

CITY OF HAMILTON

CORPORATE SERVICES DEPARTMENT
Information Services Division

TO: Mayor and Members General Issues Committee	WARD(S) AFFECTED: CITY WIDE
COMMITTEE DATE: April 18, 2012	
SUBJECT/REPORT NO: Capital and Sustainability Costs to Implement Management Action Plans as identified in Audit Report 2010-07 AUD11013 (FCS12028) (City Wide)	
SUBMITTED BY: Roberto Rossini General Manager Finance & Corporate Services Department	PREPARED BY: Maria McChesney 905-546-2424 ext 4562
SIGNATURE:	

RECOMMENDATION:

- (a) That \$465,000 allocated in the 2012 Capital Budget proceed for the completion of the Management Action Plans outlined in the Internal Audit of the Information Services Division Business Processes Management Action Plans, as detailed in Appendix "A" of Report AUD11013 – Information Services (IS) – Business Process Management (attached as Appendix A to Report FCS12028);
- (b) That the implementation of the annual operating impacts (i.e., additional FTEs) related to the Management Action Plans, for the Information Services Division, commence in 2013, upon completion of the Information Services Governance Review and subject to approval of the 2013 Budget.

EXECUTIVE SUMMARY

The 2010 Internal Audit work plan, approved by Council, included an audit of 4 Information Services Division business processes including incident, problem, change and release management to ensure that events that are not part of standard operations (e.g., incidents, problems) were recorded, analyzed and resolved in a timely manner. In addition, change and release management processes were also assessed for strength of internal controls and effectiveness and efficiency of current service delivery.

The results of the audit were presented in a formal audit report containing observations, recommendations and management responses. The Internal Audit Report (AUD 11013), approved by Council, is attached as Appendix A of report FCS12028.

Report AUD11013 highlighted that the implementation of several recommendations will be dependent on additional capital funding for the purchase of specific tools. In addition, Report AUD11013 also highlighted that many of the Management action plans refer to additional staffing resources or retraining and reallocation of current staff that will be required for the implementation of the recommendations.

There were 37 recommendations in the audit of which several have been completed and many are still in progress. Of those, 30 were implemented using existing resources and 7 require capital funding. In the Management action plan responses we originally estimated that the 7 outstanding audit recommendations would require \$725,000 of capital funding and 10.75 FTE's for sustainability and \$96,750 for the annual maintenance of software and hardware.

As we have worked through the implementation to date, we have deferred project work and used existing staff and funding to complete many of the Management action plans. To complete the remaining Management action plans, it is estimated that we will require \$465,000 in capital funds (\$385,000 in 2013 and \$80,000 in 2014) for implementation of the following audit recommendation. In addition, we will require a \$96,750 increase to the operating budget for yearly hardware and software maintenance agreements.

For details on each section number, refer to Appendix A – Report AUD11013 – Information Services (IS) – Business Process Management (AUD11013) (City Wide) (refer to Appendix A of report FCS12028).

**SUBJECT: Capital and Sustainability Costs to implement Management Action
Plans as identified in the Audit Report 2010-07 AUD11013 (FCS12028)
(City Wide) Page 3 of 8**

Internal Audit Report AUD 11013 Section Number	Capital Request	Capital Request	Annual Hardware Maintenance Costs	Annual Software Maintenance Costs
	2013	2014	2013	2014
a.6.1	\$150,000		\$15,000	\$20,000
B.11	\$100,000		\$ 9,000	\$12,000
B.15.1				
B.16.2	\$45,000		\$ 6,750	\$ 9,000
B.17.2	\$30,000	\$30,000	\$ 4,500	\$10,500
B.23		\$50,000		\$10,000
B.24	\$60,000			
Total	385,000	\$80,000	\$35,350	\$61,500

FINANCIAL / STAFFING / LEGAL IMPLICATIONS (for Recommendation(s) only)

Financial:

Capital Funds of \$385,000 is required in 2013 and \$80,000 in 2014 to implement the recommendation as identified in the Audit Report AUD11013.

An Operating budget increase of \$35,350 is required in 2013 and \$61,500 in 2014 for yearly hardware and software maintenance agreements.

Staffing:

An FTE increase of 2 FTE's is required in 2013 and another 2 FTE's in 2014 once the management action plans are implemented. However the need will be reviewed once the IS Governance project is complete.

Legal:

N/A.

HISTORICAL BACKGROUND (Chronology of events)

The purpose of the audit was to examine four business processes within the Information Services (IS) Division (Incident Management, Problem Management, Change Management and Release Management). Audit objective included:

- evaluating the IS Service Desk's processes and procedures and assessing its performance targets
- evaluating management controls related to IS Change and Release Management and the compliance of its practices with the IS Division's written procedures
- assessing the effectiveness and efficiency of current service delivery and internal controls

Recommendations were made to Information Services Management regarding opportunities for strengthening controls and improving efficiencies.

The Audit Report (AUD11013) consisted of a section of audit observations that are applicable across the entire IS Division. There were fifteen (15) recommendations that were applicable across the entire IS Division which dealt with:

- Implementation of Business Processes as identified by a prior consultant's report and in compliance with the Information Technology Infrastructure Library (ITIL) framework (a set of practices for IT Service Management (ITSM) that focuses on aligning IT services with the needs of business);
- Development and reporting of metrics applicable to each of the 4 Business Processes Incident Management, Problem Management, Change Management and Release Management;
- Time and cost tracking, as well as, budgeting on a project basis;
- Creation and/or more frequent meeting of work intake groups/committees (e.g. Information Services Working Committee, Project Advisory Board);
- Development and implementation of up-to-date, defined written procedures; and
- Effective quality assurance methodologies and reviews.

The remainder of the report consisted of a section of observations and recommendations for each of the 4 business processes examined. In addition, based on the audit and its results, Internal Audit has placed its assessment of the current status of each process on a scale, pictorially depicted below (refer to Appendix A of report FCS12028).

The 0-5 scale is based on a simple maturity scale (developed under the widely accepted Control Objectives for Information and related Technology (COBIT) framework for IS process management and control) which demonstrates how a process evolves from a non-existent capability to an optimized capability.



Where

- 0 – Non-existent
- 1 – Initial/Ad-hoc
- 2 – Repeatable but intuitive
- 3 – Defined
- 4 – Managed and Measureable
- 5 – Optimized

For the IS Division to achieve a level 5 is not a reasonable expectation because the costs to achieve that level is significant.

Incident Management

This process involves the management of the Service Desk, incidents and responding to the IS Division user queries. Incident Management also includes the collection of data that is analyzed as part of Problem Management.

The 4 recommendations made in the audit report to address Incident Management issues include:

- Written, up-to-date procedures and process documents, as well as, the training of appropriate personnel;
- A knowledge base tool to link previously resolved similar incidents and problems to documented solutions.

The Information Services Division have completed some procedures and process documents and have started to define the metrics IS needs to report on. However, in order to move towards Level 5 where a consistently high level of service is provided to the business community, we need to implement a knowledge base tool to link previously resolved similar incidents and problems to documented solutions. Capital funds are required for the knowledge base software and professional services to commission the software and integrate it with the current incident management tool. In addition, ongoing

operating funds are required for the annual software and hardware maintenance and one FTE to do the application sustainability.

Problem Management

Problem Management is the identification and classification of problems, collections or groupings of incidents, root cause analyses and the resolution of problems.

Information Services have started to update procedures and process documents and have started to define the metrics required to report on. In order to move towards Level 5, where a consistently high level of service is provided to the business community, IS needs to report metrics to management for decision making and implement a knowledge base tool to pool problems and known errors and their solution. Capital funds are required for the knowledge base software and professional services to commission the software and integrate it with the current incident management tool. In addition, as noted above, ongoing operating funds are required for the annual software and hardware maintenance and one FTE to do the application sustainability.

Change Management

Change Management is the process of ensuring that all changes made to infrastructure or applications (including emergency maintenance and patches) are managed in a controlled manner.

Information Services have completed the up-to-date procedures and process documents, as well as, the training of staff and assigned the role of a Change Coordinator to an existing IS position. In order to move towards Level 5, where a consistently high level of service is provided to the business community, we need to implement file integrity monitoring software, segregate the duties between developers and implementers and maintain a Change Management database and reporting tool. Capital funds are required for the file integrity monitoring software and the Change Management database and reporting tool. In addition, as noted above, ongoing operating funds are required for the annual software and hardware maintenance and one FTE is required to ensure that the developer and the implementer's duties are segregated.

Release Management

Release Management involves the processes followed when changes are made to the information systems environments and specifically how changes move from a test environment to a live production environment.

Information Services have developed the project charter to implement Release Management. Once this project is complete, we will have a properly documented and enforced Release Management process, a formal and well documented testing methodology (including approval levels); and a commitment to implement a Release

Management Process with several key roles in this area being assigned to existing IS staff.

POLICY IMPLICATIONS

N/A.

RELEVANT CONSULTATION

Information Services Working Committee
City Manager's Office, Internal Audit Division

ANALYSIS / RATIONALE FOR RECOMMENDATION

(include Performance Measurement/Benchmarking Data, if applicable)

N/A.

ALTERNATIVES FOR CONSIDERATION:

(include Financial, Staffing, Legal and Policy Implications and pros and cons for each alternative)

One alternative for consideration would be to maintain status quo and not complete the Management action plans as identified in the audit. This is not recommended.

A second alternative was to commence the implementation of the Management action plans commence starting in 2013, upon completion of the Information Services Governance Review. This would allow the Information Services Division to leverage resources across the city in order to reallocate FTE's required for sustainability. This is recommended.

CORPORATE STRATEGIC PLAN (Linkage to Desired End Results)

Focus Areas: 1. Skilled, Innovative and Respectful Organization, 2. Financial Sustainability,
3. Intergovernmental Relationships, 4. Growing Our Economy, 5. Social Development,
6. Environmental Stewardship, 7. Healthy Community

- ◆ Skilled, Innovative and Respectful Organization
- ◆ Financially Sustainability

APPENDICES / SCHEDULES

Appendix A - Audit Report 2010-07 – Information Services (IS) – Business Process
Management (AUD11013) (City Wide)



CITY OF HAMILTON

CITY MANAGER'S OFFICE **Audit Services Division**

TO: Chair and Members Audit, Finance and Administration Committee	WARD(S) AFFECTED: CITY WIDE
COMMITTEE DATE: March 2, 2011	
SUBJECT/REPORT NO: Audit Report 2010-07 - Information Services (IS) - Business Process Management (AUD11013) (City Wide)	
SUBMITTED BY: Ann Pekaruk Director, Audit Services City Manager's Office	PREPARED BY: Ann Pekaruk 905-546-2424 x4469
SIGNATURE:	

RECOMMENDATION

- (a) That Report AUD11013 respecting Audit Report 2010-07, Information Services (IS) – Business Process Management, be received;
- (b) That the Management Action Plans, as detailed in Appendix “A” of Report AUD11013 be approved; and,
- (c) That the General Manager of Finance & Corporate Services be directed to instruct the appropriate staff to have the Management Action Plans (attached as Appendix “A” to Report AUD11013) be implemented.

EXECUTIVE SUMMARY

The 2010 Internal Audit work plan approved by Council included an audit of four (4) Information Services (IS) business processes including incident, problem, change and release management to ensure that events that are not part of standard operations (incidents, problems) were recorded, analyzed and resolved in a timely manner. In

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addition, change and release management processes were also assessed for strength of internal controls and effectiveness and efficiency of current service delivery.

The results of the audit are presented in a formal Audit Report (2010-07) containing observations, recommendations and management responses. Audit Report 2010-07 is attached as Appendix "A" to Report AUD11013.

In addition, IS Management has prepared a spreadsheet entitled Management Responses to Audit Report 2010-07 and has requested that it be attached as Appendix "B" to Report AUD11013 in order to provide information regarding the estimated time, cost and staffing commitments necessary to implement each recommendation in the Audit Report (2010-07).

Alternatives for Consideration – See Page 12

FINANCIAL / STAFFING / LEGAL IMPLICATIONS (for Recommendation(s) only)

Financial: The implementation of several recommendations will be dependent on additional funding for the purchase of specific tools (e.g. recommendations #6, #11, #21 of Appendix "A" to Report AUD11013) and capital funding for such items as a virtual server environment (recommendation #15 of Appendix "A" to Report AUD11013) and meeting requirements for PCI compliance (recommendations #16 and #17 to Appendix "A" to Report AUD11013).

Staffing: Many of the Management Action Plans refer to additional staffing resources or retraining and reallocation of current staff that will be required for the implementation of the recommendations (e.g. #4e), #17, #20 (1 FTE) and #24 (2 positions) of Appendix "A" to Report AUD11013).

Legal: None.

HISTORICAL BACKGROUND (Chronology of events)

The audit fieldwork was carried out throughout mid 2010 and completed in September 2010. During this period, IS was undergoing a significant reorganization and hiring process in which many roles and responsibilities were being designed and reassigned.

The results of this audit are attached as Appendix "A" of Report AUD11013.

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The Audit, Finance and Administration Committee receives and approves final audit and review reports as part of its responsibilities for the oversight of governance and control.

POLICY IMPLICATIONS

None.

RELEVANT CONSULTATION

Appendix "A" to Report AUD 11013 includes management action plans which reflect the responses of management and staff responsible for the operation of Information Services, Corporate Services Department.

Appendix "B" to Report AUD11013 is a more detailed response to the recommendations in the Audit Report (2010-07) which is provided by IS Management in order to emphasize the anticipated time and resources that will be required to implement the recommendations made in Audit Report 2010-07 attached as Appendix "A" to Report AUD11013.

ANALYSIS / RATIONALE FOR RECOMMENDATION

(include Performance Measurement/Benchmarking Data, if applicable)

The purpose of the audit was to examine four business processes within the Information Services (IS) Division- Incident Management (including the Service Desk), Problem Management, Change Management and release Management. Audit objectives included evaluating the Service Desk's processes and procedures and assessing its performance targets; evaluating management controls related to IS's change and release management and the compliance of its practices with the Division's written procedures; and assessing the effectiveness and efficiency of current service delivery and internal controls. Recommendations were made to management regarding opportunities for strengthening controls and improving efficiencies.

The Audit Report (2010-07) consists of a section of audit observations located at the beginning of the report that are applicable across the entire IS Division under the title A. GENERAL. The fifteen (15) recommendations contained in the section deal with:

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- Implementation of business processes as identified by prior consultant's report
- Development and reporting of metrics applicable to each of the four business processes
- Time and cost tracking as well as budgeting on a project basis
- Creation and/or more frequent meeting of work intake groups/committees (e.g. Information Services Working Committee, Project Advisory Board)
- Development and implementation of up-to-date, defined written procedures
- Effective quality assurance methodologies and reviews

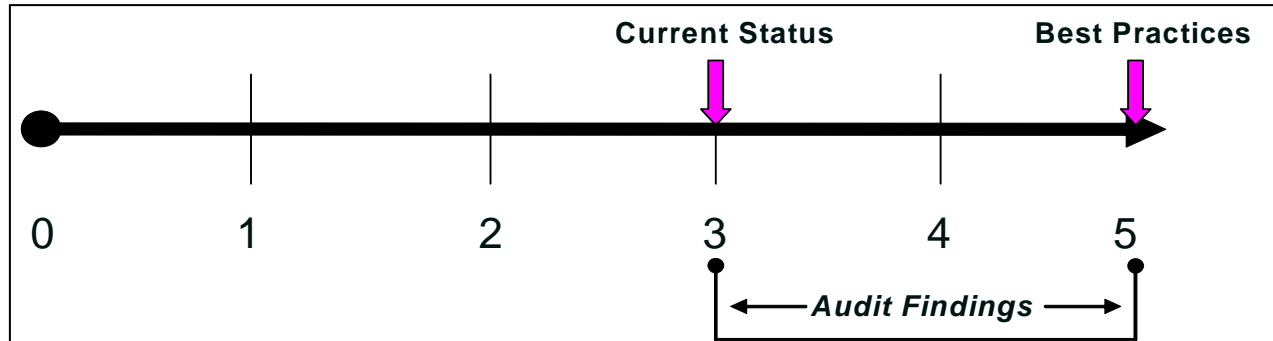
The remainder of the Audit Report (2010-07) consists of a section of observations and recommendations for each of the four business processes examined. There may be some duplication of audit observations between each of the sections. This is due to the fact that several of the observations are applicable to multiple business processes but need to be addressed individually in consideration of the factors affecting the particular process.

The text below will briefly define each business process. Based on the audit and its results, Internal Audit has placed its assessment of the current status of each process on a scale, pictorially depicted below, in order for management and Council to appreciate what is involved if improved performance is desired. The 0-5 scale is based on a simple maturity scale (developed under the widely accepted COBIT framework for IS process management and control) which shows how a process evolves from a non-existent capability to an optimized capability. The maturity scales will explain where the IS business process shortcomings exist and help management set targets for where they need to be. The graphic representations provided can easily be used as a means to support the business case for future plans (management action plans).

Incident Management

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This process involves the management of the service desk and incidents and responding to IS user queries. Incident management also included the collection of data that is analyzed as part of Problem Management.



- 0 Non-existent**
- 1 Initial/Ad Hoc**
- 2 Repeatable but Intuitive**

Current:

3 Defined: The need for an incident management (IM) process is recognized and accepted. Informal staff training (for Service Desk staff) is occurring. Incidents are tracked and individually monitored, but there is no formal reporting. Response time to queries and incidents is not measured and incidents may go unresolved. Users have received clear communications on how to report incidents.

Risks: Formal staff training is not occurring, there are no defined business procedures, and no tracking and reporting of metrics.

Impact: Staff are not formally trained (service levels to users is likely inconsistent), a lack of business procedures can lead to difficulty in managing staff. The lack of metrics means that management is unaware of staffing capacity, level of service provided to users, and it is unlikely that optimal decision making by management is occurring.

Movement to:

4 Managed and Measurable: The benefits of an IM process are well understood, and the service desk function is well established. Tools and techniques are automated with a centralized knowledge base. Service desk staff members closely interact with the problem management staff. Responsibilities are clear, and effectiveness is monitored. Business procedures are established and communicated. Service desk personnel are formally trained. Service provided to users is of good quality. Management develops metrics for the performance of the service desk.

Risks: Metrics are not yet fully developed and are not reported to management.

Impact: There is not a consistent set of management information available to enable optimal management decision making.

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5 Optimized (Best Practices): The IM process and service desk function are established and well organized and have a strong customer service orientation. Metrics are systematically measured and reported. Extensive, comprehensive FAQs are an integral part of the knowledge base. Advice is consistent, and incidents are resolved quickly within a structured process. Management utilizes an integrated tool for performance statistics of the process. Processes have been refined to the level of best industry practices, based on the results of analyzing performance indicators, continuous improvement and benchmarking with other organizations.

Impact: At this maturity level, a consistently high level of service is provided to users.

The four (4) recommendations made in the audit report to address Incident Management issues include:

- Written, up-to-date procedures and process documents as well as the training of appropriate personnel
- Knowledge base tool to link previously resolved similar incidents and problems to documented solutions.

Problem Management

Problem Management is the identification and classification of problems, collections or groupings of incidents, root cause analyses and the resolution of problems.



0 Non-existent

Current:

1 Initial/Ad Hoc: Staff recognize the need to manage problems, but the responsibility for problem management (PM) is not assigned. Impact is that information is not shared, resulting in additional problem creation and the loss of productive time while searching for answers.

Risks: No one is responsible for the process, time is spent solving the same problem multiple times, no management information is reported.

Impact: Level of service to users is poor, management is unable to make optimal decisions, time is spent solving redundant problems.

Movement to:

SUBJECT: Audit Report 2010-07 - Information Services (IS) - Business Process Management (AUD11013) (City Wide) - Page 7 of 12

2 Repeatable but Intuitive: There is awareness of the need to manage IS-related problems. A few key individuals are responsible for PM. Information sharing occurs in an informal and reactive manner. The level of service to the user community is inconsistent and is hampered by the lack of sufficient, structured knowledge being provided to the problem manager.

Risks: Information sharing does not occur properly, service levels provided to users is fair, process is generally not well-defined, no management information is reported.

Impact: Service provided to users is inconsistent, management is likely unable to make optimal decisions due to lack of information, time is spent solving redundant problems.

3 Defined: An effective problem management system is accepted and has management support, along with budgets for staffing and training. Problem resolution process has been standardized, however the recording and tracking of problems and their resolutions is fragmented, without centralization. Deviations from norms or standards will likely be undetected. Management review of problem identification is limited and informal. Service provided to users may be acceptable.

Risks: Deviations from standards will be undetected, management information is not reported, management review is limited.

Impact: Service levels cannot be accurately measured, management is likely unable to make optimal decisions.

4 Managed and Measurable: The PM process is well understood throughout the organization. Responsibilities are established and methods and procedures are documented and communicated. The function is viewed as an asset and major contributor to the achievement of IS objectives and improvement of IS services. PM is well integrated with other processes. Goals and metrics have been agreed upon, service provided to users is good.

Risks: Metrics are not yet fully developed and are not reported to management.

Impact: There is not a consistent set of management information available to enable optimal management decision making, level of service is good.

5 Optimized (Best Practices): Process is forward looking, contributing to the IS objectives. Recording, reporting, and analysis of problems and resolutions are automated. Goals are measured consistently. Process analysis occurs for continuous improvement and findings are reported to stakeholders.

Impact: At this maturity level, a consistently high level of service is provided to users.

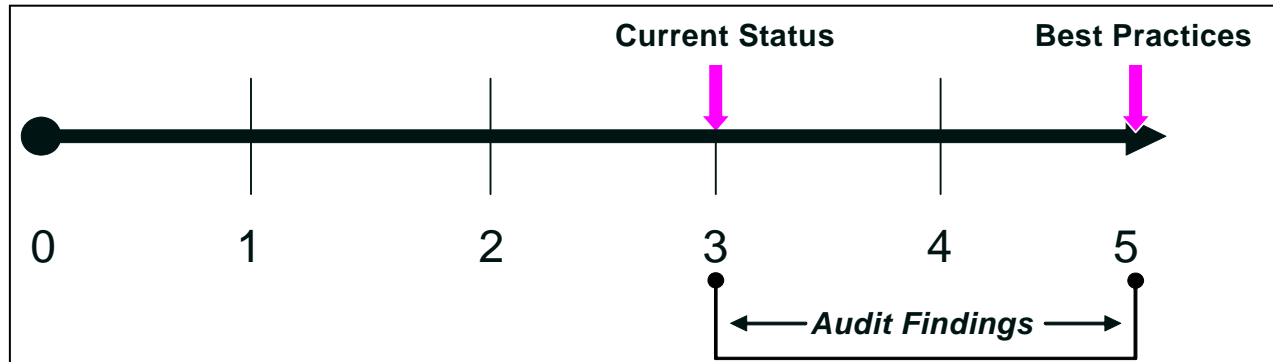
The three (3) recommendations made for this business process are:

- Implementation of a well-defined Problem Management process
- Development of key procedures documentation
- Investigation of appropriate Knowledge Base tool to track and pool problems and known errors and their related solutions.

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Change Management

Change Management is the process of ensuring that all changes made to infrastructure or applications (including emergency maintenance and patches) are managed in a controlled manner.



- 0 Non-existent**
- 1 Initial/Ad Hoc**
- 2 Repeatable but Intuitive**

Current:

3 Defined: There is a defined formal change management (CM) process in place. Compliance is emerging. Processes are often bypassed. Errors may occur and unauthorized changes occasionally occur. Analysis of impact of IS changes has not yet been formalized. Quality and performance are not monitored. There is not a strong internal control environment and there is a poor segregation of duties among staff. There are no performance metrics.

Risks: System downtime may occur due to errors that occur from poorly executed changes, and also due to unauthorized changes and the weak internal control environment. Performance and quality are not monitored, process issues may not be identified in a timely manner.

Impact: Users experience system downtime, which reduces productivity. Management is not aware of quality issues and does not have the information to enable optimal decision making.

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Movement to:

4 Managed and Measurable: The CM process is well developed and consistently followed for all changes. The process is efficient and effective, but there is a considerable reliance on manual procedures and controls. CM documentation is current and correct, with changes formally tracked. CM is more integrated with changes in business processes, to ensure that training, business continuity issues and organizational changes are addressed. There is a consistent process for monitoring the quality and performance of the CM process. Goals and metrics have been agreed upon by management.

Risks: Manual procedures and controls may not always detect quality and performance issues in the CM process. Performance metrics are not yet fully developed and are not reported to management.

Impact: Performance and service level provided are not measured, management is may not be able to make optimal decisions due to a lack of information. Service level provided to users is likely good.

5 Optimized (Best Practices): The CM process is regularly monitored, and updated to maintain good practices. Tracking of changes is sophisticated and includes tools to detect unauthorized and unlicensed software. CM is integrated with business change management, with IS enabling increased productivity and creating new opportunities for the organization. Management regularly receives performance metric information.

Impact: At this maturity level, a consistently high level of service is provided to users.

Twelve (12) recommendations were made for the Change Management business process. Among them were:

- Revisions and additions to written procedures and staff training regarding such procedures
- Implementation of file integrity monitoring software and tracking of deletions of audit trails
- Regular review of IS employee access permissions
- Segregation of duties between developers and implementers
- Designation of Change Co-ordinator and Change Analyst positions
- Tools for maintaining a Change Management database and reporting tool.

Release Management

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Release Management involves the processes followed when changes are made to the information systems environments and specifically how changes move from a test environment to a live production environment.



0 Non-existent

Current:

1 Initial/Ad Hoc: It is recognized that releases should be managed. There is poor or non-existent documentation of releases. Changes are generally not bundled into releases. Errors likely occur, along with interruptions to the IS systems caused by poor release management.

Risks: System downtime can occur due to errors that occur in releases. Changes are not bundled into releases.

Impact: Increased levels of system downtime due to errors in the release management process, more frequent amount of downtime than necessary since most changes are not being bundled into releases. Users experience downtime.

Movement to:

2 Repeatable but Intuitive: RM process in place is informal and most releases follow this approach. This process is unstructured, and prone to error. Only limited planning and impact assessment take place prior to a release.

Risks: System downtime may occur due to errors that occur in RM, leading to poor level of service for users. Metrics for RM have not been created.

Impact: Users experience some downtime, management does not have the information to make optimal decisions. Process is not controlled.

3 Defined: There is a defined formal RM process in place. Compliance is emerging as the RM process is often bypassed. Errors occur and unauthorized releases occasionally occur. The internal control environment is weak. Impact analysis of IS releases is not yet formalized. Quality & performance is not monitored.

Risks: Process is not fully controlled, internal control environment is weak, performance and quality is not monitored or reported to management.

Impact: Service level provided cannot be accurately measured (may be a good level), management does not have the information to make optimal decisions, could lead to

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rework being required as a result of errors encountered due to the weak internal control environment.

4 Managed and Measurable: The RM process is well developed and consistently followed for all releases, and changes are bundled together as releases. The process is efficient and effective, but there is a reliance on manual procedures and controls. RM documentation is current and correct, with changes formally tracked. RM is more integrated with changes in business processes, to ensure that training, business continuity issues and organizational changes are addressed. There is a consistent process for monitoring the quality and performance of the RM process.

Risks: Manual procedures and controls may not always detect quality and performance issues in the RM process. Performance metrics are not yet fully developed and are not reported to management.

Impact: Management does not have the information to enable optimal decision making. Level of service provided to users is good.

5 Optimized (Best Practices): The RM process is regularly monitored, and updated to maintain good practices. Tracking of releases is sophisticated. IS RM is integrated with business change management, with IS enabling increased productivity and creating new opportunities for the organization.

Impact: At this maturity level, a consistently high level of service is provided to users.

Three (3) recommendations were made for this process. They were:

- A properly documented and enforced Release Management process
- A formal and well documented testing methodology including approval levels
- A commitment to implement a Release Management Process with several key roles in this area being assigned to staff.

In addition to the Management Action Plans included in Audit Report 2010-07 attached as Appendix "A" to Report AUD11013, IS Management has prepared a more detailed spreadsheet summarizing the target implementation date, capital and ongoing operating costs and staffing requirements (where applicable) and allocated an appropriate "PM" scale defined as short, medium or long term implementation for each recommendation in the Audit Report (2010-07). This spreadsheet has been attached as Appendix "B" to Report AUD11013.

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ALTERNATIVES FOR CONSIDERATION

(include Financial, Staffing, Legal and Policy Implications and pros and cons for each alternative)

Council could choose to not approve any of the Recommendations in the Audit Report (2010-07) and accept the current maturity level for each of the four business processes reviewed. There would not need to be any additional investment or resources. However, this non-action would result in the added risk of poor customer service, sub-optimal decision making due to inadequate management information and, in some cases, ineffective and inefficient use of the resources that the Division does have. Considering the dollars and people resources that are currently invested in this function and the importance of technology in every aspect of the City's operations and provision of services, this alternative is not recommended.

CORPORATE STRATEGIC PLAN (Linkage to Desired End Results)

Focus Areas: 1. Skilled, Innovative and Respectful Organization, 2. Financial Sustainability, 3. Intergovernmental Relationships, 4. Growing Our Economy, 5. Social Development, 6. Environmental Stewardship, 7. Healthy Community

Financial Sustainability

- ◆ Delivery of municipal services and management of capital assets/liabilities in a sustainable, innovative and cost effective manner

Skilled, Innovative and Respectful Organization

- ◆ More innovation, greater teamwork, better client focus

APPENDICES / SCHEDULES

Appendix "A" to Report AUD11013: Audit Report 2010-07

Appendix "B" to Report AUD11013: Management Responses to Audit Report 2010-07

ap:dt

**CITY OF HAMILTON
INTERNAL AUDIT REPORT 2010-07
CORPORATE SERVICES - INFORMATION SERVICES (IS)
BUSINESS PROCESS MANAGEMENT**

INTRODUCTION

The purpose of this audit was to examine four business processes within the Information Services (IS) Division. The processes examined were:

- Incident Management (includes Service Desk)
- Problem Management
- Change Management
- Release Management

A brief description of each business process is provided as a reference point.

Incident Management

Incident Management is the process of managing the service desk and incidents and responding to IS user queries. Incident management also includes the collection of data that is analyzed as part of the Problem Management process.

Problem Management

Problem Management is the identification and classification of problems, root cause analysis and resolution of problems.

Change Management

Change Management is the process of ensuring that all changes (including emergency maintenance and patches) are formally managed in a controlled manner. Changes are logged, assessed and authorized prior to implementation and are reviewed against planned outcomes.

Release Management

Release Management involves the planning, designing, build configuration, documentation and testing of hardware, application and software components and the implementation of these components into the live IS environment.

Typically and simply, an incident is a single, "one-off" occurrence; similar incidents are identified as a problem; a problem may ultimately be resolved with a change(s); and changes are bundled together to be implemented as a release.

The audit report consists of a section of audit observations located at the beginning of the report that are applicable across the entire IS Division (General Observations). The remainder of the report consists of audit observations that are organized by business process (Incident & Problem Management (including the Service Desk), Change Management and Release Management). There may be some duplication of audit observations between each of these sections. This is due to the fact that several of the audit observations are applicable to multiple business processes but need to be addressed individually by the factors affecting the particular process.

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A. GENERAL

1. Consultants' Reports

Observation

In 2005, a consultant's report (Consultant - B. Wyze) was prepared that documented a plan to implement IT best practices process flows at the City of Hamilton.

Again in 2009, a series of four reports, commissioned from IBM for business processes design, was completed (at a cost of approximately \$100,000). To date, most of the processes discussed in the reports have either only been partially implemented or have not been implemented at all.

Recommendation

That IS complete the implementation of the business processes as outlined in the IBM reports, customizing them as necessary to best meet the needs of the City.

Management Action Plan

Agreed. The IBM study was commissioned to assist with defining the job architecture and organization structure to meet current information technology needs within the City. The definition of high level IS business processes was added to the scope at the end of IBM's engagement to assist IS with planning for the new IS organization. IS management deferred further work on the IS business processes until the restructured organization was in place to support the processes. The restructuring of the extended management group is complete and the next stage of restructuring (which involves the remaining positions) is expected to be complete by early 2011. At that time, IS will work on the development of a plan to complete the implementation of the IS business processes.

2. Performance Metrics

Observation

It was noted throughout the audit that performance measurement metrics are generally not being compiled, analyzed and reported by the IS management team to the Director of Information Technology. Calculating metrics is a key part of current information technology best practices. The review of performance metrics would enable the IS group to optimize their decision-making processes.

There is currently no way for SMT to be aware of the current state of the IS group, based on empirical evidence and statistics. It is extremely difficult to identify areas that are currently struggling and/or have inadequate resources allocated due to the current lack of performance measurement metrics.

Metrics and benchmarks are also not being utilized as part of the employee performance management process, where applicable (i.e. service desk).

Without adequate management information and performance measurements, it is highly unlikely that optimal decisions can be made.

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Recommendation

That a reporting package be developed that will be compiled by IS staff and reported to IS management and ultimately the Director of Information Technology.

The reporting package should consist of various metrics that are considered to be critical and best practice for each of the major business processes within IS (Incident, Problem, Change and Release Management). In addition, compiled metrics should be utilized as part of the employee performance management process, where applicable and appropriate.

Management Action Plan

Agreed. Information Services will be developing performance metrics that complement and align with our business processes to be implemented throughout 2011. The following lists the metrics that will be implemented initially. As our processes mature, the reporting metrics may change.

Incident - total Heat tickets per month; total calls per month; and total calls abandoned per month.

Change - number of "Requests for Changes" forms submitted/approved/denied; number of pre-approved changes implemented; number of Emergency Change requests submitted/approved/denied; and number of Changes completed on schedule.

Problem - heat tickets category; heat tickets by location; and heat tickets by department.

Release - number of incidents caused by a release; % of releases that are completed as planned, rescheduled or delayed or require content revision.

3. Time Tracking

Observation

Time tracking is not currently being done on a consistent basis within the IS division. There is no procedure that requires staff to record their time and make them accountable for their working hours by project, task, and/or workflow.

Work in IS is heavily project and/or incident based. Without time budgets or time tracking, the true cost of a project is difficult to accurately measure, limits management information and negatively impacts resource allocation.

Recommendation

That time tracking be implemented within the IS division. A timesheet template or tool should be created or purchased and staff should be required to complete and submit a weekly timesheet to their direct supervisor. Supervisors would review timesheets and perform follow up, where necessary.

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Time would be accumulated on a project basis with total cost calculated upon each project completion.

Management Action Plan

Agreed. IS is currently implementing processes and an application for Project Portfolio Management (PPM). The application includes a time sheet function that will allow us to create an employee specific time sheet for staff to track their work week to specific tasks. Supervisors will be responsible for creating the employee specific work/time sheet and following up with staff to ensure compliance. The application (including Time Tracking) will be in place and operational by the end of Q2, 2011.

4. Work Intake

a) *Intake Process Components*

Observation

IS is currently in the midst of drafting their intake process. Three of the six components of the intake process have been drafted and are in the process of being implemented. With respect to the portions that have been drafted, the following observations were noted.

Currently, the Information Services Working Committee (ISWC) meets every other month and as needed during the year. The ISWC is a key part of the intake process which determines how people, processes and technology are to be leveraged to meet business needs. This meeting frequency is not enough to effectively manage the intake process.

There is no Project Advisory Board (PAB) in IS. PAB should approve operations-based project work that is to be performed either internally within IS or externally for other groups within the City of Hamilton. Without a PAB, projects may not be approved in a consistent, effective manner that is based on a standard set of criteria.

There is no Project Portfolio Management (PPM) tool to track work requests (intake database). It is difficult to determine if there is a backlog of work (and the size of the backlog) if IS is not tracking project work in one centralized database. IS could also be missing opportunities to achieve efficiencies by staff searching the database to see if any projects have been completed that contain similar work steps that can be utilized in new projects.

Recommendation

That the ISWC meet more frequently (at least monthly). If, due to scheduling constraints, physical meetings are not possible, then innovative alternatives such as teleconferencing and email commenting should be considered.

Management Action Plan

Agreed. The new ISWC monthly meeting schedule will be in place by January, 2011.

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That a Project Advisory Board be created and meetings held at least bi-weekly.

Management Action Plan

Agreed. The IS Management Team has developed a Terms of Reference for the Project Advisory Board (PAB) and formed a PAB comprised of members of the IS extended management team and also some of the Customer Relationship Managers (CRMs). This group has standing meetings scheduled every two weeks. The first meeting was Friday, October 1, 2010.

That IS research the cost of implementing a PPM tool and plan to include the required funding for implementation in an upcoming budget.

Management Action Plan

Agreed. IS is currently implementing processes and an application for Project Portfolio Management which is scheduled to be fully implemented within IS by end of Q2, 2011. This is an upgrade to the existing industry standard PPM tool, Eclipse, by Solution Q. The total expected cost of software and implementation is \$90,000. Additional operating funding will be required in 2012 for on-going support.

b) Procedures

Observation

Pre-approved intake requests (i.e. Standard Service Requests) including related standard times have not been formally documented for the Applications Group in an IS procedures document. Inconsistent expectations can lead to friction between the IS user community and IS division staff.

Recommendation

That Standard Service Requests for all IS groups be defined in a procedures document that is related to the work intake process.

Management Action Plan

Agreed. A list of Standard Service Requests already exists for the Infrastructure & Operations and Security sections within IS since these groups handle the majority of these requests. This list will be reviewed and updated as required by Q1, 2011.

A similar list of Standard Service Requests will be developed for all remaining IS service delivery teams by Q1, 2011.

All Standard Service Requests will be incorporated into a Service Catalogue that will be released to the IS user community by Q2, 2011.

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c) *Estimate of Effort (Budgeting)*

Observation

The draft intake process for customer requests notes how an estimate of effort required to carry out the work be included on the Customer Request document. The budgeted number of IS hours costed out needs to be included. The Customer Request form itself is not consistently used across IS.

Currently missing on the Customer Request form is a section to be filled out at the end of the project to note the actual time spent and the actual project cost for the IS division including a variance analysis between actual and estimated numbers. Without such a section, performance management of project staff is not occurring on a consistent, supportable basis and projects are not being fully evaluated post-completion.

Recommendation

That a section for budgeted cost and actual cost and a section for variance analysis to indicate time that was over or under budget from the original plan be included in a revised version of the Customer Request form.

Management Action Plan

Agreed (in part). IS will record budgeted cost, actual cost and variance analysis for projects. However, IS does not believe that the Customer Request form is the best place for tracking this information. The Customer Request form is not a living document to be maintained throughout a project. It is a static document used in the initiation of the request. Instead, IS will be recording this information in the project and portfolio management processes and application to be implemented in Q2, 2011. This application will be used to track and report on costs and variances from budgeted costs for projects.

That this revised Customer Request form be implemented across IS (and therefore, across the City).

Management Action Plan

Agreed. The current version of the Customer Request form includes the estimated IS costs for implementing the project. This form is now required for all substantive IS project requests. Definitions for pre-approved or small projects will be complete by Q1, 2011. This will be implemented across the City in Q1, 2011.

d) *Customer Relationship Management (CRM)/Lead Time Policy*

Observation

In the draft intake process, a lead time policy is not included. A lead time policy would define how much notice other departments in the City would be required to give to IS to handle their intake request.

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The lead time portion of the policy includes how to deal with intake requests that do not have sufficient notification and how to enforce such a rule with other departments within the City of Hamilton. Without this policy, projects of strategic importance may not be able to be accommodated due to a lack of available resources because insufficient lead time was provided to the IS division.

Recommendation

That a Lead Time Policy be drafted, implemented and enforced across IS. This Policy should define standard lead times that are required for non-standard work based on priority levels. This Policy should also contain documentation of CRM (Customer Relationship Manager) roles within IS including responsibility for the awareness of future departmental requests and needs on a more pro-active basis.

Management Action Plan

Agreed. The development of a CRM Lead Time Policy will be beneficial to both IS Clients and IS itself. A number of meetings have already taken place with departmental management teams to raise awareness of the CRM role and to promote a departmental model for project prioritization (prior to the review through the feasibility and initiation phases of the IS Intake Process and subsequently by ISWC). Completion of the remaining Intake Process components will help IS to arrive at acceptable and attainable standard lead times required to process a non-standard work request through to completion or rejection. The experience gained in practice with the IS Intake Process will allow IS to adjust for continuous improvement to the CRM Lead Time Policy. The policy will be created as a sub-set of the efforts required to complete the Intake Process and is expected to be completed by Q4, 2011.

e) *Incomplete Process Documentation*

Observation

Currently, three parts of the intake process have not yet been drafted: IS-Intake 4 (Work Planning Process), IS-Intake 5 (Work Scheduling Process) and IS-Intake 6 (Work Execution Process).

The intake process is an important aspect of the work of IS and the process should be fully documented and implemented to ensure efficient project resourcing and execution.

Recommendation

That IS draft and implement all three remaining portions of the intake process that have not yet been completed.

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Management Action Plan

Agreed. This work is under way. However, the development and implementation of the work intake process for IS will be dependent on the implementation of the Project Portfolio Management (PPM) system in IS, as major aspects of the controls for these three sub-processes are intended to be built into the PPM system. This exercise is estimated to take about .25 FTE full time for a period of 12-18 months to do the background preparatory work and create the draft processes. Direction provided by CMO, SMT and the ISWC may affect delivery timelines.

5. Procedures

Observation

Throughout the audit, it was observed that there is a lack of up-to-date, defined procedures for IS staff to follow and for management to maintain. A lack of procedures documentation exposes the IS group to the risk of poor staff performance due to ambiguity or uncertainty surrounding processes and workflows.

Recommendation

That IS management create, regularly update and ensure staff compliance with procedures for all of the business processes within IS.

Management Action Plan

Agreed. The procedures identified in this Internal Audit report will be created and then regularly updated. IS Management will ensure that IS staff complies with these procedures.

6. Quality Assurance

Observation

During the audit, it was noted that there is no formal quality assurance (QA) function within IS. Currently, QA is performed only on an ad-hoc basis, as necessary. Best practices in effective IS organizations recommend a quality assurance responsibility.

The risk lies in that no detailed review of technical specifications is made to the production environment. No quality reviews are run on a regular basis that could detect inappropriate activity, which potentially cost the City.

Recommendation

That IS make quality assurance part of the job responsibilities of a current staff member.

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Management Action Plan

Agreed. A formal Quality Assurance function is required within IS. This will be a challenge for IS to implement within the constraints of current IS complement and budget. IS will assign a staff member and support the incorporation of QA methodologies and processes by Q4, 2011. This will require the selection, purchase and implementation of quality assurance and reporting tools that integrate into the development environment. IS has already undertaken initial investigation into this requirement. Based on research by Gartner Research (the leading IT industry analyst firm) and research conducted by our staff, the industry-leading applications will cost \$150,000 to implement. This funding has been requested in the 2011 capital budget. To provide ongoing support for this application, an increase will also be required in the 2012 operating budget.

That quality reviews for high-risk areas be run on a regular basis to deter and detect inappropriate activity.

Management Action Plan

Agreed. This is more of a security role than a QA role and the reviews will be implemented as part of ongoing security operating procedures by Q2, 2011.

7. Service Level Agreements

Observation

There are no service level agreements with functional departments that IS staff is widely aware of that define standard service times for requests submitted to IS.

Conflicts can (and do) occur over expectations for service which is difficult to resolve fairly and consistently in the absence of Service Level Agreements.

Recommendation

That IS draft and implement Service Level Agreements with other departments in the City.

Management Action Plan

Agreed (in part). Service Level Agreements (SLAs) can be very useful for common services which are repeated frequently such as Standard Service Requests. SLAs are not easily applied to services like business process analysis, custom application development or enterprise application upgrades where the scope of work can be vastly different from one instance to another. Furthermore, SLAs are most effective when customers pay for the services that they receive and there are set penalties (financial or otherwise) for failing to meet agreed to metrics. The current funding model for IS does not support this.

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The IS Service Catalog will be reviewed and updated as part of our 2011 work plan. IS will work with departments and agencies to raise awareness of IS service offerings, then draft and implement SLAs for core IS services, including a performance measurement component. This exercise is estimated to take about 0.75 FTE full time for a period of 12-18 months to do the background preparatory work and create a draft SLA. Consideration to direction provided by the CMO, SMT and the ISWC may affect delivery timelines.

B. AUDIT OBSERVATIONS BY BUSINESS PROCESS

SECTION I – INCIDENT MANAGEMENT (INCLUDING SERVICE DESK)

8. Procedures (Service Desk)

Observation

Even though detailed process documents were created in 2008, the Service Desk is not using them as they have not been updated.

There is no training guide/manual or best practices document that is currently in use by the Service Desk, especially for new Service Desk staff members. Only peer training is occurring.

Staff may not be performing to their full potential without procedural knowledge and the Service Desk may not be aware of its true capacity. If there were ever performance management issues with staff, it would be difficult to take remedial action if there are no current written guidelines against which their actions can be held accountable.

Recommendation

That IS draft and implement a procedures manual adequate and detailed enough to be used as a training guide for staff.

Management Action Plan

Agreed. Work on this is under way with a number of procedural guides completed and stored on the IS N drive. Further development and review of these guides along with supplemental information (Service Desk scripts, etc.) will form the basis for a procedural document and training guide for IS staff. Consolidation of this information into a concise package is a task Information Services will complete in Q3, 2011. This will require one FTE for a period of three months.

9. Integration

Observation

The Incident Management process is not well integrated with the Change Management process. Parent/Child relationships are not being utilized to link similar closed incidents within HEAT (Incident Management Tool) which can ultimately lead to extra staff effort being utilized to resolve incidents that have already been taken care of.

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Recommendation

That the IS Division develop and implement procedures that link the Incident and Change Management process.

Management Action Plan

Agreed. When numerous similar/related incidents are reported to the Service Desk and a problem is suspected, Service Desk staff currently create a "Heatboard" alert to link all these incidents together. This Heatboard alert simplifies administration of these tickets (communications, documentation and closure) from a central point. Creation of a report from the Heatboard alert table in Heat would enable the linkage between Incidents, Problems and Change Management. As a first step towards development of this process, IS will investigate this option and implement a manual integration between Incidents and the Change Management processes in Q1, 2011.

10. Process Documents

Observation

Within the IBM report noted earlier, several documents for Incident Management were listed as needing drafting and implementation. During the audit, it was noted that many of these documents still remain undeveloped. They include:

- Standard service request lists and the associated resolutions/answers
- Standard service request listing for the Business Applications group
- Procedures for assigning work in the Incident Management Process (and defining who the owner of an incident is)
- Service Desk scripts/standard questions to be asked to assist in diagnosing incidents and capturing accurate data
- Procedures to monitor service requests that are assigned to other groups in IS (outside of the Service Desk)
- Procedures for detailing how Service Desk staff should respond to non-standard questions and requests

Further procedures that should be developed as per Internal Audit are:

- Procedures for prioritization, classification and types of incidents
- Process for re-assigning HEAT tickets
- Procedure for reviewing assigned tickets (supervisory review), essentially a QA process
- Process to define when an incident merits escalation to the Change Management process and when a root cause analysis is required
- Incident closure process

Without a properly implemented Incident Management process and corresponding procedures documentation, the IS division continues to function on an ad-hoc basis. Best practice processes (ITIL framework) are necessary for effective Incident Management.

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Recommendation

That IS draft and implement the above-noted documents to be included in the Incident Management process documents and procedures.

Management Action Plan

Agreed. See the response to item #9 above. In addition, Information Services will develop a process flow diagram to document the integration of the above noted report to the Change Management process in Q1, 2011.

11. Tools

Observation

A Knowledge Base tool is currently not being used by IS as part of the Incident Management process in order to enable Service Desk staff to look up solutions to similar incidents and problems that have been previously resolved and that have a documented solution.

Recommendation

That IS research and implement a Knowledge Base tool for the Incident Management process.

Management Action Plan

Agreed. Knowledge Base functionality is commonly included in Incident Management and Service Level Management applications. IS currently uses the FrontRange Solutions application (HEAT) for logging and reporting incidents. This application was customized to best fit the specific environment and ITIL best practices. While a knowledge base exists within this application, it does not provide the best fit for the IS environment. Greater value would be derived by ensuring that the selection of a Knowledge Base tool integrates seamlessly with the procedures and practices that will be implemented in 2011 and 2012. As part of this development, Information Services will research a Knowledge Base tool that best meets these requirements in Q4, 2011. Implementation would proceed with capital funding in 2012. Implementation of this tool is projected to cost approximately \$90,000 and require four months of staff effort. An increase in the 2013 operating budget will be required to provide continued support for the new application.

SECTION II - PROBLEM MANAGEMENT

12. Defined Process

There is no defined Problem Management process. Analysis from a Problem Management process provides information to the Incident Management process and reduces redundant work.

A major component of the Problem Management process is root cause analysis, which is not performed as a regular part of the IS Division's workflow.

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Therefore, incidents are resolved on an individual basis but problems go unidentified which leads to replication of work. Further, solutions implemented may not ultimately address the root cause of a situation, leading to additional work in the future that is needed to address the root cause.

In order to have a properly implemented Problem Management process that is considered a best practice (ITIL framework), the required roles of Problem Management Process Owner, Problem Management Co-ordinator and Problem Analyst should be assigned to staff members.

Recommendation

That a well-defined Problem Management process be implemented by IS.

Management Action Plan

Agreed. See the responses to items #9-11 above.

13. Procedures

Observation

Similar to Incident Management, the IBM report noted several procedures requiring documentation for the Problem Management process. The following documents still need drafting:

- Problem Creation Process
- Assignment/Reassignment Process
- Escalation Procedures
- Formal methodology for investigation and trouble shooting
- Problem Closure Process
- Notification Process
- Feasibility criteria and guidelines (to be used to evaluate solutions to root causes)

Without an appropriately developed Problem Management process, staff will continue to duplicate effort by creating solutions to resolve incidents that should be easily identifiable as a problem with a known solution.

Recommendation

That the above noted documents be developed by IS and included as part of the Problem Management process implementation.

Management Action Plan

Agreed. Along with process flow documentation for incidents and integration to Change Management, IS will develop a process flow diagram and associated documentation for the Problem Management process in Q3, 2011.

14. Tools

Observation

It was noted that IS does not have a Problem Management tool (Knowledge Base) to enable the tracking of problems/known errors and the related solutions.

Without an appropriate Problem Management tool, it will be difficult and inefficient to track, extract and link information in this process.

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Recommendation

That IS investigate the capabilities of the currently used HEAT system to enable a Knowledge Base feature (currently HEAT has a Knowledge Tree function that is not being utilized on a regular basis). If this is not feasible, IS should consider the various options for a Knowledge Base tool and implement the tool that best meets the City's needs.

Management Action Plan

Agreed. See the response to item #11 above.

SECTION III - CHANGE MANAGEMENT

15. Procedures

Observation

During the audit, it was noted that procedures are not current. The existing procedures were reviewed and were determined to be out of date as an annual review had not taken place during the past year. Internal Audit was provided with an updated draft but this document has not yet been fully implemented.

The current procedures are not comprehensive or defined enough to provide a strong internal control environment for the Change Management process.

The following areas need to be adequately addressed:

- Business case information to guide prioritization of change efforts
- Structured risk and impact assessment considering impacts on the operational system and its functionality
- Communication to change requesters regarding the status of their request
- Testing, as appropriate
- Appropriate generation and/or modification of related documentation and the storage of such documentation
- Adequate communication of pending changes to affected parties, including management, users, developers, security administrators, IS operations and service desk staff (occurs at CAB but not formally to affected parties)
- Appropriate segregation of development, test and production environments
- Adequate consideration of control implications throughout the change process
- Responsibilities for investigating failures, together with the incident resolution process
- Maintenance procedures (review requirements)
- Record-keeping (i.e. meeting minutes) and the level of detail required to adequately document the specifics of meetings

The Change Management process occurs currently on an ad-hoc basis. If staff are not aware of definitive work expectations, they may make changes that are not authorized due to the lax internal control environment.

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Recommendation

That the Change Management procedures be revised to address the deficiencies noted above. After these procedures have been augmented, they need to be communicated to staff in order to set expectations and ensure that they are followed by all staff.

Management Action Plan

Agreed. Change Management procedures will be revised in co-ordination with the other related IS processes that will be implemented in 2011. With the newly-implemented CRM role, IS now has the opportunity to engage City departments proactively to prioritize changes based on business cases and to provide better communication back to change requestors.

Without dedicated Change Management staff, it is a challenge to ensure formal communications, record-keeping and follow up. At this point, CAB members are relied upon to communicate planned changes to their staff. In the interim, IS will reinforce that expectation with CAB members. Implementation of this recommendation will require the addition of one FTE to oversee these change management responsibilities. IS will include this in the 2012 operating budget submission (see the response to item #20).

Some progress is being made to segregate development, test and production environments. However, the implementation of this recommendation requires the availability of adequate development, test and production server environments. If the budget for the recommended Virtual Servers is approved, the separate environments will be implemented by Q4, 2011.

That all procedures be reviewed at least annually (with evidence, i.e. sign-off) and revised, as required.

Management Action Plan

Agreed. A formal yearly review of the Change Management processes will be implemented and will involve all CAB members. The review will target deficiencies and assign responsibilities for the process revisions as necessary. Sign-off will be included. This will be implemented in Q1, 2011.

16. Audit Trails

Observation

Audit trail event logs can be deleted from servers and this action can go undetected by IS's tracking program (LogRhythm). Therefore, the deletions do not appear on any reports that are reviewed by IS staff. A staff member could make unauthorized changes (IS production environment), delete the corresponding audit trail and the changes would not be detected by the IS Security group. Such changes to the IS environment could put the City's IS functionality at risk.

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Recommendation

That LogRhythm tracking and reporting be changed to ensure that deletions of audit trails appear in reports. These reports should be reviewed by IS staff with appropriate follow up in a timely manner.

Management Action Plan

Agreed. This will be implemented in Q1, 2011.

Currently, IS does not track changes to the IS environment in an automated manner. Changes are recorded manually by IS staff. Due to the lack of capability to track changes in an automated manner which can be achieved by using file integrity monitoring software, the City is not in compliance with PCI Requirement 11.5 - Deploy File Integrity Monitoring Software. If this non-compliance with PCI requirements continues, the City may not be able to accept credit cards as a form of payment.

Recommendation

That file integrity monitoring software be implemented in all IS production environments.

Management Action Plan

Agreed. Automated detection of changes in the production IS environment requires automated tools such as file integrity monitoring software. The selection and implementation of this is included in the PCI compliance project. However, this covers only the environment that is "in-scope" for PCI. Implementing this on all servers will be a very significant and expensive undertaking. The anticipated cost to implement this will exceed \$100,000. IS will investigate this in Q3, 2011 in order to include it in the 2012 capital budget. An increase in the 2013 operating budget submission will also be required for ongoing support of this application.

There are no documented procedures for reviewing security logs, specifically in the area that relates to changes that are made to the production environment. This is a component of PCI Requirement 10.6 - Review logs for all system components at least daily. If the City is not in compliance with PCI requirements, the City may not be able to accept credit cards as a form of payment.

Recommendation

That a procedure for reviewing logs relating to the security of the production environment be drafted and implemented. This procedure should specify the various types of reviews that should occur and which reports to use. The procedures should require a review frequency that is in compliance with PCI Requirement 10.6 (daily).

Management Action Plan

Agreed. This will be completed by the end of 2010 and will involve daily reviews for the in-scope PCI environment. Since this will be accomplished with existing IS security staff, reviews will be less frequent for systems outside of the PCI scope.

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17. Security Group Testing

Observation

Various tests were conducted on security access granted to IS staff. For a sample of 10 IS employees, a large number of permissions for access had been granted (over 40 instances noted) where the permissions were not appropriate and/or needed for the staff member's current job position. There were also three instances noted where permission granted for a security group was out of date and the security group should have been deleted.

In testing a specific job position, it was noted that there was not consistency in the access permissions granted to all employees in this category when though all held the same job title. The responsibility to review staff security access permissions is not currently assigned to any supervisory or managerial staff in IS.

Recommendation

That specific supervisory staff be assigned to review IS employee access permissions on a regular basis (e.g. quarterly) and whenever there is a change in a staff member's area of responsibility.

Management Action Plan

Agreed. Beginning in January 2011, reports showing access permissions for each IS staff member will be distributed to IS supervisors quarterly. Procedures will be developed for supervisors outlining:

- ***the response required to the quarterly reports and the timing of that response;***
- ***the notification required whenever an IS staff member changes an area of responsibility; and***
- ***the approval required for all changes to IS staff member access permissions.***

There is no segregation of duties (for access to production environment via security groups) that separates staff that perform development work from staff that implement changes into the production environment (and vice versa) as these roles are not distinguished and/or defined in IS. In particular, staff with a noted permission have access across test, development and production environments. Changes can be made, tested, reviewed and implemented by the same staff member.

Due to the lack of separation of duties between development/test and production environments, the City is not in compliance with PCI requirement 6.3.3 – Separation of Duties between Development/Test and Production Environments. The City is also not in compliance with PCI requirement 6.3.2 which stipulates access control to enforce the separation of development/test environments and the production environment.

Recommendation

That IS designate staff as either developers or implementers for specific servers and applications and the access to servers and applications be restricted to only appropriate staff members by utilizing security groups. For staff that are required to provide after hours support to all areas, an after-hours support account (that is not

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generic) should be assigned and their support accounts should have the usage monitored on a regular basis.

Management Action Plan

Agreed. IS management fully endorses this recommendation as an industry best practice. It has been identified in previous external financial audits and is a requirement for the applications within the scope for the PCI compliance project. To date, IS has been unable to satisfy this recommendation for all of the City's applications because of the significant impact on the IS budget. Initial analysis of this recommendation estimates an increase of six (6) FTEs to the current complement. With additional staffing, this could be completed within 4 months of budget approval.

18. Change Testing

Observations

There are three types of changes: Standard, Pre-Approved and Emergency changes. As part of the audit, testing was performed on each of the three categories.

During testing, it was noted that RFC's are generally poorly completed. For every RFC selected for testing, at least one field was not properly filled out. Segregation of duties and access to the production environment are not addressed on the RFC form. As noted above, the responsibility for developing, testing and implementing changes is not separated. There is no indication on the form as to how an appropriate segregation of duties will be achieved for a particular change and who will ultimately be making the change to the production environment.

Documentation related to RFC's is not stored in a central location. The current haphazard storage of supporting documentation could lead to more downtime than necessary, if any issues are encountered with the change.

Given that RFC's are not required to have supervisory review prior to being presented to CAB, much work (including testing) may be completed for changes that may not be approved by CAB. Approval should be given to a change prior to a significant amount of work being carried out.

CAB only provides a high-level approval and does not review, in detail, the contents of the RFC such as the testing and back out plan details. The impact is that staff members may be working on developing and testing changes that may not be of the greatest importance to the IS and City's strategic plan and that their time should be being spent on other projects.

As time spent on each change is not tracked, there is no way to determine if the change was over budget and how much more staff time was spent than originally planned. The impact is that tradeoffs occur and other important work is not completed due to too much time being spent on changes. This could be prevented by monitoring time spent on specific changes.

CAB minutes do not demonstrate that changes implemented in the prior week were discussed at the CAB meeting. There is no post-implementation review in the revised Change Management process for all standard and emergency changes made.

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The Incident Management process (HEAT Ticket) and the Change Management process (RFC form) do not interconnect to provide an adequate audit trail of changes. Recurring incidents and a lack of integration of the two processes could lead to system downtime.

Recommendation

That the Change Management procedures be revised to address the deficiencies noted above. Management must ensure that the documentation and approvals as noted in the revised process are being carried out.

Management Action Plan

Agreed (in part). IS understands that the current Change Management procedures are lacking in rigour. In part, this is the result of IS staffing levels and thereby, the inability to devote the staff time recommended by ITIL best practices (see the response to item #20). This is also the result of not having completed other processes that compliment the Change Management process.

To address some of the "Change Testing" observations, the current process and documentation will be reviewed and updated for the purpose of incorporating the following enhancements by Q1 2011:

- Add a preliminary step to the process to ensure the completeness and accuracy of the submitted form;***
- Modify the RFC document such that it accommodates the distinct identification of the developer, tester and person responsible for promoting the change (however, note that IS does not have separation of duties - see the response to item #17);***
- While consolidating all documentation in the same location as the RFC form may be desirable, in many instances it may not be practical. IS will enhance the Request for Change (RFC) form by adding a section where the user will identify the location and nature of the supporting documentation;***
- Update the CAB minutes to capture all events that take place during the CAB meetings (again, this will be dependent on having the appropriate IS staff to accomplish this task - see the response to item #20); and***
- Make the updates necessary to link incidents (HEAT tickets) to implement fixes which address or correct the logged incidents.***

With respect to other observations, IS disagrees. The objective of the Change Management process as it is currently implemented is defined as:

"The purpose of the Change Management Process is to ensure all changes to the IT production environment are properly planned, managed and reviewed prior to their implementation and release."

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The Change Management process was not implemented for the purpose of evaluating the business merits of proposed changes, prioritizing the work required to implement them or collecting development metrics of the body of work being promoted. Therefore, the implementation of such recommendations, where appropriate, will be included in other processes and in the PPM application.

19. Scheduling

Observation

As the Change Management process does not define the frequency of scheduled windows when standard changes are to be made, this could lead to increased risk of downtime.

Recommendation

That IS implement a schedule and procedure for the Change Management process that addresses the criteria that changes must meet in order for them to be implemented 'as ready' and which changes must occur in the pre-defined window. Any standard changes should go through the Release Management process unless otherwise justified and approved.

Management Action Plan

Agreed. It would certainly be preferable to implement changes in specific well-defined windows. Consideration must be given to the complexity of multiple changes being implemented in one window and the need for user departments to implement quickly to meet their own project timelines. Another issue to consider is the ability of IS to combine the after-hours staff time required to implement this with the need to provide normal business day support.

Currently, CAB utilizes a Change Management schedule that is reviewed at least weekly. By the end of 2010, CAB will review the feasibility of combining changes into regular maintenance windows. Criteria will be defined to address a maintenance window opportunity for a specific application or change and when it can be performed (using CRM input from user departments).

This requirement will be reviewed in more detail as the Release Management process is being implemented.

20. Roles

Observation

In the IBM reports noted above, there were several roles that were defined for the Change Management process. During the audit, it was noted that the roles of Change Co-ordinator and Change Analyst have not been assigned. The duties and responsibilities carried out by these positions are important aspects of the staff attention required as changes are made.

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Recommendation

That the roles of the Change Co-ordinator and Change Analyst be assigned with responsibilities clearly defined.

Management Action Plan

Agreed. The Change Management roles identified in this recommendation require a broad knowledge of information technology and the capacity to carry out the duties associated with the function. To date, these have been a shared responsibility among existing IS staff. IS management is currently challenged with over-extending its current staff complement. Implementation of this will require the addition of one (1) FTE to oversee these change management responsibilities. IS will include this cost in the 2012 budget submission.

21. Tools and Reporting

Observation

It was noted that IS does not have a Change Management database (CMDB-Configuration Management Database) to enable tracking of standard emergency changes. Thus, change information is not widely available. This situation coupled with the fact that reporting options are not fully utilized in the HEAT database could put the IS environment at risk by inappropriate and/or incorrectly implemented changes to the production environment.

Recommendation

That IS investigate the various options for a Change Management database and reporting tool and implement the tools that best meet the City's needs.

Management Action Plan

Agreed. By Q4, 2011, IS will investigate and review tools to support the Incident Management and Change Management processes. When the cost of these tools is known, IS will include them in the capital budget (likely 2012). Ongoing support costs will be included in the following year's operating budget.

That staff be reminded to accurately complete and maintain change records in order to facilitate information gathering and queries.

Management Action Plan

Agreed. The current Change Management documentation is lacking in many respects. As stated in the Management response to recommendation #20, Change Management roles are shared resulting in inconsistent and incomplete change documentation. Other municipal IT departments dedicate one or more resources to the co-ordination of Change Management documentation. In the context of the current environment, the following steps will be taken by the end of November, 2010:

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- *Advise the Change Advisory board (CAB) of this requirement;*
- *Ensure that supervisors vet all Request for Change (RFC) forms submitted to CAB; and*
- *Enhance the Request for Change (RFC) form by adding a section where the user will identify the location and nature of the supporting documentation.*

SECTION IV - RELEASE MANAGEMENT

22. Process

Observation

The Release Management process in IS has not been formalized. There is a lack of procedures and a formalized workflow. An approval policy for the Release Management process has not been drafted, implemented and enforced. No standards for the storage of supporting documentation for releases exist. Certain forms and specific evidence of testing is required to be retained. The process is being carried out on an ad-hoc basis with most release activity occurring in the PeopleSoft group. Procedures should include sign off criteria, levels and rules based on the risk and impact of requested release components.

Given that there is no formal Release Management process, releases are not well integrated with the Change, Problem or Incident Management processes.

Recommendation

That the Release Management process be properly documented as noted in the IBM report and in line with industry best practices.

Management Action Plan

Agreed. Representatives from each section within IS will review the Release Management Process proposed by IBM. Based on this review, the process will be customized as required, to best serve the needs of IS and the departments to which IS provides service. The customized process will adhere to industry best practices and, where limitations exist (for example, due to staffing levels), compensating controls will be introduced into the documented process. This review will be undertaken in 2011.

23. Test Methodology

Observation

There is no formal testing methodology and best practices document that has been drafted and implemented. The level of testing documentation required should be commensurate with the risk and impact of the release. Since there is no defined methodology, testing does not occur consistently. Testing is also not likely to be occurring at a high level that meets the expectations of the IS division. Impact is that releases may be implemented without adequate testing, putting the City at risk for exposure to potential downtime.

For example, the test environment is not always used for testing purposes. A recent copy of the production environment is occasionally used. Also, the test environment is not being updated on a regular basis. If the test environment does not mirror the production

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environment, problems could be encountered when the release is implemented due to the fact that testing may not have caught all potential issues.

Recommendation

That a testing methodology be drafted and implemented. It should include sign-off and approval levels depending on the risk and impact of the proposed release.

Management Action Plan

Agreed. IS agrees with this recommendation. However, the implementation of this recommendation requires the availability of adequate development, test and staging server environments. If the budget for the recommended Virtual Servers is approved in Q1, 2011, IS will implement the separate environments by Q4, 2011.

As explained in item #6, IS is implementing a testing and QA process. IS will review, design and implement a plan for development and test server refresh processes. Expected analysis and recommendations will be completed by Q3, 2011.

24. Implementation

Observation

It was noted during the audit that IS has not yet committed to fully implementing a Release Management process (including the items recommended above), assigning the required roles to staff members (Release Management Process Owner, Release Management Coordinator and Release Analyst), tracking and reporting Release Management information to management and integrating the process with the other ITIL processes.

A properly implemented Release Management process is considered a best practice (ITIL framework).

Recommendation

That IS commit to implementing a Release Management process by implementing the recommendations noted above.

Management Action Plan

Agreed. IS will engage the services of an external consultant to assist in the implementation of the release Management process. The consultant will participate in training the staff that will assume the roles of Release Management Coordinator and Release Analyst and will also develop the documents used to monitor and control the Release Management process. Target date - Q1, 2012 with an expected consultant cost of \$60,000.

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Notes:

Capital columns refer to estimated project implementation resource requirements

Ongoing columns refer to estimated operational resource requirements

FTE counts do NOT necessarily mean NEW resources, and also represent a sum of effort across many resources

"PM" scale:

1 = Short term, quick fix, low cost - six months

2 = Medium term, medium cost - within 12 months

3 = Long term, major project, large cost - 2 to 3 years

Section/ Item	Recommendation	Management Response	Target	Capital FTE	Capital \$	Ongoing FTE	Ongoing \$	"PM" Scale
A.1	That IS complete the implementation of the business processes as outlined in the IBM reports, customizing them as necessary to best meet the needs of the City.	Agreed. The IBM study was commissioned to assist with defining the job architecture and organization structure to meet current information technology needs within the City. The definition of high level IS business processes was added to the scope at the end of IBM's engagement to assist IS with planning for the new IS organization. IS management deferred further work on the IS business processes until the restructured organization was in place to support the processes. The restructuring of the extended management group is complete and	Q2 2012	0.00	0	0.00	0	3

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Section/ Item	Recommendation	Management Response	Target	Capital FTE	Capital \$	Ongoing FTE	Ongoing \$	"PM" Scale
		the next stage of restructuring (which involves the remaining positions) is expected to be complete by early 2011. At that time, IS will work on the development of a plan to complete the implementation of the IS business processes.						
A.2	That a reporting package be developed that will be compiled by IS staff and reported to IS management and ultimately the Director of Information Technology. The reporting package should consist of various metrics that are considered to be critical and best practice for each of the major business processes within IS (Incident, Problem, Change and Release	Agreed. Information Services will be developing performance metrics that complement and align with our business processes to be implemented throughout 2011. The following lists the metrics that will be implemented initially. As our processes mature, the reporting metrics may change. Incident - total Heat tickets per month; total calls per month; and total calls abandoned per month. Change - number of "Requests for Changes" forms submitted/approved/denied; number of pre approved changes implemented; number of Emergency Change requests submitted/approved/denied; and number of Changes completed on	Q4 2011	0.00	0	0.00	0	1

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Section/ Item	Recommendation	Management Response	Target	Capital FTE	Capital \$	Ongoing FTE	Ongoing \$	"PM" Scale
	Management). In addition, compiled metrics should be utilized as part of the employee performance management process, where applicable and appropriate.	<p>schedule.</p> <p>Problem - heat tickets category; heat tickets by location; and heat tickets by department.</p> <p>Release - number of incidents caused by a release; % of releases that are completed as planned, rescheduled or delayed or require content revision.</p>						
A.3	That time tracking be implemented within the IS division. A timesheet template or tool should be created or purchased and staff should be required to complete and submit a weekly timesheet to their direct supervisor. Supervisors would review timesheets and perform follow up, where necessary.	Agreed. IS is currently implementing processes and an application for Project Portfolio Management (PPM). The application includes a time sheet function that will allow us to create an employee specific time sheet for staff to track their work week to specific tasks. Supervisors will be responsible for creating the employee specific work/time sheet and following up with staff to ensure compliance. The application (including Time Tracking) will be in place and operational by the end of Q2, 2011.	Q2 2011	0.25	0	0.00	0	1

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Section/ Item	Recommendation	Management Response	Target	Capital FTE	Capital \$	Ongoing FTE	Ongoing \$	"PM" Scale
	Time would be accumulated on a project basis with total cost calculated upon each project completion.							
A.4a.1	That the ISWC meet more frequently (at least monthly). If, due to scheduling constraints, physical meetings are not possible, then innovative alternatives such as teleconferencing and email commenting should be considered.	Agreed. The new ISWC monthly meeting schedule will be in place by January, 2011.	Q4 2010	0.00	0	0.00	0	1

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Section/ Item	Recommendation	Management Response	Target	Capital FTE	Capital \$	Ongoing FTE	Ongoing \$	"PM" Scale
A.4a.2	That a Project Advisory Board be created and meetings held at least bi-weekly.	Agreed. The IS Management Team has developed a Terms of Reference for the Project Advisory Board (PAB) and formed a PAB comprised of members of the IS extended management team and also some of the Customer Relationship Managers (CRMs). This group has standing meetings scheduled every two weeks. The first meeting was Friday, October 1, 2010.	Q4 2010	0.00	0	0.00	0	1
A.4a.3	That IS research the cost of implementing a PPM tool and plan to include the required funding for implementation in an upcoming budget.	Agreed. IS is currently implementing processes and an application for Project Portfolio Management which is scheduled to be fully implemented within IS by end of Q2, 2011. This is an upgrade to the existing industry standard PPM tool, Eclipse, by Solution Q. The total expected cost of software and implementation is \$93,000. Additional operating funding will be required in 2012 for on-going support.	Q2 2011	1.00	93,000	1.00	15,600	2
A.4b	That Standard Service Requests for all IS groups be defined in a procedures document that is	Agreed. A list of Standard Service Requests already exists for the Infrastructure & Operations and Security sections within IS since these groups handle the majority of these requests. This list will be reviewed and	Q2 2011	0.08	0	0.04	0	2

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Section/ Item	Recommendation	Management Response	Target	Capital FTE	Capital \$	Ongoing FTE	Ongoing \$	"PM" Scale
	related to the work intake process.	<p>updated as required by Q1, 2011.</p> <p>A similar list of Standard Service Requests will be developed for all remaining IS service delivery teams by Q1, 2011.</p> <p>All Standard Service Requests will be incorporated into a Service Catalogue that will be released to the IS user community by Q2, 2011.</p>						
A.4c.1	That a section for budgeted cost and actual cost and a section for variance analysis to indicate time that was over or under budget from the original plan be included in a revised version of the Customer Request form.	Agreed (in part). IS will record budgeted cost, actual cost and variance analysis for projects. However, IS does not believe that the Customer Request form is the best place for tracking this information. The Customer Request form is not a living document to be maintained throughout a project. It is a static document used in the initiation of the request. Instead, IS will be recording this information in the project and portfolio management processes and application to be implemented in Q2, 2011. This application will be used to track and report on costs and variances from budgeted costs for projects.	Q2 2011	0.00	0	0.00	0	2

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Section/ Item	Recommendation	Management Response	Target	Capital FTE	Capital \$	Ongoing FTE	Ongoing \$	"PM" Scale
A.4c.2	That this revised Customer Request form be implemented across IS (and therefore, across the City).	Agreed. The current version of the Customer Request form includes the estimated IS costs for implementing the project. This form is now required for all substantive IS project requests. Definitions for pre-approved or small projects will be complete by Q1, 2011. This will be implemented across the City in Q1, 2011.	Q1 2011	0.00	0	0.00	0	1
A.4d	That a Lead Time Policy be drafted, implemented and enforced across IS. This Policy should define standard lead times that are required for non-standard work based on priority levels. This Policy should also contain documentation of CRM (Customer Relationship Manager) roles within IS including responsibility for the awareness of	Agreed. The development of a CRM Lead Time Policy will be beneficial to both IS Clients and IS itself. A number of meetings have already taken place with departmental management teams to raise awareness of the CRM role and to promote a departmental model for project prioritization (prior to the review through the feasibility and initiation phases of the IS Intake Process and subsequently by ISWC). Completion of the remaining Intake Process components will help IS to arrive at acceptable and attainable standard lead times required to process a non-standard work request through to completion or rejection. The experience gained in practice with the IS Intake Process will allow IS to adjust for continuous improvement to	Q4 2011	0.42	0	0.00	0	2

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Section/ Item	Recommendation	Management Response	Target	Capital FTE	Capital \$	Ongoing FTE	Ongoing \$	"PM" Scale
	future departmental requests and needs on a more pro-active basis.	the CRM Lead Time Policy. The policy will be created as a sub-set of the efforts required to complete the Intake Process and is expected to be completed by Q4, 2011.						
A.4e	That IS draft and implement all three remaining portions of the intake process that have not yet been completed.	Agreed. This work is under way. However, the development and implementation of the work intake process for IS will be dependent on the implementation of the Project Portfolio Management (PPM) system in IS, as major aspects of the controls for these three sub processes are intended to be built into the PPM system. This exercise is estimated to take about .50 FTE full time for a period of 12-18 months to do the background preparatory work and create the draft processes. Direction provided by CMO, SMT and the ISWC may affect delivery timelines.	Q2 2012	0.50	0	0.00	0	2
A.5	That IS management create, regularly update and ensure staff compliance with procedures for	Agreed. The procedures identified in this Internal Audit report will be created and then regularly updated. IS Management will ensure that IS staff complies with these policies and procedures.	Q2 2012	0.00	0	0.00	0	2

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Section/ Item	Recommendation	Management Response	Target	Capital FTE	Capital \$	Ongoing FTE	Ongoing \$	"PM" Scale
	all of the business processes within IS.							
A.6.1	That IS make quality assurance part of the job responsibilities of a current staff member.	Agreed. A formal Quality Assurance function is required within IS. This will be a challenge for IS to implement within the constraints of current IS complement and budget. IS will assign a staff member and support the incorporation of QA methodologies and processes by Q4, 2011. This will require the selection, purchase and implementation of quality assurance and reporting tools that integrate into the development environment. IS has already undertaken initial investigation into this requirement. Based on research by Gartner Research (the leading IT industry analyst firm) and research conducted by our staff, the industry-leading applications will cost \$150,000 to implement. This funding has been requested in the 2011 capital budget. To provide ongoing support for this application, an increase will also be required in the 2012 operating budget.	Q4 2011	0.50	150,000	0.50	20,000	3

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Section/ Item	Recommendation	Management Response	Target	Capital FTE	Capital \$	Ongoing FTE	Ongoing \$	"PM" Scale
A.6.2	That quality reviews for high-risk areas be run on a regular basis to deter and detect inappropriate activity.	Agreed. This is more of a security role than a QA role and the reviews will be implemented as part of ongoing security operating procedures by Q2, 2011.	Q2 2011	0.00	0	0.10	0	1
A.7	That IS draft and implement Service Level Agreements with other departments in the City.	Agreed (in part). Service Level Agreements (SLAs) can be very useful for common services which are repeated frequently such as Standard Service Requests. SLAs are not easily applied to services like business process analysis, custom application development or enterprise application upgrades where the scope of work can be vastly different from one instance to another. Furthermore, SLAs are most effective when customers pay for the services that they receive and there are set penalties (financial or otherwise) for failing to meet agreed to metrics. The current funding model for IS does not support this. The IS Service Catalog will be reviewed and updated as part of our 2011 work plan. IS will work with	Q2 2012	0.75	0	0.13	0	2

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Section/ Item	Recommendation	Management Response	Target	Capital FTE	Capital \$	Ongoing FTE	Ongoing \$	"PM" Scale
		<p>departments and agencies to raise awareness of IS service offerings, then draft and implement SLAs for core IS services, including a performance measurement component. This exercise is estimated to take about 0.75 FTE full time for a period of 12-18 months to do the background preparatory work and create a draft SLA. Consideration to direction provided by the CMO, SMT and the ISWC may affect delivery timelines.</p>						
B.8	<p>That IS draft and implement a procedures manual adequate and detailed enough to be used as a training guide for staff.</p>	<p>Agreed. Work on this is under way with a number of procedural guides completed and stored on the IS N drive. Further development and review of these guides along with supplemental information (Service Desk scripts, etc.) will form the basis for a procedural document and training guide for IS staff. Consolidation of this information into a concise package is a task Information Services will complete in Q3, 2011. This will require one FTE for a period of three months.</p>	Q3 2011	0.25	0	0.00	0	2

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Section/ Item	Recommendation	Management Response	Target	Capital FTE	Capital \$	Ongoing FTE	Ongoing \$	"PM" Scale
B.9	That the IS Division develop and implement procedures that link the Incident and Change Management process.	Agreed. When numerous similar/related incidents are reported to the Service Desk and a problem is suspected, Service Desk staff currently create a "Heatboard" alert to link all these incidents together. This Heatboard alert simplifies administration of these tickets (communications, documentation and closure) from a central point. Creation of a report from the Heatboard alert table in Heat would enable the linkage between Incidents, Problems and Change Management. As a first step towards development of this process, IS will investigate this option and implement a manual integration between Incidents and the Change Management processes in Q1, 2011.	Q1 2011	0.25	0	0.00	0	1
B.10	That IS draft and implement the above-noted documents to be included in the Incident Management process documents and procedures.	Agreed. See the response to item #9 above. In addition, Information Services will develop a process flow diagram to document the integration of the above noted report to the Change Management process in Q1, 2011.	Q1 2011	0.00	0	0.00	0	1

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Section/ Item	Recommendation	Management Response	Target	Capital FTE	Capital \$	Ongoing FTE	Ongoing \$	"PM" Scale
B.11	That IS research and implement a Knowledge Base tool for the Incident Management process.	Agreed. Knowledge Base functionality is commonly included in Incident Management and Service Level Management applications. IS currently uses the FrontRange Solutions application (HEAT) for logging and reporting incidents. This application was customized to best fit the specific environment and ITIL best practices. While a knowledge base exists within this application, it does not provide the best fit for the IS environment. Greater value would be derived by ensuring that the selection of a Knowledge Base tool integrates seamlessly with the procedures and practices that will be implemented in 2011 and 2012. As part of this development, Information Services will research a Knowledge Base tool that best meets these requirements in Q4, 2011. Implementation would proceed with capital funding in 2012. Implementation of this tool is projected to cost approximately \$90,000 and will require four months of staff effort. An increase in the 2013 operating budget will be required to provide continued support for this new application.	Q4 2012	0.50	90,000	0.00	10,000	2

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Section/ Item	Recommendation	Management Response	Target	Capital FTE	Capital \$	Ongoing FTE	Ongoing \$	"PM" Scale
B.12	That a well-defined Problem Management process be implemented by IS.	Agreed. See the responses to items #9-11 above.	Q4 2012	0.00	0	0.00	0	3
B.13	That the above noted documents be developed by IS and included as part of the Problem Management process implementation.	Agreed. Along with process flow documentation for incidents and integration to Change Management, IS will develop a process flow diagram and associated documentation for the Problem Management process in Q3, 2011.	Q3 2011	0.25	0	0.25	0	3
B.14	That IS investigate the capabilities of the currently used HEAT system to enable a Knowledge Base feature (currently HEAT has a Knowledge Tree function that is not being utilized on a regular basis). If this is not feasible, IS should consider the various options for a Knowledge	Agreed. See the response to item #11 above.	Q4 2012	0.00	0	0.00	0	2

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Section/ Item	Recommendation	Management Response	Target	Capital FTE	Capital \$	Ongoing FTE	Ongoing \$	"PM" Scale
	Base tool and implement the tool that best meets the City's needs.							
B.15.1	That the Change Management procedures be revised to address the deficiencies noted above. After these procedures have been augmented, they need to be communicated to staff in order to set expectations and ensure that they are followed by all staff.	<p>Agreed. Change Management procedures will be revised in coordination with the other related IS processes that will be implemented in 2011. With the newly-implemented CRM role, IS now has the opportunity to engage City departments proactively to prioritize changes based on business cases and to provide better communication back to change requestors.</p> <p>Without dedicated Change Management staff, it is a challenge to ensure formal communications, record-keeping and follow up. At this point, CAB members are relied upon to communicate planned changes to their staff. In the interim, IS will reinforce that expectation with CAB</p>	Q4 2012	1.00	30,000	1.00	10,000	2

**CORPORATE SERVICES - INFORMATION SERVICES (IS)
BUSINESS PROCESS MANAGEMENT-MANAGEMENT RESPONSE**

Section/ Item	Recommendation	Management Response	Target	Capital FTE	Capital \$	Ongoing FTE	Ongoing \$	"PM" Scale
		<p>members. Implementation of this recommendation will require the addition of one FTE to oversee these change management responsibilities. IS will include this in the 2012 operating budget submission (see the response to item #20).</p> <p>Some progress is being made to segregate development, test and production environments. However, the implementation of this recommendation requires the availability of adequate development, test and production server environments. If the budget for the recommended Virtual Servers is approved, the separate environments will be implemented by Q4, 2011.</p>						
B.15.2	That all procedures be reviewed at least annually (with evidence, i.e. sign-off) and revised, as required.	Agreed. A formal yearly review of the Change Management processes will be implemented and will involve all CAB members. The review will target deficiencies and assign responsibilities for the process revisions as necessary. Sign-off will be included. This will be implemented in Q1, 2011.	Q1 2011	0.00	0	0.00	0	1

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B.16.1	That LogRhythm tracking and reporting be changed to ensure that deletions of audit trails appear in reports. These reports should be reviewed by IS staff with appropriate follow up in a timely manner.	Agreed. This will be implemented in Q1, 2011.	Q1 2011	0.00	0	0.00	0	1
B.16.2	That file integrity monitoring software be implemented in all IS production environments.	Agreed. Automated detection of changes in the production IS environment requires automated tools such as file integrity monitoring software. The selection and implementation of this is included in the PCI compliance project. However, this covers only the environment that is "in-scope" for PCI. Implementing this on all servers will be a very significant and expensive undertaking. The anticipated cost to implement this will exceed \$100,000. IS will investigate this in Q3, 2011 in order to include it in the 2012 capital budget. An increase in the 2013	Q2 2012	0.00	100,000	0.25	0	2

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		operating budget submission will also be required for ongoing support of this application.						
B.16.3	That a procedure for reviewing logs relating to the security of the production environment be drafted and implemented. This procedure should specify the various types of reviews that should occur and which reports to use. The procedures should require a review frequency that is in compliance with PCI Requirement 10.6 (daily).	Agreed. This will be completed by the end of 2010 and will involve daily reviews for the in-scope PCI environment. Since this will be accomplished with existing IS security staff, reviews will be less frequent for systems outside of the PCI scope.	Q4 2010	0.00	0	0.00	0	1

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B.17.1	That specific supervisory staff be assigned to review IS employee access permissions on a regular basis (e.g. quarterly) and whenever there is a change in a staff member's area of responsibility.	Agreed. Beginning in January 2011, reports showing access permissions for each IS staff member will be distributed to IS supervisors quarterly. Procedures will be developed for supervisors outlining: <ul style="list-style-type: none"> ▪ the response required to the quarterly reports and the timing of that response; ▪ the notification required whenever an IS staff member changes an area of responsibility; and ▪ the approval required for all changes to IS staff member access permissions. 	Q1 2011	0.00	0	0.00	0	1
B.17.2	That IS designate staff as either developers or implementers for specific servers and applications and the access to servers and applications be restricted to only appropriate staff members by utilizing security	Agreed. IS management fully endorses this recommendation as an industry best practice. It has been identified in previous external financial audits and is a requirement for the applications within the scope for the PCI compliance project. To date, IS has been unable to satisfy this recommendation for all of the City's applications because of the significant impact on the IS budget. Initial analysis of this recommendation estimates an increase of six (6) FTEs	Q4 2012	6.00	100,000	6.00	20,000	3

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	groups. For staff that are required to provide after hours support to all areas, an after-hours support account (that is not generic) should be assigned and their support accounts should have the usage monitored on a regular basis.	to the current complement. With additional staffing, this could be completed within 4 months of budget approval.						
B.18	That the Change Management procedures be revised to address the deficiencies noted above. Management must ensure that the documentation and approvals as noted in the revised process are being carried out.	Agreed (in part). IS understands that the current Change Management procedures are lacking in rigour. In part, this is the result of IS staffing levels and thereby, the inability to devote the staff time recommended by ITIL best practices (see the response to item #20). This is also the result of not having completed other processes that compliment the Change Management Process. To address some of the "Change Testing" observations, the current process and documentation will be reviewed and updated for the purpose	Q1 2011	0.00	0	0.00	0	2

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		<p>of incorporating the following enhancements by Q1 2011:</p> <ul style="list-style-type: none"> - Add a preliminary step to the process to ensure the completeness and accuracy of the submitted form; - Modify the RFC document such that it accommodates the distinct identification of the developer, tester and person responsible for promoting the change (however, note that IS does not have separation of duties – see the response to item #17); - While consolidating all documentation in the same location as the RFC form may be desirable, in many instances it may not be practical. IS will enhance the Request for Change (RFC) form by adding a section where the user will identify the location and nature of the supporting documentation; - Update the CAB minutes to capture all events that take place during the CAB meetings (again, this will be 						

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		<p>dependent on having the appropriate IS staff to accomplish this task – see the response to item #20); and</p> <ul style="list-style-type: none"> - Make the updates necessary to link incidents (HEAT tickets) to implement fixes which address or correct the logged incidents. <p>With respect to other observations, IS Disagrees. The objective of the Change Management process as it is currently implemented is defined as: "The purpose of the Change Management Process is to ensure all changes to the IT production environment are properly planned, managed and reviewed prior to their implementation and release."</p> <p>The Change Management process was not implemented for the purpose of evaluating the business merits of proposed changes, prioritizing the work required to implement them or collecting development metrics of the body of work being promoted. Therefore, the implementation of such recommendations, where appropriate,</p>						

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		will be included in other processes and in the PPM application.						
B.19	That IS implement a schedule and procedure for the Change Management process that addresses the criteria that changes must meet in order for them to be implemented 'as ready' and which changes must occur in the pre-defined window. Any standard changes should go through the Release Management process unless otherwise justified and approved.	Agreed. It would certainly be preferable to implement changes in specific well-defined windows. Consideration must be given to the complexity of multiple changes being implemented in one window and the need for user departments to implement quickly to meet their own project timelines. Another issue to consider is the ability of IS to combine the after-hours staff time required to implement this with the need to provide normal business day support. Currently, CAB utilizes a Change Management schedule that is reviewed at least weekly. By the end of 2010, CAB will review the feasibility of combining changes into regular maintenance windows. Criteria will be defined to address a maintenance window opportunity for a specific application or change and when it can be performed (using CRM input from user departments).	Q4 2010	0.00	0	0.00	0	3

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		This requirement will be reviewed in more detail as the Release Management process is being implemented.						
B.20	That the roles of the Change Co-ordinator and Change Analyst be assigned with responsibilities clearly defined.	Agreed. The Change Management roles identified in this recommendation require a broad knowledge of information technology and the capacity to carry out the duties associated with the function. To date, these have been a shared responsibility among existing IS staff. IS management is currently challenged with over-extending its current staff complement. Implementation of this will require the availability of one (1) FTE to oversee these change management responsibilities. IS will include this cost in the 2012 budget submission.	Q2 2012	1.00	0	1.00	0	2
B.21.1	That IS investigate the various options for a Change Management database and reporting tool and implement the tools that best meet the City's	Agreed. By Q4, 2011, IS will investigate and review tools to support the Incident Management and Change Management processes. When the cost of these tools is known, IS will include them in the capital budget (likely 2012). Ongoing support costs will be included in the following year's operating budget.	Q4 2012	1.50	50,000	0.20	10,000	2

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	needs.							
B.21.2	That staff be reminded to accurately complete and maintain change records in order to facilitate information gathering and queries.	<p>Agreed. The current Change Management documentation is lacking in many respects. As stated in the Management response to recommendation #20, Change Management roles are shared resulting in inconsistent and incomplete change documentation. Other municipal IT departments dedicate one or more resources to the co-ordination of Change Management documentation.</p> <p>In the context of the current environment, the following steps will be taken by the end of November, 2010:</p> <ul style="list-style-type: none"> • Advise the Change Advisory board (CAB) of this requirement; • Ensure that supervisors vet all Request for Change (RFC) forms submitted to CAB; and • Enhance the Request for Change (RFC) form by adding a section where the user will identify the location and nature of the supporting documentation. 	Q4 2010	0.00	0	0.00	0	1

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B.22	That the Release Management process be properly documented as noted in the IBM report and in line with industry best practices.	Agreed. Representatives from each section within IS will review the Release Management Process proposed by IBM. Based on this review, the process will be customized as required, to best serve the needs of IS and the departments to which IS provides service. The customized process will adhere to industry best practices and, where limitations exist (for example, due to staffing levels), compensating controls will be introduced into the documented process. This review will be undertaken in 2011.	Q4 2011	0.50	0	0.00	0	3
B.23	That a testing methodology be drafted and implemented. It should include sign-off and approval levels depending on the risk and impact of the proposed release.	Agreed. IS agrees with this recommendation. However, the implementation of this recommendation requires the availability of adequate development, test and staging server environments. If the budget for the recommended Virtual Servers is approved in Q1, 2011, IS will implement the separate environments by Q4, 2011. As explained in item #6, IS is implementing a testing and QA process. IS will review, design and	Q4 2012	0.50	50,000	0.50	10,000	3

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		implement a plan for development and test server refresh processes. Expected analysis and recommendations will be completed by Q3, 2011.						
B.24	That IS commit to implementing a Release Management process by implementing the recommendations noted above.	Agreed. IS will engage the services of an external consultant to assist in the implementation of the Release Management process. The consultant will participate in training the staff that will assume the roles of Release Management Co-ordinator and Release Analyst and will also develop the documents used to monitor and control the Release Management process. Target date – Q1, 2012 with an expected consultant cost of \$60,000.	Q1 2012	0.50	60,000	0.00	0	3

Totals 15.75 723,000 10.97 95,600

Number of recommendations (acc. to "PM" scale):

1 (short term)	13
2 (medium term)	15
3 (long term)	9
Total recommendations	37