

Legislative
Assembly
of Ontario



Assemblée
législative
de l'Ontario

STANDING COMMITTEE ON PUBLIC ACCOUNTS

BRIDGE INSPECTION AND MAINTENANCE
(section 3.02, 2009 Annual report of the Auditor General of Ontario)

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The Honourable Steve Peters, MPP
Speaker of the Legislative Assembly

Sir,

Your Standing Committee on Public Accounts has the honour to present its Report and commends it to the House.

Norman W. Sterling, MPP
Chair

Queen's Park
November 2010

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2nd Session, 39th Parliament

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MARIA VAN BOMMEL was replaced by WAYNE ARTHURS on September 22, 2010.

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PREAMBLE

In March 2010 the Standing Committee on Public Accounts held public hearings on bridge inspection and maintenance, the subject of an audit by the Auditor General in 2009.¹ Witnesses appearing before the Committee included the Deputy Minister of Transportation and two senior officials.² This report highlights the Auditor's observations and recommendations contained in Sec. 3.02 of his *2009 Annual Report* and presents the Committee's own findings, views, and recommendations.

Acknowledgements

The Standing Committee endorses the Auditor's findings and recommendations. It also thanks the Auditor and his team for drawing attention to the important issues surrounding provincial and municipal bridge inspections in Ontario. Finally, the Committee would like to acknowledge the assistance provided during the hearings and report writing by the Office of the Auditor General, the Clerk of the Committee, and staff of the Legislative Research Service.

OVERVIEW

Objectives and Scope of the Audit

The Committee welcomed the opportunity to review the first value-for-money audit of provincial bridges since the 2004 audit of the maintenance of the provincial highway system.³ In the 2009 audit, the Auditor assessed whether the Ministry of Transportation:

- has effective systems and procedures to ensure that the bridges within its highway system are safe and in good repair; and
- conducts bridge inspections and the required maintenance, repair, rehabilitation, and replacement work on a timely basis with due regard for economy.

The audit team visited the Ministry's head office and three of its regional offices. The team interviewed staff, examined documentation, reviewed the results of bridge inspections, and researched bridge management practices in other jurisdictions. The team also accompanied Ministry staff on bridge inspections.

¹ See Section 3.02 of Ontario, Office of the Auditor General, *2009 Annual Report* (Toronto: The Office, 2009), pp. 80-98.

² For a transcript of the proceedings, see Ontario, Legislative Assembly, Standing Committee on Public Accounts, *Hansard: Official Report of Debates*, 39th Parliament, 2nd Session (24 March 2010), Internet site at http://www.ontla.on.ca/committee-proceedings/transcripts/files_pdf/24-MAR-2010_P001.pdf, accessed on August 22, 2010.

³ See Section 3.14 of the Auditor's *2004 Annual Report*.

The Auditor engaged an out-of-province structural engineering expert to review the Ministry's bridge inspection standards and practices and assist the audit team to interpret the Ministry's bridge inspection results. To obtain an independent assessment of the condition of four provincial bridges, the audit team also hired an engineering firm to conduct a re-inspection using the Ministry's Inspection Manual.

Background

Number and Types of Bridges

Of Ontario's 14,800 bridges, approximately 12,000 are located in municipalities. The remaining 2,800 bridges comprise part of the provincial highway system. The Ontario Ministry of Transportation (the Ministry) has responsibility for provincial bridges. The average age of the province's bridge infrastructure is about 40 years. Ontario's 444 municipalities are responsible for bridges in their jurisdictions. These range from the Prince Edward Viaduct in the City of Toronto which spans five lanes of traffic, to Ontario's last covered bridge in Woolwich Township.⁴ The average age of municipal bridge infrastructure in Ontario is about 43 years.

Expected Lifespan of Bridges

While bridges of the past were expected to last about 60 years, current technology and design enable bridges built today to last longer. High traffic volume, heavy trucks, salt exposure, and freeze/thaw cycles all reduce a bridge's lifespan. Regular maintenance, repair, and rehabilitation are needed to achieve and can even extend a bridge's expected lifespan.

The main safety risks related to bridge infrastructure are accidents—concrete falling, or elements of a bridge structure failing to perform their intended function of protecting vehicles travelling on the structure. Improvements to the inspection and maintenance regime of bridges help to minimize these risks and ensure that bridges remain safe, given Ontario's aging bridge infrastructure.

Legislative Framework: Provincial and Municipal Bridges

The *Public Transportation and Highway Improvement Act* (the Act) and its regulations require that all provincial and municipal bridges be inspected every two years under a professional engineer's direction using the Ministry's Ontario

⁴ The Prince Edward viaduct over the Don Valley has 5 vehicle lanes—3 eastbound and 2 westbound—with a bike lane in each direction and two pedestrian sidewalks. It also carries an eastbound and westbound subway line on its lower deck approximately 8 metres below the roadway. See S. Bagrianski, University of Toronto, "Evaluation of Primary Factors of the Existing Prince Edward Viaduct," *Engineering Science Praxis* (December 2005), Internet site at http://www.civ.utoronto.ca/pg/Teaching/Serguei_Bagrianski.pdf. (Accessed on September 2, 2010.) According to the Township of Woolwich, the West Montrose covered bridge—built in 1881—is Ontario's last remaining covered bridge. A covered bridge enhances the safety of the structure by protecting the timbers and trusses from the elements. See Township of Woolwich, Tourism Section, Things to See & Do, Internet site at http://www.woolwich.ca/en/tourism/thingstodo_kissing_bridge.asp accessed on September 2, 2010.

Structure Inspection Manual (the Manual).⁵ The Manual requires a “close-up” inspection, which involves visual assessments of each element of a bridge as well as its material defects, performance deficiencies, and maintenance and rehabilitation needs.⁶

Part III of the *Municipal Act, 2001* requires municipalities to undertake the necessary inspections and maintenance of their highways and bridges.⁷

Bridge Inspectors

Under Ontario legislation, bridges must be inspected by professional engineers. To perform bridge inspections, engineers must undertake MTO training every two years. Such training takes place over three days both in the classroom and in the field. In the off year of the training, the Ministry conducts an internal audit, re-inspecting approximately 50 provincial bridges—10 bridges in five geographical areas of Ontario. MTO inspectors review and rate each component (element) within a bridge. They re-inspect bridges that were examined the previous year to assess whether there are issues. The resulting information is relayed back to the Ministry and its five regional offices to improve future training sessions.

Municipal Bridge Inspections

Although municipalities must inspect their own bridges in accordance with the Inspection Manual, no legislation provides a provincial ministry with the authority to oversee municipalities’ compliance with this requirement. Eighty percent of Ontario’s bridges are within the municipal sphere of responsibility. Recognizing the province’s overall responsibility for the legislation governing bridge safety, the audit team surveyed about 130 Ontario municipalities and almost 60% responded. The team sought information about what systems municipalities used to keep track of bridge inventories and to report on inspections and how they perceived the current operating and funding arrangements. The team met with representatives from 10 large municipalities to discuss their survey responses, and also with representatives from the Association of Municipalities of Ontario (AMO) and the Ontario Good Roads Association (OGRA). (See pp. 95-96 of the Auditor’s *2009 Annual Report* for municipal survey results and discussion.)

Other Bridges and their Governance

In addition to provincial and municipal bridges, the Committee wished to learn from the Ministry about the governance and maintenance of “other” types of

⁵ According to Ministry of Transportation officials, Ontario is the only province where biennial bridge inspections are a legislated requirement. See Ontario, Legislative Assembly, Standing Committee on Public Accounts, *Hansard: Official Report of Debates*, p. 2.

⁶ Auditor General, *2009 Annual Report*, p. 80.

⁷ Section 44(1) of the *Municipal Act, 2001*: Maintenance – the municipality that has jurisdiction over a highway or bridge shall keep it in a state of repair that is reasonable in the circumstances, including the character and location of the highway or bridge;
Section 44(2) of the *Municipal Act, 2001*: Liability – A municipality that defaults in complying with subsection (1) is, subject to the *Negligence Act*, liable for all damages any person sustains because of the default.

bridges—those along snowmobile trails, walking trails, pedestrian bridges, and bridges or culverts along forestry roads.⁸ The Ministry explained that under provincial legislation, all bridge owners are required to conduct biennial inspections using the Ontario Structure Inspection Manual as the basis for that inspection. All owners—whether a municipality, a railway, or a private firm—must, by law, complete these inspections.⁹

Multiple governance arrangements exist in rural and remote parts of Ontario, including local roads boards and statute labour boards.¹⁰ Crown access or forest access roads may fall under the control of forest product companies or the jurisdiction of the Ministry of Natural Resources. In the province's far north, winter roads fall under the jurisdiction of the Ministry of Northern Development, Mines and Forestry. The Ministry of Transportation works closely with other ministries and in some cases provides expertise and services directly to these ministries.¹¹

ISSUES RAISED IN THE AUDIT AND BEFORE THE COMMITTEE

Significant issues were raised by the audit and before the Committee. The Committee attaches particular importance to those issues discussed below. They fall into two major categories: provincial bridges and municipal bridges.

Provincial Bridges

The structural engineering expert engaged by the Auditor advised that the Ministry had established comprehensive standards for bridge inspection in the Manual; if the standards are followed, the required inspection procedures effectively enable structural deficiencies to be identified during its biennial bridge inspections. Such standards have been adopted for use by several other Canadian jurisdictions.¹²

Provincial Bridges in Need of Repair

The Ministry's own assessment found more than 180 (7%) of provincial bridges in poor condition, requiring repair or rehabilitation work within one year of the bridge inspection. Yet, the Auditor found that over one-third of these bridges were not included in the Ministry's capital work plan for the upcoming year. The Ministry indicated that it takes a corridor management approach to prioritizing

⁸ Ministry officials clarified the difference between a culvert and a bridge. A culvert is a conduit for drainage purposes. Culverts that exceed three metres in diameter are bridges, and are subject to the same kinds of inspection and maintenance regimes as conventional bridge. Small culverts are reviewed on an annual basis. *Ibid.*, p. 8.

⁹ Standing Committee on Public Accounts, *Hansard*, p. 6.

¹⁰ Statute labour boards date from the early days when all able-bodied men in an area were required to provide several days' labour to improve or repair a local roadway. Statute Labour provisions can be found in Ontario's *Statute Labour Act*, R.S.O. 1990, c. S. 20.

¹¹ Standing Committee on Public Accounts, *Hansard*, p. 6.

¹² These Canadian jurisdictions are the provinces of Saskatchewan, Manitoba, Quebec, Nova Scotia, and Prince Edward Island.

such work, considering factors other than the rated condition of the bridge. Further, Ministry officials stated that any critical safety issues would be flagged during bridge inspections and addressed with immediate remedial work. The Auditor's engineering expert advised, however, inspection reports rarely distinguished between those deficiencies that did or did not pose a safety risk.

The Auditor recommended that the Ministry of Transportation strengthen its risk-assessment and priority-setting process, giving particular consideration to bridges identified as being in poor condition, so that any urgently required work is given first priority. Furthermore, when prioritizing the capital needs of Ontario's aging bridges, government officials should assess both safety and economic risks.

Public Hearings

Ministry officials clarified the difference between inspecting a bridge for safety and examining a bridge in order to schedule routine repairs and upkeep. Officials noted that they always address urgent maintenance issues quickly, but acknowledged that the Ministry has been less than consistent about documenting these practices.

In response to the Auditor's recommendations, the Ministry indicated that it is strengthening its risk assessment process, and will identify maintenance issues requiring urgent attention. It will also improve its record keeping and documentation.

Members queried the Ministry as to its interpretation of "urgent maintenance" in the context of bridge inspections. "Urgent" is any required work having a potential safety issue and is taken very seriously, according to the Ministry. Once identified, an urgent situation would be followed up, possibly with a further inspection to understand in more detail the issue with the bridge element in question. Officials said that the Ministry would not defer to a later date an urgent maintenance or repair—even if it were linked to other work scheduled for a later date. Nevertheless, in each instance, the Ministry examines its scheduled work through a "corridor management lens" to determine the feasibility of taking a coordinated approach. Prior to making those decisions, the Ministry would first have determined that no safety issues were being compromised.

MTO's Five-Year Work Plan

The Ministry uses the bridge condition index (BCI) as a planning tool to help it strategically schedule non-safety related bridge maintenance to be done at the optimal time. (For a description and illustration of common bridge elements and a detailed explanation of the Bridge Condition Index, see Appendix A.)

Ministry officials noted that its work plan is about upkeep and maintenance only:

- The majority of the province's bridges—2,067—require no maintenance or upkeep for the next five years.
- Another 614 bridges are scheduled for maintenance and upkeep as part of the Ministry's five-year plan.
- In the case of 39 bridges, maintenance and upkeep will commence at the same time as work already scheduled on the adjacent highway, to make the most efficient use of Ministry resources.

Members asked whether the provincial bridge inspectors are now documenting differences between bridge deficiencies that pose a safety risk versus those that indicate a loss in economic value or which are less urgent.

The Ministry responded that in an effort to distinguish between routine and urgent maintenance, the MTO inspection forms will be amended to make this distinction clearer. For example the inspection form will include coding pertinent to performance deficiencies, such as a jammed expansion joint that needs repair.

Inspector training has also been adjusted to ensure that inspectors more precisely understand Ministry expectations. The Ministry is testing the changes and the inspector training by conducting spot audits.¹³

The Standing Committee on Public Accounts recommends that:

1. **The Ministry of Transportation report to the Standing Committee the changes being made to its policies and practices since the tabling of the 2009 Annual Report of the Auditor General to differentiate and identify bridge deficiencies that pose a safety risk, versus those that indicate a loss in economic value if the required maintenance work is not done. The report should also indicate whether all provincial bridges rated fair to poor are now included in the Ministry's five-year capital plans.**

No Traffic Lane Closures

The Ministry's Inspection Manual requires a detailed visual "close-up" inspection of each bridge element, thus requiring closure of lanes and road shoulders to traffic. Close-up inspection of the critical elements of certain bridges on Highway 401 in the Greater Toronto Area (GTA) is only possible with lane closures. Yet, the Auditor noted that no such lane closures had occurred for the past three years.

¹³ Standing Committee on Public Accounts, *Hansard*, p. 5. Commenting specifically on those 39 bridges, Ministry officials noted that they had a BCI of less than 60. When officials looked into why they were not included on the Ministry's capital work plan, it was determined that the Ministry was trying to coordinate the work with other necessary work on the highway corridor to achieve better value for money. But before making those decisions, the Ministry would have first determined whether there were safety issues—and if so—dealt with them immediately.

To ensure that inspections are carried out in accordance with legislation, the Auditor recommended that the Ministry arrange for the closure of lanes and shoulders whenever required to ensure that an adequate bridge inspection can be carried out. Additionally, the Ministry should consider a risk-based approach, taking into account factors such as the age of the bridge and feasibility of rotating inspections. The Ministry might also explore off-peak closures at night or on weekends. The Auditor further recommended that the Ministry stipulate lane and shoulder closures when the Ministry issues tenders for inspections by external consultants.

Public Hearings

The Committee was told that lane and shoulder closures along Ontario's busiest highways are challenging to implement in light of the inconvenience to thousands of motorists and possible adverse effects upon the economy. Nevertheless, the Ministry scheduled and completed 50 such closures last year in the Greater Toronto Area (GTA). In addition, the Ministry will be scheduling many more road closures this year in the GTA because of the inspection cycle. The Ministry reported having begun communicating with its contractors that such closures are mandatory, stipulating in its contracts which lanes and shoulders must be closed. Written Ministry guidance is also being provided to all bridge inspectors.

The Ministry is seeking to identify the optimal times when closures impede traffic least, such as evenings and weekends. The Ministry is also providing its bridge inspectors with more guidance about alternatives to closures, particularly the use of remote-controlled cameras, scissor lifts and bucket trucks which allow inspectors to get a close-up view.

Committee Members regard the Ministry's recent initiatives pertaining lane closures as an improvement since the tabling of the Auditor's Report, and a good first step. In order to ensure that bridge inspections are carried out in accordance with legislation, the Ministry should take its action on lane closures a step further.

The Standing Committee on Public Accounts recommends that:

- 2. The Ministry of Transportation report to the Standing Committee on how it will provide more guidance on the practice of lane closures in its bridge inspection manual to allow both ministry staff and contract inspectors to perform consistent and effective bridge inspections.**

Weak Inspection Oversight

The Manual stipulates that an inspector needs to spend at least two to three hours at a typical bridge to adequately assess the condition of all the elements. Newer and smaller bridges may take only 1.5 hours to inspect while larger bridges can take at least five hours. The audit team noted that, on average, inspectors conducted three to five inspections in a single day. However, the team found 36 instances between 2006 and 2008 when 10 or more bridges were reported as being inspected by a single inspector in one day.

The audit team also observed an improvement in the overall condition rating of more than 300 bridges although little or no rehabilitation work had been done since the last inspection. In other instances, the overall rating inexplicably showed “no change” between the current and previous bridge inspections notwithstanding that elements of a bridge typically deteriorate with age. Differences in the application of judgment on the part of bridge inspectors was the reason often cited to explain the findings.

The Auditor recommended that the Ministry establish a risk-based approach for the ongoing monitoring of inspections. This approach should include assessing the reasonableness of the number of bridges that external contractors and ministry staff report as having been inspected in any one day, and following up on any unusual changes in a bridge’s condition since the previous inspection. Finally, the Ministry should standardize its agreements with its engineering firms as to the required experience and qualifications of contract inspection staff.

Public Hearings

In the instances where the Auditor found upwards of 10 bridges inspected in a single day, Ministry officials indicated they had re-inspected all those bridges and no safety issues were identified.

In an effort to improve the monitoring of bridge inspectors, the Ministry indicated that it has issued a bridge Inspection Oversight Policy confirming inspectors’ accountabilities, which extends to contracted inspectors from engineering firms. The Ministry has also initiated random site visits and spot checks.

To clarify its requirements to engineering firms, the Ministry explained that it has standardized its contracts for bridge inspections. Accordingly, the lead inspector must have a minimum of five years’ inspection experience. Inspectors must provide photographs date- and time-stamped of their work. The Ministry stipulates the amount of time required to thoroughly conduct each bridge inspection with variable time parameters, depending upon the size of the bridge. These and other requirements provided in the Ministry’s Action Plan will be reinforced in the mandatory inspection training for MTO inspectors and external engineering firms. This inspection training will emphasize the need for follow-up investigations, where required.

The Standing Committee on Public Accounts recommends that:

- 3. The Ministry of Transportation report to the Standing Committee as to whether it has monitored the effectiveness of its enhanced oversight initiatives and inspection training for MTO staff and external engineering consultants. The Ministry should also report on the results of its monitoring, including whether significant increases or decreases in a structure’s Bridge Condition Index rating from one inspection to the next are followed-up.**

Incomplete Bridge Maintenance Work and Tracking:

The Auditor observed that regions tended not to complete the recommended maintenance work resulting from biennial bridge inspections. In two of the three regions visited, only about one-third of the recommended maintenance work was actually completed. The third region did not even track whether recommended maintenance was being done.

In response, the Auditor recommended that the Ministry of Transportation develop a formal asset-management plan as a basis on which to prioritize the preventative maintenance of bridges and promptly carry out such maintenance, including the maintenance recommended in bridge inspections.

Public Hearings

According to Ministry officials, detailed data gathered during inspections are being recorded in the Ministry's Bridge Management System (BMS) software to support decision-making. The Ministry is starting to implement multi-year regional investment plans (RIPs) to more efficiently allocate capital investments for roads and bridges over a 25-year time frame. When implementing such plans, the Ministry will take the following factors into account: the role of the bridge in the highway network; the overall condition of the structure; the traffic volume; and the cost-effectiveness of timing the work to coincide with other highway work planned for the area.

Referring to the Auditor's observation that two of the three regions visited by the audit team tackled only one-third of the recommended maintenance work while the third region did not even track it, Committee Members asked the Ministry whether it has taken steps to improve the linkage between the biannual inspections, the recommended maintenance, and the completed work orders.

The Ministry explained that the one-third of the maintenance work that was completed was likely the more urgent work while the remaining two-thirds was of a less urgent nature. The Ministry's documentation and record keeping needs to be improved and the Ministry is acting immediately to implement a paper-based system to address the issue. On a go forward basis the Ministry would like to update to a centralized computer system that is capable of recording inspectors' work orders and verifying not only that the work order recipient received the work order, but that the work was completed and checked off. Ministry officials estimate that adaptation of the paper flow to the new computer system and software, to better manage bridge inspection and maintenance, will probably take between three to four years to complete.

The Standing Committee on Public Accounts recommends that:

4. **The Ministry of Transportation report to the Standing Committee on the steps it has taken to better track and explain any incomplete work relative to scheduled maintenance for the year until such time as the Ministry implements its centralized electronic system expected in three to four years' time.**

Ontario Bridge Management System (BMS)

The Ministry's database of bridge inventory—the BMS—adequately identified all provincial bridges for which it has responsibility but not the completeness and accuracy of its information on the individual elements that comprise each bridge. In addition, it lacked readily-available electronic information on the rehabilitation history for almost one-third of provincial bridges aged 40 years or older. Such information was documented in local databases and paper files. The Auditor observed that the Ministry's prioritization, cost estimates, and timelines for bridge rehabilitation work would be enhanced if such information were in the BMS. The system was also slow to respond to queries and was not user-friendly.

To make the BMS more useful, the Auditor recommended that the Ministry ensure that the information on bridge rehabilitation in the BMS is up to date, and further, assess whether the BMS meets users needs, and, whether there are cost effective ways of improving the BMS performance and capabilities—especially when reporting information needed for rehabilitation and inspection purposes.

Public Hearings

Ministry officials described their BMS as an analysis tool—enabling the Ministry to estimate its needs and establish priorities for repair and capital works. Recognizing the value of a centralized database, the Ministry is prepared to act upon the Auditor's recommendation to centralize its bridge data and upgrade its decade-old software. This fall, the Ministry plans to bring forward a strong business case in support of new software. If approved and implemented (likely over four years' time) changes to the system will further address the Auditor's recommendations.

The Standing Committee on Public Accounts recommends that:

5. **The Ministry of Transportation report to the Standing Committee the steps it is taking to integrate missing information and to correct inaccuracies and discrepancies in its inventory of provincial bridges (and their elements) in conjunction with the updating of the software for its Bridge Management System. The report should also estimate how long this exercise is expected to take and how it will be monitored for quality assurance.**

Changes to the Scope of Bridge Work between Initial and Final Contract:

The Ministry generally followed a competitive selection process in the procurement of major projects for bridge design and construction. Yet, in many of the contracts examined for design services and construction oversight consulting, the Auditor found changes to the scope of work resulting in a final price at least 50% higher than the original contract price, as well as significant change orders after contracts had been awarded.

Given the frequent and significant variances between the Ministry's estimated cost of a project and the bidder's cost, the Auditor recommended that the Ministry

examine its internal estimation process as well as the trend toward relatively few bidders.

Public Hearings

Currently the Ministry works with about 150 private sector service providers. Of the Ministry contracts, 97% are procured through competition. The untendered contracts are those involving emergency situations where the Ministry has to move quickly—such as when vehicle fires cause damage to critical links on the 400 series highways.

To enhance the competitive process, the Ministry has accepted the Auditor's advice. The Ministry will bundle design projects together into a single contract that is sufficiently large to attract firms' interest. For inspection contracts, the Ministry is introducing mandatory requests for proposals. To encourage more bidding by additional firms, the Ministry is awarding more routine projects in design or construction largely on the basis of price. The Ministry is also implementing a program to closely monitor and evaluate the difference between estimated and actual design costs. Once completed, the Ministry will evaluate and make adjustments where necessary to its internal estimating process.

Members asked about the status of the Ministry's September 2008 business case to request an increase in staff complement to promote a good balance between external consultants and Ministry staff.

Officials responded that the Ministry has started bringing some work back in-house. For example, construction oversight for design of bridges or small highway projects is being done by MTO staff. The Ministry is putting together a proposal to increase its transportation staff complement, and has received approval in principal for its "smart sourcing" initiative. While officials could not provide the Committee with an estimate of numbers of additional in-house staff, they noted that in the area of bridge inspections, 70% of inspections are now conducted by external contractors and 30% are done by internal staff.¹⁴

The Standing Committee on Public Accounts recommends that:

6. **The Ministry of Transportation report to the Standing Committee on the Ministry's conclusions stemming from its interim evaluation of its project to track and monitor the variance between estimated and actual design costs. The report should also update the Committee on the results to date of its "smart sourcing" initiative.**

¹⁴ Ibid., p. 7.

Municipal Bridges

Municipal Bridge Inspections Lack Legislated Oversight

To ensure the safety of the province's approximately 12,000 municipal bridges, Ontario's 444 municipalities must perform biennial inspections in accordance with the Ministry's Inspection Manual. As noted, there is currently no legislation that requires or even enables the Ministry of Transportation or any other ministry to oversee municipalities' compliance with this requirement.

Both to ensure the safety and proper upkeep of municipal bridges, and as part of the Ministry of Transportation's current provincial-municipal review, the Auditor recommended that the Ministry work with municipalities and other stakeholders to review practices in other large provinces and American states as to oversight of municipal responsibilities for bridge maintenance with the aim of determining whether changes to the current accountability relationship are required. The Auditor specifically noted the changes that the Government of Quebec had made resulting from the recommendations of the Commission of Inquiry that investigated the collapse of the de la Concorde overpass.

Public Hearings

During the public hearings, Committee Members heard Ministry officials describe the thorough safety inspection regime of its approximately 2,800 provincial bridges.

The observations pertaining to the provincial bridge inspection regime contrasted sharply with what Members heard about the remaining 80% of Ontario's bridges. There is no central inventory or database in existence for the 12,000 municipally-owned bridges or of their condition. No single body is responsible for bridge oversight, such as monitoring municipal compliance with legislated inspection and maintenance requirements.

In light of this, Members spoke of perceiving a "disconnect" in how Ontario deals with its provincial and municipally-managed bridges. As pointed out by the Ministry, municipal bridges are subject to the same high standards as provincial bridges. Yet, in the absence of a key oversight body with robust compliance and enforcement provisions, the Committee is concerned that the frequency and thoroughness of municipal bridge inspections and the overall condition of municipal bridges is unknown.

Ministry officials explained that while Ontario municipalities are accountable for their assets, the Ministry of Transportation assists them by:

- providing a framework for bridge inspections;
- providing bridge management system software, manuals, and free technical expertise;

- working closely with the Ontario Good Roads Association (OGRA) which provides bridge inspection training to municipalities' engineers and contract inspection firms;
- entering into a cost-sharing agreement with OGRA in which the province will contribute a maximum of \$750,000 to assist municipalities collect, process and input their asset data into Municipal DataWorks (MDW);¹⁵ and
- investing (through the Province) more than \$500 million since 2005 to support improvements to municipal bridges and roads through various federal-provincial funds.

The Ministry informed the Committee of a review known as the Roads and Bridges Review Study. It will include an inventory of municipal assets and needs, and will look at asset management practices. Partners include the Association of Municipalities of Ontario (AMO), the Ontario Good Roads Association (OGRA), the city of Toronto and the Province, among others. The partnership will review practices in other large provinces and American states and report in 2011 with options as to municipal roads and bridges—appropriate roles, responsibilities, and how best to manage these assets.

Committee Members questioned Ministry officials about municipal bridge oversight and compliance which yielded the following exchanges:

- In 1993 the Quebec government transferred responsibility for provincial roads and bridges to municipalities. In the wake of the September 2006 de la Concorde overpass collapse, a Commission of Inquiry recommended that Quebec's Ministry of Transportation regain ownership of all bridges from municipalities with a population of 100,000 or less.¹⁶ Members asked Ministry officials whether it might be worthwhile for Ontario to consider Quebec's approach.¹⁷

The Ministry replied that a working group for the Roads and Bridges Review will be examining Quebec, other Canadian provinces, and American states seeking various models of ownership, funding, and maintenance of infrastructure.¹⁸ This particular working group is scheduled to report in 2011.

¹⁵ Municipal DataWorks is a web-based infrastructure asset repository system owned and managed by the Ontario Good Roads Association (OGRA) on behalf of its member municipalities at no cost. It allows municipalities to maintain data on the extent and condition of *all* their hard assets. MDW supports over 120 unique asset types, including roads and bridges. In May 2010, MDW had signed agreements with about 288 Ontario municipalities of various sizes. Of the 444 municipalities in Ontario, almost 300 now subscribe to MDW. Two-thirds of subscribers are municipalities with a population of less than 100,000. The Ministry of Transportation invested up to \$750,000 in a one-year cost-sharing agreement with OGRA to assist municipalities to input their asset management data into MDW. Standing Committee on Public Accounts, *Hansard*, p. 3.

¹⁶ Standing Committee on Public Accounts, *Hansard*, p. 8.

¹⁷ *Ibid.*, p. 9.

¹⁸ *Ibid.* Based on the results of the first phase of the Roads and Bridges Review Study, the Ministry will be making recommendations as to possible provincial-municipal realignment options for future consideration by the partners with a target date of summer 2011. However, funding options for roads and bridges will not be examined in this phase of the work. See Ontario,

- Noting that in the United States, each state must maintain an oversight role over the safety of its bridges through the National Bridge Inspection Standards, Members asked officials if the Ministry of Transportation should be given that responsibility with respect to Ontario municipalities.

The Ministry indicated that it has a comprehensive approach to the inspection of bridges on provincial highways. As to municipalities, the *Public Transportation and Highway Improvement Act* has established a system with rules and responsibilities. According to Ministry officials,

... there is a responsibility on ... municipalities, as an order of government, to carry out their obligations and responsibilities. Whether it's a recreation centre or whether it's sewer and water facilities, or whether it's a road and bridge, ... municipalities have their responsibilities to manage their assets.¹⁹

- Members asked the Ministry what happens to the inspection reports of bridges following an inspection. Who is responsible for monitoring these reports?²⁰

The Ministry replied that in the case of municipalities, these reports form part of the asset management regime of the particular municipality. It is the responsibility of the municipal council to ensure that its obligations under the legislation are being met.

The Standing Committee takes note of all the commendable initiatives and financial support initiated by the Ministry of Transportation to help municipalities get their bridge inspection and maintenance processes in order. At the same time, without a strong central body to oversee municipal bridge inspections, public reporting, and the judicious application of penalties where appropriate, the Committee fears that some municipalities may not be fulfilling their obligations to inspect and maintain their bridge infrastructure.

The Standing Committee on Public Accounts is extremely concerned about the safety implications of the current lack of a legislative requirement for municipalities to assess and report bridge inspection and maintenance activity to a central monitoring or oversight body. Therefore the Committee recommends that:

- 7. The Ministry of Transportation report to the Standing Committee within 60 days on the status of deliberations among the partners of**

Ministry of Transportation, Office of the Deputy Minister, Sec. 2.02 Bridge Inspection and Maintenance, *Summary Status Table* (March 2010), p. 12.

¹⁹ Ibid., p. 14.

²⁰ Ibid., p. 6.

the Roads and Bridges Review and requests the Ministry to direct the review process to include an assessment of possible options for the creation of a central oversight body to monitor biennial bridge inspection and maintenance activity at the municipal level.

Conditions of Municipal Bridges:

The audit team's survey of municipalities indicated that the average age of municipal bridges was about 43 years, whereas provincial bridges averaged about 40 years. A precise picture of the overall condition of municipal bridges and accurate comparisons between municipal and provincial bridges are difficult because municipalities use many different systems to classify and determine the condition of their bridges. Further, there is no central database on the number of municipal bridges and their overall condition. The 73 municipalities that responded to the Auditor's survey have oversight for approximately 7,300 bridges. And while 90% of respondents indicated that their bridges were in good to fair condition, it is impossible to verify the overall condition of municipal bridges, due to the lack of a central database.

The Auditor recommended that the Ministry of Transportation work with municipalities and other stakeholders to ensure that the condition of municipal bridges is consistently assessed and updated every two years as required, and publicly reported.

Public Hearings

With respect to bridge conditions, Members drew attention to Figure 2 in the Auditor's *2009 Annual Report* which examined municipal capacity to maintain bridge infrastructure. It highlighted backlogs in bridge maintenance by dollar amount, expenditure, and years of backlog for four unnamed municipalities. In one instance, there were 823 bridges rated in fair to poor condition with a 19.5 year backlog totalling \$117.5 million dollars in expenditure. Committee Members commented that they found the figure unsettling.

In response, the Ministry drew a distinction between bridge condition and safety issues. (See Appendix A for a full discussion about bridge condition and safety issues.) Officials added that they lacked the specific information to comment whether the issue highlighted by the chart was one of bridge condition or bridge safety.

Figure 2: Municipal Capacity to Maintain Bridge Infrastructure

Prepared by the Office of the Auditor General of Ontario

	Population*	# of Bridges	Overall Condition of Bridges	Backlog (\$ million)	Backlog (years)
Municipality A	108,177	823	fair to poor	117.5	19.5
Municipality B	62,563	242	fair	9.5	9.5
Municipality C	668,549	108	good	nil	n/a
Municipality D	892,712	139	good	nil	n/a

* As of 2006, according to Statistics Canada

Members asked whether Ministry officials are knowledgeable about the condition of those former provincial bridges that were transferred to municipalities in 1996/97 as part of the Local Services Realignment (LSR) strategy.

The Ministry admitted to concerns about the fiscal capacity of smaller municipalities in northern and rural Ontario to manage their bridge infrastructure assets. From the Ministry's perspective, the first step is to have a strong inventory and a sense of the condition of municipal bridges. This is why the Ministry is working with the Ontario Good Roads Association (OGRA) and the municipal sector to develop the MDW system.²¹ The work of the Roads and Bridges Review Study—specifically the roles and responsibilities for municipal roads and bridges—questions whether or not the right roads are within the right jurisdiction.

Supplementary Information

During the public hearings, Members asked the Ministry how many provincial bridges were transferred to the jurisdiction of municipalities during the Local Services Realignment Strategy of 1996-97. Subsequent to the hearings, the Ministry responded that in 1996 and 1997 the Province transferred to municipalities a total of 684 structures, consisting of 411 bridges and 273 culverts on former provincial highways.²²

When Members asked if the Ministry of Transportation should have the responsibility of keeping a list of municipal bridges most in need of repair, officials reiterated the importance of having an inventory such as MDW. It would allow municipalities to make the case to federal and provincial governments about their infrastructure needs. It would also help the three orders of government to make choices about investment levels and distribution of funds.

MDW appears to be an innovative and useful tool for those municipalities seeking to maintain data on the extent and condition of all their hard assets. It can also

²¹ For additional information on MDW see Appendix B.

²² Correspondence from Mr. Bruce McCuaig, Deputy Minister, Ontario Ministry of Transportation (May 12, 2010).

serve as an inventory and database of municipal bridges and their condition. But, as the Ministry is in the midst of preparing a business case to enhance and replace its Bridge Management System (BMS), the Committee wonders whether the Ministry might wish to consult with municipalities, the Rural Ontario Municipal Association, and the Ontario Good Roads Association to ensure that its new BMS is designed so that it can also be used by municipalities.

The Standing Committee on Public Accounts recommends that:

8. **The Ministry of Transportation report to the Standing Committee as to its views on the merits of having a uniform bridge information and management system amongst municipalities. As well, the Ministry should report on the feasibility of making the province's enhanced Bridge Management System and software available to municipalities for the purpose of providing better information on bridge inspection and maintenance processes at the local level.**

Capital Funding of Municipal Bridges

The province has recently provided municipalities with one-time funding for municipal capital projects. Yet, the provision of these funds—often granted on the basis of demographics rather than need—arrived too close to the end of the province's fiscal year, making municipal planning and disbursement of the funds difficult. For instance, a significant portion of the funds provided in 2008 remained unspent one year later. Municipalities spoke of needing better asset-management practices, supported by sustainable provincial funding, to maximize safety and the lifespan of their bridges. A provincial–municipal working group is currently examining these issues.

The Auditor recommended that the Ministry work with municipalities and other stakeholders to review the Ministry's funding arrangement with municipalities to ensure that the funds provided are effective in sustaining the proper maintenance and rehabilitation of bridges and promoting good asset-management practices.

Public Hearings

Committee Members have heard from municipal officials of small, rural and Northern communities that they lack money and do not know how they are going to manage the costs associated with bridge maintenance and repair without turning to the senior levels of government.

Members familiar with municipal governance spoke of time-sensitive, year-end money “flowing out the door at the last minute,” with municipalities finding it difficult to spend on their infrastructure needs in a timely fashion. They wondered if these arrangements involving one-off time-sensitive monies to match the government's fiscal timelines could be modified to establish better asset management practices. Members would like to see more predictable, sustainable funding flowing to municipalities, thereby avoiding the last-minute scramble leading to funding approvals for bridges with cosmetic needs while those with

more critical safety issues lose out. Members have heard such concerns being expressed at meetings of municipal stakeholders such as the Association of Municipalities of Ontario, and the Rural Ontario Municipal Association.

Other Members gave examples of rural municipalities that did secure public funds for bridge infrastructure through a municipal-provincial-federal partnership. One such rural municipality engaged an engineer to inspect its bridges and gather the necessary documentation to seek project funding. Funds from three intakes of a federal-provincial infrastructure program enabled this municipality to replace seven bridges over various tributaries of the Grand River.

Ministry officials noted that since 2005, the province has spent more than \$500 million to support improvements to municipal bridges and roads. This was accomplished through the Canada-Ontario municipal rural infrastructure fund, the Building Canada fund and the infrastructure stimulus programs.

Through the Roads and Bridges Review, the province and municipalities are jointly examining options around responsibilities and funding arrangements for roads and bridges.²³

Ministry officials added that inventories like MDW will strengthen the ability to strategically disburse funds on the basis of condition, need, and capacity of the community. Moreover, the work that the Ministry is doing with the Ontario Good Roads Association, and will be doing with the Roads and Bridges Review, will help them be as strategic as possible in making these investments.²⁴

Members noted that their concern was not with programs with predictable sums of money but one-time, year-end announcements in March, for example, where millions of dollars are put "on the table" and municipalities are asked if they might be ready to go with something. Smaller municipalities find these projects challenging as they lack the staff and expertise to move forward quickly. In response to the concerns, Ministry officials promised to look into the matter.

Supplementary Information

Subsequent to the public hearings, the Ministry reported that various funding programs have assisted municipalities with their roads and bridges with varying application timeframes and criteria since 2005 as follows:

The Federal-Provincial-Municipal Programs: Building Canada, Infrastructure Stimulus Fund, Canada-Ontario-Municipal Rural Infrastructure Fund

The above-noted funds had application timeframes ranging from two weeks up to fourteen weeks in duration. In addition to eligible project categories, these funds had application restrictions based on population and the Infrastructure Stimulus

²³ Ontario, Ministry of Transportation, Office of the Deputy Minister, S. 3.02 Bridge Inspection and Maintenance, *Summary Status Table* (March 2010), p. 11.

²⁴ Standing Committee on Public Accounts, *Hansard*, p. 14.

Fund had a “shovel ready” clause that stipulated that the application was only for projects that were ready to be initiated.

In the Building Canada and Infrastructure Stimulus Fund programs there was a definite date when the approved funding for these projects had to be spent. This ranged from two years under the Infrastructure Stimulus Fund to eight years under the Building Canada fund.²⁵

Ontario funding programs:

The *Investing in Ontario Act* and the *Spring Budget 2008 Municipal Roads and Bridges Fund* specified no deadlines for the expenditure of funds. Municipalities had between one and three years to inform the Province how they intended to use the provincial funding. Provincial contributions would be maintained until the projects were completed.²⁶

To overcome the circumstances where some municipalities miss out on government funding because of year-end, time-sensitive project announcements, the Committee would like to propose a possible solution.

The Standing Committee on Public Accounts recommends that:

9. **The Ministry of Transportation report to the Standing Committee on a proposal that could enable the allocation of infrastructure funds from senior levels of government to priority municipal bridge improvement or repair projects where safety is the key criterion.**

²⁵ Ontario, Ministry of Transportation, Correspondence from Office of the Deputy Minister (May 12, 2010), p. 2.

²⁶ Ibid.

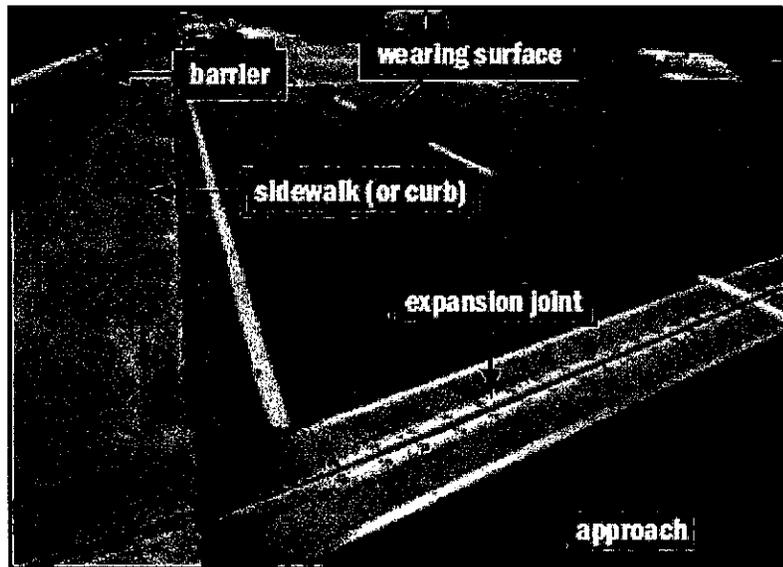
APPENDIX A

Bridge Condition Index (BCI) and Bridge Elements

The Ministry of Transportation uses the bridge condition index (BCI) as a planning tool to help the Ministry strategically schedule non-emergency bridge maintenance at the optimal time. The BCI is not used to rate or measure the safety of a bridge. It is designed as an indicator of the structure's asset value.²⁷

As an indicator of the asset value of a bridge, the BCI is a tool for assisting bridge owners to develop their asset management plan and to decide when and how to invest in the infrastructure. The BCI's purpose is to examine the material components built into a bridge such as the concrete, steel, sidewalks, and lighting in an effort to identify those elements that are still in good shape and those that are not. The index yields a composite number to give the Ministry a sense of where (within its overall bridge population) a particular bridge ranks on the continuum as to overall condition or state of repair.

In this context, bridges can be organized into approximately 20 elements—some more critical than others.



Bridge inspectors physically measure those areas of the bridge's elements that require work—chipped curbing for example—and translate it into a percentage. The percentage is then applied to the total value to replace that element. Then all the elements are tallied. A financial indicator of what the bridge has depreciated to today (current value) and what it would cost to replace it (replacement cost) are the two significant figures generated from this exercise. The current value is divided by the replacement cost which yields a ratio.²⁸

²⁷ Standing Committee on Public Accounts, *Hansard*, p. 2.

²⁸ *Ibid.*, p. 11.

For example:

Current value=\$700,000

Replacement cost= \$1,000,000

$$\begin{aligned} \text{BCI} &= \frac{\text{Current Value}}{\text{Replacement Cost}} \times 100 \\ &= \frac{700,000}{1,000,000} \times 100 \\ &= 70 \end{aligned}$$

The result is organized into ranges from 0 to 100.²⁹

BCI Range 70 – 100 Good

A bridge with a BCI greater than 70 does not usually require maintenance work within the next five years.

BCI Range 60 – 70 Fair

A bridge with a BCI between 60 and 70 usually is scheduled for maintenance work within the next five years. From an economic perspective, this is the ideal time to schedule major bridge repairs.

BCI Less than 60 Poor

For a bridge with a BCI rating less than 60, maintenance work is usually scheduled within one year.

As indicated above, the bridge condition index is a dollar value, not the safety value. The safety aspect comes into play when the inspector is inspecting the bridges to determine safety values, and immediate action would be taken to address any safety concerns.³⁰

²⁹ Ontario, Ministry of Transportation, *Bridge Condition Index (BCI)* Internet site at <http://www.mto.gov.on.ca/english/bridges/bci.shtml> accessed on February 12, 2010.

³⁰ Standing Committee on Public Accounts, *Hansard*, p. 11.

APPENDIX B

Municipal DataWorks (MDW)

As noted above, MDW is a web-based infrastructure asset repository system owned and managed by the Ontario Good Roads Association (OGRA) with start-up funding provided by the Ontario Ministry of Transportation.³¹ MDW supports over 120 unique asset types including roads and bridges.

According to supplementary information provided by the Ministry, the top ten most common infrastructure or asset types in MDW are as follows. The asset count for bridges is 2,124 and they are # 18 on the list

Municipal DataWorks	
Type of Asset	Asset Count
1. road section	66,481
2. curb	28,182
3. waterline	18,133
4. water valve	11,033
5. sewerline (wastewater)	11,007
6. sewerline (storm)	8,755
7. manhole (wastewater)	8,699
8. catchbasin (storm)	6,907
9. sidewalk	5,945
10. manhole (storm)	5,139

MDW was developed under a Public-Private Partnership with the goal of providing asset management capabilities to even the smallest of municipalities.

³¹ Membership in OGRA provides member municipalities with free access to MDW. There are no licensing fees, user fees or data storage fees. Municipal DataWorks, "Defining the Standard for Asset Management," Internet site at http://www.ogra.org/ogra_mdw?homw/mdwhome.aspx accessed on May 25, 2010.

CONSOLIDATED LIST OF RECOMMENDATIONS

Except for recommendation no. 7 where the Committee has put forward a shorter time frame, the Standing Committee on Public Accounts requests that the Ministry of Transportation provide the Committee Clerk with a written response to the following nine recommendations within 120 days of the tabling of this report with the Speaker of the Legislative Assembly.

1. The Ministry of Transportation report to the Standing Committee the changes being made to its policies and practices since the tabling of the *2009 Annual Report of the Auditor General* to differentiate and identify bridge deficiencies that pose a safety risk, versus those that indicate a loss in economic value if the required maintenance work is not done. The report should also indicate whether all provincial bridges rated fair to poor are now included in the Ministry's five-year capital plans.
2. The Ministry of Transportation report to the Standing Committee on how it will provide more guidance on the practice of lane closures in its bridge inspection manual to allow both ministry staff and contract inspectors to perform consistent and effective bridge inspections.
3. The Ministry of Transportation report to the Standing Committee as to whether it has monitored the effectiveness of its enhanced oversight initiatives and inspection training for MTO staff and external engineering consultants. The Ministry should also report on the results of its monitoring, including whether significant increases or decreases in a structure's Bridge Condition Index rating from one inspection to the next are followed-up.
4. The Ministry of Transportation report to the Standing Committee on the steps it has taken to better track and explain any incomplete work relative to scheduled maintenance for the year until such time as the Ministry implements its centralized electronic system expected in three to four years' time.
5. The Ministry of Transportation report to the Standing Committee the steps it is taking to integrate missing information and to correct inaccuracies and discrepancies in its inventory of provincial bridges (and their elements) in conjunction with the updating of the software for its Bridge Management System. The report should also estimate how long this exercise is expected to take and how it will be monitored for quality assurance.
6. The Ministry of Transportation report to the Standing Committee on the Ministry's conclusions stemming from its interim evaluation of its project to track and monitor the variance between estimated and actual design costs. The report should also update the Committee on the results to date of its "smart sourcing" initiative.

7. The Ministry of Transportation report to the Standing Committee within 60 days on the status of deliberations among the partners of the Roads and Bridges Review and requests the Ministry to direct the review process to include an assessment of possible options for the creation of a central oversight body to monitor biennial bridge inspection and maintenance activity at the municipal level.
8. The Ministry of Transportation report to the Standing Committee as to its views on the merits of having a uniform bridge information and management system amongst municipalities. As well, the Ministry should report on the feasibility of making the province's enhanced Bridge Management System and software available to municipalities for the purpose of providing better information on bridge inspection and maintenance processes at the local level.
9. The Ministry of Transportation report to the Standing Committee on a proposal that could enable the allocation of infrastructure funds from senior levels of government to priority municipal bridge improvement or repair projects where safety is the key criterion.