

## For Information Only

### Audit of Miscellaneous Roads Winter Maintenance Program

Presented To:	Audit Committee
Presented:	Thursday, Jun 03, 2010
Report Date	Thursday, May 27, 2010
Type:	Presentations
File Number:	OAG-02-10

### Recommendation

That the Audit Committee consider the report dated May 27, 2010 from the Auditor General identifying audit issues and the steps taken by Staff to resolve them, including the adequacy of management responses to audit concerns.

### Finance Implications

There are no budget implications with this report.

#### Signed By

**Auditor General**  
Brian Bigger  
Auditor General  
*Digitally Signed May 27, 10*

---

## Executive Summary

### ***Introduction***

Attached is the audit report containing the results of our audit of the Miscellaneous Roads Winter Maintenance Program. This report evaluates the stewardship over public funds, and also addresses opportunities to improve effectiveness, efficiency and economy of the Winter Road Maintenance and Repair activities. The audit was added to the annual audit program as an emerging issue.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

### ***Background***

Winter asphalt repair activities are a small but not insignificant component of the roads operating program. Citizen ratings of roads in the most recent survey, (City of Greater Sudbury 2009 Budget State of the Community Report) confirmed that Maintenance of Main Roads had one of the highest "Importance of Services" ratings at 92 percent, however "Satisfaction With Performance" of these services was only 29 percent.

Through this review, the Auditors were looking for a proactive approach and management focus on cost analysis, cost control and performance management, in order to drive value for money and make better and more efficient use of scarce resources.

### ***Scope***

The scope of the audit included a review of applicable legislation, walkthroughs, observation of work activities, interviews and a review of documentation pertaining to winter maintenance pothole repairs for the period from January 2009 to February 2010.

### ***Objectives***

The objectives of the audit were to evaluate the quality of stewardship and identify opportunities to enhance value for money through more effective, economical and/or efficient management of the winter asphalt patching program.

The audit included an evaluation of the following:

- Compliance with and the effectiveness of purchasing and budgetary controls,
- The methods used to maintain stewardship over the roads, to identify, prioritize, track and resolve road defects, (potholes, heaves and sinks) in an timely and economical fashion based on minimum road maintenance standards,
- The process surrounding utility cuts and the accountability for repairs and maintenance,

- Whether crews were working in a safe, efficient and effective manner,
- Actions taken to achieve value for money in the repair of road defects including potholes,
- Management, control and oversight of contractors and contractor billing from January 2009 to February 2010.

**Methodology**

The audit used the following methodology:

- Review of industry documentation of standard operating procedures for the repair of potholes
- Review of Municipal Act, 2001, Ontario Regulation 239/02, Minimum Maintenance Standards for Municipal Highways
- Review of Sudbury media articles relating to potholes
- Review of Citizen ratings of roads in the most recent survey, (City of Greater Sudbury 2009 Budget State of the Community Report)
- Review of documentation used for identifying, tracking and repairing potholes including ACR logs, patrol reports, deployment sheets and crew cards
- Review of winter maintenance contracts and contractor invoicing
- Review of budget information in the MMS system
- Review of budget and cost data in PeopleSoft
- Review of relevant tenders and bylaws relevant to the Miscellaneous Winter Roads Maintenance Program
- Review of permits, controls, terms and conditions related to utility cuts
- Review of City quality assurance and standard operating procedures
- Various walk-throughs, interviews and field observations of work practices

**Summary of Expenses**

In 2009, expenditures for winter asphalt patching activities exceeded the Council approved budget by \$1.6 million or 362 percent. Expenditures for Hired Equipment and Contract Services totaled \$1.14 million based on a Council approved budget of \$35,000.

The following table summarizes 2009 Winter Asphalt Patching Budget and Expenditures:

2009 Miscellaneous Winter Maintenance Program	Council Approved Budget	Staff's In-Year Budget Adjustment	Staff's Revised Budget Amounts	Actual Expenditures	Variance Over Council Approved Budget	% Variance From Council Approved Budget
Ashpalt Patching Winter-MMMS - Hired Equipment	\$ 35,000	\$ 96,310	\$ 131,310	\$ 941,761	\$ (906,761)	2591%
Ashpalt Patching Winter-MMMS - Contract Services	\$ -		\$ -	\$ 197,594	\$ (197,594)	0%
Ashpalt Patching Winter-MMMS Materials	\$ 193,200		\$ 193,200	\$ 440,960	\$ (247,760)	128%
Ashpalt Patching Winter-MMMS Labour	\$ 116,700		\$ 116,700	\$ 287,211	\$ (170,511)	146%
Ashpalt Patching Winter-MMMS - Own Equipment	\$ 102,300		\$ 102,300	\$ 197,941	\$ (95,641)	93%
<b>Totals</b>	<b>\$ 447,200</b>	<b>\$ 96,310</b>	<b>\$ 543,510</b>	<b>\$ 2,065,467</b>	<b>\$ (1,618,267)</b>	<b>362%</b>

**Key Issues**

The following eleven issues were rated as high in the audit report:

1. With a budget variance as high as \$1.6 million and 362 percent of the requested budget, clarification of staff’s authority to exceed an approved budget is required
2. Management exceeded their authority when an operating contract was extended beyond its original scope by \$423,000
3. Compliance with minimum roads maintenance standards for road patrols is not consistently met
4. City crews lose as much as 25 percent of productivity by restricting pothole repairs to daytime shifts
5. Restricting road crews to artificial geographic boundaries negatively impacts the overall value for money provided by the city
6. Crews do not always follow city and provincial safety procedures in completing roads maintenance tasks
7. With current crew sizes, the city may be paying between 20 percent and 30 percent more per pothole repair than absolutely required
8. The city will continue to overpay for unpaid work breaks if warnings to contractors are not given immediately
9. Public funds will have been wasted if the city does not recover overpayments for unpaid break periods impacting many city departments
10. The current supervisory review process for approval of contractor billing documents does not reject unpaid break periods
11. Damage to a road often extends beyond the road cut section and the cost of the extended remediation is fully borne by a limited roads budget

**Summary of Audit Findings & Impact (Measure of Residual Risk)**

Category	Total Number of Findings	Number of Findings Considered		
		High (Red)	Medium (Yellow)	Low (Green)
Spending Authority	4	2	2	0
Municipal Maintenance Management System Budget	2	0	1	1
Paper Based Documentation	2	1	1	0
Crew Productivity	6	2	4	0
Inventory Control	1	0	1	0
Crew Size and Safety	2	2	0	0
Standard Operating Procedures	3	0	2	1
Contractor Billing	4	3	1	0
Road Cuts	3	1	2	0
Used Asphalt Plant	2	0	1	1
Citizen Requests Using The 311 system	3	0	3	0
<b>Total</b>	<b>32</b>	<b>11</b>	<b>18</b>	<b>3</b>

Audit findings are classified according to the following severity scale:

Impact	Details
<b>High</b>	<ul style="list-style-type: none"> <li>• Key control does not exist, is poorly designed or is not operating as intended</li> <li>• Serious non-compliance to policy or regulation</li> <li>• May result in immediate or material loss/misuse of assets, legal/regulatory action, material financial statement misstatements, etc.</li> <li>• Indicates a serious business control weakness/deficiency requiring immediate action</li> </ul>
<b>Medium</b>	<ul style="list-style-type: none"> <li>• Key controls are partially in place and/or are operating only somewhat effectively</li> <li>• Some non-compliance to policy or regulation</li> <li>• May negatively affect the efficiency and effectiveness of operations and/or financial reporting accuracy.</li> <li>• Indicates a business control concern requiring near-term action be taken</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>• Key controls are in place, but procedures and/or operations could be enhanced.</li> <li>• Minor non-compliance to policy or regulation</li> <li>• May result in minor impact to operations.</li> <li>• Indicates a business control improvement opportunity for which longer-term action may be acceptable</li> </ul>
<b>Nominal</b>	<ul style="list-style-type: none"> <li>• Housekeeping</li> </ul>

***Follow-up***

A summary of outstanding audit issues requiring follow up will be sent to the Director of Roads according to the timelines established below. The Director is accountable for ensuring management updates are made to the relevant status and the information is returned to the Auditor General within the two week timeframe.

Follow-up of outstanding issues will be conducted as follows:

Impact of Finding	Timing of Follow-up
<b>High</b>	Quarterly
<b>Medium</b>	Semi Annually
<b>Low</b>	Annually
<b>Nominal</b>	Not Applicable

**Overall Audit Rating - Weak**

In the Auditor general’s opinion the overall audit rating for the audit is Weak, as the audit contains several high and medium impact findings for this program. Controls were found to be weak in managing contractors resulting in overpayments. Noncompliance with the Purchasing Bylaw and Book 7 safety regulations put the City and staff at risk. The audit also identified significant opportunities for improvement in operating efficiency and effectiveness for winter asphalt repairs.

This conclusion is only applicable to the function/area of this audit.

It reflects the professional judgment of the Office of the Auditor General based on a comparison of situations as they existed at the time against audit criteria as identified in the scope of the audit. This conclusion is extended to provide reasonable assurance regarding controls. There are inherent limitations in any controls, including the possibility of human error and the circumvention or overriding of controls. Accordingly, even effective controls may provide only reasonable assurance with respect to City operations.

An overall audit rating is a micro opinion based on the severity of the findings for the function audited. It is a positive assurance opinion based on the evidence found during the audit.

The overall audit rating scale is as follows:

Rating	Description
Excellent	<ul style="list-style-type: none"> <li>No internal control weaknesses noted.</li> <li>Good adherence to laws, regulations, and policies.</li> <li>Good control environment.</li> <li>Operations are considered efficient and effective.</li> </ul>
Good	<ul style="list-style-type: none"> <li>Several low and/or one or two medium findings.</li> <li>Minor contraventions of policies and procedures with compensating controls in place.</li> <li>No violation of laws.</li> <li>Minor opportunities for improvement in efficiency and effectiveness.</li> </ul>
Fair	<ul style="list-style-type: none"> <li>Many medium findings and/or one or two high findings.</li> <li>Several contraventions to policy.</li> <li>Minor violations of regulations/laws with minimal impact to City.</li> <li>Moderate opportunities for improvement in efficiency and effectiveness.</li> </ul>
Weak	<ul style="list-style-type: none"> <li>Several high findings and some medium and/or low findings</li> <li>Controls weak in one or more areas.</li> <li>Non-compliance with policies put the City at risk.</li> <li>Violation of law/regulation put the City at risk.</li> <li>Substantial opportunities for improvement.</li> <li>Operations are considered consistently inefficient and/or ineffective</li> </ul>

**Acknowledgement**

We wish to express our appreciation for the cooperation and assistance provided to the audit team by all staff involved in this process.

2010

# AUDIT OF MISCELLANEOUS ROADS WINTER MAINTENANCE PROGRAM



Office of the Auditor General  
Bureau du vérificateur général

May 27, 2010 FINAL REPORT # 2010INFRA01

This audit was performed in accordance with Generally Accepted Government Auditing Standards.



May 25, 2010

To: Robert Falcioni, Director of Roads & Transportation Services

Subject: Miscellaneous Roads Winter Maintenance Program - #2010INFRA01

Attached is the audit report containing the results of our audit of the Miscellaneous Roads Winter Maintenance Program. This report evaluates the stewardship over public funds, and also addresses opportunities to improve effectiveness, efficiency and economy of the winter road maintenance and repair activities. The audit was added to the annual audit program as an emerging issue.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

#### Overall Audit Rating - Weak

In the Auditor general's opinion the overall audit rating for the audit is Weak, as the audit contains several high and medium impact findings for this program. Controls were found to be weak in managing contractors resulting in overpayments. Noncompliance with the Purchasing Bylaw and Book 7 safety regulations put the City and staff at risk. The audit also identified significant opportunities for improvement in operating efficiency and effectiveness for winter asphalt repairs.

This conclusion is only applicable to the function/area of this audit.

Our findings and conclusions are based on a comparison of the conditions, as they existed at the time of the audit, against pre-established audit criteria and as identified in the scope of the audit, for the audit period of January 2009 to February 2010.

The original time frame for this audit was set in accordance with our normal expectations as follows:

<b>Planning Stage</b>	<b>January 28, 2010</b>
<b>Fieldwork Stage</b>	<b>February 22, 2010</b>
<b>Draft Report to Auditor General</b>	<b>March 15, 2010</b>
<b>Draft Report to Client</b>	<b>March 17, 2010</b>
<b>Audit Committee Meeting</b>	<b>April 7, 2010</b>

A first draft of the audit report was provided to staff in our exit meeting on March 24, 2010.

As has been the experience in many other Municipalities being audited for the first time, establishing a fully transparent audit process, the development of management responses and our refinement of the final audit report took longer than would be expected in the future.

We will follow-up with management on our recommendations, according to the time frame established by impact of finding. The audit committee will be kept apprised of the status of management's action plans on a regular basis.

We wish to express our appreciation for the cooperation and assistance provided to the audit team by all staff involved in this process.

Sincerely,



Brian Bigger  
Auditor General

Audit Staff: Carolyn Jodouin, Senior Auditor

CC: Greg Clausen, General Manager Infrastructure Services,  
Lorella Hayes, Chief Financial Officer / City Treasurer  
Doug Nadorozny, CAO  
Shawn Turner, Manager of Financial & Support Services

## TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	6
Introduction.....	6
Background.....	6
Scope .....	6
Objectives .....	7
Methodology .....	7
Summary of Expenses.....	8
Key Issues.....	8
Summary of Audit Findings & Impact (Measure of Residual Risk) .....	9
Follow-up.....	9
Overall Audit Rating - Weak.....	10
Acknowledgement .....	11
Overall Management response .....	11
APPENDIX A – DETAILED REPORT .....	13
1) SPENDING AUTHORITY .....	13
2) MUNICIPAL MAINTENANCE MANAGEMENT SYSTEM (MMMS) BUDGET .....	18
3) PAPER BASED DOCUMENTATION.....	19
4) CREW PRODUCTIVITY .....	24
5) INVENTORY CONTROL .....	28
6) CREW SIZE AND SAFETY .....	29
7) STANDARD OPERATING PROCEDURES .....	31
8) CONTRACTOR BILLING .....	33
9) ROAD CUTS .....	35
10) PURCHASE OF USED ASPHALT PLANT.....	37
11) CITIZEN REQUESTS USING THE 311 SYSTEM.....	38

## EXECUTIVE SUMMARY

### INTRODUCTION

Attached is the audit report containing the results of our audit of the Miscellaneous Roads Winter Maintenance Program. This report evaluates the stewardship over public funds, and also addresses opportunities to improve effectiveness, efficiency and economy of the Winter Road Maintenance and Repair activities. The audit was added to the annual audit program as an emerging issue.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

### BACKGROUND

Winter asphalt repair activities are a small but not insignificant component of the roads operating program. Citizen ratings of roads in the most recent survey, (City of Greater Sudbury 2009 Budget State of the Community Report) confirmed that Maintenance of Main Roads had one of the highest “Importance of Services” ratings at 92 percent, however “Satisfaction With Performance” of these services was only 29 percent.

Through this review, the Auditors were looking for a proactive approach and management focus on cost analysis, cost control and performance management, in order to drive value for money and make better and more efficient use of scarce resources.

### SCOPE

The scope of the audit included a review of applicable legislation, walkthroughs, observation of work activities, interviews and a review of documentation pertaining to winter maintenance pothole repairs for the period from January 2009 to February 2010.

## OBJECTIVES

The objectives of the audit were to evaluate the quality of stewardship and identify opportunities to enhance value for money through more effective, economical and/or efficient management of the winter asphalt patching program.

The audit included an evaluation of the following:

- Compliance with and the effectiveness of purchasing and budgetary controls,
- The methods used to maintain stewardship over the roads, to identify, prioritize, track and resolve road defects, (potholes, heaves and sinks) in a timely and economical fashion based on minimum road maintenance standards,
- The process surrounding utility cuts and the accountability for repairs and maintenance,
- Whether crews were working in a safe, efficient and effective manner,
- Actions taken to achieve value for money in the repair of road defects including potholes,
- Management, control and oversight of contractors and contractor billing from January 2009 to February 2010.

## METHODOLOGY

The audit used the following methodology:

- Review of industry documentation of standard operating procedures for the repair of potholes
- Review of Municipal Act, 2001, Ontario Regulation 239/02, Minimum Maintenance Standards for Municipal Highways
- Review of Sudbury media articles relating to potholes
- Review of Citizen ratings of roads in the most recent survey, (City of Greater Sudbury 2009 Budget State of the Community Report)
- Review of documentation used for identifying, tracking and repairing potholes including ACR logs, patrol reports, deployment sheets and crew cards
- Review of winter maintenance contracts and contractor invoicing
- Review of budget information in the MMS system
- Review of budget and cost data in PeopleSoft
- Review of relevant tenders and bylaws relevant to the Miscellaneous Winter Roads Maintenance Program
- Review of permits, controls, terms and conditions related to utility cuts
- Review of City quality assurance and standard operating procedures
- Various walk-throughs, interviews and field observations of work practices

## SUMMARY OF EXPENSES

In 2009, expenditures for winter asphalt patching activities exceeded the Council approved budget by \$1.6 million or 362 percent. Expenditures for Hired Equipment and Contract Services totaled \$1.14 million based on a Council approved budget of \$35,000.

The following table summarizes 2009 Winter Asphalt Patching Budget and Expenditures:

2009 Miscellaneous Winter Maintenance Program	Council Approved Budget	Staff's In-Year Budget Adjustment	Staff's Revised Budget Amounts	Actual Expenditures	Variance Over Council Approved Budget	% Variance From Council Approved Budget
Asphalt Patching Winter-MMMS - Hired Equipment	\$ 35,000	\$ 96,310	\$ 131,310	\$ 941,761	\$ (906,761)	2591%
Asphalt Patching Winter-MMMS - Contract Services	\$ -		\$ -	\$ 197,594	\$ (197,594)	0%
Asphalt Patching Winter-MMMS Materials	\$ 193,200		\$ 193,200	\$ 440,960	\$ (247,760)	128%
Asphalt Patching Winter-MMMS Labour	\$ 116,700		\$ 116,700	\$ 287,211	\$ (170,511)	146%
Asphalt Patching Winter-MMMS - Own Equipment	\$ 102,300		\$ 102,300	\$ 197,941	\$ (95,641)	93%
<b>Totals</b>	<b>\$ 447,200</b>	<b>\$ 96,310</b>	<b>\$ 543,510</b>	<b>\$ 2,065,467</b>	<b>\$ (1,618,267)</b>	<b>362%</b>

## KEY ISSUES

The following eleven issues were rated as high in the audit report:

1. With a budget variance as high as \$1.6 million and 362 percent of the requested budget, clarification of staff's authority to exceed an approved budget is required
2. Management exceeded their authority when an operating contract was extended beyond its original scope and budget by \$423,000
3. Compliance with minimum roads maintenance standards for road patrols is not consistently met
4. City crews lose as much as 25 percent of productivity by restricting pothole repairs to daytime shifts
5. Restricting road crews to artificial geographic boundaries negatively impacts the overall value for money provided by the city
6. Crews do not always follow city and provincial safety procedures in completing roads maintenance tasks
7. With current crew sizes, the city may be paying between 20 percent and 30 percent more per pothole repair than absolutely required
8. The city will continue to overpay for unpaid work breaks if warnings to contractors are not given immediately
9. Public funds will have been wasted if the city does not recover overpayments for unpaid break periods impacting many city departments
10. The current supervisory review process for approval of contractor billing documents does not reject unpaid break periods
11. Damage to a road often extends beyond the road cut section and the cost of the extended remediation is fully borne by a limited roads budget

## SUMMARY OF AUDIT FINDINGS &amp; IMPACT (MEASURE OF RESIDUAL RISK)

Category	Total Number of Findings	Number of Findings Considered		
		High (Red)	Medium (Yellow)	Low (Green)
Spending Authority	4	2	2	0
Municipal Maintenance Management System Budget	2	0	1	1
Paper Based Documentation	2	1	1	0
Crew Productivity	6	2	4	0
Inventory Control	1	0	1	0
Crew Size and Safety	2	2	0	0
Standard Operating Procedures	3	0	2	1
Contractor Billing	4	3	1	0
Road Cuts	3	1	2	0
Used Asphalt Plant	2	0	1	1
Citizen Requests Using The 311 system	3	0	3	0
<b>Total</b>	<b>32</b>	<b>11</b>	<b>18</b>	<b>3</b>

Audit findings are classified according to the following severity scale:

Impact	Details
<b>High</b>	<ul style="list-style-type: none"> <li>• Key control does not exist, is poorly designed or is not operating as intended</li> <li>• Serious non-compliance to policy or regulation</li> <li>• May result in immediate or material loss/misuse of assets, legal/regulatory action, material financial statement misstatements, etc.</li> <li>• Indicates a serious business control weakness/deficiency requiring immediate action</li> </ul>
<b>Medium</b>	<ul style="list-style-type: none"> <li>• Key controls are partially in place and/or are operating only somewhat effectively</li> <li>• Some non-compliance to policy or regulation</li> <li>• May negatively affect the efficiency and effectiveness of operations and/or financial reporting accuracy.</li> <li>• Indicates a business control concern requiring near-term action be taken</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>• Key controls are in place, but procedures and/or operations could be enhanced.</li> <li>• Minor non-compliance to policy or regulation</li> <li>• May result in minor impact to operations.</li> <li>• Indicates a business control improvement opportunity for which longer-term action may be acceptable</li> </ul>
Nominal	<ul style="list-style-type: none"> <li>• Housekeeping</li> </ul>

## FOLLOW-UP

A summary of outstanding audit issues requiring follow up will be sent to the Director of Roads according to the timelines established below. The Director is accountable for ensuring management updates are made to the relevant status and the information is returned to the Auditor General within the two week timeframe. Follow-up of outstanding issues will be conducted as follows:

Impact of Finding	Timing of Follow-up
High	Quarterly
Medium	Semi Annually
Low	Annually
Nominal	Not Applicable

## OVERALL AUDIT RATING - WEAK

In the Auditor general's opinion the overall audit rating for the audit is Weak, as the audit contains several high and medium impact findings for this program. Controls were found to be weak in managing contractors resulting in overpayments. Noncompliance with the Purchasing Bylaw and Book 7 safety regulations put the City and staff at risk. The audit also identified significant opportunities for improvement in operating efficiency and effectiveness for winter asphalt repairs.

This conclusion is only applicable to the function/area of this audit.

It reflects the professional judgment of the Office of the Auditor General based on a comparison of situations as they existed at the time against audit criteria as identified in the scope of the audit. This conclusion is extended to provide reasonable assurance regarding controls. There are inherent limitations in any controls, including the possibility of human error and the circumvention or overriding of controls. Accordingly, even effective controls may provide only reasonable assurance with respect to City operations.

An overall audit rating is a micro opinion based on the severity of the findings for the function audited. It is a positive assurance opinion based on the evidence found during the audit.

The overall audit rating scale is as follows:

Rating	Description
Excellent	<ul style="list-style-type: none"> <li>No internal control weaknesses noted.</li> <li>Good adherence to laws, regulations, and policies.</li> <li>Good control environment.</li> <li>Operations are considered efficient and effective.</li> </ul>
Good	<ul style="list-style-type: none"> <li>Several low and/or one or two medium findings.</li> <li>Minor contraventions of policies and procedures with compensating controls in place.</li> <li>No violation of laws.</li> <li>Minor opportunities for improvement in efficiency and effectiveness.</li> </ul>
Fair	<ul style="list-style-type: none"> <li>Many medium findings and/or one or two high findings.</li> <li>Several contraventions to policy.</li> <li>Minor violations of regulations/laws with minimal impact to City.</li> <li>Moderate opportunities for improvement in efficiency and effectiveness.</li> </ul>
Weak	<ul style="list-style-type: none"> <li>Several high findings and some medium and/or low findings</li> <li>Controls weak in one or more areas.</li> <li>Non-compliance with policies put the City at risk.</li> <li>Violation of law/regulation put the City at risk.</li> <li>Substantial opportunities for improvement.</li> <li>Operations are considered consistently inefficient and/or ineffective</li> </ul>



## ACKNOWLEDGEMENT

We wish to express our appreciation for the cooperation and assistance provided to the audit team by all staff involved in this process.

## OVERALL MANAGEMENT RESPONSE

The Auditor's report has identified several recommendations for improvements to how the Roads Division should operate in the future.

Prior to the winter of 2007 / 2008, the City did not utilize contract crews for winter pothole patching. The development of an abnormal quantity of potholes in the winter of 2007 / 2008 necessitated that City crews be supported by contract crews in order to fulfill the mandate of the provincial minimum maintenance standards.

Unfortunately, the winter of 2008/2009 turned out to be more severe than any previous winter for potholes and the operating budget could not support the excessive pothole repairs in 2009.

This situation was highlighted with a six hundred percent increase in claims from 50 in 2007 to over 300 in 2009.

As detailed in the Auditor's report, Staff complies with the Ontario Reg. 239/02 Minimum Maintenance Standards for roads maintenance. All potholes reported must be repaired within a specified timeline or the City may be found liable for damages.

The significant increase in the number of potholes in February/March 2009 was deemed by staff to be an emergency situation. Consequently a warm mix asphalt supply was brought up from Toronto to repair the worst areas of roadway. These patches are still holding today.

Infrastructure Services provided Council with monthly reports regarding the financial status of Winter Operations in an effort to keep them apprised of the impact of this situation on operating budgets.

In anticipation of a repeat winter such as 2008/2009, the 2010 base budget was increased by \$250,000 in accordance with the Budget Preparation Policy to enhance the Asphalt Patching – Hired Equipment account. This required increase to the budget was highlighted and approved by Council.

As a result of the unexpected 2009 pothole crisis, Staff have implemented procedures to address many of the recommendations made during the audit and described in the report.

There were also a number of other recommendations identified in the Auditor's report. Staff will ensure that applicable City policies and procedures are reviewed and modified, and changes implemented where appropriate.

Management responses to each recommendation are detailed in the report.

## APPENDIX A – DETAILED REPORT

### 1) SPENDING AUTHORITY

Inherent risks associated with a reactive roads management strategy were exposed and as a result, weaknesses in expenditure and procurement controls contributed to significant unfavorable budgetary variances.

In 2009, only \$35,000 was originally included in the budget for Hired Equipment (contractor repair) expenditures. However, in January 2009, due to the deterioration of roads, management proceeded to tender for Contract ISD09-1, Pothole Repairs within the City of Greater Sudbury's Five (5) Maintenance Sections. The value of the tender issued for these pothole repairs was identified as \$130,000. This amount was \$95,000 greater than the budget request presented to Council. Since the original budgeted amount was not adequate, management transferred \$96,000 of operating budget funds from other programs into the winter asphalt repair program as an in-year budget adjustment, and brought the approved budget into line with the stated tender value. However, by year-end actual expenditures for hired equipment and contract services exceeded the council approved budget by \$1,104,356 (Figure 1). These unfavorable variances stemming from the Roads program directly contributed to Infrastructure Services' departmental unfavorable variance of \$2 million in 2009.

2009 Miscellaneous Winter Maintenance Program	Council Approved Budget	Staff's In-Year Budget Adjustment	Staff's Revised Budget Amounts	Actual Expenditures	Variance Over Council Approved Budget	% Variance From Council Approved Budget
Asphalt Patching Winter-MMMS - Hired Equipment	\$ 35,000	\$ 96,310	\$ 131,310	\$ 941,761	\$ (906,761)	2591%
Asphalt Patching Winter-MMMS - Contract Services	\$ -		\$ -	\$ 197,594	\$ (197,594)	0%
Asphalt Patching Winter-MMMS Materials	\$ 193,200		\$ 193,200	\$ 440,960	\$ (247,760)	128%
Asphalt Patching Winter-MMMS Labour	\$ 116,700		\$ 116,700	\$ 287,211	\$ (170,511)	146%
Asphalt Patching Winter-MMMS - Own Equipment	\$ 102,300		\$ 102,300	\$ 197,941	\$ (95,641)	93%
<b>Totals</b>	<b>\$ 447,200</b>	<b>\$ 96,310</b>	<b>\$ 543,510</b>	<b>\$ 2,065,467</b>	<b>\$ (1,618,267)</b>	<b>362%</b>

Figure 1

Section 7 of by-law 2007-299 (By-law of the City of Greater Sudbury to Adopt a Policy Regarding Accountability and Transparency and a Policy Regarding Delegation of Powers and Duties) states that any expenditure “shall have been provided for in the current year’s budget (or authorized by the Purchasing by-law)”.

Furthermore, section 7 of the Purchasing Bylaw 2006-270 7(1) requires “Prescribed Council Approval” for:

- (ii) any Contract where the total acquisition cost is greater than the Council Approved Budget.
- (iv) any contract where a bid solicitation has been restricted to a single source of supply, and the Total Acquisition Cost of such Good, Service or Construction exceeds \$35,000.

Section 21 of the Purchasing Bylaw 2006-270 regarding “Contract Without Budgetary Appropriation”, requires the General Manager to submit a report to Council containing information regarding the requirement, terms of reference and availability of funds from either within existing estimates originally approved by Council, or the requirement of additional funds prior to commencement of any purchase.

Although roads winter maintenance variance reports were provided to Council, no prescribed Council approval for this overspending was sought by management. Hence, there is an opportunity to further clarify staff’s delegated authority for spending limits relative to the Council approved budget, as the bylaw is not completely clear regarding circumstances and thresholds where the General Manager may be required to report to Council.

### **RECOMMENDATION (HIGH)**

With a budget variance as high as \$1.6 million and 362 percent of the requested budget, clarification of staff’s authority to exceed an approved budget is required

- a) As it is Management’s responsibility to establish and to ensure compliance with internal controls and bylaws, Infrastructure Services Management should obtain clarification of City policies through Financial Services and Legal Services, to determine an actual percentage and dollar threshold over which prescribed Council approval would be required. In addition, changes to Council approved budgets over this threshold amount should not be allowed unless first approved by Council.

### **MANAGEMENT RESPONSE**

---

We agree with the need to have a clearer policy on budget reallocations. Finance has been working on a budget reallocation policy which will be presented to Council in the fall of 2010. In emergency situations such as that which were experienced in the spring of 2009 with potholes, we will strive to ensure that all components of the Purchasing By-law for Emergency Purchases are achieved.

---

In the spring of 2009, City Council and staff were under immense pressure to regain control over the City’s failing roads (potholes). In response to the need for more permanent repairs of potholes and road defects, management’s solution was to request that a local contractor pick up and deliver Warm Mix Asphalt from an asphalt plant in the Toronto area, grind key trouble spots, and apply Spreader Laid Patches.

Roads management used contract ENG08-31 (Tender for Hot Mix Asphalt (HMA) Spreader Laid Patches) to complete this work. They treated ENG08-31 as if it was an active carry over contract although it was originally to be completed in the fall of 2008. As such, they proceeded

on the estimated \$300,000 worth of work under this contract, without further Council approval. The public was informed of the above Warm Mix/Spring Shave and Pave program on March 16, 2009 via a published public service announcement. Council was informed of the program by e-mail on March 19, 2009. The e-mail was sent after the program had already started (March 16, 2009).

The actual cost of this two week repair blitz was \$423,988, 41 percent more than the estimate provided to Council. No report requesting prescribed Council approval or retroactive approval for these funds was ever submitted to Council.

There is no dispute that these methods were successful in achieving more permanent repairs. Our review however, revealed that change orders to support this work were related to contract ENG08-31 which had previously waived liquidating damages, released holdbacks, and had been published in the Daily Commercial News and Construction Record as being “substantially complete” as of January 22<sup>nd</sup>, 2009.

The actions of both the contractor and City management in releasing holdbacks and waiving liquidated damages for the work completed in 2008 associated with Contract ENG08-31, support our view that the work conducted in March 2009 to repair potholes with Warm Asphalt Mix material was not simply an extension or carryover of the ENG08-31 contract. In the opinion of the Auditors, this clearly indicated that the contracted work was completed as of January 22<sup>nd</sup>, 2009 and therefore change orders were not valid.

If this was deemed to be an emergency, Section 22 of the City’s purchasing by-law 2006-270 requires a formal report must be made to Council in all circumstances where the Emergency purchase exceeds \$35,000.

If not considered an emergency, Section 7 of the Purchasing Bylaw 2006-270 7(1) requires “Prescribed Council Approval” for:

- (ii) any Contract where the total acquisition cost is greater than the Council Approved Budget.
- (iv) any Contract where a bid solicitation has been restricted to a single source of supply, and the Total Acquisition Cost of such Good, Service or Construction exceeds \$35,000.

Even though the pothole crisis in March 2009 may have been a serious situation or occurrence that happened unexpectedly and demanded immediate action, management clearly exceeded their authority.

### **RECOMMENDATION (HIGH)**

Management exceeded their authority when an operating contract was extended beyond its original scope and budget by \$423,000

- b) It is Management's responsibility to establish and to ensure compliance with internal controls and bylaws. Purchasing by-law 2006-270 is clear and specific as it provides circumstances and thresholds where the General Manager is required to report to Council, or where prescribed Council approval would be required. Infrastructure Management should obtain clarification of City policies through Financial Services and Legal Services to improve awareness and understanding of key financial controls and bylaws impacting their operations.

#### MANAGEMENT RESPONSE

---

An informal email notification was provided to Council March 19, 2009. In future, staff will follow up with a formal Council Report recognizing the unbudgeted expenditure

Staff proceeded in the most expedient and economical means to address a serious problem which had developed into an emergency, in order to deal with the pothole crisis which was occurring at the time.

Staff will pursue the issue of "substantial performance certificates" with Legal and Construction Services and establish a formal process for completion of contracts to avoid / prevent a similar reoccurrence.

---

According to By-Law 2006-270, Purchasing Procedures, 3(1)(a), "If the estimated project cost is over \$50,000 in value, an account number must be provided to verify that funds have been allocated for the project", prior to the tender being advertised.

In December 2009, management issued Contract ISD10-2, Tender for Warm Mix Asphalt Patching within the City of Greater Sudbury's Five Maintenance Sections. The tender closing date was January, 12, 2010.

A review of the tender files in Purchasing Services revealed that this tender was issued without a Tender Award Form and budgetary commitments being completed. The council approved budget in the City's PeopleSoft financial system did not contain adequate funds to support the contract at the time of the audit.

#### **RECOMMENDATION (MEDIUM)**

Completion of tender award forms is required to confirm sufficient budget funds exist

- c) In order to avoid or control overspending through operating contracts, the commitment of annual budget funds must be recorded and confirmed on all tender award forms.

#### MANAGEMENT RESPONSE

---

Staff agree. Although sufficient funds were available for ISD 10-2, Staff will work with Purchasing to ensure that Tender award forms are filled out on a timely basis. The tender award form for contract ISD10-2 has been completed.

---

Although our original terms of reference for this audit referred to winter asphalt patching, the Auditors felt it prudent to extend our scope in evaluating the effectiveness of management action to reduce the unfavorable variances in Roads and Infrastructure Services expenditures. On March 16, 2009, management issued a 2009 tender Contract ENG09-31 for HMA Spreader Laid Patches (more commonly referred to as the Summer Shave and Pave Program). This contract was for the roads summer maintenance repairs to potholes. Even though the Roads division knew in April that they were going to be over budget for the year, there was no attempt to control costs for the remaining part of the year.

It is our opinion that Management had the opportunity to significantly reduce their overall unfavorable expenditure variance through possible adjustments to ENG09-31. Management indicated to the Auditors that they believe that there is no requirement to reduce summer roads expenditures when winter maintenance budgets have been exceeded.

#### **RECOMMENDATION (MEDIUM)**

Further clarification of management's responsibility for ongoing budgetary control is required to reduce the risk of overspending

- d) Roads Management must assume the initiative to mitigate future over expenditures, as is the requirement of all other City programs and departments.

#### **MANAGEMENT RESPONSE**

---

It was Council's intent to cover over expenditures in the winter program with the establishment of the Winter Reserve fund and not deplete the summer program. Summer activities are vital to ensuring permanent repairs to road surfaces which minimize winter potholes.

As reported in the 2009 Corporate Variance Report provided to the Finance Committee, the City was in an overall budget surplus and a contribution from the Winter Control Reserve Fund was not required.

AUDITORS COMMENT – Staff were unable to provide documentation to confirm council's intentions.



## 2) MUNICIPAL MAINTENANCE MANAGEMENT SYSTEM (MMMS) BUDGET

The Municipal Maintenance Management System (MMMS) is a custom developed system that has been in place since 1974. The MMMS system was designed to collect, process and report financial and performance information relating to the City's infrastructure maintenance activities. In 2007, KPMG did an extensive study of the MMMS system. At that time, it was noted that the program was intended to be replaced within the next two to three years. Currently this system is still in place.

Our review was not as extensive as that done by KPMG, as our scope was limited to the review of MMMS data that pertained to winter pothole maintenance. In our review, we have noted the following:

- MMMS planning data does not reflect actual costs by area as it was last updated in 2007 and therefore, it cannot be relied upon for management decision making. The outdated planning data was also used in developing the 2010 budget. The MMMS planning data for 2010 was being revised as we were auditing. However, once the update is complete, the 2010 budget in PeopleSoft will have to be matched to the MMMS.
- The activities do not allow for comparisons of productivity of City versus contractor crews.
- Activities do not include money for warm mix.
- MMMS does not tie by line item to the approved budget in PeopleSoft. It does however, agree in total.
- If monies are moved around between activities, this is done and tracked outside of MMMS and PeopleSoft.

The 2009 approved budget represented simple inflationary percentage increases over the previous years' expenditures. There is also no formal process in place to challenge the assumptions and related resource allocations within the budget. The current guidelines and budget schedule do not include time to provide critical analysis of the proposed budget, including challenging underlying assumptions underpinning proposed budget amounts. In 2009, the budget request by account did not line up with MMMS activity planning data for those same accounts. This was one contributing factor to management's inability to effectively control expenditures within the approved budget.

### RECOMMENDATION (LOW)

MMMS planning data does not support productivity management

- a) Due to the age of the software and limited ability within current MMMS to associate activities and costs to specific road assets or road segments, management should continue to investigate other available programs in the market place that could be used to support budget



planning, work order management, productivity tracking and cost analysis to the infrastructure asset level.

#### MANAGEMENT RESPONSE

---

Staff agree that a more updated software program should be pursued to better refine the MMMS system. A Project Development Team is being established to pursue a replacement for the current MMMS system and a new system is expected to be in place by early 2012.

#### RECOMMENDATION (MEDIUM)

The effectiveness of budgetary controls are impacted by disconnects between MMMS and PeopleSoft

- b) Recognizing that a replacement system may not be implemented for some time, the MMMS budget and planning data needs to more accurately reflect actual material, city equipment, labour, hired equipment and contractor costs of activities by area so that it can be used more effectively in budgeting, organizing, directing and controlling Roads Winter Maintenance activities. This can be accomplished without additional cost by more fully utilizing the existing capabilities of the MMMS system.

#### MANAGEMENT RESPONSE

---

The MMMS budget now ties into the PeopleSoft budget for 2010. For approximately 10 years previous, it did not.

### 3) PAPER BASED DOCUMENTATION

Information regarding foreperson patrols and work performed for pothole repairs is not always accurate, clear, concise, timely or complete. With missing or incomplete documentation, the City will end up paying out claims. According to the Municipal Act, 2001, we need to meet minimum maintenance standards for our roads. Minimum maintenance standards were developed to provide municipalities with a defense against liability from actions arising due to levels of care on roads. Ontario Regulation 239/02 came into effect on November 1, 2002 and outlines the minimum maintenance standards for all roads in Ontario.

All roads have a classification which is dependent upon both the average number of motor vehicles on the road and the posted speed limit (Table 1). Each road must be patrolled in order to check for conditions of the roadway (crack, potholes, drainage etc), bridges, traffic signs and signals, luminaries etc. The frequency of the road patrols is dependent on the classification of the

road as outlined in Table 2. Specifically relating to potholes, once a pothole is identified, it must be fixed according to the timelines in Table 3.

TABLE 1  
CLASSIFICATION OF HIGHWAYS<sup>1</sup>

Average Annual Daily Traffic (number of motor vehicles)	Posted or Statutory Speed Limit (kilometers per hour)						
	91 - 100	81 - 90	71 - 80	61 - 70	51 - 60	41 - 50	1 - 40
15,000 or more	1	1	1	2	2	2	2
12,000 - 14,999	1	1	1	2	2	3	3
10,000 - 11,999	1	1	2	2	3	3	3
8,000 - 9,999	1	1	2	3	3	3	3
6,000 - 7,999	1	2	2	3	3	3	3
5,000 - 5,999	1	2	2	3	3	3	3
4,000 - 4,999	1	2	3	3	3	3	4
3,000 - 3,999	1	2	3	3	3	4	4
2,000 - 2,999	1	2	3	3	4	4	4
1,000 - 1,999	1	3	3	3	4	4	5
500 - 999	1	3	4	4	4	4	5
200 - 499	1	3	4	4	5	5	5
50 - 199	1	3	4	5	5	5	5
0 - 49	1	3	6	6	6	6	6

<sup>1</sup> Municipal Act, 2001, Ontario Regulation 239/02, Minimum Maintenance Standards for Municipal Highways

TABLE 2  
PATROLLING FREQUENCY<sup>2</sup>

Class of Highway	Patrolling Frequency
1	3 times every 7 days
2	2 times every 7 days
3	once every 7 days
4	once every 14 days
5	once every 30 days

TABLE 3  
POTHoles ON PAVED SURFACE OF ROADWAY<sup>3</sup>

Class of Highway	Surface Area	Depth	Maximum Time To Complete Repairs Once The City Is Aware Of The Problem
1	600 cm <sup>2</sup>	8 cm	4 days
2	800 cm <sup>2</sup>	8 cm	4 days
3	1000 cm <sup>2</sup>	8 cm	7 days
4	1000 cm <sup>2</sup>	8 cm	14 days
5	1000 cm <sup>2</sup>	8 cm	30 days

All of the records for tracking patrols, dispatching workers and recording work done by the crew members are paper based. The City's patrol reports are hand written on preprinted Routine Patrol Records and copies of these documents are sent from each depot to the Frobisher Depot for filing. The patrol reports list the name of the street, the time and date it was patrolled, the foreperson who did the patrol and any conditions they saw while they were out on patrol,

<sup>2</sup> Municipal Act, 2001, Ontario Regulation 239/02, Minimum Maintenance Standards for Municipal Highways

<sup>3</sup> Municipal Act, 2001, Ontario Regulation 239/02, Minimum Maintenance Standards for Municipal Highways

including any potholes. These patrol records are either filled out when they return to their depot, or when they can safely pull off the road to complete the required paperwork. Crew cards are also filled out daily by both the City crews and contractors. These crew cards list the crew members, the work performed, and the material and equipment used on the job. All of the crew cards are signed by the foreperson and sent to the Frobisher Depot in order to be manually input into the MMMS (Municipal Maintenance Management System) system.

During our audit, we had asked for a sample of patrol reports for various weeks in 2009. The North East and South West depots could not produce a copy of the patrol records for these two weeks. Furthermore, on review of a sample of claims paid out in 2009, the City could not always produce records to substantiate that patrols were done according to the minimum maintenance standards. Claims were also paid out because the potholes were not repaired according to the timelines outlined under the minimum maintenance standards.



Crew cards are not being filled out consistently. Many times, information regarding the number of hours worked or the area the crew was working in was not filled out. This information was not recorded on both the City's and contractor's crew cards. These crew cards are used in order to substantiate the work done on a piece of road. If a claim occurs, these crew cards can become legal evidence, so they must be filled out accurately.

Entering of the crew card data into MMMS is also very labor intensive. Productivity could be increased if the information contained on a crew card were captured electronically in a system rather than being entered on a crew card, sent to Frobisher for processing and then having the data manually entered into the MMMS system. Furthermore, when a claim needs to be investigated, much time is spent searching through all of the paper documents in order to gather data on the patrolling and maintenance of a section of road.

Even though only six percent of claims are successful, on review of claims that were paid out, it was noted in the files that patrol reports were unclear at times as to the section of road patrolled and/or it was unclear whether minimum maintenance standards were met. The crew cards were also unclear as to the section of road the work was performed.

There is currently no work order system in place to track the maintenance work or costs incurred to maintain a specific road asset or segment of road. Without having this data, proper planning

and cost analysis for decision making on how to repair a section of road cannot be done. Knowing this information will aid in minimizing costs through better decision making.

Automatic vehicle location (AVL) is a means for automatically determining the geographic location on a vehicle and transmitting the information to a requester. AVL is a powerful concept for managing fleets of vehicles. The main purpose of using AVL is not only to locate the vehicles, but also to obtain information about engine data, fuel consumption and driver data. Another scenario for sensor functions is to connect the AVL to driver information, to collect data about driving time, stops or even driver absence from vehicles. When managing a fleet of vehicles, knowing the real-time location of all drivers allows management to meet customer needs more efficiently. Vehicle location information can also be used to verify that legal requirements are being met, for example, drivers are obeying speed limits.

A geographic information system (GIS) captures, stores, analyses, manages and presents data linked to a location. A GIS system will digitally map out our roads and maintain data such as our roads inventory data (i.e. signs, sidewalks, curbs, shoulders, lane width, catch basins, manholes etc.), history of the pavement, road conditions, traffic and axel load data, minimum maintenance standards, yearly maintenance and rehabilitation costs. A GIS system can also be used to create queries, track work done on a section of road and the related costs, and help co-ordinate between related activities.

With a limited budget, the AVL/GIS system will provide decision-makers tools in order to prioritize maintenance work for the entire city. When the foreperson do their routine patrols, the graphical display of our infrastructure can be quickly updated to note any items that need to be addressed as part of the regular maintenance. This will eliminate the need for paper based recording of road patrols.

In conclusion, it is clear that much effort is expended on the patrolling, identification, reporting, tracking and investigation of road hazards and that more efficient and effective tools and methods are available.

#### **RECOMMENDATION (MEDIUM)**

The timeliness, accuracy and availability of roads maintenance information is less than optimal, and impacts economy, efficiency and effectiveness

- a) It is recommended that the City continue to extend the implementation of an AVL/GIS system that will capture the entire roads infrastructure.

This will reduce the need for paper based road patrol reports as the information can be captured timely and accurately, right into GIS. Therefore, our road data will be available for reference purposes. It will be complete, accurate and timely. This information will also assist in the investigation of claims by reducing the amount of time required to trace though paperwork. Since an AVL/GIS system contains all the maintenance information, it can also

be used to track potholes and plan the most efficient and cost effective repair for a section of road. This will ensure that once a pothole is identified, it is repaired according to minimum maintenance standards. The system should handle work orders, in order to track the productivity of the crews.

#### MANAGEMENT RESPONSE

---

Staff agree. Staff have been investigating an electronic road patrolling system which would be tied to the ACR system. It is anticipated this will be in place with the new MMMS system.

#### RECOMMENDATION (HIGH)

Compliance with minimum roads maintenance standards for road patrols is not consistently met

- b) Management needs to improve procedures related to road patrol documentation to ensure regulatory requirements for patrols and repairs are consistently met.

#### MANAGEMENT RESPONSE

---

Paper copy road patrol records are being kept and are continuously being improved. Staff follow the province's road patrol documentation process. Staff have been investigating an electronic road patrolling system which would be tied to the ACR system. It is anticipated that this will be in place with the new MMMS system.

#### 4) CREW PRODUCTIVITY

Winter roads maintenance and repair is directly impacted by the weather. In order to maximize value for money on labour, equipment and material resources, management can either negotiate flexible resourcing arrangements or bear the costs of maintaining sufficient labour, equipment and material resources to cover peak seasonal demands.

In 2009, the Roads Division often operated at near peak demand. However, in 2010 it appeared that Roads management was often challenged to keep full time staff productively deployed when there was a gap in winter control (snow events) and few new potholes to repair, however temporary layoffs do not seem to have been considered.

On various dates in February 2010 we observed both city and contractor crews filling potholes. The following inefficiencies were noted:



- A crew was dispatched to an area to fill potholes where there were no potholes on the street. There were no 311 calls concerning potholes in that area, nor any potholes identified on the patrol reports within the previous week.
- Crews are given a dispatch list of streets to fill potholes. Sometimes on route to their destination, crews drove over potholes that they had been directed to repair and did not fix them.
- City crews originating from one depot enjoyed extended breaks, and overstaffed crew sizes, while another depot required the assistance of contractors to keep up with their repairs.



- City crews are also out during the day when they have the greatest impact on traffic. Daytime work experiences the highest traffic volumes and therefore, is the greatest risk to worker safety, as well as the greatest inconvenience to the public. It is also the least productive deployment of City resources due to the policy of not conducting routine work to be conducted on class 1, 2, and 3 roads (where most potholes are located) between 7:00am and 9:00am and between 3:00pm and 6:00pm when traffic volumes and potential traffic congestion impacts are greatest. Crews deployed to work on roads during the day-time lose up to two hours (or 25 percent) of productive work time as compared to crews deployed after 5:00pm or before 7:00am.
- Management stated that they held contractors to the same productivity standards as City crews. However, contractors are generally deployed outside of these restricted hours, and work at times when traffic volumes and potential traffic congestion impacts are smallest.
- Although MMMS was designed for tracking and reporting the productivity and cost performance of City and contractor crews by depot, management has not used this functionality to its maximum capability. As a result, comparisons and evaluations of actual City and contractor productivity were not conducted by management.

**RECOMMENDATION (MEDIUM)**

Inflexible resource arrangements impact the city's ability to achieve value for money in operations

- a) When finding meaningful work for staff becomes a challenge, temporary layoffs should be considered in order to minimize operating costs. An alternative solution would be to identify opportunities for increased flexibility on resourcing arrangements.

**MANAGEMENT RESPONSE**

---

The observations above were a result of a mild winter in 2010. However, that does not reflect the historical average. In 2009, our crews needed to be supplemented with contractors to keep up with the workload. This is a challenging request based on the unpredictability of the seasons and the need to secure and maintain a skilled workforce. However, staff will investigate this recommendation and others with Human Resources.

**RECOMMENDATION (MEDIUM)**

Levels of service may be impacted if a citywide view of needs and available resources is not taken

- b) There needs to be better planning for the coordinated dispatching of pothole crews so that they are sent to areas of greatest need, without geographical restrictions, and across all areas of the city.

**MANAGEMENT RESPONSE**

---

Staff agree. Sharing work crews between depots and between departments will be investigated and a more effective solution will be sought. Currently during Winter Control the Supervisor allocates resources as required between depots to respond to winter events.

**RECOMMENDATION (MEDIUM)**

Minimum roads maintenance standards may not truly be met if hazards are not reported in a timely manner

- c) City crews should report all hazardous potholes they encounter en-route to the roads they are deployed to repair. The foreperson may then direct the crew to complete immediate repairs or place the pothole on a future deployment list. This may increase efficiencies in not having to send a crew out later to that area. It may also reduce the number of citizen complaints and increase citizen satisfaction as potholes are being filled in a timely manner.



## MANAGEMENT RESPONSE

---

Staff agree. Crews have been reminded to report major potholes or roads deficiencies to their Supervisors as they come upon them.

### RECOMMENDATION (HIGH)

City crews lose as much as 25 percent of productivity by restricting pothole repairs to daytime shifts

- d) City crews fill potholes between 8am and 4pm. This is the same time most people are driving on the roads. Filling potholes in the evening would be safer and more productive as there is less traffic on the roads. However, work hours are governed by the existing collective bargaining agreement between the City of Greater Sudbury and the Canadian Union of Public Employees and its Local 4705 Outside (Service and Maintenance) Unit and restrict regularly scheduled hours of work to between 8:00am and 4:30pm. Management should continue to pursue opportunities to improve City worker safety as well as crew productivity and costs by repairing potholes after 6:00pm and before 7:00am.

## MANAGEMENT RESPONSE

---

Staff agree that the most effective time for filling potholes are between the hours of 6 p.m. and 7:00 a.m. This option is currently being investigated.

### RECOMMENDATION (HIGH)

Restricting resources to artificial geographic boundaries negatively impacts the overall value for money provided by the city

- e) Since some areas of the City have more potholes than others, increased sharing of resources across geographic areas will maximize economy, efficiency and effectiveness.

## MANAGEMENT RESPONSE

---

When potholes are occurring in full force, crews are needed in all areas. However, should one geographic area be much worse than another, resource sharing may be done.

### RECOMMENDATION (MEDIUM)

Value for money may not be optimized if cost and productivity achievements are not known

- f) A thorough analysis of cost and productivity should be done by area, for the costs for using internal crews on straight time, and overtime as compared to the use of contractors. This information should be used in scheduling so that the most cost effective method is achieved.

## MANAGEMENT RESPONSE

Cost alone is not the only factor to consider when bringing in contract crews. Other factors are considered when assigning work. Some examples are: Staff must fully utilize permanent City employees prior to having the work done by contractors. The pothole patching contract is intended to supplement city crews when they cannot keep up with the demand and meet the minimum maintenance standards.

Overtime costs for city crews must be considered outside of their regular working hours. The City's Union agreement limits our employees to twenty hours of overtime per week. This limits available hours for other essential winter control activities.

AUDITORS COMMENT - The auditors will follow-up to review Staff's analysis of cost and productivity (within existing constraints).

## 5) INVENTORY CONTROL

Asphalt repair productivity of City and contract crews is recorded in accomplishment units (tonnes of asphalt material applied per eight hour shift). Currently, there is no accurate measure of the amount of materials used to fix potholes.

The amount and type of materials used is entered on the crew card which is then manually entered into MMMS. Furthermore, there is no correction made if materials are returned at the end of the shift. The St. Clair depot does use a truck scale to weigh the materials leaving the depot and the amount of materials returned. The Frobisher depot does have a weigh scale, but it is not used to weigh asphalt materials. The other depots estimate the amount of materials loaded on the trucks using a loader bucket size and volume, as there is no weigh scale. Productivity on the crew cards reviewed ranged from 0.1 tonnes to 18 tonnes for an eight hour shift. A final inventory adjustment is made at the end of the year in the general ledger, however with inaccurate weights of materials used, the information in MMMS is not accurate.



### RECOMMENDATION (MEDIUM)

Cost and accomplishments data recorded in mmms is not accurate

- a) Materials should be weighed when they are removed from and/or returned to the depot. This will increase the accuracy of the inventory recorded on the crew cards and MMMS and

reduce the amount of the annual inventory adjustment to the general ledger. It is also a basic and essential control in the safeguarding of City assets and in monitoring crew productivity.

## MANAGEMENT RESPONSE

Staff have instructed supervisors and work crews to weigh materials at the end of each shift in order to ensure more accurate materials tracking. Staff have requested Fleet to ensure all loader scales are operational.

### 6) CREW SIZE AND SAFETY

Both City and contractor pothole patching crews are comprised of either three person or five person crews depending on the class of road. In reviewing crew cards, there were as many as seven people on a pothole crew, consisting of both City employees and contractors.

Contracts are tendered based on current internal crew sizes (three person or five person), found in MMMS planning data. These standard crew sizes relate to daytime traffic, although contractors most often work during the evening and night.

Field observation of work methods was conducted by the Auditors and indicated that having a three and/or five person crew did not make it safer than a two and/or four person crew. This was confirmed by the City's Health and Safety Officer.



When we observed contractors working with a three person crew at night, the third person did not leave the buffer truck to assist in pothole patching. Therefore a third crew member did not contribute to additional safety, nor was their evidence of increased productivity. In fact, in that case, we paid for productivity of a three person crew and received the productivity of a two person crew.

A two person City crew was also used by the north-west depot on certain roads.

The Auditors concluded that the asphalt repair crew size could be reduced to two workers, while still appearing to adhere to Book 7 traffic safety regulations on four lane / lower speed roads (e.g. Barrydowne, Kingsway, Lasalle, Regent, Paris etc.) as demonstrated by contractor and City crews. The expected result of crew size reductions is a 33 percent greater capacity to repair potholes with existing staff and reduced costs per pothole. The Auditors also noted that for City crews, having a two person crew work overtime is approximately the same cost as having a three person crew on a regular shift.

The Auditors were concerned however, with the safety of crews deployed to repair two lane roads and road intersections. An additional two workers appear to be required to establish safe working conditions in these environments.

The department does have standard operating procedures and staff are directed to follow Book 7 of the Ontario Traffic Safety Manual however, on the days of our observation, the standards did not appear to be closely followed.

Although the MMMS standard crew size is three, City crews were often working with four people. One crew we observed was not using proper traffic control, as crew members were leaving their protective area to fill potholes. Another four person crew used only one person to perform traffic control on a single lane road while the other three members of the crew were filling potholes. The person directing traffic was not using proper stop/slow signs. These specific instances were immediately dealt with by the area Supervisor.

### **RECOMMENDATION (HIGH)**

Crews do not always follow city and provincial safety procedures in completing roads maintenance tasks

- a) Safety procedures need to be reviewed with all City and contractor crews. In order to achieve this, a comprehensive safety training matrix needs to be developed in consultation with the Health and Safety Officer. Furthermore, standard operating procedures that address safety need to be provided to all workers.

### **MANAGEMENT RESPONSE**

---

Staff is currently in the process of reviewing all of its Standard Operating Procedures with the Health and Safety Officer. We are developing an electronic training monitoring system for each employee in the roads division through PeopleSoft. Currently crews are trained in a number of areas including Traffic Control, Ontario Traffic Manual Regulations, and receive monthly training sessions and daily tailgate sessions prior to their daily work deployments.

**RECOMMENDATION (HIGH)**

With current crew sizes, the city may be paying between 20 percent and 30 percent more per pothole repair than absolutely required

- b) Management should evaluate the reduction of crew sizes to two and/or four person crews, as it appears the work can be still be done safely and in accordance with Book 7 with a reduced crew size. Furthermore, when we tender, we should tender for a two and/or four person crew. This will reduce the rate per hour with no or minimal impact to productivity or safety.

**MANAGEMENT RESPONSE**

Staff will review Standard Operating Procedures with the Health and Safety department including crew sizes and their effect on worker safety.

**7) STANDARD OPERATING PROCEDURES**

The choice of materials is clearly a critical element impacting the effectiveness and ultimate cost of the winter roads maintenance program. For more troublesome locations, it was observed that repairs were sometimes repeated every two days. The expected result of clear direction through standard operating procedures is that if more effective methods and/or materials were identified by management, for example with repairs lasting four days, the costs of these repairs could be cut in half.

Management clearly has opinions on what the most effective pothole repair strategies are and stressed the need to consider the quality of materials, traffic volumes, temperature ranges, humidity/moisture, method of compaction, use of tack coats, and types and timing of road defects to be repaired. Management recently launched a program to monitor the longevity of different types of pothole patching methods and materials. The Auditors recognize these efforts as a positive step in the effort to refine the methods and materials used however, more extensive and documented cost benefit analysis is encouraged.

In the winter months, different materials are being used to repair potholes depending on the availability of the product. Most areas are using a generic Cold Mix material for the majority of their repairs. Although recycled asphalt appears to be the better material to be used under winter conditions, the Frobisher Depot is the only plant that regularly produces the recycled asphalt mix material. There are currently geographic challenges for all depots to pick up this material at the Frobisher depot. Furthermore, this recycled asphalt plant can only produce the mix at two tonnes per hour and it is not run at night when the contractors are out working. With the geographic diversity of the depots and the production capacity limitations, other depots more often use (a potentially less effective) generic cold mix material.

### RECOMMENDATION (MEDIUM)

Testing is conducted but may not provide conclusive evidence to support decision making

- a) Management should formalize testing and document the results to support their analysis of costs and benefits of procedures and materials used in pothole patching in order to maximize value for money in the future. The analysis should include, but should not be limited to materials used in the winter months.

#### MANAGEMENT RESPONSE

---

The extensive testing that staff have completed on pothole costs and materials will be documented in a formal report to assist in future decision making. Staff continue to research other effective pothole repair methods and materials and liaise regularly with other municipal jurisdictions to share knowledge on best practices.

### RECOMMENDATION (MEDIUM)

Budget options and/or capital requests may not be supported by a proper business case

- b) Once the analysis is complete, management needs to develop a proper business case for the solution(s), ensuring that adequate supply of materials and resources are available at all the depots.

#### MANAGEMENT RESPONSE

---

Staff have undertaken many trials of different pothole materials and developed costs over the years. Staff will formalize the process and create a business plan to support its Roads needs, along with the appropriate budget funds.

### RECOMMENDATION (LOW)

The Quality of asphalt repairs may not meet expectations without clear standards

- c) Clearer direction needs to be given to both City crews and contractors on the standards to fill potholes.

#### MANAGEMENT RESPONSE

---

The standards for filling potholes are detailed in the contractor's pothole patching agreements. We will continue to review these steps with the contractors and City crews to ensure that they are being followed.



## 8) CONTRACTOR BILLING

According to the Ontario Ministry of Labour Employment Standards Act, 2000, an employer shall give an employee an eating period of at least 30 minutes that will result in the employee working no more than five consecutive hours without an eating period. An employer is also not required to pay the employee for the eating period in which work is not being performed.

A sample of invoices from five pothole contractors were reviewed to ensure they were billing us according to the tender documents. Claims for the number of hours worked on invoices were compared to supporting crew cards. Four of the contractors were billing us for the entire shift they were working, including all lunches and breaks in the sample of invoices reviewed. This calculates into just over \$18,000 or six percent of the total of contractor invoices that the City paid for asphalt repair contractor lunch breaks.

During the course of our review, the Auditors learned that a review for recovery of overpayments related to contractor eating periods will impact many other departments within the City.

There was one instance where the crew card stated there was a four person crew, but the contractor charged us for a five person crew for three hours worth of work. Another crew card indicated 11 hours worked on the back of the card. On the front of the card, 12 hours was indicated under hired equipment and the contractor charged us for 12 hours of work at \$220 per hour. Another crew card indicated one hour worth of work, yet the contractor billed us for 11 hours, overbilling the City by \$2,295.

One contractor was at times, using a six person crew rather than a five person crew as per the blanket order, and charging the City an incremental rate increase over the tendered five person rate. Another contractor was using a four person crew rather than a five person crew and arbitrarily reduced the hourly rate they were charging the City.

### **RECOMMENDATION (HIGH)**

The city will continue to overpay for unpaid work breaks if warnings to contractors are not given immediately

- a) In order to prevent contractors from billing us for their eating periods and other non-billable breaks in the future, we need to inform all contractors that they are not to bill the City for the half hour unpaid break given to their employees as part of the Employment Standards Act, 2000.

## MANAGEMENT RESPONSE

---

The City will give notification to all Contractors that they are not to bill for unpaid lunches and will review with Supervisors the approval process to ensure the City is not paying for unpaid lunch periods.

### RECOMMENDATION (HIGH)

Public funds will have been wasted if the city does not recover overpayments for unpaid break periods impacting many city departments

- b) It is also recommended that all MMMS crew cards and summary invoices from City contractors be reviewed for the period January 2009 to date, and that the City recover any overpayments for un-billable eating periods as outlined in the Ontario Ministry of Labour Employment Standards Act. As many other program areas of the City may be impacted, this overpayment recovery process should be completed not only for the pothole patching contractors, but for all affected contractors working for the City. A report of the total amounts recovered, should be prepared by management and presented to Council once this exercise has been completed.

## MANAGEMENT RESPONSE

---

The City will give notification to all Contractors that they are not to bill for unpaid lunches and will review with Supervisors the approval process to ensure the City is not paying for unpaid lunch periods.

AUDITORS COMMENT - The Auditors are concerned that management has not agreed to identify, collect and report on prior (2009 and 2010) overpayments to City contractors. (As a minimum, \$18,000 related to Winter Asphalt Repairs should be recovered for 2009).

Our audit indicated a recovery of approximately six percent of hired equipment expenditures was owed taxpayers. The possibility of similar overpayments originating from other programs at the City was raised by the General Manager, Infrastructure Services.

The auditors will follow-up on staff's progress in identifying the 2009 and 2010 overpayments for all City contractors, as well as the collection and reporting of these amounts.

### RECOMMENDATION (HIGH)

The current supervisory review process for approval of contractor billing documents does not reject unpaid break periods

- c) Before the foreperson signs the contractor's crew card, they should ensure that if the contractors worked more than five hours, they are not charging the City for their eating periods and other



non-billable breaks. Eating periods and other non-billable breaks must be identified on MMMS crew cards and contractor billing documents.

#### MANAGEMENT RESPONSE

---

The City will give notification to all Contractors that they are not to bill for unpaid lunches and will review with Supervisors the approval process to ensure the City is not paying for unpaid lunch periods.

AUDITORS COMMENT - The auditors will follow-up on staff's progress with improving identification of eating periods and other non-billable breaks on crew cards and contractor billing documents.

#### RECOMMENDATION (MEDIUM)

Hourly rates paid by the city for asphalt repairs may exceed those in the blanket order

- d) Superintendents must ensure that crew sizes and rates charged by the contractors adhere to the blanket purchase order as this was the rate that was established through the tendering process. Deviations cannot be made to the terms outlined in the blanket purchase order without retendering the contract.

#### MANAGEMENT RESPONSE

---

Staff will review with the Supervisors the approval process and their responsibility in approving time cards.

### 9) ROAD CUTS

Potholes, heaves, sinkholes and other road defects can frequently be traced back to a utility cut. Wear and tear through aging, winter control practices and traffic volumes is inevitable, however once a cut is made into the road surface, the deterioration of the road is accelerated.

If a utility provider needs to cut into the asphalt, an occupancy permit is required. No permit is required if the City's water/waste water division makes a road cut. Currently, if a pothole repair needs to be made due to a road cut before a permanent patch is made; the group who made the cut is responsible to make the repair. Once a permanent patch is made, there is no warranty period for the pothole repair, so the City Roads Division incurs costs for pothole repairs and ongoing lifecycle maintenance and liability exposures related to these road excavations for years



to come. Whether it is a permanent or temporary repair, the City is responsible to have repairs completed in accordance with the minimum maintenance standards.

On review of a sample of claims for pothole damage in 2009, several were from contractors not repairing potholes due to their road cuts according to the minimum maintenance standards (Table 3). In these situations, the City repaired the potholes and recovered these costs from the contractor. Contractor delays contribute to citizen's frustration with inefficient processes and unnecessary damage to vehicles.

If a pothole is due to a water/waste water cut, a pothole patching crew from the water/waste water department is dispatched to fill the pothole. This may be inefficient if a pothole patching crew from the Roads department is already in the area.

### **RECOMMENDATION (MEDIUM)**

Accountability for the repair of road defects is unnecessarily complicated and minimum maintenance standards for roads hazards may not be met by the city if reliance is placed on others

- a) The Roads Division is responsible for meeting minimum roads maintenance standards, and can be more effective if given greater control over these processes. If a pothole arises due to a road cut the Roads department should make the repair and charge the company/department that made the cut for the cost of the repair. This will ensure that repairs are done according to minimum maintenance standards, increase efficiencies and reduce the City's chance of having a claim due to damage from the pothole.

### **MANAGEMENT RESPONSE**

Currently, resources do not permit the Roads Division to complete all utility cut repairs. A more effective solution to maintaining road cuts will be investigated. One such solution which Staff are currently working on is the Road Degradation Fee for road cuts to all Utilities including internal departments. The appropriate charges will be reflected through a by-law currently being prepared and will be presented to Council for approval.

### **RECOMMENDATION (MEDIUM)**

Once a cut is made into the road surface, the deterioration of the road is accelerated, yet lifecycle costs are fully borne by a limited roads budget

- b) All utilities requiring cuts into City infrastructure assets should provide ample warranty for the work they performed. Furthermore, permit costs should be sufficient to contribute an appropriate amount to the roads program, to offset the incremental lifecycle costs that will be required to maintain a road that has suffered road cuts.

## MANAGEMENT RESPONSE

---

Staff is reviewing the implementation of a Road Degradation Fee for road cuts to all Utilities including internal departments. The charges will be reflected through a by-law currently being prepared and will be presented to Council for approval.

### RECOMMENDATION (HIGH)

Damage to a road often extends beyond the road cut section and the cost of the extended remediation is fully borne by a limited roads budget

- c) Often in the case of water main breaks, damage to a road often extends beyond the road cut section. The roads division should inspect the site of damages, and the costs of these (extended) repairs should be paid by the water/waste water budget.

## MANAGEMENT RESPONSE

---

Staff is reviewing the implementation of a Road Degradation Fee for road cuts to all Utilities including internal departments. The charges will be reflected through a by-law currently being prepared and will be presented to Council for approval.

## 10) PURCHASE OF USED ASPHALT PLANT

The 2008 Capital Budget request for Fleet Operations included a request for contingency funds. Contingency funds are to be used only for cases where approved equipment purchases exceed estimated costs. It is not intended to fund new additions to the equipment fleet. However in 2008, these contingency funds were used to purchase a recycled asphalt plant which cost approximately \$6,000 plus \$8,000 to refurbish the machine. The equipment was intended to be used to create recycled asphalt material for use in pothole repair during the winter repair season. Since it was acquired, the plant has only been used a few times as the propane lines that power the plant freeze when the temperature is below zero. This small recycling plant requires further modification to be used for the purpose upon which it was originally intended.

There should have been a request made to Council for approval to purchase the recycled asphalt plant as it was not originally included as part of the annual capital budget. In not going to Council, monies were withdrawn from the fleet equipment reserve and spent without proper authority on the Roads Divisions behalf.

Notwithstanding the circumvention of controls on purchasing capital assets, a proper business case should have been developed and a thorough investigation done for the purchase of the recycled asphalt plant before the purchase was made in order to determine the feasibility of the plant and to support management's decision to spend the funds.

### RECOMMENDATION (MEDIUM)

City policy regarding the appropriate use of funds from the fleet reserve and a budget request to council for new capital purchases is not followed

- a) It is Management's responsibility to establish and to ensure compliance with internal controls and bylaws. Infrastructure management should obtain clarification of City policies through financial Services regarding the appropriate use of fleet reserve funds and the proper sources of funds for new additions to equipment fleet.

#### MANAGEMENT RESPONSE

---

Staff will review and follow corporate policy on purchasing small equipment

### RECOMMENDATION (LOW)

The small portable asphalt plant is not providing value for money

- b) Management should evaluate the costs and benefits related either to the further modification and use of this piece of equipment, or to its sale or salvage/disposal.

#### MANAGEMENT RESPONSE

---

Staff was acting proactively by purchasing an extra asphalt plant at minimal cost to try to reduce the travel times to pick up hot asphalt for the outlying areas. This will reduce costs in the long run.

Roads staff are working with Fleet to modify the unit to operate more efficiently during the winter months.

## 11) CITIZEN REQUESTS USING THE 311 SYSTEM

Citizens can use the 311 number to notify the City of potholes. When a call comes in through the 311 number, it is logged in the Active Citizen Request System (ACR). The Dispatcher will then route the request to the foreperson in the area so they can address the issue. Once the request is dealt with, the foreperson will close the call. If a request is not dealt with in a timely fashion, a reminder is sent to the foreperson and/or his supervisor.

311 Requests are used as evidence in defending against liability claims. In reviewing some 311 calls for potholes, it was noted that calls are being closed within minutes of them coming in, with a notation in the call log indicating that the "pothole is on the list". When a crew cannot get to the pothole during the day, information regarding the request may be lost as the call status is no longer open. If the City is aware of a pothole, and it is not repaired according to minimum

maintenance standards (refer to Table 3), then the City may be liable to pay a claim for damage. Claims have been paid out in the past due to not meeting minimum maintenance standards in fixing a pothole.

If a call is received and the citizen lists various roads, operators take a shortcut and do not identify each individual defect as a separate repair request. The information is batched into a single call record and potholes may be missed.

The Auditors also learned that the Active Citizen Request System (ACR) has the capability of being offered through the City's internet site, with requests being updated directly by citizens.

#### **RECOMMENDATION (MEDIUM)**

Repair status evidence used in defending liability claims may be inaccurate if citizen requests are closed before the work is completed

- a) Management should periodically review the 311 requests to ensure they are being handled efficiently and effectively and that they are closed out only once the work is performed.

#### MANAGEMENT RESPONSE

Staff work continuously with 311 and dispatch to better refine and improved the ACR system.

#### **RECOMMENDATION (MEDIUM)**

Evidence of the city's awareness of road hazards used in defending liability claims may be inaccurate if citizen requests are bundled

- b) If a call is received regarding potholes in different areas (e.g. various streets), a separate request should be created for each area where the potholes are located. This will enhance tracking and awareness of road hazards to ensure timely repairs.

#### MANAGEMENT RESPONSE

Staff work continuously with 311 and dispatch to better refine and improve the ACR system.

#### **RECOMMENDATION (MEDIUM)**

The City May Not Be Aware Of Some Road Hazards

- c) Management should investigate and report on the costs and benefits of offering the Active Citizen Request System (ACR) through the City's internet site, so that requests can be updated directly by citizens.

## MANAGEMENT RESPONSE

---

Staff will review this recommendation with Information Technology and Corporate Communications.