
EXTRACT FROM:

Presentation made in 1999 to the IRF Symposium on " Innovative Financing in Transportation Projects" by Kent O Lande, P.E., Asset Manager and Dan Dennis, Contracts Manager, VMS, Inc.

***Performance
Led Comprehensive
Agreement for
Virginia Interstate
Highway Asset
Management Services,
USA***

Introduction

VMS, Inc. of Richmond, VA, USA, entered into a 5 ½ year lump-sum contract with the Virginia Department of Transportation (VDOT) on December 19, 1996, to perform highway asset management services on approximately 2,000 lane km (1,250 lane miles) of interstate highway. The asset management contract was developed on the basis of performance criteria whereby all of the roadway features are maintained to a set of pre-established outcomes. VMS commenced work activities on I-95 on April 1, 1997 and on I-77, I-81 and I-381 on July 1, 1998.

The discussions presented within this paper focus on the use of private contractors to perform over 90 percent of all work rather than having the work performed by staff of public road agencies. The concept brings forward two basic terms: “just-in-time maintenance” and “design for cost”. This practice allows VMS to maintain a very small staff and a low equipment and materials inventory.

Performance and outcomes

- Manage Asset Groups. A set of seven (7) major asset groups were established jointly by VMS and VDOT:

- ① Pavement Maintenance
- ② Roadside Maintenance
- ③ Drainage Maintenance
- ④ Vegetation and Aesthetics
- ⑤ Traffic Services
- ⑥ Snow and Ice Control
- ⑦ Bridge Maintenance

Within each asset group is a series of functional activities that relate to work within the group. For example, within the Pavement Maintenance Group are activities including, but not limited to, Pothole Patching, Base Repair, Pressure Grouting, Asphalt Resurfacing and PCC Resurfacing. Other groups have from 6 to 15 discrete

activities assigned.

- Manage Outcomes. VMS guarantees services to meet agreed upon standards and established performance measures and backs this guarantee with performance bonds. These outcomes were developed jointly with VDOT personnel during the negotiation of the contract and provide written, measurable standards that are monitored on a quarterly basis for compliance.
- Manage Tolerances and Criteria. Each asset has been assigned a tolerance level of acceptance which VMS is expected to meet or exceed. As an example, potholes are not acceptable if more than 75 mm \times 100 mm (3" \times 4") and more than 25 mm (1") deep. Likewise, snow must be plowed to bare pavement within 24 hours after the cessation of a snowstorm. The appendix C presents the outcomes and performance criteria to be reached as well as the tolerances.
- Manage Performance. It was necessary to determine the overall condition of the assets at the time VMS assumed responsibility for them so the efforts required to meet the performance targets could be planned. To ensure the integrity of the data, VMS engaged outside contractors to conduct an impartial assessment of the condition of the assets on I-95 in August 1997. The contractors evaluated all assets in both the northbound and the southbound lanes at 75 randomly selected one-tenth mile sections. These assessments showed that the maintenance rating (MRP) of the entire I-95 corridor was 85.1 compared to the VDOT requirement of 92.8.

A large number of culverts and drop inlets in the drainage asset group were deficient. Many of the signs and pavement markings in the traffic services group were also found to be

inadequate. The most significant deficiency in this asset group, however, was that many roadway lighting units were inoperative.

After the initial findings were analysed, plans were developed to concentrate maintenance efforts on these deficiencies. Additional contracts were prepared and awarded to clean drainage structures and to map the highway lighting, circuitry throughout the corridor. VMS employees checked all regulatory signs and replaced those that were missing or in an unacceptable condition. Additionally, a contract to analyse the level of sign retroreflectivity was completed.

VMS recognised that up-to-date information about the state of maintenance provides an excellent management tool. To ensure consistency, the same contractors performed the additional evaluations. Ratings are conducted on a quarterly basis so VMS can collect the data necessary for proper planning as well as to evaluate its performance.

The second assessment on I-95 was completed in December 1997. The data showed that the overall maintenance rating increased to 91.5, and that a significant improvement had occurred in the drainage and traffic asset groups. The third maintenance rating was performed in April 1998. Again, the overall rating improved to 92.8. The July 1998 rating of 95.4 showed that further improvement had been made.

The first assessment of the assets associated with the Interstate 77, 81 and 381 corridors was done in April 1998. The combined rating for these corridors was 79.4.

The table below reflects the MRP achieved for the Traffic Group through four ratings taken between September 1997 and July 1998. Similar tables have been developed for Drainage, Roadside and Pavements and their respective asset elements.

MRP ACHIEVED - INTERSTATE 95 - VIRGINIA

Asset Group Asset Item	VDOT Required MRP	WMS MRP ACHIEVED - INTERSTATE 95					
		97-1	97-2	98-1	98-2	98-3	99-1
TRAFFIC		Sep-97	Dec-97	Apr-98	Jul-98	Dec-98	Mar-99
Signals	100						
Regulatory Signs	100	80.56	81.82	93.1	91.67	100	97.06
Other Signs	90	88.24	91.36	95.52	97.22	98.18	96.83
Highway Lighting	90	57.14	69.57	52.94	73.91	84.62	88.24
Pavement Messages	95	86.36	100	94.12	87.5	81.25	90.48
Pavement Markings	95	91.33	98.64	95.33	95.33	90.67	96.67
Pavement Markers	90	76.15	83.33	81.82	94.17	83.92	93.75
Guardrail	100	76.92	84.72	93.33	94.67	88.21	88.89
Traffic Detector Loops	100	---	---	---	---	---	---
Impact Attenuators	100	100				100	100
Truck Ramps	100	---	---	---	---	---	---
Overhead Signs	90	100	100	100	100	100	100
Object Markers/Delineators	90	50.55	62.82	78.79	93.02	93.17	95.79
Glare Foils	90	100	100	100	100	100	100

Contracting process

- Identify Work Needs – VMS staff determine when work needs to be accomplished through the use of software programs that schedule work and also via routine field observation of the roadways.
- Break Work into Packages – Some activities are stand-alone activities. Sub-contractors are assigned their work based on their individual contracts but sized according to VMS' assessment of a specific Work Order. Other activities are packaged together, especially when a given sub-contractor has provided responsible and responsive bids for more than one similar activity.
- Types of Contracts – VMS, Inc. has developed three levels of contracts. (Defined later in this paper).
- Meetings with Contracting Community – VMS, Inc. holds regular meetings with the contracting community in each of its three interstate highway corridors. These meetings provide an opportunity for small and/or minority-owned businesses to learn of VMS and to other their services.
- Bidding Procedures – All contracts are solicited through a bidding process with notices published in area newspapers and in contractor bulletins. Bids are publicly opened and read.
- Contract Award and Execution Procedures – Contracts are normally awarded to the lowest responsive and responsible bidder after his submission of all documents required as a part of the tendering process. However, VMS Inc. reserves the right to enter into agreements with more than one contractor if it is in VMS' best interests. As previously noted, contracts may be one time or annual contracts with all work subject to the development of a specific Work Order for the task(s) expected to be accomplished.

Contractor outreach activities

VMS does not perform maintenance operations but creates opportunities for Virginia businesses by using contractors to

provide labour, materials, and equipment as needed.

VMS began early in 1997 to identify contractors that might be interested in performing maintenance work on I-95. The company held meetings in three communities along the highway corridor to explain its open, fair and inclusive competitive bidding process. Newspaper advertisements and letters of invitation mailed to contractors on VDOT lists resulted in standing-room only attendance. VMS staff discussed the firm's approach to asset management, the types of contracts, how they would be packaged, and the procedures that would be followed in advertising and awarding work to the responsible contractor who submitted the lowest responsive bid.

VMS's program to attract qualified Virginia subcontractors, which included newspaper advertising, community meetings, and direct mail to contractors on VDOT lists, resulted in more than 300 firms asking to be notified of bid opportunities.

VMS also established backup contractors for some activities. This ensured that the work would be done if the contractor to whom the contract was awarded could not accomplish it within the timeframe necessary to achieve the performance targets.

VMS sought out minority - and women - owned small businesses and offered special workshops and training sessions to enhance the ability of these firms to compete successfully for contracts. The events included seminars on estimating, which were held in Richmond and Marion, and on-the-job-training in proper performance of litter pick-up, graffiti removal and small sign placement, provided in Petersburg.

- Minority-owned businesses were awarded contracts totaling nearly \$1.9 million in VMS fiscal year 98-99.
- Minority-owned businesses have completed nearly \$1.2 million of work in VMS fiscal year 98-99.

- Minority-owned and small businesses make up nearly 25% of the VMS, Inc. contractor database.
- VMS has collaborated with the Virginia Department of Minority Business Enterprise.

VMS, Inc. staff has developed classes for small contractors to train them how to do highway maintenance work. These informal classes are presented by VMS staff at no charge to the contractor, for field activities, all safety gear is provided during the training. Topics include: Estimating, General safety practices, Traffic Control, Training specific to the type of work.

VMS contracting philosophy

As previously outlined, VMS does not self-perform maintenance work but instead relies on the private contracting community to carry out all work activities. This then translates into several fundamental differences from a traditional governmental approach to asset management.

- Work is bid to a broader pool of Contractors
- More competition = lower price
- Reduce paperwork requirements
- Mandatory pre-bid less misunderstandings and claims
- VMS can assume more risk for a lower contract price
- Contractor's money and bonding capacity is not tied up with retainage or bonds on small work.

Contracts

VMS began in the spring of 1997 to prepare contract documents for work to be performed by contractors. Contracts are of three basic types, depending on the monetary value and the complexity of the work. The simplest ones are for work that does not require large specialised equipment. They range in value up to \$50,000, and they are packaged to interest small contractors. These contracts do not contain requirements for bid and performance bonds.

The next level of contract includes pavement maintenance, snow and ice control, general bridge maintenance, guardrail repair, and pavement striping. VMS does not require a bid bond but may require a performance bond of up to 50% of the contract value. These contracts range in value from \$50,000 to \$250,000.

The most complicated contracts are for pavement inlays/overlays and major bridge repairs. This is work requiring plans and contractors with specialized equipment and substantial experience. For that reason, VMS considers only those contractors pre-qualified by VDOT for this type of work.

Level I

Small Service Contracts – VMS' Level 1 contracts are routinely reserved for very small contractors and are very limited in scope. They have a small dollar value, are quite simple in terms of contract specifications and provisions, and normally do not require a performance bond. Instead, VMS, Inc. carries the bonding responsibility. These features allow the small subcontractors to be able to provide their service at a cost normally lower than that of larger contractors.

Features of Level I Contracts:

- Up to US \$50,000
- Types of Work:
 - Shoulder Maintenance
 - Vegetation/Aesthetics
 - Drainage Maintenance
- Contract Contents:
 - Bid Solicitation Notice

- Bid Proposal Form
- VMS Special Provisions
- VMS General Conditions
- VDOT Specifications (Generally Materials Related), if necessary
- Plans Package, if necessary
- Bidding Procedures:
 - Local Bid Requests
 - Three or more bids for an award
 - Purchase order/service contract
 - No bid or performance/payment bond required

Level II

Level II contracts are normally Medium/Specialty Agreements that involve a higher level of sub-contractor expertise as well as equipment and resources. Scope of work is more detailed and work activities are more complex.

Features of Level II Contracts:

- US \$50,000 up to US \$250,000
- Types of Work:
 - Pavement Maintenance
 - Snow & Ice Control
 - Bridge Maintenance
 - Traffic Services
- Contract Contents:
 - Bid Solicitation Notice
 - Bid Proposal Form
 - VMS and/or VDOT Special Provisions
 - VMS General Conditions
- VDOT Specifications (Work Process and Materials), if necessary
- Plans Package, if necessary
- Bidding Procedures:
 - Local Newspaper Advertisement
 - Two or More Bids w/o Second Advertisement
 - Emergency Award Declaration/Top Management Approval
 - Mandatory Pre-Bid Meetings
 - No Bid Bond
 - Performance Payment Bond may be required up to 50% of contract value

Level III

Level III Contracts are reserved in most cases to Restorative Type Work. This includes pavement milling and overlays as well as major bridge rehabilitation. Contracts are normally in excess of \$250,000 and may take several months to complete.

Features of Level III Contracts:

- Types of Work:
 - Pavement Repairs/Overlays
 - Bridge Rehabilitation
 - Normally Large \$ Value
- Contract Contents:
 - Bid Solicitation Notice
 - Bid Proposal Form
 - VDOT Special Provisions
 - VMS General Conditions
 - VDOT Specifications
 - Plans Package
- Bidding Procedures:
 - Advertisement Once Every Week for Two Weekly Periods
 - Competitive Bidding and Award
 - Certified VDOT Contractors/non-barred Status
 - Mandatory Pre-bid Meetings
 - Bid Bond Required 5% of Bid
 - Performance/Payment Bond 100% of Contract Value
 - A Contract May Have DBE/MBE/SBE % Requirements
 - An Award to Lowest Responsive Bidder
- Contract Award and Execution Procedures:
 - Bids Received One Week after Mandatory Pre-bid Meeting
 - Public Bid Opening
 - Bid Analysis/Award Recommendation
 - Award Notification & Contract Execution

Summary of Accomplishments

The chart below is a brief description of the accomplishments and costs for several maintenance items.

Activity	Number of Units	Unit of Measure	Cost
Asphalt Patching	500	Ton	\$ 497,700
Pavement Joint Repair	85	Lane Mile	\$ 565,000
Shoulder Repair	104,500	Square Yard	\$ 81,500
Fence Repair	26,200	Lineal Foot	\$ 375,000
Drainage Structure Maintenance	530	Each	\$ 85,900
Drainage Culvert Maintenance	65,400	Lineal Foot	\$ 205,500
Roadside Mowing	9,750	Acre	\$ 1,056,500
Graffiti Removal	16,400	Square Feet	\$ 127,200
Delineator Replacement	3,875	Each	\$ 116,000
Sign Replacement	785	Each	\$ 339,700
Guardrail Repair	71,400	Lineal Foot	\$ 1,398,300
Pavement Marking	678,700	Lineal Foot	\$ 311,000
Incident Response	640	Each	\$ 940,000
Glare Foil Replacement	593	Each	\$ 32,100
Highway Lighting Repair	720	Each	\$ 577,000
Bridge Deck Repair	150	Square Yard	\$ 312,100
Bridge Superstructure Repair	4,200	Square Yard	\$ 3,100,700
Bridge Joint Replacement	14,700	Lineal Foot	\$ 360,000

Cost savings

- VDOT estimated savings of \$22 million over the course of the five and one-half year contract;
- Due to the investment orientation of the VMS approach, the savings were expected to be minimal to low in the first year and to rise throughout the project, with the greatest savings realized in the final years.
- The expectation was that the road would be maintained in its existing condition.
- The initial condition of the road was below expectations.
- VMS was able to improve the highway beyond its existing condition and nearly achieve the established goals within budget.
- VMS believes that the work performed to increase the maintenance rating from 85,1 to the contract level created a cost savings

for VDOT as this work was done without any change order. It is VMS' estimate that the level of savings is between \$750,000 to \$1,000,000.

- Had the level of service been placed at the 85,1 level which existed in summer of 1997 rather than the 92,8 level of the *Agreement*, this would translate to savings of about \$1,250 to \$1,500 per lane mile.

Lessons learned

Every new venture usually experiences a few “bumps in the road” yet the implementation of this public-private partnership was remarkably smooth, with relatively few and rather minor glitches, most of which occurred in the early months. That this was the first contract of its type made the accomplishment by VDOT and VMS even more remarkable.

During the first year VMS attempted to learn from its errors and adopted new procedures to prevent recurrences. The following are a few of the most significant lessons learned in 1997.

Incident Response Services

Incident response was the activity that provided the most learning opportunities, largely due to a higher than anticipated volume of accidents. VMS assumed responsibility for this activity in April 1997. After responding to nearly 30 incidents on I-95 in the first month, it was obvious that the number would be far greater than available statistics indicated, and that additional resources were necessary. VMS modified its approaches, obtained additional equipment, and was diligent in achieving its timely response requirements.

It became apparent that rather than relying on a contractor for the placement of lane closures at all incidents, it would be more efficient and, in some instances, more economical, to have the in-house capability to do this. VMS acquired the equipment and traffic control devices needed.

Communication and coordination with police, fire and rescue workers at the incident site are very important. VMS initially equipped its personnel with cellular telephones but added two-way radios after realizing they were more reliable in some situations. VMS also learned that it would be helpful and efficient, to have access to the Virginia State Police (VSP) radio system, but was advised this would not be feasible.

To further improve coordination and communications at incident sites, VMS hired a retired VSP sergeant to serve as emergency response coordinator. This proved most effective.

Several accidents caused liquids to be spilled onto the pavement. Usually sand is spread

on the wet pavement to absorb the liquid and then swept from the roadway leaving a dry pavement. VMS originally intended to have contractors accomplish this task. It soon became apparent that the response time of the contractor was not always acceptable. Consequently, VMS equipped one of its trucks with a tailgate spreader so that it could be used to spread sand when it appeared that a contractor could not be available within an acceptable timeframe.

VMS learned the importance of meeting early on with state police, fire, and other agency personnel to improve coordination at incidents. VMS staff working on I-77, I-81 and I-381 visited with community officials well in advance of assuming maintenance responsibilities.

Drainage

Several severe rainstorms in the spring and early summer of 1997 caused the unnecessary flooding of some ramps and shoulders in the Richmond metropolitan area. Drop inlets in the barrier wall drain the affected locations, and the culverts leading from them were partially or completely blocked. A concentrated effort was made not only to clean the drop inlets but also to identify and clean the outfall culverts. Since this was done, routine flooding has not occurred as the drop inlets and culverts are functioning properly. The heavy rainfalls caused debris to cover the grates and/or slot openings of the drop inlets. It was sometimes difficult, because of the debris, to locate these and clean them so that proper drainage could be restored. Blue delineators were placed on the barrier walls directly above the drop inlets to identify their location. This will also assist maintenance crews during heavy snowfalls.

Roadside

The wildflowers in several beds established before VMS took over did not grow well. The

services of a landscape architect were utilized, to develop a realistic plan for the management of the wildflower beds in the I-95 corridor. One of his findings was that the soil in several locations was depleted of nutrients and could not support the wildflowers. Another was that different wildflowers, ones that could better withstand the harsh roadside environment, should be used. A new seeding mixture and a program of bed rotation were established to improve the appearance of the roadsides in the corridor.

Traffic

There have been many collisions with exit sign posts located in the off ramp gore areas. Delineation devices were added to better direct traffic from the deceleration lanes onto the ramps. Since this was done, there has been a marked reduction in the number of sign posts hit by vehicles.

Pavement

It became apparent early on that the life of some of the patching material being used on concrete pavement was not as long as hoped. These early failures meant that the same location had to be patched several times causing a disruption in the flow of traffic each time. To remedy this repetitive activity, VMS contracted to have Roadflex™ placed. It has proven to be very effective on bridge decks and concrete pavement. This material has performed very well and VMS will continue its use.

Contractors

Despite extensive outreach activities, VMS experienced some resistance to the concept of privatized maintenance on the part of trade associations and individual contractors. Although many fears were allayed as VMS awarded contracts through its fair, open and inclusive competitive bidding process,

concerns persisted. This situation resulted in a delay of some activities planned by VMS as well as higher prices than expected for some activities.

While VMS attracted a number of highly qualified contractors who performed quite well, five contracts were terminated for non-performance.


To date, VMS, Inc. has been successful in soliciting sub-contractors to perform work on all three of its interstate highway corridors. We developed an On-the-job training program for small and MBE/DBE sub-contractors to expand our sub-contractor base and we are seeing positive results from that training program. We have found that in many cases unless training such as this is provided, these small firms do not feel they are capable of working on interstate highway programs. The normal government-induced rules and regulations and the amount of time to administer the contracts generally are a deterrent to very small businesses. The methodologies used by VMS are intended to simplify the overall contracting process and to expedite payments to these businesses when their work tasks are completed.

Reporting

VMS experienced problems in integrating its financial and operations software, which affected its ability to deliver timely monthly reports. The problems were resolved and all monthly reports are prompt.

The Project After Two Years

As of July 1, 1999, VMS has been operating for two full years on the I-95 corridor and one full year on the I-81 and I-77 corridors. All operations are going very smoothly and MRP's are increasing as routine maintenance is performed on a scheduled and periodic basis. Government officials and ordinary



citizens are routinely stating that the roads are in better condition than they were prior to 1997. Additional contractors have been trained and are working to the expected level of performance expected in the standards of quality. Because of this, unit prices are lower than during the first year and contractors are much more willing to submit bids to work for VMS.

VMS has received several letters of recommendation from the Virginia State Police for its work on incident management. Several newspapers and trade magazines have had feature articles on the project and how it is changing the nature of maintenance in Virginia.

With the new projects in Texas and Mississippi, VMS will be continuing to expand the fundamentals of privatized asset management and the use of small, intermediate and large contractors to perform maintenance “just-in-time”.