

**Contracted Maintenance Services  
At the Ministry of Transportation, in Ontario**

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## **ABSTRACT**

### **Session: Best Practices in Contracting Routine Maintenance Services – From Managed Outsourcing to Full Private-sector Delivery**

In 1996, the Ministry of Transportation (MTO) began the transition from an in-house delivery of maintenance services to a fully outsourced delivery model. Prior to then, the ministry had contracted approximately 50% of the winter equipment fleet, although the ministry managed and directed all of the work.

The ministry carried out a full business case assessment including jurisdictional scans and a risk analysis of options for, and benefits from, outsourcing maintenance operations. The ministry's goals were to ensure service standards would be met, achieve value for money, and create an environment that is conducive to the development of new methods and technology. As a result of the assessment, the ministry decided to outsource the majority of its maintenance services provided value for money could be realized. The ministry's role would concentrate on policy and standards development, priority setting, contract monitoring and evaluation.

By 2000, the ministry had outsourced almost 100 percent of maintenance operations. A blended approach of two contract types, Managed Outsourcing (MO) contracts and Area Maintenance Contracts (AMC), was developed to ensure a viable and competitive supplier base. In MO areas a number of functional contracts are managed and directed by the ministry. In AMC areas, the contractors perform most or all of the maintenance activities in a given geographic area under a lump-sum payment system. The AMC contractor manages and plans the work in order to fulfil the standards and specifications in the contract.

There were a number of challenges moving from direct delivery to an outsourced delivery environment including the development of contracts with the appropriate risk sharing, award procedures, and monitoring. Communication with industry stakeholders was a critical success factor during and after implementation.

Most of the first generation of AMC contracts has now expired and the ministry will complete the renewal of the second generation of AMC Contracts in May 2005. The contracts continue to be refined as experience is gained generally with more comprehensive work and longer duration.

As a result, a robust and experienced private sector industry has developed and is providing high quality routine maintenance work at competitive prices.

## **1. INTRODUCTION AND BACKGROUND**

The Ministry of Transportation of Ontario is responsible for the design, construction and maintenance of the provincial highways in Ontario, totalling 46,564 lane kilometres of highway including 2,712 bridges. The current value of the system is estimated to be \$39 billion with annual capital expenditures of \$1 billion and annual maintenance costs of \$240 million. Table 1 defines capital and maintenance work.

Since the 1970's, the Ministry of Transportation of Ontario (the ministry) had privatized portions of highway maintenance. By 1995, the level of privatization was approximately 50 percent, but with ministry staff directing all work. The majority of the outsourced work was for snow and ice control. At that time, government direction advocated a smaller government structure, with fewer services being performed directly by government. In addition, comprehensive ministry visits to other jurisdictions, including those with similar climatology, indicated that highway maintenance services could be effectively contracted out while maintaining service levels.

The ministry developed a business case, which reviewed the current delivery methods and the potential alternate delivery models including a risk analysis and expected financial returns. The business case was completed in 1996, and central government agencies endorsed proceeding with two different methods of delivery (Area Maintenance Contracts (AMC) and Managed Outsourcing (MO) contracts) at a number of locations across the province in order to examine the impacts and benefits of each model. It was planned that the privatization would be completed by 1999, and a savings goal of 5% was set.

## **2. CONTRACT TYPES**

The business case defined the ministry's goals as ensuring appropriate service standards are met, getting value for money, creating an environment that is conducive to the development of new methods and technology, and developing a sustainable highway maintenance industry that is well positioned to deliver a full maintenance program in the long term. The ministry's role would concentrate on policy and standards development, priority setting, monitoring and evaluation.

Three delivery models were identified that could fulfil the ministry's vision: Managed Outsourcing (MO), Area Maintenance Contracts (AMC), and Area Term Contracts (ATC).

Under the MO model all direct delivery in an area is contracted out using a number of functional contracts for supply of labour, equipment and materials; however, the ministry retains local management responsibility (See Table 2.) Highway patrollers, who direct the work and make decisions, such as when to start snow plowing or salting, are employed by the ministry. Contractors are paid on the basis of unit prices by item (such as per day, or per km for plows, graders and sanders; per tonne for pothole patching;

per guide rail replaced; per km of line painting; etc.) Attempts are made to group work in efficient portions, and by like types. Contract duration varies, but initially was up to three years.

The MO model produces significant staff reductions and eliminates the majority of the in-house equipment fleet. Work to the private sector service providers is distributed throughout the province in such a manner that opportunities are provided for a broad range of contractors. The ministry retains flexibility with regard to setting priorities and changing budget allocations. However, significant resources are required to administer contracts. The MO delivery method was expected to produce the most cost effective service in the province's rural areas where some contractors would pass on efficiencies from their lower overhead costs.

In the AMC model, all the maintenance work in a given geographic area is assigned to a single contractor. This would include all winter and summer operations, such as snow plowing, salting, sanding, pothole patching, sign repairs and maintenance, electrical devices, pavement marking, bridge washing and guide rail repairs. The AMC contractor is also responsible for patrolling the highway, and planning, managing, and directing all the work within the contracted area. The area is large enough to provide economies of scale to both the ministry and the contractor. Initially contracts varied from 300-500 equivalent 2-lane kms and the duration was 3 years with an optional two-year extension. The contract includes the ministry's detailed standards, but the contractor is generally not told how to approach the work in order to achieve the required end result. Payment is on a lump-sum basis, with monthly payments in the winter months twice those of the summer months. Payments are increased by an inflation factor during the 2-year extension.

The philosophy behind AMCs is one of partnership between the ministry and the contractor, and the contractor is encouraged to bring forward efficiencies, innovations and new technologies. In an AMC area the ministry's role is one of monitoring, contract administration and evaluation, thus significantly reducing the ministry's staffing requirements. AMCs have other benefits similar to MOs and, in addition have greater potential to realize private sector efficiencies and innovations, and to reduce the ministry's tendering and administration requirements.

In the ATC model a single contractor would be responsible for all the maintenance work in a given area, similar to an AMC contractor, and would also be assigned the responsibility for planning, managing and carrying out all the capital work in the area including rehabilitation and re-construction but excluding expansion projects. An ATC contract may require a greater geographic area and duration than an AMC in order to generate the economies of scale necessary for the required engineering and pavement management systems to be effectively deployed.

All of the contract types had the potential to reduce costs over traditional delivery methods, and it was recognized that it was difficult to conduct accurate costing analysis without testing contractual arrangements and industry response. The recommendations

included proceeding very quickly to implement an initial series of AMCs and MOs in areas across the province. This would also give industry and the ministry experience on costs, delivery, legal and business relationships. Further contracts were to proceed on an incremental approach, allowing direction to be adjusted based on the experience gained.

The challenges included expressing the ministry's legislated responsibility for maintenance and the (previously in-house) maintenance standards in a format that contractors could bid upon. In addition, government guidelines dictated that the contracts must be awarded on a competitive basis.

### **3. PERFORMANCE STANDARDS**

In order for external parties to bid on ministry work, particularly work that they would direct and manage themselves, it was necessary to express the ministry's standards in contract language that was biddable, required a specific end result that did not restrict innovation, and incorporated the legislated obligations and responsibilities of government.

At the time, the ministry had Quality Standards and Operating Instructions, which described methods, equipment and procedures for in-house staff to carry out the work. The ministry spent several months translating these in-house procedures into end-result oriented documents. The specifications are referred to as Maintenance Special Provisions (MSPs) and in general spell out triggers for initiating the work, minimum treatment and reporting standards.

For MO contracts, separate contract documents were developed for each type of work required, and the revised specification text was inserted directly into each specialty contract. The contracts are modular with a standardized front section.

AMCs adopted the modular MSP format for specifications and standards. Although the service standards are the same, the AMC and MO contract clauses are different to reflect differences in contractor responsibilities and payment methods.

In addition, schedules of liquidated damages or penalties were developed for both MO contracts and AMC contracts. In AMC contracts an innovative schedule was developed that had increasingly severe penalties depending on the total number of penalties already levied on a given contract. If the total number of penalties reached a prescribed level, the contractor would not have the option of renewing the contract.

The generic contract packages that have been developed for both AMC and MO contracts contain "designer note" sections, which facilitate contract customization for a given geographic area or specific combinations of work types. The generic contracts are continually updated centrally.

#### **4. AWARD PROCEDURES**

MO contracts follow an open competitive procurement process and the contract is awarded to the lowest responsive bid provided the bid is within the ministry's estimate. If the low bid were higher than the ministry's internal estimate, the ministry normally would elect to re-package and re-tender the work. Bid deposits are used to ensure integrity of the bidding process. Performance and labour bonds are also required to ensure the contract is performed.

For AMC contracts the award is based on a combination of price and the technical merit of the contractors proposal.

AMC contractors must also be pre-qualified by the ministry before submitting a bid. The MTO pre-qualification system has been in use for many years for major capital projects. Any contractor can apply by submitting financial and historical information on projects completed. Pre-qualification is normally used in place of bonds; however, due to the unique nature of AMCs and the lack of performance history the ministry required performance and labour bonds on AMC contractors in the amount of \$1,000,000 per contract.

AMC contracts are normally advertised as a group of 3 or 4 contracts in a given area. Contractors can bid on any one contract in a given area, or all contracts, or any combination.

AMC are generally advertised for ten to twelve weeks, and during that period a non-mandatory bidders meeting is held, where contractors can ask questions about the work, award process or other details. Written questions are also accepted and answers are provided in writing with changes made to the tender by addenda if necessary.

Proposals for AMC contracts must be submitted in 2 parts; a technical submission and a sealed financial bid submission. The quality of each proposal is evaluated by a ministry team for compliance to the contract requirements and is overseen by an external process consultant for consistency and adherence to the prescribed evaluation process. If the technical proposal does not meet minimum criteria, it is discarded and not considered further. Otherwise, proposals are given a quality score. The contractors' price envelope is then opened and their submitted prices are adjusted by a factor whereby decreased quality increases the adjusted price. The contractor with the lowest adjusted price is awarded the contract pending resolution of any unclear components found during the evaluation process. Payment is based on the actual bid price, not the adjusted price.

Prior to the date the proposals are due, the ministry prepares and seals an estimated cost for the work that is based on the estimated cost to deliver the work using in house resources including all applicable overheads. If the price was determined to be too high in a given area the ministry would not award the AMC contract and would either use an

MO approach instead or re-tender the AMC with a different geographic area or revised work requirements that more accurately reflected expectations.

## **5. AMC CONTRACTS**

As AMCs differed the most from the ministry's past practices, they also presented some greater development challenges, including the implicit and explicit sharing of risk with contractors. The philosophy of partnership and the desire to have the contractor share in a significant but appropriate level of risk is reflected in many parts of the contract. It was recognized that there are some risks that cannot be mitigated by the contractor and any attempt to transfer such risks could prove problematic because of either very high prices or the potential for a contractor to default.

The most explicit risk-sharing clause in the AMC is for winter salt and sand usage. Under the lump sum price contractors purchase their own de-icing materials from suppliers and are responsible for all materials used up to 110 percent of the previous five years' average provided in the tender documents. Above 110 percent, the ministry reimburses the contractor for the cost of the material used only. The cost of labour and equipment to apply the material remains the responsibility of the contractor. If the material usage is under 90% of the previous five years' average, the contractor credits 90% of the material price under this limit back to the ministry. There is also risk sharing in place for more expensive freeway guide rail end treatment systems that are damaged by third party accidents.

It was also identified that the quantities for certain types of work are highly variable from year to year. This small portion of the work was excluded from the lump sum price, and is carried out under individual "Work Orders", provided the contractor is prepared to carry out the work at a competitive price. The types of work that are Work Order are defined in the contract and include beaver dam control, maintenance during tree and shrub establishment, culvert installation and extensions, and installing new signs. The overall cost of Work Order activities is generally less than two percent of the lump sum price.

As part of the partnership concept, the ministry recognized the potential benefits of having the AMC contractor perform additional capital work in order to capitalize on the contractor's capacity for highway construction work and to reduce the ministry's administrative costs for tendering relatively low value work. The AMC tender documents identified that minor capital work would be offered to the AMC contractor if the value of the project was less than \$100,000. The value was set in recognition of Ontario's trade agreement obligations to competitively tender all work over \$100,000. This minor capital work includes selective resurfacing, frost heave treatment, guide rail upgrades, minor bridge rehabilitation and gravel shoulder upgrading. Award of this work to the AMC contractor was conditional on the contractor's submitted or negotiated price being within the ministry's estimate of the work. Typically, the total value of this additional work awarded to the AMC contractor using this method ranges from \$200,000 to \$1,000,000 annually per contract area.

It was recognized the successful AMC contractor would need to acquire the necessary equipment within five to seven months normally allotted between contract award and start of work. This would impact the contractor's start up cash flow significantly and ultimately impacts contract prices. Additionally, the ministry would have surplus equipment, which is normally disposed at public auctions. As a result, it was decided that the equipment the ministry had assigned to the work would be offered to the successful contractor at prices that the ministry established based on residual value of the equipment. This was consistent with achieving maximum value for the equipment since it was competitively offered, as part of the large contract, and had the added benefit of allowing contractors to secure equipment in a reasonable period of time.

The ministry had invested considerable capital funds in the acquisition of all the patrol yards across the province. In AMC operations there was consideration given to selling the patrol yards or having the successful contractor establish its own yards. However, due to the large capital investment required and the need to maintain a competitive bidding environment in the future, it was decided that the ministry would retain ownership of the patrol yards and lease the yard to the successful contractor for a nominal amount.

The ministry also decided to retain ownership of its road weather information system (RWIS) rather than transferring to the AMC contractor because the information is of direct ongoing value to the ministry in monitoring the contractors operations. Currently the ministry has 113 RWIS stations and arranges for polling and forecasting services and makes the data available to the AMC contractors.

AMC contract packages include the following: a statement of the partnership philosophy of the contract, definitions and identification of the documents that are included and available, instructions to the contractors about how to submit proposals and how they would be evaluated for both quality and price, the general conditions and scope of the work, the historical data of the work completed in the area, the penalties for non-compliance with the contract, contract forms, the patrol yard lease, an inventory of the road infrastructure and a listing of surplus ministry equipment available for purchase by the contractor.

## **6. IMPLEMENTATION - FIRST GENERATION**

The 1996 business case advocated the accelerated implementation of both AMC and MO contracts, in order to become familiar with both. That year, the first three AMC contracts, for a total of 1214 equivalent 2-lane kms, were awarded in the Chatham area to one contractor.

Two issues then delayed the implementation of further contracts for eighteen months. Firstly, as part of a larger provincial initiative, the government was in the process of transferring some highways to lower tiers of government. Secondly, the rights and

entitlements of the ministry's surplus employees necessitated that the employer make "reasonable efforts" to ensure that employees would have access to the positions in the company to which the work was outsourced. The eventual resolution of the ministry's labour relations settlement paved the way for government to proceed in other program areas with alternate delivery methods.

In 1999, after initial experiences with both AMC and MO contracts, the ministry revisited the business plan and decided to continue implementation with a "blended approach" of both AMC and MO contract models. This approach provided ongoing work opportunities for large and small contractors, continued to develop expertise both externally and within the ministry, and gave the ministry the flexibility to use different contract types in the areas best suited to them or in the event of a non-award of an AMC contract. It was noted that where appropriate and cost effective AMCs are most desirable as they offer maximum transfer of responsibility to the private sector.

By July of 2000, one hundred percent of highway maintenance had been outsourced. There were 7 MO areas with up to 1,900 equivalent 2-lane kms in each area. There were 16 AMC areas, with a combined total of 36 contracts. A total of nine separate companies had been successful in obtaining an AMC, and there were hundreds of smaller contractors participating in MO areas. Fifty-eight (58) percent of Ontario provincial highway maintenance was under the AMC model with the remaining forty-two (42) percent delivered by the MO model. Individual AMC contracts (300-500 equivalent 2-lane kms) range from around \$1.8 million to \$4.5 million per year, depending on size, complexity, traffic volumes and other factors.

In 2001, the ministry retained the services of Deloitte and Touche to determine the savings attributable to outsourcing. They conducted a detailed assessment of costs of delivery and determined the government's savings attributable to outsourcing was 12.5% annually.

## **7. ONGOING REFINEMENTS**

The ministry and industry recognized the need for ongoing dialogue throughout the process to ensure that the program was successfully implemented and carried out. An industry advisory group, referred to as the AMC Council, was created and included one representative from each of the AMC contractors, a representative from the Ontario Road Builders Association (the umbrella industry stakeholder) and representatives from MTO. The committee meets frequently to discuss progress and resolve issues that affect industry as a whole. The council has sponsored annual industry level partnering sessions with a broad cross section of ministry staff and contractors to identify problem areas and work toward solutions.

Working together with industry, the ministry has been able to continue to refine contract language and deal with broad changes impacting all contractors. Changes in the provincial laws that govern traffic protection had an impact on maintenance work

especially on freeways. A provincial protocol was developed in consultation with industry that compensated contractors for the added costs of traffic protection. Interpretive bulletins have been prepared to clarify the required amount of winter equipment required during transition periods when unusual storms can occur.

In the summer of 2000, concern was raised by the industry transportation sector regarding the dramatic increases in diesel fuel prices. A provincial government initiative was established to provide risk sharing to alleviate spikes in diesel cost for truck operators on all construction and maintenance contracts advertised after September 1, 2000. The risk-sharing clause uses a diesel fuel index and adjusts monthly contract payments depending on the percentage change in the index from the tender closing date and the month of payment. The adjustments assume the cost of fuel is 4% of the overall AMC contract price and 8% of the overall MO contract price on certain components of the contract where the activity performed requires the use of diesel-powered equipment such as plows, spreaders, graders and pavement marking equipment.

Obtaining general commercial liability insurance at a reasonable cost became increasingly problematic for contractors after September 11, 2001. The insurance industry had apparently sustained major losses as a result of 9/11 and declining stock markets. In addition, there were some high profile court awards in Ontario involving accidents on icy roads. As a result the insurance industry was looking very carefully at all lines of business including those such as winter maintenance, which they considered high risk. The ministry met with contractors and the Insurance Bureau of Canada to discuss issues and exchange information on contracted highway maintenance in Ontario. A series of meetings resulted in a better understanding by insurers of highway maintenance and associated risks. A number of recommendations were made to clarify the contractual language and procedures in terms that the insurance industry was familiar with. In addition, the ministry elected to clearly indemnify a contractor in lawsuits involving icy roads provided the contractor was in substantial compliance with the contract. Contractors were allowed to opt into the new clauses and terms and as a result contractors have been able to secure the required coverage at competitive rates.

In MO contracts, the local area offices established the basis of payment terms and as a result there was considerable variation. Some areas of the province paid on a kilometre basis while others paid on a time basis with variations on payment for standby and operating. In 2003/04 the ministry undertook to standardize the payment method. After considerable analysis of costs and consultation with industry the ministry elected to use a simple day bid approach with risk sharing. The ministry defined the number of hours that the equipment would normally be operating on an annual basis using historical information. If the actual number of hours worked at the end of the winter season is less than 90% of the benchmark hours, the ministry would seek a credit of \$75 per hour for each hour below the 90% average. Alternatively if the actual number of hours worked were more than 110%, the ministry would pay the contractor an additional \$75 per hour for each hour over the 110% average.

There is an overall trend toward longer-term contracts. This is to reduce the administrative burden of tendering and to allow the contractor to offset the capital cost of equipment and new winter maintenance technologies. MO contractors are now required to supply electronic spreader controls and pre-wetting equipment. Contract durations for MO winter equipment contracts have increased from 3 years to 5 years. For pavement marking in MO areas, the contract duration is 9 years in consideration of the substantial capital cost of this equipment.

## **8. SECOND GENERATION AMC**

The first generation AMC contracts began expiring in the spring of 2002. The success of these contracts provided the impetus to explore more comprehensive contracts with longer terms.

The second-generation contracts were expanded to include all pavement marking and electrical work in the area. The ministry also upgraded the requirements for new technology for winter operations to reduce salt use and improve service by requiring electronic spreader controls, pre-wetting, and anti-icing. A number of activities previously paid for as work orders were also shifted over and required to be included as part of the lump sum payment. This included: beaver dam control, extruded sign maintenance, concrete barrier wall repairs, removal of graffiti and repairs to anti-glare screens.

To further emphasize the contractor's role in quality control the second-generation contracts had elicited specific responses from contractors with regard to their quality control plans during the bidding stage. These were factored into evaluations. The quality component of the RFP evaluation was increased from 1% to 5% to place more value on the contractor's approach.

The AMC model was extended to encompass slightly more of the provincial highway system. Individual AMC contracts were expanded from 300-500 two-lane equivalent km to up to 1418 two-lane equivalent kms.

With respect to risk, the cost sharing on salt and sand has worked reasonably well. In response to the increasing salt conservation benefits offered by further investment in new technology, the cost sharing formula has been modified by reducing the lower end risk-sharing from 90% to 70% and modifying the 5-year salt usage average to a "rolling average" where the average is adjusted yearly based on the contractor's efforts in salt management. The changes will result in the contractor being able to retain more savings in salt reductions thereby promoting capital investment in new equipment and technology.

Both the ministry and industry identified potential benefits in moving to longer term contracts. From the ministry's perspective the value would be in reducing the costs of tendering, attracting better contract prices and ensuring continuity through staff

retention and training. In general, the industry had expressed a desire for contracts with terms of up to 8 or 9 years to allow amortization of equipment costs and for succession planning for staff. The ministry agreed to explore longer-term contracts with inflation provisions after year 3. Contractors were given the option of bidding longer-term contracts (8 to 9 year) as well as shorter-term contracts of 5 years. Bid evaluation formulas using life cycle costing were defined in bid documents to ensure bidders clearly understood the evaluation criteria. In general, most contractors were able to provide better prices for the longer-term contracts. Based on these results, the ministry created a tendering plan, which called for 7, 8 and 9 year contracts. Near the half-way point of the second-generation tendering the ministry decided to offer bidders the option of bidding the contracts on a 3, 5 or 9 year term with the term dictated by the best net present value to the ministry. Subsequently, all contracts were awarded on the longer term except for one that was awarded on a 5-year term.

As of May 2005, tendering of the second-generation contracts is complete. The second generation had a total of 16 AMC areas with a combined total of 21 contracts totalling 13,945 two-lane equivalent kms. Six contractors have been successful in obtaining contracts. Only about 40% of the work was awarded to the incumbent contractor indicating that a competitive bidding environment exists.

Overall tender prices remain extremely competitive with normally 4-6 bidders per contract. MTO cost estimates of the work are based on the value of the previous contract, plus the cost of new work added into the contract, plus inflation. Second generation contract prices are lower than this amount by almost 9% over the entire program.

## **9. CONTRACTOR PERFORMANCE AND MONITORING**

In AMCs, in particular, the ministry's role has changed from one of directing and conducting the work to one of quality assurance where the ministry monitors the contractors' adherence to the contract requirements. The ministry's staffing complement includes 174 contract administrators. The contract administrators are supplemented by 49 specialized staff with expertise in electrical services, pavement markings, vegetation, bridge repairs and signing. In MO areas a further 137 staff are hired directly by MTO to assist with winter road patrols.

The ministry has a training plan in place for contract monitors and regularly reviews course content.

The ministry monitors all facets of the contractors' plans and work. In advance of each contract, and before each winter in multi-year contracts, the contract monitors review each contractor's work plan, including training, equipment complement, plow and spreader routes, material supply arrangements, staffing, patrolling and weather monitoring plans.

The contract monitors work irregular hours, particularly during winter storm events. After events the contract monitors review the contractors' records and responses. On a regular basis the contract monitors review highway sections and contractor patrol yard(s). They note work that is required, and whether the contractors complete the work within the timeframes and other specified standards prescribed in the contract specifications. The ministry's comprehensive monitoring records are in standardized formats and are retained and archived by the ministry.

Contractors also must keep detailed diary records of patrolling observations and work completed. In addition, contractors are required to document their accomplishments for all work performed in the ministry's software database, the Maintenance Management Information System (MMIS). Ministry contract monitors review contractor inputs, and must verify data integrity before it becomes part of the ministry's historical database.

Communication with the contractor can occur daily as required, and formal monthly meetings, with minutes, are used to discuss any contract and interpretation issues. Sections in the contract describe the penalties for non-compliance, which range from financial penalties to a demerit point system that can lead to possible loss of the contract and/or limitations on future bidding of other contracts. Guidelines for monitoring AMCs have been established to provide specific direction and a consistent approach for use by contract monitors in dealing with contract non-conformance.

In addition, senior ministry contract monitors (Maintenance Superintendents) from across the province have regular internal meetings to discuss consistent contract interpretations and administration, to comment on new ministry developments and contract language, and to bring concerns and issues from the contract monitors forward to the persons developing policy and generic contract improvements.

Contractors are formally evaluated after every contract, or annually for longer contracts. The evaluation follows guidelines that are in place for the required format, categories, and supporting documentation. Each evaluation is signed by both ministry and contractor representatives and retained on file.

A particularly interesting innovation is the Automated Vehicle Location (AVL) system. It was piloted by the ministry and is an automated system to collect and archive real-time operations vehicle data via GPS. It can provide information such as vehicle location, speed, direction, material application rates and whether the plow is up or down. The ministry completed trials on 48 units during the 2000/01 winter. The trials identified AVL as an excellent monitoring tool not only for the ministry but for contractors to monitor their ongoing operations. The ministry now has about 245 AVL units in place and is in the process of defining explicitly how the information will be employed for contract monitoring before fully deploying for all winter equipment.

The ministry's monitoring procedures are effective to ensure contractors are delivering snow and ice control to ministry standards. The ministry uses a Bare Pavement Performance System to quantify the overall effectiveness of the operation. The time to

achieve bare pavement after each storm is recorded and compared to the established target times. Overall the targets have been met and exceeded every year since implementation.

Future developments in monitoring will be to examine electronic diaries to facilitate record keeping and summarize observations and to develop more explicit guidelines on frequencies for inspections of various activities.

## **10. OVERALL COST IMPACT**

With any outsourcing initiative, actual costs savings are often looked at as a measure of success. Any actual cost comparison is complex since the savings impacts are often distributed widely among many different cost centres including for example corporate overheads for human resource management.

However, insight into cost savings can be gained by referring to published program costs. Table 5 outlines cost for the maintenance program from fiscal 1998/1999, when outsourcing began, to 2003/2004. Cost peaked during the 2002/03 fiscal year due to the severe winter. Generally overall costs have increased from about \$211 M to \$241 M or about 13%.

Cost drivers during this period included the following:

- 11% or \$23 M was the estimated inflation based on the Canadian Consumer Price Index (CPI.)
- 3% or \$6.6 M due to changes in standards to improve safety including:
  - \$1.3 M for new winter equipment technology such as an expanded ARWIS network, pre-wetting, and anti-icing.
  - \$3.8 M for enhanced emergency management including West Nile virus and border queue management.
  - \$1.5 M for additional winter equipment during the transition periods and legislative changes in traffic control requirements.
- 3% or \$6.0 m for highway expansion.

The ministry no longer purchases heavy equipment. This has been estimated to save the ministry at least \$7 M annually in the capital expense account. The cost for the equipment supply that is included in the contractors' bid prices, is now part of the maintenance expenditure line.

Taking all of the above into account, the maintenance program should have experienced cost increases of about \$42.6 M or 20% since outsourcing began. The shift to outsourcing has allowed the ministry to contain these potential cost increases.

## **11. CONCLUSIONS**

The ministry and the government of Ontario consider the privatization of highway maintenance a resounding success. Maintenance work is being delivered to standard, and the province's standards have been reformatted to support the new delivery methods. The ministry has monitored and carried out quality assurance on the contractor's performance and is confident that the ministry's legislated responsibilities are being fulfilled and that savings have been achieved.

New Area Maintenance Contract and Managed Outsourcing delivery methods have been developed, a new AMC industry has been created where one did not previously exist, and the industry capability to carry out Ontario's provincial highway maintenance has been demonstrated. Contractors have made job opportunities available to the ministry's former staff, thus retaining knowledge within the industry.

The enormous effort that was made to transform the delivery methods of highway maintenance in Ontario was a sound investment, but it is still work in progress. Possibilities include continuing contract refinements and more comprehensive delivery methods such as Area Term Contracts.

## **12. CREDITS**

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**Table 1**

**Maintenance and Capital Work**

<b>Maintenance</b>
<b>Moving people and goods safely and efficiently</b> <ul style="list-style-type: none"><li>▪ Ongoing maintenance activities include: patrolling, snow plowing and salting, shoulder grading, line painting, grass cutting, filling in potholes, cleaning up after accidents and spills, and repairing guide rails after accidents.</li></ul>
<b>Minor Capital Projects (less than \$1 million)</b>
<b>Protecting roads and bridges in order to prolong their useful lives</b> <ul style="list-style-type: none"><li>▪ <u>Prevention</u>: work to slow the deterioration of the surface layer (for example, crack filling).</li><li>▪ <u>Preservation</u>: work that both extends the life and improves the ride quality of a road or a bridge (for example, milling off and replacing the surface layer of pavement).</li><li>▪ <u>Holding</u>: work done to maintain safety and usability of a road in cases where major rehabilitation or reconstruction projects must be deferred for a few years.</li></ul> <p>Other: repairs and improvements to both highways and ancillary assets.</p>
<b>Major Capital Projects (\$1 million and more)</b>
<b>Maintaining and expanding the highway system’s capacity and improving safety</b> <ul style="list-style-type: none"><li>▪ <u>Rehabilitation</u>: extensive work on bridges and roads that restores them to close to new (for example, milling off and replacing more than one layer of pavement); each successive rehabilitation adds fewer years of service life to the asset, so that eventually it is more cost effective to reconstruct it.</li><li>▪ <u>Reconstruction</u>: typically done after two or three rehabilitations and results in the same quality and life expectancy as a new road/bridge (for example, on roads this involves removal of all old pavement, some improvements to the roadbed, and new pavement).</li><li>▪ <u>Expansion</u>: construction of a new or expansion of an existing highway; expansions of existing highways are usually conducted concurrently with reconstruction of existing lanes.</li></ul>

**TABLE 2**  
**MAINTENANCE WORK CONTRACTS**  
**(First Generation Contracts)**

Area Maintenance Contract (AMC)	Managed Outsourcing Contract (MOC)
One contract for all maintenance activities.	Separate contracts for each activity (snow plowing, line painting, etc.)
Cover sections of highway ranging from 350 to 500 two-lane-equivalent-km.	Cover sections of highway ranging from 350 to 1,900 two-lane-equivalent km.
AMC contractor responsible for all patrolling and maintenance activities.	Ministry does patrolling and calls in contractors as needed.
Terms of contracts: Fixed annual price. Duration three year plus a two-year extension.	Terms of contracts: Unit prices with three-year duration.
Total of 16 AMC areas, 36 contracts, which cover 58% of the highway system.	Total of 7 MO areas, with many contracts, which cover 42% of the highway system.

**TABLE 3**  
**MAINTENANCE WORK CONTRACTS**  
**(Second Generation Contracts)**

Area Maintenance Contract (AMC)	Managed Outsourcing Contract (MOC)
One contract for all maintenance activities.	Separate contracts for each activity (snow plowing, line painting, etc.)
Cover sections of highway ranging from 350 to 1418 two-lane-equivalent-km.	Cover sections of highway ranging from 975 to 2,300 Two-lane-equivalent km.
AMC contractor responsible for all patrolling and maintenance activities.	Ministry does patrolling and calls in contractors as needed.
Terms of contracts: Fixed annual price. Longer duration contracts up to 8 or 9 years with contractor's option to bid on short terms 3 or 5 years.	Terms of contracts: Unit prices with five-year duration.
Total of 16 AMC areas, 21 contracts, which cover 60% of the highway system.	Total of 7 MO areas, with many contracts, which cover 40% of the highway system.

**TABLE 4****HIGHWAY MAINTENANCE EXPENDITURES, 1996/97 – 2003/04**

Maintenance Program	Interim 2003/04	2002/03	2001/02	2000/01	1999/2000	1998/99
	(\$ Million)					
AMC	118	117	105	89	44	11
MOC	72	78	72	72	20	3
In-house work <sup>1</sup>	24	25	26	31	106	155
Contract oversight <sup>2</sup>	16	15	14	10	3	1
General costs <sup>3</sup>	11	17	19	20	34	41
<b>Total highway maintenance</b>	<b>241</b>	<b>252</b>	<b>236</b>	<b>222</b>	<b>207</b>	<b>211</b>
<b>Total lane kilometres maintained <sup>4</sup></b>	<b>46</b>	<b>46</b>	<b>45</b>	<b>45</b>	<b>45</b>	<b>46</b>
<b>Maintenance cost/km (\$)</b>	<b>5.3</b>	<b>5.5</b>	<b>5.2</b>	<b>4.9</b>	<b>4.6</b>	<b>4.6</b>

<sup>1</sup> The Ministry's accounts for in-house work do not include a charge for the cost of equipment (plows, spreaders, etc.) or for certain overhead costs that are reflected in payments to contractors.

<sup>2</sup> Contract oversight includes compensation of maintenance co-ordinators and winter seasonal staff.

<sup>3</sup> General costs include administration, WSIB And liability insurance premiums, and training. However, non-recurring costs related to outsourcing have been excluded.

<sup>4</sup> Total includes ramps, ramp terminals, passing lanes, and truck climbing lanes.