



City Auditor's Office

Emergency Management Audit

June 18, 2019

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The City Auditor's Office conducted this audit in conformance with the *International Standards for the Professional Practice of Internal Auditing*.

Executive Summary

The Calgary Emergency Management Agency (CEMA) leads The City's emergency management and business continuity processes. CEMA evaluates and educates on disaster risk and coordinates business continuity planning in The City to support the delivery of essential services during and after an emergency.

There were two objectives for this audit. The first was to determine the effectiveness of The City's disaster/hazard identification and risk assessment preparation, review and communication processes. The second was to determine the effectiveness of The City's business continuity planning process design and operation as an effective control to ensure the continued provision of services during disruptions caused by emergencies. The audit focused on the design of CEMA's disaster risk assessment process, preparation and communication of results for the 2018 Disaster Risk Register, and the design and preparation of selected business continuity plans (BCP) for the years 2017 and 2018.

CEMA has established an effective disaster risk assessment process that is based on the ISO 31000 Risk Management methodology. The process has defined roles and responsibilities for the identification and assessment of disaster risks with guidance provided by CEMA to subject matter experts on how to identify, analyze, and evaluate risks. We observed that the assessed disaster risks are recorded in the Disaster Risk Register in accordance to the methodology provided by CEMA. Risk results for 2018 were communicated to Council and senior management, as well as the appropriate provincial agency.

Expectations for the implementation of The City's business continuity process are detailed in The City's Business Continuity Planning Policy (Policy), and CEMA has designed a business continuity planning process that, when followed by business units (BU), effectively supports the Policy's purpose of ensuring that City services are delivered in the event of a disruption caused by emergencies. However, the business continuity planning process has not been effectively implemented by all tested BUs and may not be fully prepared to effectively provide essential services during disruptions caused by emergencies. While the Policy assigns the Administrative Leadership Team (ALT) the responsibility for compliance, a supporting process to report to ALT on compliance has not been established.

To increase The City's effectiveness in reducing risks related to the inability to deliver essential services to citizens during disruptions and the loss of citizen trust, we raised recommendations focused on:

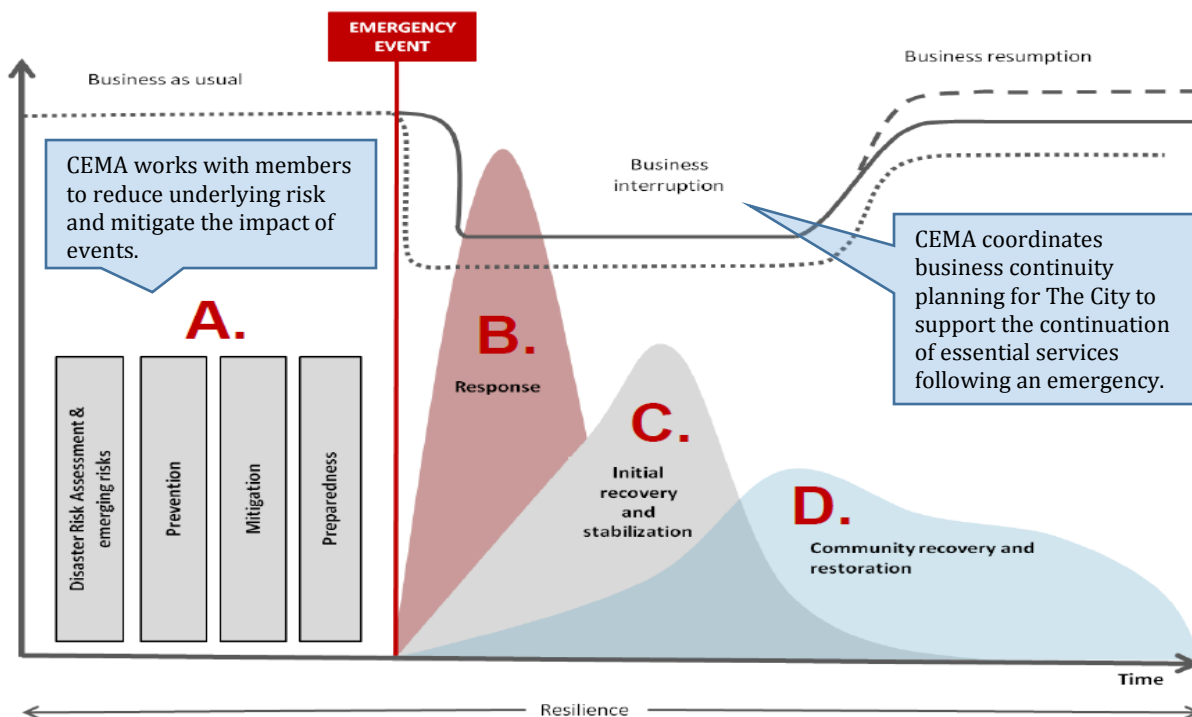
- Effective escalation on non-compliance issues to ALT;
- Engagement of BUs to support adherence to the Policy, Framework and Guide; and
- Oversight and monitoring to ensure that BCPs are revised, validated, and updated as required.

CEMA has agreed to all five recommendations and has set action plan implementation dates no later than June 30, 2020. The City Auditor's Office will follow-up on all commitments as part of our ongoing recommendation follow-up process.

1.0 Background

According to The City of Calgary Emergency Management Agency's (CEMA) The Status of Emergency Preparedness in Calgary (Status Report to the Emergency Management Committee – April 2016), an emergency is an urgent event that calls for immediate action to mitigate risk to life, property or the environment. Emergency management addresses a full spectrum of activities – prevention, mitigation, preparedness, response and recovery – that contribute to reducing risks, limiting the impact of events, ensuring timely response and supporting communities in recovering as quickly as possible after an event. The Status Report states that CEMA's role is to ensure a balanced approach to all phases to ensure programs, training and capacity are available to support each area of emergency management (Figure 1).

Figure 1 - Comprehensive Emergency Management Model



Sources: CEMA's *The Status of Emergency Preparedness in Calgary April 2016* and *Municipal Emergency Plan*

According to CEMA's Municipal Emergency Plan, the information and understanding gained in preparation stage A (Figure 1) are vital to preventing certain types of emergencies and reducing the impact of major emergencies and disasters. CEMA supports two important processes which facilitate emergency preparedness: disaster risk assessment and business continuity planning¹.

¹ Recognizing that business continuity planning is one aspect of preparedness and it spans the entire Emergency Management Model. This audit is focused on how business continuity planning facilitates emergency preparedness.

Disaster Risk Assessment

Calgary is vulnerable to several disaster-related risks due to the range of natural, biological, technological, industrial, and other human-caused hazards and threats. CEMA undertakes a city-wide Disaster Risk Assessment (DRA; prior to 2018 called Hazard Identification and Risk Assessment) to understand the disaster risk environment, communicate and educate people on disaster risk, and prioritize activities towards reducing disaster risk impact. The DRA is reviewed annually and updated every four years. The DRA utilizes a standardized methodology to identify, analyze, and evaluate disaster risks. The identification of disaster risks allows business units (BU) to develop risk treatment plans and continuity strategies that seek to mitigate potential consequences and impacts to essential services.

Business Continuity Planning

The City's Business Continuity Planning Policy was developed by CEMA at the request of the Administrative Leadership Team (ALT) in 2014 and requires every BU to develop and maintain business continuity plans (BCP) in adherence to The City's Corporate Business Continuity Framework (Framework). The Framework supports the continued provision of essential services during disruptions caused by emergencies or disasters. CEMA acts as the steward of the Framework by developing templates and organizing workshops and corporate business continuity exercises to assist BUs in adhering to the Framework.

This audit is part of the City Auditor's Office 2017/2018 Audit Plan and supports the Citizen Priority of A City of Safe & Inspiring Neighbourhoods.

2.0 Audit Objectives, Scope and Approach

2.1 Audit Objective

The objectives of this audit were to determine if:

- The City has an effective process to prepare, review and communicate a disaster/hazard identification and risk assessment which in turn identifies emergency management priorities for mitigation and preparedness activities; and
- The City's business continuity plans are designed and operating as an effective control to mitigate the risk that The City is unprepared to effectively provide services during an emergency event.

2.2 Audit Scope

The scope of the audit was specific to The City's DRA process (undertaken by CEMA) and The City's BCPs (prepared by City of Calgary BUs). Business continuity preparation undertaken by other agencies across the Calgary geographical area was not included in the scope of this audit. The scope of the audit did not include assessment of the operational effectiveness of specific BU continuity strategies.

2.3 Audit Approach

Our audit approach included the following:

- Review of the DRA process and related documents, including risk identification, risk analysis, risk evaluation, and preparation of the Disaster Risk Register (DRR);

- Review of the design of The City’s business continuity planning process, including roles and responsibilities, and guidelines to City Business Continuity Coordinators;
- Assessment of the operating effectiveness through testing compliance of a representative sample of 2017 and 2018 City BCPs with the City’s Business Continuity Planning Policy and Framework, including supporting Business Impact Analysis, identification of vulnerabilities, and the development of continuity strategies for essential services; and
- Interviews with City Business Continuity Coordinators and key CEMA personnel who support the business continuity planning process associated with the test sample, as well as key CEMA personnel who support the DRA process.

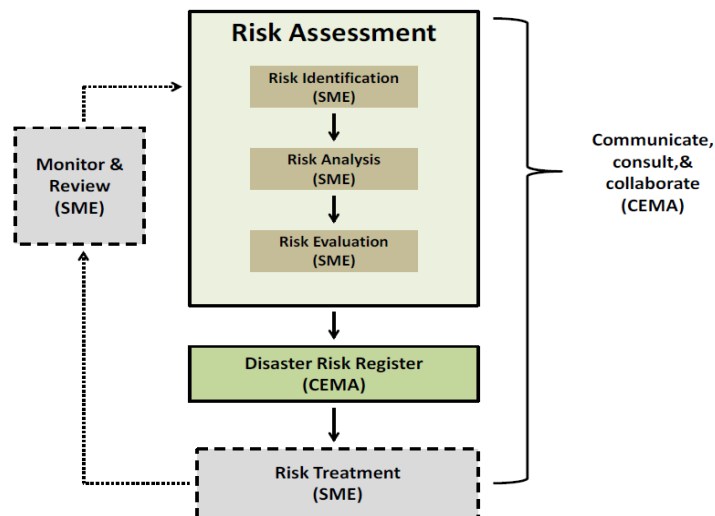
Our review of The City’s Disaster Risk Assessment process was conducted alongside independent but complimentary audits completed by the Office of the Auditor General of Alberta, and the City of Edmonton City Auditor’s Office. The intent of this audit initiative was to support broader insight and assurance on the state of emergency preparedness in Alberta. At the conclusion of all three audits, each audit office will produce their own report that may additionally contribute to a summary report if process or system opportunities are identified between the provincial government and Alberta’s two largest municipal jurisdictions.

3.0 Results

3.1 Disaster Risk Assessment

The objective of CEMA’s DRA is to assess the disaster risks from the specific hazards and threats that exist in Calgary to support end-users as they make informed decisions related to the allocation of resources and the development of key strategies to reduce disaster risk. CEMA utilizes a three-step DRA process (Figure 2) to identify, analyze, and evaluate risk using Subject Matter Experts (SMEs). The output from this process is a comprehensive DRR that can assist key decision-makers research, evaluate, resource, and monitor risk treatment options. The DRR is to be reviewed and updated (if required) on an annual basis.

Figure 2 – Disaster Risk Assessment Process



Source: CEMA’s Disaster Risk Assessment Terms of Reference

CEMA has established an effective DRA process that supports The City's emergency mitigation and preparedness activities through the preparation, review and communication of the assessment.

3.1.1 DRA Preparation

The DRA process includes clearly defined roles and responsibilities for the identification, analysis, and evaluation of disaster risks.

CEMA has utilized appropriate methodology underpinning the DRA process: the DRA methodology is based on the ISO 31000 Risk Management methodology, the same methodology used by The City's Integrated Risk Management, to facilitate future alignment. BU SMEs follow the methodology provided by CEMA's DRA Workbook to calculate likelihood and consequences for the risks under their responsibility. The risk assessment process uses both historic disaster risk information and newly identified trends. The results of the risk assessment are recorded in the DRR.

SMEs assess the risks related to specific hazards and threats, identify, evaluate and monitor risk treatment activities, and review the DRR annually. SMEs completed the 2018 DRR in accordance to the parameters and instructions set by CEMA in the DRA Workbook. We identified one area where an enhancement to the DRA Workbook will support consistent risk scoring in the DRR (Recommendation 5).

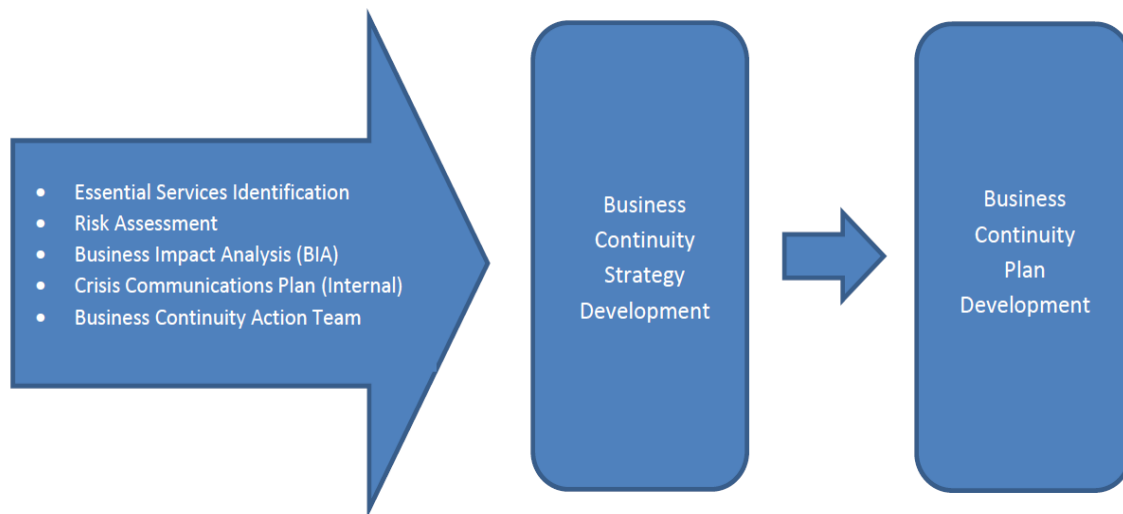
3.1.2 DRA Review and Communication

CEMA is responsible for reviewing the completed DRR, and subsequently distributing the DRR to key decision-makers for their use in support of disaster risk treatment, planning, and other activities. Communication of the 2018 DRR by CEMA supports the City's overall emergency preparedness. CEMA presented DRA results to Council in November 2018. Copies of the Corporate DRR 2018 were sent to Council and to senior management. CEMA plans going forward, to report the results of the DRA to senior management and Council on a periodic basis. CEMA shared the DRR with the Alberta Emergency Management Agency for information and awareness. To support BU emergency preparedness, CEMA will share the risks from the DRA process with Business Continuity Coordinators in order to inform preparation of BCPs.

3.2 Business Continuity Planning

The Business Continuity Planning Policy (Policy) states that business continuity is an ongoing process supported by senior management to ensure that steps are taken to identify the impact of potential losses and maintain viable recovery strategies for the continuity of services and operations, or continuity of government, following a disruptive event. The purpose of the Policy is to establish expectations regarding business continuity planning and implementation within The City of Calgary to ensure City services are effectively delivered in the event of a disruption. The Administrative Leadership Team (ALT) is designated as responsible for business continuity throughout The City and for ensuring compliance with the Policy. Overall program coordination is led by CEMA with each BU responsible for completing a set of key deliverables (Figure 3). The result of this process is the development of BCPs, a set of administrative guidelines, instructions, and procedures which enable a BU to continue providing essential services during disruptions.

Figure 3 - Corporate Business Continuity Planning Process



Source: CEMA's Business Continuity Planning Corporate Business Continuity Framework

3.2.1 Business Continuity Planning Process Design

CEMA has designed a business continuity planning process that, when followed by BUs, effectively supports the Policy.

CEMA has developed and distributed business continuity planning packages (Business Continuity Planning Framework and Business Continuity Planning Guide) to BUs. Twice a year, CEMA meets with BU Business Continuity Coordinators to provide guidance on the completion of the business continuity planning deliverables.

The Guide states that BUs are to review and update their essential services listing annually. The Guide defines essential services as services which have to be maintained by City Staff under any circumstances and are critical to the well-being of the City. Loss of service for essential services must be reversed in 0 to 48 hours. With the identification of essential services, BUs are to review and update their Business Impact Analysis (BIA), that is, determine what the essential services are dependent upon to function properly. They must also quantify the impact various business disruptions would effect on the given resources. For the BCPs, BUs must develop a continuity strategy for every critical resource. We identified one area in the Guide's design where clarity to BUs on how to identify critical resources that support their essential services can benefit BUs to optimize the time and effort required to complete their BCPs (Recommendation 4).

The Guide also sets the requirements for completing the risk assessment portion of the BCP (based on the DRA process) and exercising and validating BCPs. The purpose of BCP exercises is to promote awareness, expand knowledge and simulate/test the activities required to resume essential services in the event of a business interruption. At the conclusion of the BCP exercise, BUs are to validate their continuity strategies, conduct a debriefing process, and apply corrective actions for any limitations of the BCP.

3.2.2 Business Continuity Planning Process Compliance

Our sample testing indicated that not all BUs are fully prepared to effectively provide essential services during disruptions caused by emergencies, as there was inconsistent compliance with the Policy and Framework.

As we prepared our audit sample selection, we observed that two BUs had not identified their essential services and had not developed BCPs, and, therefore, could not be included in our audit sample. All BUs in our audit sample had completed their BIAs, that is, determined their essential services and listed their resources. However, this did not always translate into BUs incorporating continuity strategies for their essential services into their BCPs or validating their strategies through BCP exercises (Section 4.1). A process to report instances of non-conformance to ALT, and the resultant increased risk to City business continuity has not been established.

In reviewing the eight complete BCPs in our audit sample we identified that BUs inconsistently adhere to the recommended BCP creation and update process (Section 4.2) set out in the Policy, Framework and Guide. For example, only five of eight completed BCPs in our audit sample had been updated within the last year, which may impact the relevancy of the BCP in supporting the BU to react to potential threats and vulnerabilities to their essential services.

We raised three recommendations to support the escalation of non-compliance issues to ALT, engage BUs to discuss challenges in adhering to the Policy, Framework and Guide, and ensure that BCPs are revised, validated, and updated as required (Recommendations 1 to 3).

We would like to thank staff from CEMA and City Business Continuity Coordinators for their assistance and support throughout this audit.

4.0 Observations and Recommendations

4.1 Business Continuity Strategies Completion and Validation

The effectiveness of The City’s business continuity strategies is impacted by non-conformance by BUs to the Policy. This risk exposure was not recognized corporately as these areas of non-compliance have not been previously identified, escalated or reported to ALT, as a supporting process to report to ALT on compliance has not been established. Consequences of non-compliance according to the Policy include the inability for The City to deliver essential services to citizens, waste of resources, and loss of citizen trust. The Framework explains that the application of business continuity strategies will allow The City to restore services that are essential to the recovery of our organization and, in turn, the greater community.

The Policy states that BU directors are responsible for developing BCPs in accordance with the Framework. Per the Policy, business continuity is an ongoing process supported by senior management to ensure that steps are taken to identify the impact of potential losses and maintain viable recovery strategies and recovery plans. A BCP is a set of guidelines, instructions and procedures which enable a BU to continue providing essential services during disruptions. ALT is responsible for business continuity throughout The City and for ensuring compliance with the Policy. CEMA is responsible for contributing to the maintenance of the Policy and the Framework.

The Framework assigns responsibility to BUs for developing service continuity strategies. According to the Framework and the Guide, exercising and validating a BCP is extremely important in ensuring the proper execution of the plan during real emergencies. It is also an important aspect of the continuing development of the plan, as limitations and shortcomings will be illuminated.

Expectation (Source)	Compliance Observation
BU directors are responsible for developing BCPs in accordance with the Framework (Policy).	Two BUs had not identified their essential services and had not developed BCPs.
Each BU will be responsible for developing service continuity strategies that address the potential threats and vulnerabilities to its services (Framework).	In our sample of 12 BCPs, four BCPs had no continuity strategy or listed essential services with undeveloped continuity strategies. Of the four BCPs, two were draft documents that had not been reviewed or approved by management and had incomplete contact lists that would, in case of a disruption, prevent the communication of events to staff, external service providers and key customers.
BCPs and their business strategies will be reviewed and exercised annually (Framework). Exercises should validate the continuity strategies in the BCP, include a process of	Out of eight complete BCPs in our audit sample, five did not have BCP exercise documentation for the years 2017 or 2018: <ul style="list-style-type: none"> • Four BUs had no exercise documentation for 2017 or 2018, that is, no validation of business continuity strategies, no lessons

Expectation (Source)	Compliance Observation
debriefing, and a process of determining and applying corrective actions for any limitations of the BCP (Guide).	<p>learned, and the BCPs were not updated. Two of those BUs explained that they had participated in CEMA-organized exercises, but did not provide evidence of validating their strategies, debriefing notes or corrective actions; and</p> <ul style="list-style-type: none"> • One BU had exercise documentation for 2017 (exercise objectives and procedures – including for participation in the CEMA-organized exercise, debriefing notes, and lessons learned). The BU did not have exercise documentation for 2018.

While the Policy assigns ALT the responsibility for business continuity throughout The City and for ensuring compliance, ALT does not receive information on business continuity strategies to support this responsibility.

Recommendation 1

The Leader, Continuity & Risk Reduction, CEMA to:

- a) Define a process to support escalation of non-compliance to ALT, which could include a periodic report to ALT on the completion of continuity strategies that support essential services by the BUs and the documentation of BCP exercises by the BUs; and
- b) Reinforce communication to BUs of the risk of not completing their continuity strategies and not conducting and documenting BCP exercises. Communication should highlight the need to develop strategies to address potential vulnerabilities to essential services and the need to validate elements of the BCP, the identification of gaps, and the update of the BCP based on corrective action.

Management Response

Agreed.

Action Plan	Responsibility
<p>During the first two weeks of January of every year, CEMA will circulate a letter to the Directors of all business units with the following content:</p> <ul style="list-style-type: none"> • Description of the importance of business continuity and the risks of not conducting business continuity activities within the corporation; • Reminder that Directors are responsible for the development of business continuity plans that adhere to the Corporate Business Continuity Framework, as per Administration Policy GN-039; • Reminder that all components of the framework should have been reviewed and updated as necessary in the previous calendar year; • A summary of all components of the Corporate Business Continuity Framework; and • A request to sign this letter, attesting to the adherence to Administration Policy GN-039, and submit to their respective General Managers with a carbon copy to the Chief of CEMA for records. <p>Results of the letter submissions will be compiled and submitted to ALT by the Chief of CEMA. The process will be repeated annually.</p>	<p><u>Lead:</u> Leader, Continuity & Risk Reduction, CEMA</p> <p><u>Commitment Dates:</u> July 31, 2019: Letter designed and written.</p> <p>September 30, 2019: Concept communicated to Business Continuity Coordinators.</p> <p>January 15, 2020: First letter circulation to business unit Directors.</p> <p>June 30, 2020: Results submitted to ALT no later than this date.</p>

4.2 Business Continuity Plan Creation and Update Process

BUs inconsistently adhere to the recommended BCP creation and update process which may impact their ability to identify and react to potential threats and vulnerabilities to their essential services. For the eight complete BCPs in our audit sample and the Corporate Business Continuity Plan:

Expectation (Source)	Compliance Observation
<p>BCPs will be updated at minimum on an annual basis, or more frequently, if required, by substantial changes to business unit services and operations (Policy).</p> <p>BU's are responsible for ensuring that BCPs are updated on an annual basis (Guide).</p>	<p>Three of eight sampled BCPs were not updated within the past 12 months.</p>
<p>The identification of hazards and their associated risks allow a BU to make informed decisions to address the vulnerabilities that may have an impact on operations (Framework).</p> <p>BU's are asked to review and update their Risk Assessments annually as a part of their BCP process (Guide).</p>	<p>Three of eight sampled BU's provided copies of risk assessment documentation that were not updated within the past 12 months. In addition, two BU's did not have risk assessment documentation.</p>
<p>Recovery Time Objectives (RTO) asks 'how long can your service be without this resource' and is designed to assess how long a service can tolerate an interruption. This information is used in the prioritization of continuity strategies (Guide).</p>	<p>Two of eight sampled BCPs lack RTOs for one or more of their identified list of resources that support essential services.</p>
<p>A Business Impact Analysis (BIA) is designed to procure the data necessary to create effective business continuity strategies. It is recommended BU's begin by conducting the analysis on their essential services and proceed to non-essential services as resources allow (Framework).</p> <p>BU's are asked to review and update their Essential Services listing annually as a part of their BCP process (Guide).</p>	<p>Although all BU's completed their BIAs, one of eight sampled BCPs did not include an essential service that was identified in the BIA.</p>

Expectation (Source)	Compliance Observation
The Corporate Business Continuity Plan (CBCP) is an annex of the Municipal Emergency Plan (MEP). According to the MEP, annexes are the responsibility of the originating agency member. Agency members should review their annexes annually. CEMA establishes and maintains the CBCP.	The CBCP was last reviewed in November 2015.

Recommendation 2

The Leader, Continuity & Risk Reduction, CEMA to engage with Business Continuity Coordinators to discuss challenges in adhering to the processes stated in the Policy, Framework and Guide, and the benefits of reviewing and updating their BCPs, with the goal to reinforce awareness and to obtain feedback on amendments that may enhance/clarify expected processes. Discussion will include components of the Corporate Business Continuity Framework and overarching corporate business continuity process.

Management Response

Agreed.

Action Plan	Responsibility
<p>a) Annual Workshop CEMA will host an annual workshop with Business Continuity Coordinators to discuss components of the Corporate Business Continuity Framework. The discussion will variably include:</p> <ul style="list-style-type: none"> • Identifying essential services; • Developing a crisis communication plan; • Developing a business continuity action plan; • Conducting a risk assessment; • Developing continuity strategies. <p>The intended outcome of the workshop will be:</p> <ul style="list-style-type: none"> • Increased business unit skills and knowledge for conducting business continuity planning; and • Increased understanding of limitations in achieving compliance with the Corporate Business Continuity Framework, which can alter the tactics used by CEMA and possibly the Framework itself upon the next scheduled Framework review. <p>b) Exercise of BCPs CEMA will develop a process within its larger operations to encourage integration of business continuity processes within exercises of the Emergency Operations Centre, specifically with Business Continuity Coordinators.</p>	<p><u>Lead:</u> Leader, Continuity & Risk Reduction, CEMA</p> <p><u>Commitment Date:</u></p> <p>a) Annual in nature. First workshop to be hosted no later than December 31, 2019</p> <p>b) April 11, 2019</p>

Recommendation 3

The Leader, Continuity & Risk Reduction, CEMA to document the review process for the Corporate Business Continuity Plan and, if needed, update the document.

Management Response

Agreed.

Action Plan	Responsibility
CEMA will review the Corporate Business Continuity Plan, update if necessary, and integrate a review schedule within the document.	<u>Lead:</u> Leader, Continuity & Risk Reduction, CEMA <u>Commitment Date:</u> October 31, 2019

4.3 Business Continuity Plan Reference Guide – Definition for Critical Resources

BUs do not have clarity as to how to identify critical resources that support their essential services and may spend more time and effort than necessary to develop their continuity strategies.

The Guide states that BUs must develop a plan for every critical resource, and states specifically that "armed with an understanding of your BU's essential services, the critical resources required for its operation, and the appropriate continuity strategies to employ in the event of a business disruption, you are now better equipped to develop continuity strategies."

We observed two BUs that developed strategies for all resources in their BCPs, and in interviews shared that they were unsure how to define their critical resources. A definition on how to identify critical resources will support BUs in optimizing the time and effort required to complete their BCPs.

Recommendation 4

The Leader, Continuity & Risk Reduction, CEMA to add a definition of critical resources to the BCP Reference Guide.

Management Response

Agreed.

Action Plan	Responsibility
CEMA will add a definition of critical resources to the BCP Reference Guide.	<u>Lead:</u> Leader, Continuity & Risk Reduction, CEMA <u>Commitment Date:</u> July 31, 2019

4.4 Disaster Risk Assessment Workbook

CEMA's DRA has an inconsistency in the risk categorization process. This may lead to discrepancies in completing the DRR and inconsistent risk scoring.

The DRA Workbook includes a risk categorization process. The prioritization of risk guides end-users to the order in which hazards and threats need to be addressed. There are five risk priority levels with priority 1 being the highest and 5 the lowest. Following the prioritization of risks, the DRR contains a series of questions that will result in each hazard and threat being assigned to an appropriate category for future action. There are three risk categories:

1. Risks assessed with confidence to require treatment;
2. Risks requiring further analysis and re-evaluation; and
3. Risks that currently only require monitoring and maintenance of existing controls.

Figure 1 (risk categorization process) in the DRA Workbook explains that only priority 5 risks are to be categorized as category 3. We observed two priority 4 risks in the DRR that were categorized under category 3, in an inconsistent manner with the DRA Workbook.

Recommendation 5

The Leader, Community & Education, CEMA to update the DRA Workbook to ensure that the information entered in the DRR supports the risk categorization process described in the DRA Workbook.

Management Response

Agreed.

Action Plan	Responsibility
CEMA will update the disaster risk register for the two noted errors under the audit description, regarding priority 4 risks being categorized as priority 3.	<u>Lead:</u> Leader, Community & Education, CEMA <u>Commitment Date:</u> March 22, 2019