



**An Independent Review of the Airport Parkway Pedestrian/Cycling Bridge Project,  
including Recommendations for Future Projects**

**FINAL REPORT**

**Prepared for:**



**Conducted by:**

**SEG Management Consultants Inc.**

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## 1.0 Introduction

The City of Ottawa (City) requested SEG Management Consultants Inc. (SEG) to conduct an independent review of the Airport Parkway Pedestrian/Cycling Bridge project and provide recommendations for future projects. The scope of the review is detailed in the following section. SEG provided a senior consultant who has extensive construction industry related project management and contract management expertise to conduct the review. The senior consultant is not a design engineer and is not an expert in bridge design or concrete mix design. The scope of the review is limited to the management of the project by the City. The review is not intended to comment on performance of the designer or contractor in fulfilling their contract commitments. The reviewer's findings and recommendations are based on the documentation provided by the City and interviews with key City staff and Councillors associated with the project. No documentation or opinions were sought from the original consultant or the contractor. In the event there are other documents in the possession of these parties that would alter the facts then the observations and recommendations of this may be altered accordingly.

The City initiated an Environmental Assessment process (EA) to build a pedestrian/cycling bridge across the airport parkway in June 2008. This project has encountered a series of problems that resulted in a 3-year schedule delay (completion forecast to be late 2014 versus late 2011) and an increase to the budget from \$6.9M to \$11.55M. The highly visible location of the bridge along the airport parkway lead to the project being initiated as a "gateway" feature for the City and this theme was carried through the planning and design phases. The difficulties encountered by the high profile of this project have generated significant public criticism; and the project is viewed as a failure by project staff, senior management and elected officials. Accordingly the purpose of this review is to inform the Mayor of the cause of the project delays and to make recommendations regarding potential enhancements to City processes that would mitigate the risk of a similar incident in future.

While the fact the project is the subject of litigation and has been widely reported, this review is unrelated to that process and should not be relied upon by those in the litigation or used to predict its outcome. It is important to note that in assessing the causes of delay we have conducted our review outside of the legal process, used only documents provided by the City and have restricted interviews to City staff and elected officials.

## 2.0 Review Objectives

The City requested an independent project review to ascertain what measures could be taken that would eliminate or mitigate these types of issues on future projects. The review includes all phases of the project from the initial Environmental Assessment to the recent introduction of a new Design Consultant. More specifically the Statement of Work requested the following key phases and processes to be addressed:

- 1) Environmental Assessment Process
- 2) Project Intake Process

- 3) Project Design
- 4) Project Construction
- 5) Project Oversight

The Statement of Work included the following key task areas:

- 1) Conduct interviews with key staff and review relevant background material to refine and focus a detailed review to the key risk areas;
- 2) Conduct a detailed focused review of the key areas of risk; and
- 3) Prepare a report, including visuals and a presentation that provides a concise and meaningful assessment of the cause of the Project delays and to make recommendations regarding potential enhancements to City processes that would mitigate the risk of a similar incident in future.

### 3.0 Review Methodology

The review was undertaken as outlined in the Statement of Work (SOW) using a “cascading approach” that would permit early identification of issues followed by a focused investigation to more fully refine the findings and recommendations. The three phase work plan looked at five key processes, the EA process, the Intake process, the design process, the construction process and the oversight process. The review was undertaken as shown in the following tables:

Phase One	Activities	Deliverables
<b>File &amp; Data Review</b>	<ul style="list-style-type: none"> <li>• Project start-up meeting to acquire access to files and data in each of the 5 key process areas. Identify key individuals for interview.</li> <li>• Scan of files and data pertinent to the issues.</li> <li>• Interviews with key project staff.</li> <li>• Further review of files and data.</li> <li>• Compile summary of key issues.</li> <li>• Preliminary analysis.</li> </ul>	<ul style="list-style-type: none"> <li>• Preliminary findings &amp; Phase 1 verbal report</li> </ul>
<b>Objectives:</b>		
<ul style="list-style-type: none"> <li>• Gain insight into the key issues and staff perspectives of problem areas.</li> <li>• Identify range, depth and availability of written material relevant to this review.</li> <li>• Present initial findings to identify priority issues for further review.</li> </ul>		

Phase Two	Activities	Deliverables
<b>Supplementary Reviews</b>	<ul style="list-style-type: none"> <li>• Receive feedback regarding specific issues for in-depth review.</li> <li>• Review supplementary information for findings identified in phase 1.</li> <li>• Conduct follow-up interviews to probe deeper into specific areas of concern.</li> <li>• Interview additional resources that may add to the data and analysis.</li> <li>• Provide a detailed analysis of the issues.</li> </ul>	Summary findings and detailed analysis.
<b>Objectives:</b>		
<ul style="list-style-type: none"> <li>• Explore specific issues in greater depth.</li> </ul>		

Phase Three	Activities	Deliverables
<b>Recommendations, presentation and reports.</b>	<ul style="list-style-type: none"> <li>• Deliver verbal report on preliminary observations and findings</li> <li>• Receive client direction</li> <li>• Prepare a report, including visuals and a presentation that provides a concise and meaningful assessment of the cause of the Project delays and to make recommendations regarding potential enhancements to City processes that would mitigate the risk of a similar incident in future.</li> </ul>	<ul style="list-style-type: none"> <li>• Verbal report</li> <li>• Draft &amp; Final Report</li> <li>• Presentation to the City</li> </ul>
<b>Objectives:</b>		
<ul style="list-style-type: none"> <li>• Provide recommendations to address improvements for future projects.</li> <li>• Brief key City officials on the findings and recommendations.</li> <li>• Produce and submit a final report (electronic file in PDF format).</li> </ul>		

## 4.0 Critical Project Events

The Airport Parkway Pedestrian/Cycling Bridge project was initiated in June 2008 with the approval of the Transit Committee to undertake an Environmental Assessment (EA). The EA process commenced in February 2009 and was concluded in February 2010. Design Engineers (Designer) were engaged in August 2010 and completed the design in May 2011. The City tendered the project and construction started in July 2011 with

substantial completion anticipated by October 31, 2011. At the time of this review construction is still ongoing with completion forecast for November 2014. Not only did the project see a 3-year delay in completion but also a budget increase from \$6.9M to \$11.55M. While there are many events during this time that contributed to delays and cost increases, the following four key events had a substantive impact on the project:

**1<sup>st</sup> Event: Project Initiation was delayed:** In June 2008 the Transit Committee approved the SOW for the pedestrian bridge however, it was not until February of 2009 that a selection process would commence for a consultant. This initial eight month delay to the EA process would result in schedule pressures during design and construction.

**2<sup>nd</sup> Event: Defects were discovered in the placement of concrete for the tower structure;** Louis W Bray Construction Inc. (Contractor) engaged Cumberland Ready Mix to provide a Self-Consolidating Concrete (SCC) mix that was considered by LWB to be necessary given the placement characteristics of the tower structure. Following the first pour it was discovered that significant portions of the tower displayed defective concrete. A report by A. Dagenais & Assoc. Inc., commissioned by LWB, determined that the tower must be demolished and re-constructed. This delayed construction by over twelve months and generated claims by LWB, Cumberland Ready Mix and the City.

**3<sup>rd</sup> Event: Deficiencies were discovered in the fabrication and design of the steel anchor plate.** Defects in the fabrication of the anchor plate led to a change in fabricators by the Contractor and a further delay in delivery of the anchor plate until May 2013. The issues surrounding the fabrication and placement of this stay anchor would ultimately generate a design review. Shop drawings for the tower anchor plate were not submitted until October 2012 (a year after original substantial completion target date and fifteen months after the planned submittal date of July 12, 2011). This delay in submittal of shop drawings precluded a resolution of issues in parallel with the concrete tower issues, effectively adding a further eight-month delay.

**4<sup>th</sup> Event: Deficiencies and Defects were discovered in the design through a third party design review:** The Contractor encountered problems in attempting to align the anchor plate for the second tower pour to within acceptable tolerances for erection of the rod stay connections to the bridge deck. A critical site meeting to review this issue resulted in recommendations that the design be reviewed by a third party. Buckland and Taylor were retained by the City and reported several areas of deficient design. The original design consultant was dismissed by the City and new consultants were engaged to re-design the bridge structure. The redesign and construction will add a further 16 months to the project schedule with completion anticipated in late 2014.

The overall impact of these events increased the project timeline from 3 ½ years (June 08 to Nov 11) to 6 ½ years (June 08 to late 2014).

A review of documentation provided by the City and interviews with key City staff and elected officials generated the following observations:

## 5.0 Observations

### 5.1 Observation #1: The schedule was set early in the project, did not change and there was limited evidence of rigorous schedule management prior to 2012.

The initial schedule was reasonable and the project could have been completed within a 3-year time period had it not encountered the issues noted above. This was confirmed in interviews with City staff. A reasonable schedule for this project would include one year for the EA process, one year for design and one year for construction. The timeline given in the Project Intake Form (PIF), transmitted to Infrastructure Service Department (ISD) on February 25, 2010, noted a fall 2010 construction tender and construction in 2011. A December 2011 completion date was maintained on internal project reports throughout the design and construction phase.

The Transit Committee approved the project for EA in June 2008. According to interviews with staff in the Planning & Growth Management Department, (who were responsible for conducting the EA) internal workload issues delayed the start of the EA process until February 2009, a delay of 8 months. A timely start would have provided the necessary time in the project schedule to ensure a 2011 completion. Since the EA was not completed until the following year (April 2010), the Infrastructure Service Department (ISD) faced a significant challenge to solicit and award a design contract, complete pre-design and produce contract documents for construction in 2011. ISD received the completed design in May 2011 and awarded a construction contract on July 6, 2011. The construction contract included a substantial completion date of October 31, 2011 with final completion (for seasonal deficiencies) in June 2012. The effect of the early delay in the EA process is now obvious: instead of a 1-year construction period, only 4 months was available. In response, two bidders wrote to the City during the tender period and stated that the construction schedule was “totally unrealistic”. SEG did not find any record of response from the City.

A schedule for project completion was set in the EA process. The Project Intake Form (PIF) used to transfer the project from the Planning and Growth Management (PGM) Department to the Infrastructure Services Department (ISD) indicated the year of design to be 2010 and the year of construction to be 2011. SEG could find no correspondence that challenged these dates either during the EA process, at project transfer stage, during design or at tender. The PM Procedures Manual in effect at the time required that the PM obtain and document approval for the scope, budget and schedule for the project on a Project Transfer/Definition Statement form (Appendix D1). There is no record of this form on file. Further, the Designer was required to provide a proposed construction schedule as part of its contract (Annex A of the RFP). There is no evidence of these documents on file. Refinements have been made in the new ISD Project Delivery Manual (2013) (PDM2013), to the PIF process and the setting of project milestones that should result in ISD having much more influence on the establishment of the project schedule and budget. ISD published new guideline in the document, “Project Delivery Review and Cost Estimating, July 2013” that requires the project schedule to be set at time of project transfer to ISD Design & Construction.



There is no evidence of disciplined schedule analysis in the project files during the 2011 construction season. While there were detailed schedules provided by the Contractor and a standing agenda item on the bi-weekly construction site meetings, there was no record of any discussion or decisions respecting the ability to meet the substantial completion date of October 31, 2011. No letters or emails were observed that indicate any serious discussion of scheduling issues until early October 2011. Project status reports prepared by the PM at this time (2010 & 2011) consistently show a December 31<sup>st</sup> 2011 substantial completion date. It is only on the September 30<sup>th</sup> 2011 report that the completion date changes to June 30<sup>th</sup> 2012. It ought to have been clear early in the 2011 construction period that key milestones were not being met and that substantial completion was at risk. There is no evidence that this was recognized by the PM and there are no records on file that acknowledge this issue.

A revised substantial completion date of November 28, 2011 was set by the PM on November 7, 2011 in recognition of a variety of claim issues advanced by the Contractor.

Following the appointment of a new project team (April 2012), the discussion and effort surrounding schedule management has increased significantly. Facilitated scheduling meetings are now held on a regular basis and every attempt is made to forecast completion of critical tasks. It is interesting to note that even with this increased scheduling effort it was still impossible to meet the original timeframes. It still took 5 months to re-pour the lower level of the tower (mid May 2012 to early Oct 2012) and a year to complete the full tower. While this timeframe reflects other issues at play during this time, actual progress confirms that a four-month construction schedule was not reasonable.

The Project Manager's Procedures Manual 2006 and the revised ISD Project Delivery Manual 2013 (ISD PDM2013) both include the requirement for the Project Manager to review and accept the project budget, scope and schedule at time of transfer. In this project those dates were not challenged. Further, The ISD PDM2013 requires that the Project Manager monitor the project and advise of schedule variance but does not explicitly require the preparation and maintenance of a project schedule.

There is limited guidance or direction with respect to schedule management in the current ISD PDM2013. Section 8.9 of that manual states that, *"The PM should request that the Contractor submit a project schedule showing progress against the plan for at least the major phases of construction work, as required by the Contract. The PM should review these schedules and comment as necessary. These are normally reviewed on a monthly basis."*

## 5.2 Observation #2: Project Communications did not meet expectations and lacked coordination.

This was a high profile project that had a high degree of visibility. Communication with the public occurred at a variety of staff levels and with the public and elected officials without any apparent coordination or communications strategy. There was substantial media interest in the lack of progress on the bridge that generated public controversy and concern. Even though there was significant email communication (both internally and externally) and monthly project reports, there is no documentation to indicate that senior management and elected officials were made aware of issues during the initial construction period of the project (up to April 2012). The project reports provided template information only and did not draw attention to the scheduling or construction issues. It was also observed that external public communication was generally handled by elected officials who had limited access to technical information to fully address these concerns. After April 2012 the project was reassigned to a dedicated project team and communications with senior management and elected officials appear to have improved.

Substantive improvements have been made in the policies affecting communication since the initiation of this project. Two ISD directives establish the requirement for media and public communication to be coordinated through Corporate Communications. The Project Status Update (PSU) has been substantively improved and provides the opportunity for considerably more information to be reported to senior management and elected officials. In addition, the revised ISD Project Delivery Manual (2013) includes a “no surprises” principle that is intended to ensure Project Managers raise all issues of potential public concern. The combined effect of these improvements, if followed by PMs, should ensure that project issues are escalated in a timely way and coordinated for public communication.

Interviews with Councillors and staff suggest that many Councillors have a high degree of interest and involvement in projects within their Wards. In some cases Councillors take a lead role in communicating project issues with the public. File records indicate that there can be substantive communication between PMs and elected officials. There does not appear to be any protocol for this type of communication.

## 5.3 Observation #3: The design was complex and according to the Buckland & Taylor Report did not sufficiently address constructability issues and was deficient.

It was determined early in the EA process that the bridge was to be a “gateway feature”. The December 2009 report to the Transportation Committee states that, “members of the public, the National Capital Commission (NCC) and the Ottawa McDonald-Cartier International Airport Authority expressed a keen interest that the bridge structure over the Airport Parkway be designed as a gateway feature ... this issue will be dealt with at the design stage but the EA cost estimates have included a provision for this desired innovation and excellence in design”. As the design progressed the bridge evolved from a conventional clear span bridge structure (at EA) to a stay-bridge structure. During preliminary design the PM requested that the Designer engage their Architect to provide alternatives for consideration. The Designer responded by providing twelve options, a majority of which were stay-bridge structures. These alternatives were reviewed in public sessions, and ultimately the Technical

Advisory Committee (TAC) and Public Advisory Committee (PAC) selected the preferred alternative, as recorded in meeting minutes by the Designer. There is no correspondence to point to a final decision on this selection by the PM or City. The chosen design incorporated the use of a complex concrete tower structure and pipe stayed concrete deck bridge. The complexity of these types of structures was recognized by the Designer who stated in their proposal concerning 3D solid finite element analysis, that they were *“the only company in Ontario that has been at the forefront of this revolutionary design approach”*. Email correspondence to the PM from one of the members of the TAC also commented on the complexity of a stay bridge structure. The fact that the bridge structure was a complex design was acknowledged and well established.

As part of its contract with the City, the Designer was to provide monthly project management reports (SOW page 13) addressing schedule, budget and technical issues. The Design Proposal goes further and offers a constructability review (RFP Task 9) to be submitted as a deliverable. These documents ought to have been submitted by the Designer and reviewed with the PM prior to completing the design. There is no record of any documents or communication of these issues even though it formed part of the scope of the design contract. The need to address constructability is noted by the Designer in their proposal dated July 12, 2010 (page 8, last paragraph), *“When we designed the connoid shape arches at Walkley, the solid modeling using finite element analysis was much less known and we had to go a long way to convince all participants that the structures were not only safe but could also be economically built.”* The proposal also states, *“During the construction, the contractor with great difficulty attempted to form the edge ellipse of the connoid plane. We convinced him to take down his forms and build a simple totally different shape and then block out the unnecessary space. Although at first he was very reluctant to follow our instructions, the simple procedures demonstrated on a paper model made him a believer. The same approach to construction of formwork would be used for piers, stays and arches incorporated in this structural concept.”*

It is only following a meeting to discuss constructability issues associated with the anchor plate, that the City requested an independent review by Buckland & Taylor. Buckland & Taylor in their August 23, 2013 report stated that ... *“the project specifications are deficient in the technical coverage of the requirements for installation of the bridge stays and for dimensional and load control during bridge erection and stay engagement.”* The report goes on to give an extensive list of recommended information that should be made available to the contractor for bridge erection purposes.

Constructability issues were not addressed during the design process and were not incorporated into the contract documents issued for tender.

The adequacy of the design was also addressed in the Buckland & Taylor report ... *“the pipe stays of the HCCP bridge design also do not meet the CSA-S6 Canadian Highway Bridge Design Code for tension members.”* The City engaged Delcan Corporation (Delcan) to do a re-design. Delcan proposed a more conventional cable stay system to address the issues identified by Buckland & Taylor and made further revisions to accommodate a foundation design issue with the concrete tower. Delcan, in their report dated November 27, 2013 stated that further design revisions were required because a *“detailed structural analysis of the reinforced concrete cable-stayed bridge showed that the tower foundation at serviceability limit states and at ultimate limit states, would experience overstressing of the front piles and uplift of the back piles. This would cause permanent deformation of the tower foundation, which could lead to the overturning of the tower”*.

#### **5.4 Observation #4: There was a lack of appreciation for the complexity of the work during construction.**

Documents reviewed indicate that the Contractor and their Sub-Trades failed to properly execute the mix design and placement of Self Consolidating Cement (SCC) for the lower tower section (Event #2) and the fabrication of the tower anchor plate (Event #3). In both cases the Contractor dismissed the original sub-contractor or supplier and engaged others who ultimately were able to perform.

From the outset of construction, the Contractor had issues with the construction details for the tower structure. It was late in the schedule before they resolved re-bar and formwork details required to permit the first pour of concrete on November 10, 2011 (10 days after contract substantial completion). The Contractor elected to use SCC for the tower concrete and engaged a concrete supplier to provide a mix design and supply the concrete for the lower tower pour. On removal of the forms considerable defects were discovered and the City issued a Disposition of Deficient Materials and Workmanship which required the Contractor to investigate the cause of the defect and advise of the remedy for repair. The Contractor engaged the services of A. Dagenais & Associates Inc. who recommended that the tower be demolished and replaced. This process would eventually lead to the replacement of the concrete supplier, demolition and reconstruction of the lower tower section. This work was completed in October 2012, a year later than the anticipated contract completion.

The fabrication of the anchor plate also presented a significant challenge to the Contractor. The Contractor engaged a Sub-contractor to fabricate the anchor plate; however, they were unable to comply with the strict codes and standards necessary to undertake the work. The Contractor subsequently dismissed this Sub-contractor and engaged another firm who subsequently completed the work to the required standards.

The City engaged the Designer to provide technical services during construction. The Designer clearly understood the constructability challenges with the building of these types of structures. While answers to questions raised by the Contractor during construction were answered the documents do not indicate any attempt on their part to provide the necessary design support noted in the Buckland & Taylor report.

The lack of any attention to constructability and scheduling issues by the Contractor resulted in defective work and project delays.

#### **5.5 Observation #5: There were deficiencies in the management of the project.**

**5.5.1 Project Hand-off:** The Bridge project milestones were established during EA and were not challenged or revised at time of transfer to ISD. Projects are defined by a variety of departments (Planning & Growth Management, Transit, Parks and Recreation, Environmental Services) but are transferred to ISD for implementation. ISD rely on the Supply Branch to engage consultants and contractors for delivery of the design and construction. Timelines observed for Supply Branch contracting activities were consistent with expectations.

While ISD is accountable for the delivery of this project they had little input into the establishment of the project milestones. New ISD procedures require all projects defined by clients be coordinated through the Asset Management Branch, be accompanied by a PIF and be the subject of a scoping meeting with the Design and Construction Branches. Project schedules can be revised if necessary at this stage. The new ISD PDM2013 also identifies the appointment of the Project Manager at the time of this transfer process.

**5.5.2 Project Reporting:** Project reports were prepared and distributed but failed to include critical information about the status of the project. Project Manager (PM) is required to inform the Program Manager of issues in schedule, budget and scope. The PM sent biweekly construction updates (via email) commencing on July 8<sup>th</sup> 2011 to the ISD Program Manager, ISD Manager and the Ward Councillor. While these reports outlined work underway there were no definitive statements advising of schedule or technical issues. The Project Manager's Procedures Manual 2006 (PMPM 2006) in effect at the time required management reporting as follows:

**4.1.5.10 Management Reporting**

*The Division Program Manager/ISB Division Manager forwards the Project Manager's Monthly Report, after review, to the Project Management Services Technologist. The Project Management Services Technologist will make any minor adjustments required and will then forward the information on monthly cumulative cash flow and forecast final cost to the FSU. The FSU will combine this data with SAP data to produce a monthly cash flow/project status report – the **Management Summary Report**. FSU will distribute this report to, as a minimum the ISB Director, all ISB Division Managers, Division Program Managers, and the Project Managers. The monthly Management Summary Report may be distributed to others from time to time as established by the FSU and the ISB Director.*

**8.4.4 Updated Status/Schedule and Final Forecast Costs**

*The Project Manager should develop the following projections for the construction project on a monthly basis:*

- *An up to date estimate of forecast final cost for the complete project, and*
- *An up to date estimate of the completion date.*

*It is essential that, based upon the latest information available, these projections are initially developed early on in the contract to avoid cost and time overruns later in the contract when it is often too late to avoid or deal with them. These projections should be developed and updated on a monthly basis in consultation with construction staff. See typical Monthly Status Report (Appendix I). [emphasis added]*

Monthly project reports (from October 2010 to September 2011) consistently show a December 31<sup>st</sup> 2011 substantial completion date. This date was not revised at time of construction contract award even though the construction substantial completion date was October 31, 2011. On the October 31<sup>st</sup> 2011 report the date was revised to show a June 30<sup>th</sup> 2012 substantial completion date. A letter dated November 7, 2011 from the Project Manager approves an extension for various events and establishes November 28<sup>th</sup> 2011 as the revised substantial completion date. Interviews with the project team (for the 2011 construction season) indicate that

they were aware of issues through regular meetings and discussions. These meetings were not recorded nor were senior managers advised of any project delay until after the expiry of the substantial completion date.

The policies and procedures for project reporting have been substantively improved in the new ISD Project Delivery Manual (2013). The incorporation of a “no surprises” strategy throughout the project life cycle requires the Project Manager to communicate issues as soon as possible to the Program Manager or Manager if necessary. Further, the Project Status Update (PSU) report now capture extensive information on all ISD projects to better inform senior management and Council.

**5.5.3 Consultant Management:** The level of management of the consultant contract was not adequate to manage project risks. Accountability for design of this project and delivery of product in accordance with the contract rests with the Consultant however the Project Manager was required to provide oversight of the activities performed by the consultant and the success of the project.

There were early indicators that this design was complex and that constructability and performance issues ought to have been considered. The documents on file show general correspondence between the Project Manager and Consultant only and little evidence of compliance and quality review with the exception of a structural and electrical design review conducted by City staff. This review late in the design process identified several design requirement issues.

A requirement for constructability reviews formed part of contract with the Consultant. Considering that early indicators pointed to the complex nature of stayed structures, constructability would be expected to have been a topic of conversation during design and certainly a deliverable under the terms of the contract (see Observation #3). There is no evidence that this occurred.

The Project Manager’s Procedures Manual 2006 (PMPM 2006) in effect at the time required oversight as follows:

**4.2 Project Initiation – Consultant Based Projects**

**4.2.1 General**

*This section of the Project Initiation Section deals with projects that are conducted using an overall Project Manager and, possibly inspection staff that are resourced from within the staff of ISB and with the major project activities including specific day-to-day project management, design and other activities performed by contracted external consultants/consulting firms. For these Projects the Consultant is responsible for the delivery of the end product to meet the specified requirements and overall objectives stated in the Project Transfer/Definition Statement. The Project Manager is responsible for the success of the project and the oversight of the activities performed by the Consultant(s). [emphasis added]*

The ISD Project Delivery Manual (2013) now establishes more of an oversight and coordinating role for the PM during design. Reviews by the City during the design phase are limited to confirming that the design meets the operational requirements. The adequacy of design and compliance to relevant codes is a design consultant



responsibility. The PM is required to ensure that all contract deliverables are provided. Internal Detail Design Reviews (DDR) now includes a constructability review to ensure that the design is buildable; details of this process are included in Appendix 55 of the ISD Project Delivery Manual (2013).

**5.5.4 Construction Contract Management:** The level of management of the construction contract was not adequate to manage project risks. At the time of this project the PM was delegated the Contract Administrator function and was required to follow Section 8 of the Project Manager’s Procedures Manual for administration of the construction contract. In particular, Section 8.4.2 requires the PM to notify the Contractor in writing when it is noticed that the progress of construction is not meeting the Contractor’s schedule. There were ample examples of this issue early in the construction period but no record of any notice being sent or any note being made at bi-weekly site meetings.

The ISD PDM2013 provides extensive guidance for inspection and administration of the work (Inspection Manual for City Construction Contracts) but limited guidance for management of contracts, ie. schedule, defaults, claims, insurance and bonding. Construction contracts are unique to the industry and require specialized expertise to manage them effectively. The document “Contract Administration and Reporting on Supplier Performance” (Appendix 89 of the ISD PDM2013) provides some additional guidance on managing contract issues and defaults. It was noted that the decision respecting declaration of default rests with the Supply Branch not ISD adding a further complication for ISD in the management of contracts.

Authority for change management is held within ISD. Project Managers currently have full authority for changes within scope and budget. Financial change authority is scaled to the contract value and shown in Appendix 88 of the ISD PDM2013. Authorities over these amounts must be sought from the Program Manager. There are no authority limits for changes to the contract schedule.

**5.5.5 Risk Management:** At the time of this project there was no formal risk management process. Project Managers brought issues to the attention of Program Managers who would in-turn escalate the issue as they saw fit. Project Managers utilized an informal process of meetings and discussion to raise issues to the project team and senior management. In interviews with the original project team they confirmed that regular meetings did take place and all issues were discussed. Escalation of schedule risks was not initiated until fall 2011 after the Contractor failed to meet the original substantial completion date.

The ISD Project Delivery Manual (November 2013) now includes a “No Surprises Strategy” that requires Project Managers to escalate issues as soon as possible primarily to ensure that communications and expectations are managed. This is supported with a Risk Response Planning section (ISD PDM2013 4.9.9) and a risk template that is recommended for use at the project start-up phase. Significant issues affecting the project are now to be reported on the PSU forms for transmission to Senior Management and Councillors on a monthly basis.

The risk management process should be required throughout the life cycle of a project to permit the transfer of critical information between project phases and ensure that high-risk issues are being reported and addressed at the appropriate management level.

**5.5.6 Project Management Accountability:** There is no single document that sets out accountability for Project Managers. There are a substantive number of guidelines, forms, reports and directives all providing guidance for the management of projects. The ISD Project Delivery Manual is the primary source of these guidelines however there is no stated requirement for compliance to the manual. The ISD PDM2013 states in the Preface that, *“The Project Delivery Manual provides a guideline in the delivery of capital projects within the Infrastructure Services Department of the City of Ottawa.”* The Introduction echoes this intent by stating, *“The ISD Delivery Manual is intended for use by all staff within ISD and will serve as a guide for all of ISD clients.”*

The recent “Project Management Policy” approved by the City Manager sets the tone for sound project management and sets the principles under which projects should be delivered but falls short of clearly articulating Project Managers accountability respecting the management of projects. The policy states, *“The City of Ottawa shall adopt and apply sound project management principles and recognized practices while delivering projects within the City, including those led by external contractors.”* The document goes on to address the Project Managers responsibility as, *“Ensure the requirement of this Policy and any supplemental procedures or frameworks are adhered to”.*

ISD Directives are much more precise about the requirement to adhere to the directive.

The new Project Charter and ISD PDM2013 both note that adopting industry wide project management practices would enhance the City’s project management culture and encourage professional development within ISD.

Project Managers are assigned to projects but often do not have the job profile that goes with the assignment. In the case of the Pedestrian Bridge both Project Managers are in-fact Senior Project Engineers. The job description is similar in many ways however the use of the Project Manager profile would better match the PM duties. The City’s job profile for Project Manager specifies all of the duties required of the PM without reference to specific accountabilities for adhering to ISD PDM 2013 procedures.

**5.6 Observation #6: There are no performance indicators to monitor project delivery.**

The Bridge project had significant issues. However, there are no comparable data to determine if this is an anomaly or a systemic problem. Also, the principle that “what gets measured gets done” can ensure that realistic budgets and schedules are established and that Project Managers ensure delivery. These Key Performance Indicators (KPIs) could be established for both project and contract related performance.



**5.7 Observation #7: Project Managers have full authority for changes within budget and scope.**

The Bridge project has realized significant delays. One week following the substantial completion date (October 31, 2011) the PM issued a letter approving an extension to the contract to November 28, 2011. PMs have full authority to change project and contract completion dates. Additional authority limits for schedule extensions and contract defaults could be considered.

**5.8 Observation #8: Liquidated damages are used as a default resolution strategy.**

No notice of potential default was issued at the time of the extension nor did it appear to be treated with any great concern. To address the failure by the Contractor to meet the contract completion date the City imposed liquidated damages. The amounts are relatively low and compensate the City for recovery of direct costs only. In addition, these costs were suspended during the winter season (December to May). Interviews suggested that this is the standard course of action for delayed completions on City projects. It is not until April 19, 2013 that a notice of potential default was sent to the Contractor and their bonding company.

Reliance on liquidated damages is not an effective contract default strategy since the City recovers only direct costs when damages are often more extensive. Also, if this is consistently applied by the City the industry will simply build this risk into their bid cost and ignore contract completion dates. Taking decisive action in a serious default situation sends a powerful message to Suppliers that contract completion dates are to be honoured. Sending notices of potential default, calling in bonds, taking the work out of the contract, utilizing rights of set-off to complete the work and linking this to opportunities for future tenders are all possible options for dealing with this issue.

It is reasonable to assume that the contractor in this project knew that the schedule was aggressive and that liquidated damages would only represent a minor cost if the work was not completed by October 31, 2011.

**5.9 Observation #9: The City's Supplier Performance Process could be enhanced to produce better results.**

As indicated earlier, it is beyond the scope of this review to determine the extent to which the designer or contractor failed to deliver its commitment or whether they were in default of contract. The Supply Branch of the City is currently working on a supplier performance process, which may be used as the basis for decisions to restrict bidding privileges. The use of this process as a communication tool with the supply community may deliver meaningful benefits. In this model, performance is discussed during the course of the contract to ensure that the supplier has a clear appreciation for the City's expectations. Most suppliers will modify their behaviour or explain why performance cannot be met at these sessions. When this is combined with a "3 strikes you're out" approach to the evaluation process, it can significantly enhance contractor performance, or alternatively "weed out" poor performers.

## 6.0 Recommendations

### 6.1 Recommendation 1: Schedule Management

6.1.1 That a project schedule be prepared by the PM and that policies and procedures on schedule management be included in the ISD PDM2013 document to provide guidance and resources to Project Managers. It should be linked to the risk management process so that projects identified with a high schedule risk profile have an increased level of schedule management effort.

### 6.2 Recommendation 2: Communication Management

6.2.1 That a communication protocol be established in the Project Charter. The protocol would establish formal and informal communication links and strategies applicable to the project.

6.2.2 That communication with elected officials is coordinated through a dedicated team within ISD. The use of an Inquiry Process is established to ensure response times meet the needs of Council and that consistent information is delivered from ISD.

### 6.3 Recommendation 3: Design

6.3.1 That ISD monitor compliance with policy and procedures for the management of consultant contracts and constructability reviews.

6.3.2 That the City link payments to consultants with deliverables required by contract.

### 6.4 Recommendation 4: Construction

6.4.1 That “constructability risk” is included in the Risk Management Process and template. Consider pre-qualification of Suppliers as a mitigation measure.

### 6.5 Recommendation 5: Project Management

6.5.1 That ISD provide input to project milestones during the EA process in advance of the PIF or scoping process and/or establish design and construction delivery standards that can be used as guidelines during the EA process.

6.5.2 That ISD develop a quality system to monitor compliance to project management processes, including the “no surprises” provision of the ISD PDM2013

6.5.3 That ISD provide additional guidance to PMs on the management of consultant contracts.

- 6.5.4 That ISD establish more rigorous policies and procedures for contract management. Contract Administration and Inspection procedures are addressed in the ISD Project Delivery Manual however there is limited guidance to PMs on how to deal with contract defaults, schedule management, insurance and bonding, and claims management.
- 6.5.5 That the risk management process be required throughout the life cycle of a project to permit the transfer of critical information between project phases and ensure that high-risk issues are being reported and addressed at the appropriate management level.
- 6.5.6 That ISD provide clear direction on the expectations of Project Managers in adherence to policy, directives, guidelines, procedures, processes and forms.
- 6.5.7 That ISD ensure that all staff assigned Project Management duties are assigned PM accountability.
- 6.5.8 That ISD continue to evolve its project management processes and to integrate best practices and principles from PMI.

**6.6 Recommendation 6: Performance Management**

- 6.6.1 That ISD establish key performance indicators (KPI) that track project and contract performance particularly in the two key areas of schedule and cost.

**6.7 Recommendation 7: Project Authority**

- 6.7.1 That ISD maintain the principle of full authority for PMs, but that this authority is within the context of the project scope, budget and schedule established in the Project Charter. Changes must then be escalated within ISD to the appropriate level.

**6.8 Recommendation 8: Contract Default**

- 6.8.1 That ISD in conjunction with Supply Branch refine policies and procedures to effectively deal with contract defaults beyond the current use of Liquidated Damages.

**6.9 Recommendation 9: Supplier Performance**

- 6.9.1 That the Vendor Performance System currently under development includes a provision for assessment of contractor performance during the work to be used as means of communication for performance expectations with consequences for future bid opportunity.

## 7.0 Summary Remarks

The City in its Statement of Work requested that the assessment of decisions and processes would focus on key project stages. In accordance with this request the recommendations have been summarized as follows:

**Environmental Assessment Process:** The EA for this project was comprehensive and no issues were observed with the process once it began. The fact that the process was delayed by 8 months due to staff workload is viewed as a management issue and no recommendations are offered in this regard. While the transfer process has been improved (see below) it is still recommended (6.5.1) that ISD have input to the project milestones established early in this process.

**Project Intake Process:** ISD procedures now require a scoping meeting at time of project handover to ISD to ensure that project requirements can be delivered and are fully understood. Further the ISD process identifies a Project Manager at the time of this scoping event (ISD PDM2013 page 27 Planning/Startup process map). ISD now either agree with the EA milestones at time of transfer or have the authority to revise them. Recommendation 5.1 suggests that ISD have input to project timelines in advance of the transfer to avoid the setting of unrealistic expectations or establish design and delivery standards that can be used by client departments. Recommendation 6.1.1 suggests that a project schedule (high level) be prepared at this time by the PM and used as the baseline for the delivery of the project. Consultant and Contractor schedules become a component of this project schedule.

**Project Design:** The context of Project Manager's involvement in the design process is well established in the new ISD PDM2013 as an oversight and coordinating role. This has evolved from a compliance function at the time of the project. Recommendations 6.3.1 & 6.3.2 have been made to ensure that Project Managers take an active role in the oversight of the design process and ensure all contract deliverables are received. It is also suggested that additional guidance on consultant administration be incorporated into the procedures manual (Recommendation 6.5.3).

**Project Construction:** ISD have detailed contract inspection and administration guidance in their procedures manual however the focus appears to be more on administration rather than management. It is recommended (6.5.4) that additional guidance be incorporated into ISD PDM2013 to deal with construction issues such as scheduling, defaults, insurance, bonding and claims management. Further recommendation 6.4.1 was made to ensure that constructability be included in the risk matrix and where applicable consider the use of a pre-qualification process to ensure that the necessary expertise is held by the Supplier. Recommendations 6.8.1 and 6.9.1 would assist in dealing with non-performing Suppliers.

**Project Oversight:** ISD has evolved their policies and procedures significantly since the time of the Bridge project. A number of recommendations are offered to further enhance the project management discipline within ISD. A clear statement of expectations would help link all of the various policies, procedures, directives

and guidance documents. Measures noted in recommendation 6.5.6 would be a key link in this system that would ensure all PMs know precisely what the expectations are in relation to their function. Further all PMs should carry the job profile or be assigned these accountabilities at time of appointment (Recommendation 6.5.7). To ensure that expectations are being met Recommendation 6.5.2 suggests that a quality system be incorporated into ISD business processes to review/audit projects in a systematic way. And finally the adoption of the Project Management Institute (PMI) principles will further advance the discipline of project management (Recommendation 6.5.8).

Project Managers have full authority to deliver within defined scope and budget. Recommendation 6.7.1 suggests that this authority be limited to the established project schedule at time of transfer (PIF) and that any deviation require escalation for revision.

Risk Management procedures have evolved since the time of the Bridge project and are a good start to a critical project management function. Recommendation 6.5.5 was made to ensure that this process is adopted early in the project cycle and carried through to project close-out.

Communication of project issues is a critical element of perceived success or failure. Recommendation 6.2.1 suggests that a communication protocol articulated in the Project Charter would establish clear lines of communication. Further an inquiry process for elected officials would ensure a consistent and timely response to inquiries (Recommendation 6.2.2).

And finally and perhaps most importantly that ISD develop key performance indicators (KPIs) particularly for budget and schedule performance at both the project and contract level (Recommendation 6.6.1). This provides an important benchmark from which to view ISD and PM performance.

SEG are pleased to have had the opportunity to participate in this important review and hope that these recommendations will assist the City in delivery of future projects.

## **8.0 Appendices:**

- A: City of Ottawa, Statement of Work, Airport Parkway Pedestrian/Cycling Bridge, Third Party Review
- B: SEG Management Consultants Proposal (quote for services removed)
- C: Summary of Documents made available by the City
- D: List of Interviews
- E: Project Timeline