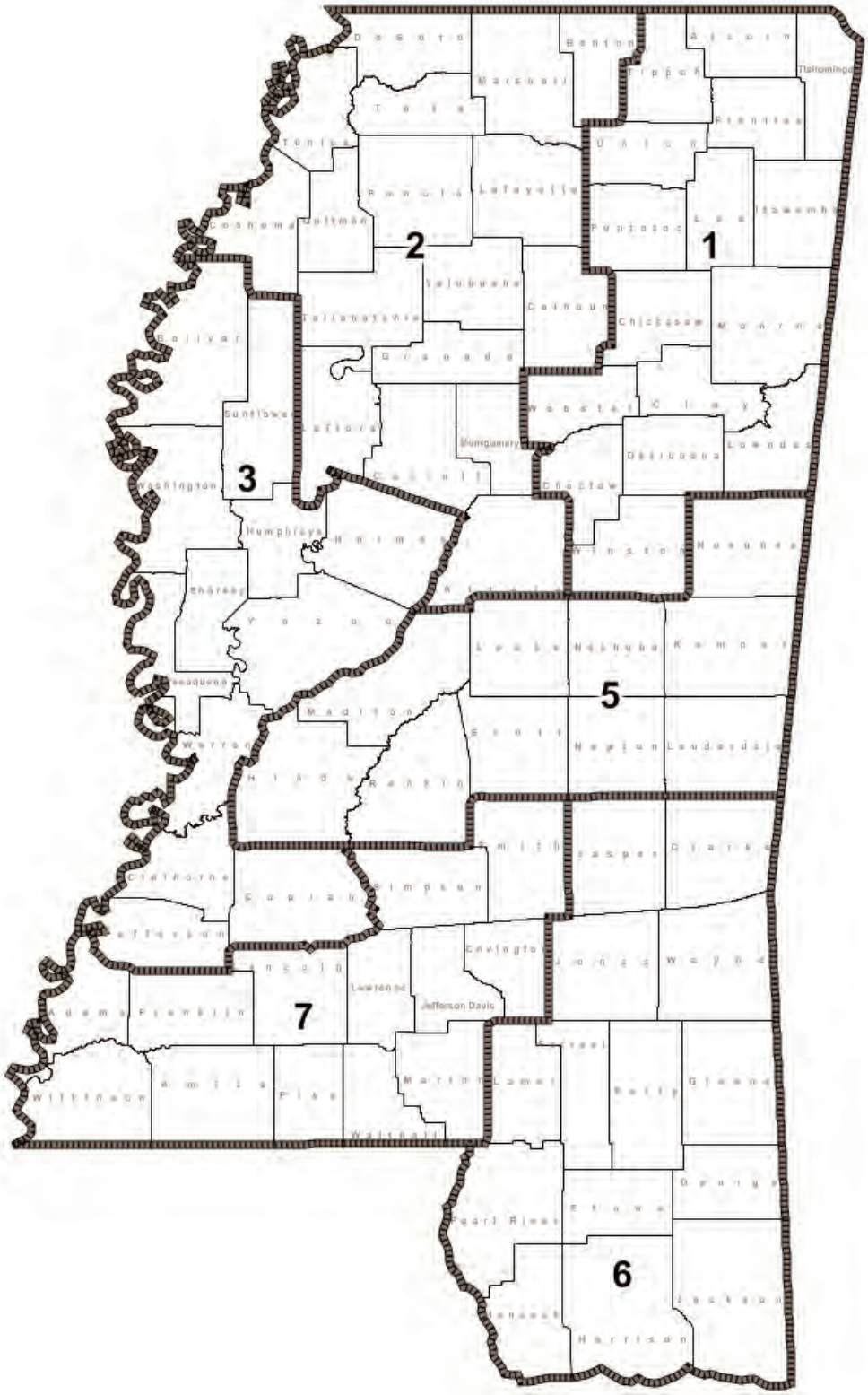
Statutory Authority and Goals of the Department of Transportation

MISS. CODE ANN. Section 65-1-2 (1972) establishes the Mississippi Department of Transportation. According to MDOT's 2035 MULTIPLAN (i. e, Mississippi's long-range plan for transportation through 2035), the following represent the goals for transportation in the state:

- *Accessibility and mobility*--improve accessibility and mobility for Mississippi's people, commerce, and industry;
- *Safety*--ensure high standards of safety in the transportation system;
- *Maintenance and preservation*--maintain and preserve Mississippi's transportation system;
- *Environmental stewardship*--ensure that transportation system development is sensitive to human and natural environmental concerns;
- *Economic development*--provide a transportation system that encourages and supports Mississippi's economic development;
- *Awareness, education, and cooperative process*--create effective transportation partnerships and cooperative processes that enhance awareness of the needs and benefits of an intermodal system; and,
- *Finance*--provide a sound financial basis for the transportation system.

MDOT frequently uses certain terms to describe its transportation system processes. See Exhibit 2, page 6,

Exhibit 1: Mississippi Transportation District Map*



*No District 4 currently exists. See note, Exhibit 7, page 18.

SOURCE: PEER.

for a list of terms used by MDOT that are included in this report.

Exhibit 2: Terms Frequently Used in the Highway Construction and Maintenance Process

Term	Definition
Average Annual Daily Traffic (AADT)	The total volume of traffic on a highway segment for one year, divided by the number of days in the year
Level of Service	A standard measurement used by transportation officials that reflects the relative ease of traffic flow
Maintenance	All activities necessary for the preservation of the state and federal highways. Routine maintenance includes patching potholes, controlling roadside vegetation, etc. Major maintenance activities include asphalt overlays, seal coats, etc.
New Capacity	Projects that involve such activities as adding new roads and interchanges
Pavement Condition Rating (PCR)	A PCR accounts for various elements of pavement to determine its condition
Significance Index (SI)	An SI value represents the overall significance of a bridge in comparison to the state bridge inventory
System Preservation	Preserving existing transportation assets and maintaining a state of good repair for transportation infrastructure (e. g., roads, bridges). Often used interchangeably with the term "maintenance." Includes bridge replacements, significant overlay projects, etc.
Vehicle Miles Traveled	The total number of vehicle miles traveled within a specific geographic area over a given period of time
Volume/capacity ratio	A measurement of roadway travel performance. It is calculated by dividing the demand flow rate by the capacity for a traffic facility.
Year of Need	The year in which the level of service on a road segment is projected to reach an unacceptable level

SOURCE: MDOT and PEER analysis.

MDOT's FY 2013 Revenues and Expenditures

In FY 2013, MDOT had over $1.1 billion in revenues, with approximately fifty percent from federal funding sources. MDOT had over $1.1 billion in expenditures in FY 2013; approximately fifty percent of expenditures were payments to contractors for capital outlay.

Exhibit 3, page 8, shows MDOT's revenues and expenditures for FY 2013. MDOT receives funds from a variety of sources (see page 22); however, federal funds account for fifty percent of MDOT's total revenues. MDOT's expenditures show that MDOT spends approximately half of its funds on capital outlay payments to contractors. Other expenditures include salaries, debt service payments, and contractual services.

Trends and Status of Transportation Systems and Funding

National data shows that transportation system needs exceed the funding allocated and state data indicates that the same is true in Mississippi.

National Transportation Data

One study shows that an additional $63 billion is needed annually to meet current highway and mass transit needs in the United States.

A 2012 study conducted by the Washington Center for American Progress found that an additional $63 billion a year is needed in the U. S. to meet current highway and mass transit needs. The 2010 spending nationwide for highways, roads, and bridges was $38.2 billion, while the estimated need totaled $85.2 billion.

State Transportation Data

MDOT has quantified its road and bridge needs to show the extent to which the needs outweigh the funding available.

Highway Needs

MDOT allocates approximately $150 million annually to pavement projects, but estimates that an estimated $1 billion would be needed to repair pavement to an acceptable condition and $400 million would be needed annually to maintain pavement in good condition.

MDOT is responsible for approximately 29,000 lane miles of state highways. According to MDOT, twenty-five percent of those lane miles are in immediate need of repair. MDOT estimates that by 2035,

Exhibit 3: MDOT's Revenues and Expenditures for FY 2013

FY 2013 Revenues:

Type	Amount	Percentage
Federal Funds[A]	$ 570,767,947	49.95%
Fuel Tax[B]	283,267,625	24.79%
Miscellaneous State Taxes and Fees[C]	39,733,152	3.19%
H.E.L.P.[D]	106,584,174	9.33%
Transfers, G.O., and Other[E]	65,554,958	7.09%
Reimbursements from outside[F]	12,174,232	--
Truck and Bus Tax/Fees[G]	64,504,691	5.65%
Total Revenues	**$1,142,586,779**	100.00%

FY 2013 Expenditures:

Category	Amount	Percentage
Salaries and Benefits	$158,112,337	14.27%
Travel	2,790,893	0.25%
Contractual Services	145,841,171	13.16%
Commodities	36,330,874	3.28%
Capital Outlay-contractors	555,963,608	50.18%
Capital Outlay-land for right-of-way	63,789,397	5.76%
Capital Outlay-equipment	12,256,458	1.11%
Subsidies: payments to State Aid, Public Transit, and Debt Service	132,803,779	11.99%
Total Expenditures	**$1,107,888,517**	100.00%

NOTES:

A=MDOT receives the majority of its federal funding through the Federal Highway Administration. MDOT also receives federal funds from other sources such as the Federal Transit Administration.
B=The state's motor fuel tax provides the primary source of state funding for MDOT. Mississippi has a fuel tax of 18.4 cents per gallon (became effective July 1, 1993).
C=MDOT receives funding from various dedicated state taxes such as tag fees, lubricating oil tax, contractor's tax, and railroad mileage tax.
D=H.E.L.P. funds are proceeds from projects done through the Highway Enhancements through Local Partnerships (H.E.L.P.) program authorized in MISS. CODE ANN. Section 65-1-8 (2) (z) (i). See page 89 for further discussion regarding the H.E.L.P. program.
E=Transfers, G.O., and Other funds include transfers from State Aid, Mississippi Development Authority, General Obligation Bond Proceed Funds, Gaming Counties Assisted Infrastructure Fund, Rails Revitalization, and Department of Public Safety.
F=Reimbursements from outside include reimbursements from state agencies, reimbursements from county and local governments on MDOT projects, and insurance proceeds for damages to MDOT guard rails or equipment.
G=MDOT receives funds from truck and bus fees, which include the truck and bus privilege tax, weight and size permits, and trip permits.

SOURCE: MDOT FY 2015 Legislative Budget Office Hearing, September 18, 2013.

over fifty percent of the lane miles will be in immediate need of repair at the current funding level.

Again, according to MDOT, an estimated $1 billion would be needed to repair pavement to an acceptable condition and $400 million would be needed annually to maintain pavement in good condition. Since MDOT allocates approximately $150 million annually to pavement rehabilitation, there is clearly a shortage of funds to meet the state's road needs.

Bridge Needs

MDOT allocates from $50 million to $80 million annually to bridge projects, but estimates that $2.7 billion would be needed to repair or replace bridges and $200 million annually would enable replacement of all currently deficient bridges in a timely manner and guarantee maintenance and repair of all bridges in the state system.

MDOT is responsible for over 5,700 bridges. Of those, three bridges are closed and over 1,000 are posted.[2] According to MDOT, an estimated $2.7 billion would be needed to repair or replace these bridges and $200 million annually would enable replacement of all currently deficient bridges in a timely manner and guarantee maintenance and repair of all bridges in the state system. MDOT allocates from $50 million to $80 million annually to bridge replacement and repair.

In light of the increasing need for expenditures to repair or maintain the state's roads and bridges, MDOT must be as efficient as possible with the funding it receives. A 2011 report by the Pew Center on the States and the Rockefeller Foundation[3] stated that, because of the funding shortage and because transportation is essential to helping advance goals such as mobility and economic growth, "state decision makers should be basing transportation policies and spending choices on the best possible data about what delivers the strongest return on investment."

The following chapter describes MDOT's operating environment, which is important in understanding how, with limited funding, MDOT makes decisions and what resources it has available to carry out its daily operations.

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[2] A *posted* bridge can safely carry legal weights but based on design or condition, does not have the ability to accommodate vehicles over certain weights. These bridges are identified with signage.

[3] *Measuring Transportation Investments: The Road to Results,* 2011.

What is MDOT's operating environment?

MDOT's governance structure is unique in that its transportation commissioners are elected, with their decisions being susceptible to political influence. According to research, states can limit political influence on transportation policy through certain best practices (e. g., avoiding geographic representation by commissioners). The commission and MDOT could also neutralize political influence through demonstrating transparency in decisionmaking, which would help assure stakeholders that decisions are data-driven rather than politically driven. MDOT carries out the day-to-day operations of the department subject to the commission's orders and is responsible for managing 3,460 employees within five major programs and a large amount of equipment, including 1,257 pieces of road-working equipment (e. g., tractors, backhoes).

This chapter addresses the following questions:

- What is the governance model for Mississippi's transportation system and how does it compare to those of other states?
- What resources does MDOT have to carry out its day-to-day operations?

What is the governance model for Mississippi's transportation system and how does it compare to those of other states?

State departments of transportation employ various types of governance models. Most state departments of transportation are governed by a secretary, commissioner, or director, as well as a policymaking board or commission, which is the model that governs MDOT. However, Mississippi's model is unique in that its transportation commissioners are elected. Consequently, MDOT's decisions or the decisions of its commissioners are susceptible to political influence.

According to *Transportation Governance and Finance: A 50-State Review of State Legislatures and Departments of Transportation*, which was conducted by the National Conference of State Legislatures (NCSL) and the American Association of State Highway and Transportation Officials (AASHTO), governance models of state departments of transportation vary, but generally fall into one of four categories:

- those that are led by a secretary, commissioner, or director;
- those that have one of these officials and a policymaking board or commission, either within the department of transportation or as a separate entity;

- those that have one of these officials and an advisory board or commission; or,
- those that use another model.

According to the *50-State Review*, nineteen states, as well as the District of Columbia, are led by a secretary, commissioner or director, twenty-two have one of these officials and a policy-making board or commission, three have one of these officials and an advisory board or commission, and six states use another model. (See Exhibit 4, below.) According to the review, Mississippi falls into the second category--i. e., has a three-member Transportation Commission tasked with developing departmental policy. See Appendix A, page 103, for a list of the department of transportation governance structures for each of the fifty states and the District of Columbia.

Exhibit 4: Four Types of Transportation Governance Models and Corresponding Number of States

Governance Model	Corresponding Number of States
Led by Secretary, Commissioner, or Director	20 (and the District of Columbia)
Led by Secretary, Commissioner, or Director AND a *policymaking* board or commission	22 (including Mississippi)
Led by Secretary, Commissioner, or Director AND an *advisory board* or commission	3
Another model	6

SOURCE: *Transportation Governance and Finance: A 50-State Review of State Legislatures and Departments of Transportation*, National Conference of State Legislatures and the American Association of State Highway and Transportation Officials, 2011.

How Mississippi's Transportation Governance Structure is Unique

Mississippi is the only state in which transportation commissioners are elected by citizens and do not report to the governor. This structure introduces the potential for political influence in the decisionmaking of the commission and of the department.

The report *Transportation Governance and Finance: A 50-State Review of State Legislatures and Departments of Transportation* describes Mississippi's governance model in the following way:

> *Mississippi's unique three-member Transportation Commission is elected by the people and does not report to the governor. This is the only selection process of DOT*

leadership in the nation that involves neither the legislature nor the executive branch. The commission appoints the DOT executive director, however, with the advice and consent of the Senate.

The selection process of the leaders or members for each of the four transportation governance models also varies across the nation. Some members are directly appointed or elected.

Each method for selecting department of transportation leadership--i. e., election or appointment--carries certain implications. According to the University of Kentucky's Transportation Center, the election of transportation leadership introduces geographic representation of leaders, which has the potential for allowing each leader to focus on the needs of his or her respective region as opposed to the overall needs of the state. However, the appointment of department of transportation leadership also introduces undue political involvement, which has the potential to impact transportation leaders' planning and decisionmaking processes. While election of commissioners allows for citizen participation, appointment of commissioners does not. See page 13 for additional discussion on the implications of methods of selecting DOT leadership.

Ways to Reduce Political Influence on Transportation Decisionmaking

The University of Kentucky's Transportation Center identified four best practices of transportation commissions that might enhance a department of transportation's performance and accountability, particularly in terms of reducing political influence on decisionmaking. PEER also contends that sufficient defensibility and transparency in decisionmaking would help reduce political influence or the appearance of political influence by assuring stakeholders that decisions are data-driven rather than being politically driven.

The University of Kentucky's Transportation Center, part of the university's School of Engineering, studied the impact of department of transportation governance models on planning and performance.

In reviewing state departments of transportation governed by commissions, the center's study identified the following "best practices" that might enhance a department of transportation's performance and accountability:

- *Have a clearly stated mission for the commission*-- Having a clearly defined mission allows the commission to have a clear direction for its roles, responsibilities, and other tasks to be carried out so that the commission does not operate outside of its boundaries.

- *Avoid giving the commission the authority to nominate or select the department of transportation's director*-- Avoiding giving the commission the authority to nominate or select the department of transportation's director allows a state to avoid a possible conflict of political interest. By allowing the director to be appointed by the Governor and not work directly under a commission who appoints him or her, a more accountable organizational structure could exist.
- *Avoid geographic representation by commissioners*-- Avoiding geographic representation by commissioners allows the commission to focus on the needs of the state in general terms instead of on a certain region.
- *Staff the commission with citizens, not elected officials*-- Having members that are citizens, not elected officials, helps minimize some of the political involvement and strives for a more accountable organizational structure.

These practices are intended to reduce political influence in the state transportation decisionmaking processes. The challenge for state departments of transportation is to reduce the effects of any disadvantages of the model employed.

PEER contends that another way of decreasing political influence on the transportation decisionmaking process is to make the process both defensible and transparent so that stakeholders can be assured that decisions are based on data rather than politics. Operating with an elected commission, as Mississippi does, requires a more defensible and transparent prioritization process to avoid the perception of a project selection process being based on simply dividing the funding among three types of projects (i. e., new capacity, bridge, road projects) instead of selecting the right project for the betterment of the state. The result of selecting and prioritizing projects based on statewide need might be that projects are not distributed evenly among districts. However, the goal of the selection and prioritization process is not to allocate work evenly among the districts but to consider the state's highest needs first and obtain the most value for the dollars spent.

A sufficient level of transparency would require not only providing a description of the methods used to select projects or make decisions, but also would require MDOT to show that it selected the *right* project and carried out the project in an efficient manner. Subsequent sections on pages 72-88 shed light on MDOT's operations in relation to this standard of transparency.

MDOT carries out the day-to-day operations of the department subject to the commission's orders. The

following section describes MDOT's staffing, programs, and equipment resources.

What resources does MDOT have to carry out its day-to-day operations?

MDOT has 3,460 employees who work in five separate programs. Of the 3,460 staff, MDOT has 195 professional engineers and an additional 83 engineers-in-training. MDOT's heavy equipment inventory includes over 7,000 vehicles and other equipment located throughout the state.

This section will address MDOT's:

- staffing;
- programs;
- engineering resources; and,
- equipment.

MDOT's Staffing, Programs, and Equipment Resources

Eighty-six percent of MDOT's 3,460 employees work in MDOT's maintenance and construction programs. MDOT's maintenance program activities are primarily performed by in-house staff. MDOT's construction program activities are performed by contractors who are responsible for actual construction, in-house staff who perform various activities (e. g., planning, design, right-of-way acquisition), and contracted staff who perform a portion of MDOT's engineering work.

MDOT's Staffing

MDOT's FY 2015 Budget Request shows the number of full-time FY 2014 authorized positions in each budget program, as shown in Exhibit 5, below. The majority of the staff (eighty-six percent) works within MDOT's maintenance and construction programs.

Exhibit 5: Full-Time Authorized Positions in Each MDOT Budget Program and Percent of Total Authorized Positions, as of July 1, 2013

Budget Program	Full-Time Equivalents (FTEs)	% of Total
Maintenance	1,550	45%
Construction	1,413	41%
Administration	220	6%
Enforcement	254	7%
Aeronautics, Rails and Other	23	1%
Total	3,460	100%

SOURCE: MDOT staff and PEER analysis.

Although MDOT budgets based on these five program areas, the organization of staff is broken down differently, as shown in the organizational chart in Appendix B, page 105.

MDOT's maintenance program activities are primarily performed by in-house staff, while MDOT's construction program activities are performed by a combination of in-house and contracted staff. While actual construction activities are consistently contracted out, other construction activities are performed by in-house staff (e.g., planning, design, and right-of-way acquisition) and engineering consultants. MDOT does not track its use of contracted staff by activity performed, although the data is available. MDOT has the capability to show how much work is contracted out versus performed in-house. However, MDOT was unable to provide information regarding the percentage of engineering work performed in-house versus contracted out within the timeframe allowed by PEER. Such information would be useful in monitoring the use of contractors over time for various activities, determining where in-house skill gaps are, and helping to build a workforce around an established goal for in-house versus contracted workload (e. g., sixty percent of engineering activities). See page 54 for a discussion of the Georgia Department of Transportation's workforce analysis, which included a review of its in-house and contract needs.

MDOT's Programs

MDOT allocates its budget according to five main budget programs:

- maintenance;
- construction;
- administration;
- enforcement; and,
- aeronautics, rails, and other (ports and waterways and public transit).

Exhibit 6, page 16, shows the primary responsibilities of each program.

Exhibit 6: MDOT's Programs, as of December 2013

MDOT Program	Responsibility
Maintenance	Administering a variety of programs necessary for the preservation, maintenance, and safety of Mississippi's state and federal highways Performing ongoing surveys of the State Maintained Highway System to compare existing conditions with established standards
Construction	Functioning as a staff organization in the overall administration of highway construction projects under state contracts and the coordination of matters relating to plan approval and contract preparation with other divisions, the districts, and the Federal Highway Administration
Administration	Overseeing budget development, financial operations, and administrative support within the department
Enforcement	Enforcing Mississippi's size, weight, and load laws for highways; fuel tax laws; privilege license laws; and collecting these taxes
Aeronautics, Rails, Ports and Waterways, and Public Transit	*Aeronautics*--Developing a safe and effective air transportation system in the state *Rails*--Focusing on the development and safety of the state's rail transportation system for freight and passenger service through a comprehensive program of capital improvement and strategic planning; striving to preserve and enhance the state's rail system, and providing a transportation option that is important to continued economic development. *Ports and Waterways*--Promoting awareness of the economic impact of the state's ports and waterways system by partnering with and supporting the waterborne industry *Public Transit*--Planning, developing, implementing, and administering sustainable transportation programs, projects, and plans that promote the most effective and efficient allocation of state, federal, and local resources throughout the state

SOURCE: MDOT.

MDOT's Engineering Resources

Of its 3,460 employees, MDOT has 195 engineers with the Professional Engineer credential and an additional 83 engineers-in-training who work under the supervision of the professional engineers. Many of MDOT's professional engineers perform administrative and oversight duties rather than working on projects (e. g., performing road or bridge design work). Engineers-in-training comprise thirty percent of MDOT's engineering staff and represent a relatively inexperienced group of engineers.

MDOT has 195 engineers who possess the Professional Engineer (PE) credential. A licensed engineer is able to use the PE credential when he or she has completed a four-year college degree, worked under a PE for at least four years, passed two competency exams, and earned a license from the state licensure board. To retain their license, PEs must continuously maintain and improve their skills.

MDOT has 83 engineers-in-training (EITs) on its in-house staff. These EITs have completed their four-year college degrees, have passed the Fundamentals of Engineering exam, and are in the process of gaining four years of experience. An EIT must always work under the supervision of a PE. The breakdown MDOT provided of its PEs and EITs is shown in Exhibit 7, page 18.

The summary in Appendix C, page 106, provides more detail on how MDOT's professional engineers are allocated. The appendix also shows general job responsibilities of the PEs. As the appendix will show, many engineers engage in a variety of oversight responsibilities, including managing and supervising staff, overseeing operations, and other administrative tasks.

Exhibit 7: MDOT Engineer Count According to Division or District,* as of September 2013

Division/District	Professional Engineers	Engineers in Training
Aeronautics	1	0
Bridge	20	11
Assistant Chief Engineers	3	0
Construction	11	0
Consultant Services	1	0
Contract Administration	3	0
District 1	22	4
District 2	16	13
District 3	14	5
District 5	16	12
District 6	21	4
District 7	13	5
Environmental	4	1
Local Public Agency	2	0
Maintenance	2	0
Materials	9	6
Chief Engineer	1	0
Planning	4	4
Ports and Waterways	1	0
Research	5	2
Roadway Design	12	10
Traffic Engineering	12	6
Transportation Information	2	0
Total	**195**	**83**

*At one time, MDOT used District 4 for accounting purposes in the allocation of project-related expenses to functions conducted at MDOT's headquarters. Due to technological advances, this allocation process became obsolete and the use of District 4 was discontinued.

SOURCE: MDOT.

MDOT's Equipment

Current Inventory

According to the State Auditor's Property Division, MDOT's heavy equipment inventory includes over 7,000 vehicles and other equipment. Of that, according to MDOT, its roadworking inventory includes 1,257 pieces of equipment, including 645 tractors.

According to the Mississippi State Auditor's Property Division, MDOT has over 7,000 vehicles and equipment listed under the "heavy duty" vehicles and equipment code. This list includes a variety of items such as vehicles, tractors, mowers, chainsaws, and portable scales.

Because one requestor of this project was primarily concerned with roadworking equipment, PEER requested from MDOT a list of its roadworking equipment inventory, which includes items such as motor graders, tractors, and bulldozers. See Exhibit 8, page 21, for this information.

Pending Consultant's Report on Equipment

Senate Bill 2917, 2012 Regular Session, mandated a moratorium on vehicle purchases for FY 2013 and a fleet reduction of two percent per year from July 1, 2012, to June 30, 2016, by all agencies with more than fifty vehicles. Subsequently, MDOT officials contracted with a consulting firm to review its equipment management processes and systems. The consultant's report was due to be released in mid-December 2013.

Because SB 2917, 2012 Regular Session, placed a one-year moratorium on vehicle purchases for FY 2013 and required a reduction in fleet (for agencies with more than fifty vehicles) by 2% per year from July 1, 2012, through June 30, 2016, MDOT officials recognized the need for a review of how the department manages its equipment. MDOT entered into a contract with Dye Management Group, Inc., to review equipment management processes and systems, identify areas for improvement, and implement additional efficiencies.

PEER reviewed the contract stipulations, conducted interviews with the consultants and approved the review's focus, scope, and methodology. The review is to focus on two key areas:

- *Equipment Utilization*--The consultant is to identify productive, reasonable utilization rates applied at other transportation departments or in research to help MDOT develop a set of productive utilization rates.
- *Buy, Lease, or Rent Decisions*--The consultant is to identify methodologies used by other transportation departments to:

- make the decision to buy, lease, or rent and determine feasibility of applying a similar approach at MDOT;
- outline the benefits and risks of each approach, including any potential increase to the contractual services budget as a result of increased renting or leasing;
- evaluate the impact of each approach on emergency response times and offer a recommendation that minimizes response times while lowering overall cost, if possible; and,
- perform a high–level benefit/cost analysis for key equipment classes using the identified methodologies to develop a recommendation for implementation by MDOT.

Dye Management Group anticipated completing its report by mid–December 2013.[4] PEER will provide the Legislature with a summary detailing the consultant's findings, recommendations, and implementation strategy once the consultant's report is released.

[4]On December 20, 2013, PEER staff received a copy of the Dye Management Group's report, "Equipment Management Review: Final Recommendation Report." PEER will provide members of the Legislature with an analytical summary of the report as soon as practicable, as recommended on page 101. **[NOTE: The Dye Management Group report and the PEER analytical summary are now available.]**

Exhibit 8: MDOT Roadworking Equipment, by Type and by District*/Central Office, as of September 2013

Type of Equipment	District 1	District 2	District 3	District 5	District 6	District 7	Central Office	Total
Pothole Patcher	8	4	2	1	1	0	0	**16**
Crack Joint Sealer	2	1	1	0	2	1	0	**7**
Paver	1	2	2	2	1	2	0	**10**
Infrared Pavement Heater	4	2	2	0	0	0	0	**8**
Bulldozer	4	7	7	7	7	6	0	**38**
Skid Steer	17	8	7	13	7	5	1	**58**
Front-End Loader	1	2	5	2	7	3	0	**20**
Force-Feed Loader	0	1	0	1	1	1	0	**4**
Dragline	2	2	0	4	2	0	0	**10**
Excavator	16	8	6	5	7	7	0	**49**
Drilling Equipment	2	2	0	0	0	1	4	**9**
Motor Grader	17	19	12	14	7	6	0	**75**
Backhoe	34	22	20	26	16	19	0	**137**
Crane	0	1	0	0	0	2	0	**3**
Trenching Equipment	1	2	0	1	1	0	3	**8**
Tractor	112	110	96	106	115	106	0	**645**
Mud Jack	1	1	1	1	1	1	0	**6**
Roller	11	17	16	15	7	9	0	**75**
Planer	0	1	0	1	1	1	0	**4**
Spreader	1	1	2	1	0	0	0	**5**
Sweeper	6	19	13	15	7	9	1	**70**
Total	240	232	192	215	190	179	9	**1,257**

*At one time, MDOT used District 4 for accounting purposes in the allocation of project-related expenses to functions conducted at MDOT's headquarters. Due to technological advances, this allocation process became obsolete and the use of District 4 was discontinued.

SOURCE: MDOT.

How does MDOT's budget compare to those of other state transportation departments and how does MDOT use its funds?

Mississippi, like other states, receives transportation funds primarily from federal and state sources based on formulas defined in federal and state laws. Compared to its contiguous states, MDOT's 2012 budget was the second lowest behind Arkansas. For FY 2013, seventy-two percent of MDOT's expenditures were for its construction program, which includes pre-construction activities (e. g., design work, acquiring right-of-way) in addition to actual construction. Activities related to system preservation and maintenance projects (e. g., bridge replacements, significant pavement overlays) accounted for the largest percentage of construction program expenditures at forty-four percent.

This section discusses the following questions:

- How is MDOT funded?
- How does MDOT compare to its contiguous states in revenues by source and per-mile disbursements by program area?
- How does MDOT use its funds?

How is MDOT funded?

MDOT, like other states, receives transportation funds from both federal and state sources. These funds are allocated based on formulas defined in federal and state laws.

Similar to other states, MDOT receives transportation funds from both federal and state sources. MDOT's federal revenue sources are appropriations made by Congress and state revenues are appropriated by the Mississippi Legislature.

Description of Federal and State Revenue Sources

MDOT receives the majority of its federal funds through the Federal Highway Administration based on specific allocation formulas. MDOT receives state funding through legislative appropriations of special funds derived from fees and the state fuel tax.

Federal Revenues

MDOT receives the majority of its federal funds through the Federal Highway Administration. MDOT also receives

federal funds from other sources such as the Federal Transit Administration.

Since 2005, federal highway and transit funding has been allocated each year according to a set of specific formulas laid out in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). In July 2012, the new law, Moving Ahead for Progress for the 21st Century Act (MAP-21), set to expire September 2014, allocates federal gas and diesel taxes to states for road, bridge, and mass-transit improvements based on the same share of funds states received under the prior law across three types of programs: need-based formula apportionments, nonformula allocations (includes projects of national or regional significance), and a special distribution program called the equity bonus to direct money to individual states that cannot demonstrate sufficient highway and transit needs or without consideration of need.

Of the $43 billion disbursed by the Federal Highway Administration in 2010 for roads, bridges, and transit, seventy-one percent went to formula-based programs, seven percent to nonformula programs, and twenty-two percent to the equity bonus program, making it the largest of all federal surface transportation programs. The core formula-based federal highway administration programs include interstate maintenance, the national highway system, surface transportation program, highway safety, congestion mitigation and bridge replacement, and rehabilitation program. These have formulas with which to allocate funds to states based on a limited set of objective factors intended to measure need, such as number of road miles, intensity of road usage, and population.

State Revenues

The Mississippi Legislature appropriates funding to MDOT through special funds derived from fees. According to NCSL, states provide nearly half of all surface transportation funding. The main source of highway funds in about half the states is the state motor fuel tax, while the rest of the states rely on federal funds, motor vehicle and motor carrier taxes, or bond proceeds. States also provide about twenty percent of the funding for transit systems nationwide, largely from general funds, fuel taxes, general sales tax, and other sources.

Mississippi has a fuel tax of 18.4 cents per gallon that has been in effect since 1987. Under current law, MDOT receives approximately seventy percent of total fuel taxes. According to the Department of Revenue, the rest is distributed to various entities or funds, such as the State Aid Road Fund, counties, the Railroad Revitalization Fund,

and the Department of Marine Resources. A December 2012 nationwide state fuel tax comparison prepared by the Washington State Department of Transportation shows that Mississippi ranked 38th nationally (along with Tennessee) in 2012 for combined state and local gasoline taxes, at 21.40 cents. The range was from 8.00 cents in Alaska to 64.10 cents in Illinois. Mississippi's contiguous states--Arkansas, Tennessee, Alabama, and Louisiana--ranked 37th, 39th, 40th, and 41st, respectively.

In addition to fuel taxes, states have a variety of innovative financing mechanisms for highways that are intended to leverage traditional funding sources, including state bonding and debt instruments, public-private partnerships, and federal debt financing, credit assistance, and fund management tools.

How does MDOT compare to its contiguous states in revenues by source and per-mile disbursements by program?

Of Mississippi's contiguous states, the Arkansas Department of Transportation had the lowest total receipts for FY 2012, followed by MDOT. Based on PEER's analysis of Federal Highway Administration statistics for 2011, Mississippi is not an outlier compared to its contiguous states in terms of amounts disbursed per mile or the percentage of funds disbursed among four categories: capital outlay (road and bridge), maintenance, administration, and enforcement.

Comparison of MDOT's Revenue Sources to Those of Departments of Transportation in Contiguous States

MDOT's total receipts for FY 2012 were approximately $1.3 billion. Of the group of states including Mississippi and its contiguous states, this was the second lowest amount. Departments of transportation in the contiguous states had receipts ranging from approximately $1 billion in Arkansas to approximately $2 billion in Tennessee. All five states received a similar ratio of federal, state, and other sources for FY 2012.

PEER compared the transportation budget of Mississippi to those of its contiguous states--Alabama, Arkansas, Louisiana, and Tennessee. State transportation department annual reports showed that all five states received a similar ratio of federal, state, and other or "miscellaneous" revenues in FY 2012, ranging from 61% federal funds received in Alabama to 49% federal funds received by Mississippi.

State or self-generated funding ranged from 44% in Tennessee to 30% in Mississippi, which has the lowest percentage because a significant portion of its funds is categorized as "other" or miscellaneous funds. According to MDOT officials, for FY 2012, the department received a

considerable amount of Mississippi Development Authority economic development funding and general obligation bond proceeds, hence the relatively large percentage of "other" funds.

See Exhibit 9, below, for each state's FY 2012 budget by revenue source. Exhibit 3, page 8, shows MDOT's revenues for FY 2013.

Exhibit 9: Federal, State, Other, and Total Receipts for FY 2012 for Mississippi and its Contiguous States

State	Federal	% of Budget	State	% of Budget	Other	% of Budget	Total Receipts
AL	$ 803,689,683	61%	$487,411,480	37%	$ 23,524,184	2%	$1,314,625,347
AR	572,841,844	55%	437,068,693	42%	27,997,972	3%	1,037,908,509
LA	905,000,000	56%	674,000,000	42%	34,500,000	2%	1,613,500,000
MS	622,507,874	49%	372,871,508	30%	271,519,328	21%	1,266,898,710
TN	1,040,770,200	53%	866,886,300	45%	45,229,600	2%	1,952,886,100

*Mississippi's "Other" includes interest, miscellaneous receipts, and interlocal proceeds. According to MDOT officials, the department receives a considerable amount of Mississippi Development Authority economic development funding and general obligation bonds.

SOURCE: States' annual reports.

Relative Size of State Transportation Department Budgets

Of Mississippi and its contiguous states, Mississippi and Arkansas have the smallest budgets based on total revenues and are therefore most similar in terms of budget size.

State transportation department annual reports showed that Mississippi, Alabama, Arkansas, Louisiana, and Tennessee funding totals for FY 2012 range from more than a $1.9 billion budget in Tennessee to just over a $1 billion budget in Arkansas. Like Arkansas, Mississippi has a relatively small budget of $1.2 billion.

Of Mississippi and its contiguous states, Mississippi and Arkansas are most similar in terms of the size of their budgets. When asked which state transportation department its budget compares most closely with, MDOT officials indicated that Arkansas's is the most similar. See Exhibit 9, page 25, for each state's FY 2012 total budget and percentages of federal, state, and other revenues.

Comparison of MDOT's Per-Mile Disbursements by Program Area to Per-Mile Disbursements of Departments of Transportation in Contiguous States

For FY 2011, Mississippi disbursements per mile were below the median in all four program areas: capital outlay (road and bridge), maintenance, administration, and enforcement. Also, the percentage of funds Mississippi distributed among the four program areas did not appear out of line with other states. Thus Mississippi is not an outlier in terms of amounts disbursed per mile or the percentage of funds disbursed among the four categories.

Although state transportation departments have similar ratios of funding sources, they differ in terms of the size of their budgets available to fund the various transportation programs they administer and allocate different percentages of their budgets to fund those programs based on the needs, priorities, and investment strategy of each state.

FHWA 2011 Statistics, the most recent year available, provides data derived from federally required and uniformly collected state reporting. PEER analyzed statistics reported by contiguous states (Alabama, Arkansas, Louisiana, and Tennessee) to develop regional comparisons based on system size according to each state transportation agency's miles of responsibility and calculated per-mile disbursements in capital outlay (road and bridge); maintenance and highway services; administration, research and planning; and highway law enforcement and safety.

Disbursement data details the portion of a state's highway budget allocated to these four major program areas and thus reflects each state transportation department's transportation investment. Disbursements for some contractual services; commodities; aeronautics, rails and transit; and subsidies, loans and grants, for example, would be excluded from the four categories. Therefore, disbursements for the four programs are not reflective of a state transportation department's total disbursements (see Exhibit 10, page 27).

For FY 2011, Mississippi's per-mile spending was below the regional median in all four disbursement categories, indicating that Mississippi's transportation spending could be considered moderate and the state was not an outlier or extreme in its comparable regional spending.

As a percentage of total program disbursements, in FY 2011 Alabama spent the least on its capital outlay program (59%) and Mississippi and Louisiana spent the largest percentages, at 78% and 77%, respectively. For maintenance programs, Louisiana spent the smallest portion, with 8%, and Arkansas spent the most, with 19%. In the area of administration, Arkansas spent the lowest amount of 3% and Louisiana and Alabama spent the

highest percentages, 11% and 12%, respectively. For enforcement, Tennessee spent the least at 2% and Alabama disbursements were considerably more than those of the other states (16%). The most any other state spent on enforcement was 9% in Arkansas.

Exhibit 10: Mileage and Disbursements Per Mile for Mississippi and its Contiguous States, FY 2011

State	State Agency Highway Mileage	Capital Outlay Disburse-ments Per Mile	%	Maintenance Disburse-ments Per Mile	%	Administration Disbursements Per Mile	%	Enforcement Disburse-ments Per Mile	%
AL	10,911	$75,861	59%	$16,258	13%	$15,746	12%	$20,182	16%
AR	16,414	40,745	69%	11,219	19%	1,994	3%	5,398	9%
LA	16,694	94,219	77%	9,664	8%	13,151	11%	5,641	4%
MS	10,834	70,102	78%	10,011	11%	6,540	7%	3,332	4%
TN	13,879	92,253	72%	21,513	17%	11,844	9%	2,503	2%

SOURCE: Federal Highway Administration State Statistics 2011 and PEER analysis.

Capital Outlay (Road and Bridge) Disbursements

MDOT spent approximately $759 million on capital outlay in FY 2011, which translates to approximately $70,000 per mile. The range for contiguous states was approximately $40,000 per mile in Arkansas to approximately $94,000 per mile in Louisiana. In terms of capital outlay spending as a percent of the total spending for the four categories of disbursements, percentages ranged from 59% in Alabama to 78% in Mississippi.

Capital outlay disbursements for roads and bridges for state-administered highways ranged from approximately $668 million in Arkansas to approximately $1.5 billion in Louisiana. Mississippi spent approximately $759 million on its capital outlay program.

Capital outlay per-mile disbursements ranged from approximately $40,000 in Arkansas to approximately $94,000 in Louisiana. Mississippi spent approximately $70,000 per mile on its capital outlay program. Mississippi's per-mile spending was below the regional median of $74,000 for per-mile capital outlay disbursements.

In terms of capital outlay spending as a percent of the total spending for the four categories of disbursements, percentages ranged from 59% in Alabama to 78% in Mississippi. These percentages illustrate the portion of each department's budget allocated or invested per category. PEER notes that "total spending" here only includes the four main categories of expenditure and

therefore does not include each transportation agency's total expenditures.

Maintenance and Highway Services Disbursements

MDOT spent approximately $108 million on maintenance in FY 2011, which translates to approximately $10,000 per mile. The range for contiguous states was approximately $9,600 per mile in Louisiana to approximately $21,500 per mile in Tennessee. In terms of maintenance spending as a percent of total spending for the four categories of disbursements, percentages ranged from eight percent in Louisiana to nineteen percent in Arkansas. Mississippi spent eleven percent on maintenance.

Maintenance disbursements in FY 2011 ranged from approximately $108 million in Mississippi to approximately $298 million in Tennessee. Maintenance disbursements per mile ranged from approximately $9,600 in Louisiana to approximately $21,500 in Tennessee. Mississippi spent approximately $10,000 per mile on its maintenance program.

Mississippi's per-mile spending on maintenance was below the median of per-mile maintenance disbursements of approximately $11,200**.** Maintenance disbursements as a percent of total spending ranged from 8% in Louisiana to 19% in Arkansas. Mississippi spent 11% of the programs total on its maintenance program.

Administration, Research, and Planning Disbursements

Administrative disbursements varied widely among the states based on FHWA 2011 data, ranging from Arkansas, with approximately $32 million, to approximately $219 million in Louisiana. Mississippi spent approximately $70 million on its administration program. Although Mississippi spending was below the regional median, Mississippi's spending more than tripled Arkansas's administrative spending on a per-mile basis.

Administration disbursements in FY 2011 ranged from approximately $32 million in Arkansas to approximately $219 million in Louisiana. Mississippi spent approximately $70 million on administration.

Administrative disbursements per mile ranged from approximately $2,000 in Arkansas to approximately $15,700 in Alabama. Mississippi spent approximately $6,500 per mile on administration.

Mississippi's per-mile spending on administration was below the median per-mile administrative disbursements of approximately $11,800. Administrative disbursements as a percent of total program disbursements ranged from 3% in Arkansas to 12% in Alabama. Mississippi's administrative spending was 7% of its total.

In an effort to determine or attempt to explain the wide-ranging administrative per-mile spending, PEER surveyed each state to obtain its FTEs for the coinciding period. Mississippi's FY 2011 FTEs were obtained from MDOT's FY 2014 budget request. (See Exhibit 11, page 30.)

Alabama had the most FTEs, with 4,729, and Mississippi had the fewest, with 3,487; however, despite Mississippi having 100 fewer FTEs than Arkansas and the two states having similarly sized budgets, Mississippi's spending more than tripled Arkansas's per-mile spending. Because administration involves salaries and personal service costs associated with administration, research, and planning personnel, and the calculation is leveraged on a per-mile basis, MDOT should take interest in determining the reasons for this variance.

The Federal Highway Administration's *A Guide to Reporting Highway Statistics* provides states with guidance on how to report on each category of disbursements. Regarding the administration, research, and planning category of disbursements, the guide requires that highway planning and research expenditures include expenses for highway planning, research, and investigation (e. g., lab and field research in road and bridge materials and design, traffic studies). Expenses for administration and engineering should include all general expenses of administration and engineering and miscellaneous expenditures not otherwise classified (e. g., executive and managerial salaries). Also, costs associated with operating expenses and overhead should be included (e. g., supporting legal, accounting, budget, and procurement departments; payments to other state offices for services; construction and maintenance of buildings; and costs associated with litigation).

Regarding reporting general administration and engineering, FHWA's Manual states, "Because of varying accounting practices, the reporting of general administration and engineering and miscellaneous expenses expenditures is not uniform among the states." All costs directly attributable to specific projects should be assigned to the appropriate classification to the extent possible and eliminated from general administration and engineering. Expenditures not specifically chargeable to projects or functions should be included.

PEER contends that due to the specificity of explicit instructions to state officials to report certain expenditures related to projects and highways in the other categories of capital outlay, maintenance, and enforcement, to what extent differing accounting practices may affect the reliability of or explain large variances between comparative state-reported administration and engineering information cannot be determined.

Exhibit 11: FHWA Administrative Disbursements and FTEs Per Mile of Responsibility for Mississippi and its Contiguous States, FY 2011

State	Administrative Disbursements Per Mile	FTEs
Alabama	$15,746	4,729
Arkansas	1,994	3,587
Louisiana	13,151	4,455
Mississippi	6,540	3,487
Tennessee	11,844	3,750

SOURCE: FHWA.

Highway Law Enforcement Disbursements

MDOT spent approximately $36 million on enforcement in FY 2011, which translates to approximately $3,300 per mile. The range for contiguous states was approximately $2,500 per mile in Tennessee to approximately $20,000 per mile in Alabama. In terms of enforcement spending as a percent of the total spending for the four categories of disbursements, percentages ranged from two percent in Tennessee to sixteen percent in Alabama. Mississippi spent four percent on enforcement.

Enforcement disbursements in FY 2011 ranged from approximately $34 million in Tennessee to approximately $220 million in Alabama. Mississippi spent approximately $36 million on its enforcement program.

Enforcement disbursements per mile ranged from approximately $2,500 in Tennessee to approximately $20,000 in Alabama. Mississippi spent approximately $3,300 per mile on its enforcement program. Mississippi's per mile spending on enforcement was below the median per-mile enforcement disbursements of approximately $5,400.

Enforcement disbursements as a percent of total spending ranged from 2% in Tennessee to 16% in Alabama. Mississippi spent 4% of the programs total on its enforcement program.

How does MDOT use its funds?

Seventy-two percent (approximately $794 million) of MDOT's FY 2013 expenditures were for the construction program, which consists of both pre-construction and construction activities. Of construction program expenditures, new capacity and system preservation and maintenance project activities accounted for approximately $499 million.

MDOT's expenditures reflect that approximately seventy-two percent of all expenditures were for its construction program, while the maintenance program accounted for the next largest percentage of expenditures at approximately fourteen percent. (See Exhibit 12, below.)

Exhibit 12: MDOT's Actual Expenditures by Program, FY 2013

Program	Amount	Percentage
Construction[A, B]	$794,206,074	71.69%
Maintenance[C]	156,668,000	14.14%
Debt Service	64,703,168	5.84%
Administration, Equipment and Buildings	48,198,990	4.35%
Aeronautics, Rails, Public Transit, and Ports	29,831,708	2.69%
Law Enforcement	14,280,580	1.29%
Total FY 2013 Expenditures	**$1,107,888,517**	100.00%

NOTES:
A=Exhibit 13, page 32, shows a breakdown of Construction Program expenditures.
B=MDOT's Construction Program consists of actual construction of new capacity, safety, and system preservation projects, pre-construction activities (e. g., design, right-of-way purchases), planning and research, etc.
C=MDOT's Maintenance Program consists of all activities necessary for the preservation of the state and federal highways. Routine maintenance includes patching potholes, controlling roadside vegetation, etc. Major maintenance activities include asphalt overlays, seal coats, etc.

SOURCE: MDOT.

MDOT's Construction Program includes funds allocated toward not only construction of state bridge and road projects, but also to other activities, including oversight of the Local Public Agencies program,[5] planning and research functions, and pre-construction functions (e. g., purchasing right-of-way). H.E.L.P. and GO/MDA funds are earmarked for specific projects. (See Exhibit 13, page 32.)

[5]The Local Public Agencies program is a partnership between the Federal Highway Administration (FHWA), MDOT, and local public agencies to develop, plan, and construct projects with federal, state, and local funds. FHWA has designated MDOT as the agency in Mississippi to administer FHWA's federal funding program.

Exhibit 13: MDOT's FY 2013 Construction Expenditures by Sub-Program

Sub-Program	Preconstruction	Construction	Total	Percentage
New Capacity[A]	$59,925,967	$90,766,144	$150,692,111	19.0%
System Preservation/ Maintenance[B]	50,871,793	297,405,952	348,277,745	43.9%
Highway Safety Improvement Program (HSIP)[C]	2,470,713	20,060,428	22,531,141	2.8%
HELP[D]	15,544,470	96,788,283	112,332,753	14.1%
GO/MDA[E]	2,032,946	66,689,408	68,722,354	8.7%
State Aid LPA	0	77,840,966	77,840,966	9.8%
Planning/Research[F]	13,809,004	0	13,809,004	1.7%
Total	**$144,654,893**	**$649,551,181**	**$794,206,074**	**100%**

NOTES:
A= MDOT's new capacity projects include new construction projects only, including adding or widening roads (e.g., I-20 widening from the I-220 vicinity to the Pearl River).
B= System preservation/maintenance includes projects such as overlays and bridge replacements
C= The Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) established the Highway Safety Improvement Program (HSIP) as a Federal Highway Administration (FHWA) program with dedicated funding for infrastructure-related highway safety improvement projects (e.g., intersection improvements).
D= See page 89 for a description of the H.E.L.P. program.
E= "GO/MDA" includes economic development funding and general obligation bonds received from the Mississippi Development Authority.
F= A portion of federal aid highway construction funds must be used for research and planning to address problems in all areas of transportation.

SOURCE: MDOT.

Of the approximately $156.6 million MDOT spent on its maintenance program in FY 2013, approximately $132.6 million (85 percent) was allocated to districts for routine maintenance (e. g., patching potholes, sealing cracks in pavement). See Exhibit 14, page 33.

Exhibit 14: MDOT's FY 2013 Maintenance Program Expenditures by District or Function and Lane Miles of Districts*

District or Function	Expenditures	Lane Miles
District 1	$21,241,004	5,502
District 2	21,982,841	5,432
District 3	17,436,241	3,774
District 5	27,229,911	5,427
District 6	25,502,565	5,647
District 7	19,208,395	3,858
District Subtotal	*$132,600,957*	
Traffic	7,979,293	
Central Services	7,249,574	
Workers Comp	2,827,207	
FMD Transfers**	2,394,826	
Other***	3,616,143	
Total	**$156,668,000**	

*At one time, MDOT used District 4 for accounting purposes in the allocation of project-related expenses to functions conducted at MDOT's headquarters. Due to technological advances, this allocation process became obsolete and the use of District 4 was discontinued.
***FMD Transfers* include money MDOT pays to Tort Claims and money MDOT transfers to MDA for the operation of welcome centers and to the Department of Agriculture for beaver control.
****Other* includes expenses primarily made by MDOT's Maintenance Division, which oversees the maintenance program statewide. This also includes other divisions that charge to maintenance activities, such as the Bridge Division, Roadway Design Division, and Outreach.

SOURCE: MDOT.

How does MDOT compare with other state departments of transportation in measuring system performance and holding the department accountable in terms of efficiency?

MDOT conducts a well-developed assessment to show its transportation system needs; however, MDOT has not yet fully developed performance measures for all of its system goals so that system-wide progress can be tracked over time. Other states have made performance measurement more central to the statewide planning and decisionmaking process by tracking numerous measures over time, annually creating trend reports, and developing dashboards to communicate progress toward goals and inform decisionmakers. In terms of efficiency, MDOT has some efficiency-related indicators; however, relative to other states, MDOT has room for improvement in measuring departmental efficiency. The best measures of internal efficiency would focus on operations under MDOT's control.

PEER sought to determine how state departments of transportation, including MDOT, address the issue of utilization of resources. By looking at Mississippi's and other states' performance measurement efforts and national performance data, PEER was able to determine how MDOT compares to other states in its administration of performance management and how Mississippi compares nationally in selected performance areas. Therefore, this section answers the following question:

- How does MDOT compare with other state departments of transportation in measuring system performance?

Because indicators of *efficiency* were not prevalent in performance information of MDOT or other state departments of transportation, PEER also addresses the following question in this chapter:

- How does MDOT compare with other state departments of transportation in holding itself accountable in terms of efficiency?

How does MDOT compare with other state departments of transportation in measuring system performance?

MDOT conducts a well-developed needs assessment to show its transportation system needs and has established broad goals for system performance, which are generally the same across states. However, MDOT has fallen behind other states by not fully developing and reporting on performance measures for each of its system goals.

Needs Assessment

MDOT conducts a well-developed needs assessment to define the critical system needs of the state.

MDOT's MULTIPLAN[6] focuses heavily on describing the critical system needs of the state (i. e., needs assessment).

Highway Needs (Backlog and Full Needs)

MDOT expresses its highway needs in three areas:

- *preservation*, including the improvement of pavement only without changes to roadway geometry;
- *modernization*, which includes improvements to pavement that change the roadway characteristics and/or the structural integrity of the pavement base; and,
- *expansion/capacity increasing projects*, which add lane(s) and change the roadway characteristics for existing lanes along the same segment.

MDOT performed its analysis of the state's highway needs using FHWA's Highway Economic Requirements System-State Version (HERS-ST), which is an engineering/economic analysis tool that uses engineering standards to identify highway deficiencies. MDOT established minimum tolerable conditions for nearly a dozen factors to use in HERS-ST to determine at what point a highway is in need of preservation, modernization, or expansion.

At the time the MULTIPLAN was produced in May 2011, the backlog of state-maintained highway and pavement needs was estimated at $5.5 billion. MDOT also calculated its total highway needs by considering backlog, current, and future needs. At that time, MDOT estimated that

[6]MDOT's MULTIPLAN 2035, dated May 2011, is Mississippi's Long Range Transportation Plan (LRTP) with a planning horizon of 2035. The data used in the plan to project system needs is 2008 data.

Mississippi's full highway needs totaled more than $25 billion through the year 2035.

Bridge Needs (Backlog and Full Needs)

MDOT presented its bridge needs in terms of:

- *rehabilitation*, including all federally-eligible maintenance, repair, and rehabilitation;
- *improvements*, which included raising, widening, and strengthening bridges; and,
- *full replacement* of the entire bridge structure.

MDOT performed its analysis of highway needs using the National Bridge Investment Analysis System (NBIAS). NBIAS is a program that performs system-level analysis of anticipated bridge needs. MDOT also established minimum tolerable conditions for bridges in determining needs. NBIAS helped MDOT to predict deterioration of the state's bridges and future investment needs.

MDOT calculated its rural and urban bridge needs backlog according to type of need (e. g., rehabilitation, improvement, or replacement). The total backlog need based on 2008 data was $4.6 billion through the year 2035. MDOT further estimated its full bridge needs, which included future, accruing bridge needs at $2.9 billion.

MDOT's assessment of need is well-developed and crucial to understanding the condition of the state's transportation system.

Goals

MDOT has developed system-wide goals that are similar to the goals of other states.

MDOT's MULTIPLAN 2035 clearly defines its critical goals for transportation system performance; these goals generally follow the national performance goals. They are:

- *Accessibility and Mobility:* Improve Accessibility and Mobility for Mississippi's People, Commerce, and Industry
- *Safety:* Ensure High Standards of Safety in the Transportation System
- *Maintenance and Preservation:* Maintain and Preserve Mississippi's Transportation System
- *Environmental Stewardship:* Ensure that Transportation System Development is Sensitive to Human and Natural Environment Concerns

- *Economic Development:* Provide a Transportation System that Encourages and Supports Mississippi's Economic Development
- *Awareness, Education, and Cooperative Processes:* Create Effective Transportation Partnerships and Cooperative Processes that Enhance Awareness of the Needs and Benefits of an Intermodal System
- *Finance:* Provide a Sound Financial Basis for the Transportation System

PEER found that other states have similar goals for their transportation systems. However, states vary in the performance indicators they use to measure those goals. Thus, while the goals are generally accepted in the field of transportation, the measures are not. (See page 41 for a description of performance measures in Mississippi and other states.)

Regularly Reported Measures of System Performance

State departments of transportation annually report data related to bridge conditions, road conditions, and fatalities to the Federal Highway Administration. This data allows for studying trends and making comparisons on three important measures of system performance that relate to MDOT's safety and maintenance/preservation goals. For two of the three measures, Mississippi has improved its performance at a faster rate than contiguous states.

States are required to submit certain information to the Federal Highway Administration (FHWA) each year. This information includes data regarding traffic volumes, roadway, pavement and bridge design factors, and the percentage of volume in peak hours. Based on this data, along with the Reason Foundation report and data collected from *State Stats*[7], PEER found comparative data on the following transportation system performance indicators:

- deficient bridges;
- percent of roadways in mediocre or poor condition; and,
- highway traffic fatalities.

Although the most recent data available for all states (2009 and 2011 data) is not current due to the time it takes FHWA to release the information, it provides a sense of progress over a long period.

[7] *State Stats* is a database that provides current and historical data series on all states from a variety of government and non-government sources.

Deficient Bridges (as a Percent of Total Bridges)

From 1992 to 2010, Mississippi showed more progress than its contiguous states in decreasing its percentage of deficient bridges. In 2010, Mississippi performed better than the national average on bridge conditions.

For 2011, 22.5 percent of Mississippi's bridges were deficient (i. e, either structurally deficient or functionally obsolete), which ranked Mississippi as 26th highest nationally.

For FY 2012, Mississippi ranked 11th highest in structurally deficient bridges, with 14.17%, and ranked 42nd highest for functionally obsolete bridges, at 7.95%.

A historical look shows that the percentage of deficient bridges nationally has decreased since 1992. (See Exhibit 15, page 39.) Mississippi's trend in percentage of deficient bridges has also decreased since 1993. Similar to its fatality rates, Mississippi showed more progress than its contiguous states between the years of 1992 and 2010, as evidenced by a noticeable decrease in the percentage of deficient bridges for those years. In 1992, Mississippi had the highest rate of its contiguous states and was higher than the national average. In 2010, Mississippi performed better than the national average for bridge conditions.

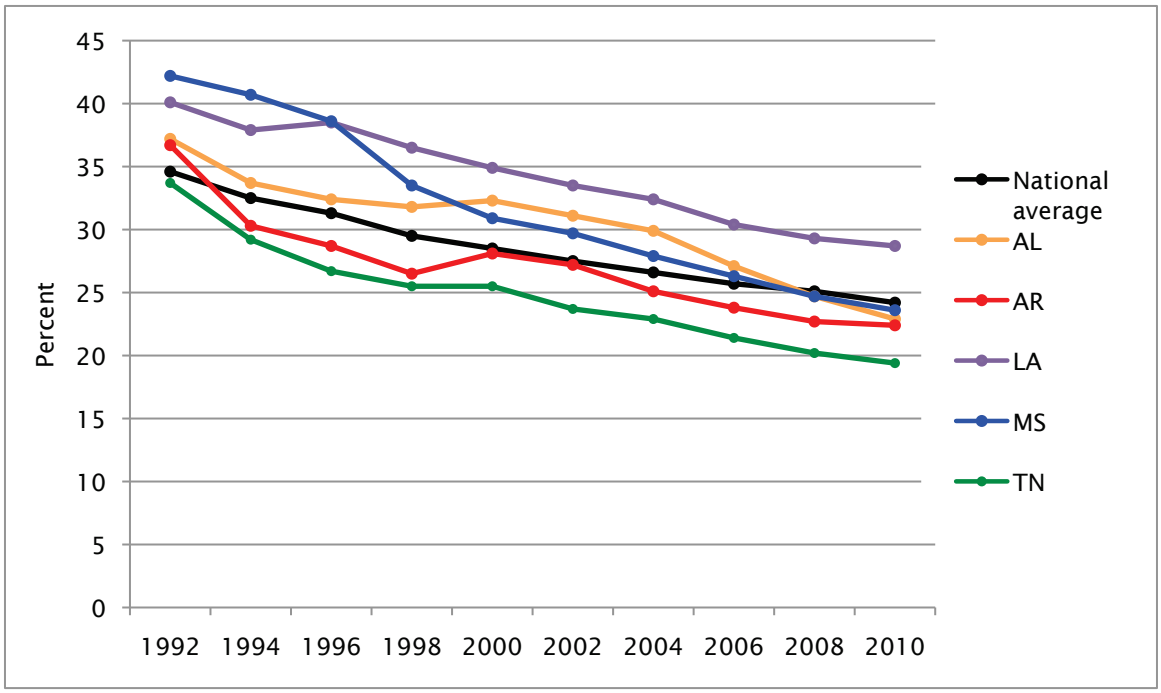
Percent of Roadways in Mediocre or Poor Condition

For 2004 to 2009, Mississippi followed the national trend showing a relatively consistent percentage of roadways in mediocre or poor condition across those years. Compared to its contiguous states, Mississippi is in the middle regarding its road conditions.

For 2009, the percentage of poor roadways in Mississippi was 17.5%, ranking 20th highest nationally. Percentages ranged from 7.5% in Tennessee, ranking 43rd nationally, to 25.5% in Louisiana, ranking 13th nationally.

A historical look shows that the percentage of roads in mediocre or poor condition nationally remained relatively stable between the years of 2004 and 2009. (See Exhibit 16, page 40.) Mississippi's trend is similar to the national trend and Mississippi's percentage is similar to the national percentage for all states. Of its contiguous states, Mississippi is in the middle for its road conditions.

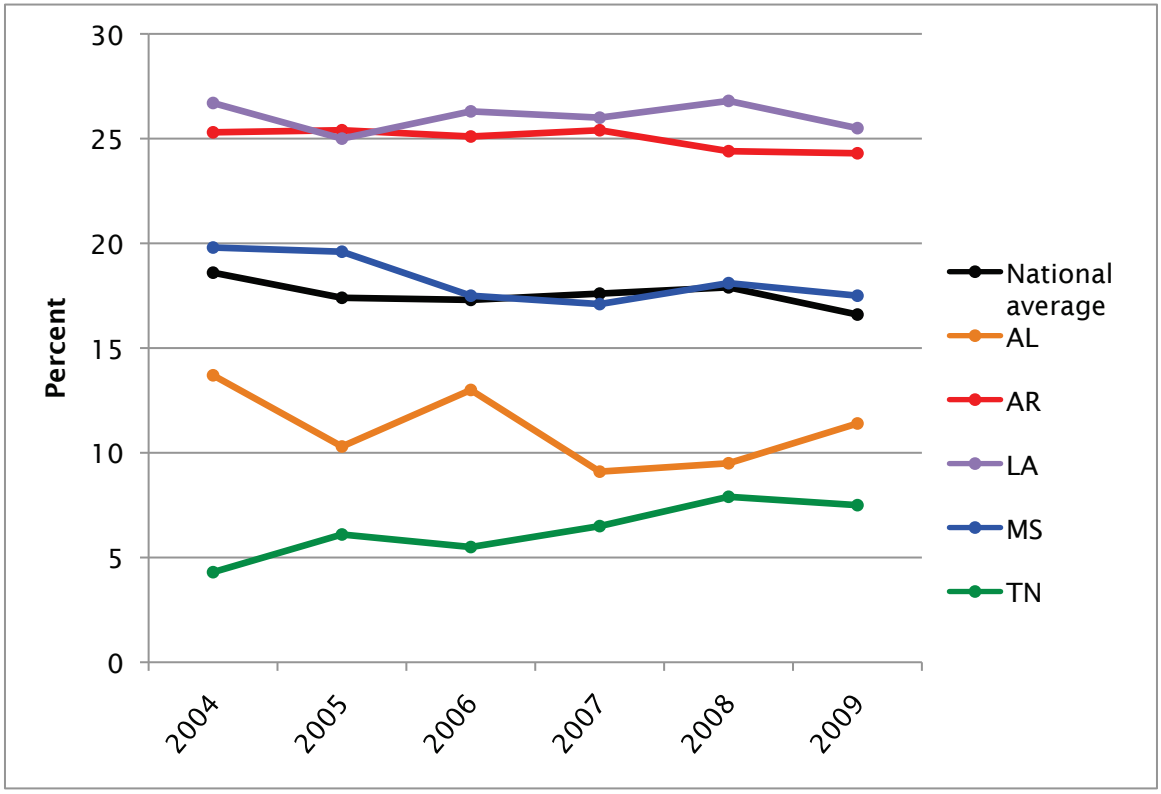
Exhibit 15: Trend in Deficient Bridges as a Percent of Total Bridges for Mississippi, Mississippi's Contiguous States, and the National Average, 1992-2010



NOTE: Data was not available for all years between 1992 and 2010. In order to maintain uniformity in the data presented, PEER used biennial data to graph the trend lines in this exhibit.

SOURCE: CQ Press, using data from U.S. Department of Transportation, Federal Highway Administration, "Deficient Bridges by State and Highway System, 2011" (http://www.fhwa.dot.gov/bridge/deficient.htm), and *State Stats*. *State Stats* used the Bureau of Transportation Statistics (BTS) as its source of information. The BTS used federal databases and other national sources to produce its "State Transportation Statistics 2011" report. For Mississippi road conditions, BTS looked only at the pavement's "smoothness" based on the International Roughness Index (IRI) as reported by the states through FHWA's Highway Performance Monitoring System (HPMS). HPMS guidance suggests that a specific IRI provides an unacceptable ride quality. Additionally, BTS included all routes reported through HPMS that contain a substantial amount of roadways maintained outside of MDOT's jurisdiction. Likewise, FHWA reported on bridges maintained by MDOT as well as local jurisdictions in their "Deficient Bridges by State and Highway System 2011" report. Approximately one-third of the bridges in this report are the responsibility of MDOT.

Exhibit 16: Trend in the Percent of Roadways in Mediocre or Poor Condition for Mississippi, Mississippi's Contiguous States, and the National Average, 2004-2009



NOTE: Because MDOT uses different models for calculating its road condition needs, the percentages presented in this chart might not match MDOT's calculations for roadway conditions in other parts of this report.

SOURCE: *State Stats*; CQ Press using data from U. S. Department of Transportation, Bureau of Transportation Statistics, "State Transportation Statistics 2011" (http://www.bts.gov/publications/state_transportation_statistics/).

Highway Traffic Fatalities

Mississippi's rate of highway traffic fatalities and the rates of contiguous states have historically been above the national average. However, from 1993 to 2010, Mississippi showed more progress in decreasing its highway traffic fatalities than did its contiguous states.

According to the Bureau of Transportation Statistics, in terms of highway traffic fatalities[8] in 2011, Mississippi ranked 21st with 630 fatalities. A historical look at fatalities shows that rates have decreased nationally from

[8] *Highway fatality rates* are fatalities per 100 million vehicle miles of travel.

1993 to 2010. (See Exhibit 17, page 42.) Mississippi's trend in fatality rates has also decreased since 1993. Further, Mississippi showed more progress than its contiguous states between the years of 1993 and 2010, as evidenced by a noticeable decrease in fatality rates for those years. In 1993, Mississippi had the highest rate of its contiguous states and was higher than the national average. By 2010, Mississippi had lower highway traffic fatality rates than Arkansas and Louisiana.

Performance Measurement and Reporting

An Outside Review of State Departments of Transportation's Performance Measurement in 2011

A 2011 report rated Mississippi as one of nineteen states "trailing behind" other states in measuring return on investment in six key areas (e. g., safety, jobs, and commerce).

A 2011 report by the Pew Center on the States and the Rockefeller Foundation[9] rated each state on whether it had essential information to identify what it is getting for its transportation dollars in key areas. States were rated according to three levels: "leading the way," having "mixed results," or "trailing behind" for each of six broad goals:

- safety;
- jobs and commerce;
- mobility;
- access;
- environmental stewardship; and,
- infrastructure preservation.

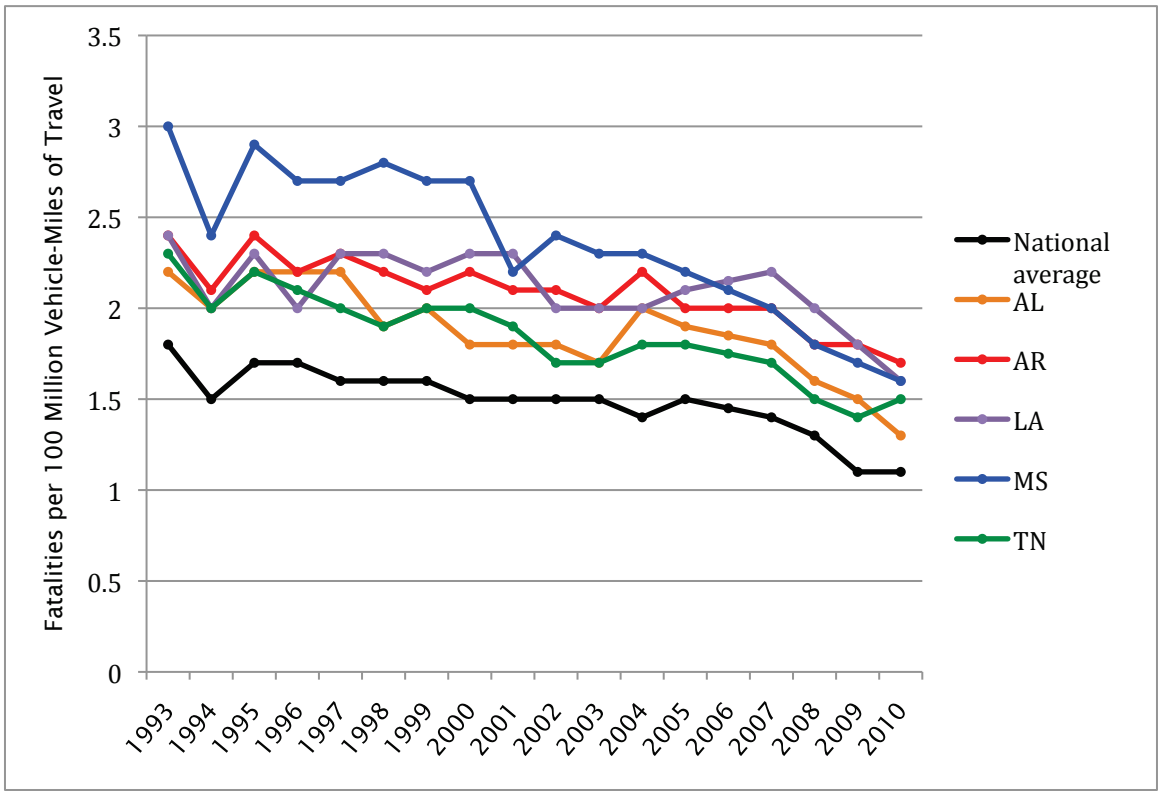
Also, each state was given an overall rating based on how it performed on the six goals. All states were doing a good job of tracking the safety of their roads and physical condition, or preservation, of their transportation infrastructure. However, many states could not answer critical questions about the return on taxpayers' investment in transportation in terms of mobility, access, environmental stewardship, and jobs and commerce.

The report highlighted Mississippi's need to develop measures, as Mississippi was one of nineteen states that received a rating of "trailing behind." The report stated that Mississippi has limited capacity to account for return on investment in its transportation systems across the spectrum of the six goals. See Exhibit 18, page 43, for a

[9] *Measuring Transportation Investments: The Road to Results*, The Pew Center on the States and the Rockefeller Foundation, 2011.

listing of states rated "leading the way," "mixed results," and "trailing behind."

Exhibit 17: Trend in Highway Fatality Rates for Mississippi, Mississippi's Contiguous States, and the National Average, 1993-2010



NOTE: 2006 data was not available. In order to maintain uniformity in the data presented, PEER inserted a surrogate data point for 2006 that equals the average of 2005 and 2007 fatality rate data.

SOURCE: *State Stats*; U.S. Department of Transportation, National Highway Traffic Safety Administration, "Traffic Safety Facts 2010" (http://www-nrd.nhtsa.dot.gov/cats/listpublications.aspx?Id=E&ShowBy=DocType).

Exhibit 18: Pew/Rockefeller Report's Overall Ratings for States and the District of Columbia in Measuring Return on Investment in Six Key Transportation Areas, 2011

Overall Rating	States
"Leading the Way" (i. e., leading the way in at least five goal areas; not trailing behind in any area)	California, Connecticut, Florida, Georgia, Maryland, Minnesota, Missouri, Montana, Oregon, Texas, Utah, Virginia, and Washington
"Mixed Results" (i. e., leading the way in four goal areas; OR leading the way in three or fewer goal areas and showing mixed results in the remaining areas; OR leading the way in five goal areas and trailing behind in one goal area)	Colorado, Delaware, Idaho, Illinois, Iowa, Kansas, Maine, Massachusetts, Michigan, New Jersey, New York, North Carolina, North Dakota, Ohio, Pennsylvania, Rhode Island, Vermont, District of Columbia, and Wisconsin
"Trailing behind" (i. e., leading the way in three or fewer goal areas; trailing behind in at least one area)	Alabama, Alaska, Arizona, Arkansas, Hawaii, Indiana, Kentucky, Louisiana, Mississippi, Nebraska, Nevada, New Hampshire, New Mexico, Oklahoma, South Carolina, South Dakota, Tennessee, West Virginia, and Wyoming

SOURCE: *Measuring Transportation Investments: The Road to Results*, The Pew Center on the States and the Rockefeller Foundation, 2011.

Sufficient Progress Not Made in Implementing Performance Measures

MDOT has not made sufficient progress in fully implementing its performance measures for each of its system-wide goals so that system-wide progress can be tracked over time.

Despite MDOT's well-developed needs assessment and identification of system goals, MDOT needs improvement in its performance measurement and reporting.

The most recent federal legislation (MAP-21) requires a transition to a performance- and outcome-based program. Accordingly, MAP-21 established seven national performance goals for federal highway programs. States have also set system-wide goals for their own transportation systems; however, some states have taken the lead in performance management by developing performance measures connected to goals and by providing visual representations of progress towards goals.

Performance measures are critical tools that can be used to:

- determine whether MDOT is meeting its goals;
- identify system deficiencies and opportunities for improvement; and,
- help guide allocation of resources.

MDOT has not made sufficient progress in fully implementing its performance measures for each of its system-wide goals so that system-wide progress can be tracked over time. MDOT's MULTIPLAN lists recommended measures for each of its seven system-wide goals; however, according to MDOT staff, MDOT does not use the goals and performance measures in the MULTIPLAN on a systematic basis at this time. MDOT plans to use these goals and performance measures in the future but is still working on establishing the appropriate goals and outputs.

MDOT contends that FHWA has not issued official guidance to states regarding the requirements under MAP-21 for performance measurement. MDOT expects FHWA to release its rules in 2014; subsequently, MDOT plans to finalize its performance measures and establish goals for future years. Also, FHWA and MDOT will be able to record these measures and document them in the Oversight and Stewardship Agreement.

Other Performance Indicators Not Yet Being Fully Utilized

MDOT's 2013 stewardship agreement with the Federal Highway Administration outlines performance measures for MDOT's construction program; however, these measures are in the initial stages of development.

MDOT provided PEER with the *Mississippi Department of Transportation and Federal Highway Administration Mississippi Division, Federal Aid Highway Program Stewardship and Oversight Agreement, April 2013.* The Stewardship Agreement breaks out MDOT's Construction into nine programs, as illustrated in Exhibit 19, page 45, including performance measures in each program area.

Although MDOT has multiple performance indicators and some efficiency indicators for its Construction Program (one of which measures the percentage of projects completed on time and within budget), it does not yet have the actual data to measure its performance. According to MDOT staff, the Construction indicators are in the initial stage of development.

Exhibit 19: MDOT's Nine Program Areas of Construction

Construction	Pre-Construction	Planning
		Environment
		Right-of-Way
		Design
	Construction	Construction
		Traffic Operations
		Research
		Highway Safety
		Bridge

SOURCE: Stewardship and Oversight Agreement 2013.

Maintenance Program Efforts to Measure Performance

MDOT's Maintenance program has made efforts to measure performance. Each district is evaluated according to maintenance goals achieved. Also, maintenance indicators are used to develop a needs-based budget of maintenance activities to help districts understand where their deficiencies are and to help maintenance staff measure their productivity against others around the state in order to improve performance.

As shown in Appendix D, page 116, MDOT's Maintenance Condition Survey shows how each of the six districts performed over the past year in certain Level of Service (LOS) areas compared to the goal for each district in each area. The Levels of Service goals are set to classes of A through F (as shown in Appendix E, page 119), then actual performance is measured against the goal. Not all goals are set at A because of the need to determine a realistic goal given the budget in that area for that district.

On a statewide level, MDOT met or exceeded thirty-six of the fifty-one Level of Service goals. Of the fifteen goals that MDOT did not meet, ten were one class lower than the goal, four were two classes lower, and one was three classes lower.

According to MDOT staff, maintenance indicators (shown in Appendices E and F, pages 119 and 122) are used for three main reasons. The first reason is to develop a needs-based budget of maintenance activities. Because the needs outweigh the budget, MDOT uses available funds to distribute to districts based on formulas. (See more

discussion regarding how maintenance funds are distributed to districts on page 84.) The second reason is for the districts to understand where their deficiencies are so that they can try to improve in those areas. According to MDOT staff, bridge and pavement maintenance are a priority and other functions are addressed as budgets and time allow. The third reason is to help the maintenance staff look at their productivity compared to other maintenance staff around the state to improve performance and potentially increase efficiency.

State Department of Transportation Performance Measurement Efforts

Some state departments of transportation have led the way in performance management by establishing and tracking performance measures, producing regular reports showing trends in system performance, and by providing online dashboards to communicate progress toward system goals and inform decisionmakers.

According to the 2011 report by the Pew Center on the States and the Rockefeller Foundation, states were rated to identify which states are doing the best in terms of having essential tools in place to make cost-effective transportation funding policy choices. The report noted considerable differences among states in measuring their ongoing performance toward important policy goals (e. g., safety, jobs and commerce).

When reviewing other state department of transportation websites, PEER found useful reporting tools for decisionmakers. For example, Washington and Michigan produce regular reports on system-wide performance. (See Appendix G, page 124, for Washington's one-page reporting tool regarding its goals, performance, and trends.) Washington's Gray Notebook is particularly noteworthy, as it is one of Washington's tools to increase transparency and to help demonstrate that taxpayer dollars are being used for projects that benefit the state. It can be found http://www.wsdot.wa.gov/accountability/.

Some states, such as Georgia, have performance dashboards to provide a visual representation of how they are performing. Georgia's dashboard may be found online at http://www.dot.ga.gov/informationcenter/statistics/performance/Pages/default.aspx.

Exhibit 20, page 47, shows some of the ways in which states are measuring performance. In addition to MDOT not having established its key performance measures, MDOT stands out as not tracking performance over time or comparing its performance to that of other states. MDOT notes that it anticipates providing performance information to the public in the future. MDOT stated that the department is in the beginning stages of developing a

dashboard similar to that of the Virginia Department of Transportation. Because MDOT's Maintenance program already collects performance information, maintenance indicators would likely be the first reported to the public in the form of an online dashboard.

Exhibit 20: State Efforts in Performance Measurement of Six Key Transportation Goal Areas

Goal Area	State Efforts
Safety	• All states generally measure safety on such measures as fatalities and crashes.
Jobs and commerce	• States are commonly focusing on measures connected to freight shipping by truck or rail, with some disaggregation of the data into the type of goods, mode of transportation, etc. • *Michigan* uses an analytical tool to compare estimates of economic benefits of transportation spending over time, including jobs created by industry and gross state product.
Mobility	• States use an array of measures to assess the ease with which travelers can move between destinations (e. g., travel times on key roads). • *Texas* uses an online dashboard that presents and explains data on several mobility measures, including a statewide congestion index, travel delays, and costs of congestion delays.
Access	• Better measures are needed; most states lack measures that focus on how transportation options affect workers' ability to reach their jobs. • *Louisiana* uses a measure aimed at helping ensure that all citizens have the ability to use public transportation: the number of participating parishes with low-cost transportation options.
Environmental Stewardship	• States are beginning to focus more on measurement in this area. • *Maryland* uses data to understand and measure the impact of transportation decisions on the environment. For example, the state presents information on its success in reducing vehicle miles traveled through park-and-ride usage and measures reductions in energy consumption by tracking the use of "green" transit vehicles.
Infrastructure Preservation	• Most states have information regarding their own pavement and bridge conditions. • *Louisiana* and *Virginia* provide comparative information on their own prior performance over time for pavement and bridge conditions and set targets for improvement.

SOURCE: *Measuring Transportation Investments: The Road to Results*, The Pew Center on the States and the Rockefeller Foundation, 2011.

How does MDOT compare with other state departments of transportation in holding itself accountable in terms of efficiency?

MDOT has some efficiency-related measures, but they are limited in determining efficiency of departmental operations. Relative to other states, MDOT has room for improvement in measuring its own efficiency. The best measures of efficiency would focus on operations under MDOT's control.

An understanding of how departments of transportation view efficiency was not prevalent in the information PEER reviewed regarding transportation system performance and goals. Efficiency measures are those measures focused on internal utilization of resources, cost, etc.

Construction Cost Per Mile Indicators

MDOT maintains bridge construction cost per square foot of deck as well as four-lane new construction average costs per mile.

Bridge Construction Efficiency-Related Indicator

According to MDOT staff, the bridge construction cost per square foot of deck is submitted by the MDOT Bridge Division to the Federal Highway Administration (FHWA). The FHWA then enters this information into a table on its website, showing bridge construction cost per square foot of deck for all states.

This information has been maintained since at least 1994 and shows increasing costs for Mississippi from that year through 2012. However, according to the FHWA data, Mississippi ranked among the top three states in the lowest bridge construction cost per square foot of deck for the past ten years (excluding the year of Hurricane Katrina and the year after).

Four-Lane New Construction Efficiency-Related Indicator

According to MDOT staff, the department has maintained construction average costs per mile since 1976. The average cost per mile for 2012 was approximately $6 million. These costs are not all-inclusive, however. They account for right-of-way, grading and draining, and paving, but they do not account for other costs such as engineering or environmental studies.

MDOT does not use this information to indicate efficiency; rather, MDOT uses this information to show how much construction costs have escalated over time. The average cost per mile in 1990 was approximately $2 million and by 2005, the average had increased to approximately $5 million.

MDOT's Use of These Two Indicators

The bridge construction cost per square foot and the construction average cost per mile measures do not have a standard and are therefore limited in determining absolute efficiency of MDOT operations. While MDOT's cost per square foot of bridge deck is consistently one of the lowest in the nation, it does not necessarily indicate efficiency of MDOT's operations because it is only relative to other states and it includes factors outside of MDOT's control, such as the cost of construction materials.

In order to be used as efficiency indicators, these numbers should be broken down into components. These components would indicate which costs MDOT has some control over and which costs MDOT does not have control over. Monitoring the costs for which MDOT has some control would provide some indication of MDOT's efficiency in operations.

Washington State DOT's Analysis of Construction Costs

The Washington State Department of Transportation (WsDOT) has made an effort to provide some context and comparisons with other states for its construction cost per mile. The WsDOT conducted a project to determine whether its construction costs are in line with national experience.[10] It reviewed fifteen projects from twelve different states, as well as twenty-one projects from Washington State. WsDOT found that the biggest factors in variations in costs per lane mile are:

- projects that have structures and interchanges have a much higher cost per lane mile;
- if a project can be built within existing right-of-way, then its cost per lane mile is much less than a project that needs additional right-of-way;
- mitigation costs for environmental impacts have a dramatic effect on cost per lane mile; and,
- differing soil and site conditions also have an impact on the cost per lane mile.

WsDOT also noted that what states include in their project cost varies. Some states report only construction costs. WsDOT obtained more comprehensive cost information, including right-of-way, design, and construction engineering. It found that Washington State's costs for typical roadway projects are in line with comparable projects from other states.

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[10] *Highway Construction Costs: Are WsDOT's Highway Construction Costs In Line with National Experience?* July 12, 2004.

Maintenance Program Efficiency-Related Indicators

MDOT has efficiency indicators that measure maintenance cost per unit of output.

MDOT's Maintenance Summary FY 2012 reports performance indicators with data that measures the cost per unit of output. The measures are in five categories (asphalt, shoulder maintenance, drainage maintenance, roadside maintenance, and traffic services), as shown in Appendix F, page 122. This summary is produced each year by MDOT, making it possible to track performance data over time and also allowing the department to compare its maintenance costs to those of other states.

As shown in Appendix F, the performance indicators and data for FY 2012 show that of the ten cost-related measures that have internal standards, MDOT performed above the standard in seven measures and below the standard in three measures.

Efforts to Get the "Best Bang for the Buck"

During fieldwork, PEER noted efforts by MDOT to get the "best bang for the buck." For example, MDOT's Research Division has developed decision trees for various pavement issues. Along with valid pavement data, these tools provide districts with the best information to make decisions regarding pavement. For example, MDOT's decision tree for two-lane, flexible pavement requires the following analysis of information:

- If the percentage of medium and high "alligator cracks" is greater than two percent but less than or equal to three percent, then evaluate the other cracks.
- If "all other and low alligator" cracks are less than or equal to 15 percent, then evaluate the "medium and high other cracks."
- If the "medium and high other cracks" are greater than fifteen percent, the treatment recommendation is for a minor rehabilitation, specifically a mill and 1.5 inch overlay.

Such tools indicate a good effort by MDOT to use its funds in an efficient manner for maintenance of the state's roads.

It was apparent to PEER during this review that MDOT has some good practices for coordinating work efforts in an efficient manner. For example, district engineers, along with staff from key divisions related to the construction program, have monthly meetings to discuss problems and potential solutions and discuss schedules of staff. Of course, these efforts are not absolute measures, which

would be more reliable to demonstrate operational efficiency of MDOT staff.

Other States' Efficiency-Related Indicators

Other state departments of transportation have made efforts to report on efficiency. Some report efficiency in terms of on-time and on-budget performance of projects or the number of employee hours per project cost. Others report efficiency as the number of employees performing various functions and dollars associated with operations (e. g., ratio of lane miles per FTE).

Indicators of efficiency are not used as widely among state departments of transportation as indicators of performance. However, other some states have made efforts to report on operational efficiency. Some of the most commonly used measures are measures that report whether project-related activities are completed on time and within budget. Less commonly used measures are ones that account for efficient delivery of services.

On-Time and On-Budget Measures

Other states have been tracking and measuring whether projects are on-time and on-budget. For example, Washington State consistently measures whether different types of projects (e. g., road, rail) meet time and budget standards. Although MDOT is currently not reporting on these measures, Mississippi's oversight and stewardship agreement with FHWA has several indicators related to on-time and on-budget performance. See Exhibit 21, page 52, for examples of potential indicators to help demonstrate efficiency of MDOT's operations.

Exhibit 21: Potential Indicators to Help Demonstrate Efficiency of MDOT Operations, from the MDOT and FHWA Stewardship and Oversight Agreement, April 2013

Construction Program Area	Measure
Consultant Selection and Management	% of active consultant contracts in the fiscal year where termination date has been extended
Environmental	% of environmental impact statements completed within thirty-six months
Right-of-Way	% of projects with right-of-way cost not exceeding the estimate by >15% upon right-of-way closeout
Design	% of projects with final preliminary engineering costs < or = 10% of low bid amount

SOURCE: MDOT and FHWA Stewardship and Oversight Agreement, April 2013.

Other Potential Efficiency Measures

Other states have measures to show efficient delivery of services, including:

- the number of employees performing various functions and dollars associated with those functions (which is one goal of performance management); and,
- number of employees or employee hours per implemented project cost.

Another potential measure is to use an administrative disbursements per-mile calculation. (See page 28 for a description of this measure.) While not an absolute measure of efficiency, MDOT could use this measure as one of multiple measures to show efficiency of operations.

A multiple indicator approach is necessary to show the efficiency of MDOT operations. It is MDOT's responsibility to track and report on the best combination of indicators, although several are listed in this section of the report.

Does MDOT have a rational decisionmaking process to ensure efficiency in its management of staff workload?

MDOT has no department-wide effort to analyze its workforce in relation to its current and future workloads. However, MDOT is in the process of creating and refining measures to track workload information for its 195 professional engineers. MDOT struggles to recruit and retain engineers due to the salary level being significantly less than what an engineer would earn at a private firm. As a result, MDOT contracts out many engineering functions due to lack of personnel or lack of in-house specialized skill sets (e. g., bridge design). According to MDOT staff and various studies, contracting out engineer work always costs more than performing those functions in-house.

This chapter discusses the following questions:

- Does MDOT have a process to account for the efficiency of its staff in relation to its current and future workloads?
- How does MDOT account for its engineering staff?
- How does MDOT justify its need to continue to outsource engineering functions?
- How does MDOT determine whether an engineering function should be contracted out?

Does MDOT have a process to account for the efficiency of its staff in relation to its current and future workloads?

While individual divisions (e.g., Maintenance) may evaluate staffing in relation to workload needs, MDOT has no department-wide effort to analyze its workforce in relation to its current and future workloads. Such an analysis would include determining the department's optimal size and the most efficient combination of full-time employees, temporary workers, and contract services to achieve MDOT's mission. Several other states have implemented such analyses in response to in-house personnel capabilities and statewide transportation department demands.

MDOT's Maintenance Division uses the Accountability and MDOT Maintenance Operations (AMMO) system to determine maintenance needs and workload. The information that is input into AMMO comes from three sources: (1) the Research Division inputs pavement information, (2) the Bridge Division inputs bridge information, and (3) the field crews conduct condition

surveys and inspections and input shoulder and roadside information.

From this information, AMMO determines maintenance needs and assigns a level of effort to deficiencies using engineering calculations. MDOT engineers then meet to judge the current conditions against the targeted conditions and AMMO creates a work plan showing the number of days and the number of workers it will take to complete an activity. If MDOT needs more workers, it will contract out.

Although MDOT does not have a department-wide effort to analyze its workforce, some individual MDOT divisions do utilize mechanisms to evaluate staffing needs. At exit conference, MDOT provided documentation that shows that it is making efforts that will allow for statewide workforce planning for its projects. These efforts are not currently in effect, but were introduced to MDOT's district leadership in mid-December 2013 and will begin soon. The statewide planning efforts are based on a recently developed map of Mississippi that is divided by county. Every county contains the number of projects that is set to be let in accordance to MDOT's five-year plan. According to MDOT staff, when any changes are made to the five-year plan, those changes will automatically be reflected on the project map. The map will show which counties have the most active projects and will allow MDOT to move staff to areas with the greatest need. The planning map will be used to facilitate discussion among MDOT leadership staff to make more efficient staffing decisions. See Appendix H, page 125, for a copy of the planning map for projects with letting dates between 2013-2018.

Several states--such as Arkansas, Ohio, New Mexico, Louisiana, Virginia, Pennsylvania, Minnesota, and New Jersey--have implemented department-wide programs to analyze and improve their workforce in response to in-house personnel capabilities and statewide transportation department demands. See Appendix I, page 126, for a description of other states' efforts. The following section contains a detailed description of Georgia's Workforce Planning Initiative.

The Georgia Department of Transportation (GDOT) Workforce Planning Initiative

Responding to a decrease of in-house skill sets due to retirement of senior staff, the Georgia Department of Transportation implemented its Workforce Planning Initiative. This initiative resulted in the department's documenting minimum staffing needs for all of its functions and determining the most efficient combination of full-time employees, temporary workers, and contract services.

PEER contacted the Georgia Department of Transportation (GDOT) and gathered information related to GDOT's recent

and ongoing efforts to completely transform its workforce. Three years ago GDOT formed a Workforce Planning Initiative (outlined in FY 2013's Strategic Plan). GDOT noticed that its turnover rate has been above 13% since 2002. In addition, in 2011, 42% of its senior leadership and 49% of its office heads were within five years of retirement. GDOT realized it would be losing many of its in-house skills and struggled with the ability to replace those skills. Thus GDOT's Workforce Planning Initiative was created.

In this initiative, GDOT management created a Workforce Efficiency Committee. This committee led the process in:

- producing minimum staffing organization charts for each office and district;
- determining the department's optimal size; and,
- identifying potential staffing solutions to reach the identified optimal size.

The three areas above involved identifying the functions within the department, documenting minimum staffing needs, and determining the most efficient combination of full-time employees, temporary workers, and contract services to achieve GDOT's mission. The process also involved staff development strategies, succession planning, cross training, personnel re-organization, and knowledge transfer.

The workforce analysis took place in every GDOT division/district. The analysis that occurred in GDOT's engineering division yielded the following information, published in GDOT'S 2013 Strategic Plan:

> *The Engineering Division conducted a workforce analysis to identify work functions and staffing requirements and develop a current workforce profile. The core function analysis involved validating or establishing a level of service (LOS) for the core functions of the Engineering Division and developing contract requirements for LOS and oversight, estimated costs for contracting, and budgetary impacts on core functions. The analysis takes into account the current and proposed design projects. Based on the projected LOS, current and proposed design project needs, the support services needed to deliver the projects and the project program and budget impacts, a minimum structure will be developed for each Engineering Division core function.*

The process also included an analysis that identified what staff resources GDOT needed based on its workload.

GDOT management relied on a study it completed in 2007 that described what impact outsourcing an engineer function had on other functions. GDOT decided that, based on current skill sets available in-house, it would outsource 60% of its engineering work and 70% of its design functions. As a result, over the past three years and without any layoffs, GDOT constructed a workforce that mirrored its decision to outsource the majority of its engineering design functions. GDOT follows what its Chief Engineer calls "knowledge management." GDOT's Chief Engineer emphasizes that knowledge management is not an "easy button" for the perfect department of transportation, but it is a basis on which to make the most efficient and effective decisions. Knowledge management is a process of discovering what knowledge GDOT has on hand and its plan for what would happen if that knowledge were no longer available in-house.

Regarding in-house accountability, GDOT engineers are held accountable mainly in two ways. First, they code their time each day at a minimum of quarter hour increments. The codes are assigned to projects, overhead, training, and management. Secondly, division or district leadership manages a staff engineer's tasks. GDOT's Director of Engineering emphasized how strict division leadership is in the way it monitors an engineer's workload. The workforce initiative determines what positions are truly necessary within GDOT; thus, if a certain engineering position is not necessary to complete current or future projects, that position may be altered, transferred to a needed area, or simply left unfilled (if positions become vacant). A separate office, the Office of Program Development, monitors and manages consultants' projects. A GDOT engineer with the skill set related to the particular project is assigned as the project manager and this engineer monitors the efficiency of GDOT contracts.

For more detail on GDOT's process for conducting its workforce initiative, see Appendix J, page 129, which presents a flow chart and the questionnaire GDOT developed for each department head to assess its departmental resources.

How does MDOT account for its engineering staff?

In-House Engineering Staff Workload

MDOT provided PEER with project workload information that accounts for roughly 7.6% of its in-house engineers. The primary concern is that the majority of engineers' workload is not tracked. Therefore, PEER could not verify, with MDOT official documentation, whether MDOT is utilizing its in-house engineering resources efficiently.

MDOT maintains project management software data for engineers assigned to projects. However, this

data is not detailed in nature and does not include the majority of the professional engineers on staff. MDOT provided PEER with project workload information that accounts for roughly 7.6 percent of its in-house engineers, which included seven Geotechnical/Materials Division engineers, three Bridge Division Engineers, and five Roadway Design Division engineers.

The software programs used include Microsoft Access (linked to the Oracle database), AASHTOWare's Project (formerly Site Manager), Primavera Software, and Microsoft Project. The divisions or districts that use these programs usually customize them for their specific division/district.

MDOT made an effort to communicate to PEER its use of engineering resources by providing written position description narratives for each of the professional engineers. (See Appendix C, page 106, for a description of professional engineering staff by division and Appendix K, page 132, for summaries of work performed by MDOT's professional engineers.) Most of these narratives included the engineer's job description and what a workday might look like. Few included the importance of that position and how it fits into MDOT's mission, while others included active assignments in which the particular engineer was involved. The engineer-written narratives allowed PEER to determine which division or district each engineer worked in and the basic duties attached to each position, but the summaries did not convey the current workload for many in-house engineers.

PEER also questioned MDOT on its timekeeping system. MDOT's system includes a variety of codes, but those codes are not descriptive enough to determine daily activities. For instance, an eight-hour workday might have a specific task code attached to it, but that code may be entitled "administration." When reviewing records, there would be no way of knowing what specific tasks were completed under the "administration" code.

MDOT's Allocation of Current In-House Engineering Resources

MDOT provided PEER with reports generated by project management software that listed projects for which seven Geotechnical/Materials Engineers were responsible. However, the documents suggested that engineers were working on projects that did not have current need.

The materials engineers are assigned to several projects that are set to let within the next five years. However, these engineers are also working on projects that are not

set to let until 2020, 2040, or 2050. PEER learned that the dates on the project management software were not true dates, but rather default dates, but work is still being completed on projects that do not have a current need or a need date within the next five years.

MDOT staff provided the explanation below as to why work was being performed for projects with a date of need in the distant future:

> *The letting dates on those active project documents come straight from our Project Development Project Management (PDPM) process. When there is a date of 2020, 2040 or 2050 that simply means that we currently don't have the funding to program a specific date. Generally those projects will have a lower priority for our Geotechnical staff. However, there are times when we do need to work on them. For example, even though a letting date has not been identified, MDOT may want to acquire the right of way for the project. Preliminary geotechnical work will need to be done to identify the type of foundation that is required for a bridge, identify what kind of shoulder slope is warranted or determine if a retaining wall is required. That information is needed so MDOT knows how much property will need to be acquired.*

MDOT's Outsourcing of Engineering Work

MDOT spent approximately $42.7 million in FY 2010 to outsource engineering functions, $47.5 million in FY 2011, and $48.5 million in FY 2012.

According to MDOT's standard operating procedures, when a division or district determines that a consultant's services are needed, "the proposed Project Director submits a formal Consultant Use Request Form [ADM-101] to the Deputy Executive Director (except in the case of Master Contract Work Assignments under $100,000)." This form includes several components, including:

- description of the project scope;
- documentation of the need for consultant services;
- cost estimate;
- proposed funding source;
- proposed selection process;
- proposed evaluation factors and weights;
- recommendation for selection committee membership; and,

- designation of the Project Director, Project Manager, and Assistant Project Manager

PEER reviewed consultant request forms that MDOT provided for FY 2013. These forms allowed PEER to determine the justification for consultants' services as well as the types of services that MDOT contracted out during FY 2013. MDOT spent approximately $42.7 million in FY 2010 to outsource engineering functions, $47.5 million in FY 2011, and $48.5 million in FY 2012.

According to PEER's review of 120 consultant request forms for FY 2013, the following were the types of engineering services for which MDOT staff requested contracts:

- Bridge;
- Roadway Design;
- Traffic Engineering;
- Construction;
- Environmental;
- Planning;
- Geotechnical;
- Ports and Waterways; and,
- Maintenance.

Bridge, roadway design, and traffic engineering were the types of engineering contracts most frequently requested in FY 2013, representing 75% of the consultant requests PEER reviewed. Outsourced engineering functions requested for bridge engineering work included areas such as bridge hydraulics, seismic design, and bridge inspection and repair. Outsourced engineering functions for roadway design included capacity analyses, conceptual intersection re-design, roadway design plans, roadway lighting, and review of shop drawings and inspections. Outsourced engineering functions for traffic engineering included traffic signal inventory, statewide signing layouts, road deficiency studies, quality control and assurance signing plans, and signal plans.

How does MDOT justify its need to continue to outsource engineering functions?

MDOT struggles to recruit and retain engineers on its staff due to the salary level being significantly less than what an engineer could earn at a private firm. Thus MDOT lacks personnel available to complete projects or personnel with specialized skill sets (e. g., bridge design). To complete the projects, MDOT must outsource to gain the particular skills needed, which increases engineering costs because the per-hour rate for contracted engineering services is higher than the in-house rate.

Of all the engineering services that MDOT outsourced in FY 2013, approximately 40% were in the Bridge Division. MDOT's Bridge Division requires specific skills, such as the ability to perform bridge hydraulics, bridge repair seismic design, and certain bridge fracture and critical inspections. According to MDOT, these skills are either unavailable in-house or MDOT lacks the personnel necessary to complete the proposed project. In order to stay in compliance with FHWA standards, MDOT must secure these skills elsewhere.

MDOT staff stated that the cost of completing a project in-house is always less expensive than hiring a private consultant to complete the same task because the per-hour rate for contracted services is higher than the in-house per-hour engineering pay rate (see page 61). Thus MDOT's contractual expenditures could most likely be lowered significantly if MDOT could complete more projects in-house.

The obvious solution would be for MDOT to hire additional skilled personnel to handle the projects that are usually outsourced. However, it is a challenge for MDOT to recruit engineering professionals with these specialized skills and MDOT Human Resource staff stated that they are currently employing no department-wide effort to recruit professional engineers (PEs), although division-specific recruitment efforts may occur. All of MDOT's engineer recruitment efforts are directed toward engineering students or recent engineering graduates. MDOT cannot offer the salary that a PE could make doing the same type of work in the private sector, leaving MDOT with an abundance of engineers-in-training who are inexperienced, lack complex skill sets, and are required to work under the supervision of a PE.

PEER recognizes that there are situations in which an outside consultant would frequently be necessary; there are cases when it would not be cost-effective to keep a highly specialized engineer on staff when his or her unique skill set would be needed infrequently. However, for tasks that are consistently outsourced, it might be beneficial to establish a method to obtain and retain certain skill sets on MDOT's staff.

In addition to problems with recruiting professional engineers, MDOT struggles with the ability to retain on-staff engineers. According to MDOT's Human Resource Director, the average turnover rate for MDOT engineers for the past five years was as follows:

- Engineer in Training--23.8%;
- Professional Engineers (I-IV)--17.2%; and,
- Engineer Administrator (Engineer Bureau Administrator, Engineering Division Administrator, Engineering Administrator Assistant)--39.4%.

According to the Society for Human Resource Management, the average voluntary turnover for all industries in 2011 was 9%.

It is common for an Engineer-in-Training to leave MDOT for a private firm once he or she completes four years of supervised experience and receives the PE credential. MDOT's HR Director states that it is also common for senior leadership (with twenty-five years of state service) to retire from MDOT and go to work in the private sector.

MDOT's Engineer Salary Cannot Compete with the Salary Offered at Private Engineering Firms

The salary that the State Personnel Board has set for MDOT professional engineers cannot compete with the salary an engineer could receive by working for a private engineering consultant firm. Many MDOT engineers will continue to move to the private sector unless MDOT salaries become more competitive.

Exhibit 22, page 62, presents the current beginning hourly rates that MDOT engineers earn, with and without fringe benefits, according to the State Personnel Board.

The U. S. Department of Labor/Employment and Training Administration's sponsored online database, The Occupational Information Network (O*NET), lists the 2012 national average civil engineer salary to be $38.14/hr.

According to data from engineering consultant contracts MDOT entered into in FY 2013, the highest rate on the contracts chosen, the lowest rate, and the average hourly rate of the selected Mississippi private sector engineering consultants, according to position, are listed in Exhibit 23, page 62.

Exhibit 22: MDOT 2013 Engineer Beginning Salary Data, Hourly Rates

MDOT Position	Beginning Salary (Hourly Rate)	Salary With Fringe Benefits
Engineer in Training	$19.20	$26.51
Engineer I	$22.59	$30.81
Engineer II	$24.28	$32.97
Engineer III	$25.64	$34.69
Engineer IV	$27.31	$36.80
Engineer Administrator Asst (Division Leadership)	$28.55	$38.37

SOURCE: Mississippi State Personnel Board.

Exhibit 23: Private Sector Engineer Rates, FY 2013, Hourly Rates

Private Sector Position	High Rate (Hourly)	Low Rate (Hourly)	Average Rate (Hourly)
Engineer in Training	$33.00	$22.50	$27.16
Engineer	47.00	32.11	37.68
Senior Engineer	58.00	38.50	48.37

NOTE: This average salary rate for a private sector engineer does not include fringe benefits, as MDOT does not pay fringe benefits for contractors.

SOURCE: MDOT Engineer Consultant Contracts/Transparency Mississippi.

Each year the Mississippi State Personnel Board (MSPB) conducts a salary survey on comparative job classes for MDOT professional engineers. It is MSPB's general practice to consider salary survey data in the public sector in Mississippi's contiguous states (Louisiana, Arkansas, Tennessee, and Alabama) and the Mississippi private sector. Although MDOT has not given a realignment increase for the past five years, MSPB's Deputy Director states that a salary increase was recommended to the Legislature and will be considered in the 2014 session. This salary increase recommendation is a result of the September 2013 MSPB comparative job class MDOT salary survey. The data and results from that survey are listed in Exhibit 24, page 63.

Exhibit 24: MSPB Engineer 2013 Salary Survey Data for Engineer III Position (Average Salaries)

Alabama	Arkansas	Louisiana	Tennessee	Average	Current Start Salary (DOT-Engineer III)
$58,100	$56,900	$61,000	$57,900	$58,475	$53,339

NOTE: MSPB conducts salary surveys for the Engineer III position and, based on that information, calculates salaries for the EIT, Engineer I, Engineer II, and Engineer IV positions.

SOURCE: Mississippi State Personnel Board.

MSPB staff then used the following formula to calculate the recommended increase:

- **(Average salary of four adjoining states – Current Start Salary for DOT-Engineer III)/Current Start Salary for DOT-Engineer III**
    - ($58,475 - $53,339)/$53,339 = 9.63% increase

The percentage increase is then applied to all of the job classes in the series to formulate the recommended realignment increase. Exhibit 25, below, is the realignment increase recommendation that was approved by the MSPB and will be sent to the Legislature for consideration.

Exhibit 25: State Personnel Board's Realignment Recommendation for DOT-Engineer Class Series

Job Class	Current Start Salary	Realignment Increase	Recommended 7/1/14 Start Salary
DOT-Engineer In Training	$39,942.52	$3,846.46	$43,788.98
DOT-Engineer I	$46,982.36	$4,524.40	$51,506.76
DOT-Engineer II	$50,511.44	$4,864.25	$55,375.69
DOT-Engineer III	$53,338.91	$5,136.54	$58,475.45
DOT-Engineer IV	$56,804.31	$5,470.26	$62,274.57

NOTE: MSPB's salary increase recommendations will be sent to the Legislature for approval to start July 1, 2014.

SOURCE: Mississippi State Personnel Board.

In the 2008 PEER report *Enterprise Mississippi: A Vision for State Government* (Report #518, December 9, 2008), PEER makes reference to the Public Employee Retirement System (PERS) benefits that are associated with state employment. Health and life insurance plans are other incentives for state service and are important to potential employees. NASHTU even reports the reasons as to why the benefits

associated with working for the state aid in recruitment and retention. However, the "take-home" salary continues to be a driving force and the ultimate reason for MDOT's inability to retain a skilled workforce. MDOT engineers will likely continue to leave the public sector for higher salaries in the private sector if no significant salary change is to occur within MDOT. In order for MDOT to recruit and retain quality engineers, it would have to offer a salary comparable to what is provided in the private sector.

MDOT's Future Consultant Needs

As previously stated, MDOT's Bridge Division needs outsourced consultants most frequently because MDOT lacks sufficient in-house skills necessary to complete complex bridge-related tasks. As federal mandates increase (for example, more rigorous bridge inspections), MDOT Bridge Division leadership believes that its outsourcing needs will also increase. A potential concern is that MDOT would not be able to monitor those contracts effectively.

The Bridge Division is so complex in nature that when an EIT is hired in that division, it would take years until that engineer would be able to undertake a bridge project at the level necessary to complete that project. One year ago, the Bridge Division hired ten EITs. However, all ten new hires are only able to handle basic bridge design under the supervision of a PE.

MDOT's Bridge Inspection Unit will soon have to follow new federal mandates for more in-depth bridge inspections known as Element Level Inspections. According to Bridge Division leadership, current bridge staff are not equipped to handle such inspections and outsourcing needs will increase in upcoming years. Thus, in the future, MDOT's Bridge Division will likely see additional need to outsource for skills unavailable in-house.

More outsourced engineers could result in MDOT engineers monitoring consultants that have a skill set far greater than their own. NASHTU reports that when private companies design, engineer, inspect, and manage entire projects, state transportation departments that have cut back on their professional staffs cannot hold consultants accountable for the cost, quality, and safety of their work. If MDOT staff lacked the expertise necessary to complete a complex project in-house and resorted to outsourcing that function, it would be difficult for MDOT staff to monitor that project effectively or hold the consultant accountable for the work.

Costs of Completing Engineering Functions In-House Versus Contracted

MDOT staff affirm that the cost to complete an engineering function in-house is always less expensive than allowing a private firm to complete that same function.

In a report entitled *Highway Robbery* released by the National Association of State Highway and Transportation Unions (NASHTU), issued first in 2002 and updated in 2007, studies performed across the country showed that conducting a cost-benefit analysis calls attention to the:

> *. . .inescapable fact that outsourcing costs more than making use of state engineering and technical employees. More than 80% of comparative studies have found that contracting-out engineering, design, and inspection costs more than do[ing] this work in-house, and none of these studies found that consultant engineers were less expensive.*

Exhibit 26, page 66, lists findings from reports state departments of transportations and other agencies have released concerning outsourcing engineering functions.

Efforts of Other States to Address High Need to Outsource

Other states have employed different measures to combat the nationwide outsourcing issue for state departments of transportation. Some states, such as Wisconsin, have proposed adding new in-house engineering positions, while other states, such as Georgia, have made the decision to outsource more than what is done in-house and build a workforce that matches that decision.

In a May 2013 report, the Legislative Fiscal Bureau in Wisconsin recommended that the Governor approve 180 new positions to be added to that state's department of transportation. Of the 180 positions, 158 would be civil engineers, engineering specialists, or engineering technicians. The new positions would perform highway engineering services that would otherwise be done by engineering consultants. The proposal Wisconsin drafted would transfer $11,741,500 in 2013-2014 and $15,655,300 in 2014-2015 from the department's budget for contractual services for the salaries, fringe benefits, and supplies and services of the new positions.

The Georgia Department of Transportation adopted a Workforce Planning Initiative that is in the process of creating the optimal size workforce based on the work it has projected to complete in-house (see page 54 for more information on GDOT's initiative).

NASHTU reports that state departments of transportations are in a position where they either must learn how to

attract and hire new skilled engineers with a certain level of expertise or rely even more heavily on private consultants.

Exhibit 26: Nationwide Engineer Consultant Studies and Findings

State	Conducted Study	Findings
Texas*	Price Waterhouse Coopers	Outsourcing is 62% more expensive for eight of the thirteen kinds of design work studied.
California	California Legislative Analysts (2001)	It would cost the department $2.1 million to perform bridge scour evaluation compared to the $4.3 million to contract the same services.
Louisiana*	Louisiana Department of Transportation	Average cost of in-house design is 77% of what consultants charge
Virginia	Virginia Department of Transportation (1999)	Safety inspections were 40% more expensive when consultants were used
Connecticut	Connecticut Department of Transportation (1994)	29% savings for using in-house engineering staff and 18% savings for using in-house inspectors
Oregon	Association of Engineering Employees of Oregon (2009)	ODOT could have saved $27 million on bridge projects built from 1997-2008 if it had used in-house staff instead of contractors
South Carolina	Legislative Audit Council (2006)	Outsourcing engineering projects contributed to $50 million in wasted spending
Wisconsin	Legislative Fiscal Bureau (2013)	WDOT would save $5.5 million a year by hiring 180 additional engineers and completing more work in-house
New Jersey	New Jersey Department of Transportation (2003)	Performing bridge inspections, construction inspections, and design projects in house would save New Jersey DOT $26 million a year

*NOTE: The dates of the Texas and Louisiana studies are unknown.

SOURCE: *Highway Robbery II: A Report by the National Association of State Highway and Transportation Unions* (NASHTU) and the Association of Engineering Employees of Oregon, 2009 Press Release.

How does MDOT determine whether an engineering function should be contracted out?

In FY 2012, 78% of MDOT's forms requesting consultant services justified the request on the basis of a lack of personnel resources needed to complete the project in a timely manner. However, MDOT does not have a formal written process to determine if and when a project should be contracted out based on the personnel available. When MDOT makes the decision to outsource, it is difficult to determine what factors are considered and what information is used to make that decision.

The consultant request form is an MDOT document that the Project Director submits to the Deputy Executive Director prior to consultant selection to justify consultant need. According to MDOT's standard operating procedures (No. ADM-24-01-00-000), one of two general conditions may warrant a consultant: if the magnitude of the work involved or the time required to complete the work is greater than the available manpower or if the project is highly specialized in nature and an expert in the field is necessary.

The two options available do not adequately account for how MDOT makes its decisions to outsource engineering functions. It was difficult for PEER to determine whether every engineer was being held accountable for assigned workload; therefore, it is equally difficult to determine whether MDOT lacks sufficient personnel with certain skill sets, leading to the perception of an increased need for hired consultants.

Also, the consultant request forms that the Project Director submits to the Deputy Executive Director include a justification section (Section 3). This section asks for a brief explanation as to why the work needed cannot be completed with in-house resources. There are two options that the Project Director can choose from: "the project requires a unique skill and/or knowledge that is not available within the MDOT" or "we do not have the personnel resources to complete this project in a timely manner." Of the 120 consultant request forms that MDOT provided, twenty-six listed that the project required a unique skill and/or knowledge that is not available within MDOT and ninety-four listed that MDOT did not have the personnel resources to complete the project in a timely manner. These options appeared to be generic choices that did not include any further information about what process occurred, what factors were considered, or what checklist was followed in order to determine how the ultimate decision to consult originated.

The need to contract due to the absence of a skill set is understandable. However, the first option on the form,

concerning the magnitude of the work being greater than the manpower, should require criteria and additional information before stating that an outsourced consultant is necessary. MDOT staff shared that they follow a process when they decide to hire a consultant; however, that process is internal, it is not written, nor is it documented for future reference. In order to achieve full transparency in its consultant acquisition process, MDOT should develop a checklist of criteria, based on its in-house workload, for use in determining whether to request consultant services.

Possible Cost Avoidance Associated with Raising the Professional Engineer Salary, Recruiting Critical Skilled Professional Engineers, and Completing More Engineering Functions In-House

Based on PEER's estimates, MDOT could save approximately $21.8 million per year in engineer consultant costs by recruiting skilled professional engineers and offering them a salary comparable to that available in the private sector.

PEER recognizes the need to pay engineers private sector comparable salaries, but only if those salaries reflect the additional, necessary, and complex skill sets MDOT would hopefully be able to provide and the workload that engineers would undertake. Increasing MDOT engineers' salaries could be used as a tool to recruit engineers with the complex skill sets necessary for some of the more technical assignments (i. e., bridge design, repair, and inspection).

Increasing the salary level could also be a motivation for current in-house engineers to stay at MDOT. For instance, the acquisition of a complex skill set would result in an increase in salary. However, the salary increase should not be granted if large numbers of projects continue to be outsourced or if MDOT is unable to account for current engineering resources and corresponding workloads. Increasing the salary of professional engineers would provide a potential alternative to begin the process of building a skilled workforce in-house.

The steps and illustration following depict (1) estimated cost avoidance MDOT could realize if it increased the salaries of professional engineers and reduced outsourcing; and, (2) estimated cost avoidance if MDOT increased its engineering personnel by 30%[11] and reduced outsourcing.

MDOT's Engineering Consultant Actual Expenses from 2010-2012 were:

[11] 30% increase was arbitrarily chosen by PEER.

- 2010: $42,756,741
- 2011: $47,587,947
- 2012: $48,567,798

The calculated national average of civil engineer salaries, according to the U. S. Department of Labor/Employment and Training Administration's online database, The Occupational Information Network (O*NET), is:

- $38/hr → $79,040/year → $137,213/year with fringes

If MDOT were to raise its salary for a professional engineer to a level comparable to the Mississippi private sector, the amount would be:

- New Salary Calculation:
    - 195 Professional Engineers at MDOT at $137,213/yr = $26,756,620

PEER notes that this is a general computation and creates an identical salary for every engineer at MDOT upon which to base the estimate. There are nine different classes of professional engineers at MDOT and each have a different pay grade scale. The highest engineering job class (Deputy Executive Director-Chief Engineer) lists a starting salary of $77,702.56, according to MSPB. Variations (above and below calculation) would have to be made to all salaries to account for the different job classes. (See Appendix L, page 136, for a description of each of MDOT's engineering job classes.)

If MDOT were to increase engineering personnel by 30% and included the salary increase, the amount would be:

- An increase of 58 PEs = 253 PEs at $137,213 = $34,714,889

Exhibit 27, page 70, provides an example of the cost avoidance involved in building a workforce to complete engineering functions in-house. To be effective, the move to perform more services in-house must be accompanied by deliberate steps to ensure that MDOT is able to complete projects in-house.

Exhibit 27: Examples of Possible Cost Avoidance if MDOT Increased PE Salaries or Hired Additional PEs and Increased PE Salaries and Correspondingly Reduced Engineering Consulting Expenditures

PEER presents the following examples of cost avoidance that MDOT might realize by:

- increasing salaries of its professional engineers to the national average and correspondingly reducing engineering consulting expenditures; *or,*
- hiring additional professional engineers at the national average salary and increasing salaries of all its professional engineers to the national average and correspondingly reducing engineering consulting expenditures.

Increasing the salaries of professional engineers already on MDOT's staff should be contingent on their acquisition of the engineering skills MDOT needs (see page 60 of report). PEER assumes that as a result of the acquisition of these needed skill sets, many of the types of projects that MDOT has outsourced in the past would be completed by in-house engineers.

PEER computed possible cost avoidance as the difference between MDOT's engineering consulting expenditures for the year shown and PEER's total computed salary (including the proposed increase to the national average salary) for professional engineers for the year shown.

PEER based these cost avoidance scenarios on data from fiscal years 2010 through 2012 and on assumptions presented in this report.

- If MDOT had retained 195 PEs and raised their salaries to the national average (to $38/hour, as reported by the U.S. Department of Labor/Employment and Training Administration), and reduced the use of engineering consultants accordingly in fiscal years 2010 through 2012, the department might have avoided from approximately $16 million to approximately $21.8 million in costs, as shown below:

Fiscal Year	MDOT Engineering Consultant Expenses	Total of Proposed Salary Increases for 195 PEs	Possible Cost Avoidance
2010	$42,756,741	$26,756,620	$16,000,121
2011	47,587,947	26,756,620	20,831,327
2012	48,567,798	26,756,620	21,811,178

- If MDOT had increased the number of PEs on its staff to 253 (by 30%) and raised salaries of all its PEs to the national average (to $38/hour, as reported by the U.S. Department of Labor/Employment and Training Administration), and reduced the use of engineering consultants accordingly in fiscal years 2010 through 2012, the department might have avoided from approximately $8 million to approximately $13.8 million in costs, as shown below:

Fiscal Year	MDOT Engineering Consultant Expenses	Total of Proposed Salary Increases for 253 PEs	Possible Cost Avoidance
2010	$42,756,741	$34,714,889	$ 8,041,852
2011	47,587,947	34,714,889	12,873,058
2012	48,567,798	34,714,889	13,852,909

SOURCE: PEER analysis of MDOT engineer salaries and consultant engineer costs.

Does MDOT have an effective and transparent process for selecting and prioritizing construction and maintenance projects based on objective rating systems and statewide data?

MDOT has shifted its priorities away from new construction to system preservation, which will result in sunk costs on new capacity projects. MDOT collects most of the data needed in order to select and prioritize projects in the most effective manner (i. e., based on need). However, in some cases, MDOT was unable to document the selection and prioritization process used in the past (i. e., prior to 2012) to justify projects on its prioritized lists. MDOT has begun using decisionmaking software for new capacity projects that could provide a well-documented system for its selection and prioritization processes; however, the department has not established a timeline for using this software or other tools (e.g., matrices) that includes a disciplined way of accounting for both quantitative and qualitative elements in the decisionmaking process for prioritizing all types of projects. Also, MDOT's five-year plan does not provide sufficient transparency to show how projects change from year to year.

Project prioritization is necessary to ensure that transportation funds are spent in the most efficient manner, considering the state's highest road and bridge needs first and obtaining the most value for the dollars spent. Also, a well-documented prioritization system promotes accountability and transparency in the decisionmaking process.

This chapter discusses the following questions:

- How have MDOT's priorities changed and what are the effects of this change?
- Are MDOT's processes for project selection and prioritization effective and transparent (i. e., well-documented) based on statewide data and on MDOT's rating systems?

How have MDOT's priorities changed and what are the effects of this change?

According to MDOT, many of the state's older bridges have become deficient and roads that were built as part of the 1987 highway program have begun to need "new life." Because in the past MDOT funds were expended heavily on road expansion and because a system preservation budget has not historically been included as part of the state's plan to build roads and replace bridges, MDOT's priorities and funding have shifted away from new capacity projects to system preservation projects (e. g., overlays, bridge replacements). For FY 2015, MDOT estimates that system preservation projects will account for 73.8 percent (approximately $415 million) of its construction program budget.

According to MDOT, the department has shifted funding from new capacity projects to system preservation (e. g., overlays, bridge replacements). This is because of the lack of a preventive maintenance budget and schedule for maintaining the roads and replacing the bridges it built as part of the 1987 highway program. According to a 2011 Smart Growth America report,[12] between 2004 and 2008, Mississippi spent seventy-four percent of its highway capital expenditures on road expansion ($666 million each year, on average) but only seven percent on repair and maintenance of existing roads. The seventy-four percent of spending on expansion added 1,346 lane miles to Mississippi's system. This significant expansion increased the annual funding needed to maintain the system.

The roads built during the expansion of the state's system are now needing "new life" in order to sustain the system. Of the state's 5,734 bridges, 2,432 (42 percent) were built prior to 1970. MDOT calculates that approximately eighteen percent of the state's bridges are either structurally deficient[13] or functionally obsolete.[14] The cost to replace those bridges would be approximately $2.6 billion; $200 million annually would enable the replacement of all currently deficient bridges in a timely manner and guarantee maintenance and repair of all bridges in the state system.

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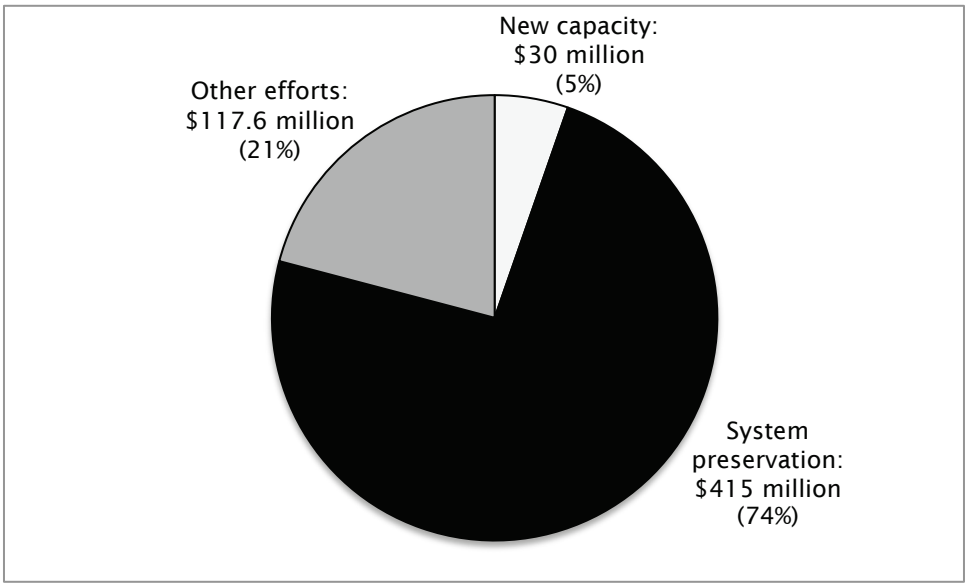
[12] *Repair Priorities, Transportation Spending Strategies to Save Taxpayers Dollars and Improve Roads,* 2011. Smart Growth America is a coalition of advocacy organizations that have a stake in how metropolitan expansion affects the environment, quality of life, and economic sustainability. Partners include national, state, and local groups working on behalf of the environment, historic preservation, social equity, land conservation, neighborhood redevelopment, farmland protection, and labor.

[13] A *structurally deficient* bridge typically requires significant maintenance and repair to remain in service and eventual rehabilitation or replacement to address deficiencies. To remain in service, structurally deficient bridges are often posted with weight limits to restrict the gross weight of vehicles using the bridges to less than the maximum weight typically allowed by statute.

[14] A *functionally obsolete* bridge is a bridge with a design not suitable for its current use (e. g., lack of safety shoulders).

Because of the shift in funds, MDOT has less money available to spend on new construction. MDOT estimates that it allocates approximately $30 million per year to new capacity projects. For the budget requested for FY 2015, $30 million would represent approximately 5.3 percent of MDOT's construction budget. MDOT will allocate the majority of its construction budget (73.8 percent, or $415 million) to system preservation projects. MDOT will allocate the remaining $117.6 million (20.9 percent) of funds to other efforts, including planning/research, State Aid, and the Highway Safety Improvement Program. (See Exhibit 28, below.)

Exhibit 28: MDOT's FY 2015 Estimated Construction Budget by Type of Project or Activity



SOURCE: PEER analysis of MDOT's FY 2015 budget hearing presentation.

Sunk Costs Related to MDOT's New Capacity Projects

As a result of shifting funds to system preservation and the high cost of construction, MDOT has a "backlog" of 77 new capacity projects on its prioritized list totaling approximately $3.5 billion in construction costs. Because funds are not sufficient to complete these projects in a timely manner, MDOT will likely have to absorb the sunk costs of work conducted on some of those projects that will not be used (e. g., environmental studies).

MDOT provided PEER with a list (i. e., a "backlog") of seventy-seven new capacity projects with an associated year of need (YON). The year of need for these projects ranged from 2013 to beyond 2050. (See Exhibit 29, below.) This list was created by MDOT's Planning Division, which calculates year of need based on traffic data. All projects on this list are in a preconstruction phase (i. e., environmental, survey, right-of-way, or design phase) or have not entered the preconstruction phase.

MDOT is only able to include one or two new capacity projects per year in its five-year plan because the average project cost for new capacity is $46 million and MDOT currently allocates approximately $30 million per year to new capacity projects.

Exhibit 29: Number of New Capacity Projects and Estimated Construction Cost, by Year of Need

Year Of Need (Calendar Year)	Number of New Capacity Projects	Estimated Construction Costs
2013	37	$1.75 billion
From 2014 to beyond 2050	40	$1.75 billion
TOTAL	**77**	**$3.5 billion**

SOURCE: PEER analysis of 2013 new capacity project list provided by MDOT.

PEER determined that many projects have had some work completed. For fourteen of the fifteen new capacity projects with a year of need beyond 2050, MDOT has spent approximately $88 million on environmental studies and right-of-way.

Because funds are not sufficient to complete these new capacity projects in a timely manner, MDOT will likely have to absorb the sunk costs of work conducted on projects that will not be used, such as environmental studies. Environmental studies identify potential environmental resources and issues within the project area and evaluate a project's effects on those resources/issues; they are generally performed during the planning and development phase of the project, before right-of-way is acquired. These studies will likely have to be re-evaluated

if and when the projects are implemented because environmental conditions change.

Are MDOT's processes for project selection and prioritization effective and transparent (i. e., well-documented) based on statewide data and on MDOT's rating systems?

MDOT collects most of the data needed in order to select and prioritize projects in the most efficient manner (i. e., based on need). However, in some cases, MDOT was unable to document the selection and prioritization process used in the past (i. e., prior to 2012) to justify projects on its prioritized lists. MDOT has begun using decisionmaking software for new capacity projects that could provide a well-documented system for its selection and prioritization processes; however, the department has not established a timeline for using this software or other tools (e. g., matrices) that includes a disciplined way of accounting for both quantitative and qualitative elements in the decisionmaking process for prioritizing all types of projects. Also, MDOT's five-year plan does not provide sufficient transparency to show how projects change from year to year.

MDOT maintains that system preservation projects receive first consideration when funding is inadequate because safety is the number one priority of the Mississippi Transportation Commission. PEER reviewed new capacity priorities, along with maintenance priorities, which are performed primarily at the district level.

MDOT's Collection of Data for Selection and Prioritization

MDOT has identified the state's needs for system preservation using valid methods of measurement. The state's needs for additional capacity (i. e., new highway segments or new lanes) have not fully been identified, although MDOT is working toward this goal by compiling the necessary data on all highways under MDOT's authority. Once all of the data is complete, MDOT will have the information it needs to make the best selection and prioritization decisions.

MDOT is able to identify the state's needs for bridges, paving, and new capacity using valid methods of measurement. These include:

- Significance Index values for the state's bridges (see Exhibit 30, page 77, for an excerpt from the Bridge Division's Significance Index Report);
- Pavement Condition Ratings for the state's roads, along with annual road inspections (see Exhibit 31, page 77, for an excerpt from the Research Division's Pavement Recommendations Report); and,
- Volume/Capacity Ratios (and associated years of need) for state-maintained highways (see Exhibit 32, page 78,

for an excerpt from the Planning Division's New Capacity Report).

Exhibit 30: Excerpt from Bridge Division's Significance Index Report, October 2013

SI Value	Planned Begin Date	Bridge ID	County	District	Structure Rating	Project Number	Termini
86	08-Nov-16	13812	Pearl River	06	2 Intolerable - Replace	102246	US 11 replace bridge at Hobolochitto Creek in Picayune
86	01-Mar-16	11025	Forrest	06	2 Intolerable - Replace	105273	US 49 replace 5 bridges between Brooklyn and Camp Shelby

SOURCE: MDOT.

Exhibit 31: Excerpt from Research Division's Pavement Recommendations Report, January 2013

Project No: 312
Recommended Treatment: Mill & 3-inch overlay
Length: 9.73
Road type: Two Lane
Begin Landmark: Holmes Co. Line
End Landmark: McAdams
Pavement Type: Flex
Shortest Treatment Length Section: 1.22 Recommendation: Mill & 3-inch overlay
Longest Treatment Length Section: 6.798 Recommendation: Mill & 1-1/2 inch overlay
Type of Treatment: Minor rehabilitation

SOURCE: MDOT.

Exhibit 32: Excerpt from Planning Division's New Capacity Report, October 2013

Priority	Current Letting Date*	Project	Estimated Construction Cost	Year of Need (Calendar Year)
1	--	I-55 from County Line Road to Old Agency Road [add four lanes]	$60,000,000	2013
2	--	I-20 widening from the I-220 vicinity to the Pearl River	$60,000,000	2013
3	November 2015	I-10 from SR 609 to SR 57	$30,000,000	2013

*For priorities 1 and 2, there is no currently scheduled letting date.

SOURCE: MDOT new capacity spreadsheet.

Significant Index Values: A Valid Method for Identifying Bridge Needs

MDOT uses a formula that accounts for traffic and structure evaluation weight, along with a traffic-detour factor, in order to assign a Significance Index (SI) number to each of the state's approximately 5,700 bridges. The SI represents the overall significance of a bridge in comparison to the state bridge inventory.

MDOT uses a Significance Index Model (SIM) that was developed in-house to assign a numerical value to each of the state-maintained bridges. An SI value represents the overall significance of a bridge in comparison to the state bridge inventory; this method is intended to ensure that bridges with the most deterioration are considered first. The SIM combines the effects of the following factors:

- *traffic-detour factor*--accounts for average daily volume of traffic and the bypass distance this traffic would have to travel in the event that the bridge was closed; and,
- *traffic and structure evaluation weight*--accounts for the exponential effect of traffic on a deteriorating bridge (i. e., as a bridge's condition worsens, traffic takes a larger toll on the bridge).

The traffic-detour factor and traffic and structure evaluation weight are represented in the following equation:

SI = [TDF X (TW/100) + (10 – SE) X (SEW/100)] X 10

SI: Significance Index

TDF: Traffic Detour Factor

TW: Traffic Weight

SE: Structure Evaluation

SEW: Structure Evaluation Weight

As of September 2013, the SI ranged from 12 to 86. A higher SI value indicates higher priority for replacement.

Pavement Condition Ratings: A Valid Method for identifying Pavement Needs

Every two years, MDOT assigns Pavement Condition Ratings (PCRs) to all MDOT routes. PCRs account for various pavement elements (e. g., pavement type, distress type) and provide a snapshot to show which roads are in need of repair. MDOT also conducts annual inspections of road conditions in order to identify significant changes or needs that might affect the priority of roads.

MDOT collects data for all state-maintained roadways in the state every two years. This data results in a Pavement Condition Rating (PCR). PCR is a function of the following:

- pavement type (e. g., flexible, composite);
- distress type;
- distress severities; and,
- distress extent/percent of section affected by each distress/severity level.

MDOT employs a valid method for identifying the state's pavement needs by comparing the PCR collected and the PCR goals established for interstates and two-lane/four-lane highways. The target PCRs are:

- 82 for interstates;
- 72 for the state's four-lane system; and,
- 62 for the state's two-lane system.

A Pavement Rating Committee, including Federal Highway Administration and MDOT representatives, prioritizes pavement rehabilitation projects.

For routine maintenance projects, districts are responsible for developing a pavement program based on relevant data (e. g., pavement condition, traffic needs). MDOT's central office reviews and approves district programs.

Volume/Capacity Ratios and Associated Years of Need: A Valid Method for Identifying New Capacity or Other Traffic-related Needs, Although Data is Incomplete

MDOT collects traffic data (e. g., Average Annual Daily Traffic) on major MDOT routes, which allows MDOT to assign a Year of Need for each of those routes. MDOT is working toward compiling data on all highways under MDOT's authority. When the data is complete, MDOT will have the traffic data needed to make the best project selection and prioritization decisions.

As noted previously, MISS. CODE ANN. Section 65-3-97 (5) (a) (i) (1972) states that the first determinant for construction of highway segments (i. e., new capacity) shall be the Year of Need (YON). According to CODE Section 65-3-97, the Year of Need is:

> *. . .the year in which the level of service on a segment is projected to deteriorate to an unacceptable level. For segments with the same year of need, prioritization shall be based on the volume to capacity ratio and the daily traffic volume.*

MDOT's Planning Division is responsible for continuously (and on a three-year cycle) collecting traffic data and calculating Year of Need for MDOT routes. MDOT's Planning Division establishes an unacceptable volume/capacity threshold for a road and establishes a growth rate for that road's Average Daily Traffic. For the year that the volume/capacity is projected to reach that threshold, MDOT designates that year to be the Year of Need.

MDOT currently has traffic data on major MDOT routes and is working toward being able to report on all highways under MDOT's authority. Currently, MDOT's Planning Division is focused on obtaining data for projects already included in the five-year schedule of proposed projects.

When the data is complete, MDOT will have the traffic data needed to help make the best project selection and prioritization decisions.

MDOT's Inability to Document Selection and Prioritization Process for Previously Selected Bridge and New Capacity Projects

Bridge Projects

While MDOT's Bridge Division has established a valid method for identifying the state's bridge needs, MDOT was unable to document its selection and prioritization process for projects already on its prioritized bridge list (i. e., bridges selected prior to 2012). As a result, MDOT is unable to demonstrate clearly and easily when and why each of the projects on MDOT's prioritized bridge list was added or why certain bridge projects have priority over others. While the department's decisions might well have been valid, the lack of supporting documentation for such decisionmaking is a concern.

MDOT has not had, nor is there now, a formal, written policy for deciding on or prioritizing bridge projects, although there is a clear, rational method for doing so based on the Significance Index Model (see page 78 for description). MDOT could not verify through documentation that the SI ratings have been the primary determinant for selecting and prioritizing bridge projects in the past.

PEER reviewed MDOT's list of bridge projects. In some cases, there were projects with high SI values that were not programmed, meaning they are not on the schedule of proposed projects in the five-year plan. Conversely, there were some projects with seemingly low SI values that are scheduled for construction as early as FY 2016. (See Exhibit 33, page 82.)

In some cases, MDOT was able to demonstrate the reasons for programming[15] bridges with low ratings (e. g., prioritizing a timber bridge because it will deteriorate faster than other types of construction). However, in order to understand the prioritization of projects completely, an outside reviewer would have to evaluate each of MDOT's ninety-two bridge projects in an attempt to determine when and why the project was originally placed on the prioritized list and why certain projects are prioritized over others. Additionally, an outside reviewer would need to review the ratings of all bridges in the system and determine why each project with a higher rating is not on the prioritized list.

[15]According to MDOT, *programming* a project means that project is placed in MDOT's five-year plan.

Exhibit 33: Examples of Projects With Low and High SI Ratings, Associated Letting Dates, and Program Cost

SI value*	Termini	Current Letting Date	Program Cost (Rounded)
40.1875	US 49 replace 2 bridges at Black Creek	2018	$10M
50.1	SR 313 bridge replacement	2018	$1M
50.5	SR 6 (Wolf Creek)	2016	$420,000
55.125	SR 487 from Tuscola to SR 35	2019	$7.5M
56.625	SR 198 replace bridge over Rocky Creek	2016	$1.5M
71	SR 12 bridge replacement	2040**	$5.8M
71	SR 27 bridge replacements	2040**	$2.3M
62.5	SR 469 at Hominy Creek	2040**	$950,000
62.5	US 80 between Brandon and Scott CL	2040**	$1.9M
62.5	SR 28 between Copiah CL and Pinola	2040**	$7.3M
62.5	US 98 replacement Bude-Lincoln Homochitto River	2040**	$7M

*A higher SI value indicates a higher priority for replacement.

**2040 is a default date for any project that is not on the current schedule of proposed projects in MDOT's five-year plan.

SOURCE: PEER analysis of bridge project information provided by MDOT.

MDOT's processes for selecting and prioritizing bridge projects should be clear and based on the Significance Index Model, which would be a valid way to select and prioritize projects. Deviations from using that model should be clearly explained to the commission in writing any time new projects are added to the schedule. Such documentation would also help a third-party reviewer to understand the rationale for MDOT's project decisions.

Because these bridge projects were placed on the schedule by former MDOT decisionmaking staff and there was no documented process for such decisions, the current staff cannot verify how former decisionmakers selected projects. As a result, MDOT cannot guarantee that bridges currently under construction represent the greatest needs of the state. Transparency and accountability by way of a documented system are key to the public's trust in MDOT to use the money it is given toward the state's highest priorities.

During discussion in project fieldwork, MDOT staff concurred that additional documentation was needed in order to show that projects listed in MDOT's five-year schedule of proposed projects represent the greatest needs of the state. PEER reviewed the documentation submitted by MDOT subsequent to the exit conference and determined that MDOT is moving in the right direction of providing sufficient documentation to support its bridge

project decisions. In the future, MDOT must ensure that this documentation becomes part of its policy for decisionmaking and is presented to the commission when projects are added or when bridge priorities change. Such documentation should be spread upon the commission minutes.

New Capacity Projects

MISS. CODE ANN. Section 65-3-97 (a) (i) (1972) provides that prioritization for new capacity projects shall be the year of need. However, this statutory requirement is not feasible due to the high costs of new capacity projects and the limited funds MDOT allocates to these projects. While Section 65-3-97 (a) (i) (1972) allows the Transportation Commission to deviate from the recommended priorities, the commission must spread the reasons for this deviation in the minutes. MDOT staff did not provide sufficient documentation to show why each of the projects on MDOT's new capacity list was added or why funding has been directed to certain projects on this list. Without this knowledge, PEER (or any third party) is unable to determine whether MDOT has historically allocated its funds to the highest priorities that meet funding source requirements and that are financially feasible.

MISS. CODE ANN. Section 65-3-97 (a) (i) (1972) requires that the first determinant for construction of highway segments (i. e., new capacity) is the year of need. Also, for segments with the same year of need, prioritization should be based on the volume-to-capacity ratio and the daily traffic volume.

MDOT provided PEER with a list of seventy-seven new capacity projects with year of need ranging from 2013 to beyond 2050. MDOT prioritized its new capacity project list in accordance with state law; however, because MDOT has planned to allocate only a small percentage of funds to new capacity (i. e., five percent for FY 2015), some projects with the highest priority are not financially feasible due to the high construction cost of the projects. The top five priorities on the list total over $405 million. Because MDOT now only allocates approximately $30 million to new capacity projects each year, the top five new capacity projects are not feasible. MISS. CODE ANN. Section 65-3-97 (a) (i) (1972) allows the Transportation Commission to deviate from the recommended priorities as long as the reasons for the deviation are spread in the commission's minutes.

MDOT's five-year plan includes a listing of re-prioritized projects (i. e., projects that deviate from the recommended priorities). This list is spread upon the commission's minutes as part of the five-year plan; however, it is not clear which projects are new capacity projects. Further, the reasons for the re-prioritizations do not have sufficient detail to show that the decisions were made in best interest of the state. The reason for several projects listed

was simply the term "economic development." Such documentation is inadequate to show why the priorities changed.

Current decisionmaking staff at MDOT state that they have not added any projects to the new capacity list but have been actively working on these projects as funding allows. Thus, MDOT was unable to demonstrate clearly and easily when and why each of the projects is on the prioritized new capacity list or why funding has been directed to certain projects on the list.

In some cases, earmarked funds are only available for a specific project, regardless of what priority it is on the list. For example, one project with a priority of 75 out of 77 in Itawamba County has its own funding source, according to MDOT. Even though that project is not needed until beyond 2050, there are funds being expended toward the completion of that project. However, without an exhaustive review of each project's history and expenses, PEER could not determine whether MDOT has historically allocated new capacity funds to projects with the earliest year of need or why MDOT has allocated new capacity funds to certain projects, particularly those projects with a year of need beyond 2050.

No Defined Formula and Timeline for Allocating Maintenance Funds to Districts Based on Need

MDOT employs a valid method for identifying the state's pavement needs and has established decisionmaking tools that allow districts to prioritize their pavement and other maintenance needs. However, prior to FY 2014, MDOT allocated maintenance funds to each district based on the vehicle miles traveled within each district rather than on need. MDOT plans to use a statewide need-based method for allocating maintenance funds to districts in the future. However, in the interim, MDOT could not provide a defined formula for allocation of funds in FY 2014 or 2015, nor could MDOT provide a timeline for when it plans to use only the need-based method. Until this transition to a need-based method is complete, MDOT does not ensure that the state's highest priority maintenance needs are met.

MDOT employs a valid method for identifying the state's pavement needs by comparing the PCR collected and the PCR goals established for interstates and two-lane/four-lane highways. Also, MDOT has established a decision-making tool that provides districts with treatment recommendations for each type of pavement issue. If districts do not adhere to the recommended treatment, they must submit a justification in writing to the central office maintenance division. (See page 50 for a further discussion of this decisionmaking tool and recommended treatment report.)

The recommended treatment report does not prioritize the projects. According to MDOT, there are other factors, such

as traffic and rate of deterioration, for which the computer program cannot account at this time. Therefore, the districts prioritize the overlays and chip seals by reviewing various sources of data (e. g., distress data such as Pavement Condition Ratings, cracking and rutting).

Prior to FY 2014, MDOT allocated maintenance funds to each district based on the vehicle miles traveled within each district. In FY 2014, MDOT began transitioning to a statewide need-based method for allocating two-lane/four-lane maintenance funds to districts. However, MDOT has not established a defined formula for allocation of funds in FY 2014 or 2015, nor has it established a timeline for when this transition will be complete.

For FY 2014, PEER calculated the difference between the amount MDOT budgeted for each district and the amount that would have been budgeted based solely on the AMMO data (i. e., the need). MDOT allocated District 6 over $10.5 million more than it would have based solely on needs identified in AMMO, while MDOT allocated District 1 more than $5.7 million less than what it would have based on needs. (See Exhibit 34, page 86.)

The allocations presented in Exhibit 34 are based on an optimal scenario of full maintenance program funding based on the needs identified in MDOT's software system (AMMO). The reader should note that because full funding is not expected, the needs-based allocation cannot exactly match the percentage of need calculated by AMMO. The percentage will vary because judgments must be made on the optimal use of limited funds; therefore, a project in one district might be funded over a project in another district due to engineering judgments on the best use of the funds. However, MDOT should use the needs-based allocations as targets and should aim to allocate funds as closely as possible with what the needs-based data shows.

MDOT should allocate maintenance funds to districts based on need so that pavement maintenance funds can be directed to the highways and interstates with the highest needs. MDOT agrees that a needs-based system for allocating maintenance funds is the best system. However, MDOT staff stated that a slow progression toward using a needs-based formula is needed so that districts have time to adjust to the new funding allocations. A transition period is understandable; however, a timeline for completion should be established, as well as a documented method for the transition percentages used.

Exhibit 34: Maintenance Funds by District, Including the FY 2014 Budgeted Amount, the Needs-Based Allocation, and the Difference

District*	Maintenance Funds Budgeted**	Needs-Based Allocation	Difference
1	$36,007,375.00	$41,712,989.68	$(5,705,614.68)
2	35,406,540.00	38,006,079.08	(2,599,539.08)
3	22,388,778.00	23,572,943.95	(1,184,165.95)
5	37,223,973.00	36,891,346.74	332,626.26
6	41,473,973.00	30,899,593.12	10,574,379.88
7	24,199,361.00	25,617,047.42	(1,417,686.42)

*At one time, MDOT used District 4 for accounting purposes in the allocation of project-related expenses to functions conducted at MDOT's headquarters. Due to technological advances, this allocation process became obsolete and the use of District 4 was discontinued.

**Includes Maintenance Program, Surface Transportation Program, and routine maintenance program funds.

NOTE: The allocations presented in this exhibit are based on an optimal scenario of full maintenance program funding based on the needs identified in MDOT's software system (AMMO).

SOURCE: PEER analysis of maintenance budgets and needs-based allocations provided by MDOT.

For each year that MDOT does not allocate funds based on needs, MDOT does not ensure that the state's highest priority maintenance needs are met. A district's individual maintenance needs may be higher or lower than its proportion of total vehicle miles traveled in the district. As a result, some higher maintenance needs in one district may not be met while a lower maintenance need in another district might be funded.

No Timeline for Use of Decisionmaking Software or Tools to Provide a Documented System for Selection and Prioritization

In order to make the selection and prioritization process more objective, accountable, and transparent, MDOT plans to use Decision Lens and other tools (e. g., matrices) that would include a disciplined way of accounting for both quantitative and qualitative elements in the decisionmaking process for prioritizing all types of projects. However, MDOT has not established a timeline for doing so.

In 2012, MDOT acquired a software program called Decision Lens, which has the potential to provide an "apples-to-apples" comparison of projects. The current method of selecting and prioritizing projects is based on the same types of projects being weighed against each other (e. g., a bridge project versus another bridge project). One of the main benefits of Decision Lens is that it allows decision-makers to view trade-off analyses, which helps to

evaluate the impact of prioritizing certain projects over others.

Decision Lens allows for both quantitative and qualitative criteria to be weighted and evaluated. Each decision-maker weights each criterion to reflect his/her view of its relative importance. This generates a prioritized ranking of projects based on the quantified and weighted judgment of all decisionmakers. To date, MDOT has only used quantitative data to prioritize projects. Qualitative criteria could be used in the future.

MDOT has entered traffic-related data as the weighting criteria for seventy-seven unfunded projects into Decision Lens. This criteria/data includes Year of Need (60% weight), Volume/Capacity Ratio (20% weight), and Average Annual Daily Traffic (20% weight) to be consistent with previous prioritization processes and the Vision 21 language.

Through Decision Lens, MDOT has access to another software called Sequencer. Sequencer can analyze budget information for multiple years, along with the cost of multiple phases of a project, to optimize projects or phases of projects based on project value established using Decision Lens, cost, and budget for a given number of years. This software has been presented to decisionmakers, who recommended that a documented procedure be developed for its future use.

While MDOT plans to use Decision Lens and Sequencer for prioritizing new capacity projects, MDOT is not sure that Decision Lens is the best tool for prioritizing all types of projects. However, MDOT is exploring other ways to make the process more objective, accountable, and transparent. Such a process would include a disciplined way of accounting for both quantitative and qualitative elements in the decisionmaking process. MDOT mentioned that establishing a prioritization matrix might be the best method, but this decision has not been made and there is no timeline for having such a tool in place.

Insufficient Transparency in MDOT's Five-Year Plan

MDOT's most recent five-year plan, dated October 2013, does not clearly show which projects MDOT modified, removed, or added from its plan dated January 2013 and on what basis. Further, because the plan is organized by county rather than by year, it is difficult to determine the priorities for a particular year or across years. Because the five-year plan is one of MDOT's primary tools for communicating statewide project information, this insufficient transparency could affect stakeholders' confidence in MDOT's decisionmaking.

MISS. CODE ANN. Section 65-3-97 (5) (a) (i) (1972) requires MDOT to prepare annually a five-year schedule for

construction, upgrades, and improvements to the state highway system.

MDOT's five-year plan dated January 2013 was over-programmed for the current year (i. e., contained too many projects that MDOT could not afford). As a result, MDOT issued a newer, more realistic five-year plan dated October 2013. However, the report is not sufficiently transparent to show stakeholders which projects were modified, removed, or added and on what basis. For example, a $1 million Vision 21 bridge replacement project in Copiah County was delayed for over one year. Stakeholders would be interested in knowing the reason for such a delay. Another example includes projects in Harrison County. The January 2013 plan listed five separate projects totaling over $173 million. For the October 2013 plan, MDOT removed two projects and added one project for a total of $15 million. It is unclear to the user of the report whether those projects listed in the January report are still on schedule or why they were removed.

In addition, the plan is organized by county rather than by year. For this reason, it is difficult for users of the plan to determine MDOT's priorities for a particular year or across years.

Because the five-year plan is MDOT's primary tool for communicating statewide project information to stakeholders, such insufficient transparency could affect stakeholders' confidence in MDOT's decisionmaking.

What is the H.E.L.P. Program and what is its impact on MDOT's future debt service requirements?

Since January 2005, the Transportation Commission has entered into interlocal agreements with six local governments to finance and accelerate highway projects by bond issues through the Highway Enhancement through Local Partnerships (H.E.L.P.) Program under the statutory authority of MISS. CODE ANN. Section 61-5-8 (1972). MDOT does not maintain proper documentation of the evaluation and selection process for this program as required by law. In addition, MDOT does not conduct a cost-benefit analysis to determine whether the issuance of H.E.L.P. bonds is both cost-beneficial and feasible to the state. By entering into these interlocal agreements, MDOT has obligated the state to debt service requirements that could impact the state's future ability to construct and maintain needed highway projects.

This chapter addresses the following:

- What is the H.E.L.P. Program and when did it begin?
- How many projects are included in the program and what are the obligations?
- How does the Transportation Commission select highway projects for the H.E.L.P. Program?
- How will the H.E.L.P. Program affect MDOT's future debt service obligations?

What is the H.E.L.P. Program and when did it begin?

In 2000, the Mississippi Legislature amended MISS. CODE ANN. Section 61-5-8 (1972), which authorized MDOT to begin the Highway Enhancement through Local Partnerships (H.E.L.P.) Program. The H.E.L.P. Program allows the Transportation Commission to enter into interlocal agreements with local governments to finance and accelerate scheduled highway construction projects in the local governments' jurisdictions.

In 2000, the Mississippi Legislature amended MISS. CODE ANN. Section 61-5-8 (1972), which authorized MDOT to enter into agreements with local governments to accelerate completion dates of scheduled highway construction projects. Under the authority of CODE Section 65-1-8, MDOT began the Highway Enhancements through Local Partnerships (H.E.L.P.) Program to accelerate the construction of large highway projects currently on MDOT's six-year project schedule that could take many years to complete using MDOT's primary method for financing highway projects, known as "pay as you go."

CODE Section 65-1-8 allows the Mississippi Transportation Commission to enter into an interlocal agreement with a local government to accelerate the completion date of a proposed highway project using bonds to finance highway projects. Section 65-1-8 (2) (z) states:

> *The Mississippi Transportation Commission, in its discretion, may enter into agreements with any county, municipality, county transportation commission, business, corporation, partnership, association, individual or other legal entity, for the purpose of accelerating the completion date of scheduled highway construction projects. Such an agreement may permit the cost of a highway construction project to be advanced to the commission by a county, municipality, county transportation commission, business, corporation, partnership, association, individual or other legal entity, and repaid to such entity by the commission when highway construction funds become available; provided, however, that repayment of funds advanced to the Mississippi Transportation Commission shall be made no sooner than the commission's identified projected revenue schedule for funding of that particular construction project, and no other scheduled highway construction project established by statute or by the commission may be delayed by an advanced funding project authorized under this paragraph (z).*

Under such an interlocal agreement, a local government entity issues bonds to finance the construction of the highway project through the Mississippi Development Bank.[16] MDOT uses the bond proceeds to construct the highway project in the local entity's jurisdiction. Although the bonds are the debt of the local government, MDOT is responsible for the debt service on the bonds.

[16]MISS. CODE ANN. Section 31-25-7 (1972) created the Mississippi Development Bank as an independent organization with the power to "borrow money and issue its bonds and notes to make funds available [to local governmental units]." According to CODE Section 31-25-3, the bank's purpose is to "finance infrastructure improvements and other public purposes from the proceeds of bonds and to the extent possible, reduce costs of indebtedness to taxpayers and residents of the State through the encouragement of investor interest in the purchase of such bonds."

How many projects are included and what are the obligations?

Since January 2005, the Transportation Commission has entered into interlocal agreements with six local counties and municipalities to construct six H.E.L.P. projects. MDOT estimates that construction on the current six H.E.L.P. projects will not be completed until February 2018.

Since January 2005, the Transportation Commission has entered into interlocal agreements with five counties (Tunica, Harrison, Madison, Marshall and DeSoto) and one municipality (Laurel) to construct H.E.L.P. projects. The projects for Tunica County and the City of Laurel were completed in October 2006 and September 2011, respectively. The H.E.L.P. project in DeSoto County, which is expected to be completed in February 2018, will be the last project completed. Exhibit 35, page 92, provides a description of each H.E.L.P. project and the expected project completion date.

How does the Transportation Commission select highway projects for the H.E.L.P. Program?

MDOT has established formal, written evaluation criteria for identifying, selecting, and evaluating highway projects for the H.E.L.P. Program. However, the department does not maintain proper documentation of the evaluation and selection process as required by law. In addition, MDOT does not conduct a cost-benefit analysis to determine whether the issuance of H.E.L.P. bonds is both cost-beneficial and feasible to the state.

MISS. CODE ANN Section 65-1-8 (2) (z) (1972) outlines the criteria that the Transportation Commission must consider prior to entering into an interlocal agreement to finance a H.E.L.P. project. Section 65-1-8 states:

> *In considering whether to enter into such an agreement, the commission shall consider the availability of financial resources, the effect of such agreement on other ongoing highway construction, the urgency of the public's need for swift completion of the project and any other relevant factors.*
>
> *Such an agreement shall be executed only upon a finding by the commission, spread upon its minutes, that the acceleration of the scheduled project is both feasible and beneficial. The commission shall also spread upon its minutes its findings with regard to the factors required to be considered pursuant to subparagraph (iii) of this paragraph (z). . . .*

Exhibit 35: Description of H.E.L.P. Projects, Transportation Commission Bond Issuance Approval Dates, and Expected Completion Dates, By Locality of Project

County/ Municipality	Project Description	Expected Construction Completion Date(s)
Tunica County	Pave and extend Highway 304 from US 61 to Interstate 55	October 2006*
Harrison County	Provide a four-lane highway, to be known as Canal Road, built to interstate standards, from Interstate 10 to US 90 near the Port of Gulfport.	2022**
City of Laurel	Redesign and reconstruct the portion of Interstate 59 located in the City of Laurel	December 2005; September 2011*
Madison County	Provide a split diamond interchange, frontage roads and connector roads to provide additional capacity to Interstate 55 from Old Agency Road to SR 463, along with the connector road of Madison Avenue from Highland Colony Parkway to US 51 and SR 463 from Grandview Boulevard/Galleria Parkway to US 51. Construct a multi-lane McClellan Drive in the City of Ridgeland from Highland Colony Parkway to US 51.	February 2015
Marshall County	Connect Interstate 269 and SR 304 from Marshall County Lane to the Tennessee state line.	July 2018
DeSoto County	Connect Interstate 269 and SR 304 in DeSoto County from Interstate 55 to the county line.	February 2018

*Project has been completed. The two dates represent completion dates for two phases of the project.
** Project currently on hold due to issues with the United States Environmental Protection Agency.

SOURCE: Mississippi Department of Transportation.

According to MDOT staff, the Transportation Commission selects projects based on the criteria outlined in the department's debt management Standard Operating Procedures, which includes criteria outlined in CODE Section 65-1-8.

PEER found that MDOT does not maintain proper documentation of the commission's evaluation and selection process of H.E.L.P. projects through the commission's minutes as required by Section 65-1-8. By maintaining appropriate records, MDOT would be able to demonstrate that it has weighed the projects against established criteria and thus support its selection

decisions for the H.E.L.P. Program in compliance with state law. As a result of not keeping proper documentation of the evaluation and selection process, MDOT cannot show a third party that proper analysis has been conducted of each project to demonstrate the need for the H.E.L.P. Program to finance highway projects.

PEER also found that the Transportation Commission did not require MDOT staff to conduct a cost-benefit analysis prior to entering into the interlocal agreements for the six H.E.L.P. projects. In addition, the commission's minutes do not reflect its deliberative process--e. g., consideration of availability of financial resources--as required by Section 65-1-8.

When considering proposed H.E.L.P. projects, the commission should direct MDOT staff to perform cost-benefit analysis that considers whether it would be feasible and beneficial to construct a project using H.E.L.P. bonds. By not conducting a thorough cost-benefit analysis, MDOT cannot provide the commission with sufficient information to determine whether the use of H.E.L.P. bonds to accelerate a highway project is both feasible and beneficial to the state as required by law.

How will the H.E.L.P. Program affect MDOT's future debt service requirements?

By entering into the interlocal agreements for H.E.L.P. bonds, MDOT has obligated the state to debt service requirements that could impact the state's future ability to construct and maintain needed highway projects. The current six H.E.L.P. projects will cost a total of approximately $1.45 billion in bond principal and interest and will not be repaid until 2040. Between FY 2015 and FY 2029, DeSoto and Harrison counties are authorized to issue an additional $208 million in H.E.L.P. bonds, which will cost an estimated $53 million in interest.

As discussed on page 90, in order to pay for H.E.L.P. projects, MDOT uses bond proceeds to construct a highway project and pays the debt service on the bonds, which includes principal and interest.

The Federal Highway Administration (FHWA) reimburses MDOT for at least 80% of debt service on the H.E.L.P. bonds. MDOT is responsible for up to 20% of the annual debt service amount and the agency must use a portion of its annual federal funds toward debt service. Thus, repayment of the H.E.L.P. bonds obligates the agency to use a portion of its funds toward debt service and, as a result, will affect the amount of available funds MDOT has to use toward constructing and maintaining needed highway projects elsewhere in the state in the future.

As shown in Exhibit 36 on page 94, MDOT has entered into six interlocal agreements for approximately $795 million in H.E.L.P. bond principal. Assuming for illustrative

purposes a federal reimbursement rate of 80%, $636 million of federal funds will be used for debt service rather than for construction or maintenance of state highways.

It should be noted that MDOT officials informed PEER that the department has no plans to issue bonds through the H.E.L.P. Program to finance highway construction projects beyond the authorized $208 million as described on page 95.

Current Total Debt Service of H.E.L.P. Bonds

The six current H.E.L.P. projects will cost a total of $1.45 billion in principal and interest and will not be repaid until 2040.

The six current H.E.L.P. projects will cost a total of approximately $795 million in bond principal and $653 million in interest for a total of $1.45 billion. The debt service for the six current H.E.L.P. projects will not be repaid until 2040. Exhibit 37, page 95, details the principal, interest, total project costs, and last year of bond payment by the locality of the H.E.L.P. project.

Exhibit 36: Principal, Interest, and Total Costs of H.E.L.P. Projects, By Locality of Project, as of October 24, 2013

Locality of Project	Principal	Interest	Total Project Costs (Principal and Interest)	Last Year of Bond Payment
Tunica County	$ 43,955,000	$ 32,794,000	$ 76,749,000	2025
Harrison County	171,275,000	154,366,000	325,641,000	2035
City of Laurel	31,625,000	22,885,000	54,510,000	2026
Madison County	141,075,000	107,901,000	248,976,000	2027
Marshall County	215,000,000	102,728,000	317,728,000	2035
DeSoto County	192,060,000	232,058,000	424,118,000	2040
Total Issued	**$794,990,000**	**$652,732,000**	**$1,447,722,000**	

SOURCE: Mississippi Department of Transportation.

Amount MDOT Has Repaid on Total Bond Debt Service

MDOT has repaid approximately $279 million, or 19%, of the $1.45 billion in total debt service for H.E.L.P. projects.

As of October 24, 2013, MDOT has repaid approximately $279 million--$107 million in principal and $172 million in

interest--or 19% of the $1.45 billion owed on H.E.L.P. bonds.

Amount of Additional H.E.L.P. Bonds to Be Issued

Between FY 2015 and FY 2029, DeSoto and Harrison counties are authorized to issue an additional $208 million in H.E.L.P. bonds, which will cost an estimated $53 million in interest.

Between FY 2015 and FY 2029, DeSoto and Harrison counties are authorized to issue an additional $208 million in two new H.E.L.P. bonds. According to MDOT staff, the additional debt was included in the interlocal agreements between the two counties and constitutes new bonds to be issued for the existing projects in each locale.

Using a fifteen-year maturity at an interest rate of 3%, MDOT estimates that the new H.E.L.P. bonds will cost approximately $53 million in interest, resulting in a total bond debt service repayment of approximately $261 million. Exhibit 37, below, details the principal, interest, and total debt service by new bond issue for DeSoto and Harrison counties.

Exhibit 37: Principal and Interest of Additional H.E.L.P. Bonds to be Issued, By Locality of Project

	Principal	Interest	Total Principal and Interest
DeSoto County	$82,900,000	$21,263,743	$104,163,743
Harrison County	125,200,000	32,113,638	157,313,638
Total	$208,100,000	$53,377,381	$261,477,381

SOURCE: Mississippi Department of Transportation.

Recommendations

1. In order to increase transparency of its decisionmaking and to help ensure an efficient distribution of resources, MDOT should place a greater emphasis on its performance measurement efforts. Specifically, MDOT should:
   a. decide on performance measures for each of its seven system goals, set performance targets, and begin to monitor annual progress toward those goals;
   b. determine and implement the best reporting tools to communicate its progress (e. g., online dashboard, as part of its annual report); and,
   c. eventually, use its performance indicators to help drive decisionmaking in all aspects of the department, including budgeting, project prioritization, and allocation of staff.
2. As part of its effort to increase accountability for resources, MDOT should establish and report measures of efficiency. Specifically, MDOT should:
   a. review its stewardship and oversight agreement and identify indicators of efficiency (e. g., on-time and on-budget indicators);
   b. review other states' measures of efficiency (including those listed in this report) to determine the best measures for MDOT to use in demonstrating efficiency of its internal operations and begin tracking those measures;
   c. in order to provide a more comprehensive measure of cost per mile, refine its cost per mile information to include all pre-construction and actual construction costs, rather than specific components;
   d. in order to compare its project costs to those of other states, consider conducting a study similar to that done by Washington State to show:
      i. all-inclusive costs for completed roadway projects around the nation or within the region;
      ii. all-inclusive costs for typical roadway projects in Mississippi; and,
      iii. where possible, how Mississippi's costs compare to those of other states.

3. In order to optimize utilization of professional staff, MDOT's Human Resources Department should conduct a department-wide workforce planning initiative (similar to that of GDOT described on page 54 and in Appendix J, page 129) that would result in a determination of optimal staff size and skill sets based on anticipated workload.

4. Once MDOT's staffing needs have been objectively determined through a workforce planning study, MDOT should conduct a cost-benefit analysis to determine which staffing option is more beneficial: (1) increasing or maintaining critical in-house skills through the addition of PINs and selected pay increases; or (2) contracting out for needed skills. If MDOT determines that building in-house skills is more beneficial, then the department should propose to the Legislature the inclusion of sufficient funds in MDOT's personal services budget to allow for needed PIN increases or salary increases for staff with complex and critical skill sets. The increases could be paid for through a reduction in the amount of dollars needed for contracts.

5. Taking into account the efforts of other state departments of transportation to address the efficiency of staff, MDOT should consider the following areas of analysis for every MDOT division and district:

    - staff development strategies, including:
        - confirming personnel's understanding and agreement with MDOT's mission and how MDOT's workforce should coincide with that mission;
        - identifying the job qualifications necessary to perform required functions;
        - determining whether the personnel holding positions possess the necessary qualifications/skills;
        - developing typically outsourced personnel skills (i. e., engineering); and,
        - in situations in which it is necessary, reorganizing and transferring personnel to other positions;
    - succession planning, including:
        - identifying which job functions will remain constant and which will change (and a plan to handle changing job functions);
        - forecasting staffing needs (based on past project data and future project plans);

- determining what staffing adjustments need to be made as a result of forecasted needs; and,
- using a resource similar to the ACCESS-based database used by New Mexico DOT's Human Resources Department. The ACCESS database allowed New Mexico to plan for succession and track more than 200 attributes of personnel (see Appendix I, page 126);

- knowledge management, including:
  - determining what skills are available in-house and how MDOT is affected if that skill is no longer available;
  - identifying MDOT's critical skill positions;
  - determining how many of the persons in those critical skill positions are eligible for retirement in the next five years and the next ten years; and,
  - determining and planning how MDOT will react if a critical skill position suddenly becomes vacant voluntarily.

  Knowledge management would be similar to the efforts of the Virginia Department of Transportation. VDOT began its knowledge management program after the significant loss of critical in-house knowledge. Its program covered VDOT in its entirety and allowed VDOT to manage job-related knowledge within its organization (see Appendix I, page 126);
- cross-training, including:
  - training personnel who were originally hired to perform one job function with the skills necessary to complete additional functions, contingent on feasibility and proposed benefits of cross-training an individual in a particular position;
- reorganization/transfer of skills, including:
  - analyzing department-wide resources to determine where that skill would best benefit the organization and best fulfill MDOT's mission; and,
  - creating incentives to current engineers for obtaining the needed skill set.

6. MDOT should utilize a uniform method to track its professional engineers' active projects and tasks. A uniform method would help to increase the transparency needed to show that its professional

staff is being held accountable for work performed and decisions regarding workload for professional staff are based on a comprehensive look at staff utilization and schedules. PEER recommends capturing this information in a system such as the "Active Project" software program used by MDOT's Materials Division for its geotechnical engineers.

7. To help ensure the most efficient use of its in-house and contracted engineering staff, MDOT should create a checklist that divisions and districts would follow to confirm and justify their proposed need to hire an engineering consultant. A knowledge management system similar to what the Virginia Department of Transportation has would allow division or district heads to know what skill sets are available in-house, regardless of that person's physical location. If the lack of available personnel is the justification for outsourcing, the requesting division should have access to the knowledge management system so that they can provide documentation to show that the skill sets are not available to complete the assignment.

   A uniform scheduling system for all professional staff (as described in recommendation #6) would allow the requesting division or district to determine whether in-house staff can complete the project in a timely manner.

   Some components of the checklist should include answers to, or documentation for, the following conditions:

   - Regardless of their position or departmental placement within MDOT, which current MDOT personnel are qualified to complete this project/skill/function required?
   - Why can the above-named staff not complete the assignment?
   - Can any workload realignments or adjustments (independent of personnel's district or division affiliation) take place to free a qualified engineer (or personnel) to complete this necessary project/skill/function?
   - What is the time frame/due date by which this project must be completed?
   - If the due date were amended, could an in-house engineer complete the project/skill/function?
   - How feasible would it be to amend a due date if it were to result in cost savings for the department?

- How would extending the due date of this project (to cut cost) hurt department-wide business?

8. In order to increase its transparency in decisionmaking regarding bridge projects, MDOT should establish a written policy for selecting and prioritizing bridge projects based primarily on the Significance Index Model (SIM). Any future decisions that deviate from using the SI rating as the basis for selecting the bridge project should include written justification for selecting those projects that are spread on the commission minutes.

9. MDOT should revise its five-year schedule of proposed projects to increase transparency. Specifically, MDOT should:

   - place its schedule online with the ability to query based on the various elements of the project (e. g., by planned begin date, by program);
   - include *all* projects MDOT plans to complete within the five-year period;
   - clearly demonstrate how projects have changed; and,
   - include a brief description of the data used to select the project (e. g., SI value, PCR/other pavement data, Year of Need).

10. Given that funds are limited for new capacity projects and that the process for allocating money to new capacity projects is presently not sufficiently transparent, the Legislature should amend MISS. CODE ANN. Section 65-3-97 (5) (a) (i) (1972) to require that MDOT submit a detailed description of the criteria and analyses used by MDOT staff to determine any re-prioritization of new capacity projects to the Transportation Commission for inclusion as an attachment to its minutes. The Transportation Commission should ensure that the specific reasons for the reprioritization are spread upon its minutes and that all supporting documentation provided by MDOT staff is included as an attachment to the minutes. The commission should make all such criteria and analyses available to the public upon request.

11. MDOT should establish a timeline for allocating maintenance funds based primarily on statewide need so that pavement maintenance funds can be directed to the highways with the highest needs. In the interim, MDOT should document its method for

transitioning to this needs–based allocation, including the method for the transition percentages used in allocating funds to districts. For example, MDOT could state that all districts will receive an allocation that is within ten percent of its needs–based allocation (i. e., based on the Accountability and MDOT Maintenance Operations [AMMO] system) by FY 2015, within five percent by FY 2016, and within less than five percent by FY 2017.

12. To provide a more objective, accountable, and documented system for project selection and prioritization, MDOT's Planning Division should develop a written plan and procedures for using Decision Lens (decision–making software) or any other prioritization tools to account for quantitative and qualitative elements and have them ready for use in its project selection and prioritization processes in FY 2015.

13. The Legislature should amend MISS. CODE ANN. Section 65–1–8 (1972) to provide that from and after July 1, 2014, the Mississippi Transportation Commission shall not enter into interlocal agreements that indebt the state to finance local highway construction projects.

14. Regarding the pending consultant's report on MDOT's equipment, the PEER Committee should provide members of the Legislature with a summary detailing the consultant's findings, recommendations, and implementation strategy as soon as practicable following the release of the consultant's report.[17]

[17]On December 20, 2013, PEER received a copy of the Dye Management Group's report, "Equipment Management Review: Final Recommendation Report." PEER will provide members of the Legislature with an analytical summary of the report as soon as practicable. **[NOTE: The Dye Management Group report and the PEER analytical summary are now available.]**

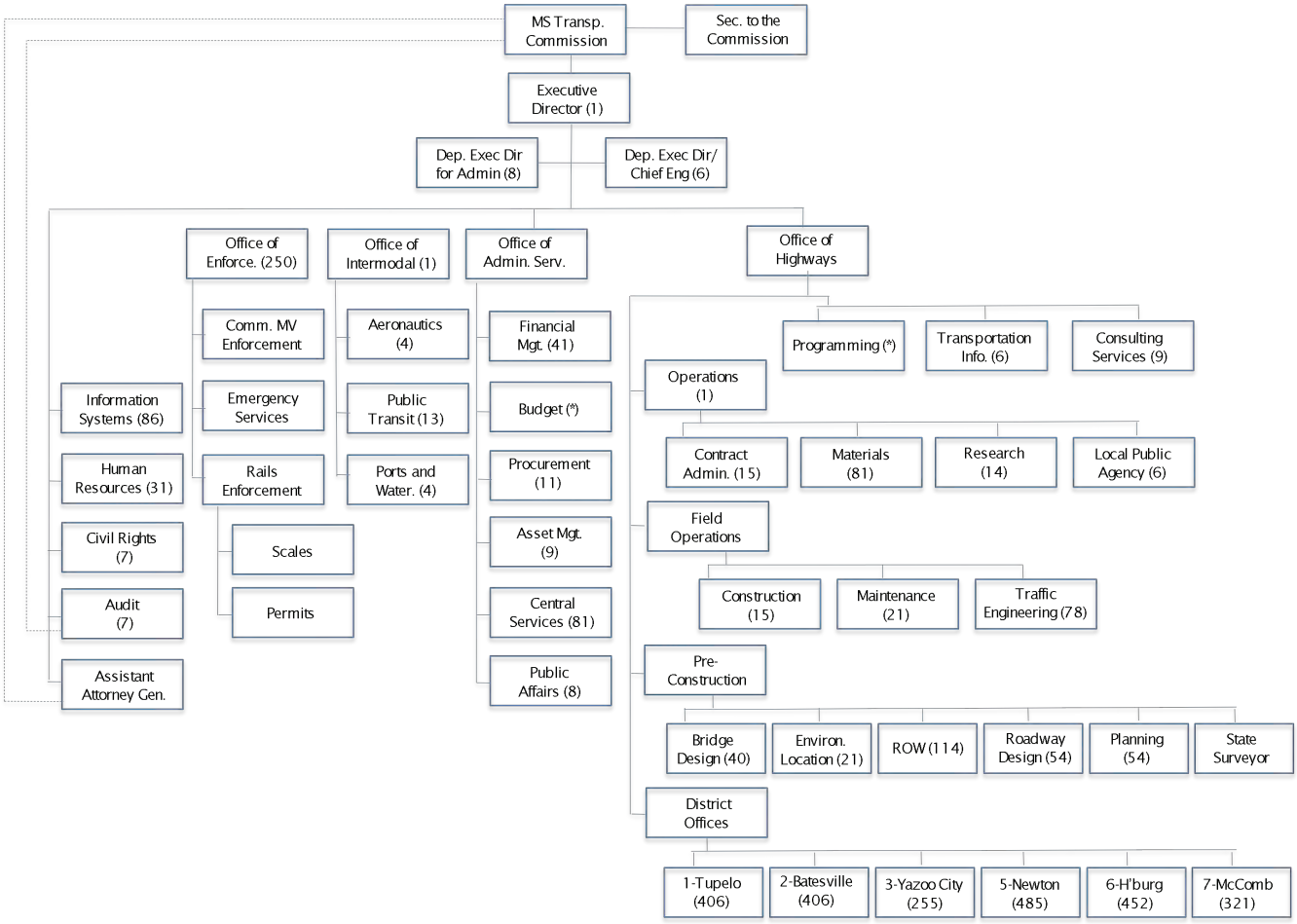
Appendix A: Department of Transportation Governance Structures by State, including the District of Columbia

State	Leadership Appointments
Alabama	Secretary, commissioner or director
Alaska	Secretary, commissioner or director
Arizona	Secretary, commissioner or director and policymaking board or commission
Arkansas	Secretary, commissioner or director and policymaking board or commission
California	Other
Colorado	Secretary, commissioner or director and policymaking board or commission
Connecticut	Secretary, commissioner or director
Delaware	Secretary, commissioner or director
Florida	Secretary, commissioner or director and policymaking board or commission
Georgia	Secretary, commissioner or director and policymaking board or commission
Hawaii	Secretary, commissioner or director and advisory board or commission
Idaho	Secretary, commissioner or director and policymaking board or commission
Illinois	Secretary, commissioner or director
Indiana	Secretary, commissioner or director
Iowa	Secretary, commissioner or director and policymaking board or commission
Kansas	Secretary, commissioner or director and advisory board or commission
Kentucky	Secretary, commissioner or director
Louisiana	Secretary, commissioner or director
Maine	Secretary, commissioner or director
Maryland	Secretary, commissioner or director
Massachusetts	Secretary, commissioner or director and policymaking board or commission
Michigan	Secretary, commissioner or director
Minnesota	Secretary, commissioner or director
Mississippi	Secretary, commissioner or director and policymaking board or commission
Missouri	Secretary, commissioner or director and policymaking board or commission
Montana	Secretary, commissioner or director and policymaking board or commission
Nebraska	Secretary, commissioner or director and advisory board or commission
Nevada	Secretary, commissioner or director and policymaking board or commission
New Hampshire	Secretary, commissioner or director
New Jersey	Other

New Mexico	Secretary, commissioner or director and policymaking board or commission
New York	Secretary, commissioner or director
North Carolina	Secretary, commissioner or director and policymaking board or commission
North Dakota	Secretary, commissioner or director
Ohio	Secretary, commissioner or director
Oklahoma	Other
Oregon	Secretary, commissioner or director and policymaking board or commission
Pennsylvania	Secretary, commissioner or director and policymaking board or commission
Rhode Island	Secretary, commissioner or director
South Carolina	Secretary, commissioner or director and policymaking board or commission
South Dakota	Secretary, commissioner or director and policymaking board or commission
Tennessee	Secretary, commissioner or director
Texas	Secretary, commissioner or director and policymaking board or commission
Utah	Secretary, commissioner or director and policymaking board or commission
Vermont	Other
Virginia	Other
Washington	Secretary, commissioner or director and policymaking board or commission
West Virginia	Other: Secretary, commissioner or director; a board or commission; and at least one other decisionmaking or advisory entity
Wisconsin	Secretary, commissioner or director
Wyoming	Secretary, commissioner or director and policymaking board or commission
District of Columbia	Secretary, commissioner or director

SOURCE: *Transportation Governance and Finance: A 50-State Review of State Legislatures and Departments of Transportation* by the National Conference of State Legislatures (NCSL) and the American Association of State Highway and Transportation Officials (AASHTO) Center for Excellence in Project Finance.

Appendix B: MDOT Organizational Chart, as of October 2013



(*) Budget FTEs are included under Dep. Exec Dir for Admin.

(*) Programming FTEs are included under Dep. Exec Dir/ Chief Eng.

SOURCE: PEER analysis of MDOT Organizational Chart.

Appendix C: Description of Job Duties of MDOT's Professional Engineers by Division

Aeronautics

MDOT has one Aeronautics engineer. He provides oversight for many different programs that the seventy-eight public-use airports in Mississippi have. His duties on any given day could include:

- Approving FAA applications for funding
- Reviewing plans and specifications for construction projects
- Assisting consultants with airport design questions
- Staying up-to-date with current aviation issues
- Representing airports statewide
- Assisting airport owners with aviation-related issues
- Reviewing airport safety inspection reports
- Communicating with FAA on a local, regional, and national level

Consultant Services

MDOT has one Consultant Services engineer who is the director of the Consultant Services Unit (CSU). He oversees the procurement, administration, payment, and closeout of engineering services and approximately 450-500 active professional-related service contracts for MDOT.

Ports and Waterways

MDOT has one engineer for Ports and Waterways. He oversees Mississippi's sixteen state ports. His typical workday includes:

- Participating in AASHTO committee meetings or teleconferences
- Negotiating and administrating consultant contracts
- Participating in modal organizations
- Assisting MDOT staff in freight planning efforts relating to ports
- Planning and specification reviews for multimodal projects
- Visiting port sites
- Reviewing commission items
- Monitoring water levels on river systems

- Keeping up-to-date on port-related Congressional legislation
- Promoting awareness and impact of port systems at various meetings and conferences
- Inspecting projects
- Administrative duties

Transportation Information

MDOT has two engineers in the Transportation Information Division. Their duties include:

- Answering questions about application design
- Developing design policy
- Recommending design solutions for various applications
- Answering questions from divisions and districts
- Coordinating all work with staff
- Developing project schedules
- Reviewing scopes of work for proposed projects
- Filling out surveys from other state departments of transportation, universities, etc., on GIS policies
- Conducting in-house training sessions
- Tracking division performance measures
- Conducting weekly project progress meetings.

Field Operations

The Field Operations Division is made up of the Construction Division, the Maintenance Division, and the Traffic Engineering Division. A Chief Engineer oversees these divisions.

Construction Division

The Construction Division has one or more engineers who perform a range of duties and hold the titles listed below:

Construction Division Area Engineer

- Attends field and office reviews, prepares contract documents, and performs erosion control inspections

Specifications Engineer

- Writes notice to bidders, interprets specifications, and researches specification language

Assistant Specifications Engineer

- Writes notice to bidders, interprets specifications, and researches specification language

State Construction Engineer

- Attends meetings, reviews claims, supplemental agreements, or value engineering proposals

Assistant State Construction Engineer

- Develops project documents, reviews supplemental agreements, and produces addendums

Office Engineer

- Inputs data into computer system, completes inventory, and acts as a back-up estimator

State Estimator

- Estimates all projects that will be bid each month and provides individual cost data

Maintenance Division

There are two engineers that make up and oversee the Maintenance Division, a State Maintenance Engineer, and an Assistant State Maintenance Engineer. The Maintenance Division is responsible for developing and coordinating the statewide maintenance budgeting and reporting, as well as the coordination, processing, and tracking of maintenance and capital improvement projects. The division acts as a clearinghouse for the development of uniform methods, standards, and condition assessments for maintenance quality assurance throughout the state. The division also helps coordinate MDOT's emergency operations as well as all anti-litter programs statewide.

Traffic Engineering Division

The Traffic Engineering Division has one or more engineers who perform a range of duties and hold the titles listed below:

State Traffic Engineer

- Administrative responsibilities (attends meetings, assists staff members on projects, and responds to emails)

Assistant State Traffic Engineer

- Reviews and approves expense accounts, leave requests, and time sheets. Answers field calls, emails, and reads technical reports

Intelligent Transportation Systems (ITS) Engineer

- Oversees planning, design, and construction of the ITS program

Signal Engineer

- Develops standards for traffic signals, performs signal warrant analyses, and implements emergency signal timing plans

Area Traffic Engineer

- Teaches proper use of traffic control devices, responds to public requests and complaints, conducts site inspections, and interprets engineering studies

Traffic Programs Engineer

- Oversees the contractual process and the development of signing plans. Answers emails and phone calls, maintains contact with vendors, and consults with field sign crews

Traffic Signal Systems and Operations Engineer

- Manages statewide signal traffic system, develops traffic signal inventory, reviews timing plans, and develops new databases

Operations

The Operations Division is made up of the Research Division, Local Public Agency, Contract Administration, and the Materials divisions. A Chief Engineer oversees these divisions.

State Research Engineer

- Oversees the operations and administration of MDOT's research

Assistant State Research Engineer

- Assists in the oversight of MDOT's research

Pavement Materials Engineer

- Performs materials support studies, organizes training, and works on various research studies

Research Administration Engineer

- Develops website and risk analysis program and participates in various research studies

Local Public Agency (LPA)

The LPA Division has a State LPA Engineer and an Assistant State LPA Engineer. They oversee the administration and operation of MDOT's LPA program.

Contract Administration

Three engineers make up the Contract Administration Division. Those positions include the State Contract Administration Engineer, the Assistant State Contract Administration Engineer, and the Final Plans Engineer. The Contract Administration engineers oversee the administration and operation of MDOT's Contract Administration Division and the Final Plans Engineer is responsible for the final plans section of the Contract Administration Division. He makes sure that contractors were paid correctly and he generates the final estimate.

Materials Division

The Materials Division has one or more engineers who perform a range of duties and hold the titles listed below:

State Materials Engineer

- Oversees the administration and operation of sampling, testing, inspecting and reporting of materials produced at facilities for use on MDOT transportation projects.

Assistant State Materials Engineer

- Assists the State Materials Engineer

State Geotechnical Engineer

- Oversees field drilling and sampling of soils, geotechnical investigations for bridge foundations, retaining walls and embankment slopes. Performs field tests of foundation elements for bridges, prepares procurement requests to support branch operations, and aids in the preparation of the division's budget.

Soils and Physical Lab Engineer

- Oversees physical, soils, and geotechnical labs, insures testing is done on schedule, completes commodities budget, and oversees equipment maintenance

Concrete Fields Engineer

- Insures concrete specifications meet guidelines and designs and maintains e-form

Senior Geotechnical Design Engineer

- Assists in oversight of field drilling and sampling of soils and geotechnical investigations, sets project priorities, and performs quality assurance

Geotechnical Engineer

- Reviews project plan alignment, characterizes soil conditions, and is responsible for inspection, field-testing, and the analysis of foundation elements

Pre-Construction

Pre-Construction is made up of the Bridge, Environmental, Planning, and Roadway Design Divisions. A Chief Engineer oversees these divisions.

Bridge Division

The Bridge Division has one or more engineers who perform a range of duties and hold the titles listed below:

Director of Structures

- Oversees planning, hydraulic design, structural design, construction, maintenance/repair, and inspections of Mississippi's structures

Program Manager

- Manages the levels that the Director of Structures oversees and oversees safety and barrier protection program, division purchasing and travel, federal design and policy compliance. Oversight also includes consultant contracting negotiation, bridge replacement prioritization, and coordination with local agencies

Bridge Design Section Engineer

- Provides training and technical guidance on designing bridges and other structures, addresses personnel concerns, schedules and manages MDOT structural projects, and reviews committee reports

Bridge Management Engineer

- Manages and maintains bridge inspection database, supports inspection staff, prepares and submits bridge inspection data

Assistant State Hydraulics Engineer

- Provides training and technical guidance on the hydraulic modeling/design of structures, addresses personnel concerns as they arise, and completes performance appraisal reports

Bridge Load Rating and Load Permit Engineer

- Performs load ratings, determines weight restrictions for state maintained bridges, and reports load and clearance restrictions

Bridge Maintenance/Management Engineer

- Performs on-site field reviews, processes equipment usage, coordinates with MDOT districts, performs plan development, quality assurance and control, and internal audits of bridge inventory

Bridge Foundations and Railroad Contract Engineer

- Determines proper foundation type, reviews construction plans, maintains database for geotechnical reports, and acquires railroad approval of bridge plans

Bridge Design Engineer

- Supervises and trains, reviews final bridge layout, analysis, and contract plans

Bridge Quantities and Finals Engineer

- Reviews bridge final estimate data for final payment, maintains letting and bid costs, and prepares and manages summary of quantities and estimated quantities detail sheets for in-house projects

Environmental Division

The Environmental Division has one or more engineers who perform a range of duties and hold the titles listed below:

Location Engineer

- Compiles and consolidates findings relative to noise, quality, bicycle and pedestrian issues, water quality, historic preservation, coastal barriers, hazardous wastes, visual impact, farmland impacts, and threatened and endangered species

Environmental Stewardship and Compliance Engineer

- Manages erosion control process, develops and implements the environmental management system (EMS), performs construction site visits and inspections, processes research and development for the EMS, and coordinates and collaborates with consultants

Assistant Environmental Division Engineer

- Oversees location engineers and the stewardship and compliance engineers, performs budget activities, evaluates employee performance, staffing needs,

maintenance and development, and improvement of division procedures and personnel

The Planning Division

The Planning Division has one or more engineers who perform a range of duties and hold the titles listed below:

State Planning Engineer

- Oversees intermodal transportation planning activities for MDOT

Assistant State Planning Engineer

- Assists State Planning Engineer in oversight activities

Database/GIS Engineer

- Oversees data collection, data processing, computer aided drafting, geographic information systems, highway performance monitoring system, and the linear referencing system

Metropolitan Planning Organization (MPO) Coordinator

- Coordinates the unified planning work program, quarterly reports, review of planning contracts, review of planning studies, funding oversight, development of regional plans, and tracking and reporting project statuses

The Roadway Division

The Roadway Design Division has one or more engineers who perform a range of duties and hold the titles listed:

Roadway Design Division Engineer

- Sets design policy, leads division in developing roadway design plans, and reviews national design standards

Roadway Design Assistant Division Engineer

- Assigns projects to in-house designers, decides which projects should be outsourced, keeps projects on schedule, reacts to issues that may arise, coordinates with district offices, and coordinates with consultants

Roadway Design CADD Engineer

- Performs software and hardware management, trains personnel, manages project plans, and provides technical support to designers

Roadway Design Environmental Engineer and Value Engineer Coordinator

- Reviews accuracy of wetland delineation reports, runs value engineering program, and updates project database

Roadway Design Hydraulic Engineer

- Determines size and location of all drainage structures and siltation containment devices

Roadway Design Pavement Engineer

- Reviews and coordinates pavement design recommendations with various MDOT divisions and updates and maintains the pavement policy

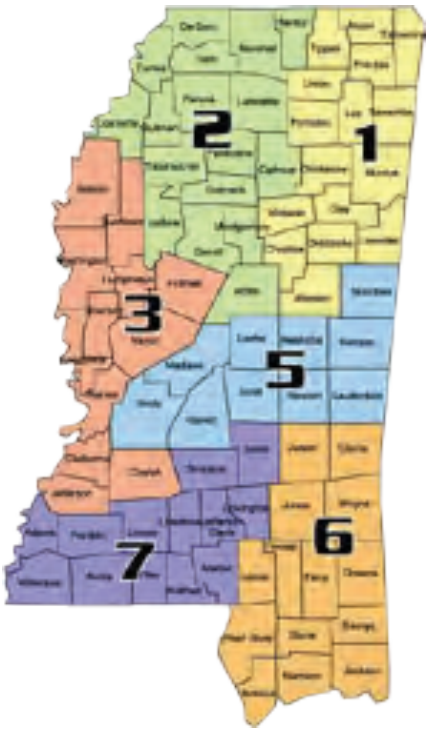
Roadway Design Quality Control Engineer

- Responsible for quality control of roadway design plans, reviews all final plans, and acts as the Standards Engineer for the division

Roadway Design Section Engineer

- Manages the design work for all projects within a district(s), supervises in-house teams, reviews the work of consultants and designs of LPA projects

Districts I, II, III, V, VI, VII



MDOT has six districts that are divided according to their geographic location. Each district has a District Engineer who oversees, directs, and coordinates all MDOT operations within the district. District I covers the sixteen Mississippi counties of Alcorn, Chickasaw, Choctaw, Clay, Itawamba, Lee, Lowndes, Monroe, Oktibbeha, Pontotoc, Prentiss, Tippah, Tishomingo, Union, Webster, and Winston. District II covers Attala, Benton, Calhoun, Carroll, Coahoma, DeSoto, Grenada, Lafayette, Leflore, Marshall, Montgomery, Panola, Quitman, Tallahatchie, Tate, Tunica, and Yalobusha. District III covers Bolivar, Claiborne, Copiah, Holmes, Humphreys, Issaquena, Jefferson, Sharkey, Sunflower, Warren, Washington, and Yazoo (no District IV). District V covers Hinds, Rankin, Madison, Noxubee, Kemper, Lauderdale, Neshoba, Newton, Leake, and Scott. District VI covers Clarke, Jasper, Wayne, Jones, Greene, Perry, Forrest, Lamar, George, Stone, Pearl River, Jackson, Harrison, and Hancock.
District VII covers Adams, Amite, Covington, Franklin, Jefferson Davis, Lawrence, Lincoln, Marion, Pike, Simpson, Smith, Walthall, and Wilkinson.

Each district has the same or similar positions. Position titles and brief descriptions are listed in Appendix K, page 132.

Appendix D: Maintenance Conditions Survey

Maintenance Element	Statewide		District 1		District 2		District 3		District 5		District 6		District 7	
	Goal	Act.	Goal	Act.	Goal	Act.	Goal	Act.	Goal	Act.	Goal	Act.	Goal	Act.
Asphalt Roadway														
Potholes	C	D+	C	D	C	C-	C	D+	C	D-	C	C-	C	C+
Rutting	C	C+	C	B-	C	C+	C	B-	C	C+	C	B-	C	C+
Stripping	C	B+	C	B+	n/a	n/a	C	B+	C	B	C	B	C	B+
Alligator Cracking	C	B	C	B	C	B+	C	B	C	B	C	B+	C	B
Linear Cracking	C	D-	C	F	C	F	C	D-	C	F	C	D	C	F
Area Cracking	C	C-	C	D+	C	C+	C	B-	C	C-	C	D+	C	D+
Sweeping Asphalt	D	D	D	F	D	F	D	F	D	D	D	B	D	C+
Edge Raveling	C	D+	C	D-	C	C-	C	C-	C	C-	C	C+	C	C-
Shoving	C	C+	C	A	C	A	C	A	C	D+	C	C-	C	A
Bridge														
Painting Steel Bridges	B	B-	B	C+	n/a	n/a	B	B+	B	B	B	B-	B	B-
Approaches	B	A+	B	A+	n/a	n/a	B	A+	B	A+	B	A+	B	A+
Deck Spalls and Holes	B	A-	B	A-	n/a	n/a	B	A-	B	A-	B	B+	B	A-
Deck Cracking	B	A-	B	B+	n/a	n/a	B	B	B	A-	n/a	n/a	n/a	n/a
Deck Joints	B	B+	B	A-	n/a	n/a	B	C+	B	A-	n/a	n/a	B	C+
Railing and Wheel Guards	B	A-	B	A-	n/a	n/a	B	A-	B	A-	B	A-	B	A-
Undesirable Bridge Vegetation	B	A	B	A+	n/a	n/a	B	A	B	A+	B	A+	B	A
Concrete Roadway														
Spalling	C	D+	n/a	n/a	C	B-	C	C	C	D+	C	D	n/a	n/a
Sweeping Concrete	D	B-	n/a	n/a	n/a	n/a	n/a	n/a	D	C+	D	A	n/a	n/a
Cracking	C	C+	C	C	C	C+	C	B-	C	C+	C	B-	C	C+
Faulting	C	B+	C	B+	C	B-	C	B	C	B+	C	B+	C	B+
Joint Sealing	C	B-	C	B+	C	B	C	B	C	C+	C	B+	n/a	n/a
Pumping	C	A	n/a	n/a	n/a	n/a	C	A	C	A	C	A	n/a	n/a
Punchouts	C	F	C	F	C	F	C	F	C	F	C	F	n/a	n/a
Drainage Ditches Paved														
Paved Ditches	C	C-	C	B-	C	F	C	F	C	C	C	C	C	C+
Drainage Ditches Unpaved														
Ditches Unpaved	C	B-	C	B	C	C+	C	C-	C	B-	C	B	C	B-
Drainage Drop Inlet/Catch Basins														
Ditch Bottom Inlets and Catch Basins	C	F	C	F	C	F	C	D-	C	F	C	F	C	D-
Drainage Structures														
Side Drains	C	F	n/a	n/a	C	F	C	F	C	F	C	F	C	F
Cross Drains	C	D	C	C-	C	D-	C	D+	C	D-	C	F	C	C
Edge Drains	C	F	C	F	C	F	C	F	C	F	C	F	C	F

SOURCE: MDOT Maintenance Summary FY 2012, pp. 137-160

Maintenance Element	Statewide		District 1		District 2		District 3		District 5		District 6		District 7	
	Goal	Act.	Goal	Act.	Goal	Act.	Goal	Act.	Goal	Act.	Goal	Act.	Goal	Act.
Roadside Area														
Mowing	C	C+	C	C-	C	D-	C	D+	C	B-	C	B-	C	B+
Roadside Connections														
Non-Paved Driveways and Connections	C	A-	C	A-	C	B+	C	A-	C	B+	C	B	C	A
Roadside Linear														
Front Slope Erosion	C	C+	C	B	C	C+	C	C+	C	C+	C	D+	C	A-
Back Slope Erosion	D	B-	D	D+	D	C	D	A-	D	C-	D	B+	D	B+
Brush Control	D	F	D	F	D	F	D	F	D	F	D	D	D	D
Dead/Hazardous Trees	D	D-	D	C+	D	D+	D	F	D	F	D	C	D	D
Litter Control	D	D	D	D	D	F	D	D	D	D	D	C-	D	D+
Undesirable Vegetation	D	C-	D	C-	D	B	D	D-	D	C	D	D+	D	C+
MDOT Fence	D	A	D	A+	D	A	D	A-	D	B+	D	A	D	A+
Shoulder Paved														
Potholes	D	C	D	D+	D	F	D	B+	D	B	D	B-	D	B+
Edge Raveling	D	B	D	B-	D	C	D	B	D	B-	D	B	D	B+
Shoulder Unpaved														
Non-Paved Drop-off	B	C+	B	B	B	C	B	C-	B	B-	B	C+	B	B-
Non-Paved High Shoulder	B	B	B	B+	B	B+	B	B-	B	C+	B	B+	B	B+
Traffic Barriers														
Guardrail	B	B	B	D	B	A+	B	B+	B	D+	B	B+	B	B+
Barrier Walls	B	A	B	A	B	A	B	A	B	A	B	A	B	A
Traffic Lighting														
Highway Lighting	C	A+	n/a	n/a	C	A+	C	A+	C	A+	C	A	C	A+
Traffic Marking & Delineation														
Delineators	C	D	C	D	C	C+	C	D	C	D+	C	F	C	C-
Striping	A	B	A	B	A	C+	A	C+	A	B+	A	A-	A	A-
Traffic Pavement Symbols														
Pavement Symbols and Legends	D	F	D	F	D	F	D	F	D	D+	D	F	D	D
Traffic Signals														
Signals	A	A-	A	A+	A	B	A	A+	A	A	A	A+	A	A+
Traffic Signs														
Signs-Regulatory and Warning	A	D-	A	F	A	F	A	D+	A	D-	A	D+	A	F
Signs -- Guide, Other	B	A-	B	C+	B	A	B	A-	B	A	B	A	B	A

SOURCE: MDOT Maintenance Summary FY 2012, pp. 137-160

NOTE: Red cells indicate maintenance elements on which MDOT's actual performance was lower than its goal. However, for example, if the goal was "C" and MDOT performed at "C-", such is not indicated in red because the goal of "C" was inclusive of C+, C, and C.

Appendix E: Maintenance LOS Measures

Maintenance Element	LOS Measure	LOS Classes				
		A	B	C	D	F
ASPHALT PAVEMENT						
Potholes	Number of potholes per lane mile	0	0-1	1-2	2-3	>3
Rutting	Rut depth (in)	0	0-1/8	1/8-1/4	1/4-1/2	>1/2
Stripping	% of surface area distressed	0	0-5	5-10	10-20	>20
Alligator cracking	% of surface area distressed	0	0-10	10-20	20-30	>30
Linear cracking	Linear ft. with unfilled cracks per lane mile	0-250	250-500	500-1000	1000-2500	>2500
Area cracking (1/8)	% of surface area distressed	0	0-10	10-20	20-30	>30
Sweeping (includes concrete pavement and bridges)	% of shoulder miles needing sweeping	0-5	5-10	10-15	15-25	>25
Edge raveling (2 in)	Linear feet of edge raveling shoulder mile	0-25	25-100	100-300	300-528	>528
Shoving	Square feet of deficiencies per lane mile	0	0-10	10-25	25-50	>50
CONCRETE PAVEMENT						
Spalling	Number of spalls per lane mile	0	0-2	2-5	5-10	>10
Cracking	Linear feet of cracking per lane mile	0	0-1500	1500-3000	3000-5000	>5000
Faulting	Average faulting (in) per lane mile	0	0-1/8	1/8-1/4	1/4-1/2	>1/2
Joint sealing (all)	% of joints deficient	0	0-5	5-10	10-15	>15
Pumping	Number of slabs deficient per lane mile	0	0-5	5-10	10-15	>15
Punch-out's	Number of punch-out's per lane mile	0	0-1	1-2	2-3	>3
SHOULDERS						
Potholes	Number of potholes per shoulder mile	0	0-2	2-4	4-6	>6
Edge Raveling	Linear feet per shoulder mile	0	0-125	125-250	250-500	>500
Non- paved – Drop off >2 in	Linear feet per shoulder mile	0	0-500	500-1000	1000-2500	>2500
Non- paved – High shoulder >1 in	Linear feet per shoulder mile	0	0-500	500-1000	1000-2500	>2500

Maintenance Element	LOS Measure	LOS Classes				
		A	B	C	D	F
DRAINAGE						
Side drains	% of pipes > 50% blocked or damaged	0	0-5	5-10	10-15	>15
Cross drains	% of pipes > 50% blocked or damaged	0	0-5	5-10	10-15	>15
Edge drains	% of drains blocked	0	0-10	10-20	20-30	>30
Ditches	% of ditch length defective	0	0-5	5-10	10-15	>15
Paved ditches	% of ditch length defective	0	0-5	5-10	10-15	>15
Ditch bottom inlets	% of inlets defective	0	0-5	5-10	10-15	>15
ROADSIDE						
Front slope – Erosion control	% of shoulder miles defective – washouts >12 in	0-1	1-2	2-3	3-5	>5
Back slope – Erosion control	% of shoulder miles defective – washouts >18 in	0-1	1-2	2-3	3-5	>5
Mowing	Average height of grass (in.) (rural)	4-8	8-11	11-14	14-18	>18
	Average height of grass (in.) (urban)	4-6	6-8	8-10	10-12	>12
Non-paved driveways and street/road connections	% of driveways defective	0-5	5-10	10-15	15-20	>20
Brush control	% shoulder miles defective	0.0-0.5	0.5-1.5	1.5-3.5	3.5-6.0	>6.0
Dead/diseased/hazardous tree removal	Number per shoulder mile	0	0-1	1-3	3-5	>5
Litter control	Number of fist-size objects per shoulder mile	0-50	50-100	100-300	300-500	>500
Undesirable vegetation	% of shoulder mile with undesirable vegetation	0-1	1-10	10-30	30-50	>50
MDOT Fence	% of fence miles defective	0-5	5-10	10-15	15-20	>20

Maintenance Element	LOS Measure	LOS Classes				
		A	B	C	D	F
TRAFFIC SERVICES						
Raised pavement markers	% of RPMs missing or damaged per center line mile	0-5	5-15	15-25	25-40	>40
Signals	% of signals defective	0-1	1-5	5-10	10-15	>15
Delineators	% of delineators defective	0-10	10-20	20-30	30-50	>50
Signs - warning and regulatory	% of signs defective	0-2	2-5	5-7.5	7.5-10	>10
Signs - guide, service, attraction	% of signs defective	0-5	5-10	10-15	15-20	>20
Striping	% of total length defective	0-2	2-5	5-15	15-30	>30
Guardrail	% of guardrail length defective	0-1	1-3	3-5	5-10	>10
Impact attenuators	% of impact attenuators needing repair	0	0-1	1-2	2-5	>5
Barrier walls	% of barrier length defective	0	0–1	1–2	2–5	>5
Highway Lighting (low or high mast)	% of bulbs malfunctioning	0-10	10-20	20-30	30-50	>50
Pavement symbols and legends	% of symbols and legends defective	0–5	5–7	7–10	10–20	> 20
BRIDGE AND STRUCTURAL MAINTENANCE						
Painting (steel bridges)	Use data from PONTIS	1.5	2.5	3.5	4.5	5
Bridge approaches	% of approach slabs deficient	0-5	5-10	10-15	15-20	>20
Deck holes and spalls (6x6x1)	Use data from PONTIS	1.5	2.5	3.5	4.5	5
Deck cracking	Use data from PONTIS	1.5	2.5	3.5	4.5	5
Deck joints (expansion or construction)	Use data from PONTIS	1.25	1.5	2.25	2.5	3
Drain holes	% of drains deficient	0-5	5-10	10-15	15-20	>20
Railings and wheel guards	Use data from PONTIS	1.5	2.5	3.5	4.5	5
Undesirable vegetation	% of bridges with undesirable vegetation	0-5	5-10	10-15	15-20	>20

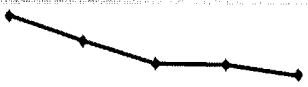
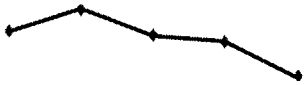
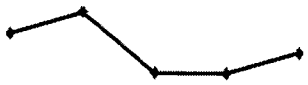
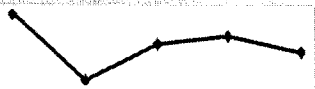
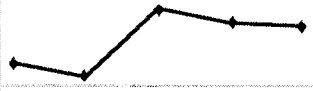
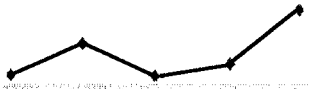
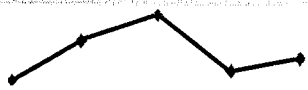
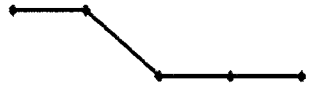
Appendix F: FY 2012 Maintenance Performance Measures by District

Type of Maint.	Performance Measure	Dist. 1	Dist. 2	Dist. 3	Dist. 5	Dist. 6	Dist. 7	Avg.	Stand.
Asphalt Roadway Maintenance: Seal Coating	· Lane miles sealed per man day	0.07	0.00	0.00	0.24	0.00	0.00	0.21	0.20
	· % of lane miles sealed	0.2%	0.0%	0.0%	3.7%	0.0%	0.0%	0.7%	12.5%
	· Cost per lane mile sealed	$23,311	$0	$0	$5,930	$0	$0	$14,621	$5,000
Asphalt Roadway Maintenance: Spot Premix Patching	· Tons of asphalt used per man day	0.44	0.81	0.73	0.41	0.78	0.46	0.57	1.25
	· Tons of asphalt used per lane mile	0.19	0.28	0.26	0.25	0.19	0.18	0.22	0.70
	· Cost per ton of asphalt used	$497.29	$364.01	$364.29	$574.20	$286.87	$457.50	$423.27	$250.00
Asphalt Roadway Maintenance: Premix Overlay	· Tons of asphalt used per man day	9.38	4.90	8.63	8.38	8.55	3.88	7.37	15.00
	· Tons of asphalt used per lane mile	0.37	0.06	1.81	2.39	2.18	1.29	1.32	2.00
	· Cost per ton of asphalt used	$129.50	$605.50	$97.85	$104.01	$97.07	$125.21	$109.09	$95.00
Shoulder Maintenance: Non-Paved Shoulder Reshaping	· Shoulder miles reshaped per man day	2.46	1.47	2.78	0.78	0.51	5.06	2.24	2.00
	· Number of bladings per shoulder mile	0.34	0.24	0.45	0.09	0.12	1.21	0.39	0.40
	· Cost per shoulder mile reshaped	$103.55	$219.06	$113.63	$325.48	$637.07	$46.65	$127.96	$153.00
Shoulder Maintenance: Non-Paved Shoulder Patching	· Cubic yards of material used per man day	6.77	12.72	9.76	7.22	10.38	6.03	8.42	11.50
	· Cubic yards of material used per shoulder mile	3.99	3.12	4.52	3.09	4.20	2.46	3.58	7.50
	· Cost per cubic yard of material used	$45.45	$23.87	$37.22	$38.76	$37.15	$41.87	$37.50	$35.00
Shoulder Maintenance: Premix Shoulder Patching	· Tons of material used per man day	0.35	2.16	0.53	0.38	1.31	1.22	0.99	3.00
	· Tons of material used per shoulder mile	0.08	0.18	0.08	0.00	0.12	0.12	0.09	0.40
	· Cost per ton of material used	$589.02	$195.52	$536.97	$492.25	$166.59	$193.75	$265.58	$134.00
Drainage Maintenance: Drainage Ditch Cleanout and Reshaping	· Linear feet of ditch cleaned or reshaped per man day	69.51	122.53	199.98	55.30	49.68	151.69	106.70	87.50
	· % of ditch cleaned or reshaped	1.01%	1.03%	1.47%	0.48%	0.25%	0.93%	0.91%	5.00%
	· Cost per linear foot of ditch cleaned or reshaped	$3.66	$2.80	$1.46	$4.97	$5.60	$1.58	$2.65	$3.00
Roadside Maintenance: Chemical Weed Control	· Acres sprayed per man day	38.2	25.1	19.5	32.1	17.7	37.9	29.0	30.0
	· Sprayings per acre	0.61	0.38	1.08	1.59	0.32	1.69	0.87	1.50
	· Cost per acre sprayed	$17.70	$18.92	$23.68	$17.48	$31.91	$13.11	$18.33	$14.00
Roadside Maintenance: Litter Pickup State Forces	· Cubic yds picked up per man day	1.52	3.25	1.50	3.12	1.12	2.43	1.98	2.25
	· Cubic yds picked up per acre	0.02	0.09	0.04	0.14	0.12	0.13	0.09	0.20
	· Cost per cubic yd picked up	$139.77	$60.06	$173.39	$68.23	$212.15	$90.40	$113.52	$103.00
Roadside Maintenance: Tractor Mowing	· Acres mowed per man day	10.36	7.70	7.33	9.00	5.77	7.01	7.59	8.50
	· Mowings per acre	1.38	1.18	1.32	1.12	1.53	1.77	1.37	2.00
	· Cost per acre (routine)	$31.12	$45.78	$49.51	$35.67	$58.81	$47.55	$44.58	$38.00
	· Cost per acre (contract)	$42.04	$31.34	$31.11	$48.65	$16.19	$0.00	$33.21	$38.00
Traffic Services Maintenance: Pavement Striping (Paint)	· Stripe miles per man day	0.62	1.47	1.93	1.03	0.84	0.86	0.93	1.50
	· % of inventory miles striped	4.1%	2.1%	7.2%	3.2%	10.5%	7.0%	5.6%	n/a
	· Cost per stripe mile	$350.78	$267.28	$239.36	$300.18	$609.67	$501.25	$439.37	n/a
Traffic Services Maintenance: Pavement Striping (Thermoplastic)	· Stripe miles per man day	0.00	0.00	0.00	1.55	0.93	0.00	1.49	n/a
	· % of inventory miles striped	0.00%	0.00%	0.00%	5.23%	0.29%	0.00%	0.99%	n/a
	· Cost per stripe mile	$0.00	$0.00	$0.00	$262.12	$459.23	$0.00	$272.85	n/a

SOURCE: MDOT'S Maintenance Summary 2012

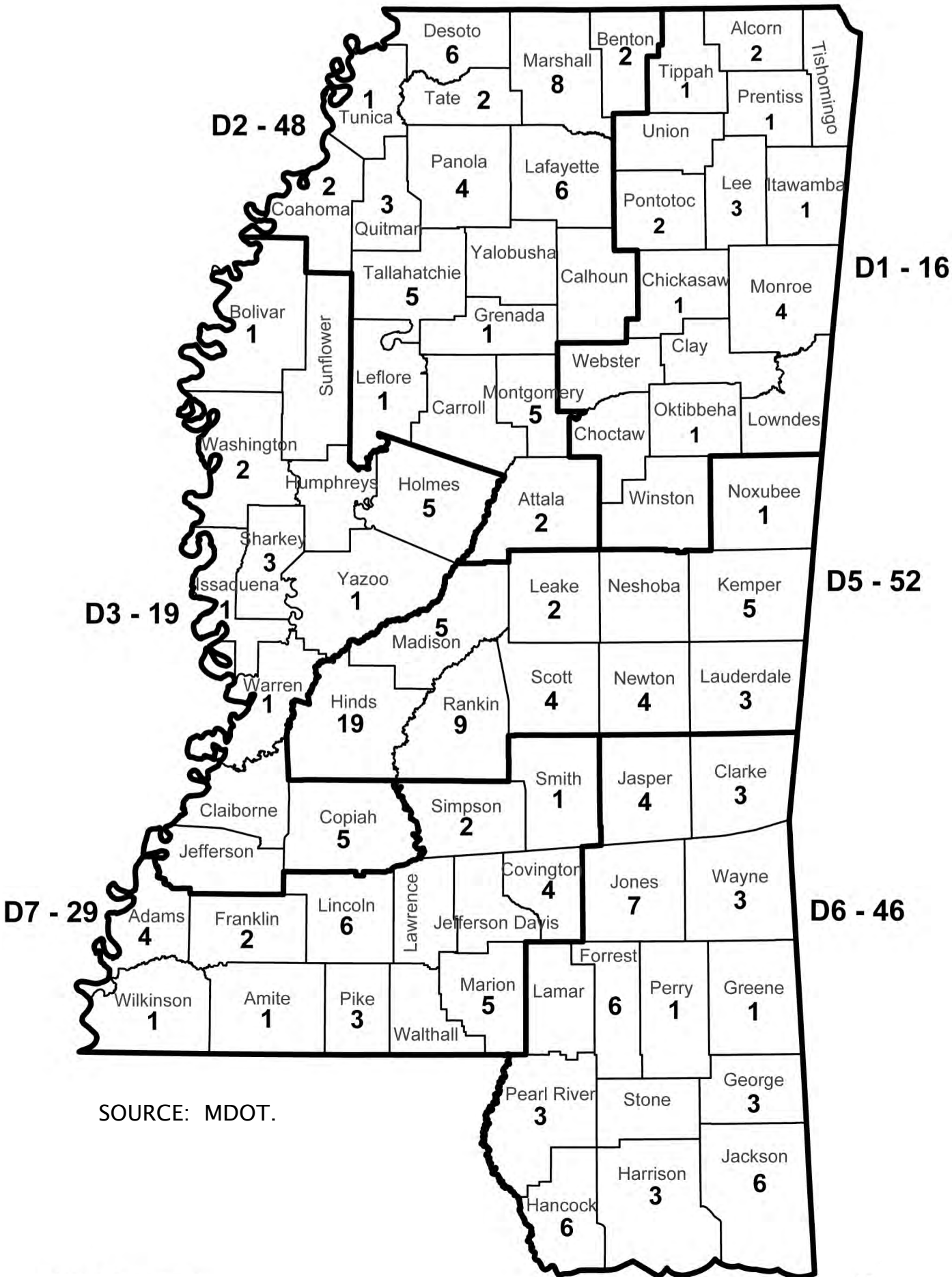
NOTE: Red cells indicate measures for which MDOT's cost per unit of output was higher than the standard (i. e., MDOT performed lower than the standard) and green cells indicate measures for which MDOT's cost per unit of output was lower than the standard (i. e., MDOT performed better than the standard).

Appendix G: WSDOT's Goals, Performance and Trends

Policy goal/Performance measure	Previous period	Current period	Goal	Goal met	Five Year Trend *(unless noted)*	Desired trend
Safety						
Rate of **traffic fatalities** per 100 million vehicle miles traveled (VMT) statewide (Annual measure: calendar years 2011 & 2012)	0.80	0.77	1.00	✓		↓
Rate of **recordable incidents** for every 100 WSDOT workers[1] (Cumulative year to date 2012 & 2013 – trend shows 2 years)	4.9	4.9	5.0	✓		↓
Preservation						
Percentage of state **highway pavement** in fair or better condition (Annual measure: calendar years 2010 & 2011 [latest available])	92.0%	90.5%	90.0%	✓		↑
Percentage of **state bridges** in fair or better condition (Annual measure: fiscal years 2012 & 2013)	95.0%	96.0%	97.0%	–		↑
Mobility (Congestion Relief)						
Highways: Annual (weekday) vehicle **hours of delay** statewide at **maximum throughput speeds**[2] (Annual measure: calendar years 2010 & 2012)	31.6 million	30.9 million	N/A	N/A		↓
Highways: Average clearance times for **major (90+ minute) incidents** on nine key western Washington corridors (Calendar quarterly measure: Q1 2013 is latest available data – trend shows last 5 quarters of available data)	143 minutes	N/A	155 minutes	N/A		↓
Ferries: Percentage of trips departing on time[3] (Fiscal quarterly measure: year to year Q1 FY2013 & Q1 FY2014)	93.4%	92.8%	95%	–		↑
Rail: Percentage of Amtrak Cascades trips arriving on time[4] (Calendar quarterly measure: year to year Q3 2012 & Q3 2013)	71.9%	76.4%	80%	–		↑
Environment						
Number of WSDOT **stormwater management facilities** constructed (Annual measure: fiscal years 2012 & 2013)	146	169	N/A	N/A		N/A
Cumulative number of WSDOT **fish passage barrier improvements** constructed since 1990 (Annual measure: calendar years 2011 & 2012)	257	269	N/A	N/A		↑
Stewardship						
Cumulative number of Nickel and TPA **projects completed,** and **percentage on time**[5] (Calendar quarterly measure: Q2 2013 & Q3 2013 – trend shows last 5 quarters)	344/ 88%	348/ 88%	90% on time	–		↑
Cumulative number of Nickel and TPA **projects completed** and **percentage on budget**[5] (Calendar quarterly measure: Q2 2013 & Q3 2013 – trend shows last 5 quarters)	344/ 91%	348/ 9• %	90% on budget	✓		↑
Variance of total project costs compared to **budget expectations**[5] (Calendar quarterly measure: Q2 2013 & Q3 2013 – trend shows last 5 quarters)	under budget by 1.4%	under budget by 1.4%	on budget	✓		N/A

Notes: N/A = not available: new reporting cycle data not available or goal has not been set. Dash (–) = goal was not met in the reporting period. 1 WSDOT began reporting recordable incident rate in January 2012; trend shows two years. 2 Compares actual travel time to travel time associated with "maximum throughput" (defined as 70 to 85 percent of the posted speeds), where the greatest number of vehicles occupy the highway at the same time. 3 Washington State Ferries' "on-time" departures include any trip recorded by automated tracking as leaving the terminal within 10 minutes of scheduled time. 4 Amtrak Cascades' "on-time" arrivals are any trips that arrive at their destination within 10 to 15 minutes of scheduled time 5 Budget and schedule expectations are defined in the last approved State Transportation Budget. See p. 27 for more information.

Appendix H: District Workload Planning Map



SOURCE: MDOT.

Appendix I: Description of State Department of Transportation Efforts to Address Efficiency of Workforce

Aside from Georgia's efforts to analyze and improve the efficiency and accountability of its workforce, other states have made efforts to address workforce-related issues. Arkansas's and Ohio's transportation departments have begun using the workforce management solutions from Kronos Incorporated to perform what Kronos refers to as "workforce analytics." Kronos believes that organizations cannot achieve productivity gains and stay within budget if they lack true transparency into their workforce. The system will allow these departments of transportation to gain visibility into workforce trends and outliers to identify areas of opportunity for innovations and growth, maximize productivity, and minimize costs. These departments of transportation will be able to track labor costs to specific projects of the department. Arkansas and Ohio will utilize this system for close to 10,000 employees combined to improve productivity.

The New Mexico DOT developed an ACCESS-based database in 1999. This database provides an effective planning tool for human resource professionals to track employee information from the date of hire to succession planning. The database is able to track more than 200 attributes about employees.

In 2004, the Louisiana Department of Transportation set a goal to reduce the number of positions in their DOT (through voluntary means) by 8% by 2007. The belief that the department could do more with less through improved efficiency and a culture of change was the driving force behind the staff reduction decision. Louisiana DOT was able to save $25 million per year on personnel costs.

The National Cooperative Highway Research Program (NCHRP) released a report outlining strategies to attract and retain a capable transportation workforce. This report evaluated several components of a department of transportation's workforce. Some of the components included: reducing voluntary turnover, anticipating and managing performance issues, developing internal staff skills, improving culture/climate, leadership development, job classification and design, succession planning, developing knowledge management systems, and restructuring benefits. The report highlighted several states' efforts to address those components. Virginia's and Pennsylvania's departments of transportation were among the departments outlined.

The Virginia Department of Transportation (VDOT) established a Knowledge Management (KM) program in 2003. This program came as a result of VDOT's significant loss of critical institutional knowledge during downsizing that occurred within that agency a few years prior. The KM program covered the entire DOT and helped the agency better manage the sharing and documentation of institutional and job knowledge within the organization. It also prevented the loss of in-house knowledge as individuals left the agency.

The Pennsylvania Department of Transportation (PennDOT) is involved in a succession planning system. PennDOT was in a situation in which it would soon lose many vital employees due to retirement. Thus, the department implemented the succession planning practice that focuses on these "at-risk" positions. PennDOT analyzed its workforce and identified a pool of candidates that were capable of completing the duties of the "at-risk" positions. These candidates then enter a mentor/mentee program so that they may be prepared for their potential future roles.

The Minnesota Department of Transportation (MnDOT) has been using a formal success planning process since 1994. This process identifies the top leadership positions within the organization and provides a comprehensive assessment of those employees currently holding managerial status to be assessed for their readiness to fill these positions. The succession planning effort involves gathering data, soliciting participants, conducting assessments, and providing feedback. Minnesota's effort is aimed at providing the agency with leadership that is aligned with the department's strategic goals and objectives. It provides a talent pool of successors to fill critical positions without unnecessary operational disruptions. This effort allows the department to learn its internal talent and recruit the needed personnel skills. MnDOT also created a new classification system department-wide. This reorganization created an environment in which multi-skilled workers were used to their fullest capacity, provided flexibility in employee assignment, increased training and skill development opportunities, and created a link between employees' skill development and their wage progression. As a result of Minnesota's efforts, the New Jersey DOT structured a succession plan based on MnDOT's model.

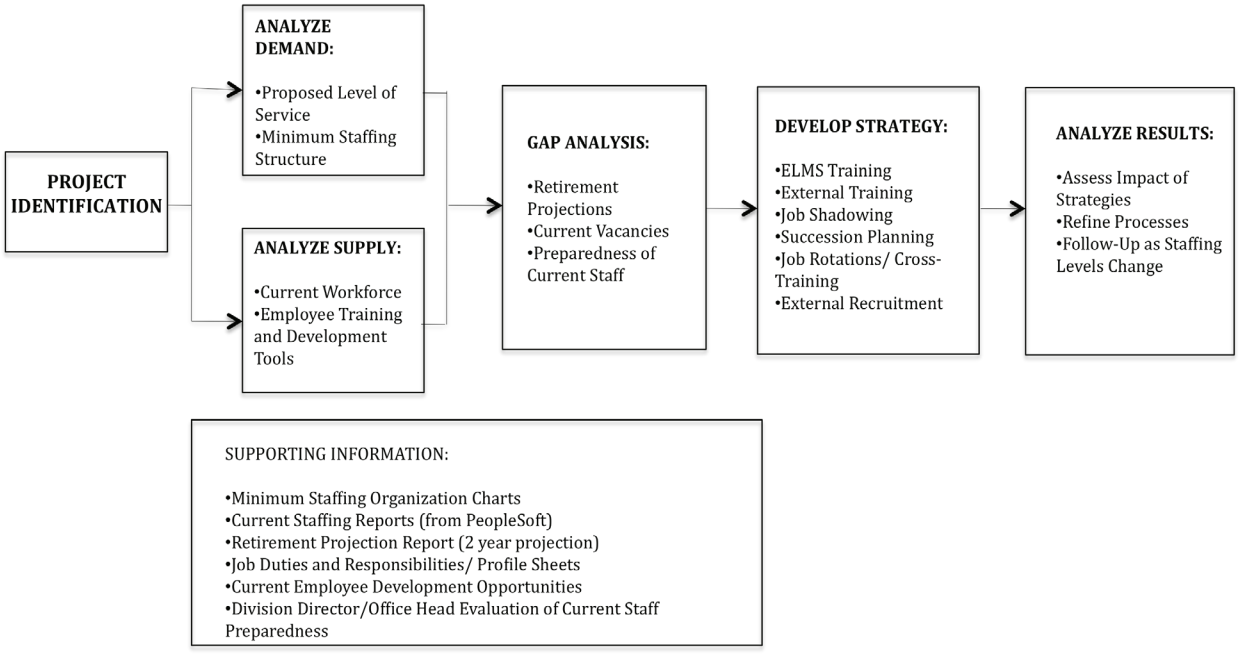
SOURCES: www.kronos.com news release, "Arkansas State Highway and Transportation Department Selects Kronos to Put Workforce Management in Fast Lane," May 2012; "Ohio Department of Transportation Fast Tracks Workforce Management with Kronos," May 2013; "Managing Change in State Departments of Transportation," Innovations in Workforce Strategies, National Cooperative Highway Research Program, Transportation Research Board, National Research Council, 2001; Louisiana Department of Transportation and Development, "Report to the

Commission on Streamlining Government," August 2009; National Cooperative Highway Research Program, "Strategies to Attract and Retain Capable Transportation Workforce: Report 685."

Appendix J: GDOT Workforce Planning Initiative Flow Chart and Department Head Questionnaire

GDOT researched best practices that it believed would best fit its organization in order to fulfill three main areas of core responsibilities, minimum staffing, and strategies (e.g., recruitment, training and development, operational changes). GDOT provided a work flow chart and a questionnaire to department heads to help assess their departmental resources. The flow chart is presented below:

GDOT Workforce Planning Initiative Flow Chart



SOURCE: Georgia Department of Transportation

The questionnaire that each department head utilized follows:

GDOT- WORKFORCE PLANNING JOURNEY
Questionnaire

Milepost 1: Set Strategic Direction for Division/Office

Your agency's strategic plan identifies your mission, vision, and measurable objectives. In this step, which provides the context of your workforce planning efforts, questions to consider:

1. How will your Division/Office's structure look in five years, and how will the current structure evolve?
2. What are the customer's expectations? How are they changing?
3. How might technology change the way we work?

Milepost 2: Conduct Workforce Analysis

Your agency's strategic plan identifies your mission, vision, and measurable objectives. In this step, which provides the context of your workforce planning efforts, questions to consider.

Workforce Demand Forecast – Identify Work Functions

The following questions will help in determining the current and future work functions:

1. Which job functions will remain unchanged?
2. What services may be discontinued or outsourced?
3. How might existing services be enhanced or changed and what effects will that have on the work and human resources needs?
4. Will any functions be consolidated?
5. Are any process changes being proposed or have any other factors changed which might result in an increase or decrease in workload?
6. How will the divisions/offices/work units and jobs be re-designed?
7. Are any reorganizations needed?

Workforce Demand Forecast – Identify Staffing Requirements

Now that you have identified the work functions that must be performed to achieve the goals of your strategic plan, it is time to identify the workforce needed to perform these functions. Questions to consider when identifying required competencies are:

1. What are the critical functions that must be performed to achieve the agency's strategic plan?
2. What job titles/levels possess the needed competencies?
3. What minimum qualifications are needed to perform each of the job functions? NOTE: HR will work with you if minimum qualifications/competencies need to be updated.
4. What additional minimum qualifications/competencies are needed to perform the job functions?

In addition to identifying competencies, determine the number of staff needed. The following questions will assist in quantifying your staffing requirements:

1. What are the projected workload volumes?

2. What staffing levels will be required by competency and/or classification, division/section/unit, and geographic location? (Refer to the minimum staffing organization chart).

Workforce Supply Analysis – Current Workforce Profile (refer to WFP Summary Sheet)

When completing your workforce summary sheet, consider the following:

1. What are the existing employee competencies, within each classification?
2. What are the employee-specific competencies, including those that fall outside of normal duties?
3. What will the future composition of the workforce be without factoring in any hiring?

Milepost 3: Conduct Gap Analysis

Compare your projection of the existing workforce, adjusted for attrition, with the number of staff required to perform the work functions. The result reveals any gaps and surpluses in staffing levels and competencies needed to perform the Department's functions such as:

1. Inadequate supply of qualified people for positions in classifications that will likely remain the same.
2. Inadequate supply of people with needed competencies for positions described within an existing classification.
3. Identify positions performing obsolete or declining functions.

Once you measure the extent of any gaps for each classification and competency set, identify where candidates will come from to fill those gaps.

Milepost 4: Develop Strategies

To develop strategies to address the workforce gaps, prioritize the most pressing needs:
1. Which workforce gaps can be handled in a routine way with a minimum commitment of resources?
2. Identify priority positions by completing Appendix "A" of the Agency Workforce Plan template.

Milepost 5 – Implement Strategies (HR Operations and HR Training and Development)

GDOT considers its workforce initiative to be an ongoing effort instead of a plan that is utilized and then stored indefinitely. Constant analysis must take place to ensure an efficient workforce.

SOURCE: Georgia Department of Transportation.

Appendix K: MDOT District Engineer Positions and Summarized Duties

Job Title	Summarized Duties
District Engineer	• Oversees all MDOT operations in respective counties
Assistant District Engineer/Construction	• Assists District Engineer • Oversees and directs all MDOT construction operations in district • Directs and implements district policies • Prioritizes various needs of the construction staff • Coordinates with other agencies • Assists the District Construction Engineer • Prepares environmental documents • Reviews overlay and construction plans • Ensures compliance with storm water permits • Prepares and process supplemental agreements • Reviews construction project sites • Supervises construction staff
District Maintenance Engineer	• Supervises and directs maintenance workforces • Oversees contracts • Supervises environmental compliance • Inspects and oversees others in inspection of highway routes in the district
Assistant District Maintenance Engineer	• Assists district maintenance engineer in planning, directing, and supervising all aspects of transportation infrastructure maintenance • Provides expertise of field engineering • Assists in overseeing contracts • Assists in reviewing pavement management data and conducting inspections • Directs and coordinates emergency repairs and responses to natural disasters
Assistant to Assistant District Maintenance Engineer (Eng I, II)	• Assists the Assistant District Engineer-Maintenance with the management of maintenance activities in the district

	• Reviews permits • Assists in overseeing projects that utilize maintenance funds • Provides engineering and technical support • Assists the Maintenance Floating Superintendent
Project Engineer (Eng I, II, III)	• Oversees multiple districts projects • Assists and supervises the construction staff • Assists in coordinating with the project office staff • Works on field and office reviews • Signs documents authorizing contractor payments • Verifies that project materials meet the requirements of the contract • Provides project and construction oversight • Assists in the supervision of staff • Provides professional and technical guidance
Materials Engineer (Eng II, IV)	• Cuts and evaluates asphalt cores • Keeps track of inventory • Conducts preliminary work • Oversees drilling of routes • Retrieves soils samples • Assists in materials clearance • Assists in concrete checks • Supervises lab personnel staff
Resident Engineer (and Assistant) (Eng III, IV)	• Supervises the staff for the project offices • Responsible for all construction contracts • Trains other engineers • Provides construction oversight • Surveys equipment • Assists in district planning
Bridge Inspection Engineer (Eng II, III, IV)	• Helps lead inspections of all bridges in the district • Reviews and accepts bridge inspection reports • Scans and sends bridge reports to Bridge Division in Jackson • Reports maintenance problems • Selects the priority of bridge-related problems
Right of Way (ROW) Engineer (Eng IV)	• Supervises all survey and right-of-way related tasks • Plans and coordinates the purchasing of all surveying equipment • Provides training as needed • Provides technical assistance

LPA Engineer (and Assistant) (Eng III, IV)	• Oversees project aviation, consultant selection and contracts, coordination of environmental work, right-of-way work, and field plans. • Attends bid openings, construction inspections, construction management, storm water inspections, and project close out. • Reviews office plans, specifications, and cost estimates
Assistant District Testing Engineer (Eng III)	• Oversees testing clearance • Prepares Job Control Variations reports • Drills and analyzes asphalt cores • Prepares asphalt pavement recommendations
Area Engineer (Eng IV)	• Oversees the construction of highways and bridges in a particular area in the district • Develops initial concept of projects • Develops preliminary surveys, property surveys, pre-engineering and design, environmental studies, ROW acquisition, plans and contract specifications review, and prepares final documentation for project closeout
Erosion Control Engineer (Eng III)	• Ensures that construction projects are in compliance with MDEQ's Storm Water Permit • Reviews contractors' storm water pollution prevention plans • Inspects construction projects routinely • Monitors effectiveness of plans • Submits erosion control reports to Project Engineer and Contractor
Traffic Engineer (Eng I)	• Oversees the design, construction, operation, and maintenance of highways • Attends office and field reviews • Deals with MDOT project engineers, contractors and subcontractors throughout the construction process • Approves project modifications
Engineer in Training	• Assists in the performance of preliminary engineering survey work and construction contracts • Indirect supervision of project office staff • Works under the guidance of experienced engineers (inspects

	projects, project closeout, and prepares final reports) • Assists Resident Engineer as needed

SOURCE: MDOT

Appendix L: Distinctions Between MDOT Engineer Job Classes

Engineer Class	Characteristics of Work	Qualifications
Engineer I	• This is supervisory and technical work of a professional nature in directing the engineering activities of a section of a district or division at MDOT. • Incumbents usually serve as assistant engineers in construction, as design squad leaders, or as assistants to district and division engineers. • The work is performed under the general direction of an engineer of a higher classification.	• Possesses a Professional Engineering License from the Mississippi State Board of Registration for Professional Engineers
Engineer II	• This is supervisory and technical work involving responsibility for supervising specialized and complex engineering projects on highways • The incumbent may be a project engineer or a design section leader • The work is performed under the general supervision of an administrative superior or an assistant head of the engineering district or division of the agency.	• Possesses a Professional Engineering License from the Mississippi State Board of Registration for Professional Engineers • Has one year of engineering experience as a registered Professional Engineer
Engineer III	• This is professional engineering work of an administrative or technical nature. Incumbents in this class may be resident supervisors over complex highway construction projects, one or more project engineers, multiple design squads, or an engineering section in a MDOT division • The work is performed under the general direction of an assistant district engineer or an assistant division head. • Incumbents in this classification exercise independent judgment over all activities of handling	• Possesses a Professional Engineering License from the Mississippi State Board of Registration for Professional Engineers • Has two years of engineering experience as a registered Professional Engineer

	small or moderate-sized engineering problems.	
Engineer IV	• This is professional engineering and administrative work, which involves organizing, directing, and coordinating the planning, design, and construction of projects undertaken by the department. • A district engineer or division engineer directs incumbents. Supervision is generally exercised over several subordinate professional engineering personnel. • Incumbents in this classification exercise high level of independent judgment in directing and coordinating engineering activities.	• Possesses a Professional Engineering License from the Mississippi State Board of Registration for Professional Engineers • Has three years of engineering experience as a registered Professional Engineer

SOURCE: State Personnel Board.

Agency Response

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December 31, 2013

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PEER Committee
501 North West St., Suite 301A
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RE: MDOT Response to PEER Report entitled "Mississippi Department of Transportation: A Review of Departmental Accountability and Transparency"

Dear Dr. Arinder:

MDOT appreciates the PEER Committee helping to identify key areas in which increased transparency will benefit the Department, the Legislature, and the State as a whole. While MDOT uses proven, data-driven, technical processes to *1*) employ the highest value construction & maintenance methods, *2*) ensure the efficient utilization of engineering resources, and *3*) prioritize construction & maintenance operations, the PEER report drives home the need to make these processes more understandable and easily accessible.

MDOT has made great strides in recent years to increase transparency to stakeholders and governing bodies. Although the PEER report recognizes the Department's accomplishments, it also notes that improvements can always be made to enhance and simplify accessibility. The PEER report provides a guiding document to assist in the development of transparency and accountability measures. As a result MDOT is currently preparing a strategic plan to tackle the challenges put forth in the report, including:

- expanding department-wide workforce planning & utilization measures,
- formalizing more accessible maintenance & construction project selection procedures,
- assessing and implementing recommendations garnered from the Equipment Utilization Study,
- continuing development of performance measures or indicators, and
- reporting indicators of efficiency & effectiveness on MDOT's website.

MDOT understands the public's demand for greater accountability and the need for increased transparency in government operations. The Mississippi Transportation Commission continually stresses the importance of accountability throughout Department operations. The Department believes utilizing the PEER Committee's recommendations will provide us with the necessary leverage to make a stronger case for improved statewide transportation to Legislators, stakeholders, and the traveling public. The Commission fully embraces MDOT's efforts toward greater transparency to enhance their ability to ensure the equitable allocation of transportation resources across the State of Mississippi.

Respectfully,

Melinda L. McGrath, P.E.
Executive Director

MLM:cle

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