Ottawa

Office of the Auditor General

AUDIT OF IT GOVERNANCE

Tabled at Audit Committee – March 12, 2015

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Executive Summary

Introduction

The Audit of IT Governance was included in the 2013 Audit Plan of the Office of the Auditor General (OAG), as approved by City Council in October 2012.

Background

The City of Ottawa's (the City's) IT Services Department (ITS) has principal responsibility for the deployment and maintenance of the IT resources used to deliver City services to people, businesses and visitors of Ottawa. ITS' net operating budget for 2013 was $52.1 Million, and it had a workforce of 352 full-time equivalents. ITS' 2013 capital budget was $11.5 Million.

Nature and Importance of IT Governance

The City's governance structure, like those of other Ontario cities, facilitates the legislative process. It consists of several different but related bodies, namely City Council, Standing Committees, Advisory Committees and arms-length Agencies, Boards and Commissions ("ABCs"), and the regulatory tools that govern those Committees, such as the Procedure By-law, the Delegation of Authority By-law and the Public Notice By-law.

The governance structure is designed to enable formal, direct community input into decision-making through citizen's Advisory Committees and Standing Committee presentations to elected representatives. It also facilitates the legislative and governmental work of the elected officials through Standing Committees and City Council meetings. Information Technology (IT) Governance is a subset of the City's overall governance structure.

IT Governance involves managing IT operations and IT projects to ensure alignment between these activities and the needs of the organization as defined in its strategic plan. This alignment means:

- Organizational management understands the potential and limitations of IT;

- The IT function understands the objectives and corresponding needs of the organization; and,

- This understanding is applied and monitored throughout the organization via an appropriate governance structure and accountability.

In addition to the implicit benefits associated with these three outcomes, research indicates that proper alignment of organizational needs and IT can result in substantial financial benefits.

There are a variety of features and attributes associated with effective IT Governance. This includes combinations of processes, controls and other mechanisms that help ensure investments in IT generate value, mitigate related risks and otherwise increase an organization's ability to achieve its goals and objectives. It also involves having a well-defined set of performance metrics that support measurement of success and help determine priorities that will improve the effectiveness and efficiency of IT operations and IT projects. While there are many widely accepted standards associated with effective IT Governance, there is no "one size fits all" when it comes to defining an optimal state for any specific organization. As such, leading organizations seek to continually improve their IT Governance such that its level of maturity best reflects and serves the organization's environment, strategies and objectives.

At the outset of this audit, the City was in the midst of developing and implementing a plan to transition its IT Governance to a higher level of maturity. This transition plan included a restructuring of IT functions, as well as updated accountabilities, governance bodies and related processes. These changes were designed to support and enhance the value associated with the City's IT investments and infrastructure and are described in more detail in the next section.

Changes to the City's IT Governance

Since 2012, the City has taken steps to enhance the overall maturity of its IT Governance. This transition includes a variety of elements including a restructuring of IT functions, new accountabilities, governance bodies and related processes. These changes were designed to support a general objective of increasing the value-added associated with the City's IT investments.

One of the key elements of this initiative was the development of an integrated plan which included changes to the organizational structure and an updated governance structure. The transitional Chief Information Officer (CIO) was tasked with developing this plan on behalf of IT Services (ITS) Department. The goal of this plan was to further enable ITS to stay focused on its key objectives, deliver on its strategy, and ensure effective communication both within ITS and the City as a whole.

The transitional CIO along with the Information Technology Services Department developed several guiding principles that inform the outlook and approach to the deployment of IT resources and how the Department achieves its business goals. Some of these principles are:

- Prioritize IT investments across the enterprise, based on alignment with corporate business strategies;

- Provide access to information in a secure manner and protect personal information;

- Evolve a standards-based technology   architecture that is integrated with City businesses, enabling cost-effective evolution of services and infrastructure and connectivity with City residents and business partners; and,

- Emphasize greater use of electronic information to conduct day-to-day business and reduce the City's dependency on natural resources.

Another recent (November 2012) development was the creation of a Technology Roadmap for 2013-2016, which was developed by ITS with the support of the IT Sub-Committee of the Finance and Economic Development Committee (FEDCO). This Roadmap aligns to the Term of Council Vision, which reads: "Over the next four years, the City of Ottawa will increase the public's confidence in city government and improve resident, enterprise, and visitor satisfaction with City services". The ITS Technology Roadmap outlines planned key strategic investments and building blocks that will position the City of Ottawa to respond to business needs and citizen expectations.

Finally, there were important developments concerning the CIO which occurred during the course of this audit. In July 2013, the City hired a permanent CIO. While the conduct phase of this audit was largely complete by that time, the audit team met with the new CIO to review the scope and objectives of this audit as well as to obtain feedback on audit findings. In early December 2013, while this audit was in reporting phase, the CIO position was once again vacant. As an interim measure, functional accountability for ITS was delegated to an Acting CIO, an individual who had been a Manager within ITS. This very recent development, the turnover at the CIO position, increases the risk that the overall effectiveness of the City's IT Governance will be impaired.

Audit Objectives, Scope and Approach

The overall audit objective was to provide Council with independent assurance regarding the appropriateness and completeness of the City's IT Governance. In particular, the audit was designed to examine the extent to which related organizational structures, leadership and processes are likely to effectively and appropriately support the following:

- Delivery of value;

- Identification, prioritization, monitoring, and measurement of IT resource allocations; and,

- Alignment with the City's strategies and objectives.

In order to provide this assurance, and to account for the in-transition state of IT Governance within the City, the specific audit objectives focus on the extent to which existing/proposed IT Governance structures, leadership and processes reflect relevant leading practices (e.g. COBIT, Information Technology Infrastructure Library IT Service Management Framework, ISO 20000, ISO 38500, Organization for Economic Cooperation and Development Corporate Governance, etc.). In 2012, the Institute of Internal Auditors (the "IIA") published "Global Audit Technology Guide #17 – Auditing IT Governance" (or "GTAG 17") which brings together these various leading practices and organizes them around five thematic areas. As such, five audit objectives have been developed to align with the following five important components of effective IT governance:

1. Organization and governance structures
2. Strategic and operational planning
3. IT Organization and risk management
4. Executive leadership and support
5. Service delivery and measurement

Figure 1: Five Important Components of Effective IT Governance (Source: Global Technology Audit Guide "GTAG" 17)

The scope of the audit addressed each of the five components identified above as well as the consideration of savings opportunities. Given changes underway at the time of the audit, the scope included an assessment of IT Governance as it existed at the time of the audit, as well as changes that were planned for future implementation.

This audit involved a planning, conduct and reporting phase. The planning phase of the audit involved various procedures and techniques, including high level review and analysis of relevant documentation and selected interviews with City Staff and Management. The conduct phase involved two main elements: a document review and a series of structured interviews.

In accordance with City of Ottawa Audit Standards, our audit was designed to ensure that sufficient and appropriate audit procedures were conducted and evidence gathered to provide reasonable assurance of the accuracy of audit findings and conclusions. The conclusions are based on a comparison of situations, as they existed at the time of the audit against the audit criteria.

Summary of Key Findings

Organization and Governance Structures

Guidance published by the IIA states that "clear organizational structures, the operational nature of their components, how they communicate with each other, and the accountability protocols are important for the IT function to provide the required types and levels of services for the enterprise to achieve its objectives." Within this context we expected to find that either a permanent Chief Information Officer (CIO) was in place or there was a recruiting process to hire a permanent CIO. We also expected that roles and responsibilities were clearly defined and communicated, and organization leaders were empowered and held accountable for results. IT Governance should be effectively integrated into the City's overall governance structure and committees would be in place to enable alignment of the City's needs with IT services. Finally, we expected that the CIO and senior City Staff meet and discuss progress of plans on a regular basis.

During the course of audit conduct, we found that the City meets many of the expectations described above. For example, a CIO recruiting process led to the replacement of the transitional CIO with a permanent employee in early July 2013. We verified the existence of a CIO position description that provides roles and responsibilities, and identified that the CIO sits on the City's Senior Management Committee. We also found that job descriptions within ITS, which we noted were in the process of being updated, further support the alignment of authorities and accountabilities. Accountabilities are also supported by Individual Contribution Agreements (ICAs). As a function, ITS roles and responsibilities are clearly defined and communicated through formal and informal means (e.g. through regular meetings/presentations). Results of interviews and document review indicated that communication and clarity of ITS accountabilities and roles & responsibilities have improved over time and helped ITS better serve and align with its various stakeholders.

In terms of oversight bodies related to IT, we identified committees and an overall committee structure that were largely functioning in an effective manner and in a manner that supports clear and aligned roles and responsibilities. We also found that the recent changes to the committee structure have been effectively integrated into the pre-existing City governance structures. Moreover, most committees have Terms of Reference (with the exception of the IT Governance Committee) and membership appears to be appropriate. Therefore the new IT Governance Committee structure appears well-positioned to enable, align and oversee the recently enhanced project planning processes.

Notwithstanding the positive results noted above, some issues related to this element of IT Governance were identified. For example, we identified a lack of explicit documentation regarding how ITS supports the City in achieving its broad objectives.

From a bottom-up view, this was evident in the ITS Technology Roadmap which describes key strategic investments but does not articulate how specific projects will contribute to the City's objectives. From a top-down view, this was evident in the City's 2011-14 Strategic Plan which references a number of technology initiatives but does not link to specific IT services as articulated by ITS.

We also noted that, while presentations to the Corporate Information Technology Management Team (CITMT) address expected topics (i.e. related to IT service delivery), there is a risk that key items are not discussed at the CITMT as the meetings do not follow a formal agenda. In addition, the IT Governance Committee is not supported by formal Terms of Reference and therefore there is no formally approved document to describe its purpose and structure. At the time of the audit, it was not clear that the IT Governance Committee was to continue to exist or otherwise serve a formal role.

Finally, we found that the ICAs lack "measureable" objectives. Such objectives are considered good practice in serving to reinforce accountabilities of ITS personnel, including the CIO. Examples of measureable objectives include those related to successfully implementing projects on time or within budget.

Executive Leadership & Support

Strong tone at the top and executive leadership plays an important role in ensuring alignment between IT and the wider organizational objectives. This means that there is a strong vision among senior management and the executive regarding the strategic importance and potential of the IT function. There are several elements which enable strong leadership and executive support and which we expected to find over the course of our audit. Specifically, GTAG 17 identifies the following leading practices:

- Senior City Management to clearly define and communicate roles and responsibilities for the IT function with respect to the City's achievement of strategic and tactical goals;

- The roles and responsibilities of the CIO to be clearly defined and communicated within a reasonable period of time after a new CIO is selected;

- The CIO to meet with Senior City Management on a regular basis to discuss IT service delivery related to strategic and tactical plans;

- IT operations and IT projects are to be provided with adequate funding and resources to meet the City's needs; and,

- Accountability for policies and procedures to be documented and acknowledged by management and staff within a reasonable period of time after selecting a new CIO.

During the course of this audit, the City's ongoing challenges with successfully staffing the CIO position were highlighted. At the outset of this audit in early 2013, the CIO position was staffed by a transitional CIO; a consultant who had been contracted by the City to lead improvements in the City's IT Governance and to set a new corporate strategic direction for ITS. At the same time, the City had undertaken a recruiting process that ultimately resulted in the hiring of a full time CIO in July 2013. By July 2013, the conduct phase of this audit was substantially complete. Less than 6 months later, the new CIO left the position. While functional responsibility for ITS was delegated to an Acting CIO, the City began 2014 without a permanent CIO.

The extent of turnover at the CIO position has been substantial. The departure of the recently hired CIO in December 2013 meant that, since March 2004, there have been 8 individuals either in the CIO position or acting in that role, including 5 since June 2012. While recent surveys indicate that average tenures of public sector CIOs has been falling to less than 4 years , the turnover rate experienced by the City is concerning. For example, it is reasonable for a new CIO to take many months if not more than a year to fully understand an organization as complex as the City, and even longer to plan and deliver significant improvements and otherwise become fully effective in the role. Since amalgamation in 2001, the City has only been served by a CIO with more than 2 years of experience in that role for just over half of the time. This level of turnover impacts both the effectiveness of IT governance, but also the likelihood that improvements to IT governance made in 2012 and 2013 will be sustained. In any event, turnover at the CIO position increases the likelihood that IT-related risks are not effectively managed and, as such, Management will need to continue ensuring these risks are carefully monitored. In addition, there is an ongoing need for clear and consistent executive support of the CIO's corporate strategic objectives, particularly in light of interviews conducted during the audit which indicated the presence of IT resources outside of ITS (e.g. within OC Transpo).

While recruiting, retention and succession planning, particularly at executive levels, are not new challenges for municipalities or for the public sector generally, the CIO staffing challenge experienced in 2013 serves to emphasize the importance of strong leadership and executive support for importance and potential of the IT function. As discussed elsewhere in this report, the City has an increasing reliance on IT systems and solutions to both meet its ongoing commitments to citizens, but also to enable achievement of significant number of key strategic objectives. Without a qualified and experienced CIO, there is an increased risk that the effectiveness of IT governance within any organization as large and complex as the City of Ottawa would be considerably impaired. Further, there is an increased risk that many of the positive attributes of the new governance processes introduced under the interim CIO in early 2013 will not be sustained in the absence of an appropriately qualified and experienced CIO. In any

event, the Deputy City Manager (the position to whom the CIO reports) and Council's IT Sub-Committee will need to carefully evaluate and monitor these risks as well as taking steps to identify and address the root causes underpinning the recruitment, retention and succession planning challenges that have resulted in the increased risks.

Notwithstanding the potentially significant issues associated with the absence of a CIO, including the sustainably of IT governance processes, expectations were generally demonstrated through the course of the audit work (i.e. audit procedures conducted in the spring and early summer of 2013). Some of the more notable findings included that we found ITS responsibilities to be effectively communicated to other parts of the City through various means (including project charters and service desk communications). While this audit did not involve a detailed assessment of IT policies, we identified a comprehensive set of relevant policies within ITS, and a clearly defined accountability for these policies (e.g. Information Security, Information System Security, Responsible Computing, Information Risk Management and Remote Access to City Network, etc.).

We also found that a strong tone at the top is demonstrated by the new investment planning process. This initiative has resulted in a more strategic approach to prioritizing IT projects as it involves all City departments working together to prioritize all projects in a way that best supports the City's strategic priorities within a specific budget constraint.

In addition to the significant recommendation related to the staffing of the CIO position, we note that some of the other recommendations in this report can be linked to potential areas of improvement within the realm of executive leadership and support. For example, no articulation of ITS' role in achieving the City's strategic objectives or the lack of established performance indicators related to ITS's strategic value (see Recommendation 6) suggest possible gaps in the executive leadership's success in positioning IT as a strategic enabler.

Strategic and Operational Planning

A strategic plan, which lays out organizational dependencies on IT as well as ITS's role in achieving the organization's strategic objectives, is a crucial component of effective IT Governance. Leading practices also emphasize the need for alignment between ITS's tactical operating plan and the corporate strategic plan.

In examining this component at the City of Ottawa, GTAG 17 identifies the following elements as leading practices:

1. That the City's Strategic Plan incorporates a description of how ITS will be required to support and enable value creation (similarly, ITS Plans incorporate a description of how its plans will support the City's Strategic Plan).

2. That the City's Strategic Plan will be supported by individual tactical operating plans that take into account ITS requirements and deliverables.
3. That all plans will state objectives and performance metrics, appropriate budget, timelines, and staff allocations.
4. That key performance indicators (KPIs) will be used to measure and monitor the effectiveness of the ITS function.

While a number of opportunities for improvement exist, a review of the City's Strategic Plan and the ITS Plan (known as the Technology Roadmap) revealed the existence of these elements. Both of these documents provide insight to IT initiatives including the objectives of these initiatives.

The 2011-2014 Strategic Plan identifies Council's priorities over its term. It is integrated with the City's budget and long-range financial planning processes. Each strategic objective is supported by one or more strategic initiatives which, in turn, are aligned to one or more performance measures. For example, the Strategic Plan contains performance targets related to such metrics as web portal usage.

The Strategic Plan was found to incorporate a variety of references to planned IT-based elements within the descriptions of related strategic initiatives. While the connections were not explicit in the documents, there is evidence of alignment between the Strategic Plan and the Technology Roadmap. For example, a project in the Technology Roadmap that is related to the City's overall IT Web Technology Platform clearly links with an initiative appearing in the Strategic Plan that relates to increasing the percentage of service and information requests processed via the Web. We also found evidence of tactical operating plans (i.e. individual departmental plans) that support strategic objectives identified in the Strategic Plan and which include references to IT-related requirements. For example, an IT project proposed by the City Clerk and Solicitor Department in connection with the 2014 municipal elections is also reflected in the Strategic Plan which contains a vote tabulation solution which is to be implemented for the 2014 elections.

However, the assessment of the Technology Roadmap and the City's Strategic Plan also resulted in the identification of a number of areas for improvement. In particular, the lack of explicit linkage and common terminology between the Strategic Plan and the IT projects described in the Technology Roadmap makes it difficult to see how individual IT projects are contributing to strategic objectives. Further, the Strategic Plan does not clearly define ITS's role and responsibilities in achieving strategic objectives nor does it identify the City's IT-related dependencies.

As with any function, it is important that ITS can clearly "see itself" in the Strategic Plan as a means to promote a coordinated and efficient approach to IT investments. Without

clearly defined roles and responsibilities in the Strategic Plan, the City's ability to measure the effectiveness of ITS's contribution to strategic goals is threatened. Moreover, there is an increased risk of misalignment between IT goals and the City's overarching goals.

We also expected to identify more evidence of how the City considered and accounted for current and planned IT capacity within the Technology Roadmap and Strategic Plan. This capacity may be measured in terms of financial resources, technical/other dependencies, number/capabilities of ITS staff, and any other items that would help to indicate how capacity was considered in developing initiatives and plans.

Another area for improvement is around the use performance indicators and related measures. While the audit identified that additional performance measures were to be developed by ITS, the current suite of performance measures were found to be insufficient as they focus only on basic operational aspects of the IT function (e.g. "down time") as well as the basic measures associated with IT projects (e.g. schedule and cost). GTAG 17 also indicates a need for performance indicators and related metrics which would support an evaluation of ITS's contributions to the City's strategic goals. Moreover, while there are some potentially relevant performance measures included in the Strategic Plan, they are not clearly assigned to ITS. There was a lack of performance metrics which address the business benefits associated with IT projects. For example, measures which address the extent to which IT projects achieved projected Return on Investment (ROI) objectives.

Service Delivery and Measurement

As identified in GTAG 17, an effective performance management framework "...captures the right quantitative and qualitative data to enable proactive measurement, analysis, and transparency further assures sound IT governance."

In examining the City's IT performance and service delivery measurement component, we had three main expectations. First, we expected to find that Council and senior management have a clear understanding of ITS costs and how those costs contribute to the achievement of organization strategic objectives. Second, we expected CIO performance to be measured by financial (e.g. performance against budget) and nonfinancial data (e.g. technical and non-technical user satisfaction) and that management monitor and measure ITS performance. Finally, we expected ITS executives to have IT controls in place for financial reporting, transaction processing, electronic messaging, data and database management, information protection and e-content management.

Notwithstanding the need to expand the number of performance measures as noted earlier, audit work indicated that ITS makes use of relevant tools and practices in order

to monitor, measure and manage performance. For example, we found that ITS follows an industry standard project management process when conducting investment reviews. ITS also uses a Balanced Scorecard to track projects and which identifies budgeted FTEs as well as budgeted expenditures and interdependencies for major projects. We also noted that investment reviews provide senior management with visibility to key IT investments. Finally, we noted that IT controls related to financial reporting are assessed annually as part of the Financial Statement audit and that other areas (e-mail, security, etc.) have been subject to audits from time to time by the OAG.

The effectiveness of these tools and practices was supported by interviewees who demonstrated a good understanding of IT costs. However, we also found that stakeholders are not clear about how IT costs contribute to the City's strategic objectives. Further, and as referenced in Section 5.3 of the full report, ITS currently does not effectively measure its value either in terms of contributions to strategic goals or the business benefits associated with IT projects.

IT Organization and Risk Management

In evaluating the IT organization's risk management practices, we expected to find three key elements. Firstly, we expected there to be standard IT hardware, software, and service procurement policies, procedures, and controls in place. Secondly, that risks be managed effectively in relation to meeting the City's needs, security, and compliance requirements. Finally, GTAG 17 indicates an expectation that data is standardized and easily shared across applications and the IT infrastructure.

We found that there is an extensive suite of policies, procedures and controls in place (e.g.: related to software, IT procurement, enterprise content management, security, etc.) that should serve to support standardization across the City. We also found evidence of standardized data and of sound approaches to support sharing of information across applications (e.g. the use of Business Intelligence Software to link financial and HR databases).

In terms of risk management, we identified the existence of a risk-management policy within ITS and found that the ITS Scorecard template requires documentation of risks related to specific projects. Further, the Technology Roadmap identifies a number of IT-related risks, including risks related to the following:

- Legacy applications;

- Unplanned failures;

- Security of information assets;

- Web technology failure; and,

- External threats.

While the risks identified in the Technology Roadmap appear relevant, the audit noted a lack of documentation supporting the identification and assessment (likelihood and impact) of risks within ITS.   Without formalized processes for identifying and assessing risks there may be a lack of consistency in the application of the process and/or understanding of the results of the analysis.

There was also an expectation of effective vertical communication of risks between ITS and the higher level/Citywide-view of risks (i.e. the Corporate Risk Profile) that was not demonstrated. Specifically, there was no guidance within the ITS Risk Management Policy as to how higher priority IT risks should be communicated up to the City's corporate risk committee. Further, it is not clear how corporate risks are cascaded down from the corporate level to ITS. This has resulted in unclear alignment between ITS risks and City-wide/corporate risks. This lack of alignment can lead to an increased likelihood of either duplicating or missing risk management activities.

Recommendations and Management Responses

Recommendation 1
That ITS develop documentation that clearly establishes the linkage between IT Services and the City's broad objectives to support governance bodies and others in the promotion and monitoring of alignment of the City's needs with IT Services. This linkage should be tracked and monitored using the ITS Scorecard.

Management Response

> Management agrees with this recommendation. The Business Technology Plan replaced the previous Technology Roadmap and was approved by the IT Sub-Committee in November of 2013. The Business Technology Plan includes key IT projects that directly support strategic objectives in the City Strategic Plan and articulates the role of ITS in supporting those projects to achieve their stated objectives. The Business Technology Plan initiatives are tracked and monitored on a monthly basis using the ITS Scorecard.

Recommendation 2
That CITMT be supported by formal agendas and the IT Governance Committee, to the extent it continues to act in a formal role, and that it be supported by a formal Terms of Reference which documents the Committee's purpose and structure.

Management Response:

> Management agrees with this recommendation. Formal agendas for the CITMT meetings are part of the governance process and have been consistently in place

since January 16, 2014. As a result of this recommendation, Management will undertake a further review of the agenda format to ensure standing items, such as Confirmation of Minutes and Roundtable, are addressed at each meeting.

In April of 2014, the IT Governance Committee was replaced by the Senior Management Committee (SMC) to further align the IT governance model with the existing City corporate governance structure. The Terms of Reference for CITMT were developed in 2013 and further revised in April 2014 to reflect the change in reporting structure from the IT Governance Committee to SMC.

Recommendation 3

That going forward, the process to develop objectives for purposes of the CIO's ICA is reviewed to better reflect objectives that are measurable.

Management Response:

Management agrees with this recommendation. The performance expectations and objectives of the CIO will be documented in an annual work plan to support the job description deliverables, Business Technology Plan, City Strategic Plan and departmental operational plans. The CIO's performance on the objectives outlined in the work plan will be reviewed and documented via the annual ICA process with the Deputy City Manager, City Operations.

Recommendation 4

That management expedite the recruitment of an appropriately qualified and experienced CIO. Further, that they review and confirm expectations and related practices concerning the CIO to ensure alignment with leading practices whereby the IT function is viewed, empowered and supported as a strategic enabler.

Management Response

Management agrees with this recommendation. The recruitment of the next CIO is currently in progress and is scheduled to be completed by the end of Q3 2014. Management agrees that the CIO position is a critical position within the organization and is a strategic enabler to assist the City in achieving its strategic goals. The expectations regarding the role and its deliverables will be set during the recruitment process and further outlined in the letter of offer to be sent to the successful candidate. As part of the on-boarding process, the Deputy City Manager, City Operations and the new CIO will review the work plan referenced in the management response to Recommendation 3 and will discuss overall performance expectations.

Recommendation 5

That management develop an effective CIO succession plan to be implemented once a new CIO is retained.

Management Response

Management agrees with this recommendation. As part of the corporate succession planning strategic initiative, all critical roles in the ITS department have been identified and succession plans are currently in development / implementation as part of the departmental workforce planning. The succession plan for the CIO will be reviewed by the Deputy City Manager, City Operations and the new CIO by Q1 of 2015 and development plans will be established with the potential successors.

Recommendation 6

That management ensure that the city's strategic objectives, as reflected in the Technology Roadmap, articulate the linkage to key IT projects. ITS' role in achieving strategic objectives, performance metrics, and IT-related dependencies should also be reflected.

Management Response

Management agrees with this recommendation.   The Business Technology Plan, which replaced the previous Technology Roadmap and was approved by Council's IT Sub-Committee in November of 2013, is currently where these relationships are captured. Management will examine opportunities to further align the Business Technology Plan with key initiatives and objectives outlined in the City Strategic Plan to further articulate the role of ITS in supporting these projects and will continue to monitor ITS capacity through the annual review of the Business Technology Plan. Business benefits and associated key performance measures are the joint responsibility of ITS and client departments leveraging the technology to achieve their business outcomes

Recommendation 7

That ITS continue to work toward developing additional KPIs related to their performance and to the business benefits associated with IT projects.

Management Response

Management agrees with this recommendation. It is the client department's responsibility to report on the business benefits and associated key performance measures. As part of the CITMT planning process for identifying departmental and/or corporate initiatives requiring ITS resources, client departments are required to complete a corporate business case which specifies the business value and any expected performance measures, such as the estimated return on investment (ROI) and planned project timelines. Client departments are expected to further refine the

project details and deliverables in their project charter documents, and are responsible for tracking and realizing the benefits associated with their IT projects.

Recommendation 8

In developing the performance measures referenced in Recommendation 6, that ITS consider, among others, specific measures that will support a better understanding of how IT expenditures are contributing to the City's strategic objectives and identify ITS's capacity to conduct projects.

Management Response

Management agrees with this recommendation. As part of the CITMT planning process, departments are required to outline the business value associated with their proposed IT projects and demonstrate clear alignment to the strategic initiatives and objectives identified in the City Strategic Plan. Direct alignment to Council-approved priorities is a main criterion for IT project and resource approval via the IT governance process. As referenced in the management response to Recommendation 7, departments are required to specify the business value and expected deliverables and performance measures within a corporate business case document and subsequent project management documents, such as charters. Departments are responsible for tracking their project deliverables and measuring outcomes.   Management, as part of the IT governance process, will summarize and monitor all measures emanating from IT projects identified in the approved Business Technology Plan and will explore suitable measures to demonstrate ITS' contribution of expenditures and resources to the City's strategic objectives.

Recommendation 9

That the ITS Risk Management Policy include guidance on how higher priority IT risks should be communicated up to the City's Corporate Risk Committee. Further, ITS should work with City Staff to develop guidance around expectations for the communication of corporate risks down to ITS. ITS should also develop or obtain formal documentation which describes the identification and assessment of IT risks within the Department.

Management Response

Management agrees with this recommendation. The ITS Information Risk Management Policy is used to manage information risk according to its criticality and importance to the City. The Policy is directly linked to the City's Enhanced Risk Management framework and identifies that the Director, ITS and CIO has overall responsibility for risk management activities within the department, including ensuring that higher priority IT risks are communicated appropriately. Further, as part of the City's Enhanced Risk Management program, each department follows the corporately approved process to identify, assess and mitigate risk. Each

department submits a corporate risk profile and register on an annual basis that identifies and provides an assessment of the risks within a department. These risk profiles, which capture higher priority IT risks, are assessed by Corporate Business Services and reported to the Corporate Risk Management Steering Committee and Senior and Executive Management. Corporate risks are communicated down to the ITS department to ensure alignment.

Potential Savings

The audit identified opportunities for potential cost savings in the area of increased efficiency. In particular, it was noted that in addition to the IT Services staff, there are City departments with employees engaged in IT-related duties. This creates the risk that some work may be duplicated. An opportunity to avoid this duplication exists in ensuring all IT activities (corporate and departmental) are aligned, and that all employees with IT-related duties are in close communication with ITS.

Along the same lines, it was noted that there are several IT related committees. Some of these committees share similar roles and responsibilities. For example one of the roles of the CITMT committee is to shepherd the IT plan through the budget process. One role of the IT Governance Committee is to support the IT plan through the budget process. In another example, one of the roles of the CITMT committee is to ensure there is one corporate IT plan for the City. Similarly, one of the roles of the Governance Committee is to make the IT plan a corporate plan. By identifying and reducing any overlap in committee roles and responsibilities the City can reduce the risk of duplicating work.

Once improvements are made to the ITS Risk Management policy and the City is assured that all ITS risks are incorporated in the City's Enhanced Risk Framework, the risk of duplication of risk-management efforts may be reduced. This will also help to establish relative priorities.

When the Technology Roadmap is linked to the City's Strategic Plan, the risk of technology projects not contributing to the City's overall goals will be also be reduced.

Conclusion

Except for the findings discussed in this report, in our opinion, based on the evidence gathered at the time of the audit, we believe the City had established the necessary items to implement an effective IT Governance structure. However, without a qualified and experienced CIO, there is an increased risk that the effectiveness of IT governance would be considerably impaired. Further, there is an increased risk that many of the positive attributes of the new governance processes introduced under the interim CIO in early 2013 will not be sustained. The changes made to ITS Governance support a general objective of increasing the value-add associated with the City's IT investments.

The City's plans to transition IT Governance reflect industry standards and otherwise appear appropriate and complete in terms of assisting IT to deliver value, identify, prioritize, monitor, and measure IT resource allocation decisions, and ensure alignment with City strategies and objectives.

Acknowledgement

We wish to express our appreciation for the cooperation and assistance afforded the audit team by management.

The following section is the detailed audit report

1.1 Detailed Audit Report

1.1.1 Introduction

The Audit of IT Governance was included in the 2013 Audit Plan of the Office of the Auditor General (OAG), as approved by City Council in October 2012.

1.1.2 Background

1.1.2.1 IT Services Department

The City of Ottawa's (the City's) IT Services Department (ITS) has principal responsibility for the deployment and maintenance of the IT resources used to deliver City services to people, businesses and visitors of Ottawa. ITS's net operating budget for 2013[1] was $52.1 Million, and it had a workforce of 352 full-time equivalents. ITS's 2013 capital budget was $11.5 Million.

1.1.2.2 Nature and Importance of IT Governance

The City of Ottawa's governance structure, like those of other Ontario cities, facilitates the legislative process. It consists of several different but related bodies, namely City Council, Standing Committees, Advisory Committees and arms-length Agencies, Boards and Commissions ("ABCs"), and the regulatory tools that govern those Committees, such as the Procedure By-law, the Delegation of Authority By-law and the Public Notice By-law.

The governance structure is designed to enable formal, direct community input into decision-making through citizen's Advisory Committees and Standing Committee presentations to elected representatives. It also facilitates the legislative and governmental work of the elected officials through Standing Committees and City Council meetings. Information Technology (IT) Governance is a subset of the City's overall governance structure.

IT Governance involves managing IT operations and IT projects to ensure alignment between these activities and the needs of the organization as defined in its strategic plan. This alignment means:

- Organizational management understands the potential and limitations of IT;
- The IT function understands the objectives and corresponding needs of the organization; and,
- This understanding is applied and monitored throughout the organization via an appropriate governance structure and accountability.

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[1] All figures in this paragraph are from the City's 2013 Budget. The ITS capital budget amount does not include $11.1 Million in IT-related investments under the ServiceOttawa initiative.

In addition to the implicit benefits associated with these three outcomes, research indicates that proper alignment of organizational needs and IT can result in substantial financial benefits. There are a variety of features and attributes associated with effective IT Governance. This includes combinations of processes, controls and other mechanisms that help ensure investments in IT generate value, mitigate related risks and otherwise increase an organization's ability to achieve its goals and objectives. It also involves having a well-defined set of performance metrics that support measurement of success and help determine priorities that will improve the effectiveness and efficiency of IT operations and IT projects. While there are many widely accepted standards associated with effective IT Governance, there is no "one size fits all" when it comes to defining an optimal state for any specific organization. As such, leading organizations seek to continually improve their IT Governance such that its level of maturity best reflects and serves the organization's environment, strategies and objectives.

At the outset of this audit, the City was in the midst of developing and implementing a plan to transition its IT Governance to a higher level of maturity. This transition plan included a restructuring of IT functions, as well as updated accountabilities, governance bodies and related processes. These changes were designed to support and enhance the value associated with the City's IT investments and infrastructure and are described in more detail in the next section.

1.1.2.3   Changes to the City's IT Governance

Since 2012, the City has taken steps to enhance the overall maturity of its IT Governance. This transition includes a variety of elements including a restructuring of IT functions, new accountabilities, governance bodies and related processes. These changes were designed to support a general objective of increasing the value-added associated with the City's IT investments.

One of the key elements of this initiative was the development of an integrated plan which included changes to the organizational structure and an updated governance structure. The transitional Chief Information Officer (CIO) was tasked with developing this plan on behalf of IT Services (ITS) Department. The goal of this plan was to further enable ITS to stay focused on its key objectives, deliver on its strategy, and ensure effective communication both within ITS and the City as a whole.

The transitional CIO along with the Information Technology Services Department developed several guiding principles2 that inform the outlook and approach to the

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[2] These guiding principles are identified in Appendix A of the City of Ottawa's Technology Roadmap 2013-2016

deployment of IT resources and how the Department achieves its business goals. Some of these principles are:

- Prioritize IT investments across the enterprise, based on alignment with corporate business strategies;

- Provide access to information in a secure manner and protect personal information;

- Evolve a standards-based technology architecture that is integrated with City businesses, enabling cost-effective evolution of services and infrastructure and connectivity with City residents and business partners; and,

- Emphasize greater use of electronic information to conduct day-to-day business and reduce the City's dependency on natural resources.

Another recent (November 2012) development was the creation of a Technology Roadmap for 2013-2016, which was developed by ITS with the support of the IT Sub-Committee of the Finance and Economic Development Committee (FEDCO). This Roadmap aligns to the Term of Council Vision, which reads: "Over the next four years, the City of Ottawa will increase the public's confidence in city government and improve resident, enterprise, and visitor satisfaction with City services". The ITS Technology Roadmap outlines planned key strategic investments and building blocks that will position the City of Ottawa to respond to business needs and citizen expectations.

Finally, there were important developments concerning the CIO which occurred during the course of this audit. In July 2013, the City hired a permanent CIO. While the conduct phase of this audit was largely complete by that time, the audit team met with the new CIO to review the scope and objectives of this audit as well as to obtain feedback on audit findings. In early December 2013, while this audit was in reporting phase, the CIO position was once again vacant. As an interim measure, functional accountability for ITS was delegated to an Acting CIO, an individual who had been a Manager within ITS. This very recent development, the turnover at the CIO position, increases the risk that the overall effectiveness of the City's IT Governance will be impaired. The extent and nature of potential damage or delay to the continued implementation of the updated governance structure are yet to be determined. However, as described further in Section 5.2 of this report, the risks associated with ineffective recruiting, retention and/or succession planning can be considerable.

1.1.3 Audit objectives

1.1.3.1   Audit Objectives and Criteria

The overall audit objective was to provide Council with independent assurance regarding the appropriateness and completeness of the City's IT Governance. In particular, the audit was designed to examine the extent to which related organizational structures, leadership and processes are likely to effectively and appropriately support the following:

- Delivery of value;

- Identification, prioritization, monitoring, and measurement of IT resource allocations; and,

- Alignment with the City's strategies and objectives.

In order to provide this assurance, and to account for the in-transition state of IT Governance within the City, the specific audit objectives focus on the extent to which existing/proposed IT Governance structures, leadership and processes reflect relevant leading practices (e.g. COBIT, Information Technology Infrastructure Library IT Service Management Framework, ISO 20000, ISO 38500, Organization for Economic Cooperation Corporate Governance, etc.). In 2012, the Institute of Internal Auditors (the "IIA") published "Global Audit Technology Guide #17 – Auditing IT Governance" (or GTAG 17) which brings together these various leading practices and organizes then around five thematic areas. As such, five audit objectives have been developed to align with the following five important components of effective IT Governance:

The following five (5) audit objectives are described in GTAG 17 in terms of their role in supporting sound IT governance as follows:

1. **Organization and Governance Structure:** Clear organizational structures, the operational nature of their components, how they communicate with each other and the accountability protocols should support ITS in providing types and levels of service required by the City in order to achieve its strategic and operational objectives.
2. **Executive Leadership and Support:** The CIO, and other senior management team members should set a clear vision for the City, understanding and communicating how ITS supports and enables the City to achieve its objectives. A clear alignment of IT investments with the City's strategy will support the understanding of IT as a strategic enabler and not simply a cost.

3. **Strategic and Operational Planning**: The strategic plan should define organizational dependencies related to IT and ITS's role and responsibilities in achieving the objectives set forth in the plan. Tactical operating plans should serve to support alignment of IT requirements and deliverables within the City's strategic goals.

4. **Service Delivery and Measurement**: IT spending should be proactively managed and include measurement of resulting value increases, such as greater Return on Investment (ROI), from IT investments. Sound IT governance also includes an effective performance management framework that captures the right quantitative and qualitative data to enable proactive measurement, analysis, and transparency.

5. **IT Organization and Risk Management**: The information and technical components of the IT environment should be very well organized and clear direction must be provided to ITS through the strategic plan and properly designed organizational structures. Sound IT governance also requires that IT risks are managed effectively in relation to meeting the City's needs and requirements.

The sixth audit objective, related to savings, was added as follows:

6. **Areas of potential savings**: During course of examining the above-noted components of effective IT governance, any opportunities for cost savings will be identified and communicated.

The criteria for each of the audit objectives described above were drawn from industry leading practices. In particular, the audit focused on the extent to which the City has adopted leading IT governance practices, such as those referenced in IIA's Global Technology Audit Guide #17 – Auditing IT Governance ("GTAG 17").

Criteria have been organized according to each of the five audit objectives referenced above. The criteria that have been developed account for the in-transition state of IT governance. In particular, they account for the fact that a permanent CIO was hired during the course of audit conduct.

1.1.3.1.1   Audit Objective No. 1
Assess Organization and Governance Structures Criteria:
- There is either a permanent CIO in place or there is a recruiting process to hire a permanent CIO;
- Roles and responsibilities are clearly defined and communicated, and organization leaders are empowered and held accountable for results;
- IT governance has been effectively integrated into the City's overall governance structure;
- There are committees in place to enable alignment of the City's needs with IT services; and,

- The CIO and senior City Staff meet and discuss progress of plans on a regular basis.

1.1.3.1.2   *Audit Objective No. 2*

Assess Executive Leadership and Support Criteria:
- Senior City Staff have clearly defined and communicated roles and responsibilities for the IT function with respect to the city's achievement of strategic and tactical goals;
- The roles and responsibilities of the CIO are clearly defined and communicated within a reasonable period of time after a new CIO is selected;
- The new CIO plans to meet with the board and the senior management team on a regular basis to discuss IT service delivery related to strategic and tactical plans;
- IT has and will have adequate funding and resources to meet the City's needs; and,
- Within a reasonable period of time after selecting a new CIO accountability for policies and procedures will be documented and acknowledged by management and staff.

1.1.3.1.3   *Audit Objective No. 3*

Assess Strategic and Operational Planning:
- The strategic plan of the City incorporates a description of how ITS will be required to support and enable value creation;
- The City's strategic plan is be supported by individual tactical operating plans that take into account ITS requirements and deliverables;
- All plans state objectives and performance metrics, appropriate budget, timelines, and staff allocations; and,
- Key performance indicators (KPIs) are be used to measure and monitor the effectiveness of the ITS function.

1.1.3.1.4   *Audit Objective No. 4*

Assess Service Delivery and Measurement:
- The Council and senior City Staff have a clear understanding of ITS costs and how they contribute to the achievement of organization strategic objectives;
- The CIO performance will be measured by financial and nonfinancial data;
- Management will monitor and measure ITS performance; and,
  ITS executives will review IT controls for financial reporting, transaction processing, electronic messaging, data and database management, information protection and e-content management.

1.1.3.1.5   Audit Objective No. 5

Assess IT organization and Risk Management:

- There are standard IT hardware, software, and service procurement policies, procedures, and controls in place;
- Risks are managed effectively in relation to meeting the City's needs, security, and
- compliance requirements; and
- Data is standardized and easily shared across applications and the IT infrastructure.

1.1.3.1.6   Audit Objective No. 6

Identify areas of potential savings for the City in the efficient and effective management and operations of Information Technology Governance:

- Determine if potential savings are possible through a more efficient and effective management and operation of Information Technology Governance.

1.1.4 Audit Scope

The scope of the audit addressed each of the five objectives listed above as well as the consideration of savings opportunities. Given changes underway at the time of the audit, the scope included an assessment of IT Governance as it existed at the time of the audit, as well as changes that were planned for future implementation.

1.1.5 Audit approach

This audit involved a planning, conduct and reporting phase. The planning phase of the audit, which occurred during the period February through April 2013, involved various procedures and techniques, including high level review and analysis of relevant documentation and selected interviews with City staff and Management.

The conduct phase, which occurred primarily between May and August 2013[3], included two main elements: a document review and a series of structured interviews. IT Governance-related documentation was identified and reviewed to assess compliance against the audit criteria. This included a variety of IT policies and ITS documents (such as strategies, business plans, targets, monitoring reports, etc.), committee structures and mandates, along with minutes of relevant committees. Job descriptions, budgets and human resource plans were also analysed, along with the ITS Technology Roadmap. ITS key performance indicators (KPIs) were identified and assessed in conjunction with the City's Strategic Plan and ITS risk management procedures were

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[3] Some additional facts, pertaining to the departure of the CIO in December 2013, were gathered in late 2013.

identified and evaluated. Structured interviews were conducted with City staff and Management within ITS and with other departmental representatives.

In accordance with City of Ottawa Audit Standards, our audit was designed to ensure that sufficient and appropriate audit procedures were conducted and evidence gathered to provide reasonable assurance of the accuracy of audit findings and conclusions. The conclusions are based on a comparison of situations, as they existed at the time of the audit against the audit criteria.

1.1.6 Detailed Findings, Observations and Recommendations

1.1.6.1 Organization and Governance Structures

Guidance published by the IIA states that "clear organizational structures, the operational nature of their components, how they communicate with each other, and the accountability protocols are important for the IT function to provide the required types and levels of services for the enterprise to achieve its objectives." Within this context we expected to find that either a permanent Chief Information Officer (CIO) was in place or there was a recruiting process to hire a permanent CIO. We also expected that roles and responsibilities were clearly defined and communicated, and organization leaders were empowered and held accountable for results. IT governance should be effectively integrated into the City's overall governance structure and committees would be in place to enable alignment of the City's needs with IT services. Finally, we expected that the CIO and senior management meet and discuss progress of plans on a regular basis.

During the course of audit conduct, we found that the City meets many of the expectations described above. For example, a CIO recruiting process led to the replacement of the transitional CIO with a permanent employee in early July 2013. We verified the existence of a CIO position description that provides roles and responsibilities, and identified that the CIO sits on the City's Senior Management Committee (SMC). We also found that job descriptions within ITS, which we noted were in the process of being updated, further support the alignment of authorities and accountabilities. Accountabilities are also supported by Individual Contribution Agreements (ICAs[4]). As a function, ITS roles and responsibilities are clearly defined and communicated through formal and informal means (e.g. through regular meetings/presentations). Results of interviews and document review indicated that communication and clarity of ITS accountabilities and roles and responsibilities have improved over time and helped ITS better serve and align with its various stakeholders.

In terms of oversight bodies related to IT, we identified committees and an overall committee structure that were largely functioning in an effective manner and in a

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[4] ICAs are an important component of the City's performance management regime as they are a tool used to emphasize key behaviours and formalize performance measures.

manner that supports clear and aligned roles and responsibilities. We also found that the recent changes to the committee structure have been effectively integrated into the pre-existing City governance structures. Moreover, most committees have Terms of Reference (with the exception of the IT Governance Committee) and membership appears to be appropriate. Therefore the new IT Governance Committee structure appears well-positioned to enable, align and oversee the recently enhanced project planning processes.

The key bodies comprising IT Governance oversight role, including the new committees[5], are as follows:

Table 1 – IT governance oversight role

Committee	Membership	Reports to	Role (as it relates to IT)
IT Sub Committee	Councillors	FEDCO/Council	Advise FEDCO, other Standing Committees as well as City Council, and the Transit Commission on potential large-scale investment in IT and long-term planning of IT needs for the City.
Executive Committee	Executive Management including City Manager	N/A	Reviews and approves the ITS Plan.
Senior Management Committee	Senior Management including the CIO	Executive Committee/City Manager	Plan and execute strategies designed to implement the operations necessary to meet the objectives and expectations expressed by Executive Committee.
IT Governance Committee	Deputy City Manager Selected Directors	Senior Management Committee	Reviews and recommends approval of the ITS Plan.
Corporate IT Management Team (CITMT)	Senior management from various departments	IT Governance Committee	Overseeing the planning and delivery of projects for ITS.
Technology Committee	ITS senior technical staff. Staff from other departments with similar functions	CITMT	Focused technology issues.

Notwithstanding the positive results noted above, some issues related to this element of IT Governance were identified. For example, we identified a lack of explicit documentation regarding how ITS supports the City in achieving its broad objectives. From a bottom-up view, this was evident in the ITS Technology Roadmap which describes key strategic investments but does not articulate how specific projects will contribute to the City's objectives. From a top-down view, this was evident in the City's

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[5] See Appendix A for further description of the new Committees.

2011-14 Strategic Plan which references a number of technology initiatives but does not link to specific IT services as articulated by ITS.

We also noted that, while presentations to CITMT address expected topics (i.e. related to IT service delivery); there is a risk that key items are not discussed at CITMT as the meetings do not follow a formal agenda. In addition, the IT Governance Committee is not supported by formal Terms of Reference and therefore there is no formally approved document to describe its purpose and structure. At the time of the audit, it was not clear that the IT Governance Committee was to continue to exist or otherwise serve a formal role.

Finally, we found that the ICAs lack "measureable" objectives. Such objectives are considered good practice in serving to reinforce accountabilities of ITS personnel, including the CIO. Examples of measureable objectives include those related to successfully implementing projects on time or within budget.

Recommendation 1
That ITS develop documentation that clearly establishes the linkage between IT Services and the City's broad objectives to support governance bodies and others in the promotion and monitoring of alignment of the City's needs with IT Services. This linkage should be tracked and monitored using the ITS Scorecard.

Management Response
Management agrees with this recommendation. The Business Technology Plan replaced the previous Technology Roadmap and was approved by the IT Sub-Committee in November of 2013. The Business Technology Plan includes key IT projects that directly support strategic objectives in the City Strategic Plan and articulates the role of ITS in supporting those projects to achieve their stated objectives. The Business Technology Plan initiatives are tracked and monitored on a monthly basis using the ITS Scorecard.

Recommendation 2
That CITMT be supported by formal agendas and the IT Governance Committee, to the extent it continues to act in a formal role, and that it be supported by a formal Terms of Reference which documents the Committee's purpose and structure.

Management Response:
Management agrees with this recommendation. Formal agendas for the CITMT meetings are part of the governance process and have been consistently in place since January 16, 2014. As a result of this recommendation, Management will undertake a further review of the agenda format to ensure standing items, such as Confirmation of Minutes and Roundtable, are addressed at each meeting.

In April of 2014, the IT Governance Committee was replaced by the Senior Management Committee (SMC) to further align the IT governance model with the existing City corporate governance structure. The Terms of Reference for CITMT were developed in 2013 and further revised in April 2014 to reflect the change in reporting structure from the IT Governance Committee to SMC.

Recommendation 3

That going forward, the process to develop objectives for purposes of the CIO's ICA is reviewed to better reflect objectives that are measurable.

Management Response:

Management agrees with this recommendation. The performance expectations and objectives of the CIO will be documented in an annual work plan to support the job description deliverables, Business Technology Plan, City Strategic Plan and departmental operational plans. The CIO's performance on the objectives outlined in the work plan will be reviewed and documented via the annual ICA process with the Deputy City Manager, City Operations.

1.1.6.2   Executive Leadership and Support

Strong tone at the top and executive leadership plays an important role in ensuring alignment between IT and the wider organizational objectives. This means that there is a strong vision among senior management and the executive regarding the strategic importance and potential of the IT function. There are several elements which enable strong leadership and executive support and which we expected to find over the course of our audit. Specifically, GTAG 17 indicates the following leading practices:

- Senior Management to clearly define and communicate roles and responsibilities for the IT function with respect to the City's achievement of strategic and tactical goals;

- The roles and responsibilities of the CIO to be clearly defined and communicated within a reasonable period of time after a new CIO is selected;

- The CIO to meet with Senior Management on a regular basis to discuss IT service delivery related to strategic and tactical plans;

- IT operations and IT projects are to be provided with adequate funding and resources to meet the City's needs; and,

- Accountability for IT policies and procedures to be documented and acknowledged by management and staff within a reasonable period of time after selecting a new CIO.

During the course of this audit, the City's ongoing challenges with successfully staffing the CIO position were highlighted. At the outset of this audit in early 2013, the CIO

position was staffed by a Transitional CIO; a consultant who had been contracted by the City to lead improvements in the City's IT Governance and to set a new corporate strategic direction for ITS. At the same time, the City had undertaken a recruiting process that ultimately resulted in the hiring of a full time/permanent CIO in July 2013. By July 2013, the conduct phase of this audit was substantially complete. Less than 4 months later, the new CIO left the position. While functional responsibility for ITS was delegated to an Acting CIO, the City began 2014 without a permanent CIO.

The extent of turnover at the CIO position has been substantial. The departure of the recently hired CIO in December 2013 meant that, since March 2004, there have been eight individuals either in the CIO position or acting in that role, including five since June 2012. While recent surveys indicate that average tenures of public sector CIOs has been falling to less than four years[6], the turnover rate experienced by the City is concerning. For example, it is reasonable for a new CIO to take many months if not more than a year to fully understand an organization as complex as the City, and even longer to plan and deliver significant improvements and otherwise become fully effective in the role. Since amalgamation in 2001, the City has only been served by a CIO with more than two years of experience in that role for just over half of the time.   This level of turnover impacts both the effectiveness of IT governance, but also the likelihood that improvements to IT governance made in 2012 and 2013 will be sustained. In any event, turnover at the CIO position increases the likelihood that IT-related risks are not effectively managed and, as such, Management will need to continue ensuring these risks are carefully monitored. In addition, there is an ongoing need for clear and consistent executive support of the CIO's corporate strategic objectives, particularly in light of interviews conducted during the audit which indicated the presence of IT resources outside of ITS (e.g. within OC Transpo).

While recruiting, retention and succession planning, particularly at executive levels, are not new challenges for municipalities or for the public sector generally, the CIO staffing challenge experienced in 2013 serves to emphasize the importance of strong leadership and executive support for importance and potential of the IT function. As discussed elsewhere in this report, the City has an increasing reliance on IT systems and solutions to both meet its ongoing commitments to citizens, but also to enable achievement of significant number of key strategic objectives. Without a qualified and experienced CIO, the effectiveness of IT governance within any organization as large and complex as the City of Ottawa, is considerably impaired. Further, there is a significant risk that many of the positive attributes of the new governance processes introduced under the interim CIO in early 2013 will not be sustained in the absence of an appropriately qualified and

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[6] "Public-sector CIOs Head to the Exits", an August 2013 article published by Computerworld, cites a recent Gartner Survey of 2000 CIOs which indicated average public sector CIO tenure had fallen from over 4 years in 2011 to 3.4 years in 2013.

experienced CIO. In any event, the Deputy City Manager (the position to whom the CIO reports) and Council's IT Sub-Committee will need to carefully evaluate and monitor these risks as well as taking steps to identify and address the root causes underpinning the recruitment, retention and succession planning challenges that have resulted in the increased risks.

Notwithstanding the potentially significant issues, including the sustainably of IT governance processes, described above, the expectations were generally demonstrated through the course of the audit work (i.e. audit procedures conducted in the Spring and early Summer of 2013). Some of the more notable findings included that we found ITS responsibilities to be effectively communicated to other parts of the City through various means (including project charters and service desk communications). While this audit did not involve a detailed assessment of IT policies, we identified a comprehensive set of relevant policies within ITS, and a clearly defined accountability for these policies (e.g. Information Security, Information System Security, Responsible Computing, Information Risk Management and Remote Access to City Network).

We also found that a strong tone at the top is demonstrated by the new investment planning process. This initiative has resulted in a more strategic approach to prioritizing IT projects as it involves all City departments working together to prioritize all projects in a way that best supports the City's strategic priorities within a specific budget constraint. Adoption and buy-in to the new planning process helps to demonstrate the commitment of senior management to leverage IT as a strategic enabler and serves to support a City-wide approach to using technology to meet objectives. This process has served to break down what was previously considered a "silo" approach to planning whereby the projects were prioritized individually by each department and then finalized solely by ITS based on its funding level.

In addition to the significant recommendation related to the staffing of the CIO position, we note that some of the other recommendations in this report can be linked to potential areas of improvement within the realm of executive leadership and support. For example, no articulation of ITS' role in achieving the City's strategic objectives or the lack of established performance indicators related to ITS's strategic value (see Recommendation 6) suggest possible gaps in the executive leadership's success in positioning IT as a strategic enabler.

Recommendation 4
That management expedite the recruitment of an appropriately qualified and experienced CIO. Further, that they review and confirm expectations and related practices concerning the CIO to ensure alignment with leading practices whereby the IT function is viewed, empowered and supported as a strategic enabler.

Management Response

Management agrees with this recommendation. The recruitment of the next CIO is currently in progress and is scheduled to be completed by the end of Q3 2014. Management agrees that the CIO position is a critical position within the organization and is a strategic enabler to assist the City in achieving its strategic goals. The expectations regarding the role and its deliverables will be set during the recruitment process and further outlined in the letter of offer to be sent to the successful candidate. As part of the on-boarding process, the Deputy City Manager, City Operations and the new CIO will review the work plan referenced in the management response to Recommendation 3 and will discuss overall performance expectations.

Recommendation 5
That management develop an effective CIO succession plan to be implemented once a new CIO is retained.

Management Response

Management agrees with this recommendation. As part of the corporate succession planning strategic initiative, all critical roles in the ITS department have been identified and succession plans are currently in development / implementation as part of the departmental workforce planning. The succession plan for the CIO will be reviewed by the Deputy City Manager, City Operations and the new CIO by Q1 of 2015 and development plans will be established with the potential successors.

1.1.6.3   Strategic and Operational Planning

A strategic plan, which lays out organizational dependencies on IT as well as ITS's role in achieving the organization's strategic objectives, is a crucial component of effective IT Governance. Leading practices also emphasize the need for alignment between ITS's tactical operating plan and the corporate strategic plan.

In examining this component at the City of Ottawa, GTAG 17 indicates and expectation for the following four elements:

1. That the City's Strategic Plan incorporates a description of how ITS will be required to support and enable value creation (similarly, ITS Plans incorporate a description of how its plans will support the City's Strategic Plan);

2. That the City's Strategic Plan will be supported by individual tactical operating plans that take into account ITS requirements and deliverables;

3. That all plans will state objectives and performance metrics, appropriate budget, timelines, and staff allocations; and,

4. That key performance indicators (KPIs) will be used to measure and monitor the effectiveness of the ITS function.

While a number of opportunities for improvement exist, a review of the City's Strategic Plan and the ITS Plan (known as the Technology Roadmap) revealed the existence of these elements. Both of these documents provide insight to IT initiatives including the objectives of these initiatives.

The 2011-2014 Strategic Plan[7] identifies Council's priorities over its term. It is integrated with the City's budget and long-range financial planning processes. Each strategic objective is supported by one or more strategic initiatives which, in turn, are aligned to one or more performance measures. For example, the Strategic Plan contains performance targets related to such metrics as web portal usage.

The Technology Roadmap serves as the ITS departmental plan. It "outlines planned key strategic investments and building blocks that position the City of Ottawa to respond to business needs and citizen expectations." The Roadmap is a planning tool which provides a higher-level description of the direction for IT at the City as well as describing the related initiatives. These initiatives are categorized as either (1) Foundation and Modernization Technologies (i.e. the building blocks that will enable ITS to deploy and support new technologies associated with ServiceOttawa and future eGovernment initiatives as well as ongoing capital spending to maintain/upgrade/replace existing technologies) or (2) Strategic Initiatives (i.e. investments in new technologies or best practices that will move the ITS environment to a more efficient and effective future state). Appendix 2 of the Technology Roadmap includes a description of various performance indicators intended to support the monitoring of the effectiveness of ITS.

The Strategic Plan was found to incorporate a variety of references to planned IT-based elements within the descriptions of related strategic initiatives. While the connections were not explicit in the documents, there is evidence of alignment between the Strategic Plan and the Technology Roadmap. For example, a project in the Technology Roadmap that is related to the City's overall IT Web Technology Platform clearly links with an initiative appearing in the Strategic Plan that relates to increasing the percentage of service and information requests processed via the Web. We also found evidence of tactical operating plans (i.e. individual departmental plans) that support strategic objectives identified in the Strategic Plan and which include references to IT-related requirements. For example, an IT project proposed by the City Clerk and Solicitor Department in connection with the 2014 municipal elections is also reflected in the Strategic Plan which contains a vote tabulation solution which is to be implemented for the 2014 elections.

For individual IT projects, the City leverages an "IT Scorecard" which provides a more detailed account of the human and financial resources, timelines associated with a

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[7] The plan reviewed by the OAG had been last amended in May 2012.

project's implementation, and relevant interdependencies. These IT Scorecards are used to support the monitoring of IT projects as they progress through the development and implementation lifecycle.

However, the assessment of the Technology Roadmap and the City's Strategic Plan also resulted in the identification of a number of areas for improvement. In particular, the lack of explicit linkage and common terminology between the Strategic Plan and the IT projects described in the Technology Roadmap makes it difficult to see how individual IT projects are contributing to strategic objectives. Further, the Strategic Plan does not clearly define ITS's role and responsibilities in achieving strategic objectives nor does it identify the City's IT-related dependencies. As with any function, it is important that ITS can clearly "see itself" in the Strategic Plan as a means to promote a coordinated and efficient approach to IT investments.

Without clearly defined roles and responsibilities in the Strategic Plan, the City's ability to measure the effectiveness of ITS's contribution to strategic goals is threatened. Moreover, there is an increased risk of misalignment between IT goals and the City's overarching goals.

We also expected to identify more evidence of how the City considered and accounted for current and planned IT capacity within the Technology Roadmap and Strategic Plan. This capacity may be measured in terms of financial resources, technical/other dependencies, number/capabilities of ITS staff, and any other items that would help to indicate how capacity was considered in developing initiatives and plans.

Another area for improvement is around the use of performance indicators and related measures. While the audit identified that additional performance measures were to be developed by ITS, the current suite of performance measures were found to be insufficient as they focus only on basic operational aspects of the IT function (e.g. "down time") as well as the basic measures associated with IT projects (e.g. schedule and cost). GTAG 17 also indicates a need for performance indicators and related metrics which would support an evaluation of ITS's contributions to the City's strategic goals. Moreover, while there are some potentially relevant performance measures included in the Strategic Plan, they are not clearly assigned to ITS.

There was a lack of performance metrics which address the business benefits associated with IT projects. For example, measures which address the extent to which IT projects achieved projected Return on Investment (ROI) objectives. The following table provides a number of examples of current metrics along with examples of potential new metrics that would serve to support the measurement and monitoring of ITS performance and the business benefits associated with IT projects as well as ITS's contributions to the City's strategic goals:

Existing Performance Metrics:
- System/network downtime
- ITS FTEs
- ITS FTEs compared to number of network users
- IT Project Metrics:
- Scope & Schedule
- Cost & Budget

Examples of Additional Performance Metrics:
- User/client satisfaction surveys for:
- Ongoing operations
- IT Projects/initiatives
- Average time to close critical support issues
- Cost per problem referred to the Help Desk
- Rate of re-opened incidents
- Percentage of incidents resolved by escalation level
- Number of errors when implementing new systems
- Average times for projects in each phase of the systems development lifecycle
- Percentage of projects that deliver 100% of their planned:
- Scope
- Return on Investment or other business outcomes
- Achievement of relevant strategic initiative performance measures as per the Strategic Plan

Recommendation 6
That management ensure that the city's strategic objectives, as reflected in the Technology Roadmap, articulate the linkage to key IT projects. ITS' role in achieving strategic objectives, performance metrics, and IT-related dependencies should also be reflected.

Management Response
Management agrees with this recommendation.   The Business Technology Plan, which replaced the previous Technology Roadmap and was approved by Council's IT Sub-Committee in November of 2013, is currently where these relationships are captured. Management will examine opportunities to further align the Business Technology Plan with key initiatives and objectives outlined in the City Strategic Plan to further articulate the role of ITS in supporting these projects and will continue to monitor ITS capacity through the annual review of the Business Technology Plan. Business benefits and associated key performance measures are the joint responsibility of ITS and client departments leveraging the technology to achieve their business outcomes

Recommendation 7

That ITS continue to work toward developing additional KPIs related to their performance and to the business benefits associated with IT projects.

Management Response

Management agrees with this recommendation. It is the client department's responsibility to report on the business benefits and associated key performance measures. As part of the CITMT planning process for identifying departmental and/or corporate initiatives requiring ITS resources, client departments are required to complete a corporate business case which specifies the business value and any expected performance measures, such as the estimated return on investment (ROI) and planned project timelines. Client departments are expected to further refine the project details and deliverables in their project charter documents, and are responsible for tracking and realizing the benefits associated with their IT projects.

1.1.6.4   *Service Delivery and Measurement*

As identified by the IIA, an effective performance management framework   "…captures the right quantitative and qualitative data to enable proactive measurement, analysis, and transparency further assures sound IT governance."

In examining the City's IT performance and service delivery measurement component, we had three main expectations. First, we expected to find that City Council and senior City Staff have a clear understanding of ITS costs and how those costs contribute to the achievement of organization strategic objectives. Second, we expected CIO performance to be measured by financial and nonfinancial data and that management monitor and measure ITS performance. Finally, GTAG 17 indicates an expectation that ITS executives have IT controls in place for financial reporting, transaction processing, electronic messaging, data and database management, information protection and e-content management.

Notwithstanding the need to expand the number of performance measures as noted in Section 1,5.3, audit work indicated that ITS makes use of relevant tools and practices in order to monitor, measure and manage performance. For example, we found that ITS follows an industry standard project management process[8] when conducting investment reviews. ITS also uses a Balanced Scorecard to track projects and which identifies budgeted FTEs as well as budgeted expenditures and interdependencies for major projects. We also noted that investment reviews provide senior City staff with visibility to key IT investments. Finally, we noted that IT controls related to financial reporting are assessed annually as part of the Financial Statement audit and that other areas (e-mail, security, etc.) have been subject to audit from time to time by the OAG.

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[8] This standard process is based on the Project Management Book of Knowledge as published by the Project Management Institute. http://www.pmi.org

The effectiveness of these tools and practices was supported by interviewees who demonstrated a good understanding of IT costs. However, we also found that stakeholders are not clear about how IT costs contribute to the City's strategic objectives. Further, and as referenced in Section 1.5.3, ITS currently does not effectively measure its value either in terms of contributions to strategic goals or the business benefits associated with IT projects.

Recommendation 8
In developing the performance measures referenced in Recommendation 6, that ITS consider, among others, specific measures that will support a better understanding of how IT expenditures are contributing to the City's strategic objectives and identify ITS's capacity to conduct projects.

Management Response
Management agrees with this recommendation. As part of the CITMT planning process, departments are required to outline the business value associated with their proposed IT projects and demonstrate clear alignment to the strategic initiatives and objectives identified in the City Strategic Plan. Direct alignment to Council-approved priorities is a main criterion for IT project and resource approval via the IT governance process. As referenced in the management response to Recommendation 7, departments are required to specify the business value and expected deliverables and performance measures within a corporate business case document and subsequent project management documents, such as charters. Departments are responsible for tracking their project deliverables and measuring outcomes.   Management, as part of the IT governance process, will summarize and monitor all measures emanating from IT projects identified in the approved Business Technology Plan and will explore suitable measures to demonstrate ITS' contribution of expenditures and resources to the City's strategic objectives.

1.1.6.5   IT Organization and Risk Management
In evaluating the IT organization's risk management practices, GTAG 17 identified to find three key elements associated with leading practices. Firstly, we expected there to be standard IT hardware, software, and service procurement policies, procedures, and controls in place. Secondly, we expected that risks be managed effectively in relation to meeting the City's needs, security, and compliance requirements. Finally, we expected data to be standardized and easily shared across applications and the IT infrastructure.

We found that there is an extensive suite of policies, procedures and controls in place (e.g. related to software, IT procurement, enterprise content management, security, etc.) that should serve to support standardization across the City. We also found evidence of standardized data and of sound approaches to support sharing of

information across applications (e.g. the use of Business Intelligence Software to link financial and HR databases).

In terms of risk management, we identified the existence of a risk-management policy within ITS and found that the ITS Scorecard template requires documentation of risks related to specific projects. Further, the Technology Roadmap identifies a number of IT-related risks, including risks related to the following:

- Legacy applications;
- Unplanned failures;
- Security of information assets;
- Web technology failure; and,
- External threats.

While the risks identified in the Technology Roadmap appear relevant, the audit noted a lack of documentation supporting the identification and assessment (likelihood and impact) of risks within ITS. Without formalized processes for identifying and assessing risks, there may be a lack of consistency in the application of the process and/or understanding of the results of the analysis.

There was also an expectation of effective vertical communication of risks between ITS and the higher level/Citywide-view of risks (i.e. the Corporate Risk Profile) that was not demonstrated. Specifically, there was no guidance within the ITS Risk Management Policy as to how higher priority IT risks should be communicated up to the City's Corporate Risk Committee. Further, it is not clear how corporate risks are cascaded down from the corporate level to ITS. This has resulted in unclear alignment between ITS risks and City-wide/corporate risks. This lack of alignment can lead to an increased likelihood of either duplicating or missing risk management activities.

Recommendation 9
That the ITS Risk Management Policy include guidance on how higher priority IT risks should be communicated up to the City's Corporate Risk Committee. Further, ITS should work with City Staff to develop guidance around expectations for the communication of corporate risks down to ITS. ITS should also develop or obtain formal documentation which describes the identification and assessment of IT risks within the Department.

Management Response

Management agrees with this recommendation. The ITS Information Risk Management Policy is used to manage information risk according to its criticality and importance to the City. The Policy is directly linked to the City's Enhanced Risk Management framework and identifies that the Director, ITS and CIO has overall responsibility for risk management activities within the department, including

ensuring that higher priority IT risks are communicated appropriately. Further, as part of the City's Enhanced Risk Management program, each department follows the corporately approved process to identify, assess and mitigate risk. Each department submits a corporate risk profile and register on an annual basis that identifies and provides an assessment of the risks within a department. These risk profiles, which capture higher priority IT risks, are assessed by Corporate Business Services and reported to the Corporate Risk Management Steering Committee and Senior and Executive Management. Corporate risks are communicated down to the ITS department to ensure alignment.

1.1.7 Potential Savings

The audit identified opportunities for potential cost savings in the area of increased efficiency. In particular, it was noted that in addition to the IT Services staff, there are City departments with employees engaged in IT-related duties. This creates the risk that some work may be duplicated. An opportunity to avoid this duplication exists in ensuring all IT activities (corporate and departmental) are aligned, and that all employees with IT-related duties are in close communication with ITS.

Along the same lines, it was noted that there are several IT related committees. Some of these committees share similar roles and responsibilities. For example one of the roles of the CITMT committee is to shepherd the IT plan through the budget process. One role of the IT Governance Committee is to support the IT plan through the budget process. In another example, one of the roles of the CITMT committee is to ensure there is one corporate IT plan for the City. Similarly, one of the roles of the Governance Committee is to make the IT plan a corporate plan. By identifying and reducing any overlap in committee roles and responsibilities the City can reduce the risk of duplicating work.

Once improvements are made to the ITS Risk Management Policy and the City is assured that all ITS risks are incorporated in the City's Enhanced Risk Framework, the risk of duplication of risk-management efforts may be reduced. This will also help to establish related priorities.

When the Technology Roadmap is linked to the City's Strategic Plan, the risk of technology projects not contributing to the City's overall goals will be also be reduced.

1.1.8 Conclusion

Except for the findings discussed in this report, in our opinion, based on the evidence gathered at the time of the audit, we believe the City had established the necessary items to implement an effective IT Governance structure. However, without a qualified and experienced CIO, there is an increased risk that the effectiveness of IT governance would be considerably impaired. Further, there is an increased risk that many of the

positive attributes of the new governance processes introduced under the interim CIO in early 2013 will not be sustained.

The changes made to ITS Governance support a general objective of increasing the value-added associated with the City's IT investments. The City's plans to transition IT Governance reflect industry standards and otherwise appear appropriate and complete in terms of assisting IT to deliver value, identify, prioritize, monitor, and measure IT resource allocation decisions, and ensure alignment with City strategies and objectives.

1.1.9 Acknowledgement

We wish to acknowledge our appreciation for the cooperation and assistance afforded the audit team by management.