

**TOWN OF MARKHAM AUDITOR GENERAL  
CONTRACT ADMINISTRATION – OPERATIONS DIVISION  
AUDIT REPORT**

**DECEMBER 18, 2009**

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## **1.0 Introduction**

This report presents the results of the Contract Administration – Operations division Audit completed on Dec 18, 2009. This Audit was conducted as part of the Auditor General's 2009 audit work plan approved by Council on November 11, 2008.

This Report contains recommendations, which if implemented, should improve the administration of contracts in the Operations division and town wide practices. This Report was discussed with line management, the Commissioners, and the Chief Administrative Officer, who have committed to implementing corrective actions as detailed in this Report.

Town staff provided the Auditor General with unrestricted access to all activities, records, systems, and personnel necessary to conduct this audit freely and objectively. All observations, findings, and recommendations of the Auditor General are included in this Report.

## **2.0 Background**

The Operations division is responsible for the maintenance of roads, parks, and streetscapes, ensuring effective winter control, environmental protection of right-of-ways, watercourses, and the maintenance of drainage infrastructure.

The Operations division 2009 budget allocated approximately \$11 million to contracts, service agreements, and construction and maintenance materials of which almost \$6 million was spent on winter maintenance activities. A further \$8.25 million was budgeted for various road resurfacing and improvement projects. In 2009, Operations managed a total of 81 contracts worth approximately \$18.5 million in total value.

The asphalt resurfacing capital project (\$5.8 million) uses a pavement management program to select rehabilitation candidates. The overall goal is to maintain an acceptable pavement condition index and user satisfaction by implementing cost effective strategies designed to extend pavement life and reduce overall maintenance costs of the road network.

Effective contract administration is critical to ensuring that contractors satisfy all of their legal obligations and that the Town receives value for money. Contract administration, for the purposes of this audit, refers to managing the contractual relationship between the Town and the supplier after contract award to contract closeout ensuring the supplier delivers the product and/or service in compliance with purchase / contract documents.

### **3.1 Audit Scope and Objectives**

The audit scope covered contract administration for all contracts managed in the Operations division after contract award to contract closeout. Both active contracts and expired contracts from the time period October 2008 to October 2009 were within scope. The asphalt resurfacing contracts were reviewed in addition to a sample of other contracts for a total of 12 contracts. The audit excluded contracts managed for fleet services as they will be included in the scope of the fleet services audit scheduled for 2010.

The objective of the audit was to assess the management framework, practices and controls that ensure:

- Contracted services are provided in accordance with terms and conditions in the contract;
- All payments made against a contract are valid with supporting documentation and comply with contract terms and prices; and
- Program intended results are achieved for the pavement management program.

### **3.2 Audit Methodology**

In order to perform the audit the following work was conducted:

- Reviewed relevant documentation such as policies and process workflows
- Interviewed departmental management and contract owners (defined as staff assigned to manage the contract once awarded)
- Conducted walkthrough of the contract administration process
- Examined files, records and documents for a sample of 12 contracts (5 expired contracts and 7 active contracts). Verified:
  - payments were made against a valid contract, supporting documentation on file, evidence of goods or services received, and invoiced amounts agree with contract prices;
  - approvals for ordering goods and services and for purchases in excess of the approved budget and / or purchase order;
  - contract terms and conditions were complied with;
  - contract performance measured and assessed;
  - contract documents in place, current and accurate; and
  - insurance and bond coverage in place.
- For the pavement management program
  - Reviewed program documentation, 3 applicable contracts, key performance indicators, pavement condition assessments, work plans, and data records,
  - Visual inspection of active work sites and road segments recently invoiced confirming work completed and site processes such as supervision, and
  - Tested payments against supporting documents such as delivery tickets.

## **4.0 Conclusion**

### **Contract Administration**

Based on a sample of 12 contracts the audit found that contracts were adequately managed, staff exercised due care to keep costs at a reasonable level and staff conducted oversight activities aligned with contract conditions, with some exceptions in older contracts (2008 purchases) and contract renewals / extensions.

Established departmental processes provided valuable accounting and recordkeeping support that was not always applied to all contracts. There was evidence of continuous improvement when contracts were brought under the department contract administration group. Overall contract owners need to take full responsibility for administration of the contract once awarded.

Of the 12 contracts reviewed, 2 were not well managed; one being small dollar value (\$37,000) and the other higher dollar value (\$476,000). Both contracts were not managed using established departmental administration processes. Staff did identify some of the weaknesses and implemented improvements during 2009.

Processes to ensure the successful completion of contract obligations could be strengthened to improve contract outcomes, such as:

- Establishing contract summary sheets of key contract information and activities;
- Requiring all contracts to use the established contract tracking and billing processes;
- Clarifying responsibilities of the contract owner, especially during contract renewals;
- Ensuring all contract documents are consistent, in particular the terms; and
- Establishing consistent and clear practices to ensure sufficiency of bonds for multi-year and extended contracts.

The audit identified the following strengths in contract administration:

- Contracts were assigned to a specific staff member for administration responsibility;
- Payments are generally supported by contractor time reports signed off by town staff;
- Duplicate payments were not identified during the audit testing;
- Insurance and bond documents were always on file and up to date;
- Pre-construction meetings are often done as needed; and
- Some contracts had very strong inspection process.

### **Pavement Management Program**

The audit examined the performance of the pavement management program, with a focus on how the Town is measuring their performance and how the annual work plan and investment supports the program objectives. The audit was unable to conclude on the performance of the program in meeting its intended outcomes because performance measurements, data collection and analysis were not sufficiently mature or verifiable.

## 5.0 Detailed Findings, Recommendations, and Management Responses

| Ref # | Page # | <b>Contract Administration - general findings</b><br><i>These audit findings come from the auditor observations and discussions with staff, and from common issues noted in the contracts tested.</i>   |
|-------|--------|---|
| 5.1   | 6      | Processes to ensure the successful completion of contract obligations could be strengthened to improve contract outcomes.   |
| 5.2   | 8      | Contract terms differed among various documents impacting contract outcomes.  |
| 5.3   | 9      | Processes were not efficient or always effective to ensure that goods and services were approved prior to delivery, and that invoices were received by accounts payable with supporting documentation on a timely basis.                      |
|       |        | <b>Contract Administration – contract specific findings</b><br><i>Of the 10 contracts tested, 3 had additional findings related to the contract. Refer to APPENDIX 1 for details.</i>   |
| 5.4   | 10     | Unexpected costs were not adequately tracked and followed up for recovery. (contract 1)   |
| 5.5   | 11     | Oversight activities specified in the contract, including some quality assurance testing, were not complied with. (contract 1 and 2)  |
| 5.6   | 12     | Performance Bonds and Labour and Materials Bonds for multi-year contract extensions were not consistently obtained, and for two contracts they were not clear as to coverage increasing the risk of insufficient coverage (contract 1 and 2). |
| 5.7   | 13     | Material delivery tickets are not sufficiently validated for weight shipments. (contract 2)   |
| 5.8   | 14     | Change order not well executed. (contract 2)  |
|       |        | <b>Pavement Management Program</b>  |
| 5.9   | 15     | Program performance was not adequately assessed and reliably measured.  |
| 5.10  | 17     | A portion of the road inventory was not sufficiently assessed and rated, potentially impacting the appropriateness of the annual work plan and achievement of the program goals.  |

## Contract Administration

### **Finding 5.1 Processes to ensure the successful completion of contract obligations could be strengthened to improve contract outcomes.**

#### **Contract Administration process**

The Operations contract administration division provides valuable accounting and recordkeeping support to the contract owners (staff assigned to manage the contract once awarded) such as verifying billings against contract terms, record keeping of work done to match against billings, and updating work done on town assets for life cycle and accounting purposes. Poorly managed contracts tended to be those that were not administered with the support of the contract administration division and the accompanying processes. In a few cases, there was poor tracking of work performed to ensure expenditures were valid, necessary and contained.

#### **Roles and responsibilities**

The purchasing department supports the operations department in coordinating procurement activities such as the selection of the contractor and executing contract documents. The roles and responsibilities between the two departments during contract renewals and extensions were not always clear with the contract owners and communication could be improved. In one case, the contract extension was entirely executed by the user department without involving purchasing and updating the purchase order. Other contract extensions were not adequately executed, or properly reflected in documents, or not well understood by contract owners.

#### **Contract handover and information**

Over the last year there have been some changes in the contract owners, either from staff leaving the Town or staff moving into other positions. The handover of the contract to the new contract owner was not sufficiently comprehensive for an effective and efficient transition of responsibilities. Responses to questions raised during the audit were not always readily available.

| Ref   | Audit Recommendation   | Town Response / Action plan<br>(who, what, when)   |
|-------|--|--|
| 5.1.1 | Establish contract summary worksheets that identify key dates, key oversight activities, key contract terms and conditions that should be monitored and any other information that impacts contract outcomes. Consider feasibility of expanding the existing contract database and sharing the information with contract owners. | <p>Agreed</p> <p><b>Operations Dept will work with Purchasing to develop contract summary worksheets by the end of the 2<sup>nd</sup> quarter 2010.</b></p> <p>Worksheets will be prepared with the tender document and identify the following:</p> <ul style="list-style-type: none"> <li>○ Dates – tender start and completion, including contract renewal options and deadline dates</li> <li>○ Alignment – tender terms align with tender award report, award letter to vendor and purchase order</li> </ul> |

|       |  |   |
|-------|--|---|
|       |  | <ul style="list-style-type: none"> <li>○ Vendor submissions – bonds, insurance, WSIB, and Health &amp; safety training certifications</li> <li>○ Contractor evaluations – completed by user department and included as part of renewal/extension report</li> <li>○ Terms &amp; conditions – Operations Department to include all testing, analysis, reporting and inspection requirements (i.e field tests, equipment inspection, equipment testing reports, etc.).</li> </ul> <p>New contract summary worksheets will provide seamless transfer of existing contracts to new contract owners, within Operations Dept.</p> <p>Purchasing to examine feasibility of providing the Operations Dept with 'read only' access to the existing contract database.</p> |
| 5.1.2 | Require that the established contract tracking and billing processes are used for all contracts that involve repetitive work orders. | <p>Agreed - completed</p> <p>Through 2009, Operations has moved all contract administration to established contract tracking and billing processes.</p> <p>Operations has implemented a new internal Blanket Purchase Order tracking system to improve capture of repetitive work orders and commitments against purchase orders.</p> <p><b>Completed</b></p>   |
| 5.1.3 | Clarify roles and responsibilities of the contract owner, particular during contract extensions and renewals.                        | <p>Agreed.</p> <p>Contract extension and renewal options to be captured and clearly outlined in both the tender document and newly created contract summary worksheet. <b>2<sup>nd</sup> quarter 2010</b></p> <p>Project Management Office to document roles and responsibilities of contract owner with Legal.</p>   |

**Finding 5.2 Contract terms differed among various documents impacting contract outcomes.**

In some of the contracts audited, the contract term, including extension terms, differed among the various documents (quotation, award letter, purchase order) causing town staff to operate under misconceptions of what was the legal contract term and conditions. The Town's general terms and conditions do provide guidance as to which document takes precedence (the quotation takes precedence over the purchase order and award letter).

The following was noted:

- In one expired contract the terms in the award letter and purchase order were more favourable to the Town than the quotation, which took precedence according to the general terms and conditions. It was unclear if staff intended to award with the more favourable terms and neglected to execute those terms properly (contract 1 in appendix);
- In another expired contract, most of the work was done after the contract expired, expiry unbeknownst to operations staff. There was a potential to save some costs had the contract been re-negotiated (contract 2 in appendix); and
- Differences in contract documents existed for one active contract although there was no impact to date.

| Ref   | Audit Recommendation   | Town Response / Action plan<br>(who, what, when)   |
|-------|--|--|
| 5.2.1 | <p>a) Establish a consistent approach to formalize the "Contract" when there are negotiated changes to the proponent's bid. Ensure all contract documents are in agreement.</p> <p>b) Revisit Town's general terms and conditions, which do list the order of precedence for contract documents, to ensure clarity on the order of precedence of contract documents and sufficient flexibility for negotiations.</p> <p>c) Refer to recommendation 5.1.1</p> | <p>Agreed.</p> <p>When there are negotiated changes to the proponent's bid, such changes should be detailed in a document (i.e. the award letter, the Purchase Order, or other document) that is signed by the Town and the proponent. Legal and Purchasing will work together to ensure that the process (and associated documents) are reviewed and revised, as necessary, to meet this requirement.</p> <p>Legal and Purchasing are currently in the process of reviewing and making revisions to the Town's <i>General Terms and Conditions</i>. Legal and Purchasing will work together to ensure that revisions to the order of precedence section will address the requirement for greater clarity and sufficient flexibility for negotiations.</p> <p><b>Completed by 4<sup>th</sup> quarter 2010.</b></p> |
| 5.2.2 | Clarify the contract terms where there are differences between the contract documents for active contracts.  | <p>Agreed.</p> <p>Operations staff will review all active contracts to ensure proper alignment of purchase order to tender</p>   |



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|  |  | document. Where differences exist, staff will work with the Purchasing Dept. and Vendors to record agreed to terms and provide formal documentation for inclusion in new summary worksheet. Work to be completed by the end of the <b>3rd quarter 2010</b> . |
|--|--|--|

**Finding 5.3 Processes were not efficient or always effective to ensure that goods and services were approved prior to delivery, and that invoices were received by accounts payable with supporting documentation on a timely basis.**

An approved project in 2010 to automate accounts payable should address process inefficiencies and provide proactive tracking of spend against blanket purchase orders (a contract between the Town and a supplier to facilitate the procurement of repetitively used goods and services for a specified term).

For purchases using a blanket purchase order, approvals for the goods and services were often done after the work was completed and invoiced. In some cases the total expenditures exceeded the purchase order but were not approved before the work was performed. Processes to track ordered goods and services against the blanket purchase order were not effective to proactively manage spending.

In a few cases work started before the purchase order was issued but always after the award letter. There is a potential that work is being done without proper general liability insurance, worker's safety insurance board certificates, and bonding as all these documents must be received before a purchase order is issued.

Processes were not efficient or always effective to ensure that goods and services were properly approved prior to ordering and delivery, that discounts were always taken, and that invoices were received by accounts payable with supporting documentation on a timely basis. Discussion with staff indicated that for larger discounts there is a concentrated effort to ensure timely processing and these tend not to be missed. Accounts payable is tracking the discounts lost due to late payment processing, and for 2009 the amount of lost discounts was negligible.

| Ref | Audit Recommendation   | Town Response / Action plan<br>(who, what, when)  |
|-----|--|---|
| 5.3 | Establish more efficient payment process with the upcoming automation of accounts payable, including improved tracking of blanket purchase orders and processes to support approval of purchases before the goods and services are received. | Agreed.<br>Through 2009 and first quarter of 2010, Operations has moved contract administration for all maintenance/repair contracts to established departmental contract tracking and billing processes (complete).<br><br>In addition, Operations has |

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|  |  | <p>implemented a new internal Blanket Purchase Order tracking system to improve capture of repetitive work orders and commitments against purchase orders to improve tracking of blanket purchase orders <b>(complete)</b>.</p> <p>Finance will review the payment process during the upcoming automation evaluation.</p> |
|--|--|---|

**Finding 5.4 Unexpected costs were not adequately tracked and followed up for recovery (contract 1 in appendix).**

Spend against the purchase order exceeded the original amount significantly, of the \$200,000 increase over the 3 years; \$88,000 was attributable to increase in scope (LED retrofit program) and a capital project. The remainder was from unexpected repairs due to motor vehicle accidents, excessive rain storms and power losses. Costs of repairs for roads and traffic signals that are damaged by a third party (vehicle accidents) are charged to the Operations budget and subsequently submitted to the insurance company for recovery.

Roles and responsibilities for managing these costs were unclear. In 2009 York Regional Police accident reports were not received for processing, although in December a few were received. No follow up to ensure the information is received potentially impacting claim recovery. Staff was unable to provide an analysis or listing of costs incurred from these events and the claims recovery activity. The most recent purchase order adjustment requested an increase of \$39,252 due to motor vehicle accidents and excessive rain storms; however the supporting invoices included regular maintenance charges and the other invoices could not be linked to accidents.

It should be noted that other town departments experience similar unexpected repairs (ie damages to signs, street lights, hydrants, culverts etc).

| Ref | Audit Recommendation   | Town Response / Action plan<br>(who, what, when)   |
|-----|--|--|
| 5.4 | Clarify responsibilities for tracking and following up on potential recoveries for costs incurred through third party damages. Ensure appropriate efforts are made to recover the costs. Ensure the budget for maintenance of traffic control devices includes some amount for unexpected costs. | <p>Agreed.</p> <p>Clerks and Operations staff have met internally to review the insurance claim process relative to these circumstances. It is clear that the claims submission process in the past 2-3 years has been inconsistent due to the fact that the receipt of Police Incidence Reports from the YPR has been inconsistent. The Town's ability to recoup costs from a party responsible requires access to the YRP's reports. The YRP had</p> |

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|  |  | <p>previously indicated that they were not able to provide the requested reports due to their interpretation of the privacy provisions of the Municipal Freedom on Information and Protection of Privacy Act. Staff are working to clarify the Town's access rights with respect to police reports.</p> <p>Estimated value of third party damages for traffic signals for 2009 was approximately \$25,000.</p> <p>In the absence of access to police reports, Operations &amp; Clerks staff will investigate opportunities to capture data related to third party damages resulting from traffic accidents and will report back on this matter by year end. <b>December 2010</b></p> <p>Clerks and Operations will document the process for recovery for costs for third party damages. Clerks Department is responsible for the tracking and follow up.</p> <p>Operations will request additional funding in 2011 to cover unexpected costs for maintenance of traffic control devices.</p> |
|--|--|--|

**Finding 5.5 Oversight activities specified in the contract, including some quality assurance testing, were not complied with (contract 1 and 2 in appendix).**

*Contract 1*

The original contract with Town of Markham (2007 and 2008) contained terms and conditions to support Operation's in their management of the contract. The audit reviewed 2 of the contractor requirements and found neither had been fully complied with; semi-annual inspection of equipment and conflict monitor test results. Staff was not aware of the requirements. The extended contract did not provide similar terms.

*Contract 2*

Within the contract there are numerous requirements for either the contractor to conduct tests, make submissions regarding the product design and usage, or for the Town to conduct random testing with the intent to monitor the quality of the contracted work. The audit sampled a number of these requirements and found that they were not always obtained or carried out. It should be noted that testing of materials placed for asphalt resurfacing was carried out. The contract owner, who was not involved in creating the contract documents, was not fully aware of all the contract conditions.

No quality assurance testing was done by the Town in 2009 on any pavement preservation strategies such as micro surfacing. The contract states that the Town *may* carry out this testing. The distress survey, designed to identify distresses that pose a hazard to the travelling public during the warranty period, was not done potentially missing warranty covered repairs.

For asphalt resurfacing work, the contractor is required to supply the Town with a final written report of test results as listed in the contract and quality control test results prior to commencement of work, however these were not submitted to the Town and the Town did not follow up to request the test results.

| Ref | Audit Recommendation  | Town Response / Action plan<br>(who, what, when)   |
|-----|---|--|
| 5.5 | <p>Staff should rethink the existing contract conditions as to feasibility and relevance, in particular focusing on effective and efficient town monitoring and oversight of the contract work.</p> <p>With the current contract expiring in December 2009 and staff developing the contract documents for tendering through a competitive process, there is an opportunity to improve the contract conditions.</p> <p>Establish a contract summary sheet that outlines the nature and timing of all required quality assurance tests for reference by the contract owner (refer to recommendation 5.1.1)</p> | <p>Agreed:<br/>Contract Summary Worksheet prepared with tender document by the Operations Dept. will cover contract terms, conditions and specifications including all testing, analysis, reporting and inspection requirements (i.e field tests, equipment inspection, equipment testing reports, etc.).</p> <p>Contract owner to monitor and ensure compliance with all terms and conditions included throughout the term of the contract.</p> <p>Contract Summary Worksheet by end of <b>2<sup>nd</sup> quarter 2010.</b></p> |

**Finding 5.6 Performance Bonds and Labour and Materials Bonds for multi-year contract extensions were not consistently obtained, and for two contracts they were not clear as to coverage increasing the risk of insufficient coverage (contract 1 and 2 in appendix).**

***Performance Bond and Labour and Materials Bond***

The purpose of these bonds is to guarantee the completion of the contract following contractor's default. The bonds are typically requested for the "term" of the contract. The audit sample of contracts identified that bonds for multi-year or extended contracts were either provided for the full term, or as a rider to extend the bond for the second year, or requested after the first year expired.

For the Asphalt Resurfacing 2 year contract renewal (value of \$9.9 million for the 2 years) a Performance Bond and Labour and Materials Bond were requested after the first year expired. The dollar amounts of the bonds were based on the one year contract value, however the purchase order was for the two year period and it was not clear in the bond documents if the coverage extended to the second year for the additional amount.

Subsequent confirmation from the bonding company indicated there was sufficient coverage. The contract document did not specify the performance bond requirements for renewal terms.

For contract 1 reviewed, there was no evidence that the change in contract was supported with the necessary bonds.

#### **Health and Safety certifications**

The contract required a confirmation of mandatory health and safety certifications, however there was no request for re-confirmation when the contract was extended for 2 years. Responsibility for obtaining was unclear among staff. Since the contractor has a number of employees (indicated up to 70 in traffic control) there would be some turnover, and reconfirmation would be advisable.

| Ref | Audit Recommendation   | Town Response / Action plan<br>(who, what, when)  |
|-----|--|---|
| 5.6 | <p>Establish consistent standardized practices for ensuring sufficiency of bonds for multi-year or extended contracts. Bonds for multi-year contracts, including extensions, should either reflect the contract value for the contract period or be renewed as needed. The Town could consider the use of renewable performance bonds for multi-year contracts.</p> <p>Contract documents should clearly specify the performance bond requirements for renewal terms.</p> <p>Refer to recommendation 5.1.1</p> | <p>Agreed</p> <p>The Town has a consistent and standardized (similar to other municipalities) bonding requirements that are put in place for all contracts that Staff deems require a surety due to project cost and/or risk. Included in bid documents released to the market place is a requirement for a performance and labour/material bond by the successful bidder upon contract execution. Staff believe the Town was duly protected to the full extent of the contract with the bonds in place and has received assurance from the surety company to this regard.</p> <p>Purchasing will review the bid documents/bonding requirements with Legal to ensure the requirements are sufficiently detailed in contracts documents to their satisfaction and undertake a review of the possible inclusion of renewable bonds for multi-year contracts. To be completed by end of 3<sup>rd</sup> quarter 2010.</p> |

#### **Finding 5.7 Material delivery tickets are not sufficiently validated for weight shipments (contract 2 in appendix)**

Payments are made to the contractor for materials used on the job (example asphalt) based on computer generated material delivery tickets provided by the contractor to the

site supervisor at the time of site delivery. The site supervisor signs off for receipt of the material before the truck is unloaded. This provides some protection against overcharges for material delivered.

The audit noted that the truck in and out times on the delivery tickets differed by only a few seconds in some cases. Apparently, the truck's empty weight is pre-loaded into the computer so that the loaded truck can be processed faster. There is a low risk that overcharging can occur, and would not necessarily be noted by the site supervisor if kept to a minimum.

| <b>Ref</b> | <b>Audit Recommendation</b>  | <b>Town Response / Action plan<br/>(who, what, when)</b>   |
|------------|--|--|
| 5.7        | Staff should be made aware of this practice and review the weighing practices of the contractor. | Operations staff will conduct a site visit and review contractor's practices and procedures at the start of the 2 <sup>nd</sup> quarter of 2010. |

**Finding 5.8 Change order not well executed (contract 2 in appendix).**

During the contract term in 2008, additional items were added to the contract as substitutes priced by the vendor at the time of the change. There was no evidence that the quoted price was reviewed against current market prices to ensure reasonable cost. One item, valued at \$284,772, was subject to the asphalt cement (AC) premium. The AC premium was paid using the differential in price index from the original contract date instead of the market price at time of the change. The overpayment was minor (\$3,000), however depending on the timing of the change, there was a potential for larger overpayment.

| <b>Ref</b> | <b>Audit Recommendation</b>  | <b>Town Response / Action plan<br/>(who, what, when)</b>  |
|------------|--|---|
| 5.8        | Prices for change orders should be reviewed against current market prices to ensure reasonable and all contract terms considered | <p>Agreed:</p> <p>When there are negotiated changes to the proponent's bid, such changes should be detailed in a document (i.e. the award letter, the Purchase Order, or other document) that is signed by the Town and the proponent.</p> <p>Changes to contract terms following contract award / execution of contract (if required) should be done by way of a change order or contract amendment (signed by both parties).</p> <p>Operations will continue to ensure that prices quoted for change orders are submitted and measured against current market prices and ensure all contract terms are considered. In progress.</p> |

## Pavement Management Program

### Background

A pavement management program encompasses a wide spectrum of activities including the planning of investments, pavement assessment, work prioritization, selection of appropriate strategies, implementation of those strategies, and evaluation of program performance through quality assurance testing, data analysis (predictions) and monitoring results.

The Town has identified their strategy going forward; to build on the investment that the Town made to clear the backlog of road repairs and move away from the “Worst-First” approach and move to a “Preservation” approach. Stated goals are to maintain the high ratio of roads rated good or better, reduce the overall life cycle cost, and reduce the environmental impacts or rehabilitation. As part of the departmental service planning project, the Town has stated its intention to evaluate the results of the existing program to help in further development of their approach.

The Town of Markham raised the investment in their roads in 2001 from \$2 million per year to \$4 million per year clearing the road repair backlog and focusing on piloting new techniques and products for the purpose of proactively maintaining roads in good repair and extending their life.

Asphalt resurfacing capital project investments:

| Year | Budget      | Lane km resurfaced |
|------|-------------|--------------------|
| 2008 | \$5,341,900 | 27 km              |
| 2009 | \$5,824,400 | 18 km              |
| 2010 | \$6,250,800 | 18 km              |

The increased investment of \$426,000 in 2010 was offset by a one time reduction of \$1 million in life cycle reserves reflecting future estimated savings from a fully implemented preservation program in 10 years.

The Town has adopted a number of good practices in delivering on the pavement management program:

- Overall strategies and goals set for the program
- Clearing backlog of road repairs
- Rehabilitation and preservation strategies evaluated as to life expectancy, costs, and criteria for usage
- Moving towards preservation and less emphasis on rehabilitation
- Implementing new strategies and techniques to proactively maintain roads and extend their life, such as micro surfacing and extended asphalt stabilization
- Pavement assessments conducted independent of the paving contractor
- Soil investigation and materials testing conducted for various streets annually (27 km in 2009) and field sampling and compaction testing on random job sites
- Town staff present on site during all construction activities

With such a significant investment, it is important to continually monitor the performance of this program and how well it achieved the intended results.

**Finding 5.9 Program performance was not adequately assessed and reliably measured.**

The pavement management program and standard procedures were not fully documented, although the town's strategy and goals have been communicated in presentations. Documentation available did not always reflect the existing processes.

One key performance measurement of the program was the percentage of roads rated good or better as determined by an overall condition index. This is also a municipal performance measure, however there is no standard industry criteria for what represents "good or better" or criteria for testing and rating the road condition, as result benchmarking results are not that meaningful.

*The reported percentage of roads rated good or better was not reliable*

The percentage of roads rated good or better by the Town in their business unit profile and to Council was not auditable, in that the underlying data could not be traced back to verifiable sources, the calculation of the average overall condition index for the road network was not consistently done year to year, and subjective assumptions were made, not documented, and were not consistently used. One key input, the condition index of road segments, was not reliably measured for some of the road inventory. What constituted "good or better" was not consistently defined.

*The target percentage of roads rated good or better was not meaningful*

The target reported in the business unit profile was not well known by staff, and was not selected with due diligence and consideration to the value obtained from the required investment. There was no common understanding among staff as to what level of condition index represented "good or better" potentially impacting the quality of decision making.

*Other performance indicators have not been developed*

The Town has not developed other performance indicators restricting the assessment of the pavement program as to achievement of its objectives. The annual budget is developed before the work plan is determined encouraging spend against total budget dollar. There is no clear analysis as to impact of spend on program outcomes.

| Ref   | Audit Recommendation  | Town Response / Action plan<br>(who, what, when)   |
|-------|---|--|
| 5.9.1 | <p>Performance indicators should be developed to effectively measure the pavement management program.</p> <p>Specifically, the targets set should be developed with regard to the value obtained from the investment required.</p> <p>How the indicators are calculated, the assumptions, and source data used should be clearly identified and consistently applied and well</p> | <p>Agreed: Underway</p> <p>Asset Management and Operations has engaged the University of Waterloo to help establish performance indicators for the Town pavement management program and more specifically to help identify pavement preservation targets and testing and training procedures fro staff.</p> <p>The work program will include</p> |



|       |   |  |
|-------|---|--|
|       | documented to allow for verification.   | development and documentation of the performance indicators as well as establishing a program to collect measurements and calculate the results.<br><br>The University will start work in Q2 2010 and is expected to be <b>completed by end of 2011.</b> |
| 5.9.2 | The pavement management program should be documented to allow for reliable assessment and reporting of progress in achieving goals. | Agreed:<br><br>As referred to in 5.9.1, the study to be undertaken with the University of Waterloo will address this recommendation. The study to be completed by <b>Q4 2011.</b>  |

**Finding 5.10 A portion of the road inventory was not sufficiently assessed and rated, potentially impacting the appropriateness of the annual work plan and achievement of the program goals.**

An effective program uses the condition coding of roadways coupled with the identification of strategies to determine maintenance or re-construction activities to achieve a predetermined level of serviceability. Generally this is the approach used by the Town, however data collection needs improvement.

*The Town has not surveyed the total road network using measurable testing mechanisms.*

Surface condition surveys were completed only for road sections installed or rehabilitated 10 years and older, on a sample basis, and not annually (done in 2005 and 2008). For 2008, the contractor tested 459 km of roadway out of the Town's 955 km road inventory through the use of specialized equipment. An overall condition index (OCI) was assigned to road segments. There is a portion of the inventory that has yet to be surveyed.

The entire network was visually inspected by town staff however no formal criteria were used and no condition rating was assigned. Visual field inspections by town staff are an important activity to confirm survey results and determine appropriate strategies that may include adding to the suggested work plan or delaying activities, but should not replace surface condition surveys. The year the condition survey was done (2008) the work plan suggested by that activity deviated significantly from the work plan developed by Operations.

*The overall condition index reported by the contractor for road segments could not be agreed with the town calculated index.*

Although the Town invested in a pavement management system (PMM) in 2005 that is able to calculate condition indexes, prediction curves, suggest strategies, and produce decision trees with financial impacts, the underlying models to support the functionality has not been built into the system. PMM does not contain the 2008 condition data.

Instead a staff developed database is used to collect, store and sort condition data and support analysis. The database is maintained and used by one staff increasing the risk of data error and loss. Information on how the database operates resides with one staff member and is not documented. This database drives the annual work plan, and generates data used for decision making on the pavement program and life cycle funding.

| Ref    | Audit Recommendation   | Town Response / Action plan<br>(who, what, when)  |
|--------|--|---|
| 5.10.1 | <p>Strengthen data collection and analysis activities. This will support staff in their intent to “monitor, track performance, and condition to ensure that the network remains in good repair” (as stated in recent presentations).</p> <p>Determine if the pavement management system (PMM) is a viable option, any other alternatives, or if the current staff developed database meets the future needs of the program. If PPM is the “book of record”, the 2008 data needs to be input, models developed and staff training provided.</p> <p>If the in house database is considered the “book of record” on a go forward basis, then documentation of the database design and proper change control processes with security need to be implemented.</p> | <p>Agreed:<br/>As noted in the Management response in 5.9.1, the study to be undertaken by the University of Waterloo will help provide a structured data collection and analysis framework for our pavement management program.</p> <p>As the study progresses staff will evaluate the effectiveness of the current PMM to meet our needs.</p> <p>A recommendation would be available by <b>Q3 2011</b></p> <p>(The 2008 condition has been input into the ‘Hansen’ PMM)</p> |
| 5.10.2 | <p>Implement a plan with a timeline that would have the entire road network surveyed at least once using measurable testing mechanisms that produce auditable condition indexes. Determine the frequency and cycle of required future testing. Visual inspections by Town staff should have standard criteria and results documented.</p>  | <p>The frequency of road testing will be established as part of the study with the University of Waterloo.</p> <p>Recommendation on timing and frequency of both visual and instrumentation surveys for all classes of roads will be included in the study and be available by <b>Q4 2011</b>.</p>  |

**Contract administration – Contract specific findings** **APPENDIX 1**  
***Of the 10 contracts tested, 3 had additional findings related to the contract.***

**Contract 1**

*Expired contract*

*Purchase order date – August 2006 (2 year plus one year option to renew)*

*Contract value - \$264,906*

*Total spend - \$476,992*

**Background**

Contract term differed between the Town's quotation and the issued award letter and purchase order. The expiration date under the quotation was July 2008 with an option to renew for an additional one year whereas the award letter and purchase order stated a 3 year term expiring July 2009 with an award amount implying no price changes. The quotation provided the contractor the option to request a price increase for any contract extension. A Performance Bond and Labour and Materials Bond were provided for 50% of the total bid price based on a 3 year term and constant prices.

At the end of the 2 year term (July 2008), the contractor requested a 30 % increase for the one year extension. Town staff did not accept the increase and instead took advantage of a York Region contract for the same contractor for similar services, at reduced unit costs from the requested increase along with the addition of a monthly maintenance fee. Staff indicated the overall cost increase was approximately 7%.

In November 2009, after the third year of the original contract term expiration date (July 2009), the Town extended the contract to December 31, 2009 as a non-competitive purchase for \$30,000 with the appropriate approvals.

**Contract extension after the second year was not adequately executed and understood by staff (included in finding 5.1, 5.2)**

In discussion with purchasing and operations staff, it was not clear how the additional year (July 2008 to July 2009) was awarded, under the original Town of Markham contract with York Region prices, or under the York Region contract with all its terms and conditions. The change in the extension was not reflected on the purchase order, which continues to reference the original contract and prices for the third year. There was no evidence that this change in contract was communicated internally, approved, and the legal contract properly executed with the necessary bonds.

The York Region contract provided for a monthly preventative maintenance fee (not in the original Town contract) in addition to unit based fees for equipment, materials and other services. There was no analysis of the cost differential at the time of extension or of the actual costs incurred. The audit noted that a number of invoice charges had item numbers or prices (police on duty) not specified in the York Region contract.

Work continued after the additional contract year expired (July 2009) without a contract or purchase order until the November 2009 contract extension, however no billings for work after July 2009 were received.

**Unexpected costs were not adequately tracked and followed up for recovery.  
(included in finding 5.4)**

Spend against the purchase order exceeded the original amount significantly, of the \$200,000 increase over the 3 years; \$88,000 was attributable to increase in scope (LED retrofit program) and a capital project. The remainder was from unexpected repairs due to motor vehicle accidents, excessive rain storms and power losses. Costs of repairs for roads and traffic signals that are damaged by a third party (vehicle accidents) are charged to the Operations budget and subsequently submitted to the insurance company for recovery.

Roles and responsibilities for managing these costs were unclear. In 2009 York Regional Police accident reports were not received for processing, although in December a few were received. No follow up to ensure the information is received potentially impacting claim recovery. Staff was unable to provide an analysis or listing of costs incurred from these events and the claims recovery activity. The most recent purchase order adjustment requested an increase of \$39,252 due to motor vehicle accidents and excessive rain storms; however the supporting invoices included regular maintenance charges and the other invoices could not be linked to accidents.

**Throughout the contract life there was insufficient monitoring and tracking of the work performed to ensure that expenditures are valid, necessary and contained.  
(included in finding 5.1 and 5.5)**

Operations did not approve or verify work completed and invoiced. Standard processes to match invoices to approved work reports and contract prices were not used (daily contract worksheets).

The original contract with Town of Markham (2007 and 2008) contained terms and conditions to support Operation's in their management of the contract. The audit reviewed 2 of the contractor requirements and found neither had been fully complied with; semi-annual inspection of equipment with results forwarded to the town and conflict monitor test results. Staff were not aware of the requirements. The extended York Region contract did not provide similar terms.

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**Contract 2**

*Expired contract – December 2009*

*Purchase order date – April 2007 (2 year renewal option)*

*Contract value - \$4,937,425 per year*

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**Sufficient Performance Bonds and Labour and Materials Bonds and other protective documents were not in place for this multi-year contract extension.  
(included in finding 5.6)**

***Performance Bond and Labour and Materials Bond***

The purpose of these bonds is to guarantee the completion of the contract following contractor's default. The bonds are typically requested for the "term" of the contract. The audit sample of contracts identified that bonds for multi-year or extended contracts were either provided for the full term, or as a rider to extend the bond for the second year, or requested after the first year expired.

For the Asphalt Resurfacing 2 year contract renewal (value of \$9.9 million for the 2 years) a Performance Bond and Labour and Materials Bond were requested after the first year expired. The dollar amounts of the bonds were based on the one year contract value, however the purchase order was for the two year period and it was not clear in the bond documents if the coverage extended to the second year for the additional amount. Subsequent confirmation from the bonding company indicated there was sufficient coverage. The contract document did not specify the performance bond requirements for renewal terms.

***Health and Safety certifications***

The contract required a confirmation of mandatory health and safety certifications, however there was no request for re-confirmation when the contract was extended for 2 years. Responsibility for obtaining was unclear among staff. Since the contractor has a number of employees (indicated up to 70 in traffic control) there would be some turnover, and reconfirmation would be advisable.

**Oversight activities specified in the contract, including some quality assurance testing, were not complied with. (included in finding 5.5)**

Within the contract there are numerous requirements for either the contractor to conduct tests, make submissions regarding the product design and usage, or for the Town to conduct random testing with the intent to monitor the quality of the contracted work. The audit sampled a number of these requirements and found that they were not always obtained or carried out. It should be noted that testing of materials placed for asphalt resurfacing was carried out. The contract owner, who was not involved in creating the contract documents, was not fully aware of all the contract conditions.

No quality assurance testing was done by the Town in 2009 on any pavement preservation strategies such as micro surfacing. The contract states that the Town *may* carry out this testing. The distress survey, designed to identify distresses that pose a hazard to the travelling public during the warranty period, was not done potentially missing warranty covered repairs.

For asphalt resurfacing work, the contractor is required to supply the Town with a final written report of test results as listed in the contract and quality control test results prior to commencement of work, however these were not submitted to the Town and the Town did not follow up to request the test results.

**Change order not well executed. (included in finding 5.8)**

During the contract term in 2008, additional items were added to the contract as substitutes priced by the vendor at the time of the change. There was no evidence that the quoted price was reviewed against current market prices to ensure reasonable cost. One item, valued at \$284,772, was subject to the asphalt cement (AC) premium. The AC premium was paid using the differential in price index from the original contract date instead of the market price at time of the change. The overpayment was minor (\$3,000), however depending on the timing of the change, there was a potential for larger overpayment.

**Material delivery tickets are not sufficiently validated for weight shipments. (included in finding 5.7)**

Payments are made to the contractor for materials used on the job (example asphalt) based on computer generated material delivery tickets provided by the contractor to the site supervisor at the time of site delivery. The site supervisor signs off for receipt of the material before the truck is unloaded. This provides some protection against overcharges for material delivered.

The audit noted that the truck in and out times on the delivery tickets differed by only a few seconds in some cases. Apparently, the truck's empty weight is pre-loaded into the computer so that the loaded truck can be processed faster. There is a slight risk that overcharging can occur, and would not necessarily be noted by the site supervisor if kept to a minimum.

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**Contract 3**

*Purchase order date – October 2008*

*Contract value - \$30,000*

*Total spend - \$37,650*

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Contract term differed between the Town's quotation and the issued purchase order, such that the expiration date of the contract was understood by purchasing to be December 2008 and by Operations, October 2009. As a result, work was completed against an expired contract.

**Staff did not initially manage the contract well**, however with a change in the contract administrator steps were taken to bring the work under control. The following deficiencies in the contract administration were noted during the audit.  
**(included in finding 5.1, 5.2, 5.3,)**

- Contract compliance was not monitored until the purchase order amount was exceeded. Work was brought in-house and no longer assigned to the contractor. There was no tracking of in-house work, no assessment of the internal costs versus third party costs, and the impact on operations activities. Discussion with staff indicated town costs are higher due to labour and equipment.
- Approval for spend in excess of the purchase order was given months after the work was done, invoiced and paid.
- Work was completed outside of the scope of the contract and priced without negotiation, however the amount was reasonable based on recent existing bids, and the out of scope work was reasonable, appears to have been missed in the Town's quotation.
- Tracking work assigned and completed, and verifying to invoices was not done for the contracted work. As a result, billings could not be audited. Anomalies noted were minor in dollars, such as visiting a site already visited by the Town, implying poor communication and ineffective sign production. It is understood that the sign department has since undergone process changes. The new contract issued in late 2009 to another contractor now has the standard Operations tracking mechanisms in place to verify invoiced work is authorized and completed.

- The new contract issued in September 2009 expired October 2009 and was extended to December 22, 2009. The contract extension was only communicated to the vendor by Operations through email and no formal letter and revised purchase order issued. The original purchase order did not indicate the contract term; however the award letter stated that the contract must be complete by October 2009.