



Final Report

Audit of the Management of Engineering Assets

Office of the Chief Audit Executive



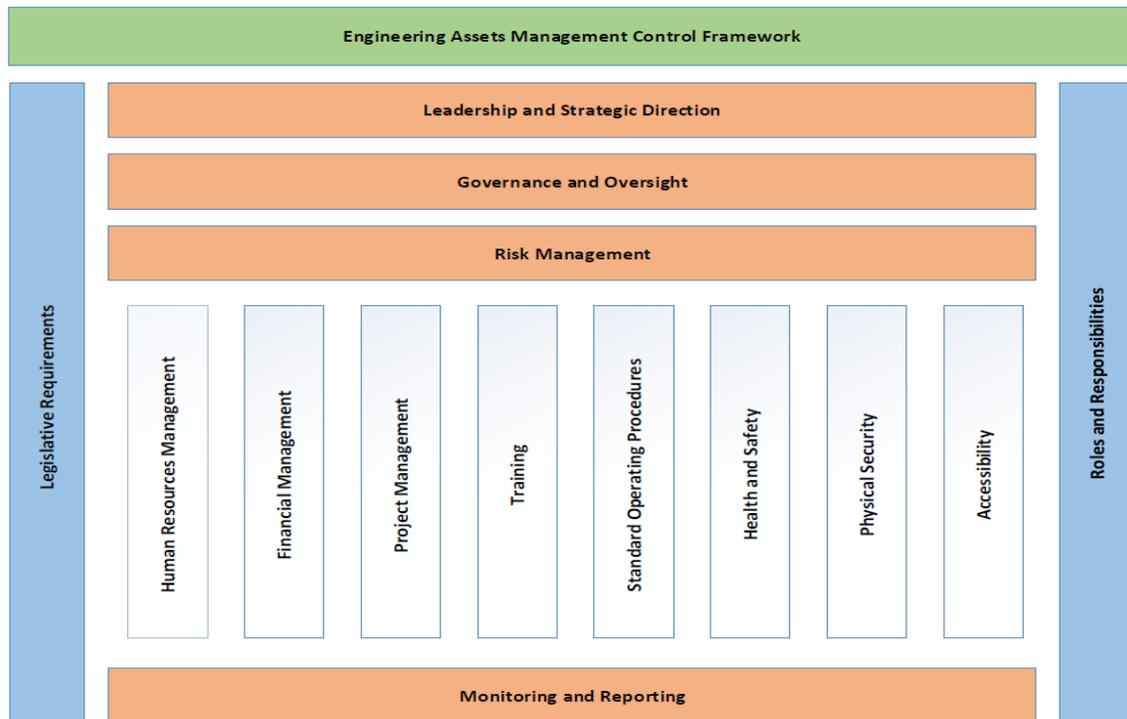
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Introduction

1. This engagement was included in the Public Services and Procurement Canada (PSPC) 2018-2021 Risk-Based Audit and Evaluation Plan, approved by the Departmental Audit Committee on June 12, 2018.
2. PSPC's engineering assets portfolio is comprised of 17 engineering assets – nine bridges, five dams, one wharf, the Esquimalt Graving Dock, and the Alaska Highway. These assets vary in their size, age, usage, and physical condition. The Deputy Minister at PSPC has delegated the Real Property Services (RPS) with the responsibility of managing Crown-owned engineering assets. The Infrastructure Asset Management (IAM) sector, within RPS, is responsible for the stewardship of the engineering assets portfolio, located across Canada. A list of assets is included at Appendix A. The asset condition assessment results are included at Appendix B.
3. In October 2017, responsibility for the management of all of the department's engineering assets was transferred from the regions to the IAM sector, moving the portfolio from a largely decentralized management approach to one of centralization. The IAM sector now has primary responsibility for the strategic direction of the portfolio, as well as, the financial, operational and human resource management of all assets within the portfolio.
4. Governance and oversight over the portfolio is provided by Executive Committee, Strategic Operations Committee, Departmental and Branch Investment Management Boards (IMB), National Operations Committee and the Real Property Governance Committee.
5. Currently, the engineering asset portfolio has a market value of \$5.02B. Funding for the portfolio is provided in two streams. The first stream is the operating and utilities budget which provides asset managers with funds to manage the day to day operations of their asset. This includes regular maintenance and repair work. The second stream of funding is for capital projects and is typically provided through federal government program spending. For example the *2016 Federal Budget, Accelerated Federal Infrastructure Investments*, provided the engineering asset portfolio with almost \$249M, to be spent over five years, to improve the physical infrastructure of its engineering assets. More recently, the *2019 Federal Budget* expects that the Government of Canada will invest more than \$16B per year on physical infrastructure for all capital assets, over the next nine years.
6. For the 2018/19 fiscal year, the portfolio was allocated an operating and utilities budget of \$46.3M, and \$129M for minor and major capital projects. At the time of reporting, the engineering asset portfolio had approximately 127 operational and administrative full-time employees (FTEs).
7. Since assuming responsibility for the engineering assets portfolio in 2017, the IAM has developed the Engineering Assets Control Framework, which is identified at Exhibit 1.

Exhibit 1: Engineering Asset Management Control Framework



Conclusion & Recommendations

8. The audit found there is a comprehensive inspection and remediation regime in place that mitigates many of the potential risks related to the structural integrity of the assets. Further, the recent centralization of the engineering asset portfolio has allowed the Department to establish a consistent, nation-wide control framework for the management of these assets. Through a single point of accountability, IAM is better positioned to review processes holistically across the portfolio and to seek opportunities for improvement,
9. However, this framework is early in its implementation, and control gaps at both the strategic and operational levels were observed. At the strategic level, we identified gaps related to senior executive oversight, monitoring and reporting, as well as, financial and human resource management. These gaps appeared to stem from a lack of clarity pertaining to the overall strategic direction/vision of the portfolio. At the operational level, issues related to standard operating procedures, training, health and safety and physical security were observed, creating unmitigated risks to both employee and public safety.
10. Resulting from these observations, four audit recommendations were developed for management action. Specifically, the Assistant Deputy Minister of RPS should 1) ensure the strategic direction for the engineering asset portfolio is clearly defined, communicated, implemented and approved by required executive bodies 2) develop a process for prioritizing capital project investments and monitoring and reporting on performance; as well as, a human resource strategy; 3) strengthen controls related to managerial oversight and tracking of a) specialized training requirements and operational employee completion, and b) completeness and accuracy of standard operating procedures and 4) in consultation with interdepartmental stakeholders, such as the regions and the Departmental Oversight Branch, should ensure that roles and

responsibilities related to health and safety and physical security are clearly defined, understood and appropriately implemented.

11. Please see the section, *Management Response*, for further details regarding the audit recommendations and management action plan.

Focus of the audit

12. The objective of this audit was to assess whether a management control framework¹ was in place to allow for the appropriate management of the Department's engineering assets. The audit scope period was from November 1, 2016 to December 31, 2018. More information on the audit objective, scope, approach and criteria can be found in the section "About the Audit" at the end of the report.
13. An audit of the management control framework for the Department's engineering asset portfolio was considered important due to the very public nature of these assets. Ensuring that appropriate controls are in place for the security, health and safety of the employees working at these assets, and the public using them, should be of the utmost importance to the Department. Additionally, assessing controls around sound stewardship was also considered to be important, particularly given the federal government's continued commitment to investing in this infrastructure. This financial commitment is as evidenced by the *2016 Federal Budget, Accelerated Federal Infrastructure Investments*, which provided the engineering asset portfolio with almost \$249M, to be spent over five years, and more recently the *2019 Federal Budget* which expects that the Government of Canada will invest more than \$16B per year on physical infrastructure for all capital assets, over the next nine years.
14. The findings from this audit are important because they suggest that while a management control framework for the Department's engineering asset portfolio has been established, it is still evolving, until the implementation of this framework has reached a steady state, strong and consistent senior executive oversight of portfolio is required to mitigate some of the significant risks related to security, health, safety, and stewardship, identified in this report.

Statement of conformance

15. The audit conforms with the Internal Auditing Standards for the Government of Canada, as supported by the results of the quality assurance and improvement program.
16. 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 upon with management. The findings and conclusion are only applicable to the entity examined and for the scope and time period covered by the audit.

¹ Please see above for the engineering assets management control framework

Observations

17. Audit observations are developed through a process of comparing criteria (the correct state) with condition (the current state). The following observations may note satisfactory performance, where the condition meets the criteria, or they may note areas for improvement, where there was a difference between the condition and the criteria.

Overview of the engineering asset portfolio

18. The Department's engineering asset portfolio is comprised of 17 engineering assets located across Canada - nine crossings (such as bridges), five dams, one wharf, the Esquimalt Graving Dock, and the Alaska Highway. For the 2018/19 fiscal year, the portfolio was allocated an operating and utilities budget of \$46.3M, and \$129M for minor and major capital projects. At the time of reporting, the engineering asset portfolio had approximately 127 operational and administrative full-time employees (FTEs).
19. The Engineering Asset Strategy Sector was formed in 2008, and subsequently integrated into IAM in 2017, moving management of the portfolio from a decentralized model to a centralized model. The objective of centralization was to establish and implement a consistent, nation-wide control framework for the management of these assets. The control framework has been established (as noted in Exhibit 1), and implementation continues. A number of critical activities have been undertaken since centralization, including improved national governance, updating the risk portfolio and capital management plans, and supporting the use of the structures during Canada 150. The sector recognizes implementation is not complete and is engaged in implementation efforts.
20. In 1985, PSPC (formerly PWGSC) was given Ministerial direction to divest/dispose of non-core assets as per the *Neilson Report*². Accordingly, the Department received funding to study its engineering assets; address immediate and critical health and safety issues; and to develop divestiture plans for each asset. In 2011, additional funding was secured to address assets that were classified as Critical Red and Red³ to pursue divestiture of these assets. The additional capital funding was secured to ensure the integrity of the various assets and required that the Department return to Parliament in 2016 to report on the progress of divestiture and funding expenditures. The number of assets within the portfolio has decreased from 35 in 1985 to 17 as of 2019, however, divestiture has proven to be difficult, due to factors such as the remoteness of various assets and a lack of interest from potential buyers (high costs associated with maintaining and repairing these assets). Due to these challenges, in recent years, the Department has moved away from a strategy of divestiture to one of maintenance and stewardship of the assets.

Leadership and strategic direction

21. Strong leadership and clear strategic direction allows an organization to maximize efficiencies and achieve its objectives. Together they provide guidance, and create

² The 1985 Nielson Report recommended that the federal government divest itself of all assets not related to core government functions

³ Critical Red and Red refer to the asset's condition risk rating. Critical Red describes an asset that has a high likelihood and high impact of failure. Red describes an asset that has medium-high likelihood and medium-high impact of failure. For additional context surrounding the assets assigned a "critical red" risk rating refer to Appendix C.

confidence throughout an organization, as employees can work more efficiently with clear objectives and targets. Clarity of purpose, provided through leadership and direction, also allow for improved communication and coordination of efforts by various stakeholders within, and external to, the organization and supports timely decision making around resource allocation and the use of public funds.

22. We expected that PSPC would have a clearly established strategic plan in place for the management of its engineering asset portfolio and that resulting investment decisions would be clearly aligned with this strategy.

The strategic vision for the engineering asset portfolio should be clearly defined

23. Since 2016, the Department has not divested any of its 17 remaining assets. We were informed that divestiture has been a challenge as there is currently no market demand. As a result, the sector has largely moved away from its efforts to divest towards a strategy of stewardship and life cycle management of the department's engineering assets.
24. We found a revised strategy has been drafted, but has not yet been submitted for approval and/or formally endorsed by PSPC senior management.

Decision-making may be difficult in the absence of a strategic direction

25. We observed effective oversight over the capital project spending. For the 2018/2019 fiscal year, the Department allocated \$129M for capital project spending to be used on minor and major capital projects, for a total of 180 planned projects (including sub-projects of larger capital projects). For the audit scope period, we found project approval requests were challenged from a technical and financial perspective, but no questions were raised about how the proposed projects fit into the larger context of the strategy for the stewardship and management of the assets as a portfolio.

Project prioritization

26. Given the relationship between health and safety and project spending, we expected there would be a robust process to ensure projects critical to asset integrity would be prioritized and funded accordingly. Given that the majority of the Department's engineering assets currently have a risk ranking of medium to low risk, with five assets identified as critical red or red⁴, we expected that such prioritization decisions would be required to ensure the appropriate and efficient use of government funds.
27. We found that there is an established process for the high level prioritization of projects which is largely based on engineer recommendations from asset inspection reports. This prioritization exercise is well informed and supported by the strong inspection regime within IAM, a regime that is reflective of the sector's clear focus on ensuring the integrity of the department's assets.
28. However, in enquiring about the process for deciding which non-critical projects should receive residual funding, we found no process exists as funding has not been a limiting factor and all capital projects proposed for funding were approved. We were informed the sector is currently developing a process to inform these decisions.

⁴ See Appendix B for 2018 KPMG Risk Ranking of PSPC Engineering Assets and Appendix C for additional context surrounding the assets assigned a "critical red" risk rating.

29. Additionally, we noted that for the 2017/2018 fiscal year actual project spending was 56% of the budget forecast, with approximately \$90M spent of its \$160M budget. We were informed this was the result of project delays, findings from environmental impact assessments (ex. species at risk), First Nations negotiations and/or significant changes to the scope of the project, which resulted in funds needing to be re-profiled.
30. The Department should take steps to clarify the vision and strategic direction for the engineering asset portfolio. This clarity will provide the sector with the appropriate lens from which to make sound project investment decisions and be the basis for informed discussions regarding the appropriate level of funding for the portfolio.

Governance and oversight

31. Strong governance and oversight allows management to monitor financial and operational performance on an ongoing basis and the degree to which results are aligned with objectives. To fulfill their role, governance and oversight bodies must be provided with timely and accurate information to inform decision making. In the absence of these controls, excessive risk-taking and insufficient identification of issues is more likely, and increases organizational risk.
32. In support of strong governance and oversight for the portfolio, we expected monitoring and reporting processes would be in place to provide senior executive committees with the information required for timely, informed and strategic decision-making.

Senior executive oversight of the portfolio could be strengthened

33. We found no formal reporting requirements to governance and oversight committees or senior management and found limited evidence of monitoring and reporting on the objectives of the portfolio and progression towards meeting these objectives.
34. The sector has begun work developing key performance indicators related to asset integrity, risk and performance. Asset specific indicators are reported to the IAM and Branch level IMBs through IAM sector dashboards and reports. A few examples of these indicators include percentage of bridges with a structural condition rating of fair or higher, dams meeting stability requirements, number of bridge lifts and vehicle usage.
35. In the absence of a formal strategy and formal reporting requirements, it is difficult to assess the completeness and appropriateness of the performance indicators that have been developed for alignment with portfolio objectives and/or to know whether the information being collected is meaningful in support of senior management decision making.

People management

36. In an environment with well-designed controls, employees have the skills necessary to support the achievement of their organizational objectives. More specifically, the organization should have controls in place to support the training and development of staff, and a suitably comprehensive suite of human resources policies and practices aimed at attraction, recruitment, development and retention.
37. We expected that a human resource (HR) strategy would be developed and aligned with the current and future staffing needs of the engineering asset portfolio. We also expected that standard operating procedures and training, including those related to health and safety, would be appropriate and adhered to by operational staff.

A formal human resources strategy should be developed

38. The engineering asset portfolio has approximately 127 FTEs, with 122 employees located at the assets in both operational and administrative positions. Operational positions include, for example, bridge and dam operators, electricians and pump house operators. Some assets, such as the Esquimalt Graving Dock, also have administrative staff onsite, such as finance and training administrators, that provide support to ensure the continuity of operations.
39. We noted that there is a low level of employee turnover and a high degree of pride and work fulfillment amongst staff interviewed. Many employees have over 20 years of service with their assets, with one interviewee having worked at the same asset for over 50 years. Analysis of human resource documents suggest that for several of the assets, loss of critical employees, due to retirement and/or medical leave, is imminent. One asset in particular is likely to lose two thirds of its workforce in the next five years.
40. We were informed that hiring the 'right people' can prove to be difficult given factors such as the remote location of assets and the very specific and technical competencies required for the job. As a result, establishing a ready and available pool of candidates to fill vacant and/or new positions, may be challenging.
41. We noted that the sector does not currently have a formal HR strategy. An HR plan for the portfolio has been developed to address immediate and short term staffing needs.

Operational staff lack access to appropriate operating procedures and training

42. Many of the Department's engineering assets have undergone, or will undergo, significant changes in terms of their technology and machinery. A few examples of such changes include the *Controls, Drives, and Overhead Cables Project* at Burlington Lift Bridge which replaced the drives and controls for the lifting mechanism of the bridge and the *Timiskaming Dam Replacement Project* which will build a new structure approximately 25 meters downstream of the existing dam, and demolish the old structure, which is nearing the end of its serviceable life.
43. We expected that current standard operating procedures (including the potential implications of these changes to employee health and safety) and training would be provided to staff in a timely manner to ensure their understanding of new work processes and requirements and to support the safe operation of the asset.
44. We noted that standard operating procedures were not consistently updated where significant operational changes had occurred. In terms of formal training, we were informed training on new operational changes tend to be 'on the job' and informal. We were also informed this approach does not always meet employees' needs.
45. Lastly, we expected asset managers would put in place quality control activities, such as spot checks, to ensure employees are completing their duties appropriately and in compliance with health and safety requirements. We found this practice was not being consistently performed.

Specialized training

46. Additionally, some operational staff require specialized training and certification specific to their position to be compliant with the legislative requirements of Occupational Health and Safety. For example, crane and bridge operators require Falling from Heights certification and employees working in pump houses require

Working in Confined Spaces certification. For both, recertification must occur every three years.

47. While most of the assets have developed training tracking tools to help them identify employee training requirements and completion, they have not been kept current, with the exception of the Esquimalt Graving Dock. We selected a sample of mandatory training courses (including Health & Safety) and assessed for course completion against a sample of employees from across the portfolio and found that not all of the employees had completed mandatory/refresher operational or Health and Safety training.
48. To ensure the continuity of asset operations, particularly in remote locations where their use is critical for local communities, proactively preparing for and addressing staffing challenges is an important management responsibility. Further, given the realities of an evolving workforce and the significant operational changes that have taken place (and continue to take place) at the assets, ensuring that all employees are provided with the training and tools needed to carry out their responsibilities should be a departmental priority, for it to continue the safe operation of its assets.

Management of asset risks

49. In an environment with well-designed controls, management and staff should have a sound and up-to-date understanding of the internal and external factors that may expose their strategic and operational objectives to risk. Well-managed organizations should have in place and implement practices that allow them to monitor their environment for conditions and/ or changes that may result in risk.
50. Given the nature of work performed at the assets and their public facing nature, we expected the Department would have a fulsome understanding of asset related risks, from the perspective of both employee and public use, and that it would mitigate these risks accordingly.

Health and safety risks may not be sufficiently mitigated

51. As previously noted, control gaps related to health and safety procedures and training completion were identified.
52. Further, we performed health and safety walk-throughs of the assets visited to assess for compliance with Occupational Health and Safety requirements. Some of the standards assessed included monthly inspections of fire extinguishers, locked flammable cabinets, and the availability of life jackets. We found that all requirements were largely respected, however one asset, the Burlington Lift Bridge, was 60% non-compliant.
53. Our physical walkthrough of this asset revealed several issues of non-compliance with these requirements such as uninspected fire extinguishers and first aid kits, expired eye wash stations, tripping hazards in workshops, as well as, out of sight and outdated emergency flotation devices. For the same asset, we also noted significant recommendations from previously completed health and safety inspection reports were left unresolved.
54. We were informed greater clarification regarding roles and responsibilities of IAM vis-a-vis the regions is required to ensure that all parties clearly understand and appropriately implement their health and safety responsibilities given the recent re-organization.

Health evaluations and task hazard profiles

55. Health Canada requires employees operating heavy equipment and machinery, such as those located at the Department's engineering assets, have health evaluations performed, with the frequency dependent on the age of the employees⁵. Exemptions for the evaluations are permissible but must be approved by the Deputy Head, with supporting documentation retained by the Department.
56. We were unable to find evidence that all required health evaluations had been performed and we were informed that many were outstanding. For certain asset types, such as the dam and highway operational staff, we were informed that health evaluations have never been conducted. No documentation, explaining why health evaluations were not required and/or that Deputy Head exemptions had been granted, was available.
57. Further, in order to comply with *Part II of the Canada Labour Code, Occupational Health and Safety*, PSPC has put in place work place hazard prevention programs, as a way to prevent work related injuries and diseases. The program requires the employer to review the hazardous prevention program every three years or when there are changes in work conditions leading to new hazards. The employer must review the task hazard profile with each employee and obtain the employee signoff stating the review has been completed and understood.
58. We were unable to obtain evidence that employees had been made aware of and signed off on the task hazards of their position and several interviews with staff suggest that they may not be aware.
59. To be compliant with legislative requirements and to support the Department's commitment to employee health and safety, controls and oversight related to health and safety requirements should be strengthened.

Physical security threats have not been assessed

60. Given that many of the department's engineering assets are intended for public use, some with high volumes of pedestrian and vehicular traffic, we expected physical security risks would be assessed with appropriate risk mitigation controls in place. We also expected Business Continuity and Emergency Preparedness Plans would be updated and revisited with operational staff.
61. As per departmental requirements, threat risk assessments are to be completed every five years and/or if there are significant changes to the asset. Threat risk assessments analyze for vulnerabilities and recommend physical security controls for the general protection of the asset. Ensuring that these assessments have been completed and are up-to-date is a shared responsibility between IAM, the Departmental Oversight Branch and the Regions. We observed that six of the 17 engineering assets had a 'valid' threat risk assessment, with one asset not having their assessment reviewed in over 15 years.
62. We observed that physical security controls may be lacking, for example, we observed unlocked doors to operating towers (accessible to the public), emergency access key pads being inoperable, and insufficient fencing along waterways.

⁵ Every five years for employees between the ages of 45 to 69 and every two years age for employees between the ages of 70 to 80

63. With the exception of the Esquimalt Graving Dock, we found Business Continuity and Emergency Preparedness Plans had not been updated annually, as per Treasury Board requirements.
64. In the interest of public and employee safety, the Department should ensure that physical security risks and threats have been appropriately assessed and mitigated, and that employees are equipped with the knowledge needed to act appropriately, if a physical security threat were to occur.

Management response

RPS agrees with the findings and recommendations and will implement the action plan below to address the issues.

Strategic direction for the portfolio requires direction from government and our plan is to prepare options based on these future strategic directions for the Engineering Asset portfolio as part of the transition planning, with an eye to seek Cabinet direction/confirmation for the assets early in the mandate.

The audit has helped re-emphasize the importance of up-to-date Standard Operating Procedures and associated training.

Recommendations and management action plan

Recommendation 1: The Assistant Deputy Minister of RPS should ensure the strategic direction for the engineering asset portfolio is clearly defined, communicated, implemented and approved by required executive bodies.

Management Action Plan 1.1: Complete the Engineering Asset (EA) Portfolio Strategy with emphasis on performance and life cycle management taking into consideration options for future strategic directions.

Management Action Plan 1.2: Approve the Portfolio Strategy through a DM Chaired Governance Committee and communicate to Stakeholders.

Recommendation 2: The Assistant Deputy Minister of RPS should develop a process for prioritizing capital project investments and monitoring and reporting on performance; as well as, a human resource strategy that are aligned with the strategic direction of the portfolio.

Management Action Plan 2.1: IAM/EA, will develop a directive to prioritize projects in alignment with the EA Portfolio Strategy, for approval through the PSC.

Management Action Plan 2.2: IAM/EA will provide an annual update through its National Operations Committee on the EA program of work, its performance and how these align with the portfolio strategy.

Management Action Plan 2.3: IAM/EA will, in consultation with HRB, establish an HR plan based on alignment with the EA Strategy and Departmental HR priorities.

Recommendation 3: The Assistant Deputy Minister of RPS should strengthen controls related to managerial oversight and tracking of a) specialized training requirements and operational employee completion, and b) completeness and accuracy of standard operating procedures.

Management Action Plan 3.1: IAM/EA will leverage, in consultation with SPAR, its centralized training program to specifically monitor and track the training of the operators within EA.

Management Action Plan 3.2: Asset Managers will:

- a) Develop a process to ensure SOPs are regularly updated;
- b) Provide training on updated SOPs for operators.
- c) Monitor process and training to ensure SOPs are followed.

Recommendation 4: The Assistant Deputy Minister of RPS, in consultation with interdepartmental stakeholders, such as the regions and the Departmental Oversight Branch, should ensure that roles and responsibilities related to health and safety and physical security are clearly defined, understood and appropriately implemented.

Management Action Plan 4.1: Strengthen existing agreements with the Regions and DOB with a view to validate or re-establish accountabilities on oversight and reporting relating to Occupational Health and Safety and Physical security.

Management Action Plan 4.2: Review and assess the Health Evaluation requirements and implement where applicable.

About the audit

The initial objective of this engagement was to assess the lifecycle management of the department's engineering assets. However, a preliminary risk assessment of the portfolio suggested a sound inspection regime in place, for ensuring the structural integrity of the Department's engineering assets. Therefore, the objective of the audit shifted, to focus on the control framework in place to allow for the appropriate stewardship and management of the portfolio.

The scope period of this audit engagement was from November 1, 2016 to December 31, 2018. It should be noted that the audit scope covers the period of transition, from regional to centralized management of the engineering asset portfolio by the National Capital Region, which took place in October of 2017.

During the Planning and Survey Phase, the following audit activities were performed: interviews with engineering asset management and operational staff; a review of Government of Canada and departmental policies pertinent to the engineering asset portfolio; a review of engineering asset business and operational plans, as well as, preliminary planning site visits to three of the Department's engineering assets.

During the Examination Phase, the audit team made site visits to six of the Department's engineering assets (LaSalle Causeway, Alexandra Bridge, Burlington Lift Bridge, Des Allumettes Bridge, the Esquimalt Graving Dock, and the Timiskaming Dam Complex). Factors considered in the selection of these assets included: materiality; structural integrity and risk of the asset (based on PSPC engineer reports and risk assessments); number of operational staff at the asset; and, the significance of the asset in its respective communities (volume of public use and commerce). During these site visits the audit team conducted in-depth interviews with asset managers and operational staff; performed on-site observations and walk-throughs; as well as, file testing. At the end of the examination phase, the audit team's observations were validated with the audited organization.

During the Reporting Phase, the audit team documented the audit findings, conclusions and recommendations in a Director's Draft Report. This report was internally cleared through the Office of the Chief Audit Executive's quality assessment function. The audited organization will be provided with the Director's Draft Report and will be requested to review and comment on the Report. Comments will be assessed and incorporated in the Chief Audit Executive's Draft Report. This report will be sent to the audited organization for final acceptance. A management response to the Report, and a Management Action Plan in response to the audit recommendations, will be provided. The Draft Final Report, management response, and Management Action Plan will be tabled at the Departmental Audit Committee meeting for final approval.

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

Criteria

Audit criteria were developed based on the principles defined in the *Treasury Board Secretariat Management Accountability Framework*, which defines the controls that should be in place for a well-managed organization. The audit criteria assessed were as follows:

- **Oversight, monitoring and reporting:** Appropriate oversight, monitoring and reporting controls are in place to provide management with sufficient and timely information, to allow for decision-making.
- **HR management:** A human resource strategy has been developed and is aligned with the current and future staffing needs of the portfolio.
- **Financial management:** There are financial controls in place to enable complete and accurate financial management and reporting across the engineering asset portfolio.
- **Standard operating procedures and training:** Standard operating procedures and training programs are designed and implemented as intended.
- **Project management:** Controls are in place for the appropriate management of small engineering asset projects.
- **Accessibility:** Accessibility needs for public use engineering assets are designed and implemented.
- **Health and safety:** Health and safety procedures / protocols and training programs are designed and implemented as intended.
- **Physical security:** Physical security needs for each of the department's engineering assets have been designed and have been appropriately implemented.

Audit work completed

Audit fieldwork for this audit was substantially completed in March of 2019.

Audit team

The Audit was conducted by members of the Office of the Chief Audit Executive, overseen by the Director of Quality Assessment and Practice Improvement, and under the overall direction of the Chief Audit Executive.

The audit was reviewed by the quality assessment function of the Office of the Chief Audit Executive.

Appendix A: PSPC Engineering Assets

Appendix A Public Services and Procurement Canada's Engineering Assets					
#	Name of asset	Description of the asset	Asset Replacement Value (000s)	FTEs (as of April 2019)	Type
1	Timiskaming Dam Complex	The Timiskaming Dam Complex comprises several buildings and two dams and is located approximately 65 kilometers Northeast of North Bay, Ontario on the border of Québec and Ontario. The Quebec and Ontario dams were built in 1909-1913.	\$44,720	3	Dam
2	Rideau Falls Dam Complex	The Rideau Falls Dam Complex comprises of two structures: the East and West dams. The Rideau Falls East Dam was originally built in the early 20th century and partially rebuilt in 1968. The Rideau Falls West Dam was replaced in 1998.	\$10,880	0	Dam
3	Latchford Dam	The original Latchford Dam was constructed between 1910 and 1914 where Bay Lake discharges into the Montreal River in Latchford, Ontario. The Latchford Dam was recently replaced, and construction was completed in December 2016.	\$14,100	0	Dam
4	French River Dams	PSPC owns and operates four dams at three sites on the headwaters of the French River in Dokis, Ontario, approximately 47 kilometers Southwest of North Bay. The dams were originally built between 1914 and 1916. The Big Chaudière South and North Dams were rebuilt in 2016 and 2017.	\$27,530	2	Dam
5	St Andrews Lock and Dam	PSPC owns and operates St. Andrews Lock and Dam on the Red River in Lockport, Manitoba. This asset also includes several buildings, a vehicle bridge and a fish ladder. The facility was completed in 1910 and is registered as a National Historic Site.	\$219,120	10	Dam
6	Macdonald Cartier Bridge	The MacDonald-Cartier Interprovincial Bridge is one of five urban transportation links that spans the waterway between the cities of Ottawa	\$166,290	0	Non-Moveable Bridge

Appendix A Public Services and Procurement Canada's Engineering Assets					
#	Name of asset	Description of the asset	Asset Replacement Value (000s)	FTEs (as of April 2019)	Type
		(Ontario) and Gatineau (Quebec). It was constructed between 1964 and 1966.			
7	Chaudière Crossing	The Chaudière Crossing is one of five interprovincial crossings that span the waterways between Ottawa, Ontario and Gatineau, Québec, and includes eight bridge structures. It was constructed between 1919 and 2010.	\$25,155	0	Non-Moveable Bridge
8	Des Allumettes Bridge	The Des Allumettes Bridge that spans the Ottawa River between Cotnam Island in Ontario and Morrison Island in Quebec. The bridge was constructed between 2014 and 2015.	\$30,000	0	Non-Moveable Bridge
9	Burlington Lift Bridge	The bridge is used by commercial traffic between Lake Ontario and Hamilton Harbour. The bridge was built in 1958 and put into operation in 1962.	\$133,340	8	Moveable Bridge
10	La Salle Causeway	The La Salle Causeway is located in the City of Kingston, Ontario. This asset includes two associated buildings, two simple span bridges, two wharves and a bascule bridge constructed in 1916.	\$93,810	3	Moveable Bridge
11	J.C. Van Horne Bridge	The J.C. Van Horne Bridge ("J.C. Van Horne" or the "Bridge"), built in 1961, is an 804-metre long interprovincial bridge spanning the Restigouche River between Campbellton, New Brunswick and Pointe-à-la-Croix, Québec.	\$67,220	0	Non-Moveable Bridge
12	Alexandra Bridge	The Alexandra Bridge is a bridge that spans the waterways between Ottawa, Ontario and Gatineau, Québec. The bridge officially opened in 1901.	\$287,300	0	Non-Moveable Bridge
13	Des Joachims Bridge	The Des Joachims Interprovincial Bridge spans the Ottawa River approximately 70 kilometers northwest of Pembroke. It was built in 1950.	\$5,700	0	Non-Moveable Bridge
14	Parc Portuaire	Parc Portuaire is located in Trois-Rivieres on the North shore of the St. Lawrence River, halfway between Montreal and Quebec City. The Parc Portuaire was built in 1988.	\$580	0	Wharf

Appendix A Public Services and Procurement Canada's Engineering Assets					
#	Name of asset	Description of the asset	Asset Replacement Value (000s)	FTEs (as of April 2019)	Type
15	Esquimalt Graving Dock	The Esquimalt Graving Dock (EGD) is located in Esquimalt, BC and the concrete dock infrastructure was constructed in 1921-1926. It is a full-service drydock ⁶ supporting national and international clientele 24 hours a day, seven days a week and 365 days a year. The EGD generates approximately \$18.8M in direct annual federal, provincial and municipal taxes. The major marine components of the EGD include: the graving dock itself, service tunnels, large concrete retaining walls, electrical duct banks, water inlet tunnels, dock-bottom drain tunnels, pump house with dewatering pumps, two steel dock gates, electrical substations, dockside cranes, and various operations / administration / maintenance / service buildings.	\$1,050,000	60	Wharf/Dock
16	Alaska Highway	The Alaska Highway stretches 2,237 km North and Northwest from the Peace River area near Dawson Creek, BC, through the Yukon capital of Whitehorse, and up to Delta Junction in Alaska. PSPC owns and operates 835KM of this roadway, most of which was built in 1943. This asset also includes 56 bridges and bridge culverts as well as maintenance yards with salt sheds.	\$2,713,000	8	Highway
17	New Westminster Rail Bridge	The New Westminster Bridge (also known as the New Westminster Rail Bridge or the Fraser River Swing Bridge) is a movable (swing) bridge that crosses the Fraser River and connects New Westminster with Surrey, British Columbia, Canada. The bridge is owned by the Government of Canada, but operated and maintained by the Canadian National Railway, through a Memorandum of Understanding with PSPC (Entrustment agreement). The bridge was constructed in 1904.	\$131,870	0	Moveable Bridge

⁶ The EGD is a dock that can be drained of water to allow the inspection and repair of a ship's hull

Note: Asset replacement values may be subject to change due to factors such as inflation, and large capital projects currently underway for the betterment of the assets.

Appendix B: 2018 KPMG Asset Condition Assessment of PSPC Engineering Assets

Risk Ranking	Definition of Risk Ranking (Based on Likelihood / Impact)	PSPC Engineering Asset
Green	Impact: Low Likelihood: Low	<i>Latchford Dam</i> <i>Des Allumettes Bridge</i>
Yellow	Impact: Low – Medium Likelihood: Low – Medium	<i>MacDonald Cartier Bridge</i> <i>J.C. Van Horne Bridge</i>
Orange	Impact: Medium Likelihood: Medium	<i>Rideau Falls Dam Complex</i> <i>French River Dam</i> <i>St. Andrew's Lock and Dam</i> <i>Parc Portuaire</i> <i>Burlington Lift Bridge</i> <i>Des Joachims Bridge</i> <i>Alaska Highway</i>
Red	Impact: Medium – High Likelihood: Medium – High	<i>Timiskaming Dam Complex</i> <i>La Salle Causeway</i> <i>Esquimalt Graving Dock</i>
Critical Red	Impact: High Likelihood: High	<i>Chaudière Crossing</i> <i>Alexandra Bridge</i> <small>See Appendix C for additional context surrounding these assets</small>

Appendix C: Critical Red Engineering Assets listed in the 2018 KPMG Report

Bridges, Dams, Highways, and Marine Infrastructure are collectively referred to as engineered assets. PSPC is responsible for 17 engineered assets located across the country. These assets were either built by or transferred to PSPC under its historical mandate for public infrastructure, many in support of the federal government's objective of stimulating economic development. In accordance with its responsibilities under the Department of Public Works and Government Services Act, PSPC is 'custodian of last resort' of federal real property for the Government of Canada and is responsible for the sound stewardship of these assets.

In 2018, KPMG was engaged to perform an asset based risk assessment in relation to engineering assets, as well as conduct a third-party assessment of the 10 Year Program of Work to mitigate asset based risks. The titled "PSPC Infrastructure Asset Management Group Asset Condition Risk Assessment 2018 - Final Report" assigned a risk rating for two Engineering Assets, as "Critical Red". Critical Red describes an asset that has a high likelihood of risk being realized and high impact of risk should it be realized. These two assets were the Chaudière Crossing and the Alexandra Bridge. The report also reflected that based on the then planned 10 Year Program of Work for both bridges, the risk rating "after treatment" was anticipated to change to "Yellow" for Chaudière Crossing and to "Red" for the Alexandra Bridge.

It is important to note that PSPC has a rigorous inspection, monitoring and intervention regime to ensure that all its bridges remain safe at all time for users. PSPC perform routine and scheduled inspections. They include weekly and monthly maintenance inspections, general inspections performed by engineers every year, comprehensive detailed inspections performed by engineers every four years and underwater inspection every four years.

Further context is provided below on the condition, work completed, underway and planned for the two bridges that were assigned a risk rating of Critical Red.

Chaudière Crossing

The Chaudière Crossing consists of eight structures. The structural condition rating and functional condition rating for two of its eight structures are Critically Inadequate (rated 1) Those two structures **have been closed indefinitely** due to sub surface instability.

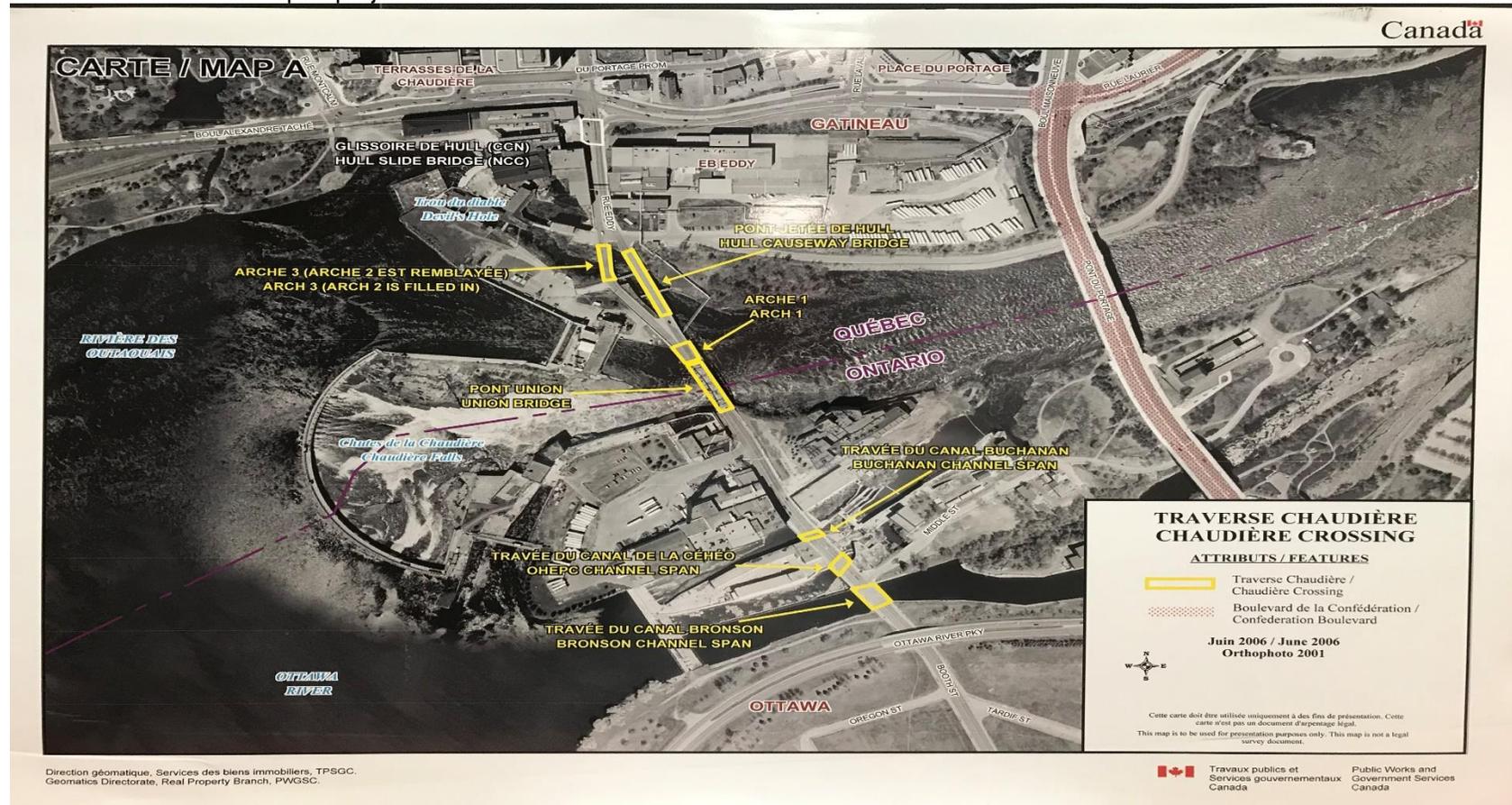
The 2018 Risk Assessment rated the crossing as Critical Red for condition asset integrity and yellow for public health and safety. The Crossing's overall Critically Inadequate rating is based on the lowest rated criteria of its eight structures, i.e. the condition asset integrity of its two structures closed indefinitely (Arch 3 and the Trestle).

PSPC has physically restricted access to the two structures and as a result, PSPC and the public no longer use them. Survey targets were installed on the structures and are surveyed on a monthly basis to determine if there are movements, which would indicate possible sub surface movement. This will continue until their decommissioning.

The remaining structures on the Crossing are rated in Poor (rated 3) condition or better. Significant rehabilitation projects are underway to improve the remaining structures of the crossing while long term plans are being put in place to permanently decommission the two structures that are currently closed.

The 10 Year Program of Work to rehabilitate and maintain Chaudière Crossing includes:

- Union Bridge - rehabilitation design underway, construction in 2021-22;
- Hull Causeway - widening design underway, with construction in 2021-22;
- Bronson Channel – repair or replacement, construction planned for 2023-24;
- Trestle / Arch 3 – study planned in 2020 to investigate methodology to decommission Trestle / Arch 3;
- Other smaller repair projects.



Alexandra Bridge

Budget 2019 provided funding to replace the Alexandra Bridge. PSPC and the NCC have begun the planning phase. The planning, design and construction of the new bridge is expected to take 10 years.

The Alexandra Bridge's structural condition rating is Inadequate (rated 2) and its functional condition rating is Fair (rated 4). The 2018 Risk Assessment rated the bridge as Critical Red for both condition asset integrity and public health & safety.

Significant repair projects and monitoring programs are underway to maintain the bridge safe and open until it can be replaced.

The 10 Year Program of Work to rehabilitate and maintain the bridge includes:

- Structural health monitoring of bridge to monitor response to thermal changes (2019 to 2021);
- Repairs twice per year to northbound lane;
- Boardwalk lane has a reduced load limit; monthly load testing of boardwalk lane;
- Structural Steel Replacement Project (construction in 2020);
- Boardwalk lane repair and articulation retrofit (construction 2022-23);

Structural health monitoring (to be installed in 2020 and monitored until bridge is replaced).