

**PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AUDIT AND REVIEW BRANCH**

FINAL REPORT

Audit of the Safety of PWGSC Bridges

1999-12-03

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AUDIT OF THE SAFETY OF PWGSC BRIDGES

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EXECUTIVE SUMMARY

Authority

This project was part of the 1999-2000 Audit and Review Plan as approved by Public Works and Government Services Canada's (PWGSC's) Audit and Review Committee.

Objectives

The overall objective of the audit was to assess the level of compliance to the regulatory regime in place to ensure the structural integrity of bridges thereby ensuring the safety of users and employees.

Scope

All bridges owned and maintained by PWGSC open to vehicular traffic were included within the scope of this audit. This included structures at thirty-three locations in four Regions and the National Capital Area. The audit did not include a technical assessment of the structural integrity of the bridges.

Background

Real Property Services Branch (RPSB) is responsible for managing a portfolio of office and other real property assets including a diverse array of Real Property holdings across the country. These include non-office facilities, wharves, dams, locks, the British Columbia portion of the Alaska Highway, as well as numerous bridges. The bridges include inter-provincial bridges, those over major navigable waterways, and 24 structures along the Alaska Highway. As custodian, the Minister of Public Works and Government Services is responsible for meeting regulatory obligations and exercising due diligence in ensuring the safety of these bridges.

Key Findings

The existing regulatory framework applicable to PWGSC is quite general and is less prescriptive than the North American norm. Only two pieces of federal legislation have a direct impact on the structural integrity of bridges included in the scope of the audit, namely *The Bridges Act* and the *Navigable Waters Protection Act*. Under this legislation, the Minister of Public Works and Government Services has the right to have an engineer authorized to inspect bridges, examine and inspect a bridge whenever an inspection or examination is deemed required. There are no provisions for the Minister to establish by regulation more specific inspection requirements or minimum standards for ongoing maintenance of these structures.

Transport Canada also has responsibility for approximately twenty bridges. For several of these structures there are Orders-in-Council which require an annual inspection by a qualified bridge

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engineer. Transport Canada's practice has been to have all of the structures in its portfolio inspected to this frequency.

In both Ontario and the United States regulations have been promulgated setting out the standard to which bridges must be inspected and to which load evaluations must be conducted. A draft policy and inspection manual developed by Architectural and Engineering Services (A&ES) is generally consistent with the practices in Ontario and the United States except for the frequency of inspection. While the Department has been respecting legislation/regulations promulgated by lower tier governments to a greater extent in recent years, it is not obligated to comply.

RPSB is currently in compliance with its existing regulatory framework, however, there are some discrepancies with industry practices. To maintain the structural integrity of bridges, a variety of practices should generally be followed. These include: periodic detailed inspections of all components including underwater members; periodic evaluation of load limits; and ongoing maintenance. The only applicable legislation, namely *The Bridges Act* and *The Navigable Waters Protection Act*, do not prescribe how often this should be done or to what standard. As such, RPSB is in compliance with its existing regulatory framework.

All bridges within the PWGSC portfolio, however, have either been examined during the past five years or are scheduled to be examined before the end of 1999, which is consistent with RPSB draft policy. The North American norm is to inspect bridges at least every two years. Underwater inspections appear to be conducted on an ad hoc basis unless there has been a previous report indicating that close monitoring is required contrary to industry practice or the requirements of the RPSB draft policy. A national CSA standard for load evaluation was promulgated in January 1990 however since then, only 13 of 33 locations in the inventory had load evaluations determined using this standard or a provincial standard. By the end of 1999, only four locations should remain outstanding. Maintenance is being carried out as required, on all the bridges within the inventory.

Inconsistent bridge inspection and evaluation practices are directly attributable to weaknesses in the management control framework. Specifically:

- Responsibility and accountability is diffuse with no organization taking full responsibility. Office Accommodation and Real Estate Services (OARES), Client Service Units (CSUs), Property and Facilities Management (PFM), Regional Architectural and Engineering Services (A&ES) and the National Bridge Engineering group all have a role. Only in the NCA has there been a practice of using a Memorandum of Understanding (MOU) to clearly delineate respective responsibilities.
- There is no consistent framework applied for inspection, load evaluations and maintenance across the country. Neither the 1991 draft inspection manual or the 1994 draft inspection policy has been finalized, approved and promulgated.
- Many of the regional staff are relatively new in their positions, as a result of recent departure incentives and are unaware of industry norms for maintaining bridges. Furthermore, with

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bridges being a small component of the total portfolio and ongoing discussion for years about possible divestiture, they tend to receive less managerial attention than they might otherwise.

- The planning focus has been very short term (2-3 years). Only recently, the NCA has started including the development of a ten year management plan as part of its inspection process.
- There has been no regular reporting called for or done for senior management on inspection and maintenance practices in comparison to standard (or generally accepted practice).

Conclusions

While *The Bridges Act* and the *Navigable Waters Protection Act* are very general or no longer applicable and are significantly less prescriptive than the North American norm, this is not in and of itself, problematic. Legislation can be difficult to change and thus in today's environment it is best to have a regulatory framework that provides maximum flexibility. On the other hand, there does need to be a minimum standard that is followed so that the Department is in a position to demonstrate that it has exercised reasonable due diligence should anything happen on any of the bridges within the portfolio. While the risk of serious injuries and significant economic losses occurring due to inadequate structural integrity is currently considered low, experience across North America shows that it can happen. This minimum standard could be established through RPSB or departmental policy.

If the policy mirrored provincial requirements as a minimum, it would also help to overcome a potential hurdle to divesting the structures to lower levels of government. An asset known to be in good condition as evidenced by its maintenance, inspection and evaluation to stringent, consistent standards is much easier to transfer than an asset in an unknown condition.

With an approved policy, staff responsible for the bridges are more likely to be knowledgeable of their own responsibilities and the standard to which the bridges must be maintained. A clear delineation of responsibilities that is understood by all parties involved is imperative when there are several different parties playing a role in maintaining the integrity of a complex asset such as a bridge. This imperative is heightened when there is a significant turnover in personnel such as experienced by RPSB in recent years. This lack of a clear delineation and understanding of respective responsibilities contributed to some of the inconsistent inspection and evaluation practices observed during the course of this audit.

By focusing on the short term in its capital plans for bridges, RPSB is acting primarily in a reactive manner. There is a significantly greater risk that repair and rehabilitation costs will be higher than otherwise necessary because problems are not anticipated in advance or detected soon enough. Given the age of most of the bridges in the inventory, an inspection cycle of at least every five years exacerbates this problem. It is not surprising that on occasion some significant structural deficiencies have been detected as part of periodic inspections or load evaluations requiring immediate attention at significant cost.

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Senior management is ultimately accountable for ensuring that regulatory due diligence is followed to ensure the structural integrity of assets in the inventory. Management needs to regularly receive information on the practices followed so that they can initiate appropriate action if they believe that the actions of the organization are insufficient to adequately maintain the assets under their control. At the time of the audit, senior management was not receiving the information it required on an on-going basis to make this type of determination.

In sum, to better manage the bridges within the portfolio so as to clearly demonstrate a reasonable level of due diligence and to minimize future maintenance costs, several elements of the management control framework must be addressed.

Recommendations

To address the discrepancies identified by this audit, it is recommended that the Assistant Deputy Minister, Real Property Services ensure that:

1. *a policy on the standard to be followed in inspecting, evaluating, and maintaining bridges within the PWGSC portfolio that is generally consistent with provincial standards is approved and promulgated;*
2. *responsibilities be clarified so that there is a clear understanding amongst all personnel involved as to their respective responsibilities;*
3. *planning take a longer term focus and that the inspection process better support it; and*
4. *there is on-going monitoring and periodic reporting to senior management on the status of the bridges and the practices followed.*

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1.0 INTRODUCTION

1.1 Authority for the Project

This project was part of the 1999-2000 Audit and Review Plan as approved by Public Works and Government Services Canada's (PWGSC's) Audit and Review Committee.

1.2 Objectives

The overall objective of the audit was to assess the level of compliance to the regulatory regime in place to ensure the structural integrity of bridges thereby ensuring the safety of users and employees.

1.3 Scope

All bridges owned and maintained by PWGSC open to vehicular traffic were included within the scope of this audit. This included structures at thirty-three locations in four Regions and the National Capital Area. A technical assessment of the structural integrity of the bridges was not undertaken as part of this audit, rather the focus was on the processes followed to maintain the structural integrity.

In each region and the NCA, key personnel involved with the bridges were interviewed. This included personnel within Office Accommodation and Real Estate Services (OARES), Client Service Units (CSU), Architectural and Engineering Services (A&ES), and Property and Facilities Management (PFM)¹. An analyst with responsibility for PWGSC from Treasury Board Secretariat and Transport Canada personnel responsible for the bridges within their portfolio, were also interviewed. Documentation relating to each bridge included in the scope of the audit was also reviewed. This included detailed inspection records, load evaluation reports, correspondence, maintenance records and financial records.

A consulting engineer knowledgeable about bridge inspection, evaluation and maintenance practices in North America was consulted at various points throughout the audit. He also reviewed key project deliverables for completeness and accuracy.

1.4 Background

The overall objective of the Real Property Services Branch (RPSB) is to manage a portfolio of office and other real property assets. RPSB also acts as custodian for a diverse array of Real Property holdings across the country. These holdings include non-office facilities, wharves, dams, locks, the British Columbia portion of the Alaska Highway, as well as numerous bridges. The bridges generally consist of inter-provincial bridges and those over major navigable waterways as well as 24 structures along the PWGSC portion of the Alaska Highway. As custodian, the Minister of Public Works and Government Services is responsible for meeting

¹ See Annex A for a list of the individuals interviewed.

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regulatory obligations and exercising due diligence in ensuring the safety of these bridges for the employees who work at these structures as well as the public who use them.

2.0 ISSUES EXAMINED

- The regulatory regime that RPSB must comply with and the regime applicable to Transport Canada and other jurisdictions (Ontario and the United States);
- The degree of compliance to the regulatory regime and to industry practice; and
- The underlying rationale for any observed discrepancies between industry practice and RPS' practices.

3.0 FINDINGS

The existing regulatory framework is at a very high level and is less prescriptive than the North American norm.

Only two pieces of legislation have a direct impact on the structural integrity of bridges within PWGSC's portfolio, namely *The Bridges Act* and the *Navigable Waters Protection Act*. The *Bridges Act* gives the Minister of Public Works & Government Services the right to have an engineer authorized to inspect bridges, examine and inspect a bridge whenever an inspection or examination is deemed required. Under the terms of the *Navigable Waters Protection Act* which is the responsibility of the Minister of Transport, any bridge over navigable water must be maintained in accordance with the plans, regulation and terms and conditions set out in the original approval. There are no provisions for either Minister to establish by regulation more specific inspection requirements or minimum standards for the ongoing maintenance of these structures.

The Minister of Transport also has responsibility for approximately twenty bridges which either span the international boundary with the United States or cross the St. Lawrence Seaway. Responsibility for these bridges was recently transferred from Transport Canada to the Canada Bridge Corporation. Orders-in-Council which require annual inspections by a qualified bridge engineer apply to several of these structures. Transport Canada's practice has been to have all of the structures in its portfolio inspected with this frequency.

In Ontario, both the *Ontario Bridges Act* and the *Public Transportation and Highway Improvement Act* give the Ontario Minister of Transportation the ability to make regulations regarding the planning, design, construction, maintenance and operation of bridges and related structures. Two Regulations have been promulgated². They require that the structural integrity, safety and condition of bridges be determined through the performance of periodic inspections under the direction of a professional engineer in accordance with the provisions of the *Ontario*

² See Annex B for details of the requirements of the Ontario Regulations.

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Structure Inspection Manual and that a determination of gross weight limits for bridges be made in accordance with the provisions of the Ontario Highway Bridge Design Code.

In the United States, the National Bridge Inspection Standards have been set out by regulation³. The regulation requires that periodic inspections be undertaken and ratings determined in accordance with the provisions of the American Association of State Highway and Transportation Officials (AASHTO) *Manual for Maintenance Inspection of Bridges* at intervals not to exceed two years. The AASHTO *Manual* also provides guidance on the determination of safe load carrying capacities.

A draft inspection policy (1994) and inspection manual (1991) developed by Architectural and Engineering Services (A&ES) is generally consistent with the practices in Ontario and the United States except for the frequency of inspection. A&ES' draft policy requires a complete detailed inspection including underwater members at intervals not to exceed five years rather than the two year norm in Ontario and the United States. It also calls for an assessment of the structural load carrying capacity.

The only other policy which may have some applicability to ensuring the structural integrity of bridges is Deputy Minister Directive 007, *Safety and Health Policy*. According to this policy, PWGSC will provide for the safety and well-being of clients and the public in all its operations. Furthermore, the Assistant Deputy Minister has been identified as having accountability for providing safe and health accommodations and facilities in accordance with the applicable codes, standards and regulations.

It does not appear, however, that there are any applicable codes, standards and regulations that legally apply to PWGSC's management of the bridges in its portfolio. While the Department has been respecting legislation and/or regulations promulgated by lower tier governments to a greater extent in recent years especially those related to health and safety where it has been abiding by the most stringent standard applicable, the department is not obligated to comply with them.

RPSB is currently in compliance with its existing regulatory framework however, there are some inconsistencies with industry practices.

To maintain the structural integrity of bridges, a variety of practices should generally be followed. These include:

- periodic detailed inspections of all components of the bridge including underwater members;
- periodic evaluation of load limits; and
- ongoing maintenance.

³ Code of Federal Regulations (CFR) Title 23 (Highways), Chapter 1 (Federal Highway Administration, Department of Transportation), Part 650 (Bridges, Structures, and Hydraulics), Subpart C sets out the National Bridge Inspection Standards. See Annex C for a summary of the key requirements of the standard.

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Neither *The Bridges Act* nor the *Navigable Waters Protection Act* set out a prescribed frequency or standard to which the bridges within the RPSB portfolio must be inspected or evaluated. As such, PWGSC is in compliance with its regulatory framework. Notwithstanding the lack of an official standard, it has been the stated intent of RPSB to inspect and evaluate the bridges in the inventory on a periodic basis using a framework, which except for frequency, is generally consistent with North American norms.

All bridges within the portfolio have either been inspected in detail during the past five years or are scheduled to be examined before the end of 1999 which is consistent with the requirements of the draft RPSB Bridge Inspection Policy. Over the past ten years, however, several bridges have not been examined at least every five years as required by the draft policy. Specifically:

- all twenty-four bridges along the British Columbia portion of the Alaska Highway (no detailed inspection reports for any of the bridges between 1986 and 1994);
- Alexandra Bridge (no detailed inspection reports between 1984 and 1995);
- Chaudière Crossing (no detailed inspection reports for six of the seven structures that make up the Crossing between 1988 and 1996, the seventh structure was inspected in 1989); and
- LaSalle Causeway (no detailed inspection report for one of five structures - High Level Bridge. It is however, scheduled to be inspected before the end of 1999.)

The Burlington Lift Bridge is the only structure in the portfolio that was inspected at a frequency consistent with North American norms.

There was no evidence that underwater inspections were consistently performed at intervals not exceeding five years which is called for in the draft RPSB policy. Rather it appeared that they were conducted on an ad hoc basis unless there had been a previous report indicating that close monitoring was required.

Many of the bridges in the PWGSC portfolio are quite old having been constructed between 36 and 98 years ago. During the intervening period the typical loads that these structures are subjected to have increased significantly. The bridges have been modified and strengthened to accommodate the heavier loads.

A national standard for load evaluation, CAN-CSA-S6-88, Supplement 1, was promulgated in January 1990 by the Standards Council of Canada. Prior to 1999, only 13 of 33 locations in the inventory had load evaluations determined using this standard or a similar provincial standard. By the end of 1999, only four locations should remain outstanding (Chaudière Crossing, MacDonald-Cartier Bridge, Pembroke-Allumette Bridge and the Burlington Lift Bridge). A report for the twenty-four bridges along the Alaska Highway was being prepared at the time of the audit.

Maintenance is being carried out on an as required basis, on all the bridges within the inventory. It includes annual high pressure washing to remove dirt in the expansion joints, patching of holes in the deck, repair of guard rails, and where applicable greasing of moveable parts. Maintenance

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and operating personnel also look for anything that looks, or in the case of structures with moving parts, sounds unusual.

Inconsistent bridge inspection and evaluation practices are directly attributable to weaknesses in the management control framework.

Weaknesses in five areas of the management control framework were observed that contributed to inconsistent bridge inspection and evaluation practices in comparison to established norms and from Region to Region across the country. Specifically:

- ***Organizational structure: Responsibility and accountability is diffuse with no organization taking full responsibility.*** Office Accommodation and Real Estate Services (OARES), Client Service Units (CSUs), Property and Facilities Management (PFM) all have a role in different parts of the country for managing these assets. OARES as the owner investor has ultimate responsibility for the assets but has in most Regions and NCA, turned over effective management of the assets to either a CSU or PFM. Because of the highly specialized nature of these assets, each of these groups in turn rely heavily on their Regional A&ES group and/or the National Bridge Engineering group to advise them as to what is required. If A&ES does not suggest something to them, it will not be considered for funding. A&ES in turn, because of its project focus, only undertakes work when specifically directed and does not have a long term management focus. It is very easy for inspections and load evaluations to be overlooked. Only in the NCA has there been a practice of using a Memorandum of Understanding (MOU) to clearly delineate respective responsibilities.
- ***Rules, factors and influences: There is no consistent framework applied for inspection, load evaluations and maintenance across the country.*** Neither a draft inspection manual prepared in 1991 or a draft inspection policy prepared 1994 has yet been finalized, approved or promulgated. As noted in the 1997 *Review of RPS Mechanisms for Policy Development*, while RPSB management recognizes that policy is important, their attention has been focused elsewhere as a result of the change that RPSB has been undergoing since 1993.

When a decision is made that a detailed inspection is required, Regional A&ES personnel may turn to the National Bridge Engineering group to develop terms of reference or will reuse the framework from the most recent, previous inspection. For the twenty-four bridges along the British Columbia portion of the Alaska Highway, the Yukon government applies their standard since nothing is stipulated in the MOU with them. The lack of a national framework has contributed to different rating scales and reporting practices being used, making it difficult to compare results from one inspection to another or to compare the current status of the structures in the inventory.

- ***Culture and climate: Many of the regional staff are relatively new in their positions as a result of recent departure incentives and are unaware of industry norms for maintaining bridges.*** For many, bridges are only a very small component of the total portfolio for which they have responsibility. In addition, these assets have been identified since the mid to late

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1980s for divestiture. Discussions are currently underway to transfer many of the bridges to Transport Canada or a lower tier government. In sum, the bridges are not seen as a long term component of the portfolio and thus tend to receive less managerial attention than they might otherwise.

- ***Planning: The planning focus has been very short term (2-3 years).*** While ten year asset management plans have been prepared, the inspection reports that these are based on tend to focus on what needs to be performed in the very near term to address identified problems. Most of the costs associated with significant repairs and/or rehabilitation tend to appear in the first two to three years of the plan to address the specific problems identified in the most recent inspection report, with ongoing maintenance costs straightlined over the balance of the planning period. Generally, they do not include provision for future cyclical inspections and evaluations of the bridges. Only the NCA has recently started including the development of a ten year management plan as part of its inspection process. These observed practices for planning and timing of capital expenditures are consistent with the recent findings of the *Review of the Management Control Framework for Long Term Capital Planning in RPSB*.
- ***Execution: There has been no regular reporting to senior management on inspection and maintenance practices in comparison to standard (or generally accepted practice) and the existing infrastructure would not support this type of reporting.*** The manner in which detailed technical reports are prepared does not facilitate ready identification and reporting of differences from inspection to inspection. Rating scales have changed and bridge components are grouped differently from report to report. One must know the bridge in detail to readily identify the differences. Furthermore, only paper records of inspection results, load evaluations and maintenance are maintained and neither the Regions or the National Bridge Engineering unit are certain if they have a complete record. Only by reviewing the paper record can one become cognizant of the elapsed time since work was last carried out.

4.0 CONCLUSIONS

While *The Bridges Act* and the *Navigable Waters Protection Act* are very general or no longer applicable and are significantly less prescriptive than the North American norm, this is not in and of itself, problematic. Legislation can be difficult to change and thus in today's environment it is best to have a regulatory framework that provides maximum flexibility. On the other hand, there does need to be a minimum standard that is followed so that the Department is in a position to demonstrate that it has exercised reasonable due diligence should anything happen on any of the bridges within the portfolio. While the risk of serious injuries and significant economic losses occurring due to inadequate structural integrity is currently considered low, experience across North America shows that it can happen⁴. This minimum standard can be achieved through RPSB or departmental policy.

⁴ The Lockport Bridge in Manitoba had to be closed for nine months in 1993. In Alberta, starting in the mid 1990s, several rural bridges were closed for safety reasons causing significant detours. There have been several major bridge collapses in the United States due to structural integrity problems. In December 1967, the Silver Bridge

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If the policy mirrored provincial requirements as a minimum, it would also help to overcome a potential hurdle to divesting the structures to lower levels of government. An asset known to be in good condition as evidenced by its maintenance, inspection and evaluation to stringent, consistent standards is much easier to transfer than an asset in an unknown condition.

With an approved policy, staff responsible for the bridges are more likely to be more knowledgeable of their own responsibilities and the standard to which the bridges must be maintained. A clear delineation of responsibilities that is understood by all parties involved is imperative when there are several different parties playing a role in maintaining the integrity of a complex asset such as a bridge. This imperative is heightened when there is a significant turnover in personnel such as experienced by RPSB in recent years. This lack of a clear delineation and understanding of respective responsibilities contributed to some of the inconsistent inspection and evaluation practices observed during the course of this audit.

By focusing on the short term in its capital plans for bridges, RPSB is acting primarily in a reactive manner. There is a significantly greater risk that repair and rehabilitation costs will be higher than otherwise necessary because problems are not anticipated in advance or detected soon enough. Given the age of most of the bridges in the inventory, an inspection cycle of at least every five years exacerbates this problem. It is not surprising that on occasion some significant structural deficiencies have been detected as part of periodic inspections or load evaluations requiring immediate attention at significant cost.

Senior management are ultimately accountable for ensuring, that regulatory due diligence is followed to ensure the structural integrity of assets in the inventory. Management needs to regularly receive information on the practices followed so that they can instigate appropriate action if they believe that the actions of the organization are insufficient to adequately maintain the assets under their control. At the time of the audit, senior management was not receiving the information it required on an on-going basis to make this type of determination.

The task of managing the bridges as an asset and reporting on the status and inspection practices to senior management would also be facilitated considerably with an enhanced infrastructure. At this point in time, it is extremely time consuming for anyone to obtain an overall picture of condition of all the bridges in the inventory. Records are located across the country and are in a different format. There is not even a centralized index indicating what records exist and where they are located. Several jurisdictions including the United States and the Yukon government maintain electronic databases containing key information about each bridge in the inventory and key details of previous inspection reports.

In sum, to better manage the bridges within the portfolio so as to clearly demonstrate a reasonable level of due diligence and to minimize future maintenance costs, several elements of the management control framework must be addressed.

across the Ohio River collapsed with 46 casualties and in 1983, the Mianus River Bridge collapsed on Interstate 95 in Connecticut. The Scholharie Creek Bridge in upstate New York collapsed in 1987 because flowing water had scoured away its foundation.

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5.0 RECOMMENDATIONS

To address the discrepancies identified by this audit, it is recommended that the Assistant Deputy Minister, Real Property Services ensure that:

1. *a policy on the standard to be followed in inspecting, evaluating, and maintaining bridges within the PWGSC portfolio that is generally consistent with provincial standards is approved and promulgated;*
2. *responsibilities be clarified so that there is a clear understanding amongst all personnel involved as to their respective responsibilities;*
3. *planning take a longer term focus and that the inspection process better support it; and*
4. *there is on-going monitoring and periodic reporting to senior management on the status of the bridges and the practices followed.*

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ANNEX A: INDIVIDUALS INTERVIEWED

National Capital Area

Architectural and Engineering Services

Alain Bastarache, Manager, Airports Engineering
George Hibbert, Manager, Highways and Bridge Engineering
Denis Lajoie, Manager, Special Projects, Project Management
Ronald Pion, Engineer, Bridges

Client Service Units

Kathleen Tomko, Director CSU 6 (PWGSC)
Monic Moncrieff, Program Manager, Federal Holdings

Office Accommodation and Real Estate Services

Gary Abson, Director Owner/Investor
Yvon Roy, Manager, Investments
Paige Cousineau, Portfolio Manager (Atlantic Region)
François Lepage, Portfolio Manager (Ontario and Québec)
Rhonda Nadon, Portfolio Manager (National Capital Area)
Anita Rosenfeld, Portfolio Manager (Western/Pacific Regions)

Atlantic Region

Architectural and Engineering Services/Property and Facilities Management

Eric Allain, Project Manager, Project Management
Edward Coy, Senior Project Manager, Project Management

Client Service Unit

Fern Babin, Geographic Service Unit Director, NB & Transport

Office Accommodation and Real Estate Services

Emery Peters, Federal Holdings Officer, Owner/Investor

Ontario Region

Office Accommodation and Real Estate Services

Paul LaRose, Regional Manager, Owner/Investor
Claudia Spera, Manager Real Property Consulting Group
John Hammond, Project Consulting, Real Property Consulting Group

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Property & Facilities Management/Architectural and Engineering Services

Dave Davies, Asset Manager, Greater Ontario
Enn Leesti, Manager, Marine Engineering
Jamel Ajeb, Property Manager, Kingston
Jane Rittenhouse, Property Manager, Hamilton
Tim Egan, Bridge Master, Burlington Lift Bridge

Pacific Region

Tracy Lakevold, Real Estate Advisor, Office Accommodation Services/Real Estate Sector

Western Region

Architectural and Engineering Services

Chris Colp, Project Manager, Professional and Technical Services (Marine)
Al Johnston, Project Manager, Alaska Highway Program
Paddy Whidden, Manager, Maintenance Program

Client Service Unit

Peter Mayberry, Client Services Unit Director (Agr/Health/DFO/Transport/DND/NRC/
SALD)

Office Accommodation Services/Real Estate Sector

Allan Capstick, Regional Manager, Owner Investor

Transport Canada

Gordon Coogan, Program Manager, Highways and Bridges
Pat McKenna, Senior Analyst, Surface Divestiture

Treasury Board Secretariat

Claude Béland, Senior Analyst, PWGSC Portfolio and Services

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ANNEX B: PROVINCE OF ONTARIO BRIDGE STANDARDS

Regulation 97/103: Standards to Determine Allowable Gross Vehicle Weight for Bridges requires that:

- a determination of a limit on the gross vehicle weight of vehicles passing over a bridge shall:
 - ◆ be made in accordance with the provisions of the *Ontario Highway Bridge Design Code*;
 - ◆ be signed and sealed by two professional engineers who have set out the maximum allowable load limit at which the bridge may be posted, and the period of time for which the determination remains valid.

Regulation 97/104: Standards for Bridges requires that:

- design, evaluation, construction, inspection or rehabilitation of a bridge must conform with:
 - ◆ the standards set out in the *Ontario Highway Bridge Design Code*; and
 - ◆ various Ministry of Transportation documents including:
 - *Structural Manual*;
 - *Structural Rehabilitation Manual*;
 - *Drainage Manual*;
 - *Roadside Safety Manual*; and
 - *Ontario Provincial Standards for Roads and Municipal Services*.
- the structural integrity, safety and condition of every bridge shall be determined through the performance of periodic inspections under the direction of a professional engineer and in accordance with the provisions of the *Ontario Structure Inspection Manual*.
- every bridge is to be kept safe and in good repair.

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ANNEX C: UNITED STATES NATIONAL BRIDGE INSPECTION REQUIREMENTS

Key requirements of the Code of Federal Regulations (CFR) Title 23 (Highways), Chapter 1 (Federal Highway Administration, Department of Transportation), Part 650 (Bridges, Structures and Hydraulics), Subpart C (National Bridge Inspection Standards) include:

- Application of this standard to all structures defined as bridges located on public roads. A bridge is defined as a structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet between undercopings of abutments or spring lines of arches.
- Each highway department shall include a bridge inspection organization capable of performing inspections, preparing reports, and determining ratings in accordance with the provisions of the AASHTO 1983 *Manual for Maintenance Inspection of Bridges* together with subsequent changes and the Standards contained in the Regulations.
- Each structure required to be inspected under the Standards shall be rated as to its safe load carrying capacity in accordance with Section 4 of the AASHTO Manual.
- Inspection records and bridge inventories shall be prepared and maintained in accordance with the Standards. A master list of the following is to be maintained:
 - ◆ those bridges which contain fracture critical members, the location and description of such members on the bridge and the inspection frequency and procedures for inspection of such members;
 - ◆ those bridges with underwater members which cannot be visually examined or feel for condition, integrity and safe load capacity due to excessive water depth or turbidity. These members shall be described, the inspection frequency stated, not to exceed five years, and the inspection procedure specified;
 - ◆ those bridges which contain unique or special features requiring additional attention during inspection to ensure the safety of such bridges and the inspection frequency and procedure for inspection of each such feature;
 - ◆ the date of last inspection of the feature designated above and description of the findings and follow-up actions, if necessary, resulting from the most recent inspection of fracture critical detail, underwater members or special features of each so designated bridge.
- Each bridge is to be inspected at regular intervals not to exceed 2 years:
 - ◆ Certain types or groups of bridges will require inspection at less than 2 year intervals. The depth and frequency to which bridges are to be inspected will depend on such factors as age, traffic characteristics, state of maintenance, and known deficiencies.
 - ◆ The maximum inspection interval may be increased for certain types or groups of bridges where past inspection reports and favorable experience and analysis justify the increase interval of inspection. If a State proposes to inspect some bridges at greater than the specified two-year interval, the State shall submit a detailed proposal and supporting data

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to the Federal Highway Administrator for approval. The maximum time period between inspections shall not exceed four years.

- The findings and results of bridge inspections shall be recorded on standard forms. The data required to complete the forms and the functions which must be performed to compile the data are contained in section 3 of the AASHTO Manual.
- Each State shall prepare and maintain an inventory of all bridge structures subject to the Standards. Under these Standards, certain structure inventory and appraisal data must be collected and retained within the various departments of the State organization for collection by the Federal Highway Administration as needed. A tabulation of this data is contained in the structure inventory and appraisal sheet distributed by the Federal Highway Administration as part of the Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges (Coding Guide) in January of 1979. Reporting procedures have been developed by the Federal Highway Administration.