



## SCAN TEAM REPORT

NCHRP Project 20 68A, Scan 11-01

# Leading Practices in Large-Scale Outsourcing and Privatization of Maintenance Functions

*Supported by the*

National Cooperative Highway Research Program

The information contained in this report was prepared as part of NCHRP Project 20 68A U.S. Domestic Scan, National Cooperative Highway Research Program.

**SPECIAL NOTE:** This report IS NOT an official publication of the National Cooperative Highway Research Program, Transportation Research Board, National Research Council, or The National Academies.



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The purpose of each scan, and of Project 20-68A as a whole, is to accelerate beneficial innovation by facilitating information sharing and technology exchange among the states and other transportation agencies, and identifying actionable items of common interest. Experience has shown that personal contact with new ideas and their application is a particularly valuable means for such sharing and exchange. A scan entails peer-to-peer discussions between practitioners who have implemented new practices and others who are able to disseminate knowledge of these new practices and their possible benefits to a broad audience of other users. Each scan addresses a single technical topic selected by AASHTO and the NCHRP 20-68A Project Panel. Further information on the NCHRP 20-68A U.S. Domestic Scan program is available at <http://144.171.11.40/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=1570>.

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## Disclaimer

The information in this document was taken directly from the submission of the authors. The opinions and conclusions expressed or implied are those of the scan team and are not necessarily those of the Transportation Research Board, the National Research Council, or the program sponsors. The document has not been edited by the Transportation Research Board.



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# Scan 11-01

## Leading Practices in Large-Scale Outsourcing and Privatization of Maintenance Functions

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## ABBREVIATIONS AND ACRONYMS

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## Abbreviations and Acronyms

AASHTO	American Association of State Highway and Transportation Officials
AMOTIA	Association for the Management and Operations of Transportation Infrastructure Assets
DOT	Department of Transportation
DOTD	Department of Transportation and Development (Louisiana)
FDOT	Florida Department of Transportation
FHWA	Federal Highway Administration
IDIQ	Indefinite Delivery Indefinite Quality
LA DOTD	Louisiana Department of Transportation and Development
Managed Competition	When a transportation agency's maintenance division is allowed to compete with private entities for the opportunity to provide maintenance services
MDOT	Michigan Department of Transportation
MnDOT	Minnesota Department of Transportation
MoDOT	Missouri Department of Transportation
NCDOT	North Carolina Department of Transportation
NCHRP	National Cooperative Highway Research Program
NHDOT	New Hampshire Department of Transportation
Outsource	Using resources not under the DOT's direct ownership or management to maintain transportation system facilities or equipment
PennDOT	Pennsylvania Department of Transportation
RIDOT	Rhode Island Department of Transportation
SASHTO	Southeastern Association of State Highway and Transportation Officials (AL, AR, FL, GA, KY, LA, MS, NC, PR, SC, TN, VA, and WV)
SCOM	Subcommittee on Maintenance (AASHTO)
TDOT	Tennessee Department of Transportation
TRB	Transportation Research Board
TxDOT	Texas Department of Transportation
UDOT	Utah Department of Transportation
VDOT	Virginia Department of Transportation
WASHTO	Western Association of State Highway and Transportation Officials (WA, OR, ID, MT, WY, ND, SD, CA, UT, AZ, CO, NM, OK, and TX)
WisDOT	Wisconsin Department of Transportation
WSDOT	Washington State Department of Transportation





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# Executive Summary

## Overview

The National Cooperative Highway Research Program (NCHRP) Project No. 20-68A, U.S. Domestic Scan Program, is a broad initiative intended to identify innovative practices used by some transportation agencies that potentially could be adopted by other agencies to help advance their own state-of-the-practice. The purpose of the scan program is to facilitate sharing of information and technology among the state departments of transportation (DOTs) and other transportation agencies and identify actionable items related to the dissemination of the scan's findings and implementation of the improved practices identified in the scan.

The purpose of this scan was to review leading DOT practices for outsourcing of maintenance activities. Outsourcing in this context refers to the use of resources not under the DOT's direct ownership or management to maintain transportation system facilities or equipment. These resources may be engaged under leases, labor contracts, or other business arrangements.

Maintenance outsourcing is practiced to a limited extent by many agencies, but typically on a small scale (e.g., through rental of specialized equipment and hiring of temporary labor). When outsourcing becomes large-scale (e.g., engaging contractors to perform selected maintenance activities within a particular district or highway corridor), complex management problems can arise.

Large-scale outsourcing is sometimes implemented by spinning off or otherwise eliminating an organizational unit within an agency, then engaging private enterprise to perform the maintenance functions previously performed by in-house forces. Such instances of outsourcing may be termed privatization. An agency's maintenance division may be asked to submit a bid to continue providing maintenance services, in what is sometimes termed managed competition with outside vendors.

Scan 11-01, *Leading Practices in Large-Scale Outsourcing and Privatization of Maintenance Functions*, was initially undertaken to consider privatization only. However, the practitioners comprising the scan team judged that limited experience with privatization of transportation system maintenance and the difficulty of distinguishing privatization from many other large-scale outsourcing instances would severely limit the scan's value. The team therefore expanded its scope of inquiry to consider all maintenance outsourcing. However, the primary focus of the team's work and of this report is large-scale outsourcing, including privatization. Unless important distinctions need to be made, this report refers to all such practices as outsourcing.

The scan team undertook a review of recent experience with large-scale maintenance outsourcing to identify leading practices that might offer lessons for other agencies. The team focused particularly on:

- Maintenance functions and specific practices outsourced
- Factors contributing to the decision to outsource maintenance
- Contractual arrangements, procurement practices, and performance management
- Experience with implementation of outsourcing, including obstacles encountered
- Agency self-assessment of the advantages and disadvantages of maintenance outsourcing

The scan team first conducted a review of published literature and anecdotal knowledge of agencies’ outsourcing experience. Based on this review, the team invited representatives from 11 states to participate in a workshop where they could present their agencies’ maintenance outsourcing experience; eight of the nine states represented on the scan team made presentations as well. All together, 19 agencies shared their outsourcing experiences and discussed their assessments of these experiences. In addition, representatives of the Association for the Management and Operations of Transportation Infrastructure Assets (AMOTIA) gave a presentation at the workshop, representing contractors’ perspectives. Table ES.1 lists the presenters’ names and affiliations. The scan format is described in Chapter 1.

**Table ES.1 Workshop presenters**

<b>Invited presenters</b>	<b>Affiliation</b>
Eric Pitts, State Maintenance Engineer	Georgia DOT
Brian Burne, Highway Maintenance Engineer	Maine DOT
Russ Yurek, Director, Office of Maintenance	Maryland DOT
Steven Cook, Operations/Maintenance Field Services Engineer	Michigan DOT
Elizabeth Wright, State Maintenance Engineer	Missouri DOT
Anita Bush, Chief Maintenance & Asset Management Engineer	Nevada DOT
Charles Goodhart; Director, Bureau of Maintenance & Operations	Pennsylvania DOT
Joseph Baker, Acting Administrator, Division of Highway/Bridge Maintenance	Rhode Island DOT
Kevin Griffin, Engineer for Maintenance	Utah DOT
Robert Prezioso, State Infrastructure Manager, Maintenance Division	Virginia DOT
Todd Matheson, State Maintenance Engineer	Wisconsin DOT
Peter Loughlin and David Rader	AMOTIA
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Tim Lattner, Director, Office of Maintenance	Florida DOTD
Leslie Mix, Maintenance Management Administrator	Louisiana DOTD
Caleb Dobbins, State Maintenance Engineer	New Hampshire DOT
Jennifer Brandenburg, State Road Maintenance Engineer	North Carolina DOT
Greg Duncan, Team Chair and Director of Maintenance	Tennessee DOT
Carolyn Dill, Director of Maintenance Management	Texas DOTD
Robert “Chris” Christopher; Director, Maintenance & Operations	Washington State DOT

## Principal Findings

In the workshop and subsequent discussion, the scan team identified and drew its conclusions about leading practices in maintenance outsourcing. Chapters 4 and 5 present the scan findings and plans for implementation. Following are the scan team’s key findings.

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## Maintenance Functions Suited to Outsourcing

A variety of economic and political factors will determine whether outsourcing of some or all maintenance activities is likely to yield benefits for a particular agency. The great variety in how agencies define particular maintenance activities makes it virtually impossible to catalog all of those activities that one agency or another has outsourced.

Some agencies effectively outsource their entire maintenance operation; in all of these instances, the scan-team found that such outsourcing engages another government entity. Some agencies have outsourced all maintenance within a specific highway corridor or geographic area to private vendors. The following are examples of maintenance activities that at least one transportation agency has chosen to outsource on a significant scale:

- Vehicle fleet outfitting and upkeep
- Highway guardrail and crash attenuator repair
- Roadway striping and marking
- Winter pavement treatment and snow plowing
- Right-of-way mowing and litter removal
- Drain cleaning and culvert repair and replacement
- Bridge inspection, washing, and painting

The outsourcing itself may be accomplished in a number of ways. Most typically, the agency responsible for operation and maintenance of a particular class of assets (e.g., a portion of a highway network, a vehicle fleet, or a set of traffic signals) will contract with another agency (e.g., a county or city) or a private-sector firm to provide specific services. The agreement may be limited to a specific length of time (e.g., five years) and establish specific compensation to be paid, or it may be open-ended and compensate for costs incurred. Developing and administering such contract agreements represents one of the more significant challenges in outsourcing.

In many cases, government regulations mandate bidding and open competition before the outsourcing contract can be negotiated and executed. Specifications and performance measures must be carefully crafted. Such requirements may pose a significant management burden for the agency, slow the outsourcing process, and add to its costs.

Other arrangements that qualify fundamentally as outsourcing include use of volunteer labor (e.g., adopt-a-highway programs and reliance on abutting property owners for grading of low-volume rural roads); use of prison labor; and even engagement of part-time workers, who do not receive the same salary or benefits as full-time staff. Such arrangements play a small part in maintenance outsourcing in U.S. practice.

## Factors Likely to Influence the Decision to Outsource

The following factors have been most significant in persuading agencies to make substantial use of maintenance outsourcing:

- Inadequate staffing (e.g., because of authorized staffing levels insufficient to handle recurring peak workloads, mandates to limit or reduce staffing, or regulatory or contractual limitations on staff assignments)

- Need for specialized expertise or equipment (e.g., for vehicle or signal-system upkeep)
- Constitutional assignment of road-maintenance responsibilities among government entities
- Mandated use of private-sector providers (e.g., to seek efficiencies or reduce agency expenditures)

Determining whether outsourcing an activity will be financially advantageous to an agency or the larger government entity of which it is a part requires accurate information on costs. However, public-agency accounting practices are poorly suited to identifying either the full costs of specific maintenance activities performed by the agency or the agency's costs associated with outsourcing those activities. The scan team found that, in general, outsourcing decisions have not been based on thorough financial analyses.

### Motivations for Large-Scale Outsourcing

Outsourcing is a way that agencies can increase their capacity to provide services in response to peak demands (e.g., by renting equipment or engaging consultant services). When practiced on a larger scale, maintenance outsourcing may be seen as a way to reduce agency staffing and the long-term liabilities associated with direct employment and asset ownership. It may also be seen as a means of taking advantage of the perceived efficiencies or excess capacity of other organizations.

The scan team encountered several reasons why particular agencies have undertaken maintenance outsourcing:

- To address seasonal or other significant variations in maintenance workloads (e.g., snow-plowing following a major storm)
- To avoid excessive investment in equipment or stockpiled materials that may be under-utilized (e.g., for line-painting)
- To take advantage of opportunities to shift maintenance efforts to lower-cost providers
- To seek opportunities for economies of scale by combining operations with other entities
- To reduce agency civil-service personnel rosters
- To reduce maintenance costs

While reducing maintenance costs often is an impetus for considering outsourcing, information presented to the scan team showed no clear evidence that significant cost reductions have been demonstrated. Some agencies suggest that savings may be achievable; however, none of them were able to present documentation of actual savings. Outsourcing industry representatives participating in the scan reported that their repeated meetings with agency financial staff have failed to yield evidence of cost savings.

Obstacles to establishing clear evidence of savings include the fundamental complexity of accounting for the full costs of particular services delivered in a corporate context and the typically different scope of the operations for contractor- and agency-provided services. In addition, some agencies using outsourcing required higher levels of service from the contractor than previously required from their in-house crews, which adds additional complexity when trying to compare costs. For example, guardrail repair and crack sealing entail use of distinct materials and methods; however, each properly bear a share of an agency's administrative costs, pension liabilities, and other indirect costs that the agency does not routinely calculate. In addition, agency maintenance crews may flexibly perform multiple functions during their normal operations without reporting precisely what they have done. Contractors tasked with providing

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specific services are being paid amounts adequate to recover the full costs of those services

## Essential Precursors to Large-Scale Outsourcing

Experience indicates that an agency should have a number of items in place before undertaking any large-scale maintenance outsourcing:

- **A comprehensive inventory of the assets to be maintained**  
The contractor must be able to know with accuracy what is to be maintained and the working conditions within which the maintenance is to be accomplished. This asset inventory must encompass all assets that the agency wishes to include in a maintenance contract (e.g., all guardrail or drainage structures within a particular geographic area or corridor).
- **An analysis of the assets' current condition**  
This analysis is the baseline against which maintenance performance is to be measured. Level-of-service or condition standards may be set at any level desired; however, experience indicates that outsourcing contracts should initially be written with standards no higher than current levels. The condition analysis may be performed on a statistically relevant subset of the inventory to be maintained (e.g., a random 10 percent sampling of the system to be covered).
- **Documentation of the agency's current standard maintenance operating procedures and performance**  
This documentation will typically include such characteristics as frequency of inspections, time to repair, and relevant traffic control and environmental protection requirements. As in the case of condition and level-of-service standards, the agency may require any practices desired; however, experience indicates initially emulating those that the agency is currently providing will avoid conflicts caused by sharp differences in practice from one part of the system to another.
- **An effective system for qualifying and evaluating prospective contractors**  
Agencies are likely to have in place such a system for construction projects, but experience indicates that maintenance outsourcing involves special requirements. For example, agencies should have the ability to very quickly deal with unexpected events or to correct errors.

These precursors are needed to support the development of technical specifications to be included in the maintenance contract. Experience indicates that agency personnel responsible for developing such specifications should engage the contracting industry to ensure that the contract requirements are technically feasible, entail acceptable levels of business risk, and are likely to elicit bids within the agency's budget. Developing specifications and making other preparations for soliciting bids represent a significant effort for an agency undertaking large-scale outsourcing.

## Making the Decision to Outsource Maintenance

The scan team found that few decisions to undertake large-scale maintenance outsourcing or privatization have been based on careful analysis of likely costs and consequences. More typically, the decision has been necessitated by inadequate staffing to perform necessary work or by pressure from outside the agency to engage the private sector, to reduce agency staffing, or to address perceived public-sector shortcomings. Intergovernmental outsourcing arrangements have typically been the product of the unique constitutional arrangements of the particular state and sub-state governments.

Experience with large-scale outsourcing suggests several guidelines that can enhance the likelihood that a particular outsourcing arrangement will prove to be satisfactory:

- Be clear about the reasons for outsourcing.
- Take a disciplined approach and research what other states are doing.
- Try to define precisely the extent of services to be outsourced and use a contract mechanism suited to those services.
- Ensure that the agency has a firm understanding of the condition and maintenance requirements of assets to be maintained.
- Try to understand the contractor's business risks.
- Ensure that agency staff has adequate training.
- Use well-defined, measurable performance standards applied uniformly to all relevant maintenance activities.
- Allow adequate time for development and implementation of operating experience, for agency and contractor personnel as well as for other stakeholders.

### Outsourcing Contract Practices

Regardless of the activities outsourced, experience indicates that an important element of success is having a clearly defined, measurable basis for judging that the services provided meet expectations (i.e., performance measures and criteria) and payment is due (i.e., work completion or service delivery). Refining the specifications that include these two items is best accomplished as a collaborative exercise that engages the outsource contractor and the agency.

Safety should be given high priority in contract development, in administration, and in performance of the maintenance functions. How interactions with the public are to be handled should be carefully defined.

Contracting between government entities for maintenance does not typically entail the effort of competitive bidding; however, it will otherwise be similar to private-sector arrangements. Measurable and mutually agreed upon criteria for judging performance and making payments are essential. If such outsourcing is to be a product of managed competition, having accurate cost accounting is essential to ensure both that the agency knows what the costs are and that public and private bids are comparable.

Several forms of outsourcing contracts have been successfully used:

- **Contract rental agreements** are used to engage equipment (with or without operators) on an at-will basis for designated time periods at a predetermined pay rate. The contractor generally operates at the direction of agency personnel; these personnel are responsible for the outcome of the maintenance activities.
- **Cost-reimbursable contracts** are those in which the provider provides the services required and invoices for the cost of doing so. Under this arrangement, which is most typically used when the provider is another government entity (e.g., a county maintaining state-owned roads), the agency may specify a level of service to be expected and monitors compliance. Unless the contract is carefully constructed to establish how costs are to be calculated, the agency may face the risk of unforeseen cost escalation.
- **Job-order contracts** are long-term indefinite-quantity and -delivery umbrella agreements that provide for on-call services, typically at fixed, predefined unit prices. The agency specifies job items that represent the likely range of activities to be required during the contract term. For example, in

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the case of guardrail repair, the items might be 0-25' repair, 25-100' repair, 100-500' repair, and > 500' repair. Negotiated contract prices would be expected to include mobilization costs and time and materials; they might also include multipliers or other variations for after-hours and weekend or holiday work. Such agreements are well suited to use for emergency repairs and demand peaks.

- **Activity- or item-based contracts** are those in which a particular maintenance activity (e.g., pavement joint and crack filling in a highway corridor or transmission overhauls for a specific vehicle fleet) are to be provided within a definite time frame. Bids are often based on unit prices, in much the same way as construction contracts typically are handled. The contractor has scheduling control, although intermediate completion targets may be included in the contract. Such agreements typically are used to supplement an agency's current maintenance activities within a district or corridor, with a focus on repairing or upgrading a specific section of the system, versus long-term engagement or quick-response activities (under a job-order contract).
- **Asset- or performance-based contracts** provide for the contractor to take full responsibility for ensuring that a particular asset meets agreed-upon performance standards; they are also referred to as fence-to-fence, corridor, or performance-based contracts. These usually are long-term agreements where minimum performance levels are established and the contractor is given complete control of the work to ensure that these levels are delivered. Such contracts can be written for a single maintenance activity (e.g., covering only pavement marking or guardrail upkeep) or for all maintenance activities for an entire section of roadway, encompassing all assets from fence line to fence line.

Agencies may initially encounter difficulties with developing maintenance outsourcing contracts because staff members have developed contracting expertise on new construction only, while maintenance personnel have little such experience. The ways in which work and pay elements are defined and the types of performance measures used for maintenance generally are different from those encountered in construction. Additionally, an agency may not have specifications for maintenance activities. Performance-based maintenance contracts should typically focus on desired outcomes, without regard for methods used in the maintenance functions.

Agencies also may encounter difficulties associated with government contracting regulations that do not influence in-house operations. For example, required engagement of disadvantaged business enterprises or direct involvement of a prime contractor in the maintenance performance may influence competition and pricing; such influence may be particularly strong in a managed competition situation.

## Maintenance Outsourcing Success Factors

Once an outsourcing agreement has been executed, each party to the agreement is fully responsible for its role. The contractor will typically provide the equipment, materials, labor, and management required to complete the outsourced maintenance activity. The government agency will usually determine that specifications and other contractual requirements have been met and make timely payments for the work with any appropriate incentives or deductions, if necessary. Experience indicates that several characteristics of the outsourcing arrangement can have an important influence on whether the agency will view the effort as a success:

- **Outsourcing scope**  
The location and extent of the maintenance outsourced must be attractive to the contracting community. While the value of the contract will influence bidders, the contractors' ability to mobilize and flexibly manage their resources can be important. Experience suggests that

maintenance outsourcing is more likely to be attractive for longer roadway sections, not located in remote or inaccessible areas, and close to centers of labor supply. A longer contract duration—experience suggests at least five years—also will be more attractive to contractors. For the agency, the size of the contract must be large enough to offset inspection and contract administration efforts, but still be manageable.

### ■ **Contractor availability**

A robust community of contractors experienced in the types of maintenance tasks to be outsourced will help ensure both that there is effective competition and that the outsourcing agency has recovery options available if problems develop after a contract has been awarded.

### ■ **Risk allocation**

Agencies should understand the business risks inherent in the contracting situation and how these risks are likely to influence contractors' bids or their willingness to bid. For example, contractors may be unwilling or unable to obtain multiyear bonding at acceptable costs. Additionally, a long-term contract might not be attractive to a contractor if the price of materials is dynamic. The manner in which the contract specifications are written may also influence the contractor's management for contingencies. Finally, the contractors' expectations about labor markets may be influenced by uncertainties regarding the agency's capital plans.

Once a contract has been awarded, experience shows that the agency must be prepared to provide adequate management and oversight for the outsourcing to proceed smoothly. Particularly with large-scale performance-based outsourcing, agency employees must understand their role and avoid trying to direct the contractor or pressing for levels of service exceeding those specified in the agreement. Agency inspectors responsible for monitoring contractor performance should be specifically knowledgeable in maintenance and in the contract requirements. Training is a productive means for ensuring that inspectors are appropriately qualified.

Experience suggests that agencies should be reluctant to outsource the entirety of their maintenance capability. If a contractor fails for whatever reason to provide critical maintenance services, public expectations are likely to require that the agency be able to take remedial action, particularly if the maintenance activities affect public safety (e.g., snow and ice removal).

## **Maintenance Outsourcing Benefits and Concerns**

The scan team concluded that outsourcing to fulfill at least a portion of an agency's total maintenance responsibilities is very widespread, but that few DOTs have used the practice on a large scale (e.g., agency- or corridor-wide). Noteworthy cases of large-scale maintenance outsourcing offer lessons for agencies considering adoption; the scan team sought to understand these lessons. The cases the scan team explored indicate that under the appropriate circumstances, large-scale outsourcing may offer potential benefits, such as the following:

- Labor cost reductions may be realized because of the greater flexibility a private contractor may have to adjust and manage the workforce assigned to the outsourced maintenance activities.
- The condition of the assets may improve.
- Equipment and inventory costs may decline if the outsourcing allows a contractor to improve utilization rates and reduce net investment levels.
- Standard specifications for maintenance activities may improve with time.



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- Accountability for performance is enhanced through enforcement of contractual standards.
  - Specialized expertise is made available on demand.

Other benefits may accrue to any particular maintenance outsourcing decision; however, the nature of the benefits and whether all stakeholders in the outsourcing decision agree on their scope and scale are not assured. Experience suggests that participation of all stakeholders in the outsourcing decision can help ensure that anticipated benefits are realized.

However, circumstances may not always favor large-scale outsourcing. Agencies considering the option may encounter a variety of concerns that must be resolved:

- Reduced staffing and loss of direct management control of the maintenance workforce will reduce operational flexibility.
- Outsourcing may reduce total employment for maintenance personnel.
- Adequate resources may not be available due to other activities in the region. For instance, energy development in Texas has created serious shortages in available personnel in much of the state.
- Outsourced maintenance services may be more costly for the outsourcing agency in initial contracts and may affect public perceptions of agency performance.
- Outsourcing may threaten agency morale and pride in performance and the agency's link to its system-using customer base.
- Contractual requirements associated with outsourcing may reduce agency management flexibility.
- Use of federally reimbursed funds to pay for outsourced maintenance may increase the complexity of agency accounting and reporting requirements and conformity with federal regulations.

Experience indicates that such concerns are meaningful, but may be resolved with adequate planning and involvement of all stakeholders in the outsourcing decision. The details of each specific situation where outsourcing is being considered should determine the agency's decision.

## Next Steps

Given the likely continued interest in large-scale maintenance outsourcing, the scan-team members agreed on a number of activities that would help to disseminate the lessons learned from previous experience. These activities are listed below and described further in Chapter 5.

- The scan team members will collaborate with the American Association of State Highway and Transportation Officials (AASHTO) Subcommittee on Maintenance (SCOM) to develop a plan for the implementation of the scan findings that considers the recommendations included in the scan report.
- Scan team members will make presentations of their findings as part of several professional forums, including meetings of AASHTO and regional associations of DOTs, local-government associations, and the Transportation Research Board (TRB).
- To support DOT efforts to develop appropriate performance measures and service standards needed for large-scale maintenance contracting, the scan team members plan to work with

AASHTO's Highway Subcommittee on Maintenance to establish a Maintenance Performance Measures and Contracts Technical Services Program<sup>1</sup>.

- To provide useful examples for agencies undertaking maintenance outsourcing, the scan team proposes to assemble a selection of specifications various agencies use to implement maintenance contracts and make these documents available in a web-accessible on-line library.
- To provide additional support for agencies, the scan team proposes that available training on the administration of performance-based maintenance contracts be promoted among states.
- In an effort to support additional opportunities for peer-to-peer exchanges, the scan team members will collaborate with the Federal Highway Administration (FHWA) and AASHTO to sponsor additional workshops that focus on issues relevant to maintenance personnel, including maintenance outsourcing.

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<sup>1</sup> AASHTO Pooled-Fund Technical Service Programs, American Association of State Highway Transportation Officials, <http://www.transportation.org/Pages/Programs.aspx>





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# 1.0 Introduction

## Background

The nation's highway system is an important contributor to the growth and economic development of states and local communities through the United States. This system, which comprises roads, bridges, guardrails, signs, and other roadside hardware, requires ongoing preservation and maintenance to provide a safe and efficient level of service to the motoring public. While few agencies will dispute the importance of maintenance activities to preserve the condition of these assets, funding levels have not kept pace with system demands. At the same time, changes in the way transportation agencies operate have led to staff reductions that have reduced the availability of personnel to perform important maintenance functions. Because of these and other factors, some agencies have turned to the outsourcing of maintenance activities as a means of meeting maintenance requirements.

In 2012, a scan was conducted to focus on agencies' experience with outsourcing maintenance activities. The purpose of the scan was to review leading practices in state departments of transportation (DOTs) for outsourcing maintenance activities. Outsourcing in this context refers to using resources not under a DOT's direct ownership or management to maintain transportation system facilities or equipment. These resources may be engaged in a number of different ways, including leases, labor contracts, or other business arrangements.

The scan considered both small-scale and large-scale maintenance outsourcing. Many agencies practice limited, small-scale maintenance outsourcing through such activities as renting specialized equipment or hiring temporary labor. Some agencies also use larger scale outsourcing (e.g., engaging contractors to perform selected maintenance activities within a particular district or highway corridor); however, the managerial and contracting requirements can be somewhat complex. In some cases, maintenance activities are spun off or otherwise eliminated within an agency and either a private entity is hired to perform work previously conducted by in-house forces (known as privatization) or an intergovernmental agreement could be reached with a separate government agency (e.g., a county) to perform maintenance activities. A relatively new hybrid approach—sometimes called managed competition—may occur when an agency's maintenance division is asked to submit a bid to compete with outside vendors to provide maintenance services.

Initially, the scan was undertaken to consider only privatized maintenance outsourcing; however, the practitioners comprising the scan team judged that limited experience with privatization of transportation system maintenance and the difficulty in distinguishing privatization from other forms of large-scale outsourcing would severely limit the scan's value. The team therefore expanded its scope of inquiry to consider all maintenance outsourcing, with an emphasis on large-scale outsourcing. Unless important distinctions need to be made, this report refers to all such practices as outsourcing.

## Scan Overview

The scan team undertook a review of recent experience with large-scale maintenance outsourcing to identify leading practices that might offer lessons for other agencies. A workshop was organized to share agency experiences, focusing primarily on:

- Maintenance functions and specific practices that are outsourced
- Factors contributing to the decision to outsource maintenance

- Contractual arrangements, procurement practices, and performance requirements
- Experience with implementation of outsourcing, including obstacles encountered
- Agency self-assessment of the advantages and disadvantages associated with maintenance outsourcing

Prior to the workshop, the scan team conducted a review of published literature and anecdotal knowledge of agencies’ outsourcing experiences. Based on this review, the team invited representatives from 11 states to participate in the workshop to present their maintenance outsourcing experience; eight of the nine states represented on the scan team also made presentations at the workshop. Nineteen agencies shared their outsourcing experiences and discussed their assessments of these experiences. In addition, representatives of the Association for the Management and Operations of Transportation Infrastructure Assets<sup>2</sup> (AMOTIA) gave a presentation at the workshop, representing contractors’ perspectives. The names and affiliations of the participants in the workshop are listed in Table 1.1.

**Table 1.1 Workshop participants**

<b>Invited presenters</b>	<b>Affiliation</b>
Eric Pitts, State Maintenance Engineer	Georgia DOT
Brian Burne, Highway Maintenance Engineer	Maine DOT
Russ Yurek, Director, Office of Maintenance	Maryland DOT
Steven Cook, Operations/Maintenance Field Services Engineer	Michigan DOT
Elizabeth Wright, State Maintenance Engineer	Missouri DOT
Anita Bush, Chief Maintenance & Asset Management Engineer	Nevada DOT
Charles Goodhart; Director, Bureau of Maintenance & Operations	Pennsylvania DOT
Joseph Baker, Acting Administrator, Division of Highway/Bridge Maintenance	Rhode Island DOT
Kevin Griffin, Engineer for Maintenance	Utah DOT
Robert Prezioso, State Infrastructure Manager, Maintenance Division	Virginia DOT
Todd Matheson, State Maintenance Engineer	Wisconsin DOT
Peter Loughlin and David Rader	AMOTIA
<b>Scan team</b>	<b>Affiliation</b>
Agustin Rosales; Chief, Roadway Maintenance, Division of Maintenance	California DOT
Tim Lattner, Director, Office of Maintenance	Florida DOTD
Leslie Mix, Maintenance Management Administrator	Louisiana DOTD
Caleb Dobbins, State Maintenance Engineer	New Hampshire DOT
Jennifer Brandenburg, State Road Maintenance Engineer	North Carolina DOT
Greg Duncan, Team Chair and Director of Maintenance	Tennessee DOT
Carolyn Dill, Director of Maintenance Management	Texas DOTD
Robert “Chris” Christopher; Director, Maintenance & Operations	Washington State DOT

<sup>2</sup> Association for the Management and Operations of Transportation Infrastructure Assets, <http://www.amotia.org/>

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Contact information for the scan team representatives is provided in Appendix A. Short biographies for each of the scan team members are provided in Appendix B.

A list of amplifying questions was sent to each workshop participant (see Appendix C). These questions helped provide a framework for structuring the presentations to ensure that the scan objectives were met.

A list of key contacts is provided in Appendix D.

## Scan Format

The workshop took place over three and a half days in August 2012. The workshop was structured in a format similar to a peer exchange, in which all participants meet in a single location to discuss the topics outlined by the scan team. Each of the topics was discussed during a two-hour session that featured presentations by two or three participating agencies and concluded with a facilitated discussion among the participants. On the last day, a longer open session was scheduled for the participants to develop a list of significant findings based on the material discussed and recommendations for implementing the scan findings.

The following topics were discussed during the workshop:

- Large-scale contracting with private contractors
- Large-scale contracting with public agencies
- Small-scale contracting with private contractors
- Performance measurements used in maintenance outsourcing
- Costs and benefits associated with maintenance outsourcing
- Private contractor's perspective on outsourcing
- Other considerations in outsourcing maintenance





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## 2.0 Deciding to Outsource Maintenance Activities

### Maintenance Outsourcing Approaches

A variety of economic and political factors will determine whether outsourcing some or all maintenance activities is likely to yield benefits for an agency. Because of the various ways that agencies define particular maintenance activities, it is virtually impossible to catalog all of the activities that have been outsourced by one agency or another. Some agencies effectively outsource their entire maintenance operation; in all instances the scan team encountered, such outsourcing engages another government entity. Some agencies have outsourced to private vendors all maintenance within a specific highway corridor or region.

The following are examples of maintenance activities that at least one transportation agency has outsourced on a significant scale:

- Vehicle fleet outfitting and upkeep
- Highway guardrail and crash attenuator repair
- Roadway striping and marking
- Winter pavement treatment and snow plowing
- Right-of-way mowing, tree trimming, and litter removal
- Drain cleaning, culvert repair, and culvert replacement
- Picnic and rest area maintenance
- Bridge inspection, washing, and painting

The outsourcing itself may be accomplished in a number of ways. Most typically, the agency responsible for the operation and maintenance of a particular class of assets (e.g., a portion of a highway network, a vehicle fleet, or a set of traffic signals) will contract with another agency (e.g., a county or a city) or a private-sector firm to provide specific services. The agreement may be limited to a specific period of time (e.g., five years) and establish specific compensation to be paid, or it may be open-ended and compensate for costs incurred. Developing and administering such contract agreements represents one of the more significant challenges in outsourcing, according to scan participants.

In many cases, government regulations mandate that bidding and open competition before the outsourcing contract can be negotiated and executed. In at least one instance, a cost-benefit analysis must be conducted. Specifications and performance measures must be carefully crafted. Such requirements may pose a significant management burden for the agency, slow the outsourcing process, and add to its costs.

U.S. transportation agencies have generally used one of three approaches to outsourcing maintenance activities:

- **Small-scale outsourcing, which is also known as contract maintenance.** Under this approach, which is the traditional method of outsourcing maintenance activities, contracts are issued to private or public entities to complete a specific maintenance activity, to provide specialized

equipment, or to provide temporary labor. For example, a contract may be issued to a private contractor to perform mowing services to help balance out workforce demands during peak periods. Other examples of this type of maintenance outsourcing include contracting out winter maintenance activities, bridge inspections, tree trimming, or right-of-way litter removal. Under this type of arrangement, the contracting agency typically directs the activities of the contractor and defines the methods and specifications to be used.

- **Large-scale outsourcing**, in which a significant portion of an agency's maintenance operations are outsourced to either another government entity or a private entity. The Wisconsin DOT<sup>3</sup> (WisDOT) is an example of a transportation agency that outsources all of its maintenance activities on the state trunk highway system to the 72 county highway departments. Other agencies outsource the maintenance of all assets within the right-of-way along a highway corridor or within a particular district. This approach to outsourcing is also referred to as total contract maintenance or an asset maintenance contract. Most large-scale maintenance outsourcing contracts with private entities are conducted as performance-based contracts. Under this type of arrangement, the contracting agency establishes the performance criteria that the private entity must achieve, but the private entity can establish the methods and means of achieving the performance objectives.
- **Managed competition** is more common internationally than in the U.S. Under this model, a transportation agency's maintenance division competes with private entities for the opportunity to provide maintenance services.

There are also examples of maintenance outsourcing to volunteer or unpaid workers through the adopt-a-highway litter removal program allowed by FHWA, for example<sup>4</sup>. The Minnesota DOT<sup>5</sup> (MnDOT) used this model for rest area custodian work after having been legislatively directed to provide employment for senior farm workers. However, this method of outsourcing maintenance activities was not a primary focus of the scan team since it plays a small part in maintenance outsourcing in U.S. practice.

## Factors Influencing the Decision to Outsource Maintenance

The motivation for an agency to outsource some or all of its maintenance activities can be influenced by a variety of factors. Some of the common factors that the scan participants identified as being most persuasive are discussed in this section of the report.

### Inadequate Staffing

Because of recent reductions in the staff levels at many DOTs, it has become difficult to sustain the availability of trained maintenance forces with a broad range of skills. Two major factors are most influential on an agency's decision to outsource maintenance activities: the available in-house staffing levels and the level of expertise available among the staff. A number of agencies participating in the scan noted that forced reductions or cutbacks in staffing levels, retirement incentives, and unfilled staff vacancies have all contributed to staff shortages.

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<sup>3</sup> Wisconsin Department of Transportation, <http://www.dot.state.wi.us/>

<sup>4</sup> Policy on Sponsorship Acknowledgement and Agreements within the Highway Right-of-Way, FHWA Order 5160.1A, <http://www.fhwa.dot.gov/legsregs/directives/orders/51601a.cfm>

<sup>5</sup> Minnesota Department of Transportation, <http://www.dot.state.mn.us/>

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## Need for Specialized Expertise or Equipment

Transportation agencies are also realizing that the skills required to staff a maintenance department have changed over time, with an increased emphasis on the use of specialized equipment and technology. However, because of the significant number of senior, experienced maintenance personnel who are retiring at the same time as new technology takes hold, there has been a significant shift in the level of experience and expertise among the in-house workforce.

The Utah DOT<sup>6</sup> (UDOT) reported that traditional maintenance pay scales are not adequate to attract the types of individuals who can fully utilize the new technologies that are available. The North Carolina DOT<sup>7</sup> (NCDOT) also indicated that its inability to attract good employees at the current salary levels had a significant impact on its decision to outsource maintenance activities.

## Constitutional Assignment of Road-Maintenance Responsibilities or Mandated Use of Private-Sector Providers

Governor and/or legislative directives that promote public/private partnerships have also contributed to the increasing consideration of large-scale maintenance outsourcing. For instance, in 1995 the legislature of the Commonwealth of Virginia enacted a law that stated “that a private entity could submit a proposal to any responsible entity within the state, including the Virginia DOT, to design, construct, finance, and operate facilities for any mode of transportation.”<sup>8</sup> Under the legislation, the Virginia DOT<sup>9</sup> (VDOT) could also solicit public/private partnerships. Soon after the legislation was passed, VDOT awarded a private entity a contract to maintain parts of Interstates 95 and 81 and all of Interstates 77 and 381, totaling 251 miles.

In 1995, the Texas legislature enacted a law that requires the Texas DOT<sup>10</sup> (TxDOT) to contract out 50 percent of its maintenance activities. The legislation imposes minimum limits on contracting to provide economic benefits to the private sector.

## Reduced Costs

Based on the discussions that took place during the workshop, it became apparent that reducing maintenance costs is typically not the driving force behind an agency’s decision to outsource maintenance. While some participants were able to report information indicating that outsourced maintenance activities are actually more expensive (e.g., hired trucks cost 23 to 46 percent more for the New Hampshire DOT<sup>11</sup> [NHDOT]; and herbicide costs are \$85/mile when performed by the contractor versus \$65/mile when performed by in-house crews), they recognized that it is difficult to compare costs on an equivalent basis. In general, the scan team found that outsourcing costs are initially higher than in-house costs; however, the differences in costs begin declining as soon as the second year of outsourcing.

Determining whether outsourcing an activity will be financially advantageous to an agency or to the larger government entity of which it is a part requires accurate information on costs. However, public-agency

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<sup>6</sup> Utah Department of Transportation, <http://www.udot.utah.gov/main/f?p=100:6:0:::V,T:,1>

<sup>7</sup> North Carolina Department of Transportation, <http://www.ncdot.gov/>

<sup>8</sup> Hyman, WA, Performance-Based Contracting for Maintenance, NCHRP Synthesis 389, National Cooperative Highway Research Program, Transportation Research Board, 2009, [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_syn\\_389.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_389.pdf)

<sup>9</sup> Virginia Department of Transportation, <http://www.virginiadot.org/>

<sup>10</sup> Texas Department of Transportation, <http://www.txdot.gov/>

<sup>11</sup> New Hampshire Department of Transportation, <http://www.nh.gov/dot/>

accounting practices are poorly suited to identifying either the full costs of specific maintenance activities performed by the agency or the agency's costs associated with outsourcing. The scan team found that outsourcing decisions generally have not been based on thorough financial analyses.

## **Additional Motivations for Large-Scale Outsourcing**

The decision to outsource maintenance activities on a large scale is a more significant decision than renting equipment or engaging a contractor to perform a particular maintenance function. When practiced on a larger scale, maintenance outsourcing may be seen as a way to reduce agency staffing and long-term liabilities associated with direct employment and asset ownership, and to take advantage of perceived efficiencies or excess capacity in other organizations. It may also be a way to shift risk to a contractor or lock in maintenance costs in future years. The scan team encountered several additional reasons why particular agencies have undertaken large-scale maintenance outsourcing, as discussed in this section.

### **Seasonal or Other Significant Variations in Maintenance Workloads**

One of the primary causes of peaks in workforce demands scan participants identified was seasonal or other significant variations in maintenance workloads. For example, agencies located in the northern part of the U.S. may find that they have excess staff in the summer months if they staff their maintenance crews based on snow-removal demands. Therefore, by using contract forces to supplement in-house snow-removal crews, an agency is able to maintain a core staff that can address typical agency demands. For example, NHDOT currently staffs for its minimal summer needs and outsources winter maintenance activities. The scan participants reported that winter maintenance in New Hampshire accounts for approximately 90 percent of the annual outsourcing expenditures.

In addition to contracting out maintenance activities to address peak demands, agencies also hire seasonal workers, provide overtime to in-house staff, or defer work to another season or to another year. In the case of NCDOT, maintenance outsourcing is used at times to expedite—or fast track—maintenance work that will help raise bridge and pavement ratings. This occasional use of contract workers has helped supplement the work of agency personnel in situations where the in-house forces had fallen behind or had been diverted to other activities.

### **Changes to Equipment and Material Management Approaches**

Other factors that are driving the outsourcing of maintenance activities are legal or cultural traditions that limit the types of equipment transportation agencies can own or that restrict the types of maintenance activities that can be performed. The Missouri DOT<sup>12</sup> (MoDOT), for example, is prohibited from owning self-propelled laydown equipment for paving.

Traditionally, DOTs have owned, operated, and maintained their own equipment. These agencies tend to keep equipment operational for as long as possible, missing opportunities to employ new technology and/or the higher productivity rates often associated with newer fleets. Some agencies have begun outsourcing fleet operations so in-house staff can focus their attention on core business functions.

### **Opportunities to Shift Maintenance Efforts to Lower-Cost Providers**

In some situations, outsourcing maintenance activities provides an opportunity for DOTs to take advantage of providers that can offer similar services for a lower cost. For example, the Washington State DOT<sup>13</sup>

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<sup>12</sup> Missouri Department of Transportation, <http://www.modot.org/>

<sup>13</sup> Washington State Department of Transportation, <http://www.wsdot.wa.gov/>

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(WSDOT) contracts out specialized work (e.g., large tree removal in particularly challenging locations) that is performed infrequently and that would be very costly for the DOT to adequately staff.

Other agencies have used prisoners or volunteers as lower-cost options for unskilled maintenance activities, such as litter removal. TxDOT, for example, has state use contracts that procure services provided by persons with disabilities for some highway maintenance activities (e.g., litter pickup and removal, mowing, tree trimming, picnic and rest area maintenance, metal beam guardrail repair and replacement, and landscape maintenance).

## Opportunities for Economies of Scale

Private contractors are often in a position to take advantage of economies of scale that help to reduce overall maintenance costs. For instance, a DOT may not be interested in purchasing a specialized piece of equipment that is only used occasionally. Private companies that can spread the use of this type of specialized equipment to multiple agencies may be in a position to rent or lease equipment to a DOT, or may contract the services to the agency, at a lower cost than if the government had purchased the equipment and trained its staff in its operation.

In another example, government agencies are able to partner together to take advantage of economies of scale. MnDOT, for example, established cooperative purchasing programs where other public agencies can choose to purchase equipment, as well as materials and some services, off the state bid at state bid prices rather than solicit their own bids. This has proven to be beneficial to all participants because the larger group is able to get more competitive pricing.

## Reducing Agency Civil-Service Personnel Rosters

In some cases, there is public pressure to reduce the number of civil-service personnel, which has resulted in significant changes in the way transportation agencies operate. For instance, the Rhode Island DOT<sup>14</sup> (RIDOT) reported that its staff had dropped from 800 full-time equivalents in 1980 to 225 in 2012. Similarly, VDOT reported that the number of maintenance employees dropped by more than half, from 7500 to 3000 employees. The magnitude of these types of staff reductions virtually requires transportation agencies to outsource activities previously conducted in-house.

## Reducing Maintenance Costs

Although it can be difficult to directly compare government costs with the costs charged by private entities, initiatives to reduce agency costs have driven some agencies to consider outsourcing maintenance activities. According to the September 2005 issue of *Public Works* magazine<sup>15</sup>, the Michigan cities of Troy and Yuma perform vehicle repair and maintenance work for other government agencies in their communities. The arrangement works well for all parties since the additional revenue helps Troy and Yuma defray their overhead costs, and the other agencies get services for reasonable rates. In 2005, the City of Troy earned more than \$170,000 in revenue for performing maintenance on police cars and other equipment, fire apparatus, and senior citizen buses.

In some cases transportation agencies (e.g., Michigan DOT<sup>16</sup> [MDOT]), have permitted private contractors to use underutilized state facilities to store equipment and materials. These types of arrangements require

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<sup>14</sup> Rhode Island Department of Transportation, <http://www.dot.ri.gov/>

<sup>15</sup> Brown DC, A Ship-Shape Shop: In-Sourcing, Technician Training, and Equipment Replacement Programs, *Public Works*, September 2005, posted March 7, 2006, <http://www.pwmag.com/best-practices/a-ship-shape-shop.aspx>

<sup>16</sup> Michigan Department of Transportation, <http://www.michigan.gov/mdot/>

a well-written lease arrangement that could involve a rental charge. The advantageous rates given to the private contractor should be reflected in a lower bid price to the state.

While reducing maintenance costs often is an impetus for considering large-scale outsourcing, information presented to the scan team showed no clear evidence that significant cost reductions have been realized. Some agencies suggest that savings may be achievable; however, none were able to present documentation of savings experienced. Outsourcing industry representatives participating in the scan reported that their repeated meetings with agency financial staff have failed to yield evidence of cost savings.

Obstacles to establishing clear evidence of savings include the fundamental complexity of accounting for the full costs of particular services delivered in a corporate context and the typically different scope of the operations for contractor- and agency-provided services. In addition, some agencies outsourcing their maintenance activities require higher levels of service from the contractor than previously required from in-house crews, which adds additional complexity when trying to compare costs. For example, guardrail repair and crack sealing entail use of distinct materials and methods; however, each properly bear a share of an agency's administrative costs, pension liabilities, and other indirect costs that the agency does not routinely calculate. Also, agency maintenance crews may flexibly perform multiple functions during their normal operations, without reporting precisely what they have done. Contractors tasked with providing specific services are being paid amounts adequate to recover the full costs of those services.

## Making the Decision to Outsource Maintenance

Unless an agency is directed to outsource maintenance activities, it is not always an easy decision to begin outsourcing maintenance activities or to increase the extent of services that are outsourced. Many considerations have to be taken into account in the decision, including the criticality of the activities to the agency's mission and goals, the availability of service providers, and the ability to describe the expected levels of performance.

The scan team found that in practice, few agencies had carefully evaluated the likely costs and consequences of large-scale maintenance outsourcing prior to initiating the contract. More typically, the decision had been necessitated by inadequate staffing to perform agency functions, or by external pressure to engage the private sector, to reduce agency staffing, or to address perceived public-sector shortcomings. Inter-governmental outsourcing arrangements have typically been the product of the unique constitutional arrangements of the particular state and sub-state governments.

## The Selection Process

NCHRP Report 692<sup>17</sup>, Decision Making for Outsourcing and Privatization of Vehicle and Equipment Fleet Maintenance, published in 2011, developed a systematic process for evaluating the decision to outsource fleet maintenance activities. This process involved the following five steps:

- **Step 1: Identify critical internal and external conditions**

During this step, the agency should set the direction for making outsourcing decisions. This could involve identifying candidate activities for outsourcing, investigating the existence of any legislation or policies that could drive (or constrain) the decision to outsource, determining the criticality of each

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<sup>17</sup> Wiegmann J and A Sundararajan with Z Tao, Decision Making for Outsourcing and Privatization of Vehicle and Equipment Fleet Maintenance, NCHRP Report 692, National Cooperative Highway Research Program, Transportation Research Board, 2011, [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_692.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_692.pdf)

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candidate activity, and assessing the external market conditions.

■ **Step 2: Analyze internal demand and capabilities**

This step is intended to evaluate whether the candidate activities identified for outsourcing are viable after analyzing internal demand and capabilities. This involves comparing agency capabilities against expected service levels and determining whether those capabilities can be adjusted to meet the demand through overtime, training, or some other internal adjustment.

■ **Step 3: Evaluate external service providers**

The third step in the process is to assemble information about external service providers so external cost and quality can be compared to the assessment of internal capabilities. This step is often conducted in parallel with the second step. It involves identifying likely providers and collecting information on the cost and performance that can reasonably be expected.

■ **Step 4: Analyze cost and performance trade-offs**

Once the information from steps 2 and 3 has been obtained, the information can be analyzed in terms of economics, value, and risk comparisons. The analysis should include an assessment of whether each of the internal and external options will produce acceptable results for the organization in terms of performance. The analysis should also determine whether costs strongly favor one approach over another. The cost evaluation should consider costs over multiple years to help negate the impact of any one-time costs or savings in the first year.

■ **Step 5: Synthesize and finalize outsourcing decisions**

The final step in the process is to assemble the information from the previous tasks into a product that provides managers with the information needed to make an informed decision. If the decision is made to outsource maintenance activities, then this task should also provide strategies for procuring the services, dealing with staff that may be impacted by the decision, and establishing processes to ensure the performance of the final product.

According to the private-sector participants in the workshop, outsourcing of maintenance functions in the U.S. is evolving, especially at the corridor level. Lessons learned through the early applications of large-scale outsourcing contracts have led to improvements in the development and administration of contracts as well as the reasonableness of performance measures used to hold contractors accountable. Important issues that continue to evolve in large-scale outsourcing projects include bonding requirements; strategies to address emergency response; contract length; and the lesser use of retainage clauses, penalties, and incentives to ensure contractor performance.

## Evaluating the Suitability of an Activity for Outsourcing

Based on the information presented during the scan, general guidelines were developed to assist agencies in determining whether a project lends itself to outsourcing. These guidelines, which are presented in Table 2.1, are intended to reflect some of the critical internal and external conditions that the scan team members have recognized as being important when making the decision to outsource.

The scan team identified several additional considerations for large-scale performance-based contracts:

- The project should be in a location where the contractor can easily acquire a skilled workforce and the workforce can be economically dispatched to work locations. Experience suggests that maintenance outsourcing is more likely to be attractive for longer roadway sections, not located in remote or inaccessible areas, and close to centers of labor supply.
- The project should cross as few adjacent district boundaries as possible since contract administration

can be more complicated with these projects.

- Bundling activities generally helps to reduce costs so the contractor can keep workers fully utilized. However, adding high-risk activities to the bundle (e.g., snow removal) may limit the amount of competition.
- The size of the contract should be large enough to benefit from cost efficiencies, but not so large that it reduces the number of contractors that can bid on the project.
- Contract duration should be long enough to allow contractors to amortize equipment and start-up costs. Contracts that are too long may increase costs due to uncertainties (e.g., increases in material costs). Several state DOTs have established three-year contracts with options to extend the contract for up to three additional years. Other contractors are extending the length of these contracts. The representatives from the private sector cited a minimum of five years for these types of contracts.

**Table 2.1 Activity suitability guidelines**

Reasons some activities are good candidates for outsourcing	Examples
In-house staffing levels are not adequate to handle the workload or have restrictions on work hours that would limit the flexibility of in-house crews (e.g., working nights or weekends).	Auxiliary or supplemental snowplows for heavy snowfalls (PA)
It requires specialized expertise that is not available in-house, but is available through external sources.	The project is large enough for the contractor to be cost competitive, but not so large that it reduces competition.
The project is large enough for the contractor to be cost competitive, but not so large that it reduces competition.	Guardrail and crash attenuator repair (LA and PA), striping and markings (TN)
It requires specialized equipment, and purchasing the equipment is difficult to justify.	Large tree removal (WA)
It consists of activities that are not central functions of the agency.	Fleet maintenance beyond preventive maintenance
It involves routine activities that do not require specialized services, but do not need to be done by in-house staff.	Litter removal, mowing (TN), rest area maintenance (LA)
Reasons some activities may not lend themselves to outsourcing	Examples
It would be difficult for a contractor to achieve satisfactory results because the requirements cannot be easily described or there is a particular challenge with the project.	Snow and ice control (TN)
The agency needs a quick response and no existing contracting mechanism is in place.	Signal repair, snow and ice response (TX)
External sources for providing the service are not readily available.	Roadway clearance before emergency contracts go into effect (LA), no local specialty contractors in remote areas (TX)
The activity is needed infrequently and the skills are available in-house.	Underwater repairs (ME)
It involves a high-profile activity, a politically sensitive critical service, or one that is closely related to safety.	Road Patrol (TN), initial emergency response and after-hours callouts (ME)



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## Outsourcing Success Factors

Once the decision to outsource has been made, a contractual agreement will be established between the two parties. Once that agreement is in place, each party to the agreement is fully responsible for its role. The contractor will typically provide equipment, materials, labor, and management required to complete the outsourced maintenance activity. The government agency evaluates that specifications and other contractual requirements have been met and makes timely payments for the work.

Experience indicates that several characteristics enhance the likelihood that a particular outsourcing arrangement will prove to be satisfactory. From a broad perspective, the scan team participants with large-scale outsourcing suggest the following success factors:

- **Be clear about the reasons for outsourcing.**  
This will help ensure that the arrangement accomplishes what it was set out to do.
- **Define the scope of the outsourcing appropriately.**  
The location and extent of maintenance activities that are outsourced must be attractive to the contracting community. While the value of the contract will influence bidders, the contractors' ability to mobilize and flexibly manage their resources can be important.
- **Use a contract mechanism suited to those services.**  
As discussed in the next chapter, the type of contract used, and the provisions incorporated into that contract, will have a direct impact on how the work is performed.
- **Take a disciplined approach and research what others are doing.**  
Most agencies have gone through several iterations of contracts to achieve desired levels of performance. Therefore, many lessons can be learned from the experiences of other DOTs.
- **Ensure that the agency has a firm understanding of the performance and maintenance requirements for the assets that will be maintained.**  
These criteria will drive the contractor's performance and will likely serve as the basis for accepting the contractor's work. In general, the criteria established for the contractor should be similar to those used for in-house crews; otherwise, the contractor's bid will reflect the increased cost to raise the level of performance to meet the new requirements.
- **Try to understand the contractor's business risks.**  
Agencies should understand the business risks inherent in the contracting situation and how those risks are likely to influence contractors' bids or willingness to bid. For example, contractors may be unwilling or unable to obtain multiyear performance bonds at acceptable costs. Additionally, they may not be interested in a long-term contract if the cost of materials is dynamic. The level of risk the contractor assumes should also be commensurate with the penalties associated with nonperformance.
- **Ensure that agency staff members have had adequate training.**  
Maintenance personnel responsible for overseeing the work of a contractor need to understand the contractual obligations of both parties. For some maintenance personnel, this is their first exposure to contractual terms. Similarly, agency inspectors responsible for monitoring contractor performance should be specifically knowledgeable in maintenance. Training is a productive means for ensuring that inspectors are appropriately qualified.
- **Use well-defined, measurable performance standards, applied uniformly to all relevant maintenance activities.**

The more objective the performance measures used, the less uncertainty there will be in administering the contract.

- **Allow adequate time for implementation and development of operating experience for agency and contractor personnel as well as for other stakeholders.**

The scan team emphasized the fact that the most successful arrangements have evolved as a partnership between the parties.

Once a contract has been awarded, experience shows that the agency must be prepared to provide adequate management and oversight for the outsourcing to proceed smoothly. Particularly on large-scale outsourcings, agency employees must understand their role and avoid trying to direct the contractor's work or pressing for levels of service that exceed those specified in the agreement.

Experience suggests that agencies should be reluctant to outsource the entirety of their maintenance capability. If a contractor fails, for whatever reason, to provide critical maintenance services, public expectations are likely to require that the agency be able to take remedial action. This is especially true if the maintenance activities affect public safety, as in the case of snow and ice removal. Scan team participants with experience in large-scale outsourcing reported that they were able to retain in-house capabilities by concentrating the efforts of the in-house maintenance forces to the portion of the state-maintained highway system not covered under the maintenance contract. The Florida DOT<sup>18</sup> (FDOT), for example, limits the amount of outsourced maintenance to 90 percent of the work so that it retains some in-house capabilities.

### Essential Precursors

Based on the experience of the scan team, agencies should not enter into large-scale outsourcing arrangements unless the following items are in place:

- **A comprehensive inventory of the assets to be maintained**  
The contractor must be able to know with accuracy what is to be maintained and the working conditions within which the maintenance is to be accomplished. This asset inventory must encompass all assets that the agency wishes to include in a maintenance contract, such as all guardrail or drainage structures within a particular district or corridor.
- **An analysis of the assets' current condition**  
This analysis serves as the baseline against which maintenance performance is to be measured. Performance metrics may be set at any level desired; however, experience indicates that outsourcing contracts should initially be written with standards no higher than the current level of performance. The condition analysis may be performed on a statistically relevant subset of the inventory to be maintained that is representative of the overall conditions. For example, the condition assessment could be performed on a random 10 percent sampling of the system to be covered.
- **Documentation of the agency's current standard maintenance operating procedures and performance**  
This documentation will typically include such characteristics as frequency of inspections, time to repair, and relevant traffic control and environmental protection requirements. As in the case of condition and level-of-service standards, the agency may require any practices desired; however, experience indicates that initially emulating those currently in place will avoid conflicts caused by dramatic differences in practice from one part of the system to another.

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<sup>18</sup> Florida Department of Transportation, <http://www.dot.state.fl.us/>

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- **An effective system for qualifying and evaluating prospective contractors**

Agencies are likely to have in place such a system for construction projects; however, experience indicates that maintenance outsourcing involves special requirements. For example, large-scale maintenance contracts should provide the ability to quickly deal with unexpected events or to correct errors.

These precursors are needed to support development of technical specifications to be included in the maintenance contract. Experience indicates that agency personnel responsible for developing such specifications should engage the contracting industry to help ensure that fulfilling the contract requirements is technically feasible, entails acceptable levels of business risk, and is likely to elicit affordable bids. The development of specifications and other criteria for soliciting bids can represent a significant effort for an agency undertaking large-scale outsourcing.

## Factors Contributing to High Outsourcing Costs

Collectively, all of the factors discussed in this section will influence the attractiveness of the project to the contracting community and the project's overall cost. However, experience suggests that the most significant factors driving the cost of outsourcing include the following items:

- **The project scope is too small.**

The size of the project must be large enough for the contractor to amortize equipment and start-up costs over the contract period. Additionally, the contractor must be able to manage its resources effectively by keeping staff fully utilized.

- **The expectations for performance are too high.**

Presumably, the maintenance budget for the DOT is adequate for providing the current level-of-service. It is unrealistic to expect a DOT to significantly improve the performance of its assets without significant changes to funding levels. Similarly, it is unrealistic to expect a contractor to provide a significantly higher level-of-service than the agency is providing at the same level of funding.

- **A significant level of risk is transferred to the contractor.**

Managing the level of risk transferred to the contractor can have a significant effect on controlling a project's cost. For example, some agencies do not include the cost of snow and ice removal in multiyear performance-based contracts because of the unpredictability of forecasting the number of weather events that will occur.

- **Penalties for nonperformance are too high.**

As discussed earlier, penalties for no-performance should be commensurate with the level of risk assumed by the contractor. If the penalties are set too high, costs to the agency will likely increase.

- **Bonding requirements are cost prohibitive.**

Contractors are unwilling and, in many cases, unable to procure multiyear bonds in excess of two years. Standard practice is a one-year bond for the total amount of the contract for a one-year period. This bond would require annual renewal. On a five-year contract with a total value of \$10 million, it is more advantageous to the contract to require a one-year bond for \$2 million that is renewed annually rather than asking the contractor to obtain a five-year bond for \$10 million.

Agencies can have a significant role in controlling the costs associated with outsourcing maintenance activities. By studying the lessons learned from agencies that have experience with large-scale outsourcing arrangements, an agency exploring the use of this type of contract can better understand the business and performance aspects of the project that have the most significant influence on the overall cost of the contract.

Experienced agencies suggest that engaging the industry in a dialogue when considering the outsourcing of maintenance functions and establishing a partnership among stakeholders are important steps in controlling costs and increasing overall satisfaction with the final product.

## Outsourcing Benefits and Concerns

The scan team concluded that outsourcing to fulfill at least a portion of an agency's total maintenance responsibilities is very widespread, but that few DOTs have used the practice on a large scale to manage a corridor or geographic area, for example. Noteworthy cases of large-scale maintenance outsourcing offer lessons regarding both benefits and concerns for agencies considering the adoption of these practices, as discussed in this chapter.

### Benefits of Outsourcing

The cases the scan team explored indicate that under the appropriate circumstances, large-scale outsourcing may offer some, or all, of these benefits:

- **Labor cost reductions may be passed on by the contractor.**  
In some cases, private contractors have more flexibility than government agencies in terms of adjusting and managing the workforce assigned to outsourced maintenance activities. This flexibility may result in cost savings to the DOT in terms of reduced labor costs.
- **Equipment and inventory costs may drop.**  
A DOT typically maintains a substantial equipment fleet to address the wide range of activities performed by maintenance crews. Contractors that are able to maintain high equipment utilization rates may result in lower total investment levels for these items.
- **Accountability for performance is enhanced.**  
Under a performance-based contract, the contractor is paid or penalized based on the degree of success at meeting performance criteria established in the contract. This naturally increases the focus on performance and provides a framework for holding the contractor accountable for the results obtained.
- **Specialized expertise is made available on demand.**  
Some agencies elect to outsource maintenance activities that require specialized expertise or equipment that would not be fully utilized in-house. Therefore, a contract to outsource this specialized expertise provides a means of supplementing in-house capabilities with experienced and trained personnel.
- **Contractors may have more flexibility to incorporate innovation into practice.**  
One of the limitations to traditional method-based contracts is that they dictate the materials and procedures to be used. Under a performance-based contract, the contractor has the responsibility for determining the means of accomplishing the desired results. Therefore, the contractor has the freedom and flexibility to administer innovative strategies to meet performance criteria.
- **Government agencies are able to reduce long-term liabilities.**  
Traditionally, pension costs have represented a significant portion of the long-term liabilities associated with government employees. One way for public agencies to reduce these liabilities is by reducing the number of government employees through outsourcing.

### Concerns About Outsourcing

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An objective assessment of maintenance outsourcing also recognizes that circumstances may not always favor outsourcing maintenance activities. Agencies considering this option may encounter the following concerns that will need to be recognized or resolved.

- **Outsourced maintenance services may be more costly for the outsourcing agency and may affect public perception of agency performance.**

It is difficult for public agencies to compare the cost of in-house and contract maintenance activities because of the challenge in allocating some costs across maintenance activities. For example, a government agency may calculate the cost of crack sealing based on the labor, material, and equipment costs associated with the activity. Overhead expenses, such as the cost of government-owned buildings and employee pension contributions, are often overlooked when determining the cost of in-house maintenance activities. However, these costs are incorporated into the bid prices provided by contractors. The availability and cost of contractor labor may also drive up the cost of a maintenance contract. In Texas, for example, energy development has created serious shortages in the number of contractors available in much of the state. The overall cost of outsourcing maintenance may also result in duplicate costs for some activities. For instance, if a maintenance contract requires a contractor to have a safety officer and the contracting agency retains its safety office position internally, there will be a net increase in the cost of providing these services. Similarly, agencies continue to incur costs for contract administration that are not captured in the contractor's estimate.

- **Contractual requirements associated with outsourcing may be substantial.**

In contrast to the reductions in maintenance work performed by in-house personnel, there will be new and additional contractual requirements when outsourcing contracts are put in place. Outsourcing maintenance activities requires the agency to prepare bid documents, to negotiate a contract, and to administer the final contract. Once the contract is in place, this involves monitoring the work of the contractor to ensure that performance expectations are met and issuing payment based on the terms of the contract. Traditionally, maintenance employees are not experienced with managing these types of contracts, so it is important that staff receive adequate training and have sufficient time to perform these tasks.

- **Contractor strategies may conflict with traditional practices.**

Under a performance-based outsourcing contract, the contractor is responsible for selecting the methods and means of achieving the expected levels of performance. In practice, the contractor may elect to utilize practices that differ from those traditionally used by DOTs. For instance, a DOT will typically repair both lanes in one direction on a divided four-lane highway when one of the lanes needs resurfacing. However, a contractor may elect to repair only one of the lanes and may choose to apply patches rather than a continuous overlay if the patches satisfy the performance criteria. It may take time for the agency to understand that its role is to evaluate the final result rather than the method used to accomplish the goal.

- **Reduced staffing and loss of direct management control of the maintenance workforce may reduce operational flexibility.**

A common concern raised by agencies considering large-scale outsourcing is the loss of agency expertise in the event the agency is required to take remedial action upon failure on the part of the contractor. As discussed previously, it is important for DOTs to retain a sufficiently skilled workforce to be able to address these situations should they arise. Additionally, the agency should retain enough expertise in-house to be able to establish performance criteria and monitor the work of the contract. The scan team heard about a contractor that had all of its equipment in one geographic

location in the U.S. when an early-season snowstorm hit in another state. As a result of this event, provisions were established to ensure that adequate backups were established for future events.

- **Outsourcing may threaten agency morale and pride in performance.**

It can be devastating to an agency to suddenly experience large decreases in the workforce, which may result from legislated initiatives. Agency employees are understandably concerned for their jobs when the discussion of outsourcing arises. This can easily lead to decreases in employee morale. However, some agencies have made conscientious efforts to retain or increase workforce morale and pride in conjunction with its outsourcing activities. For instance, UDOT combined maintenance and construction divisions so that job classifications were the same and it was easier to transfer employees to balance summer and winter workloads. This has kept employees fully utilized and expanded worker skills. TxDOT also reports that it has not had to lay off any maintenance employees as a result of its contracting efforts.

- **The direct link to the customer base is weakened.**

Outsourcing maintenance activities also changes the relationship between the transportation agency and its customer. While traditionally there has been a direct link between a DOT and the traveling public, a maintenance contract introduces a third party into the relationship. This forces agencies to reconsider responsibilities for taking and addressing customer complaints, recognizing that no matter what the contractual arrangement, the public will always consider the DOT responsible for maintenance activities.

- **Use of federally reimbursed funds to pay for outsourced maintenance may increase complexity.**

Experience has shown that mixing federal and state reimbursements into a single contract can be problematic since both funding sources may have different requirements associated with them.

Experience indicates that such concerns are meaningful, but may be resolved with adequate planning and involvement of all stakeholders in the outsourcing decision. The details of each specific situation where outsourcing is being considered should determine the strategy for addressing, or at least acknowledging, these concerns.







# 3.0 Contractual Considerations in Maintenance Contracting

## Contracting Considerations

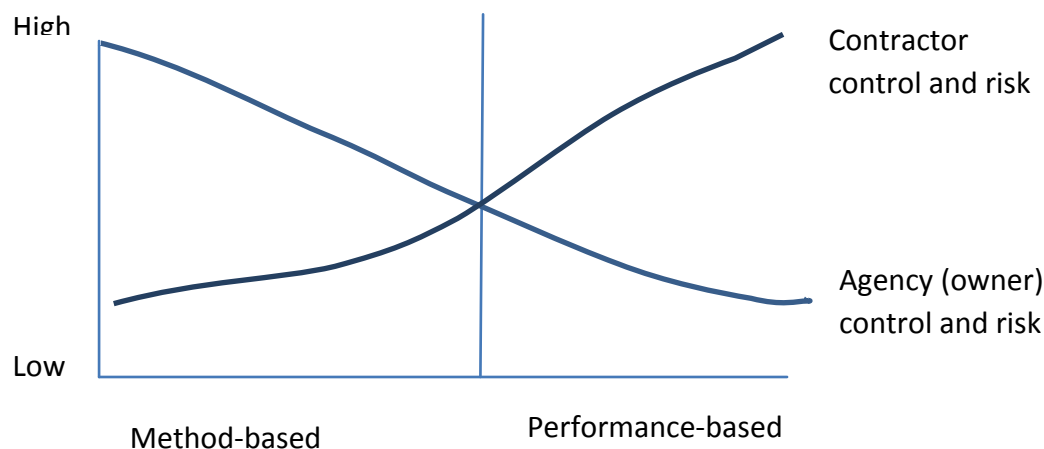
Selecting and negotiating the right contracting mechanism is an important factor in the success of outsourcing maintenance activities. Regardless of the type of activity that is outsourced, the contract provides an objective and measurable basis for evaluating the work performed by the contractor and for issuing payment to the contractor. The contractual conditions included in outsourcing contracts have evolved over time and are best accomplished through a collaborative process that involves both the agency and the contractor. The scan team identified several important contracting considerations that agencies should think through when outsourcing maintenance activities.

## Roles and Responsibilities

In general, two types of contracts are used for outsourcing maintenance activities: method-based and performance-based contracts. Method-based contracts are the more traditional of the two approaches. Under this type of contract, the agency defines the work to be performed and the method by which the work will be conducted. The agency also monitors the contractors' work to ensure that specifications are met. As a result, the agency retains much of the risk and control under this type of contract.

Under a performance-based contract, the agency identifies the expectations for performance rather than the methods to be used by the contractor. Under this type of contract, responsibility for selecting the methods

**Figure 3.1 Shift in roles and responsibilities by contract type<sup>19</sup>**



and materials is shifted to the contractor. Therefore, under a performance-based contract, the contractor has more control and assumes more of the risk for meeting the expected levels of performance. The agency will also experience changes in responsibilities for contract administration under this type of contract. This shift in roles and responsibilities associated with each type of contract is represented in Figure 3.1.

<sup>19</sup> A Guide for Methods and Procedures in Contract Maintenance, American Association of State Highway and Transportation Officials, 2002, <https://bookstore.transportation.org/imageview.aspx?id=318&DB=3>

## **Safety Issues**

Safety considerations should be given a high priority in developing and administering an outsourcing contract. While the private sector must follow the same laws and regulations as DOTs in performing maintenance work, it is possible that there will be differences in how the laws are interpreted and applied. Therefore, any specific safety precautions that a contractor is expected to follow beyond state and federal law must be specified in the contract.

## **Contractor Performance Expectations**

Under a performance-based contract, the agency is responsible for establishing the performance expectations that will be used to monitor the contractor's conformance with its contractual obligations and to determine whether payment is due. Experience has shown that establishing performance outcomes that are easily measurable and fair to the contractor can be a challenge.

Because of the difficulty in establishing measurable and fair performance outcomes, VDOT unbundled winter maintenance, mowing, litter pickup, and sweeping from its large-scale outsourcing contract. For winter maintenance activities, the department now directs the number of trucks to be used, the response times, and the application rates under its outsourcing contracts. For mowing, litter pickup, and sweeping, VDOT generates a work order each time these activities are to be performed.

Other states are using a hybrid approach in which some aspects of the contract use a performance-based approach, while other activities, such as snow and ice removal, are directed. This suggests a possible trend toward excluding specific activities from performance-based contracts so that the administration and control associated with these activities can be retained in-house.

## **Agency Expectations**

One of the challenges of administering a large-scale maintenance outsourcing contract is transferring control for the work to be done to the contractor. It may take time for agency personnel to shift from a mindset in which they are responsible for identifying the work to be done and the methods to be used to an environment in which the agency establishes performance expectations. However, with strong performance criteria in place, it is important for the agency to give the contractor full latitude to determine the best combination of skills, equipment, materials, methods, and processes to best achieve the desired outcome.

TxDOT reported that its initial experience with performance-based total maintenance contracts for rest areas were problematic due to the agency's inexperience with this type of contract and contractor issues. However, over time, the department has been able to refine its contracts to be more effective and, as a result, the maintenance of the rest areas on a statewide basis has improved.

## **Interactions with the Public**

As discussed earlier, maintenance personnel typically have a very close relationship with the traveling public because of the high level of access and interaction between the two parties. This relationship shifts when maintenance activities are outsourced. For instance, a maintenance manager may not be able to respond directly to a customer complaint, depending on the type of contract in place. Therefore, as part of the outsourcing process agencies must decide who will be responsible for taking complaints and who will be responsible for resolving them.

## **Inspector Training**

Inspecting a contractor's work under a maintenance contract requires different skills and training than

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those required to perform construction quality inspections. Depending on the nature of the contract, the inspector may be responsible only for monitoring the result of the contractor's work rather than the methods used to complete the activity. The scan participants indicated that this will require specialized training for the individuals responsible for monitoring these contracts.

## Contract Duration

The selection of the appropriate length of time for a contract requires consideration of the agency's level of comfort with the contract provisions, the contractor's upfront costs to begin operation, worker training and retraining needs, and legal provisions relative to multiyear contracts. The optimum length of large-scale outsourcing contracts is generally longer than small-scale contracts because of the magnitude of the start-up costs and the mobilization requirements for the contractor to be fully operational.

Both UDOT and VDOT established five-year performance-based contracts; however, UDOT indicated that the contract duration was too short for the contractor to fully amortize equipment expenses. FDOT used seven- and 10-year contracts that included provisions for renewal for another seven to 10 years. The Pennsylvania DOT<sup>20</sup> (PennDOT) expressed interest in using the same contract duration as FDOT.

A longer contract period can be a challenge for the agency if the contractor is not performing as expected. A longer contract period will also require more inflation provisions to be included in the contract.

## Incentives and Disincentives

As DOTs gain more experience with outsourcing maintenance activities, it is likely that there will be more creative uses of incentives and disincentives. When used properly, these tools provide opportunities to reward good performance and to quantify the consequences of poor performance. In addition to rewarding good performance, incentives may be used to encourage a contractor to complete a task faster or to reduce lane closures so the inconvenience to the traveling public is reduced.

Establishing effective incentives and disincentives can require time. For instance, VDOT indicates that it initially imposed penalties that were considered too harsh. However, the adjustments that were made were later considered not harsh enough. In general, penalties should be commensurate with the level of risk assumed by the contractor.

## Escalation Clauses

Experience indicates that the use of escalation clauses in maintenance contracts varies by agency. These types of clauses provide some relief to the contractor during periods with high rates of inflation or fluctuating material costs by reducing the level of risk in estimating the contract cost.

FDOT, for example, includes flexibility in its escalation clauses and bases the decision to renew or rebid a contract on analysis of current bids compared to renewal costs. This typically results in renewals with no escalation or a reduction from the original bid amount. UDOT allows for inflation only for fuel and asphalt costs.

## Contract Monitoring

The agency must determine the frequency with which it will monitor contractor performance as part of the contracting process. VDOT, for example, determined that sampling 5 percent of the assets for a given activity twice a year is a reasonable assessment. FDOT modified its evaluation process based on the findings

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<sup>20</sup> Pennsylvania Department of Transportation, <http://www.dot.state.pa.us/>

from an internal audit that resulted in all maintenance rating program evaluations being performed with in-house forces rather than having the contractors evaluate themselves.

The scan team also found that it is important for inspectors to monitor both in-house and outsourced work against the same performance standards. Encouraging inspectors to use available technology (e.g., cameras and tablets) to supplement inspections is also important.

## **Contracting Approaches**

While most contracts can be classified as either method based or performance based, a number of different formats are used in developing the contract. The scan participants noted that when outsourcing to private contractors, rather than public entities, the following are generally true:

- Work does not begin until a signed, legal agreement is in place.
- Expectations and performance specifications are written into the contractual agreement.
- An award is most often the results of an open, competitive bidding process.
- Payment for services is almost entirely in the form of a cash payment rather than an exchange of services.

The scan team indicated that the development of project specifications is best achieved as a collaborative effort between all parties.

## **Contracting with a Government Entity**

Contracting between government entities for maintenance is similar to private-sector arrangements with the exception of the need for competitive bidding. As in a contract with a private entity, a measurable and mutually agreeable basis for judging performance and making payments must be established. These terms are generally agreed to in a Memorandum of Understanding (or other similar document), which serves as a legal agreement between the two parties.

By law, WisDOT outsources all of its routine maintenance functions on state, federal, and interstate highway systems to the state's 72 county highway departments. Wisconsin's service delivery model relies on the county governments' ability to maintain their capacity and, in return, receive payment for actual costs incurred. By statute, WisDOT is required to reimburse counties for their actual costs, including all labor, fuel, and equipment costs associated with state trunk highway maintenance activities performed on state highways. Labor costs are paid based on actual costs; however, non-labor costs (e.g., equipment operation) are based on a statewide average rate formula. Reimbursements made based on assigned, statewide average equipment rates are sometimes disproportionate to actual costs incurred by individual counties, creating excess revenues for some and excess expenses for others. Because statewide averages are used for equipment and administration, current practice does not require an annual reconciliation of excess revenues or expenditures from either party individually. Instead, an effort is made to balance total excess revenues and expenditures in the aggregate for counties.

There are also shared concerns regarding the inconsistencies among counties in the types of equipment used to perform maintenance tasks and the variation in labor time to perform those tasks. The lack of uniform equipment usage and productivity rate requirements for specific maintenance tasks can result in inefficiencies and/or excessive costs, depending on the cost of the piece of equipment used and the staff time to complete a task. WisDOT manages total expenditures under these contracts by establishing annual budgets for each county, which sets the limit for county reimbursements. Together, the counties and

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WisDOT jointly determine the type and amount of maintenance work to be conducted, making adjustments to planned work throughout the year as needed to stay within budget limits.

## Managed Competition

Under a managed competition arrangement, state forces are allowed to compete with private contractors for work that is otherwise being outsourced. From a contractual perspective, it is important that the agency have accurate cost accounting to ensure that the agency knows what its costs are to perform the maintenance activities and to determine whether other bids are comparable.

There are several examples of managed competition in the U.S. For instance, The City of Phoenix, Arizona, initiated a managed competition contract in the early 1970s based on the premise that competition is the driving force of excellence. VDOT allows its districts to compete with private contractors as the general manager for a large-scale corridor outsourcing contract. Under this arrangement, the maintenance activities are performed by the private contractor, but the general manager directs what, when, where, and how the work is to be accomplished. In two cases, DOT districts have been awarded general manager contracts based on a price proposal similar to the ones submitted by private contractors. The district general managers are held to the same standards as if the work were being done by private entities.

Other states, such as Florida, have state laws preventing a public entity (i.e., a taxpayer-subsidized entity) from bidding against a private entity.

## Contract Rental Agreements

Contract rental agreements may be used to engage equipment (with or without operators) on an at-will basis for designated periods of time at a predetermined price. In general, the contractor operates the equipment at the direction of agency personnel, who retain responsibility for the outcome of the work.

## Cost-Reimbursable Contracts

This type of agreement is most typically used when the provider is a government entity, such as a county maintaining state-owned roads. Under this type of agreement, the provider invoices for work completed during a particular period of time. The agency typically verifies that the work was conducted and that it met the expected level of service. Unless the contract is carefully constructed to establish how costs are to be calculated, the agency may face the risk of unforeseen cost escalation.

## Activity-Based Contracting

Activity-based contracts may be either a method-based or performance-based contract. Under an activity-based contract, the agency specifies the particular maintenance activity to be performed (e.g., pavement joint- and crack-filling along a highway corridor or transmission overhauls for a specific fleet vehicle) and the contractor provides a bid to provide the services. Under a method-based contract, the agency identifies where and when the work is to be performed and the specifications to be used in performing the work. Under a performance-based version of an activity-based contract, the agency defines the expected outcome and the contractor assumes more responsibility for determining the personnel and equipment that will be used for performing the work.

UDOT, for example, used a performance-based activity contract for striping that:

- Defines the expectations in terms of a minimum retro-reflectivity requirement
- Covers a five-year period

- Provides for 90 percent payment for work performed with a 10 percent retainage held until the end of the contracting period

The scan team determined that most activity-based contracts are for one year; however, MaineDOT<sup>21</sup> has used three-year contracts that offer a three-year optional extension with success. The longer term and extensions enable contractors to amortize their start-up expenses over a longer period of time, which helps to level out costs. MaineDOT uses the longer contract terms for mowing, snow and ice control, and paving.

Typical activities outsourced under an activity-based contract include bridge maintenance, pavement repairs, guardrail/guard cable repair, general drainage maintenance, signal/lighting repair, mowing and landscaping, and building maintenance. The Tennessee DOT<sup>22</sup> (TDOT) does not include incentives or disincentives for performance on its activity-based contracts.

## On-Call Contracts

Job-order contracts, long-term indefinite delivery indefinite quality (IDIQ) contracts, and umbrella agreements are all examples of on-call contracts in which a contractor is under contract to provide services at a predefined unit price. During the bid preparation phase, the DOT specifies job items that represent the range of activities that may be required during the contract period; prices are negotiated for each item. For instance, in the case of guardrail repair, the items might include 0-25' repair, 25-100' repair, 100-500' repair, and > 500' repair. Negotiated contract prices would be expected to be all-inclusive, meaning that mobilization costs as well as time and material costs should be incorporated into the bid price. These types of agreements are well suited for emergency repairs, demand peaks, and for managing funds at the end of a fiscal year.

MoDOT uses long-term IDIQ contracts for both construction and maintenance services delivered on an on-call basis through firm fixed-price delivery orders based on pre-established unit prices. The unit prices are based on the cost of past projects and include labor, equipment, and material costs. The prices may or may not vary by project size or by region of the state. Add-ons for nighttime or weekend work factors, accelerated repairs, or work hour restrictions are examples of the types of adjustments that the contractor is allowed to make to the pre-established unit costs. There is no annual guaranteed amount of work to be contracted out; however, bidders can review the work history to estimate typical work quantities.

MoDOT has recognized the following benefits from IDIQ contracts:

- Save time and costs by minimizing the amount of bidding required
- Minimize advertisement and proposal-preparation time
- Do not require that job quantities and locations be defined until the work is needed
- Reduce the number of change orders
- Provide time to develop strong working relationships with the contractor
- Indirectly develop expertise in the private sector

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<sup>21</sup> Maine Department of Transportation, <http://www.maine.gov/mdot/>

<sup>22</sup> Tennessee Department of Transportation, <http://www.tdot.state.tn.us/>

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## Large-Scale, Performance-Based Contracts

Under a large-scale, performance-based contract, which may also be referred to as an asset maintenance (or corridor) contract or a fence-to-fence contract, the contractor accepts full responsibility for ensuring that the assets covered under the contract meet the agreed-upon performance standards. These are typically long-term agreements where minimum performance levels are set and the contractor is given complete control of the work to ensure these levels are delivered. These contracts can be written on an item-by-item basis (e.g., covering only pavement marking or guardrail upkeep), or they can include all maintenance activities for an entire section of roadway, encompassing all assets from fence-line to fence-line.

Large-scale, performance-based contracts are normally conducted on a fixed-price basis that has been negotiated with the contractor for the entire contract period. Payment to the contractor is typically distributed in accordance with a payment schedule that is incorporated into the contract agreement. For example, under a monthly payment plan for a five-year (i.e., 60-month) contract, the contractor would receive 1/60 of the fixed price regardless of how much work is performed in any given month. The monthly payment is adjusted if the contractor fails to meet the performance criteria.

Because asset-based contracts are broad in scope and involve a great deal of investment in planning, equipment, and training, the contract duration tends to be long enough to prevent the set-up costs from being prohibitively expensive. For example, VDOT used a five-year contract period for its contract, and FDOT prefers a minimum seven-year contract duration. These contracts often have provisions that allow the agency to extend the contract at its discretion.

The scan team found that experience with large-scale performance-based contracts was growing. In addition to the examples provided by FDOT and VDOT, TxDOT, TDOT, NCDOT, and the Maryland DOT all had experience using this type of contract.

## Examples

The scan team participants shared their experiences with these types of contracts.

### Small-Scale Outsourcing

Scan participants provided the following examples of small-scale outsourcing of maintenance activities.

- PennDOT has contracted out guardrail repair work for 34 years to private contractors. It has also established contracts for highway lighting and repair and for auxiliary (i.e., supplemental) snowplow trucks for heavy snowfalls.
- TDOT contracts out striping and markings, pavement marking, and mowing.
- MaineDOT contracts out culvert replacement, paving, logo signing, and blasting.
- The Louisiana DOT and Development (LA DOTD) contracts out rest area maintenance.
- TxDOT issues work order contracts for mowing, metal beam guardrail removal and replacement, sign replacement, and sweeping.

### Outsourcing to Other Government Agencies

In lieu of outsourcing or partnering, in-house staffing shortages can also be addressed by having responsibility for maintenance legislatively transferred and reassigned to another governmental entity. For example, in New Hampshire, rest areas were turned over to the Department of Resources and Economic

Development; in Minnesota, the responsibility for and control of Welcome Centers was transferred from MnDOT to the Department of Tourism. In most cases, the budget allocation for maintenance of these facilities or functions is also transferred at the time of reassignment.

By law, WisDOT outsources all of its routine maintenance functions on state, federal, and interstate highway systems to the 72 county highway departments in the state. Maintenance activities that are not included in the county agreements are outsourced to the private sector; the counties can subcontract their state work to the private sector, if desired.

In Michigan, the law allows the individual county highway departments to decide whether they are interested in performing routine maintenance functions on the state, federal, and interstate highway systems. If the county elects not to assume the responsibility for the state routes, MDOT performs the maintenance within that county. Of the state's 83 counties, MDOT has contracts with 65 to perform maintenance work. In addition, MDOT has maintenance contracts to perform work for 173 different municipalities within the state. It provides a statewide sign shop, overhead sign installation, electrical services, structural inspections (i.e., aerial and under-bridge inspections), signal maintenance, and bridge maintenance. MDOT estimates that it performs about 20 percent of the state maintenance activities, that local agencies perform approximately 75 percent of the work, and that private contractors perform about 5 percent of the work.

Several agencies indicated that they have established municipal agreements with cities to do certain maintenance work on state routes that pass through city limits. In large cities, like Minneapolis and St. Paul, these agreements cover all routine maintenance. In smaller municipalities, the agreements may only involve hauling snow away from sidewalks and curb parking along the state routes.

Several other partnerships were identified during the scan, although these relationships were not always formalized with a contract. Instead, these examples represent more of an informal agreement to share services of facilities.

- The City of Ft. Collins, CO, partnered with the state and county to provide a single facility to store and distribute solid and liquid winter maintenance chemicals.
- RIDOT partnered with the Rhode Island Public Transportation Authority for equipment maintenance services.
- NHDOT sold half of the fuel it purchased to municipalities, school districts, and other state agencies.

### Large-Scale Performance-Based Contracts

FDOT is currently in its third generation of large-scale maintenance outsourcing. The department awarded its first performance-based, fixed-price contract to a private entity in 2001. Under this contract, the contractor was responsible for managing, operating, and maintaining approximately 431 centerline miles of the state highway system within a five-county area.<sup>23</sup> The contract includes all routine maintenance activities, including rest area operation and security, emergency response, natural disaster clean up, bridge hit repair, bridge inspections, and motorist aid call box response. The contract has resulted in more uniform delivery of services within the geographic area.

In 2005, NCDOT was authorized to implement up to two performance-based contracts for routine maintenance and operations, exclusive of resurfacing, based on a best value procurement process. The initial

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<sup>23</sup> A Guide for Methods and Procedures in Contract Maintenance, American Association of State Highway and Transportation Officials, 2002, <https://bookstore.transportation.org/imageview.aspx?id=318&DB=3>



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contract focused on interstate maintenance conditions for a five-year period with the option to renew for another five years. While the contract generally worked well, it required changing the collective mindset within the agency and reassuring employees that they would not be losing their jobs. Over time, NCDOT also recognized that some of its original performance criteria were either too detailed or too vague, so some adjustments were made to better meet the contract objectives.

TxDOT reports that it has been moving toward the use of more bundled bid contracts in recent years. One such contract encompasses approximately 440 square miles and 370 centerline miles in the east half of Dallas County. Under this type of contract, the contractor provides a unit price for all maintenance activities related to roadway, roadside, bridge, and traffic operations work items. TxDOT issues work orders for various activities when it wants the work done. TxDOT has also used performance-based contracts on IH 20 through Dallas County and on IH 35 through three counties in the Waco District. Performance-based contracts have also been used for safety rest area contracts in Texas. Problems with the Dallas-area contract led to the bundled bid contract discussed previously. The Waco District has had a better experience with performance-based contracts and is now on the third generation of its contract.

TxDOT's experiences with performance-based contracts have led to the following lessons:

- Performance-based contracts may not be appropriate for highly specialized items or politically sensitive, critical services.
- The expected outcomes must be under the contractor's control and influence.
- The contractor must be provided flexibility in how the work is conducted.
- Risks should be shared between both the agency and the contractor.
- Adequate resources should be allocated to the agency's responsibilities for contract development and performance monitoring.



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## 4.0 Summary of Key Findings

### Maintenance Functions Suited to Outsourcing

A variety of economic and political factors will determine whether outsourcing of some or all maintenance activities is likely to yield benefits for a particular agency. The great variety in how agencies define particular maintenance activities makes it virtually impossible to catalog all of those activities that have been outsourced by one agency or another. Some agencies effectively outsource their entire maintenance operation; in all instances the scan-team encountered, such outsourcing engages another government entity. Some agencies have outsourced to private vendors all maintenance within a specific highway corridor. The following are examples of maintenance activities that at least one transportation agency has chosen to outsource on a significant scale:

- Vehicle fleet outfitting and upkeep
- Highway guardrail and crash attenuator repair
- Roadway striping and marking
- Winter pavement treatment and snow plowing
- Right-of-way mowing and litter removal
- Drain cleaning, culvert repair and replacement
- Picnic and rest area maintenance
- Bridge inspection, washing, and painting

The outsourcing itself may be accomplished in a number of ways. Most typically, the agency responsible for operation and maintenance of a particular class of assets (e.g., a portion of a highway network, a vehicle fleet, or a set of traffic signals) will contract with another agency (e.g., a county or city) or a private-sector firm to provide specific services. The agreement may be limited to a specific time period (e.g., five years) and establish specific compensation to be paid, or open-ended and compensating for costs incurred. Developing and administering such contract agreements represents one of the more significant challenges in outsourcing.

In many cases, government regulations mandate that there must be bidding and open competition before the outsourcing contract can be negotiated and executed. Specifications and performance measures must be carefully crafted. Such requirements may pose a significant management burden for the agency, slow the outsourcing process, and add to its costs.

Other arrangements that qualify fundamentally as outsourcing include use of volunteer labor (e.g., adopt-a-highway programs and reliance on abutting property owners for grading of low-volume rural roads); use of prison labor; and even engagement of part-time workers, who do not receive the same salary or benefits as full-time staff. Such arrangements play a small part in maintenance outsourcing in U. S. practice.

### Factors Likely to Influence the Decision to Outsource

The following factors have been most significant in persuading agencies to make substantial use of maintenance outsourcing:

- Inadequate staffing (e.g., because of authorized staffing levels insufficient to handle recurring peak workloads, mandates to limit or reduce staffing, or regulatory or contractual limitations on staff assignments)
- Need for specialized expertise or equipment (e.g., for vehicle or signal-system upkeep)
- Constitutional assignment of road-maintenance responsibilities among government entities
- Mandated use of private-sector providers (e.g., to seek efficiencies or reduce agency expenditures)

Determining whether or not outsourcing of an activity will be financially advantageous to an agency or the larger government entity of which it is a part requires accurate information on costs. However, public-agency accounting practices are poorly suited to identifying either the full costs of specific maintenance activities performed by the agency or the agency's costs associated with outsourcing. The scan team found that outsourcing decisions generally have not been based on thorough financial analyses.

### Motivations for Large-Scale Outsourcing

Outsourcing is a way that agencies can increase their capacity to provide services in response to peak demands (e.g., by renting equipment or engaging consultant services). When practiced on a larger scale, maintenance outsourcing may be seen as a way to reduce agency staffing and long-term liabilities associated with direct employment and asset ownership and a way to take advantage of perceived efficiencies or excess capacity of other organizations.

The scan team encountered several reasons why particular agencies have undertaken maintenance outsourcing:

- Seasonal or other significant variations in maintenance workloads (e.g., snow-plowing following a major storm)
- Avoidance of excessive investment in equipment or stockpiled materials that may be under-utilized (e.g., for line-painting)
- Opportunities to shift maintenance efforts to lower-cost providers
- Opportunities for economies of scale by combining operations with other entities
- Reduction of agency civil-service personnel rosters
- Reduction of maintenance costs

While reducing maintenance costs often is an impetus for considering outsourcing, information presented to the scan team showed no clear evidence that significant cost reductions have been demonstrated. Some agencies suggest that savings may be achievable; however, none were able to present documentation of savings experienced. Outsourcing industry representatives participating in the scan reported that repeated meetings with agency financial staff have failed to yield evidence of cost savings.

Obstacles to establishing clear evidence of savings include the fundamental complexity of accounting for the full costs of particular services delivered in a corporate context and the typically different scope of the operations for contractor- and agency-provided services. For example, guardrail repair and crack sealing entail use of distinct materials and methods; however, each properly bear a share of an agency's administrative costs, pension liabilities, and other indirect costs that the agency does not routinely calculate. Also, agency maintenance crews may flexibly perform multiple functions during their normal operations

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without reporting precisely what they have done. Contractors tasked with providing specific services are being paid amounts adequate to recover the full costs of those services. In addition, some agencies required higher levels of service when outsourcing than previously required for their in-house crews, which adds additional complexity when trying to compare costs.

## Essential Precursors to Large-Scale Outsourcing

Experience indicates that an agency should have a number of items in place before undertaking any large-scale maintenance outsourcing:

- **A comprehensive inventory of the assets to be maintained**  
The contractor must be able to know with accuracy what is to be maintained and the working conditions within which the maintenance is to be accomplished. This asset inventory must encompass all assets that the agency wishes to include in a maintenance contract (e.g., all guardrail or drainage structures within a particular district or corridor).
- **An analysis of the assets' current condition**  
This analysis is the baseline against which maintenance performance is to be measured. Level-of-service or condition standards may be set at any level desired; however, experience indicates that outsourcing contracts should initially be written with standards no higher than current levels. The condition analysis may be performed on a statistically relevant subset of the inventory to be maintained (e.g., a random 10 percent sampling of the system to be covered).
- **Documentation of the agency's current standard maintenance operating procedures and performance**  
This documentation will typically include such characteristics as frequency of inspections, time to repair, and relevant traffic control and environmental protection requirements. As in the case of condition and levels-of-service standards, the agency may require any practices desired; however, experience indicates initially emulating those currently provided by agency maintenance will avoid conflicts caused by sharp differences in practice from one part of the system to another.
- **An effective system for qualifying and evaluating prospective contractors**  
Agencies are likely to have in place such a system for construction projects; however, experience indicates that maintenance outsourcing involves special requirements (e.g., the ability to very quickly deal with unexpected events or correct errors).

These precursors are needed to support development of technical specifications to be included in the maintenance contract. Experience indicates that agency personnel responsible for developing such specifications should engage the contracting industry to ensure that the contract requirements are technically feasible, entail acceptable levels of business risk, and are likely to elicit bids within the agency's budget. Development of specifications and other preparations for soliciting bids represents a significant effort for an agency undertaking large-scale outsourcing.

## Making the Decision to Outsource Maintenance

The scan team found that few decisions to undertake large-scale maintenance outsourcing or privatization have been based on careful analysis of likely costs and consequences. More typically, the decision has been necessitated by inadequate staffing to perform necessary work or by pressure from outside the agency to engage the private sector, to reduce agency staffing, or to address perceived public-sector shortcomings.

Intergovernmental outsourcing arrangements have typically been the product of the unique constitutional arrangements of the particular state and sub-state governments.

Experience with large-scale outsourcing suggests several guidelines that can enhance the likelihood that a particular outsourcing arrangement will prove to be satisfactory:

- Be clear about the reasons for outsourcing.
- Take a disciplined approach and research what other states are doing.
- Try to define precisely the extent of services to be outsourced and use a contract mechanism suited to those services.
- Ensure that the agency has a firm understanding of the condition and maintenance requirements of assets to be maintained.
- Try to understand the contractor's business risks.
- Ensure that agency staff members have adequate training.
- Use well-defined, measurable performance standards, applied uniformly to all relevant maintenance activities.
- Allow adequate time for implementation and development of operating experience, for agency and contractor personnel as well as for other stakeholders.

### Outsourcing Contract Practices

Regardless of the activities outsourced, experience indicates that an important element of success is having clearly defined, measureable bases for judging that:

- The services provided meet expectations (performance measures and criteria)
- Payment is due (work completion or service delivery)

Refining the specifications that include these two items is best accomplished as a collaborative exercise engaging the outsource contractor and the agency.

Safety should be given high priority in contract development, in administration, and in performance of the maintenance functions. How interactions with the public are to be handled should be carefully defined.

Contracting between government entities for maintenance does not typically entail the effort of competitive bidding; it will otherwise be similar to private-sector arrangements. Measurable and mutually agreed bases for judging performance and making payments are essential. If such outsourcing is to be a product of managed competition, having accurate cost accounting is essential to ensure that the agency knows what the costs are as well as that public and private bids are comparable.

Several forms of outsourcing contract have been successfully used:

- **Contract rental agreements**, used to engage equipment (with or without operators) on an at-will basis for designated time periods at a predetermined pay rate. The contractor generally operates at the direction of agency personnel; these personnel are responsible for the outcome of the maintenance activities.
- **Cost-reimbursable contracts**, in which the provider provides the services required and invoices

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for the cost of doing so. Under this arrangement, which is most typically used when the provider is another government entity (e.g., a county maintaining state-owned roads), the agency may specify a level of service to be expected and monitors compliance. Unless the contract is carefully constructed to establish how costs are to be calculated, the agency may face risks of unforeseen cost escalation.

- **Job-order contracts**, long-term indefinite quantity and delivery umbrella agreements that provide for on-call services, typically at fixed predefined unit prices. The agency specifies job items that represent the likely range of activities to be required during the contract term; for example in the case of guardrail repair, the items might be 0-25' repair, 25-10' repair, 100-500' repair, and > 500' repair. Negotiated contract prices would be expected to include mobilization costs, as well as time and materials, and might include multipliers or other variations for after-hours and weekend or holiday work. Such agreements are well suited to use for emergency repairs and demand peaks.
- **Activity- or item-based contracts**, in which a particular maintenance activity such as pavement joint- and crack-filling in a highway corridor or transmission overhauls for a specific vehicle fleet are to be provided within a definite time period. Bids are often based on unit prices, in much the same way as construction contracts typically are handled. The contractor has scheduling control, although intermediate completion targets may be included in the contract. Such agreements typically are used to supplement an agency's current maintenance activities within a district or corridor, with a focus on repair or upgrade of a specific section of the system, versus long-term engagement or quick-response activities (under a job-order contract).
- **Asset- or performance-based contracts**, providing for the contractor to take full responsibility for ensuring that a particular asset meets agreed-upon performance standards (also referred to as fence-to-fence, corridor, or performance-based contracts). These usually are long-term agreements where minimum performance levels are established and the contractor given complete control of the work to ensure these levels are delivered. Such contracts can be written on an item-by-item basis (e.g., covering only pavement marking or guardrail upkeep) or for all maintenance activities for an entire section of roadway encompassing all assets from fence-line to fence-line.

Agencies may initially encounter difficulties with maintenance outsourcing contract development because staff members have developed contracting expertise on new construction only, while maintenance personnel have little such experience. The ways in which work and pay elements are defined and the types of performance measures used for maintenance generally are different from those encountered in construction. Maintenance contracts should typically focus on desired outcomes, without regard for methods used in the maintenance functions.

Agencies also may encounter difficulties associated with government contracting regulations that do not influence in-house operations. For example, required engagement of disadvantaged business enterprises or direct involvement of a prime contractor in the maintenance performance may influence competition and pricing; such influence may be particularly strong in a managed competition situation.

## Maintenance Outsourcing Success Factors

Once an outsourcing agreement has been executed, each party to the agreement is fully responsible for its role. The contractor will typically provide the equipment, materials, labor, and management required to complete the outsourced maintenance activity. The government agency will typically determine that specifications and other contractual requirements have been met and make timely payments for the work. Experience indicates that several characteristics of the outsourcing arrangement can have a significant influence on whether the agency will view the effort as a success:

- **Scope of the outsourcing**

The location and extent of maintenance outsourced must be attractive to the contracting community. While the value of the contract will influence bidders, the contractors' ability to mobilize and flexibly manage their resources can be important. Experience suggests that maintenance outsourcing is more likely to be attractive for longer roadway sections, not located in remote or inaccessible areas, and close to centers of labor supply. A longer contract duration—experience suggests at least five years—also will be more attractive to contractors. For the agency, the size of the contract must be large enough to offset inspection and contract administration efforts but still be manageable.

- **Contractor availability**

A robust community of contractors experienced in the types of maintenance tasks to be outsourced will help ensure both that there is effective competition and that the outsourcing agency has recovery options available in the case that problems develop after a contract has been awarded.

- **Risk allocation**

Agencies should understand the business risks inherent in the contracting situation and how risk is likely to influence contractors' bids or willingness to bid. For example, contractors may be unwilling or unable to obtain multiyear bonding at acceptable costs. Additionally, a long-term contract might not be attractive to a contractor if the price of materials is dynamic. The manner in which the contract specifications are written may also influence the contractor's management for contingencies. Finally, the contractors' expectations about labor markets may be influenced by uncertainties regarding the agency's capital plans.

Once a contract has been awarded, experience shows that the agency must be prepared to provide adequate management and oversight for the outsourcing to proceed smoothly. Particularly on large-scale performance-based outsourcings, agency employees must understand their role and avoid trying to direct the contractor or pressing for levels of service exceeding those specified in the agreement. Agency inspectors responsible for monitoring contractor performance should be specifically knowledgeable in maintenance and in the contract requirements. Training is a productive means for ensuring that inspectors are appropriately qualified.

Experience suggests that agencies should be reluctant to outsource the entirety of their maintenance capability. If a contractor fails for whatever reason to provide critical maintenance services, public expectations are likely to require that the agency be able to take remedial action, particularly if the maintenance activities affect public safety (e.g., snow and ice removal).

## **Maintenance Outsourcing Benefits and Concerns**

The scan team concluded that outsourcing to fulfill at least a portion of an agency's total maintenance responsibilities is very widespread, but that few DOTs have used the practice on a large scale (e.g., agency- or corridor-wide). Noteworthy cases of large-scale maintenance outsourcing offer lessons for agencies considering adoption; the scan team sought to understand these lessons. The cases the scan team explored indicate that under the appropriate circumstances, large-scale outsourcing may offer potential benefits:

- Labor cost reductions may be realized because of the greater flexibility a private contractor may have to adjust and manage the workforce assigned to the outsourced maintenance activities.
- The condition of the assets may improve.
- Equipment and inventory costs may decline if the outsourcing allows a contractor to improve utilization rates and reduce net investment levels.



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- Standard specifications for maintenance activities may improve with time.
  - Accountability for performance is enhanced through enforcement of contractual standards.
  - Specialized expertise is made available on demand.

Other benefits may accrue to any particular maintenance outsourcing decision; however, the nature of the benefits and whether all stakeholders in the outsourcing decision agree on their scope and scale are not assured. Experience suggests that participation of all stakeholders in the outsourcing decision can help ensure that the anticipated benefits are realized.

Circumstances may not always favor large-scale outsourcing, however. Agencies considering the option may encounter a variety of concerns that must be resolved:

- Reduced staffing and loss of direct management control of the maintenance workforce will reduce operational flexibility.
- Outsourcing may reduce total employment for maintenance personnel.
- Adequate resources may not be available due to other activities in the region. For instance, energy development in Texas has created serious shortages in available personnel in much of the state.
- Outsourced maintenance services may be more costly for the outsourcing agency and affect public perceptions of agency performance.
- Outsourcing may threaten agency morale, pride in performance, and its link to its system-using customer base.
- Contractual requirements associated with outsourcing may reduce agency management flexibility.
- Use of federally reimbursed funds to pay for outsourced maintenance may increase complexity with respect to agency accounting and reporting requirements and conformity with federal regulations.

Experience indicates that such concerns are meaningful but may be resolved with adequate planning and the involvement of all stakeholders in the outsourcing decision. The details of each specific situation where outsourcing is being considered should determine the agency's decision.



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## 5.0 Next Steps

There was a great deal of interest among scan participants in sharing their experiences with outsourcing maintenance activities. Each of the participants in the workshop had some experience with outsourcing maintenance activities; however, that experience typically involved small-scale outsourcing of one or more maintenance activities with the agency defining the work to be done and the methods to be used. Only a few of the participating agencies had experience with large-scale, performance-based outsourcing in which the contractor assumes responsibility for selecting the methods and materials to attain a predetermined performance levels.

The reasons for the interest in outsourcing also varied among the participants. In some instances, agencies had been forced to outsource maintenance activities by law or other forms of legislated action. In other agencies, the decision to outsource was driven by the need for specialized services or staff reductions that have made it difficult for DOTs to continue providing the desired level of service with the resources available.

### Action Items

The scan team agreed on a number of activities to help disseminate the lessons learned to other transportation agencies, as discussed in this section of the report.

#### Collaborate with the AASHTO Subcommittee on Maintenance

The scan team members recognize the importance of working with the American Association of State Highway and Transportation Officials (AASHTO) Subcommittee on Maintenance<sup>24</sup> (SCOM) to develop a plan for the implementation of the scan findings. Therefore, one of the first actions that will be taken is for the scan team to present these action items to the AASHTO SCOM for consideration. The goal will be the development of specific actions that the SCOM will take to advance the state-of-the-practice. The scan team recognizes that the SCOM is not obligated to act on any or all of the action items presented in this report; however, it may choose to consider these as suggestions from a subset of fellow practitioner.

#### Present Findings at Professional Meetings and Conferences

The findings from the scan are summarized in this report, which will be made available through the National Cooperative Highway Research Program (NCHRP)<sup>25</sup> web site . In addition to making the report available, the scan team members have agreed to present their findings at professional meetings and conferences, including annual and regional meetings of AASHTO, the annual meeting of the TRB, and other technical conferences. The presentations will concentrate on the key findings from the scan, including a summary of the types of practices that are outsourced, the considerations that must be taken into account when making the decision to outsource, and the unique aspects of each of the common contracting methods.

#### Establish a Technical Services Program to Support Large-Scale Maintenance Contracting

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<sup>24</sup> AASHTO Subcommittee on Maintenance, American Association of State Highway and Transportation Officials, <http://maintenance.transportation.org/Pages/default.aspx>

<sup>25</sup> National Cooperative Highway Research Program, Transportation Research Board, <http://www.trb.org/NCHRP/NCHRP.aspx>

Experience indicates that one of the greatest challenges in a successful large-scale performance-based contract is to develop effective performance outcomes that achieve the agency's objectives without putting unreasonable demands on the contractor. Another challenge that agencies face is developing contracting mechanisms that provide adequate protection to the agency without being overly restrictive for the contractor. In each agency that has used these types of contracts, it has taken more than one generation of contracts for the agency to begin to feel comfortable with the way the contract is working. Therefore, the scan team plans to work with the AASHTO SCOM to establish a Technical Services Program focused specifically on establishing maintenance performance measures and contract guidance to support the large-scale outsourcing of maintenance activities as part of a performance-based contract.

### **Create an On-Line Library for Contract Specifications**

In addition to the Technical Services Program, the scan team intends to develop an on-line library for storing maintenance contract documents submitted by state and local transportation agencies. Ideally, the documents will be stored in a searchable format that will enhance the usefulness of the information to practitioners. For example, if an agency wants to learn about typical contract durations, the search feature will enable the user to quickly find that section of the available documents.

### **Promote Training**

As noted in this report, large-scale, performance-based contracts require a change in the traditional way a transportation agency does business. In-house staff often view outsourcing negatively due to concerns that may or may not materialize, such as staff losing their jobs. In part, these fears can be overcome by sharing informed information about the experiences that others have realized with maintenance contracting. Additionally, this report documents the need for specialized training for maintenance inspectors to learn about contractual terms that are included in maintenance contracts and to focus on monitoring performance outcomes rather than the more traditional method specifications.

The scan team proposes to work with FHWA's Office of Asset Management, Pavements, and Construction<sup>26</sup> to promote training on maintenance contracting for maintenance personnel. This training will address the following topics:

- Shifting inspection activities from a focus on pay items to overall performance measures
- Establishing strategies for monitoring contract scheduling and performance within predefined timeframes
- Establishing effective contracting strategies for maintenance outsourcing
- Building a partnership with contractors

### **Conduct Periodic Maintenance Workshops to Focus on Relevant Issues**

The scan team members were able to experience the benefit of collaboration among the maintenance professionals across the country as it relates to maintenance contracting. Building on that collaboration, the scan team plans to work with the FHWA and AASHTO to establish periodic maintenance workshops or peer exchanges that address relevant maintenance issues (e.g., the development of common performance measures for performance-based maintenance contracting).

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<sup>26</sup> Asset Management, Federal Highway Administration, <http://www.fhwa.dot.gov/asset/index.cfm>

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## Implementation Strategy

The maintenance community provides many conduits to disseminate the scan team's findings. The planned implementation actions that the scan team will champion include, but are not limited to, the following items:

- Develop a PowerPoint presentation that summarizes the findings of the scan team. Distribute the presentation to all scan team members for their use at conferences and other technical meetings. Specifically target the following conferences for presentation:
  - AMOTIA conferences
  - AASHTO regional conferences, including Southeastern Association of State Highway and Transportation Officials (SASHTO) and Western Association of State Highway and Transportation Officials (WASHTO)
  - AASHTO SCOM meeting (to be held in Charleston, WVA in July 2014)
- In cooperation with the AASHTO SCOM, present the PowerPoint presentation as part of a webinar sponsored by FHWA, AASHTO, or TRB.
- In collaboration with the SCOM leadership team, pursue funding for a pilot state to determine the true costs of maintenance activities.
- Work with the TRB Maintenance and Operations Management Committee and the AASHTO SCOM to find a web site for hosting the online library of contract specifications.
- Work with the AASHTO SCOM leadership to create a plan for encouraging state DOTs to participate in training on performance-based training and establishing a Technical Services Program to support the use of performance-based contracts for maintenance outsourcing.
- Publish a summary of the scan team findings in technical magazines read by maintenance personnel.



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## 6.0 Recommended Next Steps

The following recommended next steps are made with the intention of collaborating with the AASHTO SCOM to evaluate implementation. The SCOM will not be obligated to act on any or all of the recommendations, but may choose to consider these as suggestions from a subset of state maintenance practitioners.

- **Form a performance measures and contracts Technical Services Program under the AASHTO Subcommittee on Highway Transport<sup>27</sup>**

The scan team suggests that a formal Technical Services Program be established for performance measures and contracts to support transportation agencies in developing appropriate performance measures and targets, as these are the critical pieces of specifications that are used to administer performance-based maintenance contracts.

- **Web upload of specifications**

The scan team saw a great benefit in having an electronic library of specifications that are used by various agencies to implement maintenance contracts.

- **Develop performance-based maintenance contract training**

While training exists for the development of these contracts, the scan team recommends that training be developed that is specific to administering performance-based maintenance contracts to shift the mindset of administrators and inspectors. Learning objectives should include:

- Exercises in shifting inspection activities from specific pay items to overall performance measures
- Shifting mindset away from direction of work to acceptance of contractor scheduling and performance of work within predefined timeframes
- Insertion of agency-specific specifications that allow the participants to gain familiarity with particular aspects of the contract requirements
- Optional exercises including potential or actual contractors to gain an understanding of the partnership that has to exist between the contractor and owner

- **Biennial maintenance quality assurance/contracting workshop**

The scan team members have experienced the benefit of collaboration among the maintenance professionals across the country as it relates to understanding maintenance quality assurance as it relates to establishing standard performance measurement techniques. The team saw a need to formalize this collaboration and support development of common performance measures for asset management of maintenance features.

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<sup>27</sup> AASHTO Subcommittee on Highway Transport, American Association of State Highway and Transportation Officials, <http://highwaytransport.transportation.org/Pages/default.aspx>





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## 7.0 Implementation Strategy

The maintenance community provides many conduits to disseminate the findings and recommendations of this scan team and workshop participants. The planned implementation actions that the team will champion include, but are not limited to, the following:

- National Highway Institute webinar (may be established with the cooperation of the AASHTO SCOM)
- AMOTIA Presentation (held in 2011 and 2013)
- SASHTO Maintenance Presentation (conducted peer exchange in 2011 following the scan meeting)
- Provide the scan results to the TRB maintenance liaison (needs funding for conference calls and travel)
- WASHTO maintenance presentation
- AASHTO SCOM presentation (tentatively scheduled for 2014 SCOM annual meeting)
- Pursue pilot state to determine internal costs (to be considered by the SCOM leadership group)
- American Public Works Association and National Association of Country Engineers presentation (to be considered by the SCOM leadership group; needs funding for travel)
- Consider a survey to track implementation of best practices (to be considered by the SCOM leadership group)
- Publish a summary in technical magazines (to be considered by the SCOM leadership group)

## APPENDIX A : SCAN TEAM CONTACT INFORMATION

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**APPENDIX B : SCAN TEAM BIOGRAPHICAL SKETCHES**

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# Appendix B:

## Scan Team Biographical Sketches

**GREG DUNCAN (AASHTO CHAIR)**, the Assistant Chief Engineer of Operations for the Tennessee Department of Transportation, is responsible for coordination of construction projects and maintenance and operations of the highway system. He has under his direction the four regional offices and the headquarters divisions of Traffic Operations, Materials and Tests, and Construction, and Maintenance. Since joining TDOT in 1994, Duncan has served in the Structures Division and in the Materials and Tests Division and has served as an Assistant Director of Construction, as the Regional Director for Region 4, and as Director of the Maintenance Division. He is an active member of the AASHTO Subcommittee on Maintenance, Systems Operations, and Management, and the Special Committee on Transportation Security and Emergency Management. Duncan is also a charter member of the Middle Tennessee Section of the American Society of Highway Engineers, where he is a past chapter president and current member of the board of directors. A licensed engineer, Duncan earned a bachelor's degree in civil engineering from Tennessee Tech University and a master's degree in civil engineering from Auburn University.

**ROBERT "CHRIS" CHRISTOPHER** is the Director of Maintenance Operations and the State Maintenance Engineer for the Washington State Department of Transportation (WSDOT). His responsibilities include oversight of the Highway Maintenance Program, Emergency Operations and Security, the Transportation Equipment Fund, and the Capital Facilities Program. Together those programs have a biennial budget of over \$500 million. Christopher began his role as Director of Maintenance Operations in 2006. He has 20 years of experience at WSDOT across a wide variety of functions, including hydraulic design, construction project delivery, traffic engineering, and highway maintenance. He earned his bachelor's degree in civil engineering from St. Martin's University in Lacey, Washington.

**JENNIFER BRANDENBURG** is the State Road Maintenance Engineer for the North Carolina Department of Transportation (NCDOT). In this position, she is responsible for monitoring the performance of the department's maintenance program through the setting and measuring of maintenance and operations performance measures. This role includes the administration of the department's Maintenance Management System and Maintenance Condition Assessment Program. In her 24 years with NCDOT, Brandenburg has held various maintenance and construction positions monitoring both contractor and employee performance and communicating results to senior management, legislators, and the traveling public. In addition to various national research committees, Brandenburg currently serves on the AASHTO Highway Subcommittee on Maintenance as vice-chair of the Pavements Technical Work Group. She is the past chair of the Performance Measures Focus Group, which coordinates the Maintenance Quality Assurance library web site for benchmarking common maintenance measures. Brandenburg is a graduate of North Carolina State University with a bachelor's degree in civil engineering and is a licensed professional engineer in North Carolina.

**CAROLYN DILL** is the Deputy Division Director of the Maintenance Division of the Texas Department of Transportation (TxDOT) in Austin. In that capacity, she is responsible for maintenance management, maintenance contracts, emergency management, and the field engineer program. She came to the division as Director of Maintenance Management, where she oversaw the Compass Project, the Four-Year Pavement Management Plans, and the Bridge Preventive Maintenance Program, along with other special projects. Dill has been with the department since 1995 and has held the positions of District Maintenance Engineer, District Planning Engineer, and District Traffic Engineer in the Odessa District. Dill is a graduate of Texas A&M with a bachelor's degree in nuclear engineering. Prior to her career at TxDOT, she worked for the Tennessee Valley Authority and was the County Engineer for Ector County. She is a licensed professional engineer in Texas.



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**CALEB DOBBINS** has been the State Highway Maintenance Engineer for the New Hampshire Department of Transportation (NHDOT) since 2006. His position is responsible for the administration of the Bureau of Highway Maintenance, encompassing the headquarters section, which is based in Concord, as well as the operation of the six highway districts located throughout the state. He has been with the NHDOT since 1989, serving as a Contract Administrator for the Bureau of Construction until 2001, when he joined the Bureau of Highway Maintenance as the Assistant State Highway Maintenance Engineer. Dobbins is currently a member of the AASHTO Subcommittee on Maintenance and the FHWA Clear Roads Pooled Fund Study Committee. He holds a bachelor's degree in civil engineering from Carnegie-Mellon University and is a licensed professional engineer in New Hampshire.

**TIM LATTNER** is the Director of the Office of Maintenance for the Florida Department of Transportation (FDOT). His primary duties include the development of policies, procedures, and budget to ensure that all state roadways and bridges are maintained at or above FDOT standards; operations management; contract management; network-level maintenance strategies; and technical supervision. The Office of Maintenance has oversight for the maintenance and management of 43,138 lane miles, 11,906 bridges, 65 rest areas, and the operation of 24 fixed-scale weigh stations. His career began in the construction engineering and inspection area, working in various roles from Inspector to Project Engineer on roadway and bridge projects over an 11-year period, until he moved into his current position in 2006 in the Maintenance Department. He has worked for both private industry and the state government during this period. Lattner graduated from University of Central Florida with a bachelor's degree in civil engineering and is a registered professional engineer in Florida.

**LESLIE W. MIX** is the Maintenance Management Administrator for the Louisiana Department of Transportation and Development (LA DOTD). In her current position, she is responsible for administering a statewide engineering program for the maintenance of highways. She oversees the development/implementation/improvement of LA DOTD's statewide maintenance management systems, Agile Assets, and SAP Plant Maintenance. She administers the statewide Equipment Unit, which is responsible for selecting and purchasing equipment for a fleet of approximately of 7500 pieces. She is also responsible for the maintenance and operation of LA DOTD's headquarters' ferry system and Central Repair Shop. She also worked for many years as the Assistant Maintenance Engineer for one of LA DOTD's district offices. Mix has a bachelor's degree in civil engineering from Louisiana State University.

**AGUSTIN ROSALES** is currently Chief of the Office of Roadway Maintenance in Sacramento for the California Department of Transportation (Caltrans) Division of Maintenance. He started with Caltrans as a student in 1983 and has worked in various divisions and district offices throughout his nearly 29-year career with the agency. For the last 12 years, he has been with the Division of Maintenance with responsibilities in pavement, traffic guidance and safety devices maintenance, emergency response, and performance evaluation (maintenance level of service). A graduate of California Polytechnic State, Rosales is a registered civil engineer.

**ROBERT YOUNIE** is currently the State Maintenance Engineer for the Iowa Department of Transportation. He is a native of Iowa and is a graduate of Iowa State University, where he earned a bachelor's degree in civil engineering.

**RODNEY (ROD) A. PLETAN (SUBJECT MATTER EXPERT)** is a retired State Maintenance Engineer from the Minnesota Department of Transportation (MnDOT). He currently works as a maintenance management consultant and teaches the maintenance operations and management course as part of a public work curriculum at the college level. During his 40-year association with MnDOT, Pletan promoted advanced winter maintenance technologies, both internal and external. He served two years as loaned staff to the American Association of State Highway and Transportation Officials (AASHTO), coordinating its Snow and Ice Pooled Fund Cooperative Program. Pletan was active in several research committees and expert panels for AASHTO, the Strategic Highway Research Program, the Federal Highway Administration, the National Cooperative Highway Research Program, the World Road Association's Road Management (C6) and Winter Road Congress (G1) committees, the Transportation Research Board (TRB), and served as chair of the Winter Maintenance Committee for the TRB. Post-retirement, Pletan coauthored a report entitled Best Practices of Outsourcing Winter Maintenance Service and directed the rewrite and update of the Maintenance Manual for MnDOT. He graduated with a bachelor's degree in civil engineering from the University of Minnesota. He retains his license as a registered professional engineer in Minnesota.

**KATHRYN A. (KATIE) ZIMMERMAN (TECHNICAL CONSULTANT)** is the President of Applied Pavement Technology, Inc. (APTech), a company she founded in 1994. Throughout her career, Zimmerman has worked with both state and local agencies to address the organizational and technical enhancements needed to support the use of asset management principles for making investment decisions for pavements and other roadway assets. She has led Federal Highway Administration (FHWA) and National Cooperative Highway Research Program (NCHRP) projects, including a synthesis on Maintenance Quality Assurance Field Inspection Practices and a Guide to Maintenance Condition Assessment Systems. She recently served as the facilitator for an NCHRP Domestic Scan on Best Practices in Performance Measuring for Highway Maintenance and Preservation. She developed a training course on maintenance management systems for the National Highway Institute (NHI) and developed a training module on maintenance administration activities for the NHI's Maintenance Leadership Academy. Zimmerman is a graduate of the University of Illinois, where she earned both bachelor's and master's degrees. She is a licensed professional engineer in Illinois and 29 additional states. She serves as the Chair of the Transportation Research Board (TRB) Committee on Transportation Asset Management.





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# APPENDIX C: AMPLIFYING QUESTIONS

## Maintenance Functions Subject to Insourcing vs. Outsourcing

- Please provide a brief overview of your organization, including the following:
  - Total lane/centerline miles
  - Total maintenance budget
- If only certain operations are contracted-out:
  - Which operations?
  - Percentage of activity(s) outsourced?
- What maintenance functions remain entirely the responsibility of state forces? Why have those responsibilities been retained in house?
- How long have you been contracting-out maintenance operations?
- Briefly describe your evolution into contracting maintenance operations.
- What issues, if any, do you have in obtaining interest from private contractors? (i.e., more interest in urban vs. less in rural locations)

## Outsourcing Decision-Tree Factors

- What factors or issues are taken into consideration when making decisions as to what is being outsourced and what is not?

## Contract Specifications

- Please provide the performance measurements that you had prior to assigning maintenance functions to private contractors.
- Do you have the different performance measures for in-house work vs. outsourced work? If not, provide the differences.
- Please provide bid specifications, bid documents, and contract documentation for the work being outsourced.
- Provide examples of performance-/outcome-based specifications.
- What is the best time-duration (e.g., years) of contracts and why?
- What is the best size/length (e.g., miles) of a contract and why?
- When are activity-based contracts preferred over asset-based contracts?
- When are output-specifications appropriate and when are outcome-specifications required?
- How are incentives/disincentives applied successfully?
- As your maintenance contracts have evolved, what statute changes have been necessary (e.g., bonding and incentives)?

## Administering Contracts

- How were the performance measures that were in place prior to assigning work to private

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contractors detailed in these contract documents?

- How do you measure contractor performance during the course of the contract?
- Have the contractors performed to the required level of performance required by contract?
- Has that performance changed over time?
- Who is responsible for the tracking of performance and how is it tracked, exactly?
- How much effort does the agency need to exert to administer the contract appropriately?

## Costs and Benefits

- Impact On Organization/Culture
  - What was the disposition of your state employees following privatization (e.g., laid off or reassigned)?
  - To what extent have you disposed of any of your support assets such as fleet, maintenance yards, salt sheds, and buildings as a result of privatization?
  - Have you seen a loss of field-level or management-level employees from your agency to private contractors?
  - Which if any emergency operations have you privatized? How have these contracts performed? What issues have you encountered relative to timely emergency response or overall performance during emergency events?
  - What management structure does your agency use to monitor your contracts appropriately? How does the structure differ depending on the type of contract used to outsource work? Has that administrative cost been factored into the overall cost of the privatization?
  - When determining whether to contract, how do you get a true comparison between contract costs and state force account costs?
- Impact on Infrastructure and System
  - How do you address degradation/improvement of the system due to possible poor/good maintenance practices over the course of the contract?
  - Please describe the three issues that had the most negative impact on maintenance operations performed by private contractors.
  - Please describe the three issues that had the most positive impact on maintenance operations performed by private contractors.
  - Have you been able to quantify long-term effects/costs vs. short-term effects/costs on the system because of contracting?
- If your state has performed an independent financial audit relative to the cost/benefit of the privatization of maintenance functions, please share and discuss value received. If your state performs a cost/benefit analysis in-house, please share and discuss value received.
- Overall, how would you rate your experience with privatization in your state (i.e., poor, fair, good, or excellent)?

## APPENDIX C : AMPLIFYING QUESTIONS

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- What is your best success/worst failure? Why?
- Beyond normal inflation, has the price of these contracts increased over time and, if so, what is the cause?
- How long have these contracts been in place and do you feel it has been long enough to know if they are working as anticipated?
- Based on your experience, what guidance would you give to other DOTs that for whatever reasons are presently doing less privatization of maintenance operations than your state is?





## APPENDIX D : KEY CONTACTS

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# APPENDIX D: KEY CONTACTS

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