JOINT LEGISLATIVE AUDIT AND REVIEW COMMISSION
OF THE VIRGINIA GENERAL ASSEMBLY

Review of VDOT's Administration of the Interstate Asset Management Contract

A Report in a Series on Transportation Issues in Virginia

Members of the
Joint Legislative Audit and Review Commission

Chairman
Delegate Vincent F. Callahan, Jr.

Vice-Chairman
Senator Kevin G. Miller

Senator Charles J. Colgan
Delegate M. Kirkland Cox
Delegate V. Earl Dickinson
Senator J. Randy Forbes
Delegate Frank D. Hargrove, Sr.
Delegate Dwight C. Jones
Senator Thomas K. Norment, Jr.
Delegate Harry J. Parrish
Delegate Lacey E. Putney
Delegate John A. Rollison III
Delegate John H. Rust, Jr.
Senator Walter A. Stosch

Mr. Walter J. Kucharski, Auditor of Public Accounts

Director
Philip A. Leone

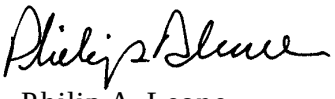
Preface

In 1998, the Joint Legislative Audist and Review Commission (JLARC) directed staff to review the administration of a new contract for maintenance of selected portions of Virginia's interstate highway system. The contract is administered by the Virginia Department of Transportation (VDOT) as a pilot to evaluate the use of contracted asset management services. Staff completed a preliminary review in the summer of 1998, and were subsequently directed by the Commission to complete this final review.

The interstate asset management pilot was to evaluate two aspects of the contracted services: whether the contractor could provide a level of services equivalent to or better than VDOT, and whether the services could be provided at a lower cost than by VDOT. The initial 1998 review found that performance measurement by VDOT was not fully developed, and that no documented analysis of cost effectiveness had been completed. Since then, VDOT has made significant progress in evaluating the contractor's performance. Some additional improvements are needed, such as implementing quarterly evaluations instead of annual reviews, and VDOT will need to continue to improve its daily monitoring of the contractor's work.

With regard to cost effectiveness, VDOT contracted with Virginia Tech to complete a comparison of contractor and VDOT bid costs, and that study will provide some of the cost effectiveness information the department needs. However, VDOT will also need to complete its own analysis of actual contractor and VDOT maintenance costs. Given the potential impact of asset management on VDOT's maintenance program statewide, the department should share the results of its analysis of the current pilot with the transportation committees of the General Assembly.

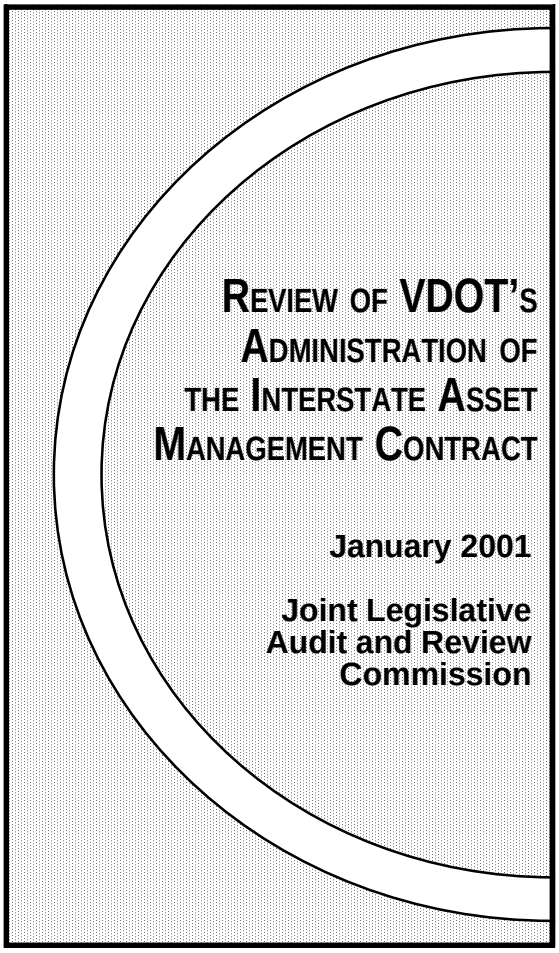
On behalf of the Commission staff, I wish to express our appreciation for the assistance provided by staff of VDOT and VMS, Inc. during this study.



Philip A. Leone
Director

January 11, 2001

JLARC Report Summary



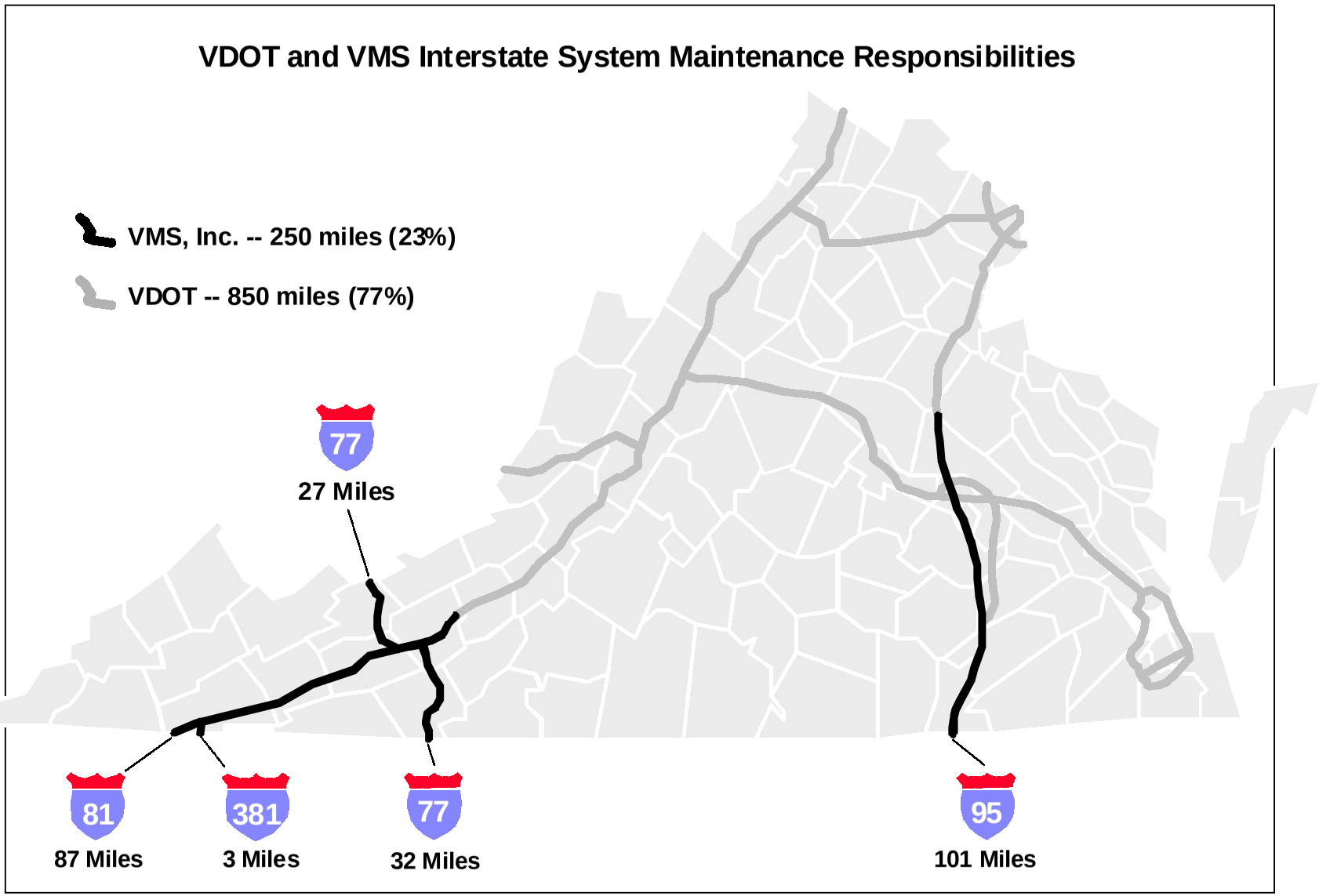
The Public-Private Transportation Act (PPTA) was authorized by the 1995 General Assembly, allowing private companies to submit solicited and unsolicited proposals for constructing, maintaining, or operating various facets of the Commonwealth's transportation system. Through an unsolicited proposal submitted under the requirements of the PPTA, the Virginia Department of Transportation (VDOT) entered into a five and one-half year contract with VMS, Inc. in December 1996 for asset management services on a portion of Virginia's interstate highway system. The contract includes portions of I-95, I-81, I-77, and I-381 (see map, next page), for a total of 250 miles, and at a total cost of $131.6 million.

Recognizing that the asset management approach was promising, but untested, VDOT designed the contract as a pilot project. The purpose of a pilot program is to prove the soundness of new concepts or untried approaches and techniques. In the particular instance of the interstate asset management contract, the pilot program needs to demonstrate two things: (1) that privately-contracted asset management can provide equivalent or better levels of service than interstate maintenance managed by VDOT; and (2) that privately-contracted asset management can provide services at lower costs than VDOT.

However, a preliminary review of the interstate asset management contract by the Joint Legislative Audit and Review Commission (JLARC) in 1998 concluded that VDOT had not determined the cost-effectiveness of the contract and had only recently implemented a program to evaluate highway maintenance performance. As a result, the Commission directed staff to conduct a limited review of VDOT's administration of the interstate asset management contract, focusing on the department's ability to evaluate the contractor's maintenance performance and determine whether the contract is cost-effective.

At the time of this JLARC review, VDOT had established a process to monitor and evaluate the contractor's performance, and was in the process of assessing the cost-effectiveness of the interstate asset management approach. The department should share the results of its evaluation of the performance and cost-effectiveness of the in-

=


VDOT and VMS Interstate System Maintenance Responsibilities
VMS, Inc. -- 250 miles (23%)
VDOT -- 850 miles (77%)
77
27 Miles
81
87 Miles
381
3 Miles
77
32 Miles
95
101 Miles

terstate asset management contract to the transportation committees of the General Assembly.

VDOT's Evaluation of Contractor Performance

Although the asset management contract is the first contract of its type that VDOT has administered, the department has established the basic structure for evaluating and monitoring the contractor's performance. VDOT has completed annual evaluations of the contractor's performance on interstate asset management contract since FY 1998 (although the FY 1999 and FY 2000 evaluations remain unpublished). Use of the evaluations prior to FY 2000 is problematic, however, because the contractor has raised several concerns about the first two year's evaluations. The contractor's specific concern was that VDOT used a pre-existing instrument that was not modified to reflect the criteria and tolerances required under the contract. In addition, the contractor complained that the baseline used by VDOT for the evaluation was flawed because the actual condition of the interstate assets assumed by the contractor were not in the condition VDOT claimed them to be.

Over the course of the past two years, VDOT and the contractor have worked to modify the evaluation so that it is a more fair representation of the contractor's performance. Based on the FY 2000 evaluation, it appears the contractor met or exceeded the performance targets for 90 percent of the items evaluated on I-95, 89 percent on I-77, 86 percent on I-81, and 86 percent on I-381. VDOT will need to continue to monitor the contractor's performance to ensure that the contractor meets additional performance targets. The department should also consider the performance of the current contractor in assessing whether to continue the use of asset management for the interstate highways.

Improvements to VDOT's Process to Evaluate Interstate Asset Management Performance Are Needed

In terms of measuring the condition of the highway assets relative to the contract's performance targets, VDOT conducts an annual evaluation of the condition of the assets. While comprehensive in terms of assets evaluated, the annual evaluation only represents the condition of the asset at the time the evaluation is conducted. Annual evaluations have several limitations: although the condition of an asset item could change following an evaluation, the change could go undetected for another year. In addition, an asset item could be neglected for several months and repaired shortly before an evaluation. In contrast, the contractor conducts its own self-evaluations three times a year.

A more effective approach for VDOT to adopt would be to conduct quarterly evaluations of the contractor's performance for all future asset management contracts. To enhance the cost effectiveness of this approach, VDOT and the contractor could jointly administer the evaluations, providing each with the opportunity to use the data for its own purposes. In addition, VDOT should also take steps to ensure that those assets not of sufficient quantity to be included in the samples selected for the systematic evaluation (annual or quarterly) are also evaluated against contract requirements.

VDOT Needs to Modify Its Monitoring Process for the Interstate Asset Management Contract

Routine monitoring of the asset management contract is conducted by five VDOT field coordinators who are each responsible for 50-mile sections of the contractor-maintained interstate highway. As part of the monitoring process, VDOT requires its field

staff to complete routine weekly reports on the contractor's work. However, there are only limited written guidelines for its staff to follow when they complete these reports. The lack of comprehensive guidelines has likely contributed to inconsistencies in the content of the reports and in the scope and completeness of the monitoring that is performed. If the weekly reports are to be effectively used to provide data and feedback to VDOT management regarding the contractor's performance, written guidelines regarding their use should be enhanced to ensure consistency in the information that is collected and reported by the five VDOT field coordinators.

The interstate asset management contract requires the contractor to repair damage that occurs to 12 asset items within specific time periods. For example, damaged road signs must be replaced within 24 hours, and debris must be removed from the roadway immediately. VDOT placed timeliness requirements on certain asset items because it felt that these assets could pose potential public-safety hazards if they were damaged and not promptly repaired. The contractor has reported data on its compliance with the timeliness requirements from the start of the contract. Yet, it was only recently that VDOT implemented a process to report the contractor's compliance with the timeliness requirements for the applicable interstate highway asset items. VDOT should continue to refine this process and include the results of its analysis in its annual report on contractor performance.

Snow and ice removal operations are also an important component of the contract. The VDOT field coordinators monitor the contractor's snow removal operations during each snow "event," and make narrative reports on the contractor's performance. However, there is a lack of consistency in how the snow removal performance of the contractor is reported by VDOT's field staff. Much of the narrative in the reports is not directly related to the required performance under the contract, but rather addresses how the contractor carried out the operation. Such narrative cannot be used to measure, in an objective manner, the contractor's performance. VDOT central office staff confirmed that the department has no measures to objectively evaluate the contractor's performance for snow removal. For any future asset management contracts, VDOT should develop specific quantifiable measures to evaluate the contractor's snow and ice control operations in accordance with the snow and ice removal plans that are approved by the department.

In addition, despite the fact that pavement is the most expensive road system asset to be maintained, VDOT has reported on its evaluation of the contractor's performance with regard to this asset group for the first time in December 2000. That evaluation is based on VDOT's statewide evaluation of interstate pavement, not on a separate review of the pavement maintained by the contractor. Given the importance and financial value of pavement in the interstate roadway system, it is important that VDOT report its annual evaluations of the contractor's pavement maintenance performance as required by the contract.

VDOT Needs to Complete Its Evaluation of the Cost Effectiveness of the Interstate Asset Management Contract

In 1996, VDOT identified an estimated $23 million in cost savings as one of the major benefits resulting from the interstate asset management contract. At that time, VDOT staff based the projected cost savings largely on estimates and forecasts of its future maintenance costs compared to the payments it would make to the contractor. JLARC staff reported in 1998 that these projections of savings were not supported

with appropriate documentation and that the soundness of VDOT's analysis of savings could not be verified. Therefore, VDOT's prior estimate of savings is not useful in assessing the cost effectiveness of the interstate asset management contract. More recently, VDOT contracted with faculty at Virginia Tech to complete a review of the comparative costs of VDOT and asset manager contracted maintenance services. JLARC staff reviewed the VDOT-approved methodology and made a preliminary review of findings for the Virginia Tech study. The study approach appears to be a reasonable effort at comparing certain costs for the contractor and VDOT. The Virginia Tech study may provide useful information, but because of its narrow scope may not provide conclusive findings on the overall cost effectiveness of the asset management approach.

Instead, only a rigorous and comprehensive analysis of actual VDOT and contractor expenditures for maintenance can provide the information needed to determine the cost effectiveness of the contract. VDOT now has the opportunity and the time to prepare a comprehensive analysis of the cost effectiveness of asset management. VDOT has recognized the need for a comprehensive cost effectiveness analysis of the interstate asset management contract. VDOT is now working on an analysis of maintenance costs for comparison to the contractor's costs. In combination with information from the Virginia Tech study, VDOT should have the information it needs to assess the cost effectiveness of the asset management contract.

In addition, VDOT's maintenance division staff established a work group to analyze the cost effectiveness of the contract. Since a decision on whether to continue the use of asset management must be made before November 2001, the substance of this group's work should be completed well before that time, preferably by June 2001. This will help ensure that VDOT's senior staff have sufficient time available for review, questions, and, if necessary, refinement of the work group's analysis. Given the cost of potential impact of asset management on the maintenance highway maintenance program, VDOT should share the results of its comprehensive evaluation of the performance and cost-effectiveness of the interstate maintenance contract with the transportation committees of the General Assembly.

Table of Contents

I. Introduction

In 1998, the Joint Legislative Audit and Review Commission (JLARC) directed staff to conduct a preliminary review of the interstate maintenance services that are provided by VMS, Inc. through a contract with the Virginia Department of Transportation (VDOT). JLARC staff presented the preliminary report in July 1998 and recommended that the Commission review the implementation of the contract by VDOT. JLARC directed its staff to conduct a limited review of the interstate highway asset management contract in order to determine VDOT's ability to evaluate the contractor's performance under the contract, and its ability to determine whether the contract is cost-effective.

This chapter provides a brief overview of the interstate asset management contract, including a discussion of the process that was used to develop the contract. In addition, an overview of the contractor's implementation of the contract is provided. The chapter concludes with a discussion of the preliminary review conducted by JLARC staff, an overview of the study's issues and research activities, and a brief summary of the report's organization.

THE INTERSTATE ASSET MANAGEMENT CONTRACT

In 1994 the General Assembly authorized the Qualifying Transportation Facilities Act which was amended in 1995 as the Public-Private Transportation Act (PPTA). It was under the guidelines of the PPTA that VMS, Inc. submitted its unsolicited proposal for asset management services on the State's interstate highway system. Pursuant to the competitive process required by the PPTA, VMS was awarded a contract for interstate asset management services on a portion of I-95, I-81, and I-77 and all of I-381.

On the sections of the interstate highways covered by the contract, the contractor is responsible for maintaining all assets between VDOT's right-of-way fences. This includes performing maintenance activities to the road surface and subsurface, as well as to the guardrail, signage, and drainage assets. In addition, the contractor is required to provide snow and ice removal services for the 250-miles of interstate highway that it is responsible for maintaining. The asset management services are provided through a fixed-price contract, which means that the State is protected from factors such as the need for extraordinary maintenance activities or increases in the cost of maintenance services.

The asset management contract for selected sections of the interstate highway system is a new and innovative approach to highway maintenance made possible by the Public-Private Transportation Act. Virginia was the first state to use privately-contracted asset management for interstate maintenance. Recognizing that the ap-

proach was promising, but untested, VDOT designed the contract as a pilot project. VDOT will need to decide whether to continue the use of asset management under the PPTA by November 2001.

The purpose of a pilot program is to prove the soundness of new concepts or untried approaches and techniques. In the particular instance of the interstate asset management contract, the pilot program needs to demonstrate two things: (1) that privately-contracted asset management can provide equivalent or better levels of service than interstate maintenance managed by VDOT – *performance outcomes*; and (2) that privately-contracted asset management can provide services at equal or lower costs than VDOT – *cost-effectiveness*. VDOT's responsibility is to properly evaluate both performance outcomes and cost effectiveness to determine if asset management should be continued and expanded statewide.

Overview of the Public-Private Transportation Act

The PPTA was originally enacted in 1994 as the Qualifying Transportation Facilities Act. However, it was amended to its current form by the 1995 General Assembly. Specifically, the PPTA allows for selected State government agencies and local governments to accept solicited and unsolicited proposals from private entities that are interested in acquiring, constructing, improving, maintaining, and/or operating the Commonwealth's transportation facilities. These facilities include roads, bridges, tunnels, overpasses, ferries, airports, mass transit facilities, vehicle parking facilities, and port facilities.

In order for a private business to receive a contract through the PPTA, it must submit a 'conceptual' proposal to either a State government agency or to a local government. After receiving the conceptual proposal, the government agency publicly posts it and encourages other private entities to compete for the contract by submitting additional proposals. An initial review committee (IRC) reviews each conceptual proposal. The IRC evaluates the PPTA proposals based on the project's financial feasibility as well as the private firm's qualifications and technical abilities.

Conceptual proposals that meet the IRC's minimum engineering and financial requirements are presented to the Commonwealth Transportation Board. The Board must approve the proposals before they are submitted to the Public-Private Transportation Advisory Panel (PPTAP) for additional evaluation. Based on the private firm's qualifications and the project's financial feasibility and compatibility to the State's transportation goals, the PPTAP determines whether the proposal should be submitted to the Commonwealth Transportation Commissioner for final approval. Once the PPTAP submits its recommendations to the Commonwealth Transportation Commissioner, the Commissioner may then enter into negotiations with the selected firm.

The Interstate Asset Management Contract Developed through the PPTA

The current asset management contract is with VMS, Inc. VMS was created in 1995 as a joint venture between two national engineering firms, Sverdrup and Louis Berger, Inc. In October 1995, VMS submitted an unsolicited proposal to VDOT, under the provisions of the PPTA, to provide asset management services to the State's entire interstate highway system. VDOT publicly posted VMS' proposal for 30 days to allow other private firms to submit proposals for the contract that VMS was attempting to obtain. After the VMS proposal was posted as required by the PPTA, VDOT received additional proposals from two other Virginia-based companies, Commonwealth Services Corporation (CSC) and DynCorp.

VDOT's initial review committee examined all three conceptual proposals and determined that they were feasible and merited further consideration. As a result, the IRC submitted the proposals to the Commonwealth Transportation Board. The IRC recommended that each company submit a detailed proposal discussing the level of service that it planned to provide for the State's interstate highways. In addition, each company was required to include a financial plan outlining its ability to achieve these services in the most cost-effective manner.

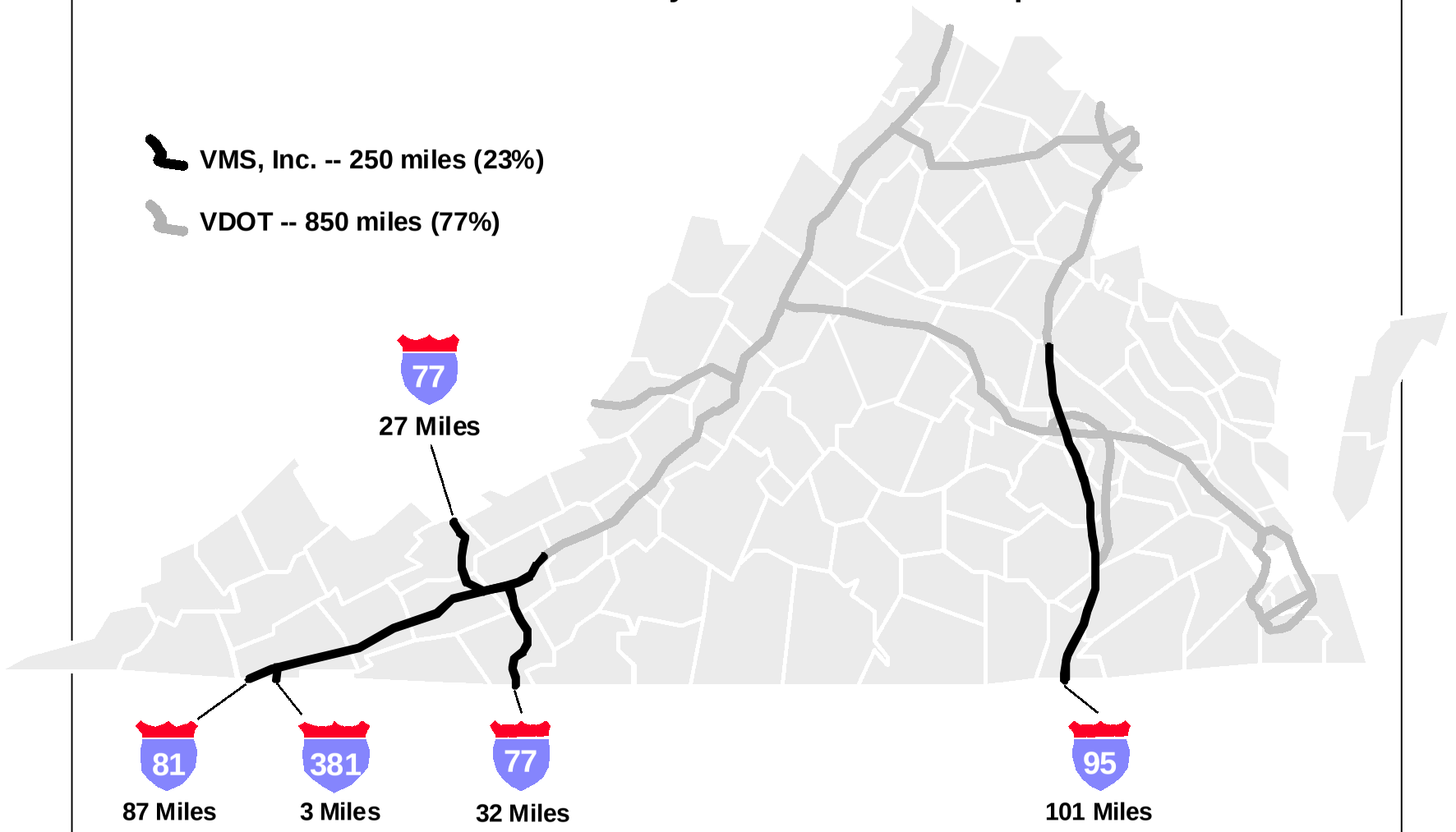
In March 1996, members of the PPTAP met with VMS, CSC, and DynCorp representatives to discuss the requirements of the detailed proposal. However, only two firms, VMS and CSC, submitted detailed proposals to the PPTAP. These proposals were reviewed and the Advisory Panel determined that VMS' proposal was in compliance with the PPTA's requirements.

VDOT staff evaluated VMS' detailed proposal for several months. In September 1996, the PPTAP recommended that VDOT's Commissioner begin negotiations with VMS to define the project's scope and cost. After two months of negotiations, VDOT and VMS signed a contract in December 1996 for a five and one-half year period. VDOT has the option to renew the contract in November 2001.

VMS' original proposal was for the company to provide asset management services for the entire interstate system. However, the final contract required the company to assume asset management responsibilities for 250 miles of the State's 1,100 miles of interstate highway. Specifically, the contractor is required under the terms of the contract to provide asset management services to 101 miles of I-95 from the North Carolina border to the Caroline County line, 59 miles on I-77 from the North Carolina border to the West Virginia border (excluding the mountain tunnels), three miles on I-381, and 87 miles on I-81 north from the Tennessee border (Figure 1). However, the company did not assume responsibility for asset management of all these sections of the interstate highway at the same time. The timetable required the contractor to assume responsibility on I-95 by July 1, 1997 and to extend services to I-77, I-81, and I-381 on July 1, 1998.

Figure 1

VDOT and VMS Interstate System Maintenance Responsibilities



Source: Virginia Department of Transportation.

The Contractor's Administrative and Operational Structure

VMS' corporate headquarters is located in Henrico County. At the present time, there are three VMS field offices that administer all maintenance activities on the sections of the interstate covered by the contract. The field office located in Petersburg is responsible for the interstate maintenance along the I-95 corridor. The work on the I-81 and I-77 corridors is administered from the Wytheville and Chilhowie area offices. Staff in the field offices are generally organized into a management team, a contract inspection team, and a maintenance team. VMS does little direct maintenance work because it contracts out the vast majority of its highway maintenance activities. However, it does maintain staff at each field office to perform limited highway maintenance activities and incident management services.

The Contractor's Responsibilities Under the Terms of the Contract

VDOT refers to the services provided under the contract as "asset management." In terms of responsibility for maintaining the 250 miles of interstate highway under contract, the contractor is generally responsible for all assets between the right-of-way fences on all sections of the interstate highway included in the existing contract.

The contractor is responsible for providing all work, materials, labor, services, and equipment necessary to achieve the contract's established asset-specific performance targets. Specifically, the contractor is responsible for all routine repairs, including: (1) preventative, rehabilitative, and restorative maintenance activities; (2) snow and ice removal; (3) incident management; and (4) emergency response services that are required on the contracted portions of interstate highway. The contractor's responsibilities also include trash and litter removal and mowing operations.

The contract requires the contractor to meet or exceed specific maintenance performance targets for five asset groups that are located within VDOT's right-of-way. Each asset group is subdivided further into a number of individual assets related to the group. For example, the traffic asset group includes the subcategories of signs, signals, highway lighting, pavement markings, and guardrails (Exhibit 1).

In addition, the contractor is responsible for ensuring that the assets in each asset group meet specific VDOT performance targets, condition assessment tolerances, and criteria. For example, the contractor is required to ensure that 100 percent of the interstate highway's regulatory signs meet reflectivity standards and are free of damage and obstruction. If the signs do not meet these performance targets and condition assessment tolerances, they must be corrected within 24 hours of being identified as deficient.

The key to the contractor's asset management program is its highway quality management system (HQMS). The HQMS is a proprietary computerized asset man-

Exhibit 1

Selected Interstate Highway System Assets Maintained by the Contractor, by Asset Group

Asset Group	Assets	
Drainage	• Cross pipes • Box culverts • Paved ditches • Unpaved ditches • Entrance pipes • Underdrains	• Edge drains • Storm drain drop inlets • Curb and gutter • Sidewalk and ramps • Stormwater management ponds
Roadside	• Grass • Debris and roadkill • Litter • Landscaping	• Brush • Concrete barriers • Sound barriers • Slopes • Fence
Traffic	• Signals • Signs • Highway lighting • Pavement messages • Pavement markings • Pavement markers • Guardrail	• Traffic detector loops • Impact attenuators • Truck ramps • Overhead signs • Object markers and delineators • Glare foils
Pavement	• Paved lanes – asphalt • Paved lanes – concrete	• Paved shoulders • Unpaved shoulders
Bridges	• Overall bridge • Deck • Joints • Paint	• Substructure • Structural culverts • Retaining walls • Channel and channel protection • Superstructure

Source: *Comprehensive Agreement for Interstate Highway Asset Management Services*, December 1996, Virginia Department of Transportation and VMS, Inc.

agement system designed to develop the contractor's maintenance programs by storing highway asset inventory data, projecting annual maintenance requirements, establishing maintenance budgets, developing pavement maintenance and rehabilitation programs, and administering subcontractor services. In addition, the HQMS also allows the contractor to issue work orders, project annual workloads, and store data necessary to evaluate the quality of its maintenance operations.

Asset Management Services Are Provided through a Fixed Price Contract

The compensation for asset management services is fixed at a total of $131.6 million over the five and one-half year life of the contract. The fixed price feature of the contract presents a risk to the contractor because no additional compensation will be provided to the company beyond the reimbursement provided in the contract. In essence, the exposure to unanticipated maintenance-related problems is shifted from VDOT to the contractor. The contractor's return on equity is also limited to 125 percent of the return on equity for corporations with assets between $1 million and $5 million as set out in the *Almanac of Business and Industrial Financial Ratios*.

The contractor has limited opportunities to request change orders under the contract's terms and conditions. The contractor can request a change order for any of 13 specified reasons, all of which are situations beyond the contractor's control. For example, change orders may be requested due to misplaced utilities, the discovery of hazardous substances, or in the event of "*force majeure*.". Examples of *force majeure* include the declaration of a state of emergency by the Governor, or events that constitute an immediate threat to life or property. Snow and ice storms of any sort do not represent circumstances beyond the contractor's control and do not qualify for change orders. VDOT staff reported at the time of this review that no change orders have been requested by the contractor.

The fixed price nature of the contract is another potential benefit that the State achieves through this maintenance arrangement. The fixed price contract ensures that:

- any maintenance cost increases are absorbed by the contractor and not the State,
- the risk for extraordinary costs associated with damages from incidents such as bridge and overpass collisions is transferred to the contractor, and
- the costs for extraordinary snow and ice removal or storm damage activities are assumed by the contractor.

To ensure the State's highway assets are completely protected, the contractor is required to purchase performance bonds to guarantee its interstate maintenance activities. Performance bonds are financial instruments intended to protect VDOT in the event that the contractor is unable to fulfill its contract. If such failure occurs, the performance bonding agency will pay for the cost of completing the contract.

VDOT's Maintenance Division Administers the Interstate Asset Management Contract

The responsibility for administering the contract and evaluating the contractor's daily maintenance activities is assigned to the maintenance division's con-

tract section located in the central office. Five VDOT field coordinators, who are assigned to the maintenance division's contract section, monitor the contractor's interstate maintenance operations. These coordinators report to the contract section's transportation engineer program supervisor.

In order for the VDOT maintenance division to monitor the contractor's performance on an ongoing basis, each field coordinator is responsible for monitoring work on a 50-mile section of interstate highway. Two VDOT field staff based in Richmond are responsible for monitoring the contractor's maintenance performance on the sections of I-95 covered by the contract. The remaining three VDOT field coordinators are responsible for monitoring the applicable sections of I-77, I-81, and I-381. The field coordinators consult with respective VDOT district staff such as bridge, traffic, and environmental engineers as necessary.

As part of the general monitoring process, the VDOT field coordinators conduct both day and night reviews of the contractor's work. In addition, the field staff coordinate all of the contractor's lane closure requests, and observe incident management activities and maintenance projects. Moreover, field coordinators conduct periodic meetings with VDOT and contractor representatives and participate in meetings between the contractor and the Virginia State Police, VDOT, and local emergency services personnel.

The field coordinators submit weekly reports to VDOT's central office staff that outline the contractor's accomplishments, and they also submit detailed reports on specific work activities, such as snow and ice removal. The program supervisor compiles and maintains the data from these reports to determine whether there are performance trends or concerns that recur. In addition, VDOT staff also use these reports to prepare the annual performance evaluation report.

JLARC REVIEW AND REPORT ORGANIZATION

In 1998, the Joint Legislative Audit and Review Commission directed staff to review VDOT's oversight of the interstate asset management contract. The Commission directed the review as a follow-up to the JLARC study of the use of consultants by VDOT. Initial concerns were related to VDOT's management of the contract, including its ability to monitor the contractor's performance, the potential cost savings from the contract, and the impact on other VDOT operations. In a preliminary review completed in July 1998, JLARC staff found that VDOT's initial estimates of cost savings from the contract could not be documented, and that no written analysis of the savings could be produced by VDOT. Staff also raised concerns about VDOT's administration of the PPTA with regard to the criteria and processes for evaluation of proposals from the private sector, and its estimation of public savings and private costs.

The Commission directed staff to continue to monitor the interstate asset management contract. Staff were to complete a final review once VDOT and the con-

tractor had sufficient time to fully implement the contract. Two broad issues were developed to guide the research for this report. These issues addressed:

- VDOT's ability to adequately evaluate the contractor's performance in maintaining the interstate highways in compliance with contractual requirements, and
- VDOT's process for determining the cost effectiveness of the current asset management contract.

It should be noted that JLARC staff did not attempt to evaluate the contractor's performance for this study.

A number of research activities were used to address the study issues. The research activities included:

- structured interviews with VDOT and contractor staff,
- site visits to two of the contractor's field offices,
- analysis of VDOT's evaluations of the contractor's maintenance performance, and
- document reviews.

JLARC staff also observed, with contractor or VDOT staff, most of the 250 miles of interstate highway covered by the contract.

This chapter provided a brief overview of the interstate asset management contract, study issues, and JLARC staff research activities. Chapter II addresses VDOT's oversight and monitoring systems for the contract. Chapter III addresses cost effectiveness issues pertaining to the asset management contract, and examines the extent to which VDOT is in a position to determine whether the contract is cost effective for the State.

II: VDOT's Performance Monitoring and Evaluation of the Asset Management Contract

A key feature of the interstate asset management contract is the use of outcome-based performance requirements. To systematically evaluate the extent that the outcome-based performance targets are achieved by the contractor, VDOT implemented an annual evaluation of the condition of the interstate highway's assets. In addition, VDOT established an ongoing monitoring process to ensure that the contractor's maintenance work is consistent with the contract's specific requirements.

The interstate asset management contract represents a new approach to highway maintenance in Virginia, so objective evaluation of its outcomes is essential. VDOT has made progress in establishing an evaluation and monitoring process for the asset management contract. However, VDOT's performance data for evaluations in FY 1998 and FY 1999 are of limited usefulness, and certain asset management activities, such as pavement have not been fully evaluated until this year. So, additional enhancements were identified during this review that should be considered in order to improve the utility of the performance data and information collected. The proposed changes should enable VDOT to make an accurate assessment of the contractor's performance in future asset management contracts.

VDOT'S PERFORMANCE EVALUATION PROCESS

Although the current contract is the first interstate asset management contract VDOT has administered, VDOT has established the basic structure for evaluating and monitoring the contractor's performance. In terms of measuring the condition of the highway assets relative to the contract's performance objectives, VDOT conducts an annual evaluation of the condition of the assets. While comprehensive in terms of assets evaluated, the annual evaluation only represents the condition of the asset at the time the evaluation is conducted. Annual evaluations have several limitations: although the condition of assets could change following an evaluation, the changes could go undetected for another year. In addition, assets could be neglected for several months and only maintained shortly before the evaluation (which occurs at the same time each year.

A more effective approach for VDOT might be to conduct several evaluations throughout the year. In addition, opportunities may exist for VDOT and the asset management contractor to jointly administer the evaluations, providing each with the opportunity to use the data for its own purposes. VDOT should also take steps to ensure those assets that are not of sufficient quantity to be included in the samples selected for the formal evaluation are evaluated against contract standards.

VDOT's Evaluation of Contractor Performance

VDOT evaluates the contractor's performance in five general asset categories, such as drainage and traffic management. Ratings are made for 37 specific asset items (Table 1), excluding pavement and bridges, which are assessed in other processes. The evaluation is based on established performance criteria which are measured on samples of 0.1 mile segments of interstate highway. Each of the 37 asset items has a target percentage of measured items that should meet the established criteria. Table 1 shows the target percentages and the actual percentage of measured items meeting the criteria in the FY 2000 evaluation. That evaluation was completed between July and September of 2000.

VDOT has been evaluating the contractor's performance annually since June of 1998, so the most recent evaluation was the third completed. Use of the evaluations prior to FY 2000 is problematic, however, because the contractor has raised several objections to the evaluations. The contractor's specific concern was that VDOT used a pre-existing evaluation instrument that was not modified to reflect the criteria and tolerances required under the contract. The contractor also complained that the baseline used by VDOT for the evaluations was flawed because the assets assumed by the contractor were not in the condition that VDOT represented they were in. It appears that the condition of some of the interstate highway assets that the contractor assumed responsibility for maintaining was generally below contract standards. As a result, the contractor was required to first improve the condition of the assets before it could begin to maintain them to the contract's performance targets.

Over the course of the past two years, VDOT and the contractor have worked to modify the evaluation so that it is a fairer representation of the contractor's performance. Based on the FY 2000 evaluation, it appears the contractor met or exceeded the performance targets for 90 percent of the items evaluated on I-95, 89 percent on I-77, 86 percent on I-81, and 86 percent on I-381. The contractor did not meet the performance target for paved ditches on three of the four interstate routes it maintains, and missed the targets for pavement markers and regulatory signs on two of four routes. Overall, however, it appears the contractor is performing at the level required by the contract.

VDOT will need to continue to monitor the contractor's performance to ensure that the contractor meets additional performance targets. The department should also consider the performance of the current contractor in assessing whether to continue the use of asset management for the interstate highways.

VDOT Should Evaluate All Asset Types Maintained by the Contractor

VDOT's formal review process is based on the results that it obtains from an evaluation of all asset types that the contractor is responsible for maintaining. The evaluation is made of assets that are contained in a sample of test sites that are each 0.1-mile in length. The sample of test sites is selected using a formula stated in the

Table 1

Results of the FY 2000 Performance Evaluation for the Interstate Asset Management Contract

Asset Items	VDOT Target*	Percent of Assets that Passed Annual Evaluations			
		FY 2000 I-95	FY 2000 I-77	FY 2000 I-81	FY 2000 I-381
Shoulders-Hard Surface					
Surface Defects	90	92	100	100	100
Drop Off	90	100	100	99	100
Separation	90	98	100	100	100
Drainage	90	99	100	100	100
Shoulders-Non-Hard Surface					
Drop Off	90	NA	NA	NA	NA
Drainage	90	NA	NA	NA	NA
Roadside					
Grass	90	100	100	100	100
Debris and Road Kill	100	100	100	100	100
Litter	90	100	100	99	100
Landscaping	80	100	NA	NA	NA
Brush and Tree Control	95	98	100	100	100
Concrete Barrier	99	100	100	100	NA
Sound Barrier	95	NA	100	NA	NA
Slopes	90	96	97	100	100
Fence	98	**95**	100	99	**96**
Drainage					
Ditches, Paved	90	90	**84**	**84**	**85**
Ditches, Unpaved	90	96	97	99	100
Pipes	95	**91**	100	98	100
Box Culverts	95	100	100	100	NA
Under/Edge Drains	90	100	94	100	NA
Storm Drains/Drop Inlets	90	98	94	95	100
Curb and Gutter	95	**93**	NA	100	NA
Sidewalks	90	NA	NA	NA	NA

(Continued on next page)

Table 1 (Continued)

Results of the FY 2000 Performance Evaluation for the Interstate Asset Management Contract

Asset Items	VDOT Target	Percent of Assets that Passed Annual Evaluations			
		FY 2000 I-95	FY 2000 I-77	FY 2000 I-81	FY 2000 I-381
Storm Water Management Pond	95	NA	NA	NA	NA
Traffic					
Signals	100	NA	NA	NA	NA
Pavement Messages	95	100	100	100	100
Pavement Striping	95	97	98	97	100
Pavement Markers	90	99	98	**88**	**11**
Delineators/Object Markers	90	91	98	99	100
Glare Foils	90	91	NA	100	NA
Signs-Regulatory	100	100	**91**	**92**	100
Signs-Other	90	100	100	100	100
Luminaries	90	93	97	100	100
Guardrail	100	100	100	**91**	100
Impact Attenuators	100	100	NA	NA	NA
Truck Ramps	100	NA	NA	NA	NA
Cross Overs	100	100	**80**	100	NA

	FY 2000 I-95	FY 2000 I-77	FY 2000 I-81	FY 2000 I-381
Asset Items Passed	28	24	24	19
Assets Items Failed	3	3	4	3
Not Evaluated	6	10	9	15

*Notes: The VDOT Target represents the percentage of assets in a 0.1-mile section of interstate that is required to pass the annual evaluation. The "percent of assets that passed annual evaluations" represents the percent of sampled asset items that achieved VDOT's Target. Percentages in bold did not meet the VDOT Performance Target.

As required in the contract, VDOT uses a random sampling process to select the 0.1-mile sections of interstate required for its annual evaluation of the contractor. As a result, VDOT evaluates 223 test sites on I-77, 215 test sites on I-81, 192 test sites on I-95, and 27 test sites on I-381.

Assets that received an "NA" score were not contained in the sample of 0.1-mile test sites that VDOT selected for evaluation or are not present on the specified interstate route.

Source: Virginia Department of Transportation.

contract that is intended to achieve results with a 95 percent confidence level. All asset items that are contained in the 0.1-mile test sites are evaluated by VDOT against performance standards in the contract. For example, all asset items that are contained in about 260 test sites along the 100-mile section of I-95 are evaluated. Along the entire 250 miles of interstate highway that the current contractor is responsible for maintaining, the assets in about 1,000 sites are formally evaluated.

However, the random sampling process that VDOT uses to obtain the sample of test sites does not always result in a statistically significant number of asset items. Moreover, some of the asset types that the contractor is responsible for maintaining are not evaluated because they are not present in the sample of test sites. For example, VDOT did not evaluate pavement messages on I-95, sound barriers on I-81 and I-77, and impact attenuators on I-381. Although these assets were not present in the sample, if such assets exist elsewhere on the facility, field coordinators evaluate their condition outside of the annual evaluation process

Thus, VDOT may not systematically evaluate all of the asset types that the contractor is responsible for maintaining during its annual evaluation. VDOT should evaluate at least one item of every asset type that the contractor is responsible for maintaining as a part of the annual evaluation (not just through field monitoring).

VDOT is conducting a cost-benefit analysis to determine the feasibility of taking additional samples to ensure that it evaluates a statistically valid number of all assets that the contractor is responsible for maintaining. If the analysis indicates that sampling all asset types is cost-effective, VDOT will require the contractor that collects the data for the annual evaluation to specifically evaluate assets that are not adequately represented or included in the sampled test sites. However, if VDOT determines that it is not cost-effective to have the contractor evaluate these assets, then its field coordinators should conduct the annual evaluation of these assets to ensure that the contractor is providing an adequate level of service to all asset types. The results of the field staff's evaluation should be included in VDOT's annual report.

Recommendation (1). **The Virginia Department of Transportation should evaluate all assets that the interstate asset management contractor is responsible for maintaining to determine if the condition of the assets meets the contract's performance targets.**

VDOT Should Consider Conducting Quarterly Evaluations of the Contractor's Performance

As discussed in the previous section, VDOT's evaluation of the contractor's performance is conducted annually. When VDOT developed the interstate asset management contract, it determined that an annual evaluation was the most cost-effective method because of the costs involved in hiring a contractor to collect the data. While the annual evaluation is systematic and consistent, some shortcomings were identified.

The annual evaluation only represents the condition of the asset at the time the evaluation occurs. A limitation of VDOT's annual evaluation is that the condition of the assets could change immediately following the evaluation but go undetected for another year. In addition, assets may score lower during a spring evaluation because it follows the winter months that are characterized by inclement weather. Due to weather constraints, many maintenance activities occur in the spring, summer, and early fall. Thus, a fall evaluation may more accurately measure the impact of the contractor's maintenance work.

In contrast to the annual process used by VDOT, the contractor implemented a maintenance rating program (MRP) to evaluate three times a year the overall condition of the assets it maintains. The methodology used to generate the MRP is similar to the process VDOT uses to rate contract performance. The contractor uses the data that it obtains through the MRP to plan how to use its resources to improve its ability to meet the contract's performance targets, and to verify that work is done. In order to conduct the MRP, the contractor hires a sub-contractor to evaluate the transportation assets that are located along the 250 miles of interstate at 75 randomly selected 0.1-mile sections. Because the MRPs are conducted throughout the year, seasonal effects on maintenance activities and asset conditions are captured.

Figure 2 shows the scores that two asset items received on the contractor's MRP. These data show that periodic evaluations during the year depict the fluctuation that occurs in transportation assets more accurately than an annual evaluation. For example, the asset item "grass" fluctuated between a score of 53 and 100 during the September 1997 to December 1999 time period. The "guardrail" asset item fluctuated between a score of 64 and a score of 95 during the same period.

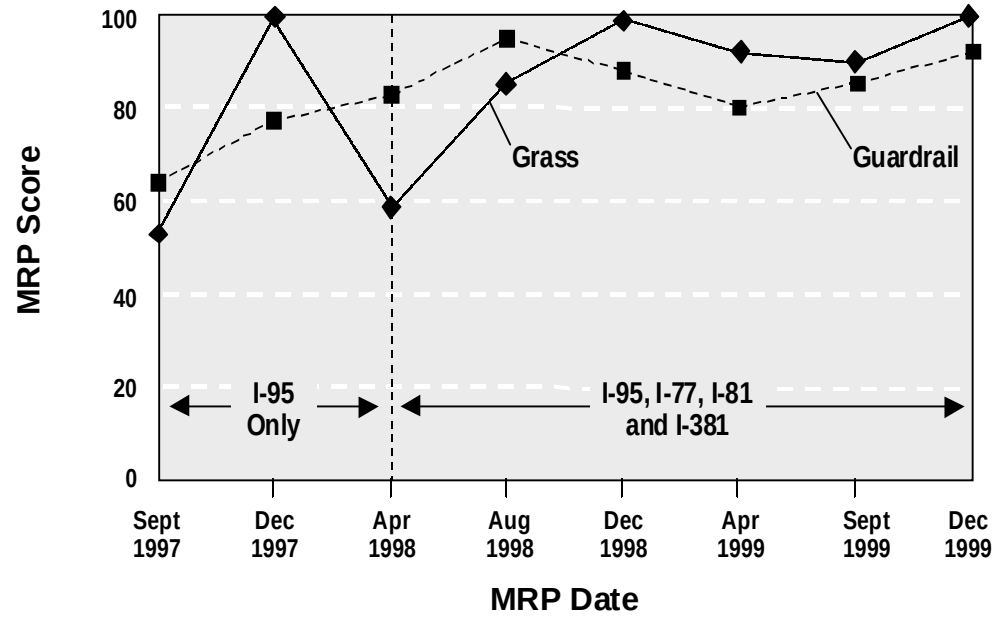
The variation in the contractor's periodic evaluations, presented in Figure 2, is not captured in VDOT's annual evaluations. For example, VDOT rated grass along I-95 a 100 on its FY 2000 evaluation, while the contractor's periodic evaluations ranged from 53 to 100. Moreover, guardrail along I-95 received a score of 100 on VDOT's FY 2000 evaluation, but the scores varied from 64 to 95 on the contractor's periodic evaluations. The effects of seasonal change and planned maintenance activities that occur throughout the year are not reflected in VDOT's annual evaluation. Since seasonal variations occur that may impact the condition of the sampled asset items, a quarterly evaluation process could present a more accurate reflection over time of the condition of the sampled asset items.

If VDOT continues its use of interstate asset management, it should require joint quarterly evaluations of the assets in future contracts. To enhance the cost effectiveness of this approach, both VDOT and the private asset management contractor should share the cost of the evaluations based on some mutually agreed upon methodology.

Periodic evaluations conducted throughout the year would allow VDOT to systematically track the contractor's performance in improving and maintaining the assets. In addition, the evaluations would provide VDOT with a more consistent picture

Figure 2

VMS' 1997-1999 Maintenance Rating Program (MRP) Scores for Selected Asset Items



Source: VMS, Inc.

of the condition of interstate assets. Finally, multiple evaluations would enable VDOT to comprehensively monitor over time how performance varies and to identify the factors that might account for any substantial changes.

Recommendation (2). **If the use of interstate asset management is continued, the Virginia Department of Transportation should consider requiring quarterly evaluations of contractor performance. VDOT should consider hiring, as part of any subsequent asset management contracts, an independent evaluator to collect data for both the State and the private interstate asset management contractor.**

ROUTINE MONITORING OF THE INTERSTATE ASSET MANAGEMENT CONTRACT

Routine monitoring of the interstate asset management contract is conducted by five VDOT field coordinators who are each responsible for 50-mile sections of the contractor-maintained interstate highway. As part of the monitoring process, VDOT requires its field staff to complete routine weekly reports on the contractor's work.

However, there are only minimal guidelines for its staff to follow when they complete these reports. The lack of comprehensive guidelines has contributed to inconsistencies in the content of the reports and in the quality of the monitoring that is achieved. In addition, although the contractor provided the required information during the entire contract period, VDOT has only recently begun to report on the contractor's compliance with the timeliness requirements for 12 asset items specifically required by the contract.

Snow and ice removal performance is also an important component of the contract. The department relies on narrative reports from its field staff to evaluate the contractor's performance for snow and ice removal. However, there is a lack of consistency in how the results of snow removal operations are reported by VDOT's field staff. In addition, despite the fact that pavement is the most important road system asset to be maintained, VDOT has reported its evaluation of this asset group for the first time in December 2000.

Guidelines for VDOT'S Routine Monitoring Process Are Needed

The key element of VDOT's ongoing monitoring process of the asset management contract is the five field coordinators. Currently, VDOT requires its five field coordinators to complete two routine reports regarding their monitoring of the contractor's performance: weekly reports and interim performance reports. VDOT developed these reports in an attempt to identify and document potential problems with the contractor's maintenance work.

The weekly reports provide daily summaries of the maintenance work that the field coordinators have observed. JLARC staff reviewed a large number of these reports and found that there was little consistency in the content of the reports completed by the various field staff. Some reports contained detailed summaries of the type of work completed and whether or not it was performed in accordance with the contract. For example:

> *One VDOT field engineer reported in 1999, that a subcontractor performed guardrail repairs on I-81 northbound lane at mile marker 66.35 on the inside shoulder. The guardrail was damaged in an accident that occurred approximately three weeks earlier. The coordinator noted that the subcontractor did not repair the damaged guardrail in a timely manner. However, the subcontractor did use an approved lane closure procedure and maintained traffic control as required by the VDOT Work Area Protection Manual. The VDOT coordinator concluded by indicating that all replacement guardrails were installed to standard.*

Other reports covering maintenance activities on the same asset type simply indicate the type of work completed and provide little or no comment regarding the timeliness or quality of the work. For example, one field coordinator only reported that

"contractor...repairing guardrail at mile marker 90 in the northbound lane." This report does not indicate if the repair was performed in accordance with the contract's performance criteria. It also does not identify the date that the guardrail was damaged or the date that the repairs were completed.

This inconsistency results from the minimal written guidelines for staff to follow when they complete these reports. VDOT central office staff have provided verbal guidelines to the field staff concerning the type of information that they should provide in the weekly reports. For example, VDOT staff instructed the field coordinators to report on the contractor's activities that they observed during the week.

VDOT staff reported that the weekly reports essentially serve as documentation for the interim performance reports. It is not clear at this time how systematically the interim performance reports are utilized. As a result, it appears that the weekly reports are currently VDOT's primary source of performance information on the contractor's maintenance work.

The written guidelines should also address the frequency with which the VDOT field coordinators are to inspect the contractor's materials and quality of work, especially with regard to road or bridge surface repair and replacement. Section 3.11 of the interstate asset management contract specifies that the department has the "...right to oversee, inspect and test all materials and each detail of work of VMS under this Agreement...." The monitoring that this section of the contract allows is important, as it can help to ensure that the condition of the asset will be maintained into the future.

If the weekly reports are to be effectively used to provide data on the contractor's maintenance activities, comprehensive written guidelines regarding their use should be developed to ensure consistency in the information that is collected and reported by the five field staff. The written guidelines should provide a discussion on the type of information to be included in the reports, indicate the items and activities to be evaluated, and note the frequency that reviews are to occur.

Recommendation (3). **The Virginia Department of Transportation should develop comprehensive written guidelines to ensure consistency among the performance data its field staff collect and report regarding the interstate asset management contract. The written guidelines should indicate the type of information that is to be included in the weekly reports, the items and activities that are to be evaluated, and the frequency that reviews of materials and selected details of work are to occur.**

VDOT's Interim Performance Reports Should Be Linked to Contract Performance Criteria

To quantitatively evaluate the contractor's performance between annual evaluations, VDOT developed the interim performance report. The interim performance report assigns numerical scores to the contractor's performance on such criteria as

"prosecution of work," "communication," "work zone safety," and "quality of work." VDOT has verbally instructed its field staff to randomly complete these reports on specific asset management projects in order to provide a representative sample indicating the quality of the contractor's work.

VDOT indicated that it is revising these reports and plans to eventually generate interim performance reports on all of the contractor's maintenance activities. In addition, VDOT reported that it intends to structure the reports to evaluate the contractor's performance in accordance with the contract's performance criteria. This change in the performance report appears appropriate, and should be implemented by VDOT as soon a practical. Yet, at this time, there are no guidelines or criteria for determining when and how often these reports should be utilized. Therefore, the ability of these reports to provide consistent and systematic data that represents an overall assessment of the contractor's performance is questionable.

VDOT reported that it is planning to link its interim performance reports to the contractor's weekly workplan reports and accomplishment reports. These weekly workplan reports indicate the type of work that the contractor has planned for the upcoming week and its accomplishment reports indicate the work that it completed during the previous week. If VDOT links its interim performance reports to the contractor's weekly workplan and accomplishment reports, then this would facilitate the development of a secondary quantitative evaluation process to supplement the data collected during VDOT's annual evaluation. Moreover, it would also ensure comprehensive and consistent evaluation of the contractor's performance.

In order for the interim performance reports to be use effectively, a database for storing and analyzing the results should be fully developed. Apparently, VDOT initiated the development of a database, but staff turnover has kept the project from being completed. Completion of this database should be given priority by VDOT so the results of the interim performance reports can be reported along with the results of the annual evaluation.

Recommendation (4). **The Virginia Department of Transportation should implement its proposed redesign of the interim performance reports, establish criteria for when performance is to be evaluated, and develop a database that is capable of linking its interim performance reports to the contract's asset management requirements. The results from the performance reports should be included in VDOT's annual evaluation report.**

Timeliness Requirements for Certain Assets Require Better Verification

The contract requires the contractor to repair damages that occur to 12 asset items within specific time periods (See Exhibit 2). VDOT placed timeliness requirements on these particular asset items because it believes that these assets may develop into potential public-safety hazards if they are damaged and not promptly repaired. The requirement to meet the timeliness obligations only begins once the contractor is noti-

Exhibit 2

Timeliness Requirements for Interstate Asset Items that VMS is Responsible for Maintaining

Asset Item	Timeliness Requirement
Debris and Road Kill	• Respond immediately upon notification • Road kill promptly and properly disposed of
Signals	• Repaired immediately (within four hours)
Signs (includes overhead signs)	• Replace warning and regulatory signs within 24 hours of notification
Highway Lighting	• Non-functional lights will be repaired within a week of notification
Guardrail	• Repair or replace badly damaged guardrail within one to two days, mitigate immediately upon notification • Damaged but functional guardrail replaced within one week
Impact Attenuators	• Repair or replace badly damaged attenuators within one to two days, mitigate immediately upon notification • Damaged but functional impact attenuators will be replaced within a week
Truck Ramps	• Repair or replaced badly damaged truck ramps within 1-2 days, mitigate immediately upon notification • Damaged but functional truck ramps will be replaced within a week
Overhead signs	• Repair overhead sign structures that present a safety hazard immediately upon notification
Paved Lanes (Asphalt)	• Potholes causing a threat to safety will be responded to immediately, others within two days of notification
Paved Lanes (Concrete)	• Potholes causing a threat to safety will be responded to immediately upon notification, others within two days of notification
Overall Bridge	• Structurally critical conditions must be addressed immediately upon notification
Traffic Safety Features	• Repair or replace badly damaged traffic safety features within one to two days, mitigate immediately upon notification • Damaged but functional traffic safety features will be replaced within a week

Source: *Comprehensive Agreement for Interstate Highway Asset Management Services*, December 1996, Virginia Department of Transportation and VMS, Inc.

fied that an asset is damaged. Under the terms of the contract, VDOT is required to verify that the contractor has complied with the timeliness requirements. More specifically, the contract states:

> Where a timeliness of response has been listed in the asset tolerances and criteria in Outcome and Performance Targets, timeliness of response will be measured. Recording this measurement will be the responsibility of VMS, validation, the responsibility of VDOT.

In order to comply with this provision of the contract, VDOT has the ability to verify compliance with the timeliness performance criteria by identifying damaged assets that have timeliness requirements and by monitoring the length of time that it takes the contractor to repair those assets. VDOT's primary source for identifying damaged assets that have timeliness requirements is the field coordinators who monitor their assigned sections of interstate highway sections daily. VDOT staff also identify damaged assets with timeliness requirements by reviewing Virginia State Police (VSP) accident reports that indicate the date the accident occurred and the asset items damaged as a result. In addition, VDOT receives notification of damaged assets from the Transportation Emergency Operations Center (TEOC) and from VDOT district offices and residencies. VDOT staff obtain the date that the damaged assets were repaired by reviewing the contractor's weekly accomplishment reports and its subcontractor invoices.

Through early 2000, VDOT did not systematically report on the contractor's performance in this area, although the contractor was providing performance data to VDOT on a monthly basis. However, in August 1999, VDOT received notification from its field coordinators that the contractor was not repairing damaged guardrail in accordance with the contract's timeliness requirements. Therefore, VDOT conducted an informal evaluation of the contractor's ability to repair damaged guardrail within the contract's timeliness requirements. Specifically, VDOT determined that the contractor's Petersburg office achieved the contract's timeliness requirement for repairing damaged guardrails approximately 53 percent of the time. Its Wytheville office met the timeliness requirement about 35 percent of the time, and the Chilhowie office complied with the contract's timeliness requirement approximately 68 percent of the time. Overall, VDOT staff reported that the contractor achieved the contract's timeliness requirement for repairing damaged guardrail about 52 percent of the time.

VDOT's analysis suggests that the contractor has at one time experienced difficulty in achieving the contract's timeliness requirements for guardrail repair. In fact, the need to verify the contractor's compliance with this aspect of the contract was noted by VDOT's internal audit division. The internal audit division reported in a March 2000 study that:

> There are no reports from VMS or VDOT showing how well VMS is doing overall in meeting the timeliness criteria in each area. VDOT can not adequately rate VMS' performance without reporting on whether or not they are achieving the timeliness requirement.

The contractor confirmed to JLARC staff this it had a problem responding to guardrail repairs in a timely manner, but that it has successfully addressed this problem.

During the spring of 2000, VDOT implemented a new process to evaluate the contract's timeliness requirements. As part of the new process, the contractor is required to submit a monthly timeliness report for each of the affected assets that indicates the date it was notified of a damaged asset, the location of the asset, and the date and time the asset was completely repaired. The contractor has submitted timeliness data from the beginning of the contract, but the new reporting format makes it easier for VDOT to evaluate and report this information. VDOT's field coordinators may access performance online, or may visit the contractor's offices to check records and work orders to ensure that information reported is accurate. In addition, VDOT staff reported that the field coordinators may check State Police accident and incident records as another method of verifying the accuracy of the data reported by the contractor.

VDOT staff report that the current process for verifying the timeliness requirements of the contract has been in place for several months and appears to be working as intended. Both VDOT and the contractor should continue to monitor and refine the process to ensure that it can comprehensively address each of the 12 assets with timeliness requirements. Finally, VDOT should include the results from this process in its annual report on the contractor's performance.

Recommendation (5). **The Virginia Department of Transportation should continue to monitor and refine as necessary the process for evaluating compliance with the timeliness requirements for applicable interstate highway asset items. The results of the evaluation should be reported in VDOT's annual report on the performance of the interstate asset management contractor.**

Snow Removal Performance Requires Systematic Evaluation to Document Compliance with Contract Standards

VDOT considers snow and ice control operations to be very important transportation maintenance requirements due to the public safety issues involved. In addition, VDOT has a "bare pavement" policy that requires at least one traveling lane to be free of snow and ice accumulation during a storm. The importance of the contractor's ability to undertake snow and ice control operations is highlighted by the applicable section of the contract that states:

> If VMS fails to present a plan satisfactory to the Department by March 1...or satisfy the Department by July 1...that it has sufficient resources to undertake Snow and Ice Control during the Fiscal Year...the Department's sole remedy will be to terminate VMS' right to conduct Snow and Ice Control for the Fiscal Year....

Concerning the contractor's responsibilities for performing snow and ice control operations along the 250 miles of interstate highway, the contract states:

> VMS is required to submit no later than March 1 of each fiscal year, a plan to VDOT for carrying out snow and ice control operations. In addition, VMS is required no later than July 1 of each fiscal year to demonstrate to VDOT that it has adequate equipment, materials, and personnel to fully implement snow and ice control operations on all segments of interstate.

In developing the interstate maintenance contract, VDOT recognized the importance of snow and ice removal on the sections of interstate that are maintained by the contractor. In terms of performance criteria for snow and ice control operations, the contract requires that:

> During times of...winter weather conditions...Operator shall at all times maintain a minimum of one lane of travel in each direction of the facility. Within twenty-four hours of the cessation of a winter weather event, the Operator shall provide bare pavement on all travel lanes. In addition, shoulders shall be cleared of all accumulated ice and snow as soon as possible and not later than forty-eight hours after the cessation of the winter weather event.

In order to monitor and evaluate the contractor's snow and ice removal performance against this broad requirement, VDOT requires its field coordinators to complete snow removal reports and interim performance reports. The snow removal reports form the basis of meetings held between VDOT, the contractor, the Virginia State Police, and other interested parties to review the events that occurred during the storms. The VDOT field coordinators encourage all parties involved to discuss both the positive and the negative aspects of the contractor's performance.

A review of VDOT's snow removal and ice control reports indicates a lack of consistency in how the results of snow removal operations are reported by the five VDOT field coordinators. Much of the narrative of these reports is not directly related to required performance under the contract, but rather addresses how the contractor carried out the operation. Such narrative cannot be used to measure, in an objective manner, the contractor's performance. As a result, it is difficult to compile the results of the snow removal reports in a manner that facilitates analysis. VDOT central office staff confirmed that there are clear standards for the contractor's performance, there currently no measures to quantify the contractor's performance when evaluating snow and ice removal.

Snow and ice removal is clearly a priority activity regarding the interstate highways. For any future asset management contracts, VDOT should develop a specific measures to evaluate the contractor's snow and ice control operations in accordance with the plans that are approved by VDOT. VDOT should develop a process that

formally evaluates the contractor in a manner conducive to quantitative analysis of the contractor's performance.

Recommendation (6). **The Virginia Department of Transportation should develop measures and procedures for the proper evaluation of the snow and ice removal performance under any future interstate asset management contracts.**

VDOT Evaluation of Contractor-Maintained Pavement Needs to Be More Promptly Reported

In addition to maintaining the drainage, roadside, and traffic asset groups, the asset management contractor is responsible for maintaining the pavement. According to both VDOT and contractor staff, pavement is the most expensive asset to be maintained. For example, in FY 1998, the contractor reported spending approximately $4.6 million on pavement maintenance. Recognizing its importance, the contractor has a pavement condition assessment performed regularly by an independent evaluator.

VDOT has just completed its first evaluation of the pavement asset group to document compliance with performance targets as it is required to do by the contract. The contract states that VDOT is required to annually use an existing statewide evaluation program, the pavement management system, to determine the condition of the pavement that the contractor maintains. The pavement management system was originally designed to measure one index, the pavement condition index, that would be used as a threshold limit for identifying distressed pavement. Since VDOT periodically evaluates pavement, it can compare the condition of the pavement before and after the contractor became responsible for maintaining the 250 miles of interstate to determine if any noticeable improvements occurred.

However, a review of contractor-maintained pavement assets as required by the contract has just been completed for pavement ratings in 1997, 1998, and 2000. The annual performance report for FY 2000, to be published in December 2000, will report that pavements maintained by the contractor warrant a "good" rating. VDOT should ensure that it completes future pavement rating reports on a timely basis.

III: Cost Effectiveness of the Interstate Asset Management Contract

According to the Virginia Department of Transportation (VDOT), one of the primary benefits of the interstate maintenance contract is the potential cost savings of almost $23 million over the life of the contract. This estimate of cost savings, developed in 1996, was based on the difference between forecasts of VDOT's interstate maintenance costs and the payments to be made to the asset management contractor. However, with a November 2001 deadline for a decision on whether to continue and expand the use of interstate maintenance contract, VDOT has only recently established a process to determine if the current contract provides actual cost savings for the State. This process relies on a combination of analyses completed by researchers from Virginia Tech and by VDOT staff.

Because the asset management contract is the first maintenance contract of this type that VDOT has administered, it presents opportunities for VDOT to ensure the processes are in place for determining the cost effectiveness of projects of this type. The Public-Private Transportation Act (PPTA) was intended to encourage proposals from private firms to conduct highway-related activities such as construction and maintenance. It is possible that additional proposals such as the current interstate asset management contract will be submitted. The structured process that VDOT establishes now for review of the current contract should give the department the capacity to determine the cost effectiveness of other similar proposals or contracts in the future.

PRIOR REVIEWS OF COST EFFECTIVENESS ARE INADEQUATE

In 1996, VDOT identified an estimated $23 million cost savings as one of the major benefits from the interstate asset management contract. At that time, VDOT staff based the projected cost savings largely on estimates and forecasts of its future maintenance costs compared to the payments it would make to the asset management contractor. JLARC staff reported in 1998 that these projections of savings were not supported with appropriate documentation and the soundness of VDOT's analysis of savings could not be verified. Moreover, estimates of planned maintenance expenditures completed in 1996 may have little relationship to the actual maintenance costs in subsequent years. Therefore, VDOT's prior estimate of savings is not useful in assessing the effectiveness of the contract.

The contractor maintains that an analysis of VDOT budgeted maintenance costs on a per-lane-mile basis demonstrates the cost effectiveness of the asset management contract. However, this approach does not use actual expenditures for maintenance, and does not account for the complexity of the VDOT statewide interstate maintenance program or the differences in the types of facilities maintained by VDOT and the contractor.

Initial Projections of Cost Savings from Asset Management Developed from Estimates

As noted earlier, the current asset management contractor presented its proposal to VDOT regarding the privatization of interstate maintenance services in late 1995. One component of VDOT's evaluation was to determine the cost effectiveness of the interstate asset management proposal. VDOT's analysis of the proposals estimated that the total cost savings over the life of the contract would approach $23 million (Table 2).

The data in Table 2 also illustrate that no VDOT cost savings were identified in FY 1997, which was the transition period from VDOT maintenance services to the contractor's maintenance services along I-95. The transition from VDOT to the contractor occurred gradually with more intense contractor maintenance activities occurring closer to the July 1997 turnover date. The $4.9 million payment made to the contractor in FY 1997 was largely for mobilization. In addition, the costs to VDOT for administering the contract were estimated to be about $250,000 annually. The costs for private attorney services were also included.

Table 2

VDOT's Estimate of Savings from the Interstate Asset Management Contract FY 1997 – FY 2002

Fiscal Year	Estimated VDOT Maintenance Costs Eliminated	Contractor Payments	Projected Savings
1997	$0	$4,900,000	($4,900,000)
1998	$13,995,000	$11,300,000	$2,695,000
1999	$33,632,000	$31,000,000	$2,632,000
2000	$34,641,000	$28,600,000	$6,041,000
2001	$36,027,000	$28,000,000	$8,027,000
2002	$37,468,000	$27,800,000	$9,668,000
Subtotal			**$24,163,000**
VDOT Administrative Costs			($1,125,000)
Attorney Fees			($125,000)
Total Estimated Contract Savings			**$22,913,000**

Source: Virginia Department of Transportation estimate, 1997.

JLARC staff initially requested documentation of the analysis of cost savings in the summer of 1998. At that time, VDOT was unable to produce any written documentation of the analysis it had used. Subsequently, in response to the current review, VDOT staff were able to elaborate on the process used to estimate cost savings from the contract.

In evaluating the cost effectiveness of the private interstate asset management proposal in 1996, VDOT staff recognized that its own interstate maintenance costs needed to be identified. According to VDOT staff, the department determined that despite the amount of financial data contained in its fiscal systems, actual cost data for specific activities and at the level of detail necessary for this type of analysis were not readily available.

After evaluating a number of possible methods for developing estimated costs, VDOT staff elected to develop the estimated costs using the value of the planned and ongoing work in FY 1997 and FY 1998 on the State's interstate highways. To further develop the projected VDOT maintenance cost estimates, the maintenance plans and programs specifically for I-95 were examined in greater detail. By using this approach, VDOT staff refined the estimated costs to ensure that they would be as close as possible to actual costs in the first one or two years of the proposed contract.

Specifically, VDOT reports that it identified maintenance costs based on the ordinary maintenance programs and the maintenance replacement programs. Once VDOT costs for the first two years were established, costs were then projected over the life of the proposed contract using an estimated rate of inflation for each year. This is reportedly similar to the process used to estimate the growth of revenue and expenditures in VDOT's six-year planning process.

It appears that VDOT's estimated maintenance costs for I-81, I-77, and I-381 were based on the cost estimates developed from the I-95 corridor. VDOT staff noted that I-95 was "equally or better" maintained than the other sections of interstate covered in the VMS proposal. Further, staff noted that "significant resources have been invested in major rehabilitation projects ... specifically, the I-95 pavement work...." Finally, VDOT staff noted that the same intensity of maintenance activities that occurred on the I-95 corridor in the mid-1990s would likely be replicated to some degree through the late 1990s and early into the 21st century along the I-81 and I-77 corridors.

Comparison of VDOT Budgeted Costs and Contractor Expenditures Per Lane Mile Is of Limited Usefulness

The asset management contractor has proposed using a comparison of VDOT's budgeted interstate maintenance costs per lane mile with the contractor's expenditures. Such a comparison is cited by the contractor as evidence of the cost effectiveness of the contract. In 1999, the contractor used this approach to calculate the per-lane-mile cost for VDOT and the asset management contract. VDOT's costs per lane mile were estimated to be $34,124, while costs for the contractor were found to be $22,230.

JLARC staff reviewed the approach proposed by the contractor for this comparison, and found it to be of limited usefulness for accurately calculating VDOT interstate maintenance costs. The approach uses gross amounts from the VDOT budget, and makes several adjustments to account for administrative costs and other items. Many of these adjustments appear to be arbitrary amounts, and in some cases are based on assumptions not supported by any evidence or data. For one step in the approach, the contractor sates that, "This is just an estimate with no empirical basis."

Moreover, the approach does not account for the significant differences in the types of interstate facilities maintained by VDOT and the contractor. The 250 miles of interstate maintained under the contract consists largely of rural highway. VDOT on the other hand, continues to maintain many miles of both rural and urban highway, including interstate routes in Northern Virginia and Hampton Roads. VDOT is also responsible for maintenance of the tunnels and bridges in Hampton Roads. These facilities are not comparable to any of the facilities maintained under the asset management contract. In fact, the contractor does not maintain the mountain tunnels on I-77, for example – these are still maintained by VDOT. Given the problems with the comparison of VDOT budgeted maintenance and the costs under the contract, it is not an adequate substitute for an analysis of actual maintenance expenditures.

However, the general approach could be applied to more carefully specified expenditure data which controls for the potential sources of error in the contractor's earlier estimates. Expenditure data from the department's financial system, FMS-II, could be used to calculate per-lane-mile costs to be compared with the contractor's costs. In order for such an approach to be applied, however, the department would need to examine assumptions related to indirect and administrative costs. Also, this approach might yield more useful results if VDOT costs could be captured at the county level in order to control for the types of interstate facilities maintained by VDOT and the contractor, and for the rural/urban nature of the routes maintained.

VDOT NEEDS TO COMPLETE ITS REVIEW OF THE COST EFFECTIVENESS OF THE INTERSTATE ASSET MANAGEMENT CONTRACT

While prior analyses of cost effectiveness are not currently useful, a rigorous analysis of actual VDOT and contractor expenditures for maintenance can provide the information needed. VDOT now has the opportunity and the time to prepare a comprehensive analysis of the contract's cost effectiveness. The department has implemented a financial reporting system that appears to have the capability to provide substantial amounts of financial information useful to an analysis of the asset management contract. VDOT reports that it is using this interstate maintenance cost data in an analysis of the cost effectiveness of the asset management contract.

However, the process that has been initiated needs to be completed in a timely manner to ensure that VDOT management can make an informed decision by November 2001 regarding the continuation and expansion of asset management on the inter-

state system. In combination with an analysis completed by Virginia Tech, the department's analysis may provide sufficient information to determine if asset management is a cost effective approach to interstate maintenance.

A Cost Study by Virginia Tech Provides Useful Information But Appears Too Narrow to Be Conclusive

To address the lack of information about the cost effectiveness of the asset management contract, VDOT contracted with faculty at Virginia Tech to compare selected costs of the asset management contract to the projected cost of interstate maintenance as if it were performed by the department. The study, which was completed November 30, 2000, is based on a bid item and unit rate comparison for the contractor's work if conducted at the average bid prices in VDOT contracts. Since the cost to VDOT of the asset management contract is a fixed amount, comparisons can then be made between the calculated VDOT projected costs and contractor costs.

JLARC staff reviewed the VDOT-approved methodology for the Virginia Tech study but made only a preliminary review of the study's findings because they were not made available until after the completion of this report. Based on an assessment of the methodology and the preliminary review of findings, the study approach appears reasonable in assessing the costs of work contracted by the asset manager and VDOT. The Virginia Tech analysis shows that work done by the asset management contractor may be 12 percent cheaper than comparable work if contracted directly by VDOT. While the study provides useful information about a single component of the cost of the contract, it does not appear to provide a broad, conclusive comparison of costs. A broader, direct comparison of interstate maintenance expenditures would be a useful supplement to the Virginia Tech study. The need for an actual cost comparison is discussed in the next section.

VDOT Should Use Actual Interstate Maintenance Cost Data for the Review of Cost Effectiveness

The interstate asset management contract was established as a pilot project to evaluate the extent to which PPTA contracts could be used for maintenance of interstate highways. Although performance is one important factor in determining whether to continue the use of such contracts, cost effectiveness is certainly another.

As discussed earlier, the expected cost savings due to implementation of the asset management contract was initially based on projected, not actual, expenditures by VDOT for interstate maintenance. VDOT staff reported that projected maintenance expenditures were used due to the fact that "…clear and unambiguous costs for maintenance, except at the highest level, are not easily identified." The current comparison of VDOT and contractor costs being conducted for VDOT is based on "…comparing the projected cost for such maintenance as if performed by VDOT directly with VMS' lump sum contract."

However, reliable, actual cost data would be the best source on which to base a decision regarding the privatization of interstate maintenance services. The contractor's financial systems can apparently provide very detailed interstate maintenance cost data. Moreover, the contractor's fiscal staff reported that its cost data can be calculated and reported in a manner that make it possible for VDOT to evaluate against its maintenance costs.

Meaningful comparisons of actual costs between the contractor and VDOT are essential in determining the overall cost effectiveness of the interstate maintenance pilot project. Actual VDOT interstate maintenance cost data can be obtained through the agency's financial management system, known as FMS-II. FMS-II is a relatively new system that has the potential to provide cost data at levels of detail previously unavailable. VDOT fiscal staff have reported that FMS-II is capable of retrieving and calculating the necessary cost data for most direct costs. One issue that will likely pose some challenge for VDOT in determining its total costs are indirect and administrative costs. Nonetheless, VDOT's current financial management system may be a source of timely and accurate maintenance cost data. As noted earlier, the general approach suggested by the contractor, with actual expenditure data rather than budgeted amounts, might be a useful tool for the comparative analysis of VDOT and contractor costs.

VDOT staff report that the department has already started an analysis of costs which will be based on a per-lane-mile cost comparison. In the analysis, VDOT is controlling for many of the potential problems in the contractor's proposed statewide cost approach. For example, VDOT is compiling FMS-II expenditure data at the county level for those portions of the interstate that would provide the most appropriate comparison to contractor-maintained portions of the highway. VDOT staff report that they are also controlling for traffic volume in selecting the counties and routes to use in the comparison.

This analysis was not complete at the time of this JLARC review. However, the general approach appears reasonable. It uses actual VDOT costs for the comparison to the contractor's costs, rather than projections. VDOT staff appear to have carefully considered and addressed necessary assumptions to ensure an accurate comparison.

Using actual cost data to determine the cost effectiveness of the interstate maintenance contract is important for more than just the current contract. The framework established by VDOT for reviewing the cost effectiveness of the current interstate asset management contract could serve as the basis for reviewing other, similar contracts that are submitted under the PPTA. Therefore, determining whether and how actual VDOT cost data can be obtained for the current contract review should be applicable to analysis of the cost effectiveness of similar maintenance contract proposals.

Recommendation (7). **In conducting a review of the asset management contract's cost effectiveness, the Virginia Department of Transportation should use actual interstate maintenance cost data.**

VDOT Should Complete Its Cost Effectiveness Analysis in a Timely Manner

The current contract permits VDOT to renew or extend the contract for up to five years. The contract also requires that a decision by VDOT to renew or extend the contract occur no less than 240 days prior to the end of the existing contract. Therefore, VDOT must notify the contractor of its decision regarding contract renewal or extension by November 2001. This leaves about 11 months for VDOT to determine the contract's cost effectiveness and to draw conclusions about the program's highway maintenance performance.

VDOT's maintenance division has focused on three periods in the interstate asset management contract — April 1997, July 1997, and July 1998 — when responsibility for specific segments of interstate maintenance was transferred to the contractor. At the same time, VDOT established and implemented a monitoring and evaluation process for the asset management contractor. This monitoring process generally enables VDOT to assess whether the sections of the State's interstate system are maintained according to performance targets in the contract. Resources should now be applied to determining the program's cost effectiveness prior to the deadline for determining whether to continue and expand the use of asset management.

VDOT's maintenance division has recognized the importance of a comprehensive cost effectiveness analysis of the interstate asset management contract. In March 2000, VDOT's maintenance division staff established a work group responsible for analyzing the cost effectiveness of the contract. The objective of this group is to:

> Develop a strategy/methodology to assess the significant costs associated with the VMS, Inc. agreement by and between the Virginia Department of Transportation (VDOT) and VMS, [I]nc. (VMS). The result of which would be a sustainable process to measure and quantify output to outcome cost comparisons between VDOT and VMS.

Members of the group include two faculty members from Virginia Tech, a VDOT district administrator, two VDOT district maintenance engineers, a VDOT budget analyst, and a representative from the contractor. The first meeting of this group was held in March 2000.

Because a decision to continue the use of asset management must be made before November 2001, the substance of this group's work should be completed well before that time, preferably by June 2001. This will help ensure that VDOT's senior

staff have sufficient time available for review, questions, and, if necessary, refinement of the work group's analysis. Given the cost and potential impact on the department's maintenance program, it should share the findings of its analysis of cost effectiveness with the General Assembly's transportation committees.

Recommendation (8). **The Virginia Department of Transportation should complete its process to determine the cost effectiveness of the current interstate asset management contract in a timely manner. A determination of the cost effectiveness of the contract should be completed for review by June 2001. The department should share its findings with the House and Senate Transportation Committees.**

Cost Analysis by Highway Asset Groups Should Also Be Conducted

As discussed earlier, the asset management contract covers seven primary asset groups or services related to the State's interstate highway system:

- drainage,
- roadside,
- traffic,
- pavement,
- bridges,
- snow and ice removal, and
- incident management.

Currently, the contractor is fully responsible for providing the services necessary to maintain these assets to predetermined outcome objectives or standards.

As presented earlier in the report, VDOT's 1996 evaluation of the proposed contract's cost effectiveness focused on comparing VDOT's total interstate maintenance cost to the cost of the asset management contract. However, because the current contract is largely focused on providing services across seven primary asset groups or services, a comparison of VDOT's and the contractor's costs for maintaining each of these assets may be useful.

In the future when FMS-II is more fully developed and VDOT has appropriate maintenance activity data, analysis of this type could determine whether there are asset groups or assets within those groups that VDOT can maintain at a substantially lower cost than a private firm. For example, there may be services that VDOT provides for other road systems for which substantial economies-of-scale are achieved resulting in lower costs. Or, some asset's maintenance requirements may involve a specialized skills or equipment that VDOT has ready access to, enabling the services to be provided at a lower cost.

In addition, analysis at this level could indicate that there are performance outcomes or objectives that are very costly to achieve. For some objectives, a decision

could be made that the expense of achieving that specific objective is cost-effective. On the other hand, a determination could be made that it may be more cost-effective to modify the performance objective in order to reduce the overall cost of the maintenance contract.

VDOT could also attempt to identify and analyze cost by the asset item or group. The contractor reportedly can provide cost data at the level necessary to conduct this type of analysis already. The VDOT work group should also review the steps necessary to ensure that VDOT's cost data is in a similar format for analysis at a later time.

Recommendation (9). **The Virginia Department of Transportation should, when necessary data become available, evaluate interstate maintenance costs for VDOT and the contractor by highway asset item or asset group.**

Appendix A

Responses to the Exposure Draft

As part of an extensive data validation process, the major entities involved in a JLARC assessment effort are given an opportunity to comment on an exposure draft of the report. Appropriate technical corrections resulting from the written comments have been made in this version of the report.

The appendix contains responses from the following:

- Secretary of Transportation
- VMS, Inc.

DEC 14 2000

COMMONWEALTH of VIRGINIA

Office of the Governor

James S. Gilmore, III
Governor

Shirley J. Ybarra
Secretary of Transportation

December 14, 2000

Mr. Phillip Leone, Director
Joint Legislative Audit and Review Commission
Suite 1100, General Assembly Building
Capitol Square
Richmond, Virginia 23219

Dear Mr. Leone:

Thank you for the opportunity to respond to the exposure draft of VDOT's Asset Management Contract with VMS. I have attached VDOT's response to the nine recommendations contained in the draft.

I appreciate the cooperation of JLARC, VDOT and VMS staffs during the review of this contract. I believe that these cooperative efforts have provided a better understanding and a more balanced and positive appreciation of this very important contracting initiative.

Sincerely,

Shirley J. Ybarra

attachment

cc: Mr. Charles D. Nottingham, Commissioner
Mr. A. V. Bailey, II
Mr. Gregory A Whirley, Sr.

P.O. Box 1475 • Richmond, Virginia 23218 • (804) 786-8032 • TDD (804) 786-7765

Virginia Department of Transportation
Response to Exposure Draft of the VMS Contract
December 14, 2000

Response to Recommendation (1)

The statistical sampling process is designed to provide a high level of confidence that results accurately portray the condition of various assets. To be fully successful, a complete inventory of maintainable assets is required. VDOT is in the process of identifying the most cost-effective approaches to obtaining this inventory. Once this inventory is obtained VDOT will be able to determine if it can be used with the contract specified methodology to obtain the results that JLARC staff recommends.

Response to Recommendation (2)

Should there be future outcome-based contracts, using similar performance expectations, VDOT will consider the cost-effectiveness of more frequent periodic reviews of the contractor's performance by an independent party. This consideration will include the quarterly reviews recommended by JLARC staff. A cost benefit study of various sampling methods and frequencies will be completed by March 15, 2001.

Response to Recommendation (3)

VDOT will issue guidelines to its staff that coordinates and oversees the day-to-day activities of the contractor and its subcontractors. These guidelines will be issued not later than March 1, 2001. They will include guidance regarding types of information, methods for evaluating different activities and the frequency of reporting as well as the format and timing of the reports.

Response to Recommendation (4)

As noted in the previous response, VDOT will implement the recommended improvements. These will be included in future reports of the VMS contract.

Response to Recommendation (5)

Since the outset of the contract VDOT has continued to improve its monitoring of the timeliness requirements of the contract are important. These improvements and others that follow will be included in future reports.

Response to Recommendation (6)

As VDOT is able to improve its own measurement of snow removal effectiveness, these improvements will be included in future outcome-based contracts that include snow removal.

Response to Recommendation (7)

The review of the cost-effectiveness of any outcome-based maintenance and operations contract requires a comparison of actual VDOT costs in addition to any other methodologies that may also be appropriate to providing a full picture of the relative costs of contracted work. These have been incorporated into the current analysis of the VMS contract and will be part of all future contract evaluations.

Response to Recommendation (8)

VDOT has completed an in-depth analysis of the VMS contract. We are prepared to share this information with the House and Senate Transportation Committees.

Response to Recommendation (9)

Cost, as well as accomplishment information at the asset group and asset type levels, is important to properly evaluate production and efficiency of VDOT's operations and its contracts. VDOT is developing systems that will support this level of detail and the capabilities required to properly use the information. When these systems are implemented over the next two to three years, VDOT will routinely use this information in administering its maintenance and operations program.

DEC 6 2000

1510 E. Parham Road • Richmond, VA 23228
TEL (804) 553-4001 • FAX (804) 264-1808
e-mail: vms@vmsom.com
www.vmsom.com

December 6, 2000

Mr. Philip A. Leone, Director
Joint Legislative Audit and Review Commission
General Assembly Building, Suite 1100
Capitol Square
Richmond, Virginia 23219

RE: Exposure Draft "Review of VDOT's Administration of the Interstate Asset Management Contract"

Dear Mr. Leone:

After thorough review, it is readily apparent JLARC staff has expended considerable effort wrestling with the issue of how to correctly evaluate benefits of the Privatized Asset Management program to Virginia. In that context, the exposure draft reflects a basic lack of understanding of available data which may be due in part to the new and innovative nature of the Privatized Asset Management program itself.

My comments are intended to clarify or, in certain instances, refute conclusions by JLARC staff as well as to provide a better understanding of standard methodologies which can be employed to accurately assess the long-term cost savings resulting from Privatized Asset Management. We hope our effort contributes to a better familiarization of Privatized Asset Management and we are prepared to assist JLARC as it moves forward in this area.

SUMMARY OF KEY COMMENTS

A. COST COMPARISON

1. The JLARC staff appears to be confused. On the one hand, staff dismissed all existing asset management cost comparisons – the VDOT approach, the Virginia Tech study and the Statewide Average Cost Model (SACM) approach – as being inadequate. Yet staff did indicate the value of, and accept the methodology for, the SACM, suggesting it be used with actual VDOT expenditure data.

2. Concluding that all three studies are inadequate is factually incorrect, as they all implement legitimate methodologies using legitimate databases and the two studies that have been published produce the exact same conclusion:

   Privatized asset management is less expensive than the traditional system.

3. The JLARC staff approach, using FMS-II data at the individual road level, would produce error-filled results due to the inadequacy of the data upon which it relies.

4. The proper way to implement the JLARC objective is to utilize the data contained in the FMS-II database at the statewide level, where all costs are included and data

inconsistencies are eliminated. This in fact is the Statewide Average Cost Model approach.

B. SNOW AND ICE CONTROL

1. The JLARC staff recommends the need to develop quantitative standards for snow and ice control.
2. In fact, these standards already exist within the asset management contract.

C. PAVEMENT

1. The JLARC staff states that VDOT has not undertaken a systematic evaluation.
2. Although this is factually correct, VMS has had independent evaluations performed that show the pavement condition exceeds the standards set in the contract.

A. COST COMPARISON

1. The JLARC Staff Position

Although three cost analyses have been completed to date, the JLARC staff advocates the need to perform additional studies to confirm the comparison of cost between the Department and the contractor. The basic thrust of the JLARC position is as follows:

- **The VDOT approach**: JLARC asserts that VDOT's method is flawed due to the use of "estimated data" rather than "actual data".
- **The Virginia Tech study:** The analysis of cost prepared by the Engineering Department of Virginia Tech is inadequate because it is too narrow.
- **The Statewide Average Cost Model approach:** The analysis of cost prepared by the contractor is inadequate because it allegedly uses "arbitrary" adjustments and does not account for potential cost differences between urban and rural areas and highways with large bridges or tunnels. Also, the data is again alleged to not be "actual".

We note the fact that JLARC staff has implicitly rejected the cost studies performed in six other states and public roadway authorities who have adopted this approach and executed seven similar agreements to maintain more than 4,000 lane miles of Interstate highways and toll roads. These states have determined, through various study approaches, that these projects **produce savings of 13-54%** depending upon the unique circumstances of each state.

The JLARC staff concludes that all existing cost comparisons are inadequate and that a new study is required. They assert the new study should use "actual data" at the individual road level as generated by the Department's FMS-II system.

2. Errors in the JLARC Staff Position

The JLARC staff argument is fundamentally incorrect. While it is obvious that the Department should perform comparison of cost between its own performance and outside contractors, the reasons for rejecting existing cost comparisons studies are incorrect and the detailed, road-level method of study JLARC proposes is unobtainable. It reflects a basic lack of understanding of the available data.

FMS-II collects direct cost data by type of roadway, by county and by asset item. It collects direct cost information by activity for some items and by district for other items.

The FMS-II system contains no data relating cost to accomplishments or results. In addition, data from this system is only available for two years.

Given this data structure, reliance on this data source for a cost comparison would present the following problems:

- As there is no link between activity data – i.e. design, procurement, permitting, inspection, etc. – and asset item data, there is no simple way to know the real cost of maintaining a particular asset (a complex series of adjustments would be required). Thus, $500.00 spent in Rockbridge County to maintain interstate highway cross drains only tells us a portion of the cost. We would have no idea what other costs were required to enable this particular expenditure of funds.
- There is no link between expenditure and result. If, according to FMS-II, $500.00 was spent on cross drain maintenance in Rockbridge County, there is no way to know if there is underspending and the cross drains are deteriorating; funds were spent in earlier years and this level of spending produces the desired result; or the spending level is correct in and of itself.
- Further examination of the FMS-II database indicates a broad range of expenditure levels for individual asset items within different counties across the state. Indeed, in a number of counties there is no data recorded at all for a number of asset items. With only two years of data available, there is no way to interpolate for missing data.

This lack of an appropriate database comes as no surprise. Indeed, it is this fact that led the three existing cost comparison studies to adopt their respective methodologies. Each approached these issues as follows:

- Using standard methodology and **ACTUAL** data, VDOT initially prepared an engineer's estimate of the cost of the work if VDOT were to continue to perform it. This estimate led to the conclusion that this contract would produce savings of nearly $23 million. The summary paragraph on page 40 of the Exposure Draft states that JLARC staff reported they could not initially find documentation (although this was later produced), and they could not verify the soundness of the analysis. Yet the method VDOT used is an industry standard used by many state and municipal governments to estimate projects of all sizes. Indeed, in JLARC's own description of the method (on pages 41-44) the staff recognized the complexity of the analysis and the fact that VDOT "refined the estimated costs to ensure that they would be as close as possible to actual costs in the first one or two years of the proposed contract". JLARC should not dismiss this method out-of-hand.
- The Virginia Tech Engineering Department solved the problems inherent in the FMS-II database by avoiding it altogether. They developed their own data based upon contractor bid tabulations from **ACTUAL** VDOT work and then factored this analysis to capture the differences on all cost components.
- VMS performed an analysis of VDOT annual budgets to determine VDOT actual statewide average costs on their portion of the Virginia interstate highway system (see Appendix). Cost data for this study came from the VDOT budgets, which

come from FMS-II, the VDOT database that houses **ACTUAL** interstate maintenance cost data. Comparing this cost on a per-lane-mile basis to VMS' cost also indicates substantial savings under this contract – $43 million. The JLARC staff agrees that the methodology is sound yet dismisses the analysis, questioning the impact of using "gross amounts from the VDOT budget", the complexity of the statewide interstate maintenance program and the differences in the types of facilities maintained by VDOT and VMS.

In fact, the analysis reviewed by the staff already eliminated the Hampton Roads District costs, which were cited by the staff because of the inherent skew due to the complexity of the tunnels and bridges in that district. VMS also performed an additional analysis of the VDOT data in an effort to answer the differences in highway type (rural/urban) question; the analysis shows that focusing the comparison on only the rural VDOT districts reduces the savings about 7% to $40 million. We should reiterate that cost data for this study came from the VDOT budgets, which come from FMS-II, the VDOT database that houses **ACTUAL** interstate maintenance cost data.

- Indeed, the Statewide Average Cost Model approach is the JLARC approach with the above-identified data problems eliminated.

B. SNOW AND ICE CONTROL

Your statements regarding evaluation of snow and ice control operations are not consistent with the contract – there are indeed quantitative standards. As you have noted in the Exposure Draft, the contract clearly states these required outcomes[1]:

- Operator shall at all times maintain a minimum of one lane of travel in each direction of the Facility.
- Within twenty-four hours of the cessation of a winter weather event, the Operator shall provide bare pavement on all travel lanes.
- In addition, shoulders shall be cleared of all accumulated ice and snow as soon as possible and not later than forty-eight hours after the cessation of the event.

VMS has in fact met these clearly defined standards during every one of the more than 100 snow and ice events over the past 3 years. The Virginia State Police have commended VMS for our performance during one of the worst snowstorms of the past 50 years.

C. PAVEMENT

While your statement that VDOT has not yet undertaken a systematic evaluation of the pavements is technically correct, VMS has contracted with respected VDOT contractors to perform this evaluation and has made these results available to VDOT. As indicated in the table on the following page, the pavement is being maintained to standard because the overall Pavement Condition Index (PCI) is higher than at the contract's inception.

---

[1] Comprehensive Agreement for Interstate Highway Asset Management Services, Exhibit B, Part

Pavement Condition Index

	1997	1999
I-95	92	93
I-81	83	86
I-77	91	89
Overall	89	90

D. OTHER ISSUES

VMS takes exception to the following:

- Your observation that "it was only recently that VDOT implemented a process to report the contractor's compliance with the timeliness requirements for the applicable highway asset items" (pg. vi) is wrong, as stated in your own report (pg.30):

  > *Where a timeliness of response has been listed in the asset tolerances and criteria in Outcome and Performance Targets, timeliness of response will be measured. Recording this measurement will be the responsibility of VMS, validation, the responsibility of VDOT.*

  Clearly, a method was established at the beginning of the contract and has been followed ever since. While VMS did at one point have some difficulty meeting some of the timeliness requirements, this has been corrected as JLARC itself noted. Working with VDOT, VMS has recently improved the system by enabling VDOT to access this information online.

- Your recommendation regarding interim performance reports, while certainly useful for VDOT in understanding how VMS is performing, is not recognized under the contract as a measurement tool for evaluation. This contract is **outcomes-based**, VDOT does not dictate means and methods of maintenance performance.

E. CONCLUSION

As referenced at the outset, our goal throughout this assessment has been to clarify or correct what we believe to be incorrect or erroneous conclusions drawn by JLARC staff in its continuing familiarization with Privatized Asset Management. We hope our effort helps contribute to a better understanding of methodology that can be utilized to accurately assess the long-term cost savings resulting from Privatized Asset Management and we are prepared to assist JLARC as it moves forward in this area.

Sincerely,
VMS, Inc.

Nicholas J. Masucci

Nicholas J. Masucci
President/CEO

Appendix

COST COMPARISON USING STATEWIDE AVERAGE COST MODEL

Actual VDOT costs are derived from the Department's average per lane mile cost for Interstate maintenance based on funds in the Department's annual budget.

The statistical average Interstate highway maintenance cost per lane mile is used because this value is relatively stable year to year. In effect, use of the average minimizes skewing of individual event values on a year to year basis. It is possible that one or more districts might expend funds for special needs that permanently bias the average to be larger than would be otherwise. VMS examined this potential and found only the Hampton Roads District has the potential to exert this level of impact. Accordingly, the Hampton Roads District's costs were lowered to equal the statewide average, thereby eliminating any upward bias. Comparing the average cost on a per-lane-mile basis with the contract cost for VMS again indicates a substantial savings for the Commonwealth (data taken from VDOT annual budget reports).

The method of determining VDOT's actual Interstate maintenance cost per lane mile is explained below and illustrated by the figures, which were extracted from VDOT annual budget reports, in Table 1:

- The Total Highway System Maintenance Cost is reduced by the fixed price paid to VMS, plus VDOT supervision.
- Indirect costs are those administrative and support costs that should be attributed to the maintenance component of VDOT. The maintenance share is determined by dividing the total maintenance cost (without VMS) by the total VDOT budget. This percentage is then applied to total administrative cost to yield the highway maintenance share.
- To estimate total highway maintenance cost, the direct maintenance cost is added to indirect costs.
- The Interstate share of total loaded maintenance cost is calculated by dividing the identified Interstate cost portion by total highway system maintenance costs. This is multiplied by total highway maintenance cost to yield total Interstate cost.
- The Interstate cost is reduced by 8% to eliminate the effect of the Hampton Roads District spending a higher average than other districts.
- The Interstate cost is reduced by 25% to estimate the effect of possibly charging other costs to the Interstate account[2].
- Estimated non-VMS Interstate lane miles are 4,040 (4,790 in 1998 includes I-77 and I-81). Dividing the reduced Interstate maintenance cost by the lane mile figure gives the comparable number.

---

[2] It is possible that costs that are not truly related to operational maintenance are assigned to the Interstate maintenance budget. This estimate attempts to account for this potential.

NOTE: Variances in calculations are the result of rounding.

Table 1
Calculation of VDOT Actual Cost

	1998	1999	2000	2001	2002	Average
Total Highway Maintenance (k$)	$667,944	$762,488	$771,369	$827,019	$858,723	$777,509
Cost of Asset Management (k$)	12,050*	32,550	30,030	29,430	29,230	26,658
Highway maintenance cost w/o Asset Management cost (k$)	$655,894	$729,938	$741,339	$797,589	$829,493	$750,851
Allocation of Indirect cost (administration and support) (k$)	19,604	21,308	28,617	25,423	26,440	24,278
Total highway maintenance cost (k$)	$675,498	$751,246	$769,956	$823,012	$855,933	$775,129
Interstate share of highway maintenance (k$)	25.02%	22.66%	23.13%	24.12%	24.12%	23.80%
Total Interstate maintenance cost (k$)	$168,996	$170,191	$178,117	$198,473	$206,451	$184,446
Reduce by 8% to eliminate Hampton District overage (k$)	$155,476	$156,576	$163,868	$182,595	$189,935	$169,690
Reduce by 25% for non-maintenance cost items (k$)	$116,607	$117,432	$122,901	$136,946	$142,451	$127,268
Lane miles (w/o Asset Mgmt portion) [a]	4,730	4,040	4,040	4,040	4,040	N/A[a]
Average VDOT cost/lane mile	24,653	29,067	30,421	33,898	35,260	30,660
Average VMS cost/lane mile	20,959	25,759	23,765	23,266	23,100	23,370
Difference	3,694	3,308	6,656	10,632	12,160	7,290
%	15%	11%	22%	31%	34%	24%

Notes – Year 2002 figures are estimates;
*- First year VDOT cost of administering the VMS contract is estimated at $750,000.
[a] - First year is higher due to phase-in of I-81/I-77

As Table 1 demonstrates, the overall five-year average of $30,660 per lane mile is VDOT's actual cost on its Interstate highways.

Comparing this average with the VMS average of $23,370 for the five-year period yields a difference of $7,290 per lane mile. This overall savings of 24% would translate into a five-year program savings of approximately $43 million. This is substantially higher than the original estimate of savings by VDOT, mainly due to overall VDOT costs increasing at greater than a 5% rate rather than the 3% rate originally expected. Over this same period, VMS' costs according to contract have remained essentially flat.

JLARC Staff

Director: Philip A. Leone
Deputy Director: R. Kirk Jonas

● *Division I Chief:* Glen S. Tittermary
Division II Chief: Robert B. Rotz

Section Managers:
Patricia S. Bishop, Fiscal and Administrative Services
John W. Long, Publications and Graphics
Gregory J. Rest, Research Methods

Project Team Leaders:
● Craig M. Burns
Linda Bacon Ford
Harold E. Greer, III
Cynthia B. Jones
Wayne M. Turnage

Project Team Staff:
Aris W. Bearse
Kelly D. Bowman
Ashley S. Colvin
● Gerald A. Craver
Scott F. Demharter
Lisa V. Friel
Eric H. Messick
Anne E. Oman
Jason W. Powell
Christine D. Wolfe
Sandra S. Wright

Fiscal Analysis Section:
Walter L. Smiley, Section Manager
Daniel C. Oney
Kimberly A. Maluski

Administrative and Research Support Staff:
Kelly J. Gobble
Joan M. Irby
Betsy M. Jackson
Becky C. Torrence

● *Indicates JLARC staff with primary assignment to this project*

Recent JLARC Reports

Services for Mentally Disabled Residents of Adult Care Residences, July 1997
Follow-Up Review of Child Day Care in Virginia, August 1997
1997 Report to the General Assembly, September 1997
Improvement of Hazardous Roadway Sites in Virginia, October 1997
Review of DOC Nonsecurity Staffing and the Inmate Programming Schedule, December 1997
VRS Oversight Report No. 9: Semi-Annual VRS Investment Report, December 1997
Technical Report: Gender Pay Equity in the Virginia State Workforce, December 1997
The Secretarial System in Virginia State Government, December 1997
Overview: Review of Information Technology in Virginia State Government, December 1997
Review of the Comprehensive Services Act, January 1998
Review of the Highway Location Process in Virginia, January 1998
Overview: Year 2000 Compliance of State Agency Systems, January 1998
Structure of Virginia's Natural Resources Secretariat, January 1998
Special Report: Status of Automation Initiatives of the Department of Social Services, February 1998
Review of the Virginia Fair Housing Office, February 1998
Review of the Department of Conservation and Recreation, February 1998
VRS Oversight Report No. 10: Semi-Annual VRS Investment Report, July 1998
State Oversight of Commercial Driver-Training Schools in Virginia, September 1998
The Feasibility of Converting Camp Pendleton to a State Park, November 1998
Review of the Use of Consultants by the Virginia Department of Transportation, November 1998
Review of the State Board of Elections, December 1998
VRS Oversight Report No. 11: Semi-Annual VRS Investment Report, December 1998
Review of the Virginia Department for the Aging, January 1999
Review of Regional Criminal Justice Training Academies, January 1999
Interim Report: Review of the Health Regulatory Boards, January 1999
Interim Report: Review of the Functional Area of Health and Human Resources, January 1999
Virginia's Welfare Reform Initiative: *Implementation and Participant Outcomes*, January 1999
Legislator's Guide to the Virginia Retirement System, 2nd Edition, May 1999
VRS Oversight Report No. 12: Semi-Annual VRS Investment Report, July 1999
Preliminary Inquiry, DEQ and VDH Activities to Identify Water Toxic Problems and Inform the Public, July 1999
Final Report: Review of the Health Regulatory Boards, August 1999
1999 Report to the General Assembly, September 1999
Competitive Procurement of State Printing Contracts, September 1999
Review of Undergraduate Student Financial Aid in Virginia's Public Institutions, October 1999
Review of Air Medevac Services in Virginia, October 1999
Alternatives to Stabilize Regional Criminal Justice Training Academy Membership, November 1999
Review of the Statewide Human Services Information and Referral Program in Virginia, November 1999
The Impact of Digital TV on Public Broadcasting in Virginia, November 1999
Review of the Impact of State-Owned Ports on Local Governments, December 1999
Review of the Use of Grievance Hearing Officers, December 1999
Review of the Performance and Management of the Virginia Department of Health, January 2000
Virginia's Medicaid Reimbursement to Nursing Facilities, January 2000
Interim Report: Review of the Virginia Housing Development Authority, January 2000
Interim Report: Child Support Enforcement, January 2000
Interim Special Report: Revolutionary War Veteran Gravesites in Virginia, February 2000
VRS Oversight Report No. 14: Semi-Annual VRS Investment Report, July 2000
Final Report: Review of the Virginia Housing Development Authority, August 2000
Technical Status Report: An Overview of Expenditure Forecasting in Four Major State Programs, August 2000
Virginia's Welfare Reform Initiative: Follow-Up of Participant Outcomes, October 2000
Final Report: Child Support Enforcement, November 2000
Technical Report: The Cost of Raising Children, November 2000
Review of the Medicaid Inpatient Hospital Reimbursement System, December 2000
Special Inquiry: A Review of Child Support Enforcement and the Judicial Process, December 2000
Review of the Virginia Distribution Center, January 2001
Review of Construction Costs and Time Schedules for Virginia Highway Projects, January 2001
Review of RMA and Powhite Parkway Extension Toll Facility Operations, January 2001
Review of VDOT's Administration of the Interstate Asset Management Contract, January 2001

JLARC
Suite 1100
General Assembly Building
Capitol Square
Richmond, Virginia 23219
(804) 786-1258 Fax: 371-0101
http://jlarc.state.va.us