



City Auditor's Office

Calgary Fire – Inspections Audit

July 14, 2020

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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

Calgary Fire Department's (CFD) Fire Inspections team perform compliance inspections to ensure properties meet the requirements of the Alberta Fire Code. The City's inspection model, documented in its Quality Management Plan (QMP) and accepted by the province, is based upon responding to requests or complaints. CFD identified that fire risk in Calgary is increasing and communicated to Council that they would like to respond through a new model, the Risk-Based Inspection (RBI) Program and Apartment Building Compliance Program (ABCP) to be piloted in the 2019-2022 One Calgary Service Plans and Budgets cycle.

Our audit objective was to assess the effectiveness of the RBI Program in mitigating the fire safety risk associated with higher-risk buildings.

RBI proactively inspects higher risk buildings. Currently, RBI is in a pilot phase where a property's fire risk is based upon its occupancy classification. In 2020 Fire Inspections started a project to move the RBI Program to a dynamic model that will consider more factors to identify and prioritize RBI. The ABCP would have required upgrades to pre-1974 apartment buildings, which were not built to a uniform fire code, to improve fire safety. Although the ABCP will no longer continue as the province withdrew the 1996 fire code ruling this program relied on, pre-1974 apartment buildings are included in the RBI Program.

For all inspection types, Fire Inspections understands some code changes have restricted the ability of Safety Codes Officers (SCO) to require building upgrades to mitigate fire safety risk. A formal process is not in place to assess and communicate these regulatory risk exposures. Working within these regulatory constraints, RBI successfully targeted a high-risk occupancy and resolved significant violations demonstrating the value of the program in improving fire safety. A greater number of RBI could have been completed had Fire Inspections' ability to assign SCO to RBI not been impacted by QMP responsibilities and position vacancies and absences. Fire Inspections also need to improve the identification and prioritization of high-risk buildings. Fire Inspections has already started to address risk prioritization through their project to move to a dynamic framework, which will allow more precise determination of high-risk.

In summary, although the RBI pilot is a positive step towards mitigating the increased risks associated with high-risk occupancies for the public, greater focus and effort is required to ensure the program effectively addresses public safety. Our three highest priority recommendations, discussed in greater detail within this report, focus on managing regulatory risk and increasing the number of RBI given their value. We also made two recommendations for cost effective controls to manage model risk, for incorporation into the project to develop the dynamic inspection model. Finally, we made two recommendations readily implementable in the current pilot to avoid the risk of accidentally missing an inspection.

We believe management actions currently underway combined with our recommendations provided in this report will result in an effective program to mitigate public fire safety risk. Fire Inspections has agreed to all seven recommendations and has committed to action plan implementation dates no later than December 31, 2021. The City Auditor's Office will follow-up on all commitments as part of our ongoing recommendation follow-up process.

1.0 Background

Calgary Fire Department's (CFD's) Fire Inspections & Enforcement service line provides fire inspections of multi-residential, commercial, industrial and assembly structures, fire code consultation and related technical services to:

- Enhance public safety;
- Ensure compliance with legislation;
- Minimize fire-related risks; and
- Protect lives, property and the environment.

The City of Calgary (The City) is an accredited municipality under the Alberta Safety Codes Act, which provides CFD with enforcement authority to review and inspect buildings to ensure they meet the codes, standards and regulations for the fire discipline¹. Accredited status is based upon the submission and approval of a Quality Management Plan (QMP) outlining The City's inspection model.

Under the current inspection model, Safety Codes Officers (SCO) on the Fire Inspections team complete inspections to ensure code compliance as part of the business licensing process, and to respond to concerns raised by members of the public, and CFD crews. Compliance inspections are scheduled via a 311 service request.

CFD's 2019 – 2022 One Calgary Service Plans and Budgets submission notes fire risk is increasing due to several factors including reduced maintenance on building life safety systems following the economic downturn, the increased vacancy rate, aging infrastructure, fire-prone business activities (such as paint booths), and careless behaviours that increase the risk of fires (e.g. careless cooking and smoking). Fire Inspections responded to this increased risk by introducing the Risk-Based Inspection (RBI) Program pilot in October 2018 to proactively conduct RBI.

In addition, on April 4, 2019, CFD provided Council with a briefing note that outlined an Apartment Building Compliance Program (ABCP) to address the risks specific to pre-1974 apartment buildings. Apartment buildings constructed prior to April 1974 were not constructed to a uniform building code. Enforcement authority for the ABCP was based upon a November 1996 Fire Code ruling, which provided reasonable measures for meeting minimum safety standards for residential buildings constructed prior to April 1, 1974. This was an approved guideline under the 1992 Alberta Fire Code and was published by Alberta Municipal Affairs Safety Services in the form of a STANDATA bulletin.

CFD reported its intent to evaluate pre-1974 buildings and require upgrades as part of the RBI Program in an April 4, 2019, Council Briefing. This briefing also indicated that Calgary was the last major municipality to implement an ABCP. CFD advised that the STANDATA resulting from the 1996 fire code ruling had been withdrawn in late 2019². As a result, the ABCP would no longer proceed as intended since CFD did not have the authority to enforce the upgrades. Although pre-1974 apartment buildings would continue to be part of the RBI Program, these inspections would not require the upgrades provided for under the 1996 fire code ruling that would have resulted in

¹ Alberta Fire Code

² <https://open.alberta.ca/dataset/f756585e-2808-4544-a808-fe92b4bc6d67/resource/d7c64318-a319-4559-aca7-3aaab07e8e68/download/fcr12-1.pdf>

improved mitigation of fire safety risk exposure.

This audit was included in our 2019 audit plan due to the importance of Fire Inspections and Enforcement to support Council's priority of A City of Safe & Inspiring Neighbourhoods by preventing fires and saving lives. The audit focused on the RBI Program since inspections under the program focused on buildings that may not have been subject to an inspection for several years.

2.0 Audit Objective, Scope and Approach

2.1 Audit Objective

The objective of this audit was to assess the design and operating effectiveness of the RBI Program to mitigate the fire safety risk associated with higher-risk buildings.

2.2 Audit Scope

The scope of this audit included the RBI Program, since the buildings covered by the program represents the highest risk to public safety. Sample testing of individual RBI was evaluated for the period of January 1, 2019 – October 31, 2019. Completeness and accuracy of the list of high-risk buildings and forecasting completion of inspections were evaluated at the time of testing. The data analysis shown in our results section is for properties that had their first RBI in 2019.

QMP based inspections are not included in the scope of the audit.

2.3 Audit Approach

Our audit approach included assessing:

- The effectiveness of the design of the RBI Program against National Fire Protection Agency (NFPA) standards and good practice from other municipalities;
- Whether the model was effectively applied to develop the initial list of high-risk properties;
- The design and operating effectiveness of controls to update the list of high-risk properties and ensure accuracy and completeness;
- The design and operating effectiveness of controls to ensure deficiencies identified through inspections are addressed and escalated to ensure timely compliance;
- The status of the RBI Program and whether high-risk inspections will be completed in a timely manner based on NFPA standards; and
- The effectiveness of risk mitigation processes for residential buildings constructed prior to April 1, 1974.

3.0 Results

RBI, as with all other fire inspections types, operate within a provincial regulatory framework that establishes fire safety requirements that property owners need to meet. Operationally Fire Inspections understands some code changes have restricted the ability of SCO to require building upgrades to mitigate fire safety risks. However, a formal process is not in place to assess and communicate these regulatory risk exposures.

Fire Inspections initiated their RBI Program pilot in October 2018 with the intention of gathering baseline data on the number of inspections completed. By the end of 2019 they had completed inspections on 158 properties including resolving all associated violations. Fire Inspections' approach in the pilot phase was to select buildings using their occupancy classification. Individual RBI inspections were effective in mitigating safety risks in high-risk buildings to the extent achievable within the existing Alberta Fire Code. SCO visited high-risk occupancies and successfully worked with owners to resolve violations. However, a greater number of RBI could have been achieved if Fire Inspections' ability to assign SCO to RBI had not been impacted by QMP responsibilities and position vacancies and absences.

Fire Inspections will continue their occupancy-based pilot for approximately two more years after which they expect to move to a new dynamic data driven RBI model (Dynamic Model). Fire Inspections has already initiated their project to move to a dynamic framework, which will allow a more precise identification and prioritization of high-risk inspections. At present the maturity of the RBI Program requires enhancement to effectively support mitigation of the risk that high-risk buildings are unsafe for the public. We believe management actions combined with our recommendations below will help the RBI Program develop into an effective program to better mitigate fire safety risk.

Our detailed results have been organized based on priority and impact, starting with managing regulatory risk, followed by the current occupancy-based RBI Program pilot, and concluding with an evaluation of the future RBI state.

3.1 Managing Regulatory Risk

SCO enforcement authority is derived from the provincial Alberta Fire Code. Changes to the provincial fire code occur on an ongoing basis through published STANDATA bulletins. During the audit we were made aware of changes related to pre-1974 apartment buildings and residential dwellings for persons with developmental disabilities that have restricted the ability of SCO to require upgrades to mitigate safety risks.

Fire Inspections indicated they captured the risk associated with the pre-1974 apartment buildings in their service line risk register and operationally are aware of the impact of STANDATA changes. However, there is no formal process in place to assess and, where appropriate, communicate these types of risk exposures to the Administrative Leadership Team and/or Council. We made a recommendation to implement such a process (see section 4.1).

3.2 Current Occupancy Based Pilot

We conducted data analysis using 2019 data to evaluate the contribution the RBI Program made to mitigating fire risk and protecting public safety. Our infographic, figure 1, is based upon the 107 properties that had their first inspection in 2019.

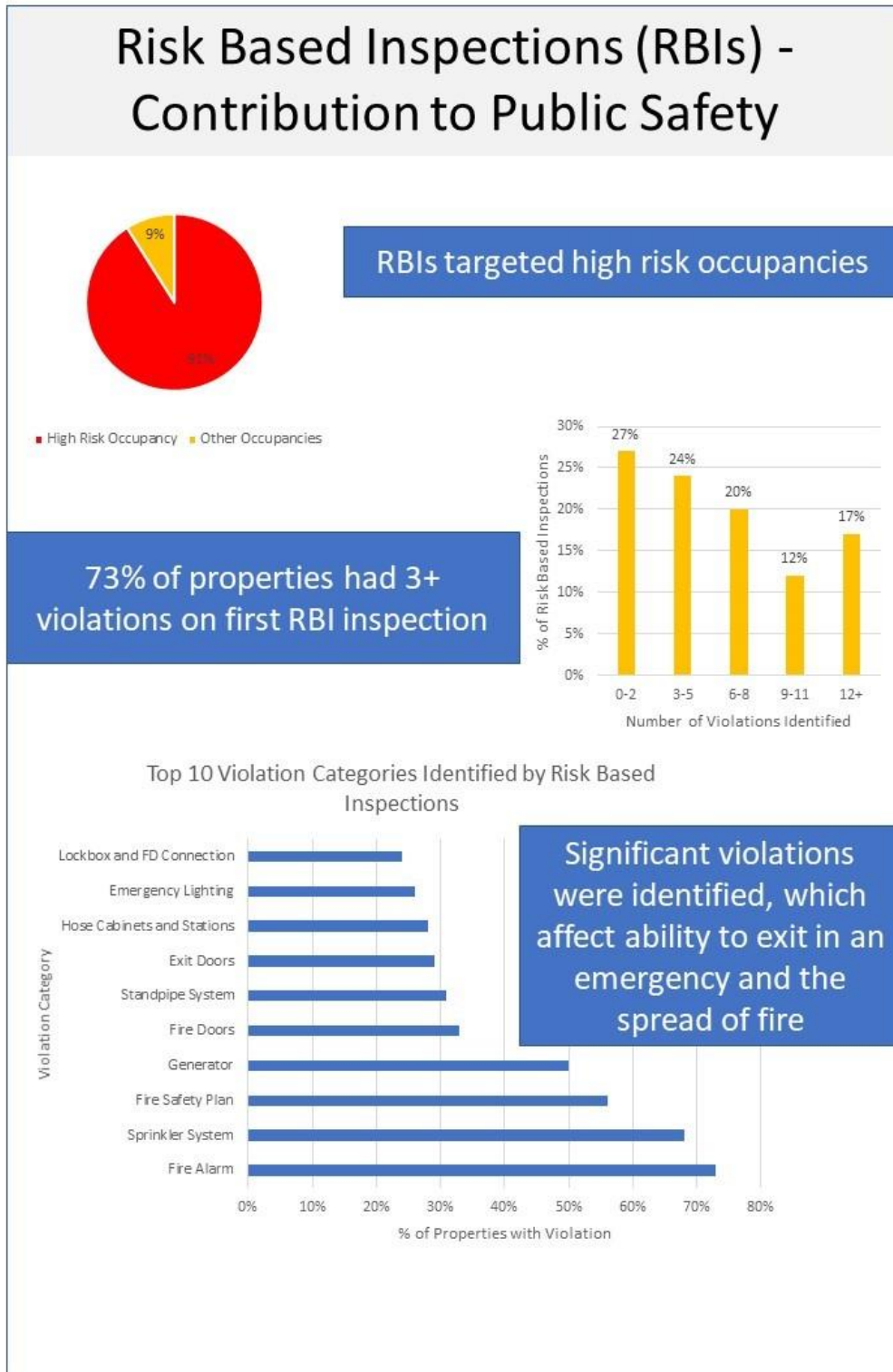


Figure 1: Risk Based Inspections - Contribution to Public Safety

We conducted testing on twelve properties that required three or more inspections to resolve violations identified. We confirmed that Fire Inspections was successful at working with owners using their enforcement powers to resolve outstanding violations. This confirms the value of the program, shown through our data analysis previously, since violations identified are remediated.

The initial listing of high-risk properties developed for the RBI pilot provided a reasonable basis to start the program and is sufficient until Fire Inspections moves to their future state Dynamic Model in 2022. We reviewed this listing and confirmed it captured properties within the high-risk occupancies that Fire Inspections initially identified for inclusion. Longer term the listing is not a sustainable solution as there are no processes to update it and those not directly involved in its initial creation do not have complete understanding of its contents. We expect Fire Inspections' upcoming move to a dynamic model will address the sustainability of the listing. For this interim phase we made an additional recommendation (see section 4.5) to reduce the risk that a high-risk property is not inspected due to accidental changes in this list.

The key area for improvement for the current occupancy-based pilot is increasing the number of inspections that are performed (see section 4.2). The focus during the initial phase of the pilot was inspecting high rise apartment buildings that are over six stories tall. We analyzed data available at the time of testing (October 2018 - November 2019) to forecast the time to complete the remainder of apartment buildings over six stories tall on the list. Management estimated approximately 1.75 resources were applied to these inspections and going forward expects it to increase to 2.75 resources. Based upon these resourcing levels we estimate it will take approximately 12 months to complete the remaining buildings bringing the total time to 26 months, a time span which falls below annual best practice expectations³.

Part of the reason for limited resources was the assignment of SCO to work on inspections under other inspections required under the QMP and position vacancies. Our recommendation (see section 4.2) for setting objectives for the RBI Program is designed to give the program greater visibility and increase accountability for completion, which supports effective resource allocation. There is a potential opportunity to redeploy additional resources to the program given less resources are expected to be required to support occupancy inspections due to 2020 changes in procedures with Calgary Building Services. Longer term, Fire Inspections may consider revisions to the QMP and to the RBI program to allow greater flexibility in resource allocation.

Finally, we tested controls to ensure Fire Inspections was collecting reinspection fees. In our testing of 20 re-inspections we noted revenue leakage of \$8,000, which was a result of a manual process for billing reinspection fees. We provided a low-cost value add opportunity to improve controls in this area. Fire Inspections advised they will be introducing a reconciliation between the FireHub system, used to record inspections, and the Corporate Billing & Accounts Receivable system to address this opportunity.

³ National Fire Protection Association guidance, which are considered best practice by Fire Inspections, recommends high-risk classifications are inspected annually. Although Fire Inspections want to meet or exceed NFPA Standards, the standards are not part of their mandate.

3.3 Future State

In early 2020, Fire Inspections initiated a project to transition from their current RBI model to a Dynamic Model that will consider factors beyond occupancy classification. This approach aligns with leading models such as FireBird (Atlanta Fire Department), Metro21 Fire Risk Prediction Model (Pittsburgh) and Fire Cast (New York Fire Department). These other factors include items such as fire history, age and construction material. A successful transition to this approach would enhance Fire Inspections' ability to prioritize limited resources than their current occupancy-based model allows.

As advantageous as this Dynamic Model may be it does increase model risk which is the potential for adverse consequences from decisions based on incorrect or misused model outputs and reports. Analyzing more factors increases the model's complexity and requires a greater number of data sources. We have raised recommendations to implement appropriate control measures at the early stages of this project, which is more cost effective (see section 4.3 and 4.4) in the long run.

We would like to thank staff from Fire Inspections for their assistance and support throughout this audit.

4.0 Observations and Recommendations

4.1 Regulatory Risk Communication and Response

The withdrawal of the STANDATA bulletin related to pre-1974 apartment buildings, which resulted in CFD cancelling the previously announced ABCP, was not reported to Council. CFD operate within a provincial regulatory framework, which includes the Alberta Fire Code. Changes to the Alberta Fire Code occur on an ongoing basis through published STANDATA bulletins. Some code changes have restricted the ability of SCO to require building upgrades to mitigate fire safety risks, which prevents loss of life. Although operationally CFD is aware of these impacts and indicated they recorded the risk associated with the apartment buildings in their service line risk register, a formal process is not in place to assess and, where appropriate, communicate these types of regulatory risk exposure to the Administrative Leadership Team and/or Council.

Pre-1974 Apartment Buildings and Apartment Building Compliance Program

As noted in the Background section, the ABCP is no longer proceeding as intended since CFD does not have the authority to enforce upgrades. Although pre-1974 apartment buildings will continue to be part of the RBI Program, these inspections will not require the upgrades provided for under the 1996 Fire Code Ruling that would have resulted in improved mitigation of fire safety risk exposure.

We noted the list of 322 high-rise apartment buildings on the RBI list includes 89 high-rise apartment buildings classified as pre-1974. SCO completed RBI on 44 of these buildings bringing their existing building systems into compliance. However, these inspections did not require the upgrades noted above.

Other STANDATA Changes: Residential Dwellings for Persons with Developmental Disabilities

During the audit, we also were made aware of the December 2016 decision by Alberta Municipal Affairs to withdraw the August 2015 STANDATA guidelines to improve fire and life safety in existing dwellings that have undergone a “change of use” to a residential support dwelling or a residential care dwelling under the Government of Alberta’s Persons with Developmental Disabilities program⁴. Some of the buildings are being used as “Residential Detention Dwellings” where individuals with developmental disabilities are confined or secured in spaces or bedrooms from which they cannot leave of their own volition. The 2015 guideline was developed because of the fatality of an Edmonton woman⁵. Discussions with CFD indicated that they had received direction from the province not to inspect group homes.

Recommendation 1

The Deputy Fire Chief:

- Implement a process to assess the impact of STANDATA bulletins (including their withdrawal) on Fire Inspections’ ability to mitigate fire safety risk through the RBI Program and/or other programs.

⁴ <https://open.alberta.ca/dataset/eaf11cf0-b5b5-4175-a69d-db1c46f77c51/resource/1226174c-9d48-4850-8957-2afdc7c662de/download/2015-08-pdd-safety-standards-withdrawn.pdf>

⁵ <https://open.alberta.ca/dataset/6481eec4-b44d-43dc-958c-7e8bd1f7de1a/resource/609aed3e-58c8-4c74-9793-aa07849818f1/download/01207-report-to-minister-into-death-of-marilyn-may-lane.pdf>

- Communicate risk exposure through The City’s Integrated Risk Management program and directly to the General Manager of Community Services. Risk exposure that cannot be adequately mitigated through the existing regulatory framework and the cancellation of a previously reported program should be reported to the Administrative Leadership Team and/or Council.

Management Response

Agreed.

Action Plan	Responsibility
<p>The Deputy Chief, Risk Management will implement a process to assess and communicate any risks arising from Provincial STANDATA’s or other regulatory changes that will impact Fire Inspections and Enforcement. Any regulatory change impacts will be captured in a briefing note that will be discussed with the GM, Community Services who will determine the best way to communicate to ALT and/or Council.</p>	<p><u>Lead:</u> Deputy Chief, Risk Management</p> <p><u>Support:</u> Manager, Strategic Services</p> <p><u>Commitment Date:</u> December 31, 2020</p>

4.2 Risk-based Inspection Program - Objectives

Fire Inspections’ ability to assign SCO to RBI in the pilot phase was limited due to QMP responsibilities and position vacancies. Although SCO inspected 135 buildings in a high-risk occupancy classification in the first 14 months⁶ of the pilot phase, more inspections could have been completed with additional resources. Fire Inspections should evaluate the RBI Program pilot and develop objectives for the next phase of the program considering further prioritization of high-risk properties based on defined criteria, available resources, and expected level of coverage. The next phase will cover an interim period of approximately two years until the planned Dynamic Model can be implemented. Setting objectives for the next phase supports prioritization of resources on the properties that represent the greatest safety risk.

Fire Inspections created an initial list of risk-based properties based on occupancy classification and tracked progress using a dashboard. In the first 14 months of the RBI Program, the focus of the program was on the high rise building over six stories occupancy classification. Fire Inspections completed 135 inspections in that classification using 1.75 SCO. Management estimated the resources dedicated to the pilot phase taking into account the assignment of RBI to three SCO, staff vacancies and long-term absences, and responsibilities to complete QMP inspections. Assuming an increased complement to 2.75⁷ SCO, it will take 12 months to complete the 187 remaining buildings in the occupancy classification for a total

⁶ CFD’s 2019 – 2022 One Calgary Service Plans and Budgets submission included an increase of one SCO to RBI in each year.

inspection time of 26 months. NFPA Standard 1730 (6.7) recommends an annual inspection of a high-risk classification. Management advised NFPA Standards are best practices Fire Inspections want to meet or exceed. However, the standards are not part of Fire Inspections' mandate.

Going forward, Fire Inspections should further prioritize high-risk inspections based on defined criteria such as occupancy classification and NFPA Standards. As required by NFPA Standard 1300, CFD conducts a Community Risk Assessment to evaluate fire risk in Calgary and guide risk reduction activities. This process assigns a risk rating to each structure based upon the consequence and probability of an incident. This assessment may represent an additional useful data point to consider when prioritizing within an occupancy class.

Fire Inspections is responsible for inspection obligations under the QMP, which includes attending occupancy inspections upon request. There is a potential opportunity to redeploy additional resources to the RBI Program given less resources are expected to be required to support occupancy inspections due to 2020 changes in procedures with Calgary Building Services.

Based on prioritization and available resources, Fire Inspections should determine the expected level of coverage for the next phase of the program. The level of coverage could be incorporated into SMART (Specific, Measurable, Attainable, Relevant and Timebound) objectives to allow Fire Inspections to measure the success of the next phase. Fire Inspections should collect information on the number of hours to complete an RBI to support the determination of the level of coverage that can be achieved based on available resources and timebound objectives.

Additional Considerations

SCO indicated current prioritization of RBI within a given occupancy classification (e.g. high-rise residential) is based upon their personal judgement. This may include knowledge from their time as a front-line firefighter, information received from CFD crews regarding buildings with a high number of incidents and occupancy levels. In the interim, there is value in ensuring individual SCO prioritization aligns with the objectives of the next phase of the program.

Recommendation 2

The Fire Marshal set objectives for the interim phase of the RBI Program (expected to be 2020 and 2021) that cover:

1. The number of properties to be inspected within each occupancy classification within each calendar year; and
2. Expected coverage of high-risk properties to be achieved.

In setting these objectives consider hours of effort required to complete inspections, available resources and risk prioritization including appropriate results of the Community Risk Assessment.

Management Response

Agreed.

Action Plan	Responsibility
<p>The Fire Marshal will establish goals and objectives for the Risk-Based Inspection pilot program based upon the SMART model in order to better assess the long-term sustainability of the model. The performance measures will include but not limited to</p> <ol style="list-style-type: none"> 1. The number of properties to be inspected within the High classification according to the risk matrix within each calendar year. 2. Expected coverage of high-risk properties to be achieved. 	<p><u>Lead</u>: Fire Marshal</p> <p><u>Support</u>: Manager, Strategic Services</p> <p><u>Commitment Date</u>: September 30, 2020</p>

Recommendation 3

The Fire Marshal implement a process to collect information on hours of effort required to complete an RBI to inform objective setting both for the interim RBI approach and future Dynamic Model.

Management Response

Agreed.

Action Plan	Responsibility
<p>The Fire Marshal will implement a tracking system to identify the approximate expected timeframe required to complete the various types of inspection services offered. Due to the intricacies related to building, occupancy, and specific inspection type; this will only be an estimated timeframe and cannot be used as an absolute measure. These expectations will be used in future goal and objective setting initiatives.</p>	<p><u>Lead</u>: Fire Marshal</p> <p><u>Support</u>: Fire Inspections Coordinators</p> <p><u>Commitment Date</u>: July 30, 2020</p>

4.3 Dynamic Model Development - Model Risk

Fire Inspections has initiated a project to create a Dynamic Model that will be used to identify and prioritize RBI. Implementing a Dynamic Model introduces model risk, which is the potential for adverse consequences from decisions based on incorrect or misused model

outputs and reports. Fire Inspections should build in controls to address model risk as part of the initial phase of the project. Building in controls at this early project phase will be a more cost-effective approach.

Consistent with dynamic models, used in cities such as Atlanta and Pittsburgh, the Dynamic Model is expected to use algorithms and a number of data sources on an ongoing basis to identify high-risk properties for potential inspection. This increased complexity results in model risk, which can originate from:

- Inappropriate, improper or unintended usage;
- Flawed assumptions; and
- Inaccurate, inappropriate or incomplete data.

Model risk should be managed throughout each stage of the model's life cycle. These stages are:

1. Model development and implementation - This step involves the design and creation of the model. Risks at this stage include the model design not aligning with its intended use, the developed model not functioning as designed, relevant parties not understanding the model and loss of knowledge as personnel change over time.
2. Ongoing monitoring – This stage addresses the risk that the model is no longer fit for purpose. This could be due to outdated assumptions or data quality issues.
3. Modifications – This stage involves both significant modifications and routine maintenance. CFD should monitor changes to ensure the model continues to function as intended to mitigate the risk that properties are not identified appropriately.

To determine appropriate controls to manage model risk, we reviewed supervisory guidance from the financial services industry and material related to the implementation of the Atlanta and Pittsburgh models mentioned previously. We only selected controls that are proportionate for Fire Inspections to apply.

Recommendation 4

The Manager, Strategic Services, integrate the following controls within the scope of the Dynamic Model project to address model risk at each stage of the model's life:

Model Development and Implementation

- Document statement of purpose to ensure the model is aligned with its intended use.
- Document evidence in support of all model choices including theoretical construction, key assumptions, data and specific mathematical calculations.
- Test to determine if the model is performing as intended, which includes checking the model's accuracy, assessing limitations, testing behaviour over a range of input values, and documenting test plans and results.
- Assign model ownership responsibility to an individual within Fire Inspections, who will be responsible for approving the implementation and subsequent modifications.

Ongoing Monitoring

- Periodically verify data inputs to ensure they remain accurate, complete and consistent with model purpose.

- Implement a process for SCO and other front-line personnel to be able to effectively challenge the results of the model when model results do not align with their experience.
- Annually verify to ensure that the model performs as expected. This could include:
 - Outcome analysis - mapping the model to actual outcomes. For example, the model used in Atlanta correctly predicted fires 71% of the time.
 - Benchmarking the model to alternative models.

Modifications

- Implement change control processes to ensure that the model can only be altered by approved parties. All changes should be logged and approved by the model owner.
- Test the model based on the significance of the change.

Management Response

Agreed.

Action Plan	Responsibility
Strategic Services will develop, implement, monitor and modify the dynamic risk model. The implementation requires the hiring of a limited term subject matter expert and the model is anticipated in late 2021. Recommendation above to be included in the model design for change management and data verification.	<u>Lead:</u> Manager, Strategic Services <u>Support:</u> Deputy Chief, Risk Management <u>Commitment Date:</u> December 31, 2021

4.4 Communication of Model Risk Exposure

The Dynamic Model will be used to identify and prioritize RBI. Fire Inspections will establish a cut-off score, based upon resources, below which properties would not be included in the future RBI Program. As this score would be in the context of the Dynamic Model, Fire Inspections senior management not closely involved in the program may not be aware of the risk exposure related to properties not included in the planned RBI Program. Fire Inspections should develop reporting to communicate fire safety risk addressed through RBI and unmitigated risk exposure to assist in strategic planning and decision making.

As noted in observation 4.3, Fire Inspections is moving to a dynamic RBI approach that will use a variety of data sources and algorithms to score properties to determine inspection priorities. A cut-off score will need to be established to determine the properties that can be inspected based on available resources. Reporting that explains the impact of this cut-off score should be developed to ensure Fire Inspections senior management is aware of the implications to fire safety risk.

Recommendation 5

The Manager Strategic Services include, within the scope of the Dynamic Model project, reporting to Fire Inspections senior management to communicate the level of fire safety risk addressed through the planned RBI Program and unmitigated risk exposure.

Management Response

Agreed.

Action Plan	Responsibility
<p>Strategic Services will provide updates on the unmitigated risks across the City and by First Due Fire District. Implementation will coincide with recommendation 4.</p> <p>Project reporting and summary of identified risks compared to the change in risk over the standard timeframes to be reported annually as part of the annual program appraisals.</p>	<p><u>Lead</u>: Manager, Strategic Services</p> <p><u>Support</u>: Deputy Chief, Risk Management</p> <p><u>Commitment Date</u>: December 31, 2021</p>

4.5 ArcGIS Layer Access Review

User access to the risk-based inspection layer within ArcGIS was not restricted to staff with a valid business need, and update access for SCO went beyond what was required for them to perform their inspection role. Restricting access helps prevent accidental changes, such as deletions, that could result in Fire Inspections not inspecting a high-risk property.

Fire Inspections created an initial list of risk-based properties based on occupancy classification, which was included in the ArcGIS risk-based inspection layer. SCO access the layer to assign RBI and update details when an inspection is complete.

We inspected a listing of 23 users that have access to the risk-based inspection layer. Management confirmed that five users no longer required the access that they were assigned based on current roles. SCO had the ability to delete and add structures (known as features in ArcGIS) from the layer. This access is beyond what is required for their role as they would be expected to update attributes associated with each structure based upon the results of the inspections but not change which structures are in the scope of the program.

Since SCO also update risk-based inspection information in FireHub, Fire Inspections may want to consider a similar access review process for the FireHub system.

Recommendation 6

The Fire Marshal ensure Fire Inspection Coordinators:

- Annually review user access to the ArcGIS risk-based inspection layer, including the type of access, to ensure access remains appropriate;
- Request removal of access that is no longer required; and

- Consider implementing a similar access review process for the FireHub system.

Management Response

Agreed.

Action Plan	Responsibility
<p>Fire Inspections have already removed the access for the five individuals identified above.</p> <p>Going forward the Fire Inspections Coordinators will conduct an annual audit of the users requiring and those having access to the ArcGIS risk-based inspection layer. They will work with GIS Analytics & Planning to review and amend access as appropriate.</p> <p>The Fire Inspections Coordinators will conduct a similar audit process for the FireHub system specific to the Properties module.</p>	<p><u>Lead</u>: Fire Marshal</p> <p><u>Support</u>: Fire Inspection Coordinators, Leader, GIS Analytics & Planning, FireHub MSA</p> <p><u>Commitment Date</u>: December 31, 2020</p>

Recommendation 7

The Fire Marshal ensure Fire Inspection coordinators work with the GIS Analyst to change edit access for SCO from "add, update and delete features" to "update attributes only".

Management Response

Agreed.

Action Plan	Responsibility
<p>Leader, GIS Analytics & Planning and the Fire Marshal will ensure that access changes are completed to amend Safety Codes Officer access in the ArcGIS system to "Update attributes only".</p>	<p><u>Lead</u>: Fire Marshal</p> <p><u>Support</u>: Leader, GIS Analytics & Planning, Fire Inspection Coordinators</p> <p><u>Commitment Date</u>: April 30, 2020</p>