

**CITY AUDITOR'S OFFICE**



**AUDIT OF DEPARTMENT  
OF INFORMATION TECHNOLOGIES  
CHANGE CONTROL PROCEDURES**

**Report IT005-2021-15**

**June 10, 2021**

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**CITY AUDITOR**

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**BACKGROUND**

Change management is the process that ensures that all modifications to hardware and software systems are processed in a controlled manner, including standard changes and emergency maintenance relating to technological business processes, software applications, hardware, and underlying infrastructure. The main purpose of change management is to enable fast and reliable delivery of change to the organization and mitigation of the risk of negatively impacting the stability or integrity of the changed environment. Without a structured change management process, unplanned system outages could negatively impact organizations.

Change control procedures are part of change management and are defined by the city's Department of Information Technologies (IT) policies and procedures. Oversight of these policies is the responsibility of the IT Configuration Control Committee (ITCCC), which acts as a gatekeeper to the IT production systems. The ITCCC holds change control meetings biweekly to determine which application changes and infrastructure updates (programs, jobs, configurations, parameters, etc.) are ready to be moved from the test and development environments into the production environment.

Since the beginning of 2019, the city has utilized change management software (a module of ServiceNow, also known as CLV Service) to track and administer all change requests, including approval workflows, scheduling, and historical catalog of changes. The ITCCC began formalizing change control procedures in February 2019. Of the 540 change requests considered by the ITCCC during 2019, 2 were rejected and the rest approved.

**OBJECTIVES**

Our audit objectives were as follows:

- To determine whether change requests are recorded in sufficient detail to support discussion, testing, and assessment of the proposed changes.
- To determine whether change requests are authorized by management.
- To determine whether relevant stakeholders have access to and knowledge of change requests.
- To determine whether a formal change management process is documented and followed.

**SCOPE AND METHODOLOGY**

The scope of our work was limited to the management controls within the context of the audit objectives and scope of the audit. The scope of the audit was limited to the review of proposed change requests that were made between January 1, 2020 and March 31, 2020, with a focus on the supporting process to assess and authorize the changes before they are implemented. During this time period, 138 change requests were considered by the ITCCC, with only one rejected and the remainder approved. The last date of fieldwork was January 25, 2021.

Our audit methodology included:

- Review of change control policies and procedures
- Review of change requests entered into CLV Service
- Interviews with city employees
- Observation of change control meetings and procedures

We conducted this performance audit in accordance with Generally Accepted Government Auditing Standards except for the requirement for an external peer review every three years. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides reasonable basis for our findings and conclusions based on our audit objectives.

## **FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS**

The following findings and conclusions to the audit objectives were noted:

### **Objective:**

To determine whether change requests are recorded in sufficient detail to support discussion, testing, and assessment of the proposed changes.

### **Conclusion:**

All known change requests can be viewed in the CLV Service application by licensed users. The information captured in the application, however, includes only minimal descriptive information and does not include documentation of testing procedures or results. Testing procedures and results are not typically discussed in the change control meetings (See Finding #1).

### **Objective:**

To determine whether change requests are authorized by management.

### **Conclusion:**

The membership of the ITCCC is not clearly defined and does not include a robust group of city-wide representatives. There is currently only one apparent member of the ITCCC. Furthermore, the approval process observed during change control meetings does not follow a clear, formalized voting procedure (See Finding #2).

### **Objective:**

To determine whether relevant stakeholders have access to and knowledge of change requests.

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**Conclusion:**

While there is some participation by city departments outside of IT during change control meetings, communication of upcoming changes and discussion of new change requests is limited to mostly IT personnel (See Finding #3).

**Objective:**

To determine whether a formal change management process is documented and followed.

**Conclusion:**

IT's policies and procedures that are on file for the change control process have expired and do not accurately reflect the current change management process (See Finding #4).

Further information on these areas is contained in the sections below. While other issues were identified and discussed with management, they were not deemed appropriate for reporting purposes.

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## 1. Inadequate Change Control Testing Documentation

### Criteria

The city's Information Technologies Configuration Management and Change Control Procedure (IT104a.1) states the following:

*For each change to operational systems or during the development or purchase of new systems, the following items must be accomplished...*

- *Conduct a test of all changes prior to deployment on a production system...*

*All screen forms and other application programs will be carefully tested to ensure that necessary security functions are present and that programs function as error-free as possible. No program testing will be allowed to take place on the production computers with the exception of load and performance testing, if necessary, without the approval of IT management.*

### Condition

Documented evidence of pre-production testing was unavailable within the CLV Service application for each of the 137 approved change requests submitted from January 1 to March 31, 2020. Details of test plans or testing procedures were missing from 73 of the change requests (53%) and results were not typically presented by the requesters or implementers of changes prior to approval in change control meetings. The facilitators of the change control meetings were not observed requesting details on testing procedures or results before approving change requests.

### Cause

- IT policies and procedures do not explicitly require documentation or review of pre-production testing procedures and results as a part of the ITCCC's change request approval procedure.

### Effect

- The ITCCC is not provided information on test procedures or results, and could be authorizing changes to be made to city hardware and software without adequate testing, which could result in system instability, security flaws, and unintended behavior. Without scrutiny of test results in a controlled environment, the impact of changes is unknown prior to deployment to production.

### Recommendations

- 1.1 IT management should require that all change requests include documented test results in a non-production environment, based upon a testing plan that has been previously approved and documented. If a change cannot be fully tested in a controlled test environment, IT management should require a documented explanation of the impediment. Test results for

each change request should be submitted and assessed before approval in change control meetings, as well as attached to the request in the CLV Service application.

- 1.2 IT management should update its policies and procedures to require that testing procedures and results be reviewed before approval is granted by the ITCCC.

## **2. ITCCC Membership and Procedures Are Not Clearly Defined**

### **Criteria**

The city's IT Configuration Control Committee (ITCCC) Change Request Procedure (IT104b) states the following:

*No changes will be made by IT staff (except for systems and database administrators for routine maintenance or in the case of an emergency) without prior approval. All requests must be sent to the ITCCC chairperson for disposition. Approvals are granted by a majority vote of a quorum (more than half) of committee members. In the case of email voting, a unanimous vote of available members is required, providing that a quorum is present. This is because an email setting limits discussion, and a unanimous approval indicates no further discussion is required by committee members. In a formal meeting environment, sufficient discussion can take place to allow a change to proceed without complete agreement.*

*The special circumstances request differs from the routine request as follows: if the request for change is urgent and can be justified, then email votes will be taken from members and the change allowed to proceed if approved by a majority of available members provided there is a quorum. If the change request is so urgent that time cannot be taken for an email vote, or if a quorum of voting members is not present, then the ITCCC Chairperson will seek approval from an IT Manager or the Director of IT. Sufficient information must be provided so the committee members may make their decision. Discussion at the next scheduled ITCCC meeting is also required.*

### **Condition**

No formal list of ITCCC members is published by the department or recognized during change activities. The required composition of the membership of the ITCCC is not clearly defined, and it is observed to operate at times with a rotating representation based on availability. The IT department is not in compliance with their own policies regarding quorum requirements and voting procedures during change control meetings or emergency (special circumstance) change approvals via email.

### **Cause**

- IT policy does not address requirements around the required size, diversity, or qualifications of the ITCCC.

- IT policy does not include requirements that the current membership of the ITCCC is communicated to all city departments.

### **Effect**

- The ITCCC does not have an adequate number of established members, representing a variety of expertise (cybersecurity, networking, database, etc.) to appropriately evaluate proposed changes to city infrastructure and systems. It is unclear which participants of formal change control meetings hold an official vote or what constitutes a quorum for voting purposes, either via email or in person.

### **Recommendations**

- 2.1 IT management should create a roster of the current membership of the ITCCC that clearly identifies voting parties. This roster should be communicated to all city departments and updated regularly as needed.
- 2.2 IT management should document and implement procedures requiring that approval activities during change control meetings acknowledge the formal voting actions of the ITCCC members, including voting activities conducted via email. All voting results should be clearly documented in the meeting minutes for change control meetings.
- 2.3 IT management should update its policies and procedures with details on the required size and personnel makeup of the ITCCC. IT management should ensure that the group is inclusive of diverse expertise, knowledge, and skillsets.

## **3. Inadequate Communication of Upcoming Changes**

### **Criteria**

The following is an industry best practice for delivery of IT services (ITIL Foundation 4):

*The change schedule is used to help plan changes, assist in communication, avoid conflicts, and assign resources. It can also be used after changes have been deployed to provide information needed for incident management, problem management, and improvement planning. Regardless of who the change authority is, they may need to communicate widely across the organization. Risk assessment, for instance may require them to gather input from many people with specialist knowledge. Additionally, there is usually a need to communicate information about the change to ensure people are fully prepared before the change is deployed.*



### **Condition**

Not all city departments are aware of change control decisions or of when changes impacting their departments are being considered. The calendar of planned changes is only available to city employees who hold a seat license for the CLV Service application, which limits access to mainly IT personnel. The meeting agendas and minutes are not widely distributed and available to all city departments.

### **Cause**

- IT policy does not address requirements around the communication of upcoming changes to city departments.

### **Effect**

- Departments outside of IT may not be aware of what system changes are being discussed and planned in the change control meetings, and have limited opportunity to provide input prior to approval. System users who are most affected, often in a department other than IT, may not be aware of upcoming changes.

### **Recommendations**

- 3.1 IT management should maintain a calendar of planned changes that is accessible by all city departments. Representatives from each department should be notified of any change control decisions that may impact their operations and have access to meeting minutes that document ITCCC decisions.
- 3.2 IT management should update its policies and procedures to include requirements for communication to city departments about upcoming system changes.

## **4. Expired Change Control Policies and Procedures**

### **Criteria**

The city's Adding, Revising, and Deleting Policies/Procedures procedure (CM601) states the following:

*The originating Department is responsible for:*

1. *Proposing the development of citywide policies/procedures to the Executive Management Committee;*
2. *Writing and updating citywide policies/procedures, department policies/procedures, and SOPs/work rules relevant to their department functions and scope of work;*

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3. *Distributing approved department policies/procedures, and SOPs/ work rules to their employees;*
4. *Distributing approved citywide policies/procedures to applicable staff throughout the city after OAS has distributed the policy/procedure to TLV and Deputy Directors.*
5. *Ensuring that all department policies/procedures and SOPs/work rules have a commencement and expiration date that does not exceed five years;*
6. *Working with OAS to obtain approval of citywide policies/procedures;*
7. *Submitting all department policies/procedures and SOPs/work rules to the Director of Human Resources and City Attorney's Office for review as defined herein;*
8. *Obtaining feedback from the applicable Deputy City Manager on all department policies/procedures and SOPs/work rules;*
9. *Approving department policies/procedures and SOPs/work rules and uploading a signed PDF and the Microsoft Word version to the Governance Portal; and*
10. *Overseeing the maintenance, retention, administration and updates of all applicable department policies/procedures and SOPs/work rules.*

*Expiration: All citywide policies/procedures, department policies/procedures and SOPs/work rules will expire five years after finalization and need to be reviewed, edited, reissued or archived.*

**Condition**

During the course of our audit, we reviewed the IT change control management policies and procedures maintained on the IT Governing Documents webpage. We noted that they had not been updated in many years and have expired according to city policy. See the table below for a listing of the expired change control policies and procedures:

<b>No.</b>	<b>Policy/Procedure Title</b>	<b>Last Update</b>
IT104	Configuration Control Policy	7/17/2009
IT104a	Information Technologies Configuration Control Committee Change Request Procedure	2/12/2007
IT104a.1	Configuration Management and Change Control Procedure	7/17/2009
IT104b	Information Technologies Configuration Control Committee (ITCCC) Change Request Procedure	7/17/2009
IT126	Software Change Control Policy	2/12/2007

**Cause**

- The department has not conducted a recent review of the expired change control policies and procedures.

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**Effect**

- Written policies include outdated information and do not reflect actual practices or management expectations. These policies are considered expired according to city policy CM601.

**Recommendation**

- 4.1 IT management should update its change control policies and procedures to reflect current practices. These updated policies and procedures should subsequently be communicated to staff and implemented. The new policies and procedures should include:
- A requirement that testing procedures and results be submitted and reviewed before approval is granted by the ITCCC (See Finding #1).
  - An outline of the required size and personnel makeup of the ITCCC, and require that the group is inclusive of diverse expertise, knowledge, and skillsets (See Finding #2).
  - Requirements for communication to city departments about upcoming changes at the change control meetings (See Finding #3).

## MANAGEMENT RESPONSE

### 1. Inadequate Change Control Testing Documentation

- 1.1 IT management should require that all change requests include documented test results in a non-production environment, based upon a testing plan that has been previously approved and documented. If a change cannot be fully tested in a controlled test environment, IT management should require a documented explanation of the impediment. Test results for each change request should be submitted and assessed before approval in change control meetings, as well as attached to the request in the CLV Service application.

#### Management Action Plan:

IT will formalize the requirement of testing and signoff on all comprehensive change requests. Supporting documentation of appropriate Request for Change (RFC) requests will be archived within ServiceNow (CLV Service) and made available online to all internal stakeholders.

**Estimated Date of Completion:** September 30, 2021

- 1.2 IT management should update its policies and procedures to require that testing procedures and results be reviewed before approval is granted by the ITCCC.

#### Management Action Plan:

IT will publish Change Control policy and procedures, including requirements that address inclusion of testing results and signoff, or evidence of validation of changes where non-production environments are not available. All documentation will be made accessible.

**Estimated Date of Completion:** December 30, 2021

### 2. ITCCC Membership and Procedures Are Not Clearly Defined

- 2.1 IT management should create a roster of the current membership of the ITCCC that clearly identifies voting parties. This roster should be communicated to all city departments and updated regularly as needed.

#### Management Action Plan:

IT will create and maintain an online roster of voting members of the Change Advisory Board (CAB) accessible online.

**Estimated Date of Completion:** September 30, 2021

- 2.2 IT management should document and implement procedures requiring that approval activities during change control meetings acknowledge the formal voting actions of the ITCCC members, including voting activities conducted via email. All voting results should be clearly documented in the meeting minutes for change control meetings.

**Management Action Plan:**

IT will formalize, document and communicate the composition of the voting membership of the ITCCC, now known as the Change Advisory Board or (CAB). Policies and procedures will be updated to include formalization of change control group memberships and voting procedures. Documentation, including meeting minutes and voting results will be accessible online.

**Estimated Date of Completion:** December 30, 2021

- 2.3 IT management should update its policies and procedures with details on the required size and personnel makeup of the ITCCC. IT management should ensure that the group is inclusive of diverse expertise, knowledge, and skillsets.

**Management Action Plan:**

IT will update change control policy and procedures to include provisions concerning the Change Advisory Board (CAB) composition, as well as their associated responsibilities. IT will also review distribution lists associated with the change control process and adjust accordingly.

**Estimated Date of Completion:** December 30, 2021

### **3. Inadequate Communication of Upcoming Changes**

- 3.1 IT management should maintain a calendar of planned changes that is accessible by all city departments. Representatives from each department should be notified of any change control decisions that may impact their operations and have access to meeting minutes that document ITCCC decisions.

**Management Action Plan:**

IT will create a Change Control Portal where departments and stakeholders can review agendas, documentation, meeting notes and locations and schedules of past and future meetings of the Change Advisory Board (CAB).

**Estimated Date of Completion:** September 30, 2021

- 3.2 IT management should update its policies and procedures to include requirements for communication to city departments about upcoming system changes.

**Management Action Plan:**

IT will revise change control policy and procedures to reflect additional requirements concerning dissemination of information to stakeholders and departments.

**Estimated Date of Completion:** December 30, 2021

#### **4. Expired Change Control Policies and Procedures**

- 4.1 IT management should update its change control policies and procedures to reflect current practices. These updated policies and procedures should subsequently be communicated to staff and implemented. The new policies and procedures should include:
- A requirement that testing procedures and results be submitted and reviewed before approval is granted by the ITCCC (See Finding #1).
  - An outline of the required size and personnel makeup of the ITCCC, and require that the group is inclusive of diverse expertise, knowledge, and skillsets (See Finding #2).
  - Requirements for communication to city departments about upcoming changes at the change control meetings (See Finding #3).

**Management Action Plan:**

IT will conduct a comprehensive review of all change control policies and procedures and revise as required. This will include incorporating and retiring policy and procedure recommendations identified in this report. All revised policies and procedures, once approved will be made available online for review by internal stakeholders and departments.

**Estimated Date of Completion:** February 3, 2022