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Final Report

2010-711

Follow-up Audit of the Management Practices of PWGSC Bridges and Dams

January 26, 2012

Office of Audit and Evaluation



**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

TABLE OF CONTENTS

MAIN POINTS	i
INTRODUCTION	1
FOCUS OF THE AUDIT	3
STATEMENT OF ASSURANCE.....	3
OBSERVATIONS	4
MANAGEMENT CONTROL FRAMEWORK.....	4
An overall governance framework has been established.....	4
A sound policy framework, complete with supporting guidance, is available.	6
Condition of the inventory is known, but divestiture and funding remain a challenge.	6
A rigorous risk management process has been developed.....	9
Strategic planning is ongoing.....	9
Inspections are conducted; however, certain documentation of oversight practices should be strengthened.....	10
CONCLUSION.....	12
MANAGEMENT RESPONSE.....	13
RECOMMENDATIONS AND MANAGEMENT ACTION PLAN.....	13
ABOUT THE AUDIT.....	14
Appendix A – Inventory of Bridge and Dam Engineering Assets.....	18
Appendix B – Assessment of progress in implementing previous recommendations.....	19

MAIN POINTS

What we examined

- i. A bridge is a structure that provides a roadway or walkway for the passage of vehicles, pedestrians or cyclists across an obstruction, gap, or facility, and has a span of more than three metres. A dam is a barrier constructed of earth, rock, or concrete for the purpose of enabling the storage or diversion of water.
- ii. At Public Works and Government Services Canada (PWGSC) bridges and dams are classified as engineering assets, which are defined as any land or marine assets for which PWGSC is the custodian. All of the engineering assets under the responsibility of the Engineering Assets Strategy Sector, PWGSC are managed as a portfolio. This portfolio includes 15 major engineering assets that meet the definition of bridges or dams to be preserved under the Real Property Branch *Bridge Inspection and Evaluation Policy* and the Real Property Branch *Dam Inspection and Evaluation Policy*. These 15 assets are complex and total 83 different structures (Appendix A).
- iii. The replacement value of the bridge and dam engineering assets, including the Alaska Highway, is estimated to be \$3.76 billion (2010), with an operation and maintenance budget of \$45.2 million (2009-2010), and a capital investment budget of \$86.3 million (2009-2010).
- iv. Our follow-up audit focused on key elements of the management control framework that support the Department's management practices and development of a long-term divestiture and/or stewardship strategy. The follow-up audit was not designed to assess the condition or safety of bridges or dams nor to assess whether inspections were conducted in accordance with all elements of the *Bridge Inspection* and *Dam Inspection Manuals*. Rather the follow-up audit was designed to examine the management practices to support the discharge of responsibilities under relevant authorities.

Why it is important

- v. Bridge and dam engineering assets are public capital infrastructure designed for multiple purposes including travel by pedestrians and motor vehicles. Canadians expect to safely travel over bridges and to live near dams. The preservation of bridges and dams is part of a larger North American public sector debate on how to effectively plan and manage transportation infrastructure. Governments must consider the age of the assets, the increasing traffic and weight of transportation vehicles and the effect of corrosive salt on existing roadways and bridges. Those responsible for bridges and dams in Canada have to address these factors.
- vi. The challenges associated with managing PWGSC-owned bridges and dams are well documented. A preliminary third-party assessment conducted in 2007 identified various degrees of challenges related to the bridges and dams including factors such as financing,

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

health and safety, and reputation. In addition, numerous studies and inspections have been carried out over recent years to assess the current condition of the assets and to update the assessment of risks related to management of the assets.

What we found

- vii. To help address the need for a comprehensive portfolio-based strategy, the Real Property Branch established the Engineering Assets Strategy Sector in January 2007. The Sector was given a three-year mandate to develop a comprehensive divestiture and stewardship portfolio-based strategy and implement urgent recapitalization projects for high-risk structures.
- viii. The previous internal audit was conducted in 2007 when the Engineering Assets Strategy Sector was in its infancy. Since that audit, the Department has improved the management of the engineering assets program. Many of the previously reported weaknesses in the management control framework have been strengthened including:
 - A governance structure with assigned roles and responsibilities has been established;
 - Policies, complete with supporting guidance, are available and complete; and
 - A rigorous risk management process has been developed.
- ix. To support the development of the portfolio-based strategy, the Sector received \$26.9 million over four years, starting in 2008-2009, and has conducted 221 portfolio analyses and studies, including individual Engineering Asset Management Plans. The Department has also obtained \$193.8 million in short-term capital funding to implement urgent projects to address some immediate repairs related to identified health and safety challenges; however, significant sustained funding will be required to effectively maintain these assets. Strategic planning is ongoing and the Sector expects to present the portfolio-based strategy to the Government in 2011.
- x. In addition, since 2007 the Department has made some progress in fulfilling its divestiture mandate and has successfully divested the Vieux Port of Montreal and three dams. However, PWGSC remains the custodian of half its original inventory which includes 20 engineering assets and several wharves. Fifteen of these engineering assets are bridges and dams, the remaining five represent a diverse portfolio of land and marine assets such as the Esquimalt Graving Dock and are not included in the scope of this audit.
- xi. Since 2007, numerous inspections have been conducted for each of the bridges and dams. However, we found that the documentation of management decisions to make alterations to this inspection regime when they are justified and documentation to demonstrate oversight over inspections should be strengthened. It is important that the Department demonstrate its due diligence through proper documentation to illustrate that it has followed its portfolio management principles and that inspections of bridges and dams are conducted in accordance with the Real Property Branch policies and procedures.

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

- xii. A table summarizing our assessment of progress in implementing previous recommendations is presented in Appendix B.

Management Response

The Real Property Branch is in agreement with the recommendations in this report and will work with the appropriate stakeholders to implement actions in a timely manner.

Recommendations and Management Action Plan

Recommendation 1: The Assistant Deputy Minister, Real Property Branch, should periodically reassess the national strategy for divestiture and/or long-term stewardship and continue to pursue the stable incremental capital funding required to implement the strategy.

Management Action 1.1: Engineering Assets Strategy Sector will periodically reassess the national strategy for divestiture and/or long-term stewardship and will continue with the implementation of divestiture plans and strategies. This will include, among other initiatives, continued negotiations with the National Capital Commission for the custodial transfer of three bridge crossings in the National Capital Region. Divestiture for many of the assets will continue to pose major challenges, and strategies will continue to be developed and refined to make progress in this respect.

For those assets which continue to be the responsibility of Public Works and Government Services Canada they will be managed in accordance with Treasury Board asset management policies with divestiture opportunities pursued as they arise.

Management Action 1.2: Engineering Assets Strategy Sector will continue to pursue the stable incremental capital funding required to implement the strategy.

On October 4, 2011, the Government approved an additional \$248M in funding for engineering assets as a result of PWGSC's representations.

Recommendation 2: The Assistant Deputy Minister, Real Property Branch should strengthen documentation related to the oversight of inspections and ensure that the justification and approval to alter inspection regimes are properly documented.

Management Action 2.1: The National Centre of Expertise (NCOE), Professional and Technical Services Management Sector, will develop and maintain a monitoring spreadsheet listing each asset. The spreadsheet will list the inspections required for each asset in the current fiscal year and projected bridge and dam inspections in future years. The Engineering Assets Strategy Sector in consultation with the regions will submit a list of inspections planned for the

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

fiscal year to the Professional and Technical Services Management Sector. The Professional and Technical Services Management Sector will ensure that the planned inspections submitted, are in accordance with their list and any discrepancies are mutually resolved.

Management Action 2.2: The approval of the Director General of the Professional and Technical Service Management Sector and the Director General of the Engineering Assets Strategy Sector will be required for any change to the inspection regime of an asset.

The Engineering Assets Strategy Sector and the Professional and Technical Service Management Sector have revised the risk assessment procedure to ensure future changes are documented and approved on a timely basis.

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

INTRODUCTION

1. This follow-up audit was approved as part of the 2010-2015 Risk-Based Multi-Year Audit and Evaluation Plan.
2. Public Works and Government Services Canada (PWGSC) is responsible for managing federal office accommodation and a number of non-office federal real property holdings, including engineering assets such as bridges and dams. The Minister's mandate includes managing and maintaining federal real property in a proper fashion and advising the public on safe access to such property. The *Bridges Act*, 1985, states that the Minister is directly responsible for the administration, including the responsibility to perform inspections and examinations, of bridges identified in the Act. The Minister is also responsible for dams under the *Act Respecting Certain Works on the Ottawa River* and the *Department of Public Works and Government Services Act*.
3. Historically, PWGSC has constructed a number of engineering assets on behalf of the Government of Canada, which are not directly related to its program responsibility of providing office accommodation for federal public servants. Over the years, a number of engineering assets have been transferred to PWGSC. As custodian, the Department has been responsible for the stewardship of these assets.
4. In the mid-1980s, the Nielsen Task Force on Program Review directed federal government departments to divest land, marine and transportation assets that were no longer required for program purposes. Under this direction, PWGSC divested itself of half of its original inventory of major engineering assets. PWGSC is currently the custodian of 20 remaining engineering assets, including 15 major engineering assets that meet the definition of bridges or dams to be preserved under the Real Property Branch *Bridge Inspection and Evaluation Policy* and the Real Property Branch *Dam Inspection and Evaluation Policy*. While the remaining assets are being inspected and maintained, they are difficult to divest due to a variety of reasons including:
 - Age – the engineering assets range from 50 to almost 100 years old, and some are nearing the end of their useful service life; many of the assets do not meet current standards and are functionally deficient as the design life on these structures when originally built was 50 years, reflecting the standards of the time;
 - Condition – while urgent issues are being dealt with, many assets require additional capital investments in the near future;
 - Maintenance – the assets present an ongoing financial burden, including periodic needs for major capital upgrades and rehabilitation;
 - Lack of revenue opportunities – there are few opportunities to generate substantive revenues with these assets (unless tolling is introduced);
 - Other issues – the assets present challenges in areas such as real estate, legal and environmental issues which complicate divestiture discussions.

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

5. Third-party assessments of the engineering assets portfolio completed in 2007 indicated that several assets require urgent repairs/upgrades to avoid structural or equipment failure. Some of the assets are important parts of regional and provincial infrastructure, serving thousands of Canadians daily, and providing substantial local and regional benefits. Although they no longer serve federal program purposes, the *PWGSC Act* requires that these assets be responsibly maintained.
6. In January 2007, the Engineering Assets Strategy Sector was created within the Real Property Branch. This Sector provides the direction and focus required to develop and implement a comprehensive strategy to ensure effective stewardship of PWGSC's engineering assets portfolio. Before the Sector was established, the assets were managed in each region on an ad-hoc basis.
7. As part of its mandate, the Sector is responsible for discharging the Owner/Investor portfolio management role for the Engineering Assets Portfolio. This includes, amongst other things, accountability for developing a portfolio investment plan, as well as a comprehensive stewardship plan for each asset. In the past, some funding was provided through Program Integrity; however, this source of funding sunset in 2007-08 and no stable source of long-term recapitalization funding was established for the engineering assets. In 2008, PWGSC received approval to develop a program of work to bring the portfolio of engineering assets to a standard of good stewardship and was directed to present it to the Government in 2011. Until further direction is received from the Government in 2011, the Engineering Assets Strategy Sector is operating as an interim organization tasked with developing a comprehensive strategy and implementing urgent recapitalization projects for high-risk structures.
8. Over the last 10 years, PWGSC has conducted several audits concerning bridges and dams. In 1999, the Audit of the Safety of Bridges found that while PWGSC adhered to the legislative framework in place, there were gaps and weaknesses in the management control framework, such as a more stringent requirement for underwater inspections, load evaluations and maintenance standards. A management action plan was prepared by PWGSC to address these shortcomings by 2000. A follow-up audit conducted in 2001, reported that management actions from a 1999 audit had not been fully implemented. Additional follow-up work conducted in 2006 confirmed that the status of a number of the original 1999 actions could not be fully validated. As a result, the Audit of Management Practices of PWGSC Bridges and Dams Used as Bridges was conducted in 2007. This audit found that while some progress had been made to improve management practices over PWGSC-owned bridges and dams, there were several areas that required further attention. In light of these findings, the Office of Audit and Evaluation conducted a follow-up audit of the management practices related to bridges and dams under PWGSC's control. The results of this follow-up audit are presented in this report.

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

FOCUS OF THE AUDIT

9. The objectives of this follow-up audit were to determine whether:
- The management practices related to bridges and dams are adequate to ensure that Public Works and Government Services Canada's responsibilities under relevant authorities are discharged; and
 - Management actions from the Audit of Management Practices of PWGSC Bridges and Dams Used as Bridges (December 2007) have been effectively implemented and are achieving the desired result, or that senior management has accepted the risk of not taking action.
10. The follow-up audit focused on the management actions taken to address the recommendations from the 2007 Audit of the Management Practices of PWGSC Bridges and Dams Used as Bridges. It also included an examination of management practices for the period of August 2007 to February 28, 2011. The audit focused on key elements of the management control framework that support these management practices including governance, roles and responsibilities, policies, risk management, strategic planning, and monitoring. The audit was conducted from November 2010 to February 2011.
11. The follow-up audit was not designed to assess the condition or safety of bridges and dams, nor to assess whether inspections were conducted in accordance with all elements of the *Bridge Inspection* and *Dam Inspection Manuals*. Rather the follow-up audit was designed to examine the management practices to support the discharge of responsibilities under relevant authorities. We examined documentation, such as strategic plans, policies, procedures and manuals to assess whether a sound management framework existed. We also spoke with key stakeholders within the Engineering Assets Strategy Sector and the Professional and Technical Services Management Sector.
12. More information on the objective, scope, approach and criteria can be found in the section "About the Audit" at the end of this report.

STATEMENT OF ASSURANCE

13. This follow-up audit was conducted in accordance with the Institute of Internal Auditors' *International Standards for the Professional Practice of Internal Auditing*.
14. Sufficient and appropriate audit procedures have been conducted and evidence gathered to support the accuracy of the findings and conclusions in this report and to provide an audit level of assurance. The findings and conclusions are based on a comparison of the conditions, as they existed at the time, against pre-established audit criteria that were agreed on with management. The findings and conclusions are only applicable to the entity examined and for the scope and time period covered by the audit.

OBSERVATIONS

MANAGEMENT CONTROL FRAMEWORK

15. Control frameworks are tools that help management to oversee operations. An effective control framework incorporates controls that are appropriate for the benefits and risks of a given activity. This framework should consist of interrelated components including: an effective governance structure with assigned roles and responsibilities; documented policies and procedures; integrated risk management; risk-based strategic plans; and monitoring. The control framework for engineering assets should utilize these components to allow the prevention and detection of problems, reduce the risks that engineering assets are not maintained as required, and ensure that corrective actions are taken.

An overall governance framework has been established.

16. Governance is the combination of processes and structures implemented by management to inform, direct, manage, and monitor the activities of the department towards effective strategic direction, operational plans, support to the Minister and Parliament, and the delivery of results. When properly executed, organizations are better able to achieve their objective through effective decision-making based on clear strategic direction. Proper governance is essential to achieving the Engineering Assets Strategy Sector's objective and mandate.
17. In 2007, we found that the management of engineering assets was undergoing change. The Engineering Assets Strategy Sector was in its infancy and there was no management accountability framework in place. It was unclear how the shared accountabilities for engineering assets between headquarters and the regions would be decided and put in place. We also found that Memoranda of Understanding between National Headquarters and the Regions for bridges and dams existed; however, they did not always assign appropriate accountability for all roles and responsibilities. As a result, some important responsibilities were not assigned and the sharing of responsibilities between National Headquarters and the Regions was not always clearly defined.
18. During this follow-up audit, we expected to find a well-developed governance framework, with assigned accountabilities and responsibilities, for managing engineering assets to allow the Department to achieve its divestiture and stewardship objectives through effective decision-making based on clear strategic direction.



Exhibit 1 - Lower Liard River Bridge, Alaska
Highway, British Columbia

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

19. We found that the Real Property Branch has created a sound governance framework for engineering assets, which is aligned with the greater Real Property Branch governance framework and Corporate Real Estate Model. As part of the governance framework, the Engineering Assets Strategy Sector is accountable, as owner and investor, for all engineering assets, including bridges and dams. As such, the Sector is the approval body for all financial and strategic decisions (up to \$10 million) regarding engineering assets. The responsibility for operating and maintaining these assets is shared with the regions. Annual work plans are negotiated between the Sector and Regional Offices. The Regions are responsible for providing technical resources and operational expertise to meet annual work plans, schedules, and project delivery requirements. The Professional and Technical Services Management Sector, Real Property Branch, provides professional advice and guidance to the Engineering Asset Strategy Sector and the Regions when required.
20. We found that the accountability, and roles and responsibilities for engineering assets are defined in formal Memoranda of Understanding (MOU). The MOUs are based on a template which helps ensure consistent application of roles and responsibilities for all internal stakeholders. Modifications were made to the template when the roles and responsibilities between key stakeholders required further clarification.
21. We also found that these MOUs are supposed to be completed on an annual basis between the Engineering Assets Strategy Sector and key stakeholders which include: the Regions, the Professional and Technical Services Management Sector, and the Major Crown Projects Sector. However, we found that MOUs were not always established with all stakeholders. Prior to the 2008 Government direction to develop the portfolio-based strategy, MOUs were not used. After funding was received, MOUs were prepared in 2009-2010 for all stakeholders except for the Quebec and Atlantic Regions. This was attributed to the fact that these two regions were only managing one asset each in comparison with the other regions who managed several assets. While MOUs were prepared with all stakeholders in 2010-2011, the majority were not signed by the responsible Directors General and/or Regional Directors General until the third quarter of the fiscal year. These documents are based on a template and thus the majority of the roles and responsibilities do not change from year to year; however the MOUs are meant to outline the agreed to annual work plan for each fiscal year. Consequently, the parties operated most of the year without a formal agreement in place. However, the annual work plan for each region was reviewed on a monthly basis by the Engineering Assets Strategy Sector and the responsible region.
22. Consistent, complete, and timely agreements regarding roles and responsibilities help ensure appropriate accountability and communicate important responsibilities. This is of particular importance in situations where those that are responsible for actions, in this case the Regions, are different from those who are accountable for those actions, in this case National Headquarters.

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

A sound policy framework, complete with supporting guidance, is available.

23. Policies inform and guide daily practice and ensure that employees are aware of their roles and responsibilities. Additional supporting guidance, such as procedure manuals, helps ensure that activities are carried out in a consistent, timely and appropriate manner.
24. In 2007, we found that the Real Property Branch had developed a *Bridge Inspection and Evaluation Policy* (May 2001). We also found that it had developed a *Dam Inspection and Evaluation Policy* (2004) and an *Engineering Asset Management Policy* (2006); however, they were both in draft form. As well, we found that a *Bridge Inspection Manual* to guide the inspection activities in the regions existed but that the draft *Dam Inspection Manual* was not available in both official languages.
25. During this follow-up audit, we expected there would be complete, specific and properly documented policies and procedures that had been approved and communicated. We found that the Real Property Branch updated its engineering asset policy suite to the appropriate industry standards. All guidance documents are available in both official languages and were disseminated to the appropriate stakeholders within the Department.

Condition of the inventory is known, but divestiture and funding remain a challenge.

The current condition of the inventory is known.

26. Accurate, complete and timely information on the age, condition, costs and location of the Department's bridge and dam inventory helps to ensure that the Department can properly discharge its mandated responsibilities related to all bridges and dams for which it is responsible.
27. In 2007, we found that there was no single reliable mechanism to identify the inventory of engineering assets because there was more than one source of information and the various sources were not cross-referenced to each other. A master inventory database of bridge and dam information was being developed at the conclusion of the 2007 audit.
28. During this follow-up audit, we expected that the Department would have addressed the 2007 audit findings and have a central inventory of all bridges and dams for which it is the custodian.
29. We found that both the Engineering Assets Strategy and the Professional and Technical Services Management sectors have developed and are maintaining a centralized inventory for all engineering assets, including bridges and dams, for which PWGSC is the custodian.
30. In addition, the Sector received \$26.9 million over four years, starting in 2008-2009, to conduct portfolio studies and analyses to assess the current condition of the engineering

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

assets. With this funding, the Sector conducted 221 studies and analyses, which include, but are not limited to, condition reports, feasibility studies, public-private partnership (P3) studies, heritage studies, and individual Engineering Asset Management Plans. Combined, these studies identify the current condition of the engineering assets and support the development of comprehensive portfolio-based strategies related to the potential divestiture and possible long-term stewardship of the Department's inventory of engineering assets.

The Department continues to face challenges in fulfilling its divestiture mandate.

31. There is a longstanding Government direction for the Department to divest itself of assets no longer required for program purposes, including bridges and dams. Initially, the Department successfully divested some of its attractive engineering assets, such as the rebuilt Perley Bridge in the National Capital Area in 1999. However, other assets required repairs or repair funding before divestiture could be achieved.
32. In 2007, we found that the Department had limited success in achieving its divestiture mandate over the last 25 years. Although roughly half of the original inventory had been divested, the remaining assets were difficult to divest due to barriers such as: the condition of the assets; costly negotiations; divestiture packages not always seen as advantageous by other jurisdictions; and legal/environmental liabilities inhibiting interest from other levels of government.
33. In 2008, the Government confirmed the divestiture mandate for PWGSC's surplus land and marine assets, including all of the bridges and dams that are included in the scope of this audit. During this follow-up audit, we expected to see continued progress towards fulfilling divestiture of bridge and dam assets. We found, since our 2007 audit, the Department successfully divested the Vieux Port of Montreal and three dams. Nonetheless, it is still the custodian of 20 engineering assets, including 15 major engineering assets that meet the definition of bridges and dams.
34. The Department has documented the many challenges it has and continues to face in divesting the remaining surplus engineering assets including: the age and condition of the assets; the financial burden of maintaining the assets; the lack of appeal the assets have for potential recipients due to a lack of revenue generating opportunities; real estate, legal, and environmental issues; and, in some cases, a lack of logical recipient for the assets. Consequently, the Department is developing, and seeking approval of a strategy and appropriate funding for these assets. The strategy will consider long-term stewardship, and where feasible divestiture.



Exhibit 2 - Vieux Port of Montreal,
Montreal, Quebec

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

The future of stable funding remains uncertain.

35. As the custodian of engineering assets, the Department has a duty to maintain these assets according to health and safety standards. However, as assets age, capital investment becomes increasingly costly and necessary to meet these standards.
36. In 2007, we found that repair and capital funding were uncertain. While the Department believed it had maintained its engineering assets to health and safety standards through regular inspection and repair of identified concerns, its ongoing funding envelope had been restricted to inspecting assets and covering minor repairs.
37. During this follow-up audit, we expected that the Department would have pursued adequate long-term stable funding for the management and rehabilitation of all bridges and dams for which it is the custodian.
38. We found that the Department continues to receive \$13 million annually for the Alaska Highway. In addition, it was successful in obtaining approval for \$193.8 million in short-term capital funding for the portfolio of engineering assets, including bridges and dams. This funding included:

- \$53 million over three years for health and safety recapitalization of urgent high-risk structures in 2008-2009;
- \$40 million from the Accelerated Infrastructure Program for the repair of four PWGSC managed bridges in 2009-2010 and 2010-2011;
- \$12.6 million from the Accelerated Infrastructure Program for the Alaska Highway for repairing eight bridges, resurfacing asphalt, and repairing culverts in 2009-2010 and 2010-2011;
- \$64.6 million from 2007 to 2009 for Laniel Dam and Alexandra Bridge;
- \$12.7 million over three years for Individual Asset Project Development and Design; and
- \$10.9 million from National Investment Strategy funding since 2007-2008.

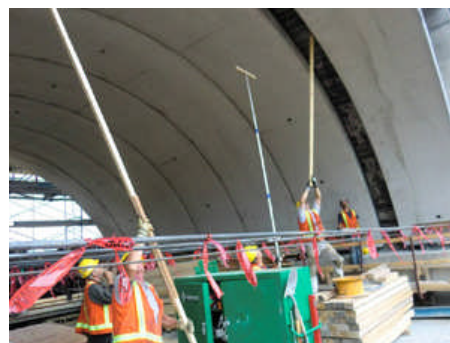


Exhibit 3 - Chaudière Crossing Rehabilitation Project, Ottawa, Ontario

39. This funding allowed the Sector to initiate and/or accelerate urgent projects on all of the bridges and dams that required immediate repairs related to protecting health and safety. As part of the portfolio-based strategy it is developing, the Engineering Assets Strategy Sector is seeking access to significant multi-year funding that will make it possible to implement additional much-needed recapitalization projects. Until the Department is successful in obtaining this funding, the incremental capital funding for engineering assets available to the Department is limited to \$7.4 million in 2011-2012. Access to the required funds would assist in bringing the assets to an acceptable state of repair, and put

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

the Department in a better position to successfully divest itself of the remaining assets or to assume their long-term stewardship.

A rigorous risk management process has been developed.

40. Risk management is a systematic approach to identifying, assessing and managing risks, including the identification and implementation of strategies to mitigate identified risks. These risk strategies are monitored and evaluated to ensure that risks are adequately managed and that any residual risk is acceptable.
41. In 2007, we found that risk assessments were ongoing but incomplete. A preliminary profiling and ranking of risks at the portfolio level had been developed. We also found that a formal risk assessment of individual bridges and dams was in progress.
42. During this follow-up audit, we expected to find that risk assessments were ongoing and complete for the portfolio and for individual bridges and dams.
43. We found that the Sector has developed a rigorous risk management process. Although in previous years, documentation to record decisions and show the participation of all key stakeholders was lacking, the Sector developed the *Engineering Assets Interim Risk Assessment Procedure* and updated its *Risk Code Rules* in August 2010. This has strengthened the risk assessment process by: using a quarterly approach to risk assessments where risks are assessed according to predefined risk drivers; ensuring that appropriate stakeholders with the knowledge and expertise to assess the risks are involved; and documenting decisions. The Sector will continue to follow this procedure in the future or reassess it once direction is received from the Government in 2011.
44. The 2009-2010 fourth quarter risk assessment, which served as the basis of the strategy, was externally validated by an independent third party. The third party reviewed the source documentation used by the Sector such as condition reports, and agreed with the risk ratings the Sector had assigned to each asset.

Strategic planning is ongoing.

45. Strategic planning is an organization's process of defining its strategy, or direction, and making decisions on allocating its resources to pursue this strategy. Every project that an organization undertakes should contribute to its strategic plan. When funding is limited, a project selection and priority system is important to ensure that the selected projects meet established criteria. As such, we expected that the Department allocate its funding to mitigate the highest priority risks.
46. We found that the 2008 Government direction confirmed that the Engineering Assets Strategy Sector must follow portfolio management principles for engineering assets. The principles include: giving priority to rehabilitation projects with a focus on health and safety, including both known challenges and challenges that emerge as additional

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

information becomes available; and focusing on value for money and responsible, financially prudent stewardship, and planning and preparation for divestiture.

47. In accordance with this direction, the Department has identified and assessed challenges, including health and safety issues, associated with each of the engineering assets. To address the identified risk drivers, many of these assets require complex and costly rehabilitation projects.
48. We found that an overall risk level is assigned to each asset during the risk assessment process. The overall risk level determines the priority of the asset and the highest priority is given to assets requiring rehabilitation with a health and safety focus. Bridges meeting this criterion are considered to be high priority, but dams meeting this criterion are given higher priority than bridges because while a bridge can have a load posted or be closed, a dam cannot be closed.
49. For the asset identified as having priority, rehabilitation projects are selected and planned for as part of the annual program of work. This process is conducted annually by the Engineering Assets Strategy Sector in consultation with the regions and key stakeholders and is based on several sources including: regular inspections; condition reports and other studies; individual Engineering Asset Management Plans; and risk assessments. Emerging urgent issues are handled as required on a case-by-case basis.
50. Rehabilitation projects are also planned for as part of the 2011 strategy to be presented to the Government in 2011; which includes prioritization under a limited funding scenario presented as part of the options analysis. An independent third party review, commissioned by the Sector, looked at the 2011 strategy's proposed capital program for each asset and concluded that the projects selected address the currently identified risk drivers and that the schedule for each capital project is logical in terms of timing and priority of the various elements.

Inspections are conducted; however, certain documentation of oversight practices should be strengthened.

51. In the interest of public safety and preservation of the assets, PWGSC bridges and dams are to be inspected to a level of service consistent with accepted industry practices, codes and standards. In order to ensure this, regular and ongoing structural inspections of PWGSC bridges shall be scheduled and undertaken by competent and qualified personnel in accordance with the Real Property Branch *Bridge Inspection and Evaluation Policy, Procedure, and Manual* and the Real Property Branch *Dam Inspection and Evaluation Policy, Procedure, and Manual*. Compliance with these policies helps ensure the adequate discharge of the Department's responsibilities.

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

52. The Real Property Branch *Bridge Inspection and Evaluation Procedure* prescribes the minimum type of inspections required for bridges and their frequency. Each structure of a bridge requires an inspection to be completed at least annually. The annual inspection alternates between a general inspection and a comprehensive inspection; underwater inspections are required at least every four years. The exception to this is movable bridges which require a comprehensive inspection annually. The Real Property Branch *Dam Inspection and Evaluation Procedure* prescribes the minimum type of inspections required for dams and their frequency. Each structure of a dam requires a general inspection annually and a comprehensive inspection, including underwater, every four years.



Exhibit 4 - St. Andrews Lock and Dam, Lockport, Manitoba

53. In accordance with the Real Property Branch *Bridge Inspection and Evaluation Policy* and the Real Property Branch *Dam Inspection and Evaluation Policy*, the Regions are responsible for ensuring that inspections and necessary repairs are conducted. National Headquarters (Engineering Assets Strategy Sector and Professional Technical Services Management Sector) is accountable for ensuring that the inspections conducted by the Regions are completed in compliance with these policies.
54. We expected that all required inspections would be performed at the minimum frequency prescribed by the above mentioned policies and procedures and that compliance to the policies would be monitored by National Headquarters.
55. We found that between 2007 and 2009, 253 inspections were conducted covering each of the 83 structures classified as bridges or dams including: 152 comprehensive inspections; 82 general inspections; and 19 underwater inspections.
56. Between 2007 and 2009, management decisions were made to alter the minimum inspection regime required by the Real Property Branch *Bridge/Dam Inspection and Evaluation Procedure* for 11 inspections. The procedures allow for such exemptions, if their justification is documented and submitted to the Director General, Professional and Technical Services Management Sector who must consult with the Director General, Engineering Assets Management Sector prior to their approval. We found that these decisions were not properly documented at the time they were made.
57. Although the decisions were not properly documented, management explained that they were made because: a major capital project was taking place on the asset or next to the asset (inspections of 6 structures); a major project was being planned on one asset which affected the inspection regime for all assets on the site (inspections of 3 structures); or for practical, financial, or contracting reasons (inspections of 2 structures). For example, in

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

the year that a comprehensive inspection should have been conducted, one asset had a general inspection conducted instead because additional specialized inspections beyond the requirements of a comprehensive inspection were conducted as part of readying the asset for a major capital project. In another example, some underwater inspections were deferred in order to align the inspection schedule because inspections for assets in the same geographic area are contracted in bundles. During this period, only one asset had an annual inspection that was missed in its entirety without explanation; this asset has since been inspected on an annual basis.

58. Because the Real Property Branch has moved towards a portfolio-based management approach for engineering assets, we also expected that there would be oversight tools in place at the National Headquarters level to demonstrate monitoring practices over inspections. We found strong documentation to demonstrate monitoring to ensure that the planned inspections are conducted and reported on; however, we found that documentation to demonstrate oversight of the type and timing of inspections and changes to this regime should be strengthened at the National Headquarters level.
59. Strengthened documentation of management decisions and other oversight practices would help the Department better demonstrate its due diligence in ensuring that during the annual planning process the correct type of inspections are planned for, scheduled, and conducted in compliance with the *Bridge/Dam Inspection and Evaluation Policies and Procedures*.

CONCLUSION

60. The management actions from the Audit of the Management Practices of PWGSC Bridges and Dams Used as Bridges (December 2007) have been effectively implemented. The management practices related to bridges and dams are adequate to ensure that PWGSC's responsibilities under relevant authorities are discharged.
61. We found that an overall governance framework has been established to manage the assets to meet the needs of the organization. Roles and responsibilities are defined and assigned in formal Memorandums of Understanding (MOUs). The governance framework is supported by engineering asset policies, procedures, and manuals that have been updated to appropriate standards and are available, in both official languages, to appropriate stakeholders within the Department.
62. Although the Department has had some success fulfilling its divestiture mandate by transferring three dams and the Vieux Port of Montreal, divestiture of the remaining assets continues to be challenging. The Engineering Assets Strategy Sector has developed a comprehensive portfolio-based strategy related to the potential divestiture and long term stewardship of the Department's inventory of engineering assets. To assess the current condition of the portfolio, the Sector has developed a rigorous risk management process and conducted 221 portfolio studies and analyses, which include Engineering Asset Management Plans for each bridge and dam engineering asset. These

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

studies support the ongoing strategic planning and the prioritization of assets. This strategy will be presented to the Government in 2011; however, until this happens the future of stable incremental capital funding remains uncertain.

63. Finally, while we found inspections are being conducted, we found that certain documentation of management decisions and inspection oversight should be strengthened. Properly documented oversight and decisions would help the Department further demonstrate due diligence and that it has followed its portfolio management principles.

MANAGEMENT RESPONSE

The Real Property Branch is in agreement with the recommendations in this report and will work with the appropriate stakeholders to implement actions in a timely manner.

RECOMMENDATIONS AND MANAGEMENT ACTION PLAN

Recommendation 1: The Assistant Deputy Minister, Real Property Branch, should periodically reassess the national strategy for divestiture and/or long-term stewardship and continue to pursue the stable incremental capital funding required to implement the strategy.

Management Action 1.1: Engineering Assets Strategy Sector will periodically reassess the national strategy for divestiture and/or long-term stewardship and will continue with the implementation of divestiture plans and strategies. This will include, among other initiatives, continued negotiations with the National Capital Commission for the custodial transfer of three bridge crossings in the National Capital Region. Divestiture for many of the assets will continue to pose major challenges, and strategies will continue to be developed and refined to make progress in this respect.

For those assets which continue to be the responsibility of Public Works and Government Services Canada they will be managed in accordance with Treasury Board asset management policies with divestiture opportunities pursued as they arise.

Management Action 1.2: Engineering Assets Strategy Sector will continue to pursue the stable incremental capital funding required to implement the strategy.

On October 4, 2011, the Government approved an additional \$248M in funding for engineering assets as a result of PWGSC's representations.

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

Recommendation 2:

The Assistant Deputy Minister, Real Property Branch should strengthen documentation related to the oversight of inspections and ensure that the justification and approval to alter inspection regimes are properly documented.

Management Action 2.1: The National Centre of Expertise (NCOE), Professional and Technical Services Management Sector, will develop and maintain a monitoring spreadsheet listing each asset. The spreadsheet will list the inspections required for each asset in the current fiscal year and projected bridge and dam inspections in future years. The Engineering Assets Strategy Sector in consultation with the regions will submit a list of inspections planned for the fiscal year to the Professional and Technical Services Management Sector. The Professional and Technical Services Management Sector will ensure that the planned inspections submitted, are in accordance with their list and any discrepancies are mutually resolved.

Management Action 2.2: The approval of the Director General of the Professional and Technical Service Management Sector and the Director General of the Engineering Assets Strategy Sector will be required for any change to the inspection regime of an asset.

The Engineering Assets Strategy Sector and the Professional and Technical Service Management Sector have revised the risk assessment procedure to ensure future changes are documented and approved on a timely basis.

ABOUT THE AUDIT

Authority

This follow-up audit was approved by the Audit and Evaluation Committee of Public Works and Government Services Canada as part of the 2010-2011 to 2014-2015 Risk-Based Audit and Evaluation Plan.

Objectives

To determine whether:

- The management practices related to bridges and dams are adequate to ensure that PWGSC's responsibilities under relevant authorities are discharged; and
- Management actions from the Audit of the Management Practices of PWGSC Bridges and Dams Used as Bridges (December 2007) have been effectively implemented and are achieving the desired result, or that senior management has accepted the risk of not taking action.

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

Scope and Approach

This follow-up audit was conducted from November 2010 to March 2011. It examined the management practices related to PWGSC bridge and dam engineering assets from fiscal year 2008-2009 to 2010-2011.

The follow-up audit involved the Real Property Branch and covered the management practices related to the inventory of engineering assets to be preserved under the Real Property Branch *Bridge Inspection and Evaluation Policy* and *Dam Inspection and Evaluation Policy* that totals 83 structures, including:

- Fifty-six bridges along the British Columbia portion of the Alaska Highway;
- One bridge between Campbellton, New Brunswick and Pointe-à-la-Croix, Quebec;
- One bridge in Lockport, Manitoba;
- One railway bridge in New Westminster, British Columbia;
- Twelve bridges on the Ottawa River between Ontario and Quebec;
- Three bridges in Kingston, Ontario;
- One bridge in Burlington, Ontario;
- One bridge on the Portage Channel at French River, Ontario;
- One lock and dam in Lockport, Manitoba; and
- Six dams in Ontario and Quebec.

The portfolio of engineering assets includes an additional five major engineering assets that do not meet the definition of a bridge or dam, such as the Esquimalt Graving Dock, and less than 100 wharves. These assets were not included in the scope of this audit.

Note: One dam in Quebec was divested during the conduct of our follow-up audit (Laniel Dam to the Province of Quebec). Eighty-three structures remain in the Department's portfolio.

This audit was not designed to assess the condition or safety of bridges and dams used as bridges, nor to assess whether inspections were conducted in accordance with all elements of the *Bridge Inspection and Dam Inspection Manuals*. Rather the follow-up audit was designed to examine the management practices to support the discharge of responsibilities under relevant authorities.

This audit was conducted in accordance with the Institute of Internal Auditors' *International Standards for the Professional Practice of Internal Auditing*.

Criteria

The criteria, accepted by the Real Property Branch, were as follows:

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

Audit Objective 1: To determine whether the management practices related to bridges and dams are adequate to ensure that PWGSC's responsibilities under relevant authorities are discharged.

- 1.1 A sound governance framework is in place to manage the assets to meet the needs of the organization.
- 1.2 Roles and responsibilities are clearly defined, assigned and communicated to all parties.
- 1.3 Policies and procedures are available, complete, specific, and properly documented.
- 1.4 A risk management process is in place and is adequate to support program managers in the achievement of program results.
- 1.5 Strategic plans providing resource allocation, which consider priorities and risk, are developed, promulgated, understood, monitored and complied with.
- 1.6 Monitoring practices and controls are adequate to ensure compliance with selected elements of policies and procedures related to engineering assets. Information resulting from monitoring practices is sufficient, appropriate, and consistent.

Audit Objective 2: To determine whether management actions from the Audit of the Management Practices of PWGSC Bridges and Dams Used as Bridges (December 2007) have been effectively implemented and are achieving the desired result, or that senior management has accepted the risk of not taking action.

- 2.1 A national strategy for divestiture or retention has been developed and implemented, and necessary funding for bridge and dam engineering assets has been pursued.
- 2.2 National roles and responsibilities for the stewardship and asset management of bridge and dam engineering assets have been clarified and adequate monitoring to ensure roles and responsibilities are adequately discharged has been ensured.
- 2.3 A single inventory of bridge and dam engineering assets exists and Engineering Asset Management Plans have been developed for each bridge and dam engineering asset.
- 2.4 Appropriate procedures exist, are approved, and communicated.

Audit Work Completed

Audit fieldwork for this audit was substantially completed on February 28, 2011.

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

Audit Team

The audit was conducted by members of the Office of Audit and Evaluation and an audit consultant, overseen by the Director Internal Audit and under the overall direction of the Deputy Chief Oversight Officer.

The audit was reviewed by the quality assessment function of the Office of Audit and Evaluation.

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**









Appendix A – Inventory of Bridge and Dam Engineering Assets


Major Asset	Region Where Asset is Located	Name of Major Asset	Number of Structures
1	Atlantic Region	JC VanHorne Bridge	1
2	National Capital Region	Alexandra Bridge	1
3	National Capital Region	Chaudiere Crossing	8
4	National Capital Region	Des Allumettes Bridge	1
5	National Capital Region	Des Joachims Bridge	1
6	National Capital Region	Macdonald-Cartier Bridge	1
7	National Capital Region	Latchford Dam	1
8	National Capital Region	Rideau Falls Dams	1
9	National Capital Region	Timiscaming Dams	1
10	Ontario Region	Burlington Lift Bridge	1
11	Ontario Region	LaSalle Causeway	3
12	Ontario Region	French River Dam Complex	4
13	Pacific Region	New Westminster Railway Bridge	1
14	Pacific Region	Alaska Highway	56
15	Western Region	St. Andrews Lock & Dam	2
Total Number of Structures			83


Since our last audit, PWGSC has not constructed or acquired any new structures or major engineering assets. When the Department's policies were updated to current industry standards, the definition of "bridge" changed from a span greater than eight metres to a span greater than three metres. The reduction in metres resulted in a greater number of structures being defined as bridges, thereby increasing the number of structures from 50 to 83.


**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

Appendix B – Assessment of progress in implementing previous recommendations

Recommendation	2007 Progress	2010 Progress
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 should be approved and promulgated.	 Satisfactory progress. The Real Property Branch has finalized and distributed a <i>Bridge Inspection and Evaluation Policy</i> supported by a <i>Bridge Inspection Manual</i> and has a draft <i>Dam Inspection and Evaluation Policy</i> and <i>Engineering Asset Management Policy</i> .	 Significantly addressed. The Real Property Branch has finalized and distributed a <i>Bridge Inspection and Evaluation Policy</i> , <i>Dam Inspection and Evaluation Policy</i> , and <i>Engineering Asset Management Plan Policy</i> . These policies are supported by procedures and manuals.
Responsibilities are to be clarified so that there is a clear understanding amongst all personnel involved as to their respective responsibilities.	 Some progress. The Real Property Branch has made efforts to establish roles and responsibilities in regional memoranda. However, the responsibilities between headquarters and the Region still need to be enhanced.	 Satisfactory progress. The Real Property Branch has established a governance framework for engineering assets that is aligned with the greater Real Property Branch governance framework. However, Memoranda of Understanding were not signed with 2 of the 6 regions for fiscal year 2009-2010; these 2 regions were only managing one structure each (1 bridge and 1 wharf) in comparison with the other 4 regions which managed 82 structures (75 bridges and 7 dams) altogether. In addition, the Memoranda of Understanding were not always signed in a timely manner.
Planning should take a longer-term focus and the inspection process should better support it.	 Some progress. The Real Property Branch ensured short-term inspection funding was in place. Management was unable to meet long-term planning needs. For example, Asset Management Plans and the Memorandum to Cabinet have not yet been completed, even though both were to be completed in 2005-06, as per the Business Plan.	 Satisfactory progress. The Real Property Branch has completed numerous studies and analyses, including individual Engineering Asset Management Plans, to assess the current condition of the engineering assets. These studies and analyses support the Department's portfolio-based strategy that will be presented to the Government in 2011.
The Assistant Deputy Minister, Real Property Branch should ensure there is ongoing monitoring and periodic reporting to senior management on the status of the bridges and the practices followed.	 Some progress. The Real Property Branch provided Annual Summary Bridge Inspection reports to its management team. However, the responsibilities for monitoring due diligence and compliance do not appear adequately established as recommended in June 2001 Follow-up Audit of the Safety of Bridges.	 Satisfactory progress. The Real Property Branch has developed Annual Summary Bridge Inspection reports which are provided to key engineering assets stakeholders. However, further strengthening of certain documentation to demonstrate compliance to the minimum inspection regime and the approval of decisions to make alterations to it is required.

 **Significantly addressed.** Most of the original significant audit findings have been fully addressed.

 **Satisfactory progress.** Substantial progress has been made in addressing the original audit findings, but some additional action is still required.

 **Some progress.** Some progress has been made in addressing the original audit findings, but considerable additional action is still required to achieve the desired results.

**2010-711 Follow-up Audit of the Management Practices of
PWGSC Bridges and Dams
Final Report**

○ **Unsatisfactory progress.** Progress has not been made in addressing the original audit findings, and action remains outstanding.