TOWN OF OKOTOKS

COMMUNITY RISK ASSESSMENT

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PREFACE

This Community Risk Assessment will serve to assist the Town of Okotoks to comply with CFAI accreditation requirements and as a companion document to inform and direct the development of a Fire Services Master Plan. The Fire Services Master Plan will address the strengths, threats and vulnerabilities that are unique to the town, to protect lives, the environment and property.

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ACRONYMS

AEMA	Alberta Emergency Management Agency
CEMP	Community Emergency Management Program
CFAI	Commission on Fire Accreditation International
CRA	Community Risk Assessment
EOC	Emergency Operations Centre
ESL	Estimated Service Lives
FPPA	Fire Protection and Prevention Act
FSMP	Fire Services Master Plan
HIRA	Hazard Identification and Risk Assessment
IAFF	International Association of Fire Fighters
MVC	Motor Vehicle Collision
MW	Megawatt
NBC	National Building Code
NFC	National Fire Code
OFR	Okotoks Fire & Rescue
RSL	Remaining Services Lives
UWI	Urban Wildland Interface

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EXECUTIVE SUMMARY

Introduction

A Community Risk Assessment (CRA) is a process used to identify, evaluate, and prioritize the nature and magnitude of all hazards, vulnerabilities, and risks to the public within a specific community or geographic area. As per NFPA 1300, the CRA serves to inform the development and implementation of future community risk reduction plans and programs, to mitigate, reduce or eliminate the community's risk.

Following NFPA standards, and the Commission on Fire Accreditation International (CFAI) guidelines, this CRA will serve as a component of the Town of Okotoks Community Risk Assessment for CFAI accreditation. The goal of the CRA is to assess and classify all fire and non-fire hazards within the community. This CRA will not define future goals and objectives for service delivery, but rather serve as a foundational document to further analyses in the town's Fire Service Master Plan.

Department Overview

Okotoks Fire & Rescue (OFR) has a proud history of serving Okotoks and continues to evolve in their service delivery to meet the increasing demands of a growing community. OFR is currently considered a composite fire service, relying primarily on career full-time firefighters, supported by community part-time firefighters responding out of two fire stations within the town boundaries.

OFR maintains an administrative structure supporting a combination of full-time and community part-time firefighters to deliver emergency services, fire prevention and public education within the Town of Okotoks. The career firefighters, except the fire chief and two deputy fire chiefs are represented by International Association of Fire Fighters (IAFF) Local 4829.

OFR is currently funded to employ the following positions:

- 1 Fire Chief/Director of Emergency Management
- 2 Deputy Chiefs
- 1 Full-time Administrative Assistant
- 1 Temporary Casual Administrative Assistant
- 1 Emergency Management Coordinator (Reports to Chief, part of Corporate Services)
- 8 Career Captains (+1 acting Captain developing SOGs)
- 28 Career Firefighters
- 8 Community Firefighters

Community Risk Assessment Process

As per NFPA 1300, there are nine mandatory profiles that must be examined during the development of the community's CRA. This CRA will examine the nine mandatory profiles as below, with an additional profile assessing the critical infrastructure in the community. The profiles are explained below.

1. **Geographic Profile:** Physical features of the community
2. **Building Stock Profile:** Types, numbers, uses and ages of buildings in the community.
3. **Critical Infrastructure Profile**: Facilities and services that meet vital needs, sustain economy, and protect public security.
4. **Demographic Profile:** Composition of the community's population
5. **Public Safety and Response Profile:** Organized agencies and organizations in the community that can respond to certain types of incidents.
6. **Community Services Profile:** Community agencies, organizations and associations that can provide supportive services.
7. **Hazard Profile:** Natural, human-caused, and technological hazards in the community
8. **Economic Profile:** Economic sectors that are critical to financial stability of the community.
9. **Past Loss and Event History Profile:** Past emergency responses in the community

Each profile is considered and where applicable, taken through the core six-step process of a CRA development as outlined in the table below.

No.	Step	Description
1	Data Collection	Gather relevant data about the community, including demographics, geography, infrastructure, land use, historical disaster data, socio-economic factors, and stakeholder input.
2	Hazard Identification	Identify the various hazards that could affect the community. Hazards include natural, human-made and technological events.
3	Vulnerability Analysis	Assess the community's vulnerabilities in relation to each identified hazard. Consider factors such as population density, housing quality, socio-economic status, access to community resources and community protection agencies.
4	Risk Assessment	Combine information about hazards and vulnerabilities to assess the overall risk to the community by quantifying the likelihood and potential impact of various hazards occurring and affecting vulnerable areas.
5	Risk Mapping	Create maps that visually represent the identified hazards, vulnerabilities, and risks within the community to understand the spatial distribution of risks and assist in decision-making regarding emergency service levels.
6	Risk Categorization and Risk Treatment	Assign each risk a ranking and identify high-level potential risk treatment options to accept, avoid, mitigate, or transfer the risk. Assign mitigation strategies based on the 5 Es of Community Risk Reduction.

The results of the six-step process will provide a series of identified risks and key findings. Identified risks are factors which may highlight a need for future consideration during the development of a Fire Services Master Plan (FSMP) when examining emergency service levels. Identified risks will be taken through a risk assessment process to determine a risk ranking and risk category. Key findings may be noted as strengths in the community's current response model and/or trends to be monitored and will not be further assessed on the basis that there is either no quantifiable risk to the community, or insufficient data to conclude the level of risk to the community.

The identified risks and key findings of the Town of Okotoks's CRA are summarized in the next section. A full overview of the risk assessment process and analysis is provided in Section 11 of this report.

Summary of Identified Risks and Key Findings

The following identified risks and key findings are drawn from analyses presented throughout the report. They are grouped based the nine mandatory profiles and in the order in which they appear in the report.

The risk treatments presented in this report are a generalized basis for further consideration and in-depth analysis during the development of a FSMP, which will serve to account for their feasibility, cost, and execution.

Summary of Identified Risks

No.	Identified Risk	Risk Level	Rationale	Risk Treatment
Geographic Profile				
1	Approximately 60% (6,759) of commuters travel from Okotoks to the City of Calgary for work, and 60% of all commuter's commute between the hours of 6:00 a.m. and 8:00 a.m., increasing the risk of MVCs along major routes, particularly during these times. Call volume by time of day (Section 11.2.1.2) reflects an increase in call volume during these times, as well as a moderate increase between 5 P.M. and 6 P.M. before declining, which may be indicative of commuters returning from the city.	Moderate	• 60% of commuters travel from Okotoks to Calgary for work and leave between 6 A.M. and 8 A.M. • Potential risk to life safety • Potential for minor property loss (MVCs) • High probability of MVCs	Mitigate Risk - Implement appropriate response protocols, standard operating guidelines, and activities. Ensure appropriate staffing levels at peak times.

No.	Identified Risk	Risk Level	Rationale	Risk Treatment
Geographic Profile				
2	The town has an extensive dangerous goods bylaw to prevent major spills in central parts of town. Incidents can still occur on major routes however, including Highway 2A over Sheep River.	Moderate	• No major releases reported in the town, however provincially dangerous goods releases on highways occur annually. • Report (2018) from Statistics Canada indicates there were 464 incidents involving dangerous goods in Canada, 48.5% of which occurred in Alberta[1]. • Over half of all dangerous goods release incidents occurred on roadways. • Threat to life safety, moderate property, and environmental damage	Mitigate Risk – Implement appropriate response protocols, standard operating guidelines, and activities. Continue to implement awareness level hazardous materials training in accordance with NFPA standards. Review existing dangerous goods bylaw.
3	At grade level rail crossings have the potential to create a physical barrier to connectivity to the roadway network, causing delays in response time. There are six at-grade rail crossings throughout the town.	Low	• Trains can pass through the town at any time • Alternate routes exist however timing unknown • Delay in response times could have impact on response outcomes	Mitigate Risk – Knowing the locations of at grade crossings and alternate routes can provide for better planning in the event a route is blocked.

[1] *As retrieved from Dangerous goods incidents in Canada, 2018 (statcan.gc.ca)*

No.	Identified Risk	Risk Level	Rationale	Risk Treatment
Geographic Profile				
4	There is a low probability, however, a high degree of risk to the public and the environment associated with a train derailment in the area; with or without a release of dangerous goods.	Moderate	• July 2022 train carrying grain derailed near Bassano Alberta • December 2022 train derailed near Taber Alberta • 2018 three trains derailed in southern Alberta • In comparison to number of trains travelling across the province, frequency of derailment is low • Potential loss of life and major property and environmental damage	Mitigate Risk – Implement appropriate response protocols, standard operating guidelines, and activities. Continue to implement awareness level hazardous materials training in accordance with NFPA standards. Continue communications with CP rail.
5	Given the location of the Okotoks Regional Airport, within a residential area, there is a possibility of an air incident requiring a response from OFR and could directly or indirectly (reduced service levels) affect the town.	Moderate	• Between 2007 and 2019 there have been 9 reported incidents at the Okotoks airport, including one fatality • Potential threat to life safety • Moderate loss of property damage (small planes)	Mitigate Risk – Implement appropriate response protocols, standard operating guidelines, and activities.

No.	Identified Risk	Risk Level	Rationale	Risk Treatment
Geographic Profile				
6	Areas around Sheep River are frequented by residents of the town and visitors for recreational activity that may pose the risk of injury and/or rescue. Some areas along the river are difficult or impossible to reach by apparatus.	Moderate	• Water and ice rescues occur annually • Potential risk to life safety • Property damage not expected	Mitigate Risk – Implement appropriate response protocols, standard operating guidelines, and activities.
7	With only two crossings bridging the north and south portions of the town, Sheep River could pose a challenge to response times if either were unavailable.	Moderate	• There are stations on both sides of the river • Possible to have concurrent calls • Mutual aid agreements do exist • No scheduled major maintenance of the bridge • Potential risk to life safety • Moderate property damage for extensive delays	Mitigate Risk – OFR should be informed of any development projects that will impact these crossings in order to review service levels and mutual aid agreements in place.

No.	Identified Risk	Risk Level	Rationale	Risk Treatment
Geographic Profile				
8	Despite flood mitigation efforts, portions of the town are in a flood hazard area, including popular, high density recreational and residential areas.	High	• Last major flood event in 2013 • Several significant floods in past • Climate change increasing frequency of severe weather • Could cause extensive damage and disruptions • Overland flooding in nearby areas could have indirect impact on town and emergency services	Mitigate and Transfer Risk - Implement appropriate response protocols, standard operating guidelines, and activities. Ensure public education (signage, education) of safe water recreation and closures, particularly targeted during hazardous times.
9	The town has an extensive network of trails frequented by visitors on a regular basis. Some portions of the trail are inaccessible or difficult to access by vehicle or apparatus, which could impede a rescue response.	Moderate	• Rescue calls occur annually • No statistics on how many calls delayed by access although possible • Threat to life safety • No or minimal property damage expected	Mitigate Risk -Implement appropriate response protocols, standard operating guidelines, and activities. Ensure public education (signage, education) of safe water recreation and closures, particularly targeted during hazardous times.
10	There is a considerable risk of a grass fire in areas of urban interface. The landscape surrounding the town is primarily agricultural, and increasing development in natural areas increases the threat of a wildfire impinging on the town.	High	• Multiple grass fires around Calgary and Okotoks areas in 2023 • No major losses to date however wildfires increasingly burning more area in recent years and in particular 2023. • Resources may be unavailable to assist during busy seasons	Mitigate Risk - Ensure public knowledge (signage, education) of proper fire safety and fire bans (when in effect). Consider enforcement actions to reduce occurrence of unsafe practices. Consider FireSmart and building practices in areas of wildland urban interface.

No.	Identified Risk	Risk Level	Rationale	Risk Treatment
Building Stock Profile				
11	As with most jurisdictions, residential buildings account for the majority of the stock in Town of Okotoks and are the most common building involved in structural fires and attribute to the most fatalities and injuries.	High	• Residential fires occur annually in the town • There have been 8 injuries and one fatality in the town between 2018 and 2022 • Threat of life safety • Moderate property loss	Mitigate Risk – Implement appropriate response protocols, standard operating guidelines, and activities. Ensure public education/campaigns of fire safety in the home i.e., smoke detectors.
12	In order to meet the projected housing demands associated with population growth in the town, new developments will primarily be of medium density housing, therefore increasing the fire-risk potential in these areas.	High	• Residential fires account for most number of fires in Okotoks • Exposure fires are a common cause of fire in Okotoks • Potential for large loss of life and significant property damage including businesses in medium density areas	Mitigate Risk – Implement appropriate response protocols, standard operating guidelines, and activities. Ensure public education/campaigns of fire safety in the home i.e., smoke detectors. OFR to be included in development planning.
13	Extensive residential and mixed-use development in the southeast and northern portion of the town could increase fire risk and service demands in these areas.	Moderate	• The increase in both housing and commercial properties will increase service demand levels • Residential fires occur annually in the town • Potential for loss of life • Potential for moderate property damage and loss of business	Mitigate Risk - Ensure safe building practices with increased inspection and enforcement. Review services levels. Ensure public education/campaigns of fire safety in the home i.e., smoke detectors.

No.	Identified Risk	Risk Level	Rationale	Risk Treatment
Building Stock Profile				
14	Data provided by the 2021 census indicates that more than 11.17% of the town's residential building stock was built prior to the introduction of the 1984 fire code and at least 2.24% of the building stock was built prior to the introduction of the building code.	Moderate	• No data on number of fires as related to building age however residential fires account for most fires in Okotoks, assumed may affect at least one building under these conditions • Potential for loss of life • Potential for moderate property damage and loss of business	Mitigate Risk – Implement appropriate response protocols, standard operating guidelines, and activities. Ensure public education/campaigns of fire safety in the home i.e., smoke detectors.
15	The number of new homes being built with lightweight construction poses a risk to firefighter safety and can hinder the ability for occupants safely evacuate in a timely manner.	High	• The presence of lightweight construction has proven to increase the rate and severity of residential fires • Lightweight truss systems have been proven to collapse more quickly and causing loss of life of firefighters and occupants	Mitigate Risk – Ensure training includes awareness of dangers of lightweight construction in newer residential areas.
16	There are no buildings over four storeys in the town, however there are plans to develop a 6-storey residential building in a newly proposed neighbourhood in the southwestern portion of the town.	Moderate	• With increasing demand for housing, there is a potential for larger buildings • Infrastructure and space are limited and lead to the demand for residential buildings with more levels • Potential for loss of life • Increased property loss with a high-density residential fire	Mitigate Risk – OFR should be involved in development planning of structures greater than five storeys. Ensure proactive inspections, enforcements, and potential incentives for new structures.

No.	Identified Risk	Risk Level	Rationale	Risk Treatment
Building Stock Profile				
17	There are several properties within the town that have a potentially high fuel load and therefore an increased fire risk.	Moderate	• No reported industrial fires in last 5 years • Small number of properties with high fuel load • A large industrial fire could result in large losses • Potential for large loss of life	Mitigate Risk - These properties should be routinely inspected (where applicable) to ensure they are being properly maintained, have adequate fire water, suppression equipment, evacuation procedures, emergency plans and are conducting evacuation drills.
18	There are four assisted living/senior residences in the town.	Moderate	• One reported fire in a care facility between 2018 and 2022. • Increased risk due to mobility and communication challenges. • There is a potential for high loss of life if a fire were to occur in one of these occupancies.	Mitigate Risk - These properties should be routinely inspected (where applicable) to ensure they are being properly maintained, have adequate fire water, suppression equipment, evacuation procedures, emergency plans and are conducting evacuation drills.

No.	Identified Risk	Risk Level	Rationale	Risk Treatment
Building Stock Profile				
19	In addition to registered vulnerable occupancies the town has 17 schools (including preschools and kindergarten schools) and three licensed childcare facilities that represent higher fire life-safety risks.	High	• There was one reported fire at a care occupancy and three at an assembly occupancy in the last 5 years • There is a potential for high loss of life if a fire were to occur in one of these occupancies.	Mitigate Risk - These properties should be routinely inspected (where applicable) to ensure they are being properly maintained, have adequate fire water, suppression equipment, evacuation procedures, emergency plans and are conducting evacuation drills. Consideration for implementation of bylaw and/or other standards to track the location of these residences.
Critical Infrastructure Profile				
20	The town's water supply capacity is increasingly threatened by hot and dry summer months, lowering the water tables, and coupled with increasing demand during these periods. The shortage in supply could threatened the availability of water to ensure an appropriate level of fire protection for larger fire suppression events.	High	• Water shortages occurred 5 times (2015, 2017, 2021, 2022, 2023) during summer months • Town reservoirs have a limited supply of water can only stave off short periods of high demand. • More development in the town will further strain water resources • Water shortages which threaten firefighting could have significant consequences to property and life	Mitigate Risk – Assess vulnerable areas and determine fireflow requirements ahead of low water events. OFR involved in planning of new developments and replacement of infrastructure.

No.	Identified Risk	Risk Level	Rationale	Risk Treatment
Critical Infrastructure Profile				
21	Watermain sections along North Railway Street have been the site of recent watermain breaks. According to the most recent Water Master Plan, cast iron watermains in that area (see Figure 9) are reaching their ESL and should undergo upgrades as the risk of failure is increasing.	High	• Several reported breaks in the last 5 years • Infrastructure is aging and expected to deteriorate if not replaced • Minot property loss • Threat to some businesses	Mitigate Risk – Assess vulnerable areas and determine fireflow requirements/deficiencies ahead of a mainbreak event. OFR involved in planning of replacement of infrastructure.
22	The town's 3N water reservoir requires rehabilitation work. Reservoirs can be greatly and quickly impacted by events such as water main breaks, drought and high temperatures which consequently can have an immediate and critical impact on firewater availability.	Moderate	• Failure at reservoir in the past resulted in immediate water outages • Reservoir is scheduled for maintenance - if circumstances change threat reduced • Water shortages occurred 5 times (2015, 2017, 2021, 2022, 2023) during summer months • Town reservoirs have a limited supply of water can only stave off short periods of high demand More development in the town will further strain water resources • A major outage could pose a firefighting risk to areas served by the reservoir • There are alternate means of transporting water and backup systems	Mitigate Risk – Assess vulnerable areas and determine fireflow requirements/deficiencies ahead of a failure event. OFR involved in planning of replacement of infrastructure.

No.	Identified Risk	Risk Level	Rationale	Risk Treatment
Demographic Profile				
23	The population of the town has steadily increased, with a continued anticipated growth. Rapid changes in population and development can affect service level needs of the town.	Moderate	• The town anticipates continued growth • Threat to life safety and potential for moderate loss	Accept and Mitigate Risk – Ensure safe building practices with increased inspection and enforcement. Review services levels.
24	Seniors (those 65 years and over) are considered to represent one of the highest fire risk groups across the province based on residential fire death rate. The percentage of the population aged 65 years and older in the town represents 14.78% of the total population.	High	• Historically across the province this group represents the highest fire fatality • One reported fire in a care facility in the last 5 years • Seniors more likely to live in high density housing • Threat to life safety and potential for moderate loss	Mitigate Risk - Education and prevention activities should be largely focused on this age group. Ensure inspections and potential enforcement actions in senior assisted living residences.
25	Of the town's population, 11.82% fall into the age range of 55 to 64, representing a potential future increase as this cohort will age towards 65+. Based on historic residential fire fatality data, this population will become greater fire fatality risk.	High	• Historically across the province this group represents the highest fire fatality • One reported fire in a care facility in the last 5 years • Seniors more likely to live in high density housing • Threat to life safety and potential for moderate loss	Mitigate Risk - Education and prevention activities should be largely focused on this age group. Ensure inspections and potential enforcement actions in senior assisted living residences.

No.	Identified Risk	Risk Level	Rationale	Risk Treatment
Demographic Profile				
26	The majority of residences in Canada with only one inhabitant are 85 and older. There are 895 residents in this age range in the Town of Okotoks, although there is no data on how many live alone.	Low	• Seniors living along have an increased fire-safety risk • There are a low number of seniors relative to the general population • It is unknown how many seniors over 85 live alone in the Town of Okotoks Threat to life safety • Minor property loss	Mitigate Risk – Target this population for educational awareness such as in home smoke detectors etc.
Hazard Profile				
27	The town's 2021 Hazard Identification and Risk Assessment (HIRA) identifies the top hazards listed below that could impact the ability of OFR to deliver fire protection services: • Flood (watercourse, heavy rain) • Urban Wildland Interface (UWI) Fire • Human health emergency (pandemic) • Drought/water shortage • Tornado • HAZMAT spill – fixed site/transportation • Civil disturbance • Extreme winter weather (extreme cold, ice storm, blizzard etc.)	Moderate	• Most of the hazards listed in the towns' HIRA do occur annually with some minor disruptions and added challenges i.e., weather, road conditions. • Potential for major disruptions and losses associated with less frequent but more severe incidents.	Accept Risk – Implement appropriate response protocols, standard operating guidelines, and activities.

No.	Identified Risk	Risk Level	Rationale	Risk Treatment
Past Loss and Event History				
28	Preliminary data would suggest that when compared to provincial averages, the town may experience a higher rate of injuries associated with residential fires, however further analysis using statistics from a comparable municipality to that of Okotoks would provide more conclusive results.	Moderate	• Estimates indicate 10% of residential fires in Okotoks resulted in injury compared to 4% in the province • Potential threat to life safety and loss of life	Avoid and Mitigate Risk - Education and prevention activities should be largely focused on this phenomenon.
29	The leading reported cause source of ignition in the Town of Okotoks is cooking	Major	• Fires caused by electrical distribution equipment reported annually • Depending on occupancy type could have a moderate or major impact to life safety and property loss	Avoid and Mitigate Risk - Education and prevention activities should be largely focused on this phenomenon.
30	Over the period from January 1st, 2018, to December 31st, 2022, the volume of emergency calls responded to by OFR increased by 19.40%.	High	• The call volume has steadily increased • Anticipated growth in the community will lead to an increase in call volume • If service levels do not keep pace with development, there is an increased risk to losses and life safety	Avoid Risk: OFR must monitor call volume and adjust service levels accordingly in anticipation of increasing populations.
31	The peak call time in the town is between the hours of 9 A.M. and 7 P.M.	Moderate	• MVC during this time reported annually	Mitigate Risk – Implement appropriate response protocols, standard operating guidelines, and activities. Adjust service levels accordingly.

Summary of Key Findings

No.	Key Finding
Geographic Profile	
1	There are currently no major projects scheduled for bridge and/or culvert repairs.
2	At grade level rail crossings have the potential to create a physical barrier to connectivity to the roadway network, causing delays in response time. There are six at-grade rail crossings throughout the town.
Building Stock Profile	
3	Extensive residential and mixed-use development in the southeast and northern portion of the town could increase fire risk and service demands in these areas.
4	There are 15 identified heritage buildings (not including private residences) within the town.
Demographic Profile	
5	The 2021 Census data indicates that children aged 14 and under, represent 21.62% of the town's total population. This represents an important demographic for the purposes of public education. There is value in targeting public education and prevention programs to this demographic.
6	Areas around Sheep River and in the northern portion of town consist of 13 – 49.5% of seniors. Seniors are at an increased risk of fire fatality and medical calls.
7	The greatest concentration of population aged 0-14 years is concentrated in densely populated neighbourhoods close to schools and amenities. This age group is best targeted for fire prevention education.
8	The gender distribution in Okotoks is roughly equal in all age groups. It does not appear that gender based public education would have a positive influence on reducing fire related incidents, fatalities, or injuries.
9	Okotoks has a comparable labour force participation rate to that of the province, which suggests there is not an increased fire risk based on these statistics.
10	When comparing educational attainment and median total income per household between the province and Okotoks, it appears that Okotoks may have a slightly lower fire risk.
11	When comparing the socio-economic factors, the statistics may suggest that there is a lower fire risk to the town compared to the province.
12	When comparing housing tenure for the town of Okotoks to that of the Province, Okotoks appears to have a lower fire risk.
13	The low proportion of immigrants in the area, and statistics regarding spoken languages, suggests that there are no concerns with cultural and language barriers in understanding fire safety messages, warnings, practices etc.
14	An approximate 10% of the population of Okotoks falls into the age range typical of post-secondary students. This could indicate an uncaptured statistic for commuters and unregistered student housing, both of which pose an increased risk in call volume due to MVC and fire statistics.

No.	Key Finding
Demographic Profile	
15	The town's commuter population presents a factor that may impact traffic congestion, and the potential occurrence of motor vehicle accidents within the towns on major routes.
Public Safety Response Profile	
16	The Town of Okotoks is well supported by a number of public safety agencies withing the community.
17	The Town of Okotoks has a number of formal mutual aid and cost sharing agreements in place with a number of agencies for fire and emergency services support.
Community Services Profile	
18	This list of community services demonstrates that the town is very well supported in the event of a major or serious emergency.
Economic Profile	
19	The town has identified top employers that contribute to the economic vitality of the community. The largest of these are education and service (retail, grocer and eating establishments) sectors.
20	Disruptions to the retail, construction, health, and educational services could impact more than 50% of the labour force. Incidents having a long-term impact on these sectors (such as a pandemic, government disruptions etc.) could have negative consequences and result in secondary incidents i.e., medical and distress calls.
Past Loss and Event History	
21	Between January 1, 2018, and December 31, 2022, the number of fires within the town remains fairly consistent year over year, however the total loss varies significantly in some years.
22	The town has a significantly lower number of exposure fires when compared to the province, likely attributed to lower density residential areas.
23	The town has a significantly high number of fires with reportedly unknow sources of ignition.
24	Provincial data suggests that the presence and proper maintenance of smoke alarms does lower the rate of fire fatalities and injuries with the exception for those under the influence of drugs and alcohol and who have mental challenges. OFR does not have this data readily available for analysis.
25	There is very little fluctuation in call volume thought the week.
26	Between January 1, 2018, and December 31, 2022, the majority of responses were attributed to responding medical co-response calls (51.99%) and alarm no fire calls (25.18%)

SECTION 1
INTRODUCTION

1.1 Background

This Community Risk Assessment (CRA) has been developed for the Town of Okotoks to support compliance with the Commission on Fire Accreditation International (CFAI) accreditation requirements. The CFAI accreditation model requires that a complete risk assessment of all relevant fire and non-fire risks to the community are evaluated, categorized, and documented herein. Additionally, this CRA will be developed as a companion document to inform the Fire Services Master Plan (FSMP) being and any other future programs and standards being developed for the Town of Okotoks, to further analyze and address the identified risks as they relate to service models and response areas, current programs, standards of cover and standards of practice.

1.2 Methodology

The methodology applied to develop this CRA has been informed by current industry standards and best practices. These include:

1. 10th Edition CFAI Accreditation Model
2. NFPA 1300, Standard on Community Risk Assessment and Community Risk Reduction Plan Development (2020 Edition)
3. NFPA 1730, Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations (2019 Edition)
4. Office of the Ontario Fire Marshal Community Risk Assessment Technical Guideline OFM-TG-02-2019
5. Vision 20/20 Community Risk Assessment: A Guide for Conducting a Community Risk Assessment (Version 1.5, 2016)
6. Vision 20/20 Community Risk Reduction Planning: A Guide for Developing a Community Risk Reduction Plan

As required by NFPA 1300, this CRA includes a comprehensive analysis of the nine mandatory profiles including:

- Geographic Profile
- Building Stock Profile
- Critical Infrastructure Profile
- Demographic Profile
- Public Safety and Response Profile
- Community Services Profile
- Hazard Profile
- Economic Profile
- Past Loss and Event History Profile

Within each of the nine profiles, there are several sub-topics examined. These sub-topics are illustrated in Figure 1. These profiles are based on an analysis of several sources of information, including data provided by the Town of Okotoks, Okotoks Fire & Rescue (OFR), Statistics Canada, Office of the Fire Commissioner, and desktop research. Where applicable all numerical data has been rounded to the nearest 1/100 (hundredth) decimal point to provide consistency in the analysis. As a result, the numerical totals presented within each analysis although presented as reflecting 100% may reflect a minor variance based on the use of only the nearest 1/100 (hundredth) decimal points.

The mandatory profile analyses result in a series of risk related conclusions identified in the document as either an 'Identified Risks' or 'Key Finding'. Identified risks are factors which may highlight a need for future consideration during the development of a Fire Services Master Plan (FSMP) when examining emergency service levels, while key findings may be noted as strengths in the community's current response model and/or trends to be monitored. Identified risks are taken through a risk assignment process as illustrated in Figure 2, as adopted from 'Ontario Office of the Fire Marshal Community Risk Assessment Technical Guideline OFM-TG-02-2019', which is a technical guideline developed to assist a fire service in conducting a community risk assessment. The guideline includes a modified version of the Vision 20/20 Community Risk Assessment: Guide for Conducting a Community Risk Assessment tables on quantifying risk based on probability and consequence to determine a risk classification.

Key findings are noted throughout the document as either a strength of the department, or a trend to monitor. They are not taken through additional risk assessment analyses on the basis that they either pose no threat to the community, or there is no further data to quantify the existence of or level of threat. The risk assessment process is explained in further detail in Section 11 of this report.

Figure 1: Community Risk Profiles and Sub-topics

Figure 2: Risk Treatment Process

SECTION 2
DEPARTMENT PROFILE

2.1 Department Overview

Okotoks Fire & Rescue (OFR) has a proud history of serving Okotoks and continues to evolve in their service delivery to meet the increasing demands of a growing community. OFR is currently considered a full-time career fire service, relying primarily on full-time firefighters, supported by community part-time firefighters responding out of two fire stations within the town boundaries.

2.1.1 Staffing Complement

OFR maintains an administrative structure supporting a combination of career full-time and community part-time firefighters to deliver emergency services, fire prevention and public education within the Town of Okotoks. The career firefighters, except the fire chief and two deputy fire chiefs are represented by IAFF Local 4829.

OFR is currently funded to employ the following positions:

- 1 Fire Chief/Director of Emergency Management
- 2 Deputy Chiefs
- 1 Full-time Administrative Assistant
- 1 Temporary Casual Administrative Assistant
- 1 Emergency Management Coordinator (Reports to Chief, part of Corporate Services)
- 8 Career Captains (+1 acting Captain developing SOGs)
- 28 Career Firefighters
- 8 Community Firefighters

2.2 Core Services

The Town of Okotoks has Bylaw 10-17, A Bylaw of the Town of Okotoks in the Province of Alberta to Establish Fire Services in and for The Town of Okotoks. This bylaw commonly known as the "Fire Services Bylaw" includes the purpose of the Okotoks Fire & Rescue provides for fire protection, rescue, medical assistance, and fire prevention services, however, does not cite the specific core services and standards (standard of cover), to which the OFR shall perform to.

The current services being delivered by OFR include.

- Structural Firefighting
- Wildland Urban Interface
- Medical First Response
- Motor Vehicle Collisions and Extrications
- Hazardous Materials Response
- Technical Rescue Services

- Citizen Assist and Public Services

OFR also provides the community with the following supportive services:

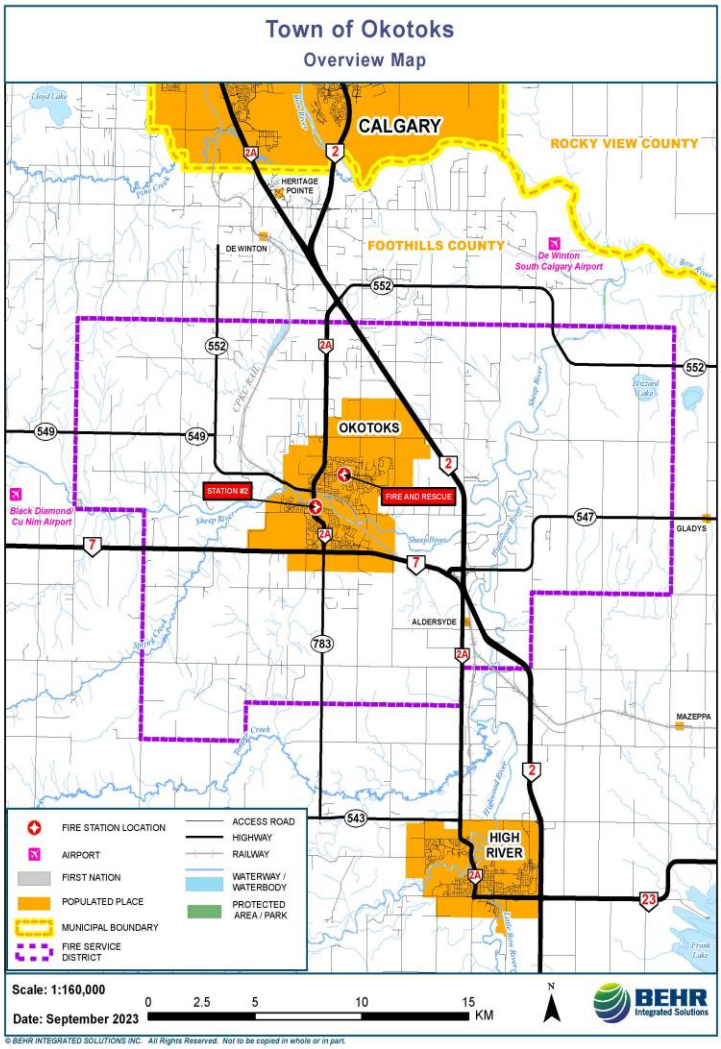
- Fire Prevention Services
  - Fire Code Inspection Services
  - New Developments Plan Reviews
  - Fire Cause and Origin Services
  - Fire public Education Services
- Pre-Emergency Planning

SECTION 3
GEOGRAPHIC PROFILE

3.1 Geographic Overview

The geographic profile of a community is a crucial component for emergency services planning and preparedness. It provides an assessment of the physical features of a community such as the transportation infrastructure, waterways, bridges, recreational and natural areas that may pose a risk to the community and impact emergency services' ability to respond quickly and effectively[2]. The Town of Okotoks' geographical features are thoroughly examined in this section, to assist with the determination of the type and level of fire protection services the community needs, as well as any potential service-related issues they may present.

Map 1: Town of Okotoks Overview Map



The Town of Okotoks is situated in Foothills County, approximately 38 km south of Calgary's city centre; 56 km from the Calgary International Airport and 159 km from the Sweetgrass-Coutts border crossing in Montana.

The town has a land-based area of 38.55 km^2, with a population of 30,405 which equates to a population density of 788.7 per km^2. The town continues to experience growth year over year and is currently Alberta's largest town[3].

[2] *Community Risk Assessment: Office of the Fire Marshal OFM-TG-02-2019, 2019.*

[3] *Statistics Canada. 2023. (table). Census Profile. 2021 Census of Population. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released March 29, 2023. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (accessed August 14, 2023).*

The town's land use area is predominantly residential, with a downtown district in the central part of the town and pockets of general commercial areas, mainly south of the town's centre. There are also two industrial park areas, one adjacent to the town centre and the other on the southeast edge of the town. Most of the area surrounding the town is mainly agricultural land.

The town has several natural features. It is located within the Sheep River watershed, which provides the area with wetlands, woodlands, low vegetational grasslands, agricultural lands as well as fish and wildlife habitat. The Sheep River, which is a major feature of the watershed, bisects the town in an east-west direction, and is a popular site for day and overnight recreational use.

3.2 Transportation Network

3.2.1 Road Network

Understanding the road network within a community is critical for fire and emergency services, as it directly impacts their ability to respond effectively and efficiently to emergencies. The road network provides pathways for emergency vehicles to reach the scene of an incident. Knowing the road layout and conditions helps emergency services plan the fastest and safest routes to the emergency location. Congested traffic, load restrictions and physical barriers (railway crossings, construction, and detours) can all significantly delay a response time. Roadways are also a common source of emergency call volume. Knowledge of accident-prone areas, traffic patterns and historical incident data can assist emergency services to effectively allocate resources.

The Town of Okotoks owns and maintains an extensive network of 190 km of arterial, collector and rural roads. The town sits at the junction of Provincial Highway 7(turning into Highway 2A) which runs east-west along the southern border of the town, and Highway 2A running in a north-south direction through the western portion of the town. The most recent transportation data indicates that annual daily traffic counts along Highway 2A are 26,230 entering the town from the north and 10,060 exiting to the south. North of the main developmental area of the town, 338 Avenue runs in an east-west direction, connecting Highway 2A to Highway 2, which leads in a north-south direction along the western edge of town. Plans to develop along this roadway are forecasted and include an interchange at the Highway 2 intersection. The most recent Transportation Master Plan Update (2020) indicated that all roadways were to urban standard, most having a speed limit of 40 kms per hour, with the exception of 338 Avenue which is mostly 80 kms per hour and Highway 2A which is 50-60 kms per hour.

According to the 2021 census and the Okotoks Local Transit Implementation Plan, there are 11,265 workers commuting within and out of town, and an estimated 60% of those commuters travel to the City of Calgary. Only 33.73% of commuters travel less than 15 minutes for work. Of all workers commuting within and beyond town limits, 65.82% were beginning their community between 6:00 a.m. and 8:00 a.m., which increases the likelihood of motor vehicle incidents (MVCs) during that time period.

Identified Risk: *Approximately 60% (6,759) of commuters travel from Okotoks to the City of Calgary for work, and 60% of all commuter's commute between the hours of 6:00 a.m. and 8:00 a.m., increasing the risk of MVCs along major routes, particularly during these times. Call volume by time of day (Section 11.2.1.2) reflects an increase in call volume during these times, as well as a moderate increase between 5 P.M. and 6 P.M. before declining, which may be indicative of commuters returning from the city.*

As all provincial highways are dangerous goods routes, traffic carrying a variety of dangerous goods is likely to pass through the town on a daily basis using the designated dangerous goods routes as specified by Bylaw 16-16. These major throughfare routes include:

- Northridge Drive (Highway 2A)
- Southridge Drive
- Highway 7
- 32nd Street

The bylaw specifies routes, times, and conditions for the transportation of goods through the town to promote public protection. Goods are not to be transported through the central business district between 6:00 a.m. and 9:00 p.m. other than with a permit. It should be noted that OFR also has jurisdictions outside of the town limits within their response zone.

In addition to roadway spills, although there is a low probability, a dangerous goods release from a vehicle into the Sheep River could impact the town's water supply, as the river is the town's drinking water source.

Identified Risk: *The town has an extensive dangerous goods bylaw to prevent major spills in central parts of town. Incidents can still occur on major routes however, including Highway 2A over Sheep River.*

3.2.2 Bridges and Culverts

Bridges must be considered when conducting a CRA, as they can create a physical barrier to a response and negatively impact response times. An apparatus may be restricted from crossing (i.e., load restrictions), or the roadway connectivity may be disrupted if a bridge is rendered out of service for maintenance/repairs. Further, incidents located on a bridge have an increased risk associated with spills, congestion, and accessibility. Incidents may also require high angle rescue which requires specialized skill and equipment.

The town is responsible for maintaining several bridges and culvert systems. Bridges of note in town are:

- CPR Train bridge at 32nd Street
- Laurie Boyd Pedestrian Walk Bridge at Library
- East (Former Highway 2A Bridge), Level Indicator on Bridge
- West (Former Highway 2A Bridge), Level Indicator on Bridge

- Hwy 549 East of S bend along Railway Tracks

At the time of this analysis, information regarding the estimated service life and current condition of these assets was not reported, and there were no notable large-scale projects scheduled for repairs and/or maintenance. There was also no indication of seasonal or non-seasonal weight load restrictions on any bridges within town limits. This may suggest these assets are currently in good condition and do not pose an immediate of foreseeable threat to response times.

> ***Key Finding:*** *There are currently no major projects scheduled for bridge and/or culvert repairs, or any types of restricted access.*

3.2.3 Rail

At-grade rail crossings (an intersection at which a road crosses a rail line at the same level) can create delays in emergency response by impeding access to a roadway. Also, the physical barrier created by the rail infrastructure itself, such as rail yards or the placement of rail infrastructure (e.g., tracks, grade separations, grade level crossings, etc.) within and throughout a town can impact emergency services travel times and overall emergency response times. In addition to the rail infrastructure, the frequency at which trains pass through a community and the goods they carry, poses varying degrees of risk due to derailment and potentially dangerous goods releases.

The Canadian Pacific Railway (CPR) bisects the town from the southeast to the mid-west quadrant of the town. The rail line passes through the centre of the town and follows along the north embankment of Sheep River. Desktop research indicates that there are six at grade crossings including one crossing Northridge Dr (Highway 2A) and one major crossing over the Sheep River.

> ***Identified Risk:*** *At grade level rail crossings have the potential to create a physical barrier to connectivity to the roadway network, causing delays in response time. There are six at-grade rail crossings throughout the town.*

These rail systems pose an inherent risk, as all rail systems do. The possibility of a derailment and release of dangerous goods is low, although it could have a major impact and would require a specialized response. Dangerous goods are frequently transported along these routes which pass near populated areas as well as over water. A spill into the Sheep River (or upstream into its tributaries) is of significant concern, considering it is the source of the community's drinking water. In order to contain the spill and protect the town's water supply and infrastructure, coordination with water services would be required and may involve shutting off the town's supply. The town's current water reserve is limited to a maximum supply of a few days. A significant spill may require shutting systems down for a longer period of time. There are currently plans to add raw water storage from the regional water system, which could help mitigate some risk, however this may not be operational for several years.

Identified Risk: *A dangerous goods spill into Sheep River could have an impact on the town's drinking water supply and infrastructure, as it is the town's drinking water source. A significant spill could require shutting off the water supply for several days, which may be longer than the town's reserve can support the community.*

Information sharing practices between the railway operators and emergency responders can provide insight into the types and frequencies of dangerous goods being shipped through the town.

Identified Risk: *There is a low probability, however, a high degree of risk to the public and the environment associated with a train derailment in the area; with or without a release of dangerous goods.*

3.2.4 Airport

Airports present unique hazards associated with the movement of people and goods and the possibility for incidents or accidents involving one or more aircraft, hazardous materials, and fuel load. The Transportation Safety Board of Canada reported in 2020 that air accidents have decreased by up to 32% over the last decade, and air incidents have decreased 47% below the average. Accidents and incidents do still occur unfortunately, despite continual efforts to improve air travel safety.

The Okotoks Air Ranch Airport is located within the northeastern town limits, in a residential neighbourhood. The airport is operational every day from 07:00 to 23:00 and has runway lighting on a timer set to daily sunrise and sunset. The airport is home to a range of businesses, a UAV training facility and helicopter maintenance facility, as well as a fueling station. There is also a large privately owned hangar which rents individual bays.

Between 2007 and 2019 there were nine incidents reported to the Transportation Safety Board of Canada involving aircraft form the Okotoks Air Ranch Airport, which resulted in three injuries and one fatality.

The Black Diamon/Cu Nim Airport is located outside the town's boundaries, however within the OFR response zone. There have been two reportable incidents at the airport, one in 2019 and one in 2018, resulting in one fatality.

Due to the proximity of the airport to the town, a plane could potentially crash within the town limits, and depending on the location, could result in mass casualties and the potential for OFR to respond for support.

Identified Risk: *Given the location of the Okotoks Regional Airport, within a residential area, there is a possibility of an air incident requiring a response from OFR and could directly or indirectly (reduced service levels) affect the town.*

3.3 Waterways

Waterways pose a natural hazard due to potential flooding, ice jams, erosion etc. Incidents of this nature can trigger the need for a rapid evacuation and/or a rescue response. Additionally, waterways that are frequently used for recreational activities require that responders have specialized technical rescue training and equipment. In some settings, waterways can also create a physical barrier for responses.

The Sheep River running through the town centre, creates a potential for water and ice rescue, and dangerous rescue conditions. The river is used for a variety of water activities such as boating, fishing, paddling swimming etc. There is also a shallow wading area within a family friendly campground adjacent to the river. These features all pose the possibility of injury and need for rescue. In areas further from the campground and close to (or on) the water, there is an added challenge, as some vehicles and apparatus may have difficulty or the inability to access the site of an incident directly.

> ***Identified Risk:*** *Areas around Sheep River are frequented by residents of the town and visitors for recreational activity that may pose the risk of injury and/or rescue. Some areas along the river are difficult or impossible to reach by apparatus.*

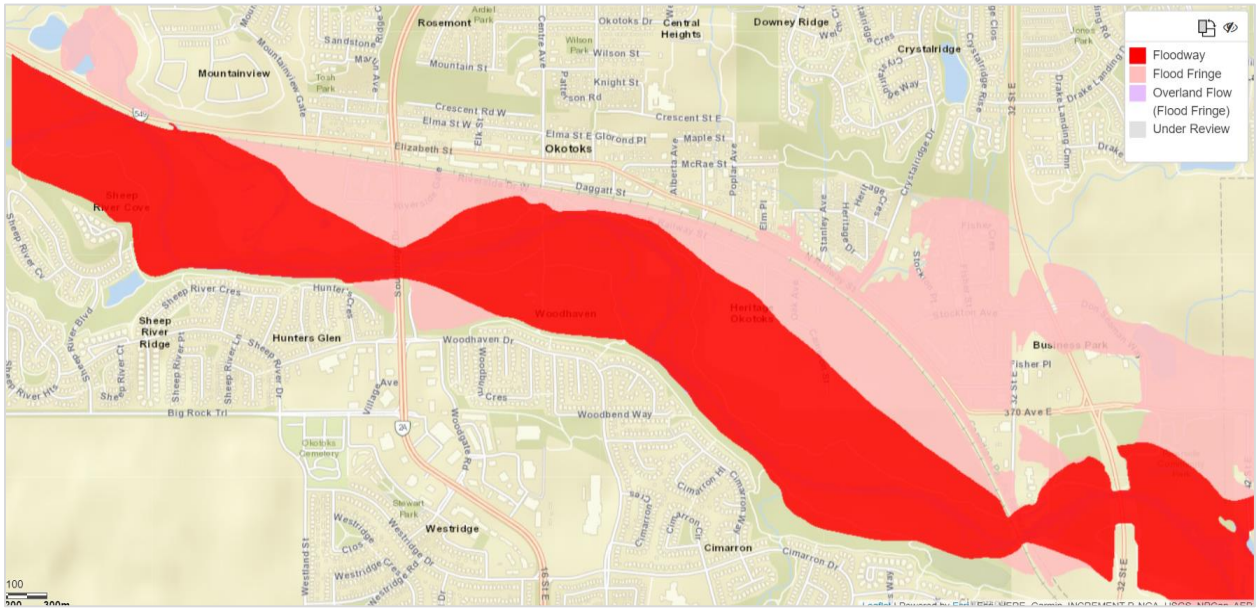
The location of Sheep River can also pose challenges to response times. There are only two river crossings bridging the north and south portion of the town. The inability to access one or the other could result in long detours.

> ***Identified Risk:*** *With only two crossings bridging the north and south portions of the town, Sheep River could pose a challenge to response times if either were unavailable.*

In addition to the recreational activity on and around the river, overland flooding is possible and has occurred in the past. In 2013, flooding along the river caused extensive damage to the recreational use area. Reports indicate that 15 residents of the area filed for compensation, however the location and extent of the damages of the residences was not made publicly available. During the 2013 flood, the south approach to the CP railway bridge was also washed out and one municipal well was destroyed. The town has had flood mitigation studies and projects completed since this time, as well as developed flood response plans, and identified sand-bagging areas, however increased activity, and development along the river as well as changing climate patterns continues to increase the risk.

The flood hazard map below provides an overview of the floodway (portion of the hazard area where flows are deepest, fasted and most destructive) and flood fringe (portion of the hazard area where flows are shallower and new development may be permitted in some cases) for the town.

Figure 3: Town of Okotoks Flood Hazard Map



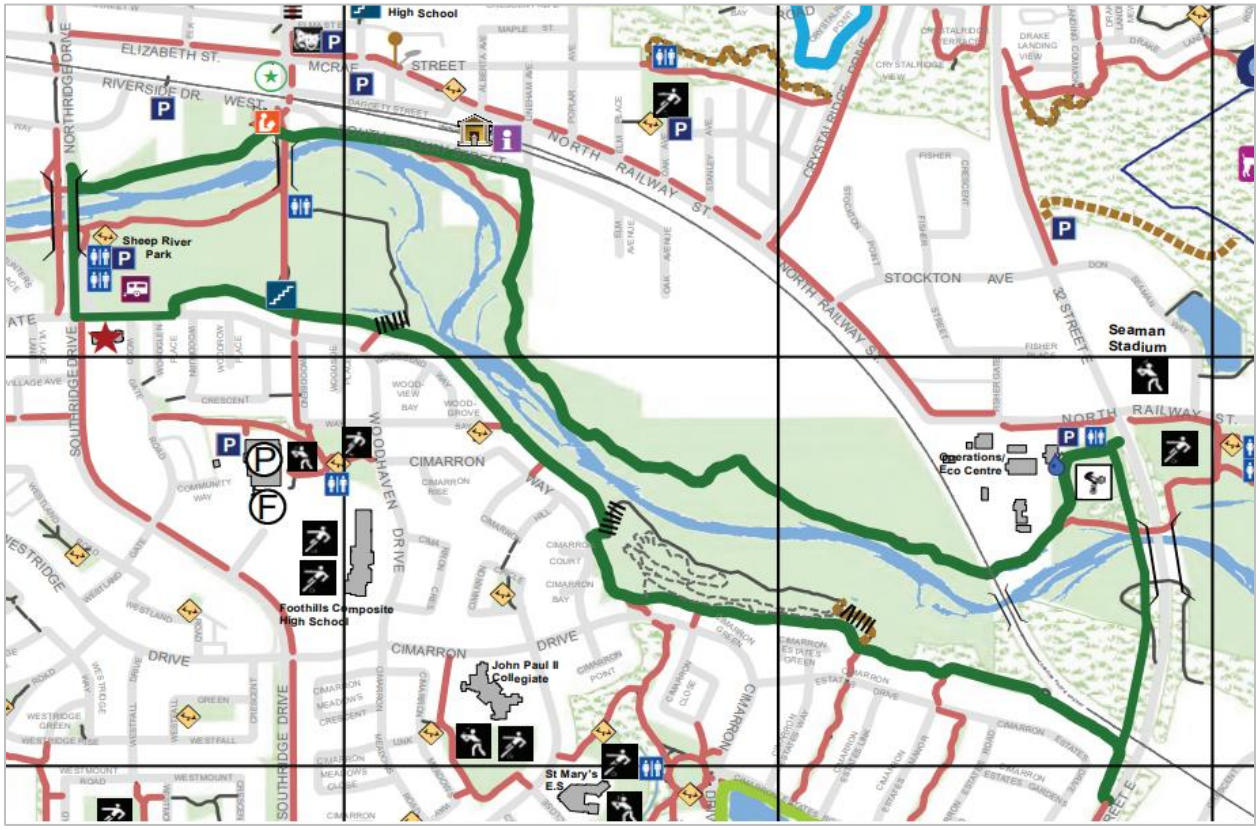
Identified Risk: *Despite flood mitigation efforts, portions of the town are in a flood hazard area, including popular, high density recreational and residential areas.*

3.4 Natural Recreation Areas

Conservation and outdoor recreation areas are taken into consideration when conducting a CRA, due to the activities that take place in this locale and certain geographical features that may be present in these areas. Conservation areas are frequently used for strenuous recreational activities such as hiking, biking, swimming, etc. and may have a varying degree of terrain such as steep embankments, dirt trails, rivers, and creeks etc. which poses the risk of a medical call.

The town has more than 179 ha of public parks and open spaces, as well as 329 ha of natural areas along the river and extensive network (94 km) of trails throughout the town. Of particular concern is the Sheep River Valley Trail, which is a 7.7 km loop which closely follows the riverbanks. This trail is used by residents and visitors of all ages for activities such as walking, running, and biking etc. These recreational areas along the river may in some cases be difficult to access by vehicle or apparatus.

Figure 4: Town of Okotoks Sheep River Trail (in green)



Identified Risk: *The town has an extensive network of trails frequented by visitors on a regular basis. Some portions of the trail are inaccessible or difficult to access by vehicle or apparatus, which could impede a rescue response.*

3.5 Wildland Urban Interface

NFPA 1730 identifies wildland-urban interface as geography-based risk for consideration. This interface refers to the area of transition between unoccupied land and human development. This transition area can be comprised of a mix of woodlots, bush, or grass. These open unoccupied areas can experience fuel buildup and pose a threat of ignition and wildfire in the spring/summer months. To date Alberta has experienced 916 wildfires (not including holdover and mutual aid fires), while the 5-year average is 1,107. When comparing five-year totals to date, 2023 has not experienced more wildfires than average, however when comparing the total area burned, the difference is significant. There is indication that these trends will continue to grow year after year, with hotter and drier climates, droughts, and increased development.

Given the agricultural areas surrounding the Town of Okotoks, paired with increasing development in natural spaces, it is expected that year over year the wildfire threat will increase. There have been noted instances in 2021 and 2023 where crews have had to respond to grassfires. It should be noted however, that the town proactively undertakes certain mitigation

practices. Where topography permits, a 3-meter-wide mowed strip is maintained between parcels with buildings and non-manicured public lands (parks and open space). This would not include the interface of privately owned agricultural land and urban development.

Figure 5: Five-Year Total Wildfires in Alberta (2018-2022)

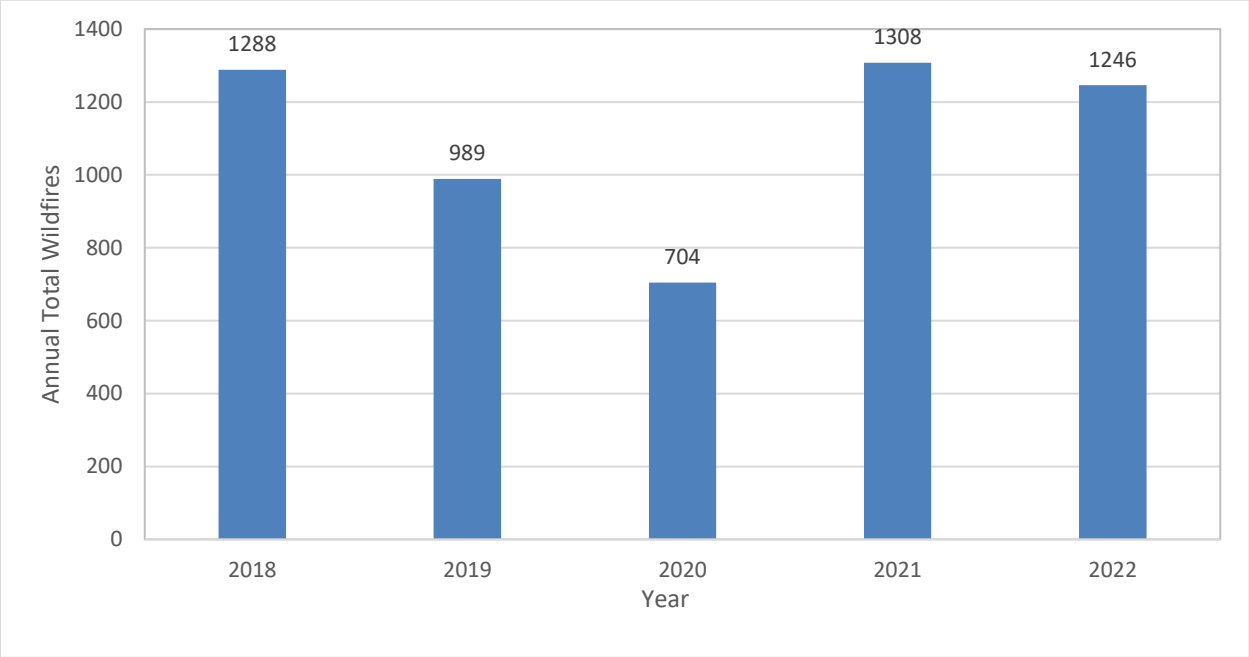
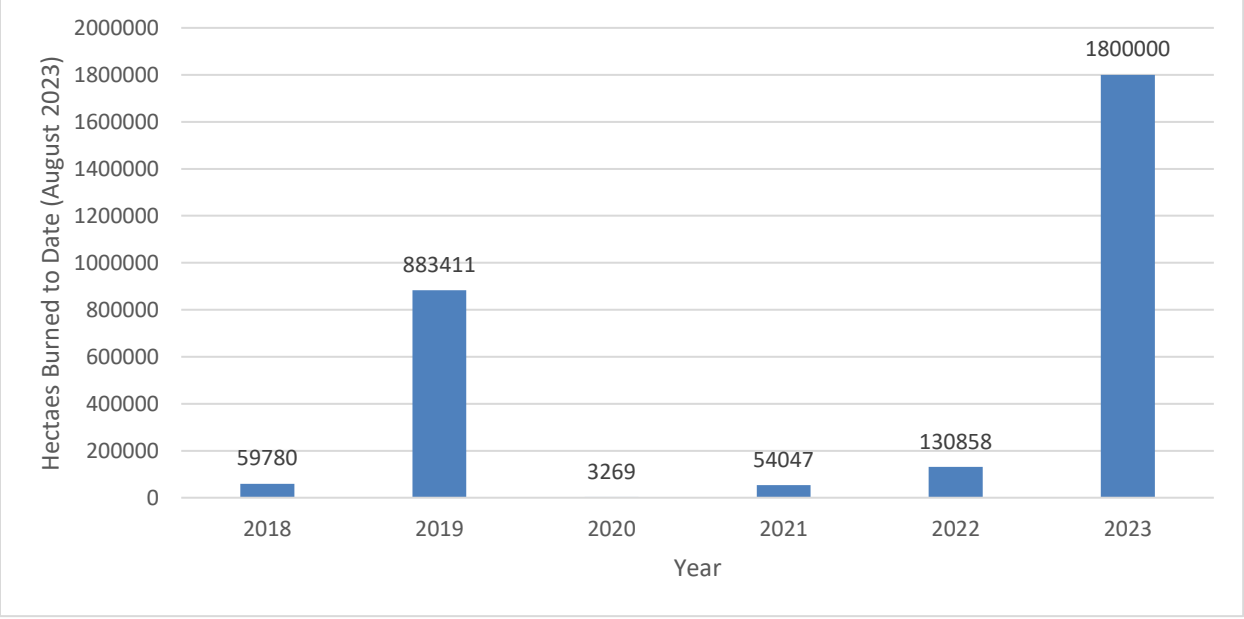


Figure 6: Five-Year Area Burned (ha) to Current Date Alberta (2018-August 2023)[4]



[4] *As Retrieved from Alberta Wildfire Status Dashboard (arcgis.com) (Accessed August 15, 2023)*

Identified Risk: *There is a considerable risk of a grass fire in areas of urban interface. The landscape surrounding the town is primarily agricultural, and increasing development in natural areas increases the threat of a wildfire impinging on the town. The town does however proactively take measures to protect parcels of land with buildings adjacent to non-manicured public lands such as parks and open spaces.*

SECTION 4
BUILDING STOCK PROFILE

4.1 National Building Code of Canada Occupancy Classifications

A building stock profile assessment includes an analysis of the types and uses of the building stock within the town and potential fire risks. There are fire risks associated with different types or uses of buildings given the occupancy type, presence or absence of fire safety systems and equipment, presence and storage of hazardous materials, time of construction and maintenance thereafter. This section considers these building characteristics within the town.

The National Building Code (NBC) of Canada - 2019 Alberta Edition categorizes buildings into six major building occupancy classifications (groups). Within each group the occupancies are further defined by division. The NBC major classification groups and divisions are presented in Table 1.

Table 1: NBC Major Occupancy Classifications

Group	Division	Description of Major Occupancies
A	1	Assembly occupancies intended for the production and viewing of the performing arts
A	2	Assembly occupancies not elsewhere classified in Group A
A	3	Assembly occupancies of the arena type
A	4	Assembly occupancies in which occupants are gathered in the open air
B	1	Detention occupancies
B	2	Care and treatment occupancies
B	3	Care occupancies
C	All divisions	Residential occupancies
D	All divisions	Business and personal services occupancies
E	All divisions	Mercantile occupancies
F	1	High-hazard industrial occupancies
F	2	Medium-hazard industrial occupancies
F	3	Low-hazard industrial occupancies

4.2 Fire Risk by Occupancy Classification

For the purposes of this fire-risk assessment, only major occupancy groups (A,B,C,D,E,F) will be used, rather than the more detailed sub-divisions (A1, A2, A3 etc.). This approach can simplify the assessment process based on the assumption that buildings within a major occupancy group share similar fire-related risks due to their common use, occupancy load, fuel load, compliance with building and fire codes and other characteristics. Table 2 below provides an overview of the major occupancy groups, their definitions, related fire risks and high-level risk reduction strategies.

Table 2: Fire Risk by Major National Building Code Classifications

NBC Occupancy Classification	NBC Major Building Classifications	Definitions	Fire Related Risks	Proactive Measures for Reducing Risk
Group A	Assembly Occupancies	An assembly occupancy is defined as one that is used by a gathering of persons for civic, political, travel, religious, social, educational, recreational or like purposes or for the consumption of food or drink.	Assembly buildings are often occupied by many people and may contain high quantities of combustible furnishings and decorations. Occupants are generally unfamiliar with the building's exit locations and may not know how to react in the event of an emergency. Low light conditions are inherent to some of these occupancies and can contribute to occupant confusion during an evacuation. Numerous examples exist of disastrous events that have occurred throughout the world, resulting in multiple fire fatalities in these occupancies. Therefore, these facilities require special attention. Accordingly, it is paramount to ensure that maximum occupant load limits are not exceeded, detection is available, an approved fire safety plan is in place and adequate unobstructed exits/means of egress are readily available.	• Regular fire prevention inspection cycles • Automatic fire detection and monitoring systems • Approved fire safety plan and staff training • Pre-planning by fire suppression staff

NBC Occupancy Classification	NBC Major Building Classifications	Definitions	Fire Related Risks	Proactive Measures for Reducing Risk
Group B	Care or Detention Occupancies	A care or detention occupancy means the occupancy or use of a building or part thereof by persons who: • Are dependent on others to release security devices to permit egress. • Receive special care and treatment; or, • Receive supervisory care.	In addition to the presence of vulnerable occupants, these occupancies may contain quantities of various flammable/combustible liquids and gases, oxidizers and combustible furnishings that will impact the intensity of the fire if one should occur. The evacuation or relocation of patients, residents, or inmates to an area of refuge during an emergency poses additional challenges in these facilities. It is essential to ensure that properly trained staff is available and prepared to quickly respond according to the facility's approved fire safety plan.	• Regular fire prevention inspection cycles • Automatic fire detection and monitoring systems • Approved Fire Safety Plan and staff training • Pre-planning by fire suppression staff
Group C	Residential Occupancies	A residential occupancy is defined as one that is used by persons for whom sleeping accommodation is provided but who are not harboured or detained to receive medical care or treatment or are not involuntarily detained.	In Canada between 2017 and 2021, residential fires accounted for 94% of all fire deaths[5]. Residential units that are in multi-unit buildings, including secondary units in a house, pose additional risks due to egress and firefighting accessibility challenges.	• Home smoke alarm programs • Public education programming including home escape planning • Retro-fit and compliance inspection cycles for compliance • Pre-planning by fire suppression staff • Fire Drills as required the Fire Commissioner

[5] *As retrieved from: Add/Remove data - Fire-related deaths and persons injured, by type of structure (statcan.gc.ca)*

NBC Occupancy Classification	NBC Major Building Classifications	Definitions	Fire Related Risks	Proactive Measures for Reducing Risk
Group D	Business & Personal Services	A business and personal services occupancy is defined as one that is used for the transaction of business or the rendering or receiving of professional or personal services.	Many office buildings are occupied by many people during business hours and contain high combustible content in the form of furnishings, paper, books, computers, and other office equipment/supplies. Those that are in a high-rise building pose additional risks due to egress and firefighting challenges.	• Regular fire prevention inspection cycles to maintain NFC compliance • Targeted fire prevention inspections for Fire Commissioner retrofit compliance • Staff training in fire prevention and evacuation procedures • Public education programs • Pre-planning by fire suppression staff
Group E	Mercantile	A mercantile occupancy is defined as one that is used for the displaying or selling of retail goods, wares, or merchandise.	Larger mercantile occupancies such as department stores are generally occupied by many people and contain high quantities of combustibles in the form of merchandise, furnishings, and decorations. Customers may be unfamiliar with the building's exit locations and not know how to react in the event of an emergency. Additional hazards will be present in "big box" type stores that sell and store large volumes of combustible materials in bulk. These stores generally have similar properties to industrial warehouses with the additional hazard of higher number of occupants.	• Regular fire prevention inspection cycles • Automatic fire detection and monitoring systems • Approved Fire Safety Plan and staff training • Pre-planning by fire suppression staff

NBC Occupancy Classification	NBC Major Building Classifications	Definitions	Fire Related Risks	Proactive Measures for Reducing Risk
Group F	High/Medium/Low Hazard Industrial	An industrial occupancy is defined as one for the assembling, fabricating, manufacturing, processing, repairing, or storing of goods and materials. This category is divided into the following sub-categories based on its combustible content and the potential for rapid fire growth: • low hazard (F3) • medium hazard (F2) • high hazard (F1)	These occupancies constitute a special fire hazard due to high levels of combustible, flammable or explosive content and the possible presence of oxidizing chemicals and gases. Processing and other activities that involve various ignition sources often occur in these occupancies. The lack of security during non-operational hours also makes them susceptible to incendiary type fires. Industrial fires generally involve large quantities of combustible materials and potentially result in large financial losses (e.g., building, contents) and significant damage to the community's environment and economic well-being (e.g., loss of jobs).	• Regular fire prevention inspection cycles • Staff training in fire prevention and evacuation. • Public education • Pre-planning by fire suppression staff • Installation of early detection systems (e.g., fire alarm systems, heat detectors) • Installation of automatic sprinkler systems • Approved Fire Safety Plans • Fire extinguisher training

4.2.1 Existing Major Building Classification Summary

Analysis of the town's major building occupancy types was conducted using data provided by the town and the 2021 census. Table 3 summarizes the town's existing major building occupancy classifications. Note there may be other occupancies in the town not classified under the NBC or outside the jurisdiction of the NBC.

The majority of the town's existing property stock is comprised of Group C - Residential Occupancies (95.92%), with 73.73% being single-detached homes. It should be noted as in Section 11.1.2, 84.34% of residential fires in the town occurred in single-detached homes. The second largest occupancy type within the town is Groups D and E Commercial 2.62% of the town's property stock (300).

Table 3: Towns of Okotoks Total Existing Property Stock[6]

NBC Occupancy Classification	Major Building Classifications	Number of Occupancies	Percentage of Occupancies
Group A	Assembly Occupancies	26	0.23%
Group B	Care or Detention Occupancies	1	0.01%
Group C	Residential Occupancies - Total	10,986	95.92%
Group C	Single Family	8,444	73.73%
Group C	Multi-unit Residential*	2,220	19.38%
Group C	Hotel / Motel	2	0.02%
Group C	Mobile Homes / Trailers	102	0.89%
Groups D & E	Commercial	300	2.62%
Group F (all Divisions combined)	Industrial Occupancies	138	1.20%
	Total	11,453	100.00%
** As per 2021 Census*			

Consistent with most other municipalities in Canada, Group C - Residential Occupancies represent the most prominent type of building occupancy type within the town. Between seven jurisdictions across Canada that provided data to the National Fire Information Database, structural fires occur at a rate of 7 in 10 and account for the largest number of fires and those most likely to cause an injury or fatality. In 2021, three out of four fire-related deaths occurred in residences at a rate of 1%.

Identified Risk: *As with most jurisdictions, residential buildings account for the majority of the stock in Town of Okotoks and are the most common building involved in structural fires and attribute to the most fatalities and injuries.*

[6] *Town of Okotoks 2022 Municipal Assessment*

4.3 Building Density and Exposure

NFPA 1730 - Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations (2019 Edition) lists building density as a key factor for understanding potential fire risk with particular consideration given to core areas (downtown). Closely spaced buildings, typical of historic downtown core areas and newer infill construction, may have a higher risk of a fire spreading to an adjacent exposed building. In a built-up area with minimal building setbacks, a fire originating in one building could extend to a neighbouring structure due to the proximity. The proximity of buildings can also impede firefighting operations due to the limited access for firefighters and equipment.

The 2022 Municipal Development Plan forecasts the town's population to be 44,000 by 2041 and 75,000 by 2076, which will require a significant amount of development to support. The town is committed to balance growth while conserving environmentally sensitive and valuable areas, therefore growth will be focused on creating areas of medium density mixed-use urban nodes. New growth areas must demonstrate an increase from 8 units per acre to 12 units per acre to create more sustainable and compact neighbourhoods. This pattern of development will be in contrast to the types and rates of development the town has previously seen when comparing the growth in housing types between 2016 – 2021. As displayed below, to date, the housing increase has largely been attributed to single detached homes.

Table 4: Household and Dwelling Characteristics Town of Okotoks (2016 – 2021)

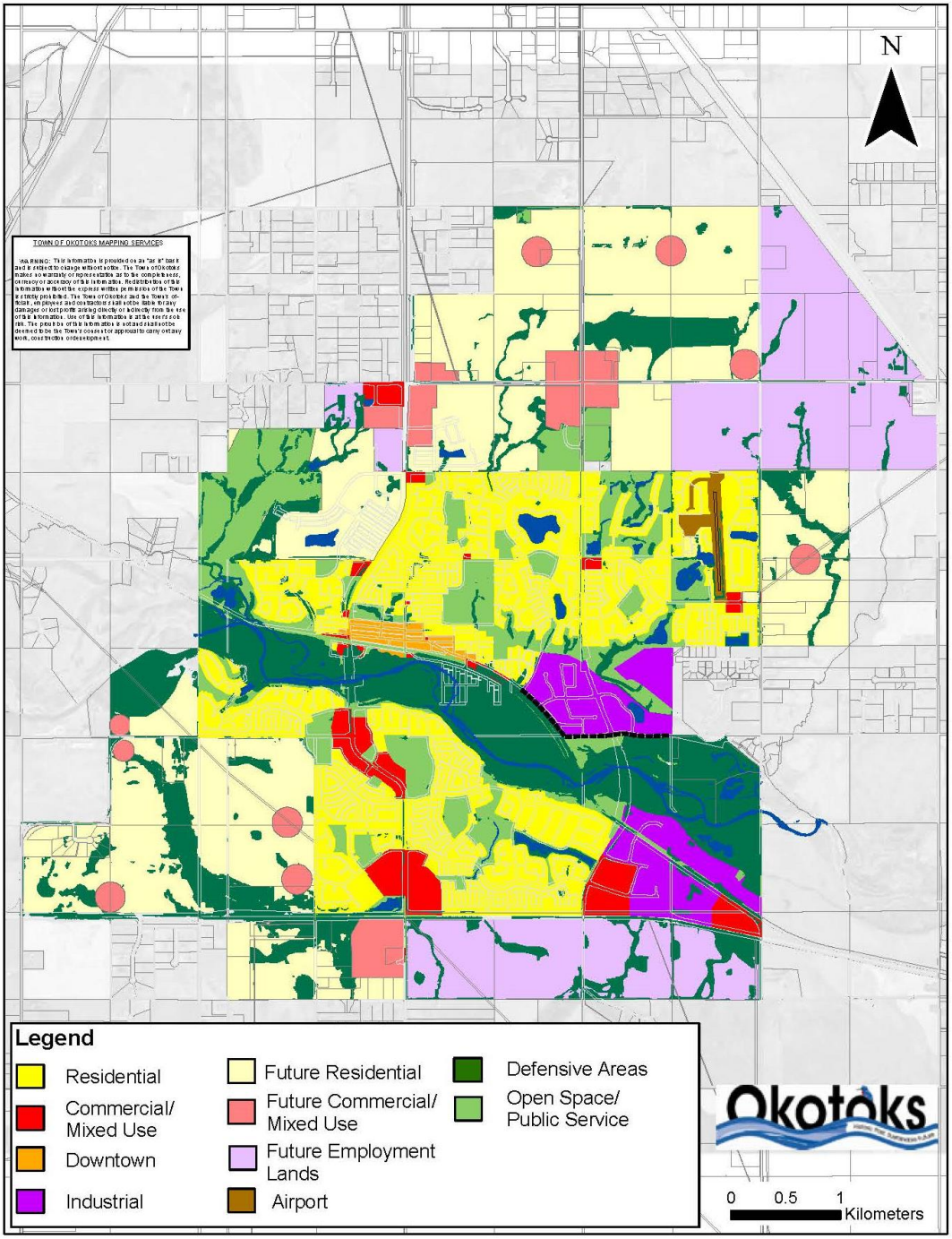
Housing Type	Number of Dwellings 2016	Number of Dwellings 2021
Single-detached home	7,455	8,135
Apartment in a building with 5 or more storeys	5	0
Semi-detached house	470	515
Row house	630	645
Apartment or flat in duplex	115	110
Apartment in a building that has fewer than five storeys	950	950
Other single-attached house	5	0
Movable dwelling	35	110

Identified Risk: *In order to meet the projected housing demands associated with population growth in the town, new developments will primarily be of medium density housing, therefore increasing the fire-risk potential in these areas.*

The figure below outlines the projected future land use areas. The areas represented as 'Future Residential' can be expected to be areas of medium-density residential dwellings and mixed

urban use areas. These residential areas pose a greater fire risk than the town's current lower density residential areas.

Figure 7: Town of Okotoks Future Land Use Concept



Identified Risk: *Extensive residential and mixed-use development in the southeast and northern portion of the town could increase fire risk and service demands in these areas.*

4.4 Building Age and Construction

The Alberta Building Code (now the National Building Code) was adopted in 1974, and the Alberta Fire Code (now the National Fire Code) was adopted in 1984. Together, these two codes have provided the foundation for eliminating many of the inconsistencies in building construction and maintenance that were present before adoption.

The codes were developed to ensure that uniform building construction and maintenance standards are applied for all new building construction. The codes also provide for specific fire and life safety measures depending on the use of the building.

Examples of the fire and life safety issues that are addressed include:

- Occupancy
- Exits/means of egress including signs and lighting
- Fire alarm and detection equipment
- Fire service access
- Inspection, testing, and maintenance

In many situations the age and construction of a building can be directly associated with whether the building was constructed prior to, or after the introduction of these codes. For example, during the late 19th century and early 20th century, balloon frame construction was a common wood framing technique that was used in both residential and small commercial construction.

This technique allowed for exterior walls to be continuous from the main floor to the roof, in some cases extending multiple stories through a building. The result was the potential for fire and smoke to spread unobstructed from the basement to the roof of a building. In many cases, the result was a fire that started in the basement spreading to the roof very quickly and without the knowledge of building occupants or fire service personnel. The Alberta Building Code implemented requirements to change this construction method and introduce additional requirements to mitigate the potential of fire spread through wall cavities.

Similarly, the new codes have recognized new construction techniques such as light weight wood frame construction. This includes the use of wood trusses to replace conventional wood frame roofing techniques and new construction materials including laminated veneer lumber that is a high strength engineered wood product now used commonly in residential and commercial buildings. Although these techniques and materials have enhanced the efficiency and cost of construction, this construction presents very different challenges to firefighters from those of historical construction methods. For example, the lightweight wood frame construction used in an engineered wood truss roof system relies on all of the structural components to work together. In the event one of the components fails due to exposure to high heat or fire, the result is the potential for the entire roof system to fail. Lightweight construction is discussed further in Section 3.4.1 below.

In addition to building construction, fire growth rate depends on the flammability of the materials and contents within the building which introduces variances into the growth rates presented

above. The impact of increasing fire growth rates is directly related to the time lapse from ignition to flashover when the combustible items within a given space reach a temperature that is sufficiently high for them to auto-ignite.

Listed in Table 5 are fire growth rates measured by the time it takes for a fire to reach a one-megawatt (MW) fire. Fire growth rate depends on the flammability of the materials and contents within the building which introduces variances into the growth rates presented below.

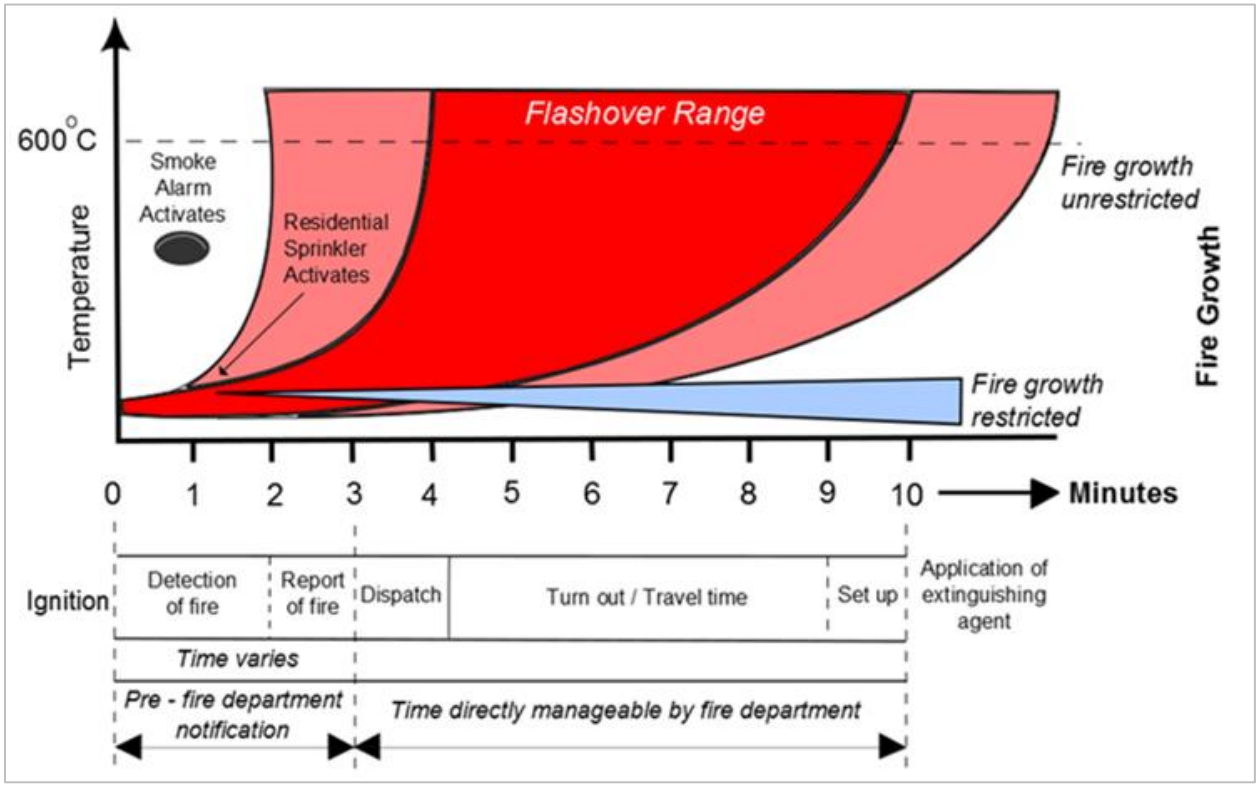
Table 5: Time to Reach 1 MW Fire Growth Rates in the Absence of Fire Suppression[7]

Fire Growth Rate	Time in Seconds (Minutes) to Reach 1 MW	Time in Seconds (Minutes) to Reach 2 MW
Slow	600 seconds (10 minutes)	848 seconds (14.13 minutes)
Medium	300 seconds (5 minutes)	424 seconds (7.07 minutes)
Fast	150 seconds (2.5 minutes)	212 seconds (3.53 minutes)

In addition to building construction, fire growth rate depends on the flammability of the materials and contents within the building which introduces variances into the growth rates presented above. The impact of increasing fire growth rates is directly related to the time lapse from ignition to flashover when the combustible items within a given space reach a temperature that is sufficiently high for them to auto-ignite. The graph in Figure 8 (below) highlights the exponential increase in fire temperature and the potential for loss of property/loss of life with the progression of time.

[7] *Office of the Fire Marshal and Emergency Management. (2017, May). Operational Planning: An Official Guide to Matching Resource Deployment and Risk Workbook.*

Figure 8: Fire Propagation Curve



Source: Fire Underwriters Survey "Alternative Water Supplies for Public Fire Protection: An informative Reference Guide for Use in Fire Insurance Grading" (May 2009) and NFPA "Fire Protection Handbook" (2001)

Understanding building construction and building materials is a critical component for firefighters in determining the appropriate type of fire attack and safety measures that need to be in place. As such, having knowledge of the age of a building may be directly related to the type of construction methods and materials used to build it, making building age and construction an essential component of this Community Risk Assessment.

Table 6 summarizes the age of the building stock within the town prior to the introduction of the Alberta building and fire codes. This analysis indicates that more than 11.17% of the town's building stock was built prior to 1984, preceding the adoption of the 1984 fire code. This a significant fire risk within the community, although it is a much lower percentage when compared to the province (more than 36.59%).

Table 6: Period of Construction of all Dwellings – Okotoks – 2021 Census, Statistics Canada [8]

Period of Construction	Okotoks Total Number of Dwellings	Okotoks Total Percentage of Dwellings	Alberta Total Number of Dwellings	Alberta Total Percentage of Dwellings
Prior to 1960	235	2.24%	168,925	10.34%
1961-1980	935	8.93%	428,655	26.25%
1981-1990	920	8.78%	188,550	11.54%
Total*	10,475	100.00%	1,633,220	100.00%
**Total occupied private dwellings 25% sample data*				

Identified Risk: *Data provided by the 2021 census indicates that more than 11.17% of the town's residential building stock was built prior to the introduction of the 1984 fire code and at least 2.24% of the building stock was built prior to the introduction of the building code.*

Identified Risk: *The number of new homes being built with lightweight construction poses a risk to firefighter safety and can hinder the ability for occupants safely evacuate in a timely manner.*

4.5 Building Height and Area

One of the unique characteristics and risks of tall/multi-storey buildings is known as the "stack effect". This is characterized as vertical air movement occurring throughout the building, caused by air flowing into and out of the building, typically through open doors and windows. The resulting buoyancy caused by the differences between the indoor/outdoor temperature and elevation differences causes smoke and heat to rise within the building.

This can have a dramatic effect on smoke permeation throughout the common areas and individual units within the building. This can be directly related to the high percentage of deaths that occur in high-rise buildings because of smoke inhalation. The nature of taller buildings also brings the presence of higher occupant loads and higher fuel loads due to the quantity of furnishings and building materials.

Efficient evacuation can also be a challenging process due to a lack of direction, signage, knowledge, or familiarity of the occupants which may result in overcrowding of stairways and exit routes.

Ensuring all required fire and life safety systems are in place and functioning is a priority for these occupancies. Taller buildings can experience extended rescue / fire suppression response times

8 Statistics Canada. 2023. (table). Census Profile. 2021 Census of Population. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released March 29, 2023. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (accessed June 14, 2023).

for firefighters to ascend to the upper levels. This is commonly referred to as "vertical response" representing the time it takes for firefighters to gain entry into the building and ascent to the upper floors by the stairwells. Options such as "shelter-in-place" whereby occupants are directed by the fire service to stay within their units can be an effective life safety strategy. However, ensuring internal building communications systems are in place and functioning is critical to the success of this strategy. Targeted public education campaigns addressing strategies like shelter-in-place are also critical to educating building occupants.

It is important to note that there are a variety of meanings associated with the terms "high rise", "tall buildings" and "high buildings." For the purposes of developing this CRA, the NBC/NFC definition has been used to analyze building height within the town which defines high-rise as 18 metres above grade, or six storeys.

The following fire safety features of high buildings are required by the NBC for new buildings, and the NFC once they are occupied:

- Building services (ventilation, firefighter elevators, water supply, etc.)
- Non-combustible construction (concrete and steel)
- Interior finishes (drywall, block, concrete slab)
- Fire detection and notification of occupants (pull stations, heat detectors, fire detectors, alarm system)
- Compartmentation (containment of fire and smoke spread, fire doors, fire shutters, self-closing mechanisms on doors, etc.)
- Means of egress (stairwells constructed with non-combustibles)
- Fire protection system (automatic sprinklers, standpipes and hose cabinets, fire pumps, fire extinguishers, etc.)

These fire safety features serve to keep the public and firefighters safe.

Building areas can cause comparable challenges to those present in taller buildings. Horizontal travel distances rather than vertical can mean extended response times by firefighters attempting rescue or fire suppression activities. Large buildings, such as industrial plants and warehouses, department stores, and big box stores, can also contain large volumes of combustible materials. In many of these occupancies the use of high rack storage is also present. Fires within this type of storage system can be difficult to access and may cause additional risk to firefighter safety, due to collapse-related risks.

There are currently no buildings in the town over four storeys, however there are plans for a six-storey construction consisting of 161 residential units in the newly proposed Tillotson neighbourhood, to be developed in the southwestern edge of the town. As housing demands increase, it can be expected that there may be the potential for additional proposed multi-storey residential developments.

Identified Risk: *There are no buildings over four storeys in the town, however there are plans to develop a 6-storey residential building in a newly proposed neighbourhood in the southwestern portion of the town.*

4.6 Potential High-Fire Risk Occupancies

Potential high-fire risk occupancy is another factor for consideration within a town's building stock. High fire risk can be linked to a combination of factors such as building density (exposures), building age, and construction. Fuel load typically refers to the amount and nature of combustible content and materials within a building. This can include combustible contents, interior finishes as well as structural materials. Combustible content tends to create the greatest potential fire loss risk. Higher fuel loads results in increased fire loss risk due to increased opportunity for ignition and increased fire severity. In many communities, large amounts of fuel load can be contained within a single occupancy, such as a building supply business, within a large multi-unit residential building, or within a historic downtown core. This section of the CRA will focus primarily on fuel load for industrial occupancies.

4.6.1 Fuel Load Concerns

Buildings with potential fuel load include buildings housing materials such as oxidizers and flammable and combustible liquids and chemicals. These businesses are of interest to fire services as they may store and/or use products and goods that may pose a hazard to the public or responders during an emergency event. In addition to ensuring compliance to the requirements of the NBC and the NFC, there are operational strategies that a fire service can implement to address fuel load concerns. These include regular fire inspection cycles and pre-planning of buildings of this nature to provide an operational advantage in the event of fire.

Okotoks has a medium sized workforce in the manufacturing sector, with strength in food, wood products and chemical manufacturing[9]. A list of major manufacturers in the town with a potential for high-fire risk fuel loads are listed below.

Table 7: Potential High-Fire Risk Occupancies

Business Name	Function	Address
Altrek Industries	Non-metallic fibreglass	138 Fisher Street
Rolco Rollshutters	Metal fabrication	137 Fisher Street
Sibro Technologies	Fabricated metal	62 Fisher Place Bay
Western Tank and Lining	Fabricated metal	105 Stockton Pt
Alberta Stairworks	Wood products	104 Fisher Street

[9] *As retrieved from: MANUFACTURING_SectorProfile_proof.pdf (okotoks.ca)*

Identified Risk: *There are several properties within the town that have a potentially high fuel load and therefore an increased fire risk.*

4.7 Occupancies with Potential High-Fire Safety Risk

Fire risk does not affect all people equally. Those who are at an increased risk of fire injury or fatality are known as vulnerable individuals. In the event of a fire, these individuals may be unable to self-evacuate and/or require assistance in their evacuation efforts. Identifying the location and number of vulnerable individuals or occupancies within the community provides insight into the magnitude of this demographic within a community.

4.7.1 Vulnerable Occupancies

From an occupancy perspective, vulnerable occupancies contain vulnerable individuals who may require assistance to evacuate in the event of an emergency due to cognitive or physical limitations, representing a potential high-life safety risk.

These occupancies house individuals such as seniors or people requiring specialized care and include hospitals, certain group homes and seniors' residences and long-term care facilities. It is important to note, however, that not all vulnerable individuals live in vulnerable occupancies; for example, some seniors who are vulnerable due to physical limitation can live on their own or in subsidized housing, making them a key demographic to reach.

A list of vulnerable occupancies is presented in Table 8. Although it is presumed these buildings are being inspected and are sprinklered, no data was provided for this analysis.

Table 8: Vulnerable Occupancies

Property Name	Occupancy Type	Location
Sandstone Lodge	Senior Supportive Care	101 Centre Court
Sheep River House	Seniors Residence	21 Elma Street
Rivera the Heartland	Seniors Residence	47 Riverside Gate
Tudor Manor	Senior Supportive Care	200 Sandstone Drive

Identified Risk: *There are four assisted living/senior residences in the town, although typically these buildings are inspected and sprinklered.*

4.7.2 Other High-Fire Life Safety Risk Occupancies

From the perspective of risk, it can be valuable for a fire service to identify additional potential high fire life-safety risk considerations. This includes day care facilities and schools. Children, due to age and potential cognitive or physical limitations may prevent or delay self-evacuation in the event of an emergency. For the purposes of this CRA, potential high life-safety risk occupancy considerations include schools and licensed day care facilities. Desktop

research identified that there are 17 schools (including kindergarten and preschools) in the town three registered childcare facilities.

It would be beneficial for OFR to conduct pre-planning activities for all occupancies with vulnerable occupants. Pre-planning activities increase fire service personnel familiarity with buildings of special interest. A fire service can help reduce the risk faced by vulnerable individuals or vulnerable occupancies by performing regularly scheduled fire safety inspections; approving and witnessing fire drill scenarios; providing public education on fire safety issues; conducting pre-planning exercises to increase fire service personnel's familiarity with the facility; reviewing fire safety plans for accuracy and encouraging facility owners to update facilities as needed; providing staff training; and encouraging fire drills.

Table 9: Schools and Registered Childcare Facilities

School/Childcare Facility	Occupancy Type	Address
Ecole Good Shepherd School	K-6	1 McRae Street
St. Mary's School	K-6	42 Cimarron Trail
Holy Trinity Academy	10-12	338072-32nd Street E, RR2
St. John Paul II Collegiate	7-9	53 Cimarron Drive
Ecole Beausoleil	K-12	71 Okotoks Drive
Dr. Morris Gibson	K-6	147 Crystalridge Drive
Meadow Ridge School	K-9	21 Chinook Arch Way
Big Rock School	K-6	33 Hunters Gate
Ecole Percy Pegler	K-6	69 Okotoks Drive
Westmount School	K-9	240 Westland Street
Ecole Secondarie Foothills Composite	High School	229 Woodhaven Drive
Ecole Okotoks Junior High	Junior High	1 Pacific Ave
Good Shepherd Kindergarten	K	52 Robinson Drive
Leap n' Learn Preschool	Preschool	103-235 Milligan Drive
Les Petits Rayons de Beausoleil	Preschool	1100 village Lane
Okotoks Preschool Academy	Preschool	14 Crystal Ridge Drive
Serendipity Pre-Kindergarten	Preschool	106 Elma Street
BrightPath	Childcare Facility	49 McRae Street
Okotoks Before & After School Centre	Childcare Facility	65 Robinson Drive
Kids & Company	Childcare Facility	239 Westland Street

Identified Risk: *In addition to registered vulnerable occupancies the town has 17 schools (including preschools and kindergarten schools) and three licensed childcare facilities that represent higher fire life-safety risks.*

4.8 Historic or Culturally Significant Buildings

An understanding of the location of historic or culturally significant buildings or facilities is an important consideration within the building stock profile of a CRA. Such buildings or facilities may be keystone features to the community that provide a sense of heritage, place, and pride and act to other buildings, and importance to the community. Regular fire inspection as tourism destinations could result in an economic impact. Historic areas can present a high fire risk due to age, the materials used to construct the buildings, exposure cycles and strategies to enforce continued compliance with the NFC are considered as best practices to achieving the legislative responsibilities of the municipality and providing an effective fire protection program to address fuel load risks.

The Town of Okotoks is rich in history and is home to many heritage buildings whose construction dates back from late 1800s to early 1900s (see the table below). Pre-fire planning activities increase fire service personnel's familiarity with buildings of special interest. A fire service can help reduce the risk of fire within heritage properties through regularly scheduled fire safety inspections, enforcement of the NFC, regular review of fire safety plans for accuracy and encouraging facility owners to upgrade facilities as needed (note: private residences were omitted from the table below).

Table 10: Historical Buildings

Business/Building Name	Function	Address
House of Proust Antiques	Antique Store	2 Clark Ave
Bistro 1882	Restaurant	52 North Railway Street
CIR Real Estate Office	Real Estate Office	1300 Village Lane
Elks Hall	Community Hall	58 Elizabeth Street
Heartland Café	Restaurant	46 McRae Street
Masonic Hall	Community Hall	13 Elma Street W
Offices (Stockton Block)	Town Office Building	14 McRae Street E
Okotoks Art Gallery	Art Gallery	53 N Railway Street
Okotoks Museum and Archives	Museum	49 N Railway Street
Okotoks United Church	Church	3 Elma Street
On-Tap Oil & Vinegar	Retail Store	22 McRae Street
Rotary Performing Arts Centre	Theater	3 Elma Street E
Rumpled Quilt Skins	Retail Store	64 N Railway Street
The Royal Duke	Hotel and Restaurant	2 Elizabeth Street
TRM Office	Office and Apartments	50 McRae Street

Key Finding: *There are 15 identified heritage buildings (not including private residences) within the town.*

SECTION 5
CRITICAL INFRASTRUCTURE PROFILE

5.1 Critical Infrastructure

Critical infrastructure within the town includes the facilities and services required to meet essential needs, sustain the local economy, ensure public safety and security, and maintain continuity in government.

Public Safety Canada identifies ten categories of critical infrastructure: energy and utilities, information and communications technology, finance, health, food, water, transportation, public safety, government, and manufacturing.[10]. The interconnectedness of these critical infrastructures further increases the risk. Infrastructure is a complex system of interconnected elements whereby failure of one could lead to the failure of others. The vulnerability of infrastructure is often connected to the degree to which one infrastructure component depends upon another. Therefore, it is critical that these elements be viewed in relation to one another and not in isolation.

For the purposes of this CRA, critical infrastructure of similar types was grouped into the categories listed above. General considerations and concerns related to each critical infrastructure as it pertains to the provision of fire protection services for the town are included in Table 11 below.

[10] *As retrieved from National Cross Sector Forum 2018-2020 Action Plan for Critical Infrastructure (publicsafety.gc.ca)*

Table 11: Critical Infrastructure Overview

Identified Critical Infrastructure	Critical Infrastructure Sector	Issues / Concerns
Energy and Utilities	Electricity Transmission and Distribution	• Downed power lines cause safety concern for firefighters responding • Lack of heat/cooling resulting in increased assistance calls • Rescue operations may be required for individuals improperly running generators • Fires can be sparked by downed lines and transformers • High voltage electrical hazards present with fires at electrical substation • Chemical hazards possible with presence of cooling agents for electrical conductors
Information and Communications Technology	Radio Communications	• Loss of radio communications results in significant challenges for fire service operations such as inability to communicate with crew and with first responders • Lack of uninterrupted power supply to radio systems and computers results in disruption of communications
	Cellular towers and phone lines (911 dispatch)	• Damage to telephone lines and towers results in lack of means of notifying first responders • Downed communication lines result in inability to complete transactions (fuel, necessities, supplies etc.) • Calls not dispatched or not dispatched on • Residents cannot call for assistance
Finance	Banking Institutions	• A disruption to this sector may result in the inability to make transactions for things such as fuel and supplies, maintenance, utilities etc. • May create inability to pay workers • May result in compromised data and funds in reserves and allocated for payroll, purchasing, utility payment etc.

Identified Critical Infrastructure	Critical Infrastructure Sector	Issues / Concerns
Health	Assisted Living	• Disruptions large number of people with mobility issues • Potential communication issues • Need for specialized medical equipment • Okotoks has four assisted living residence for seniors
	Outbreak/Illness	• A major outbreak or illness can create unexpected shortages in the workforce • Reduced staffing can result in inability to run an apparatus in a certain part of the town, as well as affect ambulance and police services for widespread illnesses • Illnesses and outbreaks can also increase medical calls in the region and have an increased cost in replenishing medical PPE • COVID-19 experienced in 2020
	Health Centres	• Okotoks has one Health and Wellness Centre • A long-term disruption to this centre may result in increased calls for emergency transportation to facilities outside of the town • Public services offered by the centre support vulnerable population, Long-term disruption may lead to increase in medical and public assistance calls • Next closest hospital in Calgary (15 minutes)
Food	Food Supply and Demand	• Food insecurity increases the number vulnerable population, which can in-turn increase the number of public assistance and medical calls
Water	Water Distribution and Reservoirs	• Water supply is essential for firefighting and is accessible through hydrant system • Damage to infrastructure could impede firefighting • Droughts and low water levels could impede firefighting

Identified Critical Infrastructure	Critical Infrastructure Sector	Issues / Concerns
Water	Sanitary and Sewer Network	• Overflows or malfunctions can create water system contamination, floods, or reduced water system capacity for firefighting purposes • Contaminated water system creates serious health hazards and operational issues for the town
Transportation	Roadways	• Poor road conditions due to snow, ice, heavy rain create increased calls for assistance, as well as a hazard for responders • Damaged/impassable roads create a risk of damage to apparatus as well as increased calls for service where access may be difficult
Public Safety	Fire and Emergency Services	• There are two fire stations located in the town. There is an RCMP detachment in the town. • A large-scale emergency or frequent events affecting either the region, could result in shortages of responders across the area.
	Incident Command Post	• Widespread power loss and poor weather, or large-scale emergency may impede access to Incident Command Posts delaying major emergency response actions and communication, and potentially increasing losses associated with the emergency
Government Operations	Municipal Government	• Municipal government closed due to extreme weather, cyber-attack, health emergency, location, civil disruption causes disruption to decision making, financial support, declaration of emergencies etc.
Manufacturing	Supply Chain Disruption	• Prolonged disruptions to supply chains can impact apparatus replacement due to manufacturing delays (resulting in them going over lifetime) • Supply disruptions also have an unforeseeable but potentially impactful financially impact on running apparatus, as well as the ability to obtain/replenish PPE

5.1.1 Water Infrastructure

Water supply is a critical infrastructure that is essential for firefighting. Having access to the town's water delivery systems is crucial to the fire service. The town's water distribution system consists of one water treatment facility (Sheep River Water Treatment Plant), 13 groundwater wells, 3 storage reservoirs, 6 pump stations, 506 hydrants and 135 km of watermains[11].

Current estimates indicate that Okotoks is reaching its 'build-out' capacity and future development plans will exceed water licensing and availability. Currently water is drawn from the Sheep River Basin, which is a part of the greater South Saskatchewan Basin. The South Saskatchewan Basin is a protected basin, with a set amount of available water license. The basin has already reached or exceeded this number of available licenses. The town has a Water Shortage Response Plan to assist to sustain the current water availability, however there are factors which pose a limitation on the current supply, particular in the summer months. The demand for water increases in the town from 40-60% during these months. Increasingly hot and dry conditions also strain the supply of water into and flowing through the Sheep River Basin. Water restrictions are managed through the Water Shortage Response Plan. The water supply for firefighting can be threatened by water shortages.

> ***Identified Risk:*** *The town's water supply capacity is increasingly threatened by hot and dry summer months, lowering the water tables, and coupled with increasing demand during these periods. The shortage in supply could threatened the availability of water to ensure an appropriate level of fire protection for significant fire suppression events.*

An additional factor to consider, is the condition of the town's water distribution assets. As a part of the Okotoks Water Master Plan (2020) development, a condition assessment and risk evaluation of the town's linear (watermains) and non-linear (reservoir, pump stations, hydrants and pressure reducing valve stations) assets was conducted to determine likely condition and likelihood of failure of assets based on age according to the 2016 Canadian Infrastructure Report Card (CIRC) and the Canadian Network of Asset Managers (CNAM) Asset 101 Booklet. These standards outline Estimated Service Lives (ESL) and Remaining Services Lives (RSL) for assets, which are standardized time-based approaches to estimating when an asset is likely to be in declining condition and in need of replacement[12].

5.1.1.1 Linear Assets

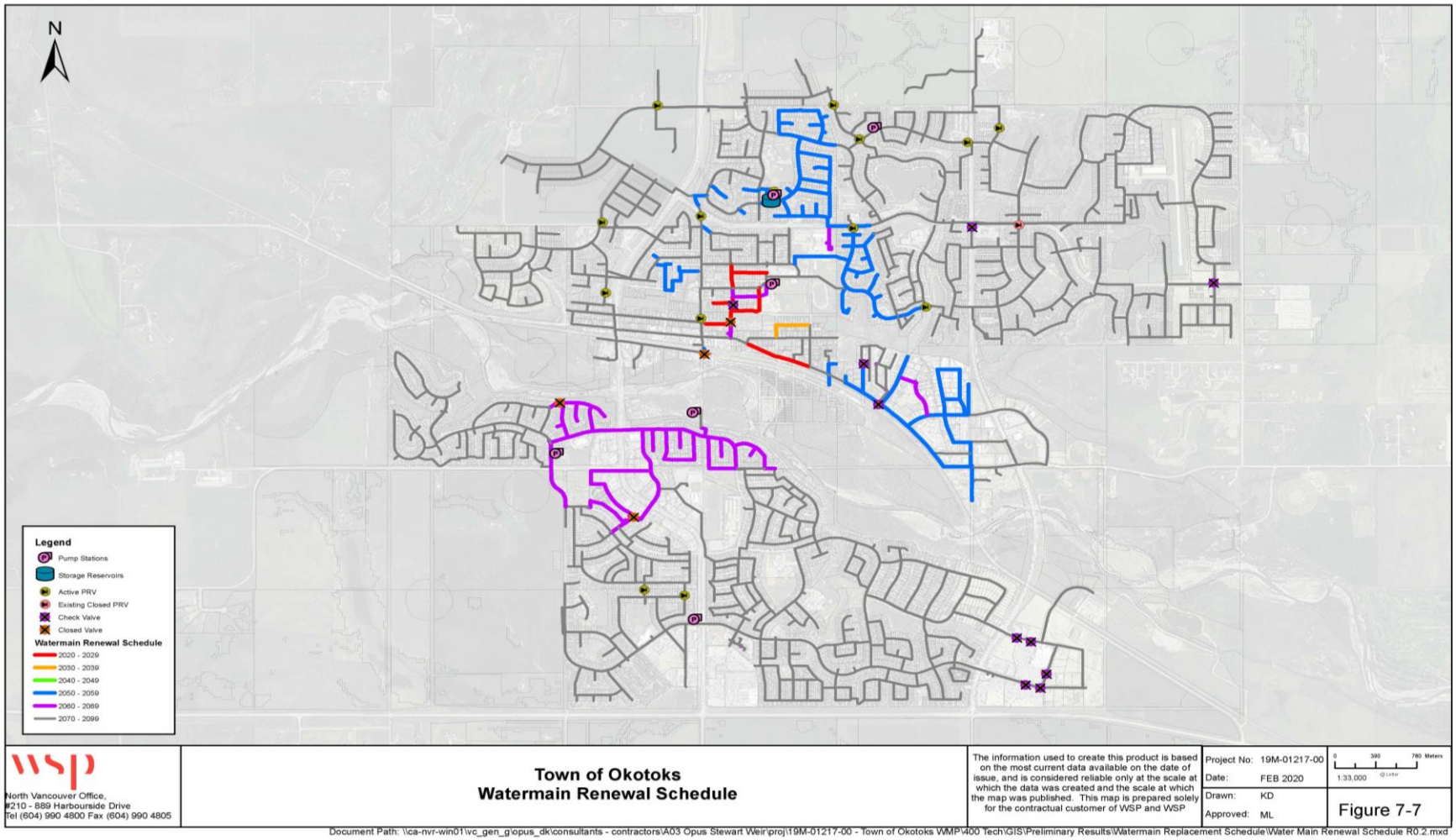
An examination of the town's watermains with respect to age, material and historical watermain breaks provided an estimated renewal schedule based on expected deterioration of watermain networks. Apart from cast iron watermains (60 years), the watermain network overall has an ESL of 80 years. The linear assets for the town are in

[11] *Town of Okotoks Water Master Plan. February 2020.*

[12] *Ibid.*

good or very good condition with no major upgrades expected until 2058 and beyond. The figure below represents aging cast iron mains that have been the site of recent main breaks (North Railway Street) and targeted for upgrades (some complete) between 2020 and 2029.

Figure 9: Cast Iron Watermains (red) Scheduled for Upgrades (2020-2029)[13]



[13] *Ibid*

Identified Risk: *Watermain sections along North Railway Street have been the site of recent watermain breaks. According to the most recent Water Master Plan, cast iron watermains in that area (see Figure 9) are reaching their ESL and should undergo upgrades as the risk of failure is increasing.*

5.1.1.2 Non-Liner Assets

As a part of the town's Water Master Plan, non-linear assets were examined and assigned a condition and consequence of failure, which determined the asset's risk ranking. The consequence of failure rating was based on the size of the downstream service area of the asset, as well as the asset's criticality in delivering services (i.e., primary versus secondary supply and alternate/backup supplies). The outcome of the analysis is presented below.

Table 12: Reservoir Risk Ranking

Reservoir	% Remaining Service Life	Risk Score
South	75%	10 (accept)
2N	83%	5 (good)
3N	59%	15 (monitor)

The Okotoks reservoirs collectively have a low-risk rating, although the 3N reservoir has been noted as needing rehabilitation. The rehabilitation work has been included in the Capital Plan; however, it should continue to be monitored. In 2021, the town reported a water leak which caused compromised water levels in two of the town's reservoirs, requiring an immediate conservation of water use. This demonstrates that a major event impacting a reservoir could have a critical and unexpected impact on firewater availability.

Identified Risk: *The town's 3N water reservoir requires rehabilitation work. Reservoirs can be greatly and quickly impacted by events such as water main breaks, drought and high temperatures which consequently can have an immediate and critical impact on firewater availability.*

SECTION 6
DEMOGRAPHIC PROFILE

6.1 Population and Dispersion

The demographic profile assessment includes analysis of the composition of the community's population, respecting matters relevant to the community such as population size and dispersion, age, gender, cultural background, level of education, socioeconomic make-up, and transient population. The following sections consider these demographic characteristics within the Town of Okotoks.

Over the past two decades (2001-2021), the Town of Okotoks's population and private dwellings have generally grown at a much faster pace than the province overall, as shown in Table 13. The slow growth in 2016 (for the town and province) was a result of the economic downturn experienced by plummeting oil prices starting in 2014 resulting in the worst recession the province has experienced to date.

The data and empirical studies indicate that the town will continue to experience upward trends in growth and development. The town's Municipal Master Plan projects that by 2076, the population of Okotoks will exceed 70,000.[14]

Table 13: Historic Growth in Population and Households – Town of Okotoks - 2021 Census, Statistics Canada [15]

Year	Population	% Change	Total Private Dwellings	% Change
2001	11,664	36.8%	3,804	Not available
2006	17,150	46.7%	5,927	35.8%
2011	24,511	42.9%	8,704	31.9%
2016	28,881	17.8%	9,840	11.5%
2021	30,405	4.8%	10,750	8.5%

** Population counts of geographic areas are adjusted to ensue confidentiality. Percent change may not reflect actual values. Values used are as reported by Statistics Canada.*

[14] *Town of Okotoks Municipal Development Plan 2022*

[15] *Statistics Canada. 2023. (table). Census Profile. 2021 Census of Population. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released March 29, 2023. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (accessed August 14, 2023).*

Table 14: Historic Growth in Population and Households – Alberta 2021 Census, Statistics Canada [16]

Year	Population	% Change	Total Private Dwellings	% Change
2001	2,974,807	10.3%	1,171,841	Not Available
2006	3,290,350	10.6%	1,335,745	12.3%
2011	3,645,257	10.8%	1,505,007	11.2%
2016	4,067,175	11.6%	1,654,129	9.0%
2021	4,262,635	4.8%	1,772,670	6.7%

** Population counts of geographic areas are adjusted to ensue confidentiality. Percent change may not reflect actual values. Values used are as reported by Statistics Canada.*

Identified Risk: *The population of the town has steadily increased, with a continued anticipated growth. Rapid changes in population and development can affect service level needs of the town.*

6.1.1 Population Age

Identifying a community's population by age category is a core component of developing the CRA as certain age demographics represent a greater risk of fire injury and fatalities and can guide specific mitigation measures to mitigate risks. The age distributions of the town's population and Alberta's population are compared in Table 15.

Table 15: Population by Age Group – Town of Okotoks and Alberta - 2021 Census, Statistics Canada

Age	Okotoks Population	Okotoks Percentage of Population	Alberta Population	Alberta Percentage of Population
0 to 4 years	1,650	5.43%	250,250	5.87%
5 to 9 years	2,210	7.27%	278,810	6.54%
10 to 14 years	2,715	8.93%	280,585	6.58%
15 to 19 years	2,490	8.19%	249,765	5.86%
20 to 24 years	1,495	4.92%	248,740	5.84%
25 to 29 years	1,165	3.83%	275,465	6.46%
30 to 34 years	1,620	5.33%	323,260	7.58%
35 to 39 years	2,135	7.02%	338,945	7.95%
40 to 44 years	2,405	7.91%	307,665	7.22%
45 to 49 years	2,405	7.91%	277,770	6.52%
50 to 54 years	2,025	6.66%	262,770	6.16%

[16] *Ibid*

Age	Okotoks Population	Okotoks Percentage of Population	Alberta Population	Alberta Percentage of Population
55 to 59 years	1,795	5.90%	274,150	6.43%
60 to 64 years	1,800	5.92%	265,240	6.22%
65 to 69 years	1,520	5.00%	217,270	5.10%
70 to 74 years	1,275	4.19%	163,890	3.84%
75 to 79 years	815	2.68%	105,520	2.48%
80 to 84 years	455	1.50%	70,160	1.65%
85 to 89 years	270	0.89%	44,670	1.05%
90 to 94 years	135	0.44%	21,430	0.50%
95 to 99 years	30	0.10%	5,480	0.13%
100 +	5	0.02%	795	0.02%
Total	30,405	100.00%	4,262,635	100.00%
Median Age of the Population	39.2		38.4	
Population aged 14 and under	6,575	21.62%	809,640	18.99%
Population aged 65 and over	4,495	14.78%	629,220	14.76%
Population aged 55 to 64	3,595	11.82%	539,390	12.65%
** Population counts of geographic areas are adjusted to ensue confidentiality. Values used are as reported by Statistics Canada.*				

The youngest demographic (those 14 years of age and under) represents 21.62% of the town's total population, which is slightly higher in comparison to the province (18.99%). While at a lower risk of fatality in residential occupancies overall when compared to seniors or adults, youth (aged 14 years and under) represent an important demographic for the purposes of public education. As a result, there is value in targeting public education and prevention programs to this demographic. Structured education programs consistently provided to children and youth can help to engrain fire and life safety awareness and knowledge into future generations.

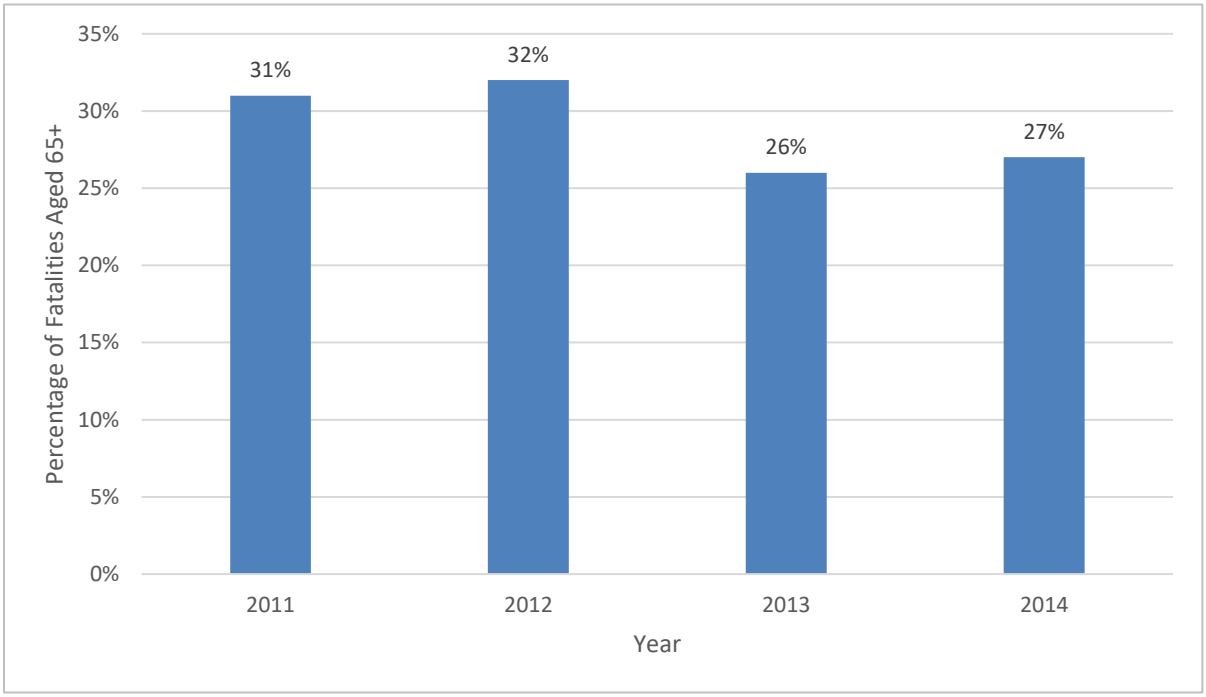
The percentage of the population aged 65 years and older in Okotoks represents 14.78% of the total population, which is roughly equal to that the province (14.76%). An additional 11.82% of the town's population falls between the age group of 55 and 64, who are ageing towards the senior demographic of 65 years of age and older. Based on historic residential fire fatality data, this population will become seniors who will be at greater risk. These demographic trends are important considerations for the development of informed targeted public education programs and risk reduction strategies within the community.

A community's population by age is an important factor in identifying specific measures to mitigate risks associated with a specific age group, such as seniors. Canada's aging population has been recognized as one of the most significant demographic trends. According to

Statistics Canada, from 2016 to 2021 Canada experienced a large increase in the proportion of seniors since Confederation" due to the baby boomer generation reaching the age of 65. There are more Canadians over the age of 65 (18.54% of the population) than there are children aged 14 years and younger (15.83%).[17]

The most current statistics for Alberta and Canada, indicate that seniors aged 65 and older are at a greater risk of fire fatality than other age categories. Between 2011-2020, over one-third (39%) of residential fire-related deaths in Canada were aged 65+. In Alberta, the most recently published Alberta Fire Commissioner's Annual Statistical Reports and Fire Risk Assessments both show similar trends. In Alberta the average death rate for seniors was calculated at twice as high as the Alberta average. Seniors over the age of 85+ also commonly live alone (if not in residential care). In 2021, 42% of those who lived alone were 85 and older. Although indications are that this trend is shifting with gradual convergence of life expectancies between men and women, the risk for this age group living alone is high. There is no data specific for the town, however educational awareness programs should target this demographic.

Figure 10: Percentage of Fire Fatalities in Alberta Aged 65+ (2011-2014)[18]



[17] *Statistics Canada. (2017, May). The Daily: Age and sex, and type of dwelling data: key results from the 2016 Census. Retrieved from http://www.statcan.gc.ca/daily-quotidien/170503/dq170503a-eng.htm?HPA=1.*

[18] *Office of the Fire Commissioner: Fire Commissioner Statistical Reports 2011-2014*

Key Finding: *The 2021 Census data indicates that children aged 14 and under, represent 21.62% of the town's total population. This represents an important demographic for the purposes of public education. There is value in targeting public education and prevention programs to this demographic.*

Identified Risk: *Seniors (those 65 years and over) are considered to represent one of the highest fire risk groups across the province based on residential fire death rate. The percentage of the population aged 65 years and older in the town represents 14.78% of the total population.*

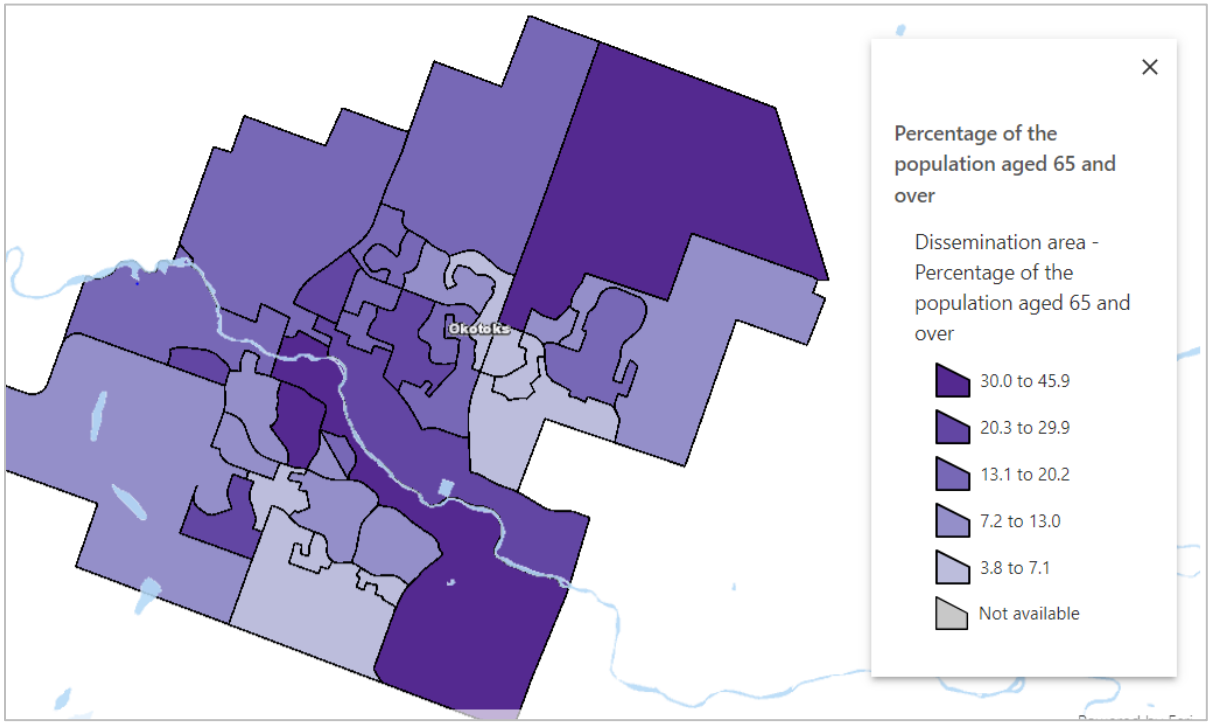
Identified Risk: *Of the town's population, 11.82% fall into the age range of 55 to 64, representing a potential future increase as this cohort will age towards 65+. Based on historic residential fire fatality data, this population will become greater fire fatality risk.*

Identified Risk: *Most residences in Canada with only one inhabitant are 85 and older. There are 895 residents in this age range in the Town of Okotoks, although there is no data on how many live alone.*

6.1.2 Mapping Population Age

To understand the spatial distribution of population by age across the town, 2021 Census data was mapped by dissemination area. Figure 11 presents the distribution of the senior population (65 and older). It shows the town has a high percentage of the population over 65 years concentrated in north end and along the Sheep River. This is consistent with the fact that there are several retirement complexes in the vicinity of the river, and the northern portion of the town is less densely populated and geared towards older demographics.

Figure 11: Distribution of Population Aged 65+ - Town of Okotoks - 2021 Census, Statistics Canada

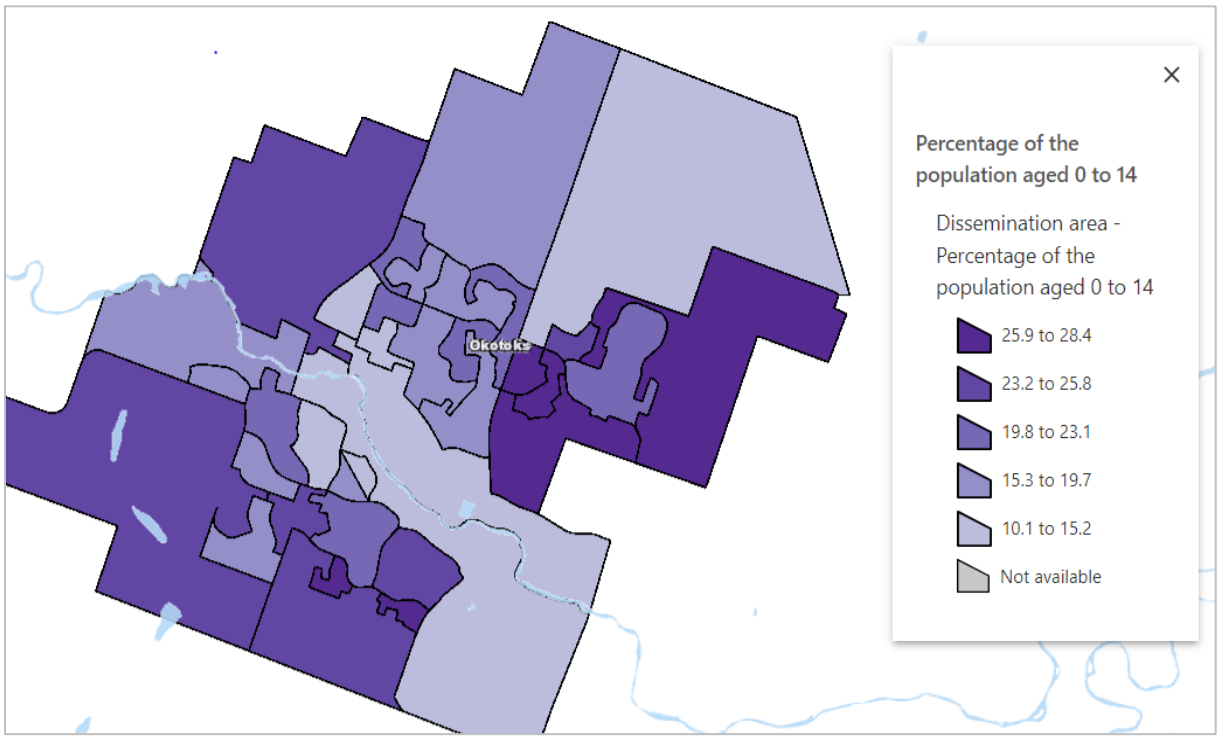


Source: Statistics Canada 2022 Census Program Data Viewer

***Key Finding:** Areas around Sheep River and in the northern portion of town consist of 13 – 49.5% of seniors. Seniors are at an increased risk of fire fatality and medical calls.*

Figure 12 represents the distribution of the 0-14 population. As expected, similar trends are seen where this age group is most concentrated in densely populated neighbourhoods near schools and amenities etc.

Figure 12: Distribution of Population Aged 0-14 Years – Town of Okotoks - 2021 Census, Statistics Canada



Source: Statistics Canada. 2022. Census Program Data Viewer

> ***Key Finding:*** *The greatest concentration of population aged 0-14 years is concentrated in densely populated neighbourhoods close to schools and amenities. This age group is best targeted for fire prevention education.*

6.2 Gender

NFPA 1730 - Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations (2019 Edition) considers sex as part of a CRA due to the finding that, based on historic data, males are more likely to be injured or die in a fire. Table 16 displays the distribution of both sexes by age for Okotoks. The proportion of males versus females is 49.20% male and 50.80% female. When specific age groups are reviewed, there are minor variations. Typically, one of the most significant differences is the proportion of males to females in the over 65 age group. This is the case with the town of Okotoks, however large gaps (over 10%) are not observed until the 80+ demographic, which presents a low proportion of the population. Based on these statistics, it is not anticipated that public education programming would be refined based on gender.

Table 16: Gender Distribution by Age Group – Town of Okotoks - 2021 Census, Statistics Canada[19]

Age Group	Total Population	Male	%	Female	%
0 to 4 years	1,650	860	52.12%	790	47.88%
5 to 9 years	2,210	1,115	50.45%	1,095	49.55%
10 to 14 years	2,715	1,430	52.67%	1,285	47.33%
15 to 19 years	2,490	1,285	51.61%	1,200	48.19%
20 to 24 years	1,495	820	54.85%	675	45.15%
25 to 29 years	1,165	605	51.93%	560	48.07%
30 to 34 years	1,620	770	47.53%	850	52.47%
35 to 39 years	2,135	995	46.60%	1,140	53.40%
40 to 44 years	2,405	1,115	46.36%	1,285	53.43%
45 to 49 years	2,405	1,150	47.82%	1,255	52.18%
50 to 54 years	2,025	1,020	50.37%	1,005	49.63%
55 to 59 years	1,795	885	49.30%	905	50.42%
60 to 64 years	1,800	855	47.50%	950	52.78%
65 to 69 years	1,520	725	47.70%	795	52.30%
70 to 74 years	1,275	595	46.67%	680	53.33%
75 to 79 years	815	365	44.79%	450	55.21%
80 to 84 years	455	200	43.96%	255	56.04%
85 to 89 years	270	110	40.74%	160	59.26%
90 to 94 years	135	55	40.74%	85	62.96%
95 to 99 years	30	5	16.67%	20	66.67%
100 +	5	0	0.00%	5	100.00%
Total	30,405	14,960	49.20%	15,445	50.80%

** Population counts of geographic areas are adjusted to ensue confidentiality. Values used are as reported by Statistics Canada.*

Key Finding: *The gender distribution in Okotoks is roughly equal in all age groups. It does not appear that gender based public education would have a positive influence on reducing fire related incidents, fatalities, or injuries.*

[19] *Statistics Canada. 2023. Census Profile. 2021 Census of Population. Statistics Canada Catalogue number 98-316-X2021001. Ottawa. Released March 29, 2023.*
https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (accessed April 27, 2023).

6.3 Socioeconomic Circumstances

Socioeconomic circumstances of a community are known to have a significant impact on fire risk. Socioeconomic status is reflected in an individual's economic and social standing and is measured in a variety of ways. These factors can be reflected in the analysis of socioeconomic indicators such as labour force status, educational attainment, and income as well as household tenure, occupancy, suitability, and cost.

Socioeconomic factors intersect in several ways and have direct and indirect impacts on fire risk. As one consideration, households with less disposable income may be less likely to purchase fire safety products (e.g., smoke alarms, fire extinguishers, etc.), which puts them at higher risk of experiencing consequences from a fire. Another consideration is that households living below the poverty line may have a higher number of persons per bedroom in a household and/or children who are more likely to be at home alone. These circumstances would impact both the probability and consequence of a fire. While these complex relationships between socioeconomic circumstances and the probability/consequence of a fire are not well understood, this CRA seeks to explore these factors.

The factors reviewed at a high level have been selected based on the data available from Statistics Canada. Socioeconomic factors such as income decile group and median household income have been displayed spatially throughout this section.

Factors that are highlighted in this section include:

- Labour force status
- Educational attainment
- Household tenure, occupancy, suitability, and cost

6.3.1 Labour Force Status

Those who are economically disadvantaged, including low-income families, the homeless and perhaps those living alone, may experience a higher fire risk. There are a number of reports that suggest there is a correlation between income levels and fire risk. The reports identify the following factors:

- The higher number of vacant buildings found in low-income neighborhoods attract the homeless. This introduces risks such as careless smoking, drinking and unsafe heating practices.
- Building owners are less likely to repair building systems (electrical, mechanical, suppression) due to affordability, increasing fire risk from improper maintenance.
- Households with lower disposable income are less likely to purchase fire safety products (i.e., smoke alarms, extinguishers, cigarette ignition resistant furniture, etc.) due to affordability.
- Households with lower disposable income are more likely to have utilities shut off due to non-payment, leading to increased risks related to unsafe heating, lighting, and cooking practices.

- Single parent families are more economically challenged due to the fact that there is only one income. These households also have fewer resources to arrange childcare, increasing the likelihood of fires caused by unsupervised children.
- Studies have shown that cigarette smoking is inversely related to income. In Canada, findings by the Centre for Chronic Disease Prevention and Control through the National Population Health Survey established that there were nearly twice as many smokers in the lowest income group when compared against the highest (38% vs. 21% respectively).
- Those with low education and literacy levels are inhibited in their ability to read instruction manuals and warning labels and less likely to grasp fire safety messages.[20]

Labour force status is a possible indicator of income levels which directly influence fire risk (e.g., lower income, increased fire risk). The participation rate (i.e., the proportion of residents in the labour force) can also be an indicator of income and can be considered alongside unemployment rates (e.g., lower participation rate and higher unemployment could mean lower income, higher fire risk).

Labour force status, shown in Table 17 below, shows that Okotoks has a slightly higher participation rate than the province (68.06% versus 68.01%). This would suggest that the town faces a slightly lower or comparable fire risk to the province from the perspective of labour force statistics.

Table 17: Labour Force Status – Town of Okotoks and Alberta - 2021 Census, Statistics Canada [21]

Status	Okotoks Population	Okotoks % Participation	Alberta Population	Alberta % Participation
In the Labour Force	15,960	68.06%	2,295,380	68.01%
Employed	14,485	61.77%	2,030,730	60.17%
Unemployed	1,470	6.27%	264,650	7.84%
Not in the Labour Force	7,485	31.92%	1,079,750	31.99%
Total	23,450	100.00%	3,375,135	100.00%
**Total - Population aged 15 years and over by labour force status*				

Key Finding: *Okotoks has a comparable labour force participation rate to that of the province, which suggests there is not an increased fire risk based on these statistics.*

[20] *Ibid*

[21] *Ibid*

6.3.2 Educational Attainment

The relationship between educational attainment and income is complex. An analysis conducted by Statistics Canada has found that high-income Canadians are generally more likely to be highly educated. Approximately two thirds (67.1%) of the top 1% had attained a university degree compared to 20.9% of all Canadians aged 15 and over.[22] Based on this national trend and for the purposes of this CRA it is assumed that a higher education leads to more disposable income and a lower fire risk. It is also assumed that households with more disposable income are more likely to invest in fire life safety products such as fire extinguishers and smoke alarms reducing the fire risk.

Table 18 displays educational attainment for the Town of Okotoks and the Province of Alberta.

Table 18: Educational Attainment – Town of Okotoks and Alberta - 2021 Census, Statistics Canada[23]

Educational Attainment	Okotoks Population	Okotoks %	Alberta Population	Alberta %
No Certificate / Diploma / Degree	2,935	12.52%	522,835	15.49%
High School Diploma or Equivalent	7,455	31.79%	972,110	28.80%
Postsecondary Certificate; Diploma or Degree	13,050	55.65%	1,880,185	55.71%
Total	23,450	100.00%	3,375,135	100.00%

According to the 2021 Census, 55.65% of residents in Okotoks have a postsecondary certificate, diploma, or degree, which is approximately equal to the provincial data (55.71%), and the median household income for Okotoks in 2020 was $21,000 higher than the provincial median total income of $96,000.

Table 19: Median Income – Town of Okotoks and Alberta (2020) - 2021 Census, Statistics Canada

Geography	Median Income Individual	Median Income Household
Okotoks	$44,800	$117,000
Alberta	$41,600	$96,000

Key Finding: *When comparing educational attainment and median total income per household between the province and Okotoks, it appears that Okotoks may have a slightly lower fire risk.*

[22] *Statistics Canada. (Modified 2018, July). Education and occupation of high-income Canadians. Retrieved from Statistics Canada Website*

[23] *Ibid*

https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (accessed August 14, 2023).

6.3.3 Income Decile Groups

Income can also be viewed through the lens of income decile groups. As stated by Statistics Canada, a "decile group provides a rough ranking of the economic situation of a person based on his or her relative position in the Canadian distribution of the adjusted after-tax income of economic families."[24] Economic family income decile group for the population in private households in Okotoks is presented in Table 20**.** Okotoks has a higher portion of the population that falls within the top distribution of income decile groups (64.39%) when compared to the province (53.56%). These statistics may be suggestive of a lower fire risk.

Table 20: Economic Family Income Decile Group for the Population in Private Households – Town of Okotoks and Alberta- *2021 Census, Statistics Canada*[25]

Decile Group	Okotoks Population	Okotoks %	Alberta Population	Alberta %
In the bottom half of the distribution	10,690	35.61%	1,894,410	54.65%
In the top half of the distribution	19,330	64.39%	2,283,310	53.56%
Total	30,020	100.00%	4,177,715	100.00%

Key Finding: *When comparing the socio-economic factors, the statistics may suggest that there is a lower fire risk to the town compared to the province.*

6.3.4 Housing Tenure

Housing tenure reflects socioeconomic status whereby a low home ownership rate may reflect lower incomes in the community and a higher overall fire risk. The town has a comparable proportion of dwellings that are owned versus rented when compared to the province (85.73% owned in Okotoks versus 70.87% in the province). See Table 21 below.

6.3.4.1 Occupancy

A higher proportion of multiple persons per household can result in increased fire loss (consequence) resulting in a higher risk. There are 105 households (1.00% of total households) that have more than one person per room in Okotoks. This reflects a lower percentage compared to the province where 2.67% of households have more than one person per room. See Table 22 below.

6.3.4.2 Suitability

The 2021 Census reports on housing suitability which, according to Statistics Canada, refers to whether a private household is a suitable accommodation according to the

[24] *Ibid*

[25] *Ibid*

National Occupancy Standard. Suitable accommodations are defined by whether the dwelling has enough bedrooms based on the ages and relationships among household members. Based on this measure, 2.79% (or 290 households) are classified as "not suitable" within the town, compared to 4.67% for the province as a whole. From the perspective of housing suitability, the town has a lower fire risk than the province. See Table 23 below.

6.3.4.3 Housing Costs

The cost of shelter may also be indicative of the amount of disposable income within a household. Households with less disposable income have less funds to purchase household fire life safety items resulting in a higher risk. In Okotoks, 17.26% of households spend 30% or more of the household total income on shelter costs. This is approximately 4% less than the province, where 21.25% of households spend 30% or more of their income on shelter costs.

When comparing shelter costs, the median value of dwellings in Okotoks is $452,000 ($52,000 higher than the provincial median). The town also has a higher median monthly shelter costs for owned and rented dwellings than the province – a difference of approximately $300 per month. See Table 24 and 25 below.

Table 21: Household Tenure – Town of Okotoks and Alberta - 2021 Census, Statistics Canada

Household Tenure	Okotoks Population	Okotoks %	Alberta Population	Alberta %
Owner	8,980	85.73%	1,157,495	70.87%
Renter	1,495	14.27%	465,220	28.48%
Total	10,475	100.00%	1,633,220	100.00%

Table 22: Household Occupancy – Town of Okotoks and Alberta - 2021 Census, Statistics Canada

Household Occupancy	Okotoks Population	Okotoks %	Alberta Population	Alberta %
One person or fewer per room	10,370	99.00%	1,589,600	97.33%
More than one person per room	105	1.00%	43,620	2.67%
Total	10,475	100.00%	1,633,220	100.00%

Table 23: Household Suitability – Town of Okotoks and Alberta - 2021 Census, Statistics Canada

Housing Suitability	Okotoks Population	Okotoks %	Alberta Population	Alberta %
Suitable	10,190	97.28%	1,556,960	95.33%
Not suitable	290	2.77%	76,260	4.67%
Total	10,475	100.00%	1,633,220	100.00%

Table 24: Shelter Costs – Town of Okotoks and Alberta - 2021 Census, Statistics Canada

Shelter Costs	Okotoks Population	Okotoks %	Alberta Population	Alberta %
Spending less than 30% of household total income on shelter costs	8,650	82.74%	1,251,370	78.75%
Spending 30% or more of household total income on shelter costs	1,805	17.26%	337,585	21.25%
Total	10,455	100.00%	1,588,960	100.00%

Table 25: Median Costs – Town of Okotoks and Alberta - 2021 Census, Statistics Canada [26]

Median Costs	Okotoks	Alberta
Median value of dwellings	$452,000	$400,000
Median monthly shelter costs for owned dwellings	$1,900	$1,600
Median monthly shelter costs for rented dwellings	$1,520	$1,280

Key Finding: *When comparing housing tenure for the town of Okotoks to that of the Province, Okotoks appears to have a lower fire risk.*

6.4 Cultural Background, Language Considerations

Cultural background and language considerations can be factors for fire service providers to consider in developing and delivering programs related to fire prevention and public education. Communication barriers, in terms of language and the ability to read written material, may have an impact on the success of these programs. There may also be familiarity challenges related to fire safety standards within newcomer populations. A high proportion of immigrants could demonstrate a large population that has a potential for unfamiliarity with local fire life safety practices and/or may experience possible language barriers. Table 26 summarizes the immigration status of Okotoks's population. The town has almost half of the proportion of

[26] *Ibid*

newcomers (13.29%) when compared to Alberta (23.24%) and shows a consistently lower immigration rate.

Table 26: Immigration Status – Town of Okotoks and Alberta - 2021 Census, Statistics Canada

Immigration Status	Okotoks Population	Okotoks %	Alberta Population	Alberta %
Non-immigrants	25,925	86.36%	3,141,915	75.21%
Immigrants	3,990	13.29%	970,970	23.24%
Before 1980	835	2.78%	127,275	3.05%
1980 to 1990	410	1.37%	91,320	2.19%
1991 to 2000	350	1.17%	126,605	3.03%
2001 to 2010	1,005	3.35%	239,260	5.73%
2011 to 2015	705	2.35%	193,335	4.63%
2016 to 2021	635	2.12%	193,175	4.62%
Non-permanent residents	100	0.33%	64,830	1.55%
Total	30,020	100.00%	4,177,720	100.00%

Knowledge of official languages based on the 2021 Census is included in Table 27 for Okotoks and Alberta.

As illustrate below, 92.35% of the population in the town have knowledge of English only, 7.37% possess knowledge of both English and French, 0.25% have no knowledge of English or French, and 0.05% speak French only. The potential for communication barriers in the town is considered to be very low.

Table 27: Knowledge of Official Language – Town of Okotoks and Alberta - 2021 Census, Statistics Canada

Language	Okotoks Population	Okotoks %	Alberta Population	Alberta %
English Only	27,900	92.35%	3,894,690	92.25%
French Only	15	0.05%	3,105	0.07%
English and French	2,225	7.37%	258,330	6.12%
Neither English nor French	75	0.25%	65,705	1.56%
Total (non-institutional)	30,210	100.00%	4,221,835	100.00%

Key Finding: *The low proportion of immigrants in the area, and statistics regarding spoken languages, suggests that there are no concerns with cultural and language barriers in understanding fire safety messages, warnings, practices etc.*

6.5 Transient Populations and Commuting

Transient populations refer to the concept of population shift where the population within a community can shift at various times during the day or week or throughout the year. Population shift can be a result of several factors including employment, tourism, and education. In some municipalities, residents regularly leave the community for employment. This can contribute to increased traffic resulting in an increase in the number of motor vehicle collision calls. Other communities may be major tourist and vacation destinations resulting in large population shifts related to seasonal availability of tourism activities. This can result in an increased risk due to overnight tourism accommodation (sleeping) which can impact the demand for fire protection services. Educational institutions can attract a transient student population who commute to school daily or reside in dormitories or student housing on a seasonal basis.

Student accommodations and short-term rental units present unique fire safety issues that may be attributed to the conversion of houses into boarding houses or rooming house type accommodations that do not conform to the NBC. These properties are not always known to the fire service, posing a challenge for fire prevention division staff responsible for fire code enforcement.

6.5.1 Tourism

An increase in tourism can result in an increased risk due to overnight tourist accommodation which can impact the demand for fire protection services. There are several family-oriented community events hosted by the town throughout the year. Attractions mainly draw local residents and out-of-town day visitors.

Annual events throughout the year include, but are not limited to:

- Okotoks Parade and Children's Festival
- BuskerFest
- Canada Day Celebrations
- Taste of Okotoks
- Chillifest

Large crowds increase the risk of emergency calls, however as the events typically draw manageable crowd sizes, the expected increase in call volume is minimal.

6.5.2 Education

Educational institutions are a key source for population shift in larger communities as they attract people from outside of the typical community. They are important to consider since they may have school-based residences or contribute to a population that is not captured through the census such as commuters (captured for working purposes only, see Section 5.6.3). The City of Calgary is the closest urban centre with several large post-secondary institutions. The city is approximately a 30-minute commute from Okotoks. When evaluating the age statistics for Okotoks, combined with commuting distance, there could be an

estimated 10% of the population living in the town and commuting daily to Calgary for post-educational purposes.

> ***Key Finding:*** *An approximate 10% of the population of Okotoks falls into the age range typical of post-secondary students. This could indicate an uncaptured statistic for commuters and unregistered student housing, both of which pose an increased risk in call volume due to MVC and fire statistics.*

6.5.3 Commuters

A shift in commuter population may impact the demand for fire protection services. These figures are important from a fire suppression standpoint as large numbers of people commuting in and out of the city could increase the number of vehicle collision calls to which the fire service responds. This is unlikely to be a key risk for Okotoks.

Commuter populations represent a significant portion of Okotoks's labour force. In comparison to the province (23.22%), Okotoks has roughly double the percentage of labour force (52.06%) commuting to a difference census subdivision within the census division of residence. Okotoks is within Census Division No.6, which includes the cities of Calgary, Airdrie, and Chestermere, as well as the surrounding towns and villages that makeup Mountain View and Rocky View Counties. As aforementioned, a high percentage of the commuters are known to be travelling to the City of Calgary.

Table 28: Commuting Destinations – Town of Okotoks and Alberta - 2021 Census, Statistics Canada[27]

Commuting Destination*	Okotoks Population	Okotoks %	Alberta Population	Alberta %
Commute within census subdivision of residence	3,655	42.43%	902,040	71.63%
Commute to a different census subdivision within census division of residence	4,485	52.06%	292,360	23.22%
Commute to a different census subdivision and census division within province or territory of residence	350	4.06%	52,590	4.18%
Commute to a different province or territory	120	1.39%	12,315	0.98%
Total	8,615	100.00%	1,259,305	100.00%
**Commuting destination for the employed labour force aged 15 years and over in private households with a usual place of work - 25% sample data*				

> ***Key Finding:*** *The town's commuter population presents a factor that may impact traffic congestion, and the potential occurrence of motor vehicle accidents within the towns on major routes.*

[27] *Ibid*

SECTION 7
HAZARD PROFILE

7.1 Hazard Identification and Risk Assessment (HIRA)

The hazard profile assessment includes analysis of the hazards within the community, including natural hazards, hazards caused by humans, and technological hazards to which a fire service may be expected to respond, and that may have a significant impact on the community. This section considers these hazards within the Town of Okotoks.

A hazard is defined as a phenomenon, substance, human activity, or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. Hazards can be natural, human-caused, or technological. A Hazard Identification and Risk Assessment (HIRA) is a comprehensive process to assess risks based on potential consequences and frequencies. The outcome of the HIRA assists municipalities in prioritizing risks based on their likelihood and potential to cause an emergency. Appropriate measures can then be taken to mitigate, prepare for and respond to the risks that pose the greatest threat, in order to reduce future losses.

Under the Local Authority Emergency Management Regulation 203/2018, municipalities are required to have an emergency plan that must include a 'hazard and risk assessment'. The regulation does not specify which standard must be used; however, the use of a formal HIRA process is encouraged.

7.1.1 HIRA and the Community Risk Assessment

A CRA provides an opportunity to examine the results of the HIRA and the impact that these identified hazards would have on a fire service. For the purposes of this CRA, a "fire protection services" lens will be applied to the top hazards as identified.

7.1.2 Town of Okotoks HIRA

As a part of the town's Community Emergency Management Program (CEMP), a risk assessment was conducted in 2023, indicating that Okotoks has complied with its legislative requirements. It was identified in the CEMP that the methodology used for the assessment was adopted by the United Nations.

As a component of the risk assessment and risk analysis process, the top risks in Okotoks were identified. The HIRA assigned likelihood and consequence levels to a list of hazards based on the potential for impacts to people, property, and the environment. As a result of this analysis, the following top hazards were identified: (note some hazards were grouped together based on similar risks)

- Flood (watercourse, heavy rain)
- Urban Wildland Interface (UWI) Fire
- Human health emergency (pandemic)
- Drought/water shortage

- Tornado
- HAZMAT spill – fixed site/transportation
- Civil disturbance
- Extreme winter weather (extreme cold, ice storm, blizzard etc.)

To better understand the risks of hazards as they pertain to fire protection services, the top hazards have been assessed to identify possible impacts on fire protection services. Many of the potential impacts are not unique to a jurisdiction. The results of this review are presented in Table 29.

Table 29: Impacts of Hazards on Fire Protection Services

Hazard	Possible Impact
Flood	Okotoks experienced three major flooding events along the Sheep River in 1995, 2005 and 2013, impacting the downtown area and areas along the flood fringe of the Sheep River. **Overall Impact (from HIRA)** Businesses and homes on flood plains or flood prone areas could be impacted. Potential for large evacuations. Roadways and environment could be impacted with debris. Stormwater systems may not be able to handle the surge resulting in flash flooding. **Fire Services** Depending on the severity of the flooding, access to various sections of the road network could be limited to fire department response delaying emergency response times and OFR deployment model could be impacted as the number of simultaneous calls could put a strain on service capabilities. Dangerous rescue conditions may exist and exposure to hazardous materials including sewage is possible.
Urban Wildland Interface Fire	Okotoks fire service responded to notable grassfires in 2021 and 2023. Alberta has a significant increase in hectares burned by wildfires in 2023. Increasingly hot and dry climates indicate the threat of wildfires throughout the province will increase. **Overall Impact (from HIRA)** Threat of grassfire impinging on homes and businesses. Large-scale evacuations may be possible, with many people displaced. Evacuations with little notice may occur. Large potential for damages and loss. Damage to the environment and threat to wildlife. **Fire Services** May require extensive mutual aid support. May not be equipped (with enough people or apparatus) to extinguish fire as it expands. May require extended effort and resources at a single or multiple sites leaving the town vulnerable.

Hazard	Possible Impact
Human Health Emergency (Pandemic)	The 2020 COVID 19 Pandemic implications are still having a negative impact on communities. **Overall Impact (from HIRA)** Medically vulnerable persons are at risk. Increased use of non-recyclable PPE for staff. Critical infrastructure must be maintained with planning for staffing and acquisition of critical supplies. **Fire Services** Epidemic or pandemic breakout can present significant challenges to first responders causing potential fire service workplace absenteeism, and an increased demand for medical response and supplies as was illustrated during COVID 19. PPE was severely limited and supply chain issues for all equipment impacted operations. In many cases planned programming related to inspections and public education had to be delayed or modified.
Drought/Water Shortage	Low water levels in the Sheep River during summer months, paired with an increase in demand lead to water restrictions on the town. Increasing development as well as changes in climate can increase the frequency and severity of this strain. **Overall Impact (from HIRA)** Water restrictions on the town create dry conditions susceptible to grassfires and damage to crops. Vulnerable populations may be at an increased risk. Risk of damage to infrastructure. **Fire Services** Fire flow may be compromised, leaving residents vulnerable in case of a structure fire. Increased potential for grassfires. Prolonged dry conditions increase risk.
Tornado	The Okotoks and surrounding area have had tornado warnings (last known 2023) in effect and funnel clouds have been reported (2009). **Overall Impact (from HIRA)** Above ground power lines, toppled trees could impact buildings or roads and winds could take down communication towers. **Fire Services** Depending on the severity of the debris on roads and downed power lines, access to various sections of the road network could be limited to fire service response delaying emergency response times. Interruptions to communication towers could impact fire service communications.

Hazard	Possible Impact
HAZMAT spill – fixed site / transportation	No major reports of spills within town limits, however hazardous releases occur annually across the country in both fixed and transportation scenarios. Increased risk with railway through town as well as the airport. **Overall Impact (from HIRA)** Serious injury or fatality. Possible secondary emergencies such as fire or explosion when chemicals mixed with air, water, or other agents. Could require small- or large-scale evacuation of homes, businesses, school etc. **Fire Services** Depending on the severity and type of release, could pose secondary risk to firefighters on-scene. Must have proper knowledge of chemical release. May not be able to access the scene until proper back-up arrives or have proper information.
Civil Disturbance / Large Event or Crowd	Although no major reported events in the town, civil disturbances can arise frequently on any scale – due to major events and or disturbances between individuals etc. affecting public safety. **Overall Impact (from HIRA)** Serious injury or fatality. Possible secondary emergencies such as fire or explosion. Could require small- or large-scale evacuations and or shelter-in-place orders. **Fire Services** Could pose a threat to the safety of the responder(s) i.e. violence, injury with weapon, exposure to illicit substances.
Extreme Winter Weather	The region frequently experiences winter weather warning which include heavy snowfall and extreme cold. **Overall Impact (from HIRA)** Vulnerable people (homeless, elderly living alone etc.) at increased risk of injury or fatality. Dangerous driving conditions and power outages possible. **Fire Services** Increased risk of motor vehicle and medical calls. Dangerous driving conditions for responders. Potential power outages affecting communications and dispatch. Multiple simultaneous calls.

Identified Risks: *The town's 2021 Hazard Identification and Risk Assessment (HIRA) identifies the top hazards listed below that could impact the ability of OFR to deliver fire protection services:*

- *Flood (watercourse, heavy rain)*
- *Urban Wildland Interface (UWI) Fire*
- *Human health emergency (pandemic)*
- *Drought/water shortage*
- *Tornado*
- *HAZMAT spill – fixed site/transportation*
- *Civil disturbance*
- *Extreme winter weather (extreme cold, ice storm, blizzard etc.)*

SECTION 8
PUBLIC SAFETY RESPONSE PROFILE

8.1 Public Safety Response Agencies in Okotoks and Area

Public safety and response agencies refer to agencies and organizations that respond to specific types of incidents within a community that provide trained personnel and resources critical to upholding public safety. Each of these entities offer specialized skill sets in support of front-line operations. The types of response services offered might include fire protection, medical attention, rescue operations, policing activities, or dangerous goods response. In addition to responding individually to certain types of incidents, these entities work closely with one another in the event of major emergencies through a structured standardized response approach to ensure effective coordination among all response agencies.

Table 30 lists the public safety response agencies who could be able to assist the town in a collective emergency response effort and may contribute to the minimization of risk within the community. Identifying the public safety response agencies within the community can help the fire service understand the agencies that may be able to assist in the response to an emergency.

Table 30: Public Safety Response Agencies

Public Safety Response Agency	Types of Incidents they Respond to	Agency Role in Incident
Okotoks Fire & Rescue	• Residential, commercial, and industrial fires • Motor vehicle collisions • Medical emergencies • Natural gas and propane emergencies • Water/ice rescue • Carbon monoxide emergencies • Hazardous and flammable materials spills and leaks	• Fire suppression • First on scene medical response • Vehicle extrication • Dangerous goods containment/clean up (from vehicle) • Water and ice rescue • Leak detection and containment • Inspections and investigations
Royal Canadian Mounted Police (Okotoks Detachment)	• Federal provincial and municipal law infractions • Traffic calls, emergency calls, crowd control, public assistance • Major crimes i.e., homicide, kidnapping, organized crime • Investigations • Complaints	• Enforce Criminal Code • Enforce Municipal bylaws • Investigate cross-jurisdictional and major crimes • Offender transport
Community Peace Officers	• Bylaw infractions • Complaints/investigation of complaints	• Raise awareness of provincial acts and regulation and town bylaws • Enforce town bylaws

Public Safety Response Agency	Types of Incidents they Respond to	Agency Role in Incident
Alberta Fire Commissioner	• Fire	• Assistance with managing fire and obtaining resources beyond capability of town
Alberta Health Services (EMS)	• Advanced EMT pre-hospital care • Mass casualty incidents • Evacuation of health facilities (hospital, nursing homes etc.) • Disease related emergencies	• Ensuring provision of paramedic services at the site of the emergency • Ensuring continuity of paramedic services coverage is maintained throughout the remainder of the community • Liaise with the Medical Officer of Health to help facilitate medical services at the hospital.
Alberta Health Services (Calgary Zone) Okotoks Health and Wellness Centre	• Urgent care • Communicable Diseases • Health Inspection Services • Advice on Medical Services • Public Health Advisory • Liaise with long term care facilities, hospitals, retirement homes, and other vulnerable populations as required	• Same-day treatment of urgent but non-life-threatening health concerns • Provide information and instructions to the population on matters concerning public health. • Protect the health of the community from inherent health threats by enforcement of the applicable legislation. • Continue delivery of established programs to ensure continuity of care and general health protection.
Foothills Regional Victim Services	• Serious assault • Domestic violence • Sexual assault • Stalking	• Immediate crisis response • Vitim assistance • Victim support and needs assessment and referrals
CANUTEC	• Hazardous spills/emissions	• Product information • Safe handling information • emergency actions
Ministry of Environment and Protected Areas	• Spills • Environmental disasters	• Provide personnel and equipment for cleanup and remediation
Alberta Emergency Management Agency	• Large-scale emergencies requiring declaration of state of local emergency	• Provincial level support • Communication

Key Finding: *The Town of Okotoks is well supported by a number of public safety agencies withing the community.*

8.1.1 Mutual Aid Agreements

Large emergency events can quickly overwhelm the response capacity of most community fire departments in Alberta. This is especially true for smaller fire departments with limited resources. As a result, mutual aid and automatic aid agreements are a necessary component in adding response capacity for these low frequencies but potentially high or extreme consequence events.

The Town of Okotoks has formal mutual aid and/or cost sharing agreements with:

- Calgary South Emergency/Disaster Mutual Assistance with city, town, and village participants
- Intermunicipal Cost sharing with city, town, and village participants
- Municipal District of Foothills Number 31 "Master Shared Services Agreement", "Fire Suppression/Rescue Mutual Aid Agreement", "Fire Services Agreement"
- Town of Black Diamond "Fire Suppression Mutual Aid Agreement"
- Town of High River "Joint Fire Services Support Agreement"
- Town of Strathmore "Fire and Disaster Mutual Aid Agreement"

The principal purpose for entering into these mutual aid agreements is to promote and ensure that adequate and coordinated resources are made available when requested from, or by a neighbouring municipality to minimize the loss of human life and property and damage to the environment in the event of an emergency that requires such additional resources.

The Town of Okotoks is a partnering participant in the Foothills Regional Communications Board. The purpose of this Board is for the formation and staffing of an emergency communications organization to provide an adequate single call answer and dispatch system for the fire and emergency medical services.

All inter-municipal agreements should be reviewed regularly and adjusted as required. This provides for the updating and clarification of agreements and consideration of adjustments. It may also lead to discussions regarding localized fire service response agreements and considerations about whether automatic aid in defined circumstances might be of additional value.

Key Finding: *The Town of Okotoks has a number of formal mutual aid and cost sharing agreements in place with a number of agencies for fire and emergency services support.*

SECTION 9
COMMUNITY SERVICES PROFILE

9.1 Community Services

The community services profile assessment includes analysis of the types of services provided by other entities in the community, and those entities' service capabilities. This includes the presence or absence and potential abilities of other agencies, organizations, or associations to provide services that may assist in mitigating the impacts of emergencies to which the fire service responds. The following sections consider these community service characteristics within the Town of Okotoks.

Fires and other emergency events can have devastating effects on a community and at times can overwhelm public safety and security agencies' capacity to respond. In an emergency event, community-based agencies, organizations, and associations can provide surge capacity to the response and recovery efforts of first responders and a useful resource to call upon if integrated into the emergency management framework early on. These types of affiliations can contribute a variety of capabilities essential to response and recovery efforts including support in the areas of communications, health care, logistics, shelter, food and water supply, emergency clothing, and more specialized skill sets. Table 31 lists the community agencies, non-government organizations (NGOs), which area available to the town.

Table 31: Community Service Agencies

Community Service Agency	Assistance Provided
Okotoks Family Resource Centre	• Support to families and children struggling with mental health issues • Provide child protective services • Support to families struggling with financial issues
Foothills Search and Rescue	• Assist RCMP, AEMA and other government agencies with ground search and rescue, disaster relief and civil emergencies
Local School Boards: Foothills School Division	• Life safety education
Foothills Advocacy in Motion (FAIM)	• Supports adults with developmental disabilities • Residential services and community participation support
Alberta Health Services - Counselling	• Addiction and mental health support
Non-Governmental Organizations	
Canadian Red Cross	• Assist with obtaining basic needs of those victims of large-scale disaster • Emergency shelter and feeding locations • Donation management

Community Service Agency	Assistance Provided
Salvation Army	• Donation management • Food/clothing • Victim support • Long-term recovery support for victims
St John's Ambulance	• Medical support for reception centres • Health related screening • Transportation for victims • Assist with evacuation of hospitals and health care facilities • Training
Alberta SPCA	• Responds to needs of animals in event of emergency/disaster

Key Finding: *This list of community services demonstrates that the town is very well supported in the event of a major or serious emergency.*

SECTION 10
ECONOMIC PROFILE

10.1 Economic Sectors and Employers in the Town of Okotoks

An economic profile assessment includes analysis of the economic sectors affecting the community that are critical to its financial sustainability. This involves economic drivers in the community that have significant influence on the ability of the community to provide or maintain service levels. The following sections consider these economic characteristics within the Town of Okotoks.

Certain industries, employers and events contribute to the financial sustainability and economic vitality of a community. A fire or other emergency at key sectors and employment facilities within a community could have significant impacts on the local economy and employment.

The top employers in the town are summarized in Table 32 below.

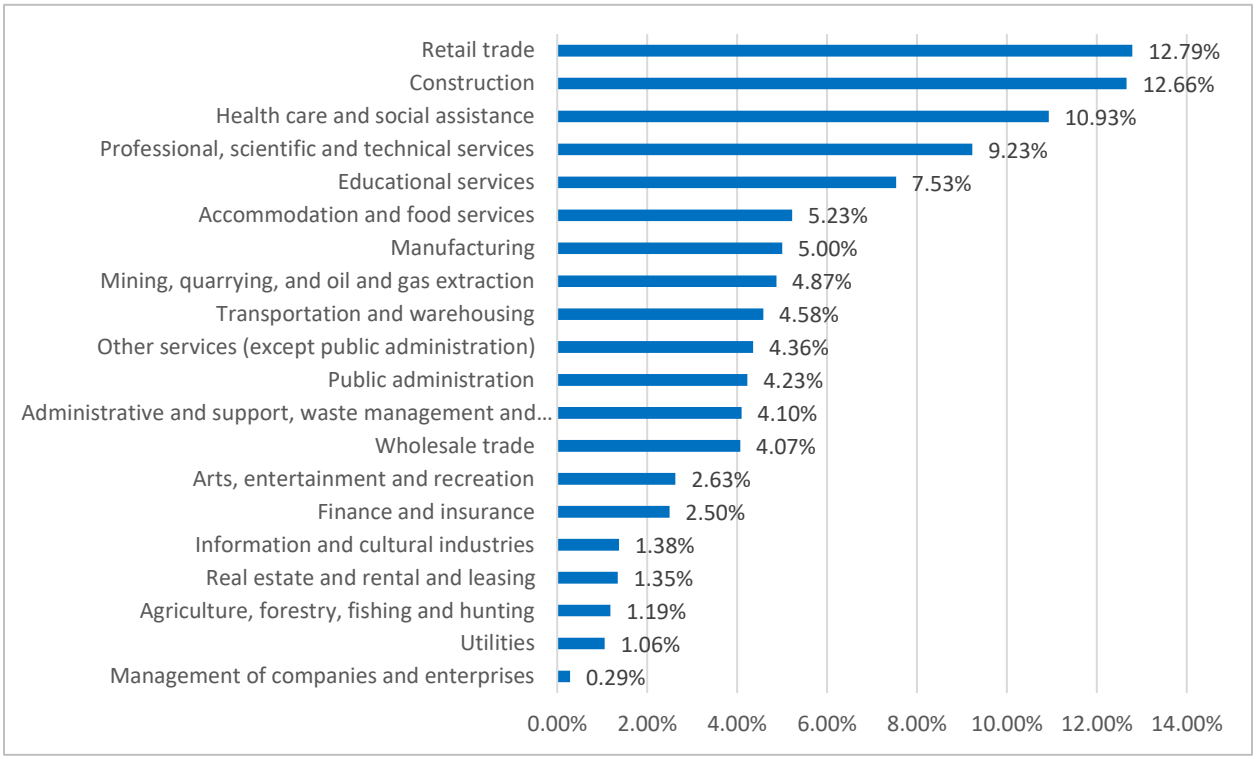
Table 32: Major Employers in the Town of Okotoks

Company	Product/Service	Number of Employees
Foothills School Division	Education	870
Christ the Redeemer Catholic Schools	Education	425
COSTCO Wholesalers	Grocery Store	310
Okotoks Health and Wellness Centre	Health	303
Town of Okotoks	Municipal Services	289
Walmart Canada	Retail	261
Sobeys	Grocery Store	160
Tudor Manor	Assisted Living for Seniors	142
Home Depot	Retail	114
Canada Safeway	Grocery Store	110
Save on Foods	Grocery Store	104
Bow Mark Paving and Construction	Construction	101
McDonald's	Eating Establishment	98
Tim Hortons	Eating Establishment	85
Southland Transportation	Transportation	78
Canadian Tire	Retail, Automotive	75
D'arcy Ranch Golf Club	Gold Course	70
Mullen Group	Transportation	57
Christine's No Frills	Grocery Store	50

Key Finding: *The town has identified top employers that contribute to the economic vitality of the community. The largest of these are education and service (retail, grocer and eating establishments) sectors.*

The figure below represents the division across job sectors in the town. As previously noted, a large percentage of the labour force works beyond the town limits. Although a fire or emergency event may not impact the fire service directly, impact to industries supporting the community can have secondary impacts on the safety and stability of the town.

Figure 13: Economic Sectors – Town of Okotoks – 2021 Census, Statistics Canada



As displayed, roughly 12.79% of the employed population in Okotoks works in the retail trade sector, with an additional 12.66% in construction and 10.93% in healthcare and social assistance. These figures in conjunction with the top employers in the town suggest that the majority of those represented in the top sectors, except for construction work within the town. It is assumed, particularly for the professional, technical services and construction industry, that a large percentage of those may be working outside the town. Impacts to these sectors could have a significant social and economic impact on the town.

Key Finding: *Disruptions to the retail, construction, health, and educational services could impact more than 50% of the labour force. Incidents having a long-term impact on these sectors (such as a pandemic, government disruptions etc.) could have negative consequences and result in secondary incidents i.e., medical and distress calls.*

SECTION 11
PAST LOSS & EVENT HISTORY

11.1 Past Loss

The past loss and event history profile assessment is an analysis of the number and types of emergency responses, including dates and times, injuries, deaths and dollar losses, and a comparison of the community's fire loss statistics with provincial fire loss statistics. Evaluation of previous response data will inform decisions on fire protection services delivery including public fire safety education and inspection programs. The following sections consider these past loss and event history characteristics within the town of Okotoks, and where possible, in comparison to the Province of Alberta.

Analysis of historical data provides valuable insight into understanding the specific trends within a community. Assessing the key factors of life safety risk and fire risk in relation to provincial statistics provides a foundation for evaluating where specific programs or services may be necessary. The analysis within this section is based on the Office of the Fire Commissioner's statistical report for the Town of Okotoks.

11.1.1 Total Fire Loss

Analysis of the total fire loss within the town over the five-year period from January 1st, 2018, to December 31st, 2022, as displayed in Table 33 includes two categories representing the primary types of fires and the total amount of dollar loss associated with these fires. This includes 117 structure fires and 22 vehicle fires representing $8,056,000 in total dollar loss. Over this five-year period, the town averaged 28 fires per year and $1,611,200 in property loss per year. It should be noted that losses are estimated by the fire service, and the actual loss amount is unknown and not published by the Insurance Board of Canada.

As expected, the majority of loss is associated with structural fires, although year over year the total loss significantly varies despite the number of fires (both structural and vehicle) remain fairly consistent.

> ***Key Finding:*** *Between January 1, 2018, and December 31, 2022, the number of fires within the town remains fairly consistent year over year, however the total loss varies significantly in some years. No data was provided to assess the large increase in losses in 2022.*

Table 33: Total Fires and Loss – Town of Okotoks and Province of Alberta (2018-2021)[28]

Year	# Structure Fires	Loss ($)	# Vehicle Fires	Vehicle Loss ($)	Total Fires	Total Loss
2018	26	$2,200,000	5	$32,000	31	$2,232,000
2019	22	$190,000	8	$3,000	30	$19,3000
2020	19	$570,000	1	$15,000	20	$585,000
2021	26	$621,000	6	$135,000	32	$756,000
2022	24	$4,200,000	2	$90,000	26	$4,290,000
Total	117	$7,781,000	22	$275,000	139	$8,056,000
Average	23	$1,556,200	4	$55,000	28	$1,611,200
% of All Fires	84.17%	96.56%	15.82%	3.41%	100.00%	100.00%

[28] *Fire Commissioners Office Data – Okotoks 2018-2021*

11.1.2 Fires by Occupancy Type

This section assesses the structure fires that occurred over the period from January 1st, 2018, to December 31st, 2022, based on the type of occupancy. Information for this analysis was provided by OFR (note totals not reflective of above).

The analysis in Table 34 indicates that during this period, Okotoks recorded a total of 82 structure fires (as classified under the NBC). As expected, the majority (84.34%) of all fires were attributed to residential fires (Group C). This is consistent with provincial averages. The second most significant number of fires occurred in Group E – Mercantile. Further analysis of dollar loss and years in which fires occurred, may account for differences in loss year after year. Provincial data on the rate of mercantile fires was not available for comparison at the time of this analysis.

Table 34: Fire by Occupancy Type (2018-2022)

Group	Occupancy Classification	# of Fires	% of Fires
A	Assembly	3	3.61%
B	Care & Detention	1	1.20%
C	Residential	70	84.34%
D	Business & Personal Services	1	1.20%
E	Mercantile	7	8.43%
F	Industrial	0	0.00%
Other	Not Classified in NBC	1	1.20%
Farm	Classified in the NBC	0	0.00%
	Total	82	100.00%

11.1.3 Fatalities and Injuries

As shown in Table 35, according to the Office of the Fire Commissioner, over the five-year period from January 1st, 2018, to December 31st, 2021, there were 8 reported injuries and one reported fire fatality within the town.

Table 35: Civilian Fatalities and Injuries (2018-2021)

Year	# Civilian Injuries	# Civilian Fatalities
2018	3	0
2019	3	0
2020	0	0
2021	0	1
2022	2	0
Total	8	1

When analyzing the rate of injuries by occupancy type as in the table below, 100.00% of injuries occurred in residential occupancies. This data concludes that over this time period, roughly 10% of all residential fires resulted in injuries and 0% resulted in fatalities.

Table 36: Civilian Injuries and Fatalities by Occupancy Types (2018-2022)

Group	Occupancy Classification	Injuries	Fatalities
A	Assembly	0	0
B	Care & Detention	0	0
C	Residential	7	0
D	Business & Personal Services	0	0
E	Mercantile	0	0
F	Industrial	0	0
Other	Not Classified in NBC	1	1
Farm	Classified in the NBC	0	0

Comparable data was not available for the province, however between 2012 and 2021, there were reportedly 23,674 'home fires' (the term 'home' includes one/two family dwellings, apartments, and mobile homes), resulting in 211 deaths and 963 injuries. This would suggest that the rate of fatalities resulting from 'residential' fires is approximately 0.89% and the rate of injuries is roughly 4.01%. Further analysis would be required to make a more direct comparison, particularly with a community with similar demographics and service levels to that of Okotoks, however the data would suggest that the town may experience a higher rate of injuries in residential fires than that of the provincial averages.

Identified Risk: *Preliminary data would suggest that when compared to provincial averages, the town may experience a higher rate of injuries associated with residential fires, however further analysis using statistics from a comparable municipality to that of Okotoks would provide more conclusive results.*

11.1.4 Reported Fire Cause

The NFPA defines fire cause as "the circumstances, conditions, or agencies that bring together a fuel, ignition source, and oxidizer (such as air or oxygen) resulting in a fire or a combustion explosion."[29] Assessing the possible cause of the fires reported is an important factor in identifying potential trends or areas that may be considered for introducing additional public education or fire prevention initiatives. Table 37 presents the reported fire causes for the town compared to the province over the five-year period 2012-2021 (data beyond 2021 was not available at the time of analysis). Overall, the town had a similar rate of reported fire causes as the province. Anything with a greater than 5% difference was highlighted in the

[29] *Source: N.F.P.A., Glossary of Terms, 2019 Edition.*

table below. The largest discrepancy was between exposure fires which were reportedly a rate of 16.78% lower in the towns. This discrepancy is likely attributed to the building stock profile of the town as previously noted, is predominantly single detached and low to medium density. Discrepancies in the number of unknow causes may be attributed to the low overall sample size for the town or capacity to investigate, however the difference is relatively small given the sample size.

Apart from unknown causes, the greatest reported fire causes were due to cooking (14.86% and electrical distribution equipment (12.16%). There may be some value in expanding educational programs surrounding these causes.

Table 37: Reported Fire Cause – Town of Okotoks and Province of Alberta (2012-2021)

Home Fire Causes	Okotoks # Fires	Okotoks % Fires	Alberta # Fires	Alberta % Fires
Appliance/Equipment Related	3	4.05%	374	1.58%
Arson/Set Fire	5	6.76%	1957	8.27%
Candle (accident)	1	1.35%	294	1.24%
Child Fireplay	0	0.00%	81	0.34%
Clothes Dryer	3	4.05%	296	1.25%
Cooking	11	14.86%	3,443	14.54%
Electrical Distrib. Eqpt.	9	12.16%	1,809	7.64%
Exposure Fire	3	4.05%	4,931	20.83%
Flammable Gas Ignition	1	1.35%	93	0.39%
Flammable/Comb. Liquid Ignition	1	1.35%	160	0.68%
Heating Eqpt. Related	7	9.46%	1,124	4.75%
Inadequate Control of Open Fire	0	0.00%	46	0.19%
Light/Fluorescent Bulb	0	0.00%	192	0.81%
Match/Lighter Not Used for Smoking	0	0.00%	135	0.57%
Other Causes/Unknown	24	32.43%	6,309	26.65%
Smoking	5	6.76%	2,350	9.93%
Welding/Torch Too Close	1	1.35%	79	0.33%
Total	74	100.00%	23,673	100.00%

Key Finding: *The town has a significantly lower number of exposure fires when compared to the province, likely attributed to lower density residential areas.*

Identified Risk: *The leading reported cause of fire in the Town of Okotoks is cooking.*

11.1.5 Ignition Source

Table 38 provides reported sources of ignition for fires in the town of Okotoks between 2012 and 2021, comparable data for the province was not available at the time of analysis. The large number of unknown ignition sources may indicate a need for further analysis of data and/or investigation capacity.

Table 38: Source of Ignition (2012 – 2021)

Source of Ignition	Okotoks # Fires	Okotoks % Fires
Appliances and Equipment - unclassified or unknown	4	2.76%
Battery, Rectifier - includes charger, rotary convertor	2	1.38%
Block Heaters	2	1.38%
Candle, Taper	1	0.69%
Central Heating Unit - includes furnace, boiler, stoker	4	2.76%
Chemical Reaction, Spontaneous Combustion	1	0.69%
Clothes Dryer	4	2.76%
Commercial and Industrial Machinery, Equipment. Includes sawing, planning, grinding, forming, opening	1	0.69%
Electrical Distribution Equipment - unclassified or unknown	2	1.38%
Electrical Equipment - unclassified or unknown	6	4.14%
Exposure to Open Fire. Includes campfire, bonfire, warning flare, rubbish fire, -open- incinerator	1	0.69%
Exposure, Structure Attached	1	0.69%
Exposure, Structure Detached	8	5.52%
Exposure, Vehicle (As described in Section B - property classifications 8400-8890)	4	2.76%
Extension Cord	2	1.38%
High Intensity Residential Fire	3	2.07%
Igniting Object - cannot be determined	38	26.21%
Individual Refrigeration Unit - includes refrigerator, freezer, refrigerated vending machine	1	0.69%
Internal Combustion Engine - includes exhaust system	3	2.07%
Masonry, Brick Fireplace	1	0.69%
Match or lighter - cannot be determined	4	2.76%
Match, lighter (not used in conjunction with smoking)	2	1.38%
Miscellaneous Igniting Object - Unclassified	6	4.14%

Source of Ignition	Okotoks # Fires	Okotoks % Fires
Motor 1 H.P. and over. Includes motor forming an integral part of an appliance or separated by a be	1	0.69%
Motor under 1 H.P. Includes motor forming an integral part of an appliance or separated by a belt,	1	0.69%
No Igniting Object (i.e. lightning)	4	2.76%
Open Fired Broiler, Portable Type - includes Barbeque	4	2.76%
Oven of Stove, Range	2	1.38%
Permanent Electric Wiring, Cable - includes junction box, power line	5	3.45%
Portable Space Heater - includes room heater, salamander	4	2.76%
Smoker (meat, fish, etc.)	1	0.69%
Smoker's Material - Cigarette	5	3.45%
Smoker's Material - Lighter	1	0.69%
Smoker's Material and "Open" Flames - unclassified or unknown	2	1.38%
Smoker's Material. Includes cigarette, pipe, cigar and/or matches, lighter when used in conjunction	1	0.69%
Stationary Space Heater. Includes wall furnace, unit heater, room heater, heating stove, baseboard	1	0.69%
Stove, Range, top burner area - involving fire in pan	2	1.38%
Stove, Range, top burner area - involving fire in pot used as a deep fat fryer	2	1.38%
Stove, Range, top burner area - involving other circumstances	2	1.38%
Switch, Outlet - includes receptacle, socket	2	1.38%
Toaster, Waffle Iron	1	0.69%
Torch, other than cutting, welding. Includes plumbers' furnace, blow torch, plumbers torch, Bunsen burner	2	1.38%
Water Heater	1	0.69%
Total	145	100.00%

Key Finding: *The town has a significantly high number of fires with reportedly unknow sources of ignition.*

11.1.6 Smoke Alarm Status

Smoke alarms are required on every level of a dwelling and are the first line of defense. As a result, smoke alarm programs and compliance are a key component of public education and fire prevention activities provided by municipal fire services across the province. As below, the provincial data clearly indicates that when a smoke alarm is present and known to have activated, there is a lower potential death rate*[30] and alarms assist with the evacuation of occupants. The exception to this fact is in the case of those under the influence or those with mental challenges that prevent them from evacuating upon hearing an alarm. All of these factors should be considered when developing educational and awareness programs and campaigns. During the time of this analysis, the corresponding data was not available for the Town of Okotoks. The town should consider reviewing and/or collecting this data in the future.

Table 39: Smoke Alarm Installation Alberta (2017 – 2021)

Smoke Alarm Installation	Fires	% of Fires	Deaths	% of Deaths	Injuries	% of Injuries
Installed	1891	23	48	42	180	45
Not Installed	6321	76	64	57	213	54
Total	8212	100	112	100	393	100

Table 40: Smoke Alarm Activation Alberta (2021-2017)

Smoke Alarm Activation	Fires	% of Fires	Deaths	% of Deaths	Injuries	% of Injuries
Activated	770	40	11	22	96	53
Activation - unknown	622	32	27	56	47	26
Not Activated	499	26	10	20	37	20
Total	1891	100	48	100	180	100

[30] There is a percentage of deaths and injuries when it is unknown if alarm was activated but assumed it was present

Table 41: Smoke Alarm Assistance to Occupants Alberta (2021-2017)

Alarm Assistance to Occupants	Fires	% of Fires	Deaths	% of Deaths	Injuries	% of Injuries
Alarm assisted occupants to evacuate	520	67	3	27	73	76
Alarm did not assist occupants to evacuate	84	10	1	9	12	12
Not applicable/no occupants	117	15	0	0	4	4
Occupant evacuation unknown	49	6	7	63	7	7
Total	770	100	11	100	96	100

Table 42: Reasons Alarms Did Not Assist Alberta (2017-2021)

Reasons Alarms Did Not Assist	Fires	% of Fires	Deaths	% of Deaths	Injuries	% of Injuries
Alarm inaudible	4	4	0	0	0	0
Physical/mental challenge	3	3	1	100	0	0
Unable to evacuate-age related	2	2	0	0	0	0
Under the influence of drugs/alcohol	15	17	0	0	7	58
Unnecessary to evacuate	60	71	0	0	5	41
Total	84	100	1	100	12	100

Table 43: Reason Smoke Alarm Not Activated Alberta (2021-2017)

Reasons Alarms Not Activated	Fires	% of Fires	Deaths	% of Deaths	Injuries	% of Injuries
AC not connected/disabled	38	7	0	0	7	18
Dead battery	25	5	3	30	2	5
Mechanical failure	37	7	4	40	3	8
No battery	35	7	2	20	2	5
Not enough smoke	354	70	1	10	22	59
Unsuitable location	10	2	0	0	1	2
Total	499	100	10	100	37	100

Key Finding: *Provincial data suggests that the presence and proper maintenance of smoke alarms does lower the rate of fire fatalities and injuries with the exception for those under the influence of drugs and alcohol and who have mental challenges. OFR does not have this data readily available for analysis.*

11.2 Event History

Event history seeks to apply OFR historic emergency call data to develop an understanding of community risks. OFR provided the data used in this analysis for all historical calls for the five-year period from January 1st, 2018, to December 31st, 2022. This section provides a statistical assessment of historic emergency call volumes for the town.

The volume and frequency of historic calls informs the understanding of response probability. The types of calls inform the potential consequences OFR responses and calls for service. The combined consideration of these elements provides an understanding of community risk, based on past calls for service.

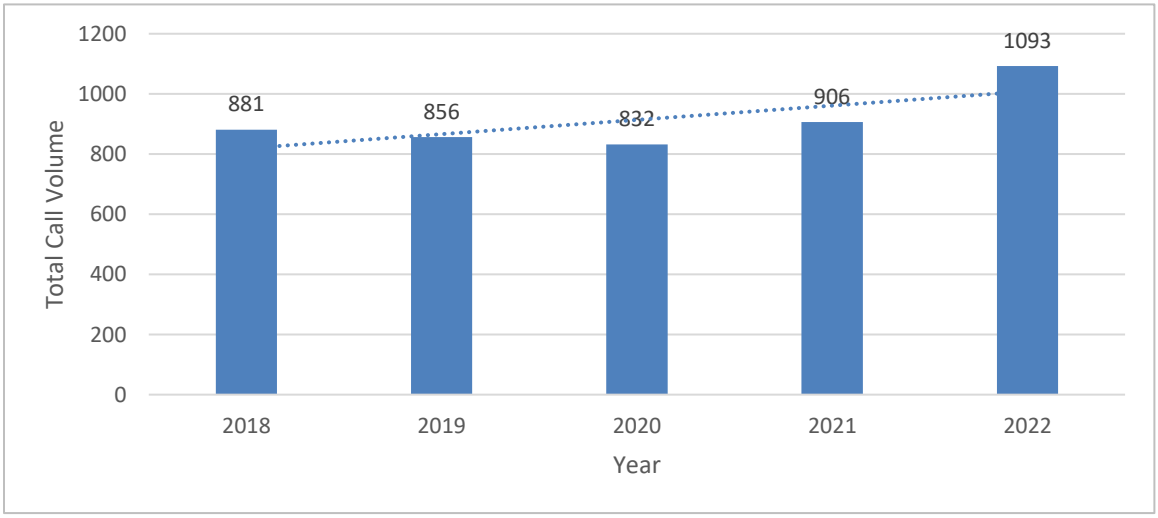
11.2.1 Emergency Call Volume – All Incident Types

This section illustrates the historical emergency call volume by year, day of week, and time of day for all types of incidents responded to by OFR for the time period from January 1st, 2018, to December 31st, 2022.

11.2.1.1 Annual Emergency Call Volume – All Incident Types

The analysis of annual emergency call volume can be beneficial in understanding evolving trends or changes in emergency response demand. A summary of the total number of emergency calls for the period from January 1st, 2018, to December 31st, 2022, is shown in Figure 14. This analysis identifies an increase in the total emergency call volume within the town this period from 881 calls in 2018 to 1093 calls in 2022. This represents a total increase of 19.40% over this five-year period with an average of 914 calls per year. This upward trend should be monitored, as it impacts service levels.

Figure 14: Annual Call Volume – All Incidents (2018-2022)

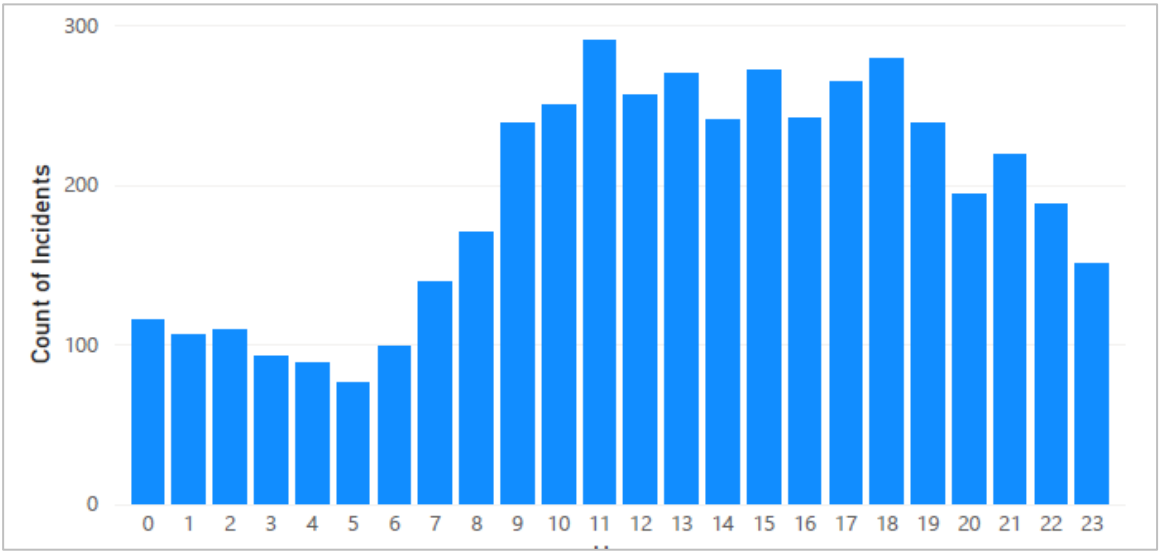


Identified Risk: *Over the period from January 1st, 2018, to December 31st, 2022, the volume of emergency calls responded to by OFR increased by 19.40%.*

11.2.1.2 Daily Emergency Call Volume – All Incident Types

Figure 15 indicates that for the period from January 1st, 2018, to December 31st, 2022, call volume tends to steadily increase between the hours of between 8 A.M. and 9 A.M. and remain steady until 7 P.M. when they begin to decline. Call volume is lowest between the hours of 12 A.M. and 5 A.M.

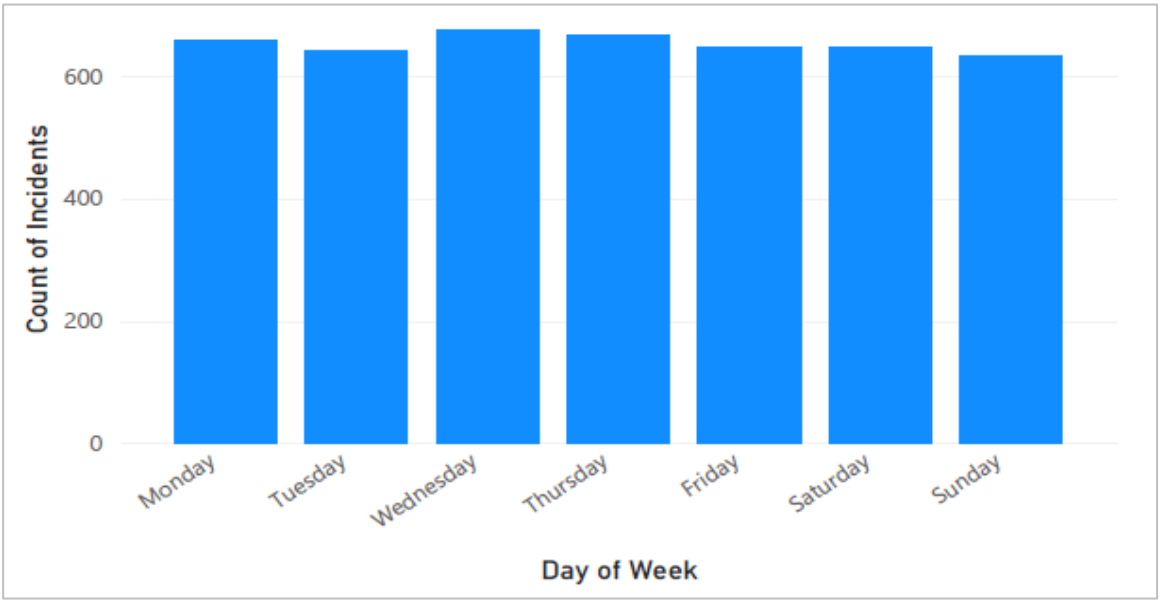
Figure 15: Okotoks Incidents by Time of Day (2018 – 2022)



Identified Risk: *The peak call time in the town is between the hours of 9 AM and 7 PM*

The Town of Okotoks shows a steady trend of incidents throughout the week with very little fluctuation between days of the week.

Figure 16: Okotoks Incidents by Day of the Week (2018 – 2022)



Key Finding: *There is very little fluctuation in call volume thought the week.*

11.2.1.3 Total Emergency Call Volume – All Incident Types

This section analyzes all emergency call volumes for the period from January 1st, 2018, to December 31st, 2022. Table 44 below illustrates that during this period 51.99% of the total emergency calls that OFR responded to were medical co-response calls. The second most common call was alarm-no fire.

Table 44: Total Number of Calls (2018-2022)

Call Type	2018	2019	2020	2021	2022	Total	%
Medical Co-Response	509	426	389	470	581	2,375	51.99
Alarm-No Fire	180	229	240	207	294	1,150	25.18
Vehicle Accident	35	49	34	66	64	248	5.43
Rescue	22	27	41	54	35	179	3.92
Gas Leak	32	28	27	24	27	138	3.02
Public Service	32	23	27	17	29	128	2.80
Complaint/ Controlled Burn	15	17	24	23	21	100	2.19
Public Hazard	22	23	24	20	9	98	2.15
Rubbish or Gass Fire (no loss)	12	18	10	10	11	61	1.34
Fire	15	12	9	9	15	60	1.31
Other/Unclassified	9	6	10	6	9	40	0.88
Total	881	856	832	906	1,093	4,568	100.00

Key Finding: *Between January 1, 2018, and December 31, 2022, the majority of responses were attributed to responding medical ca-response calls (51.99%) and alarm no fire calls (25.18%).*

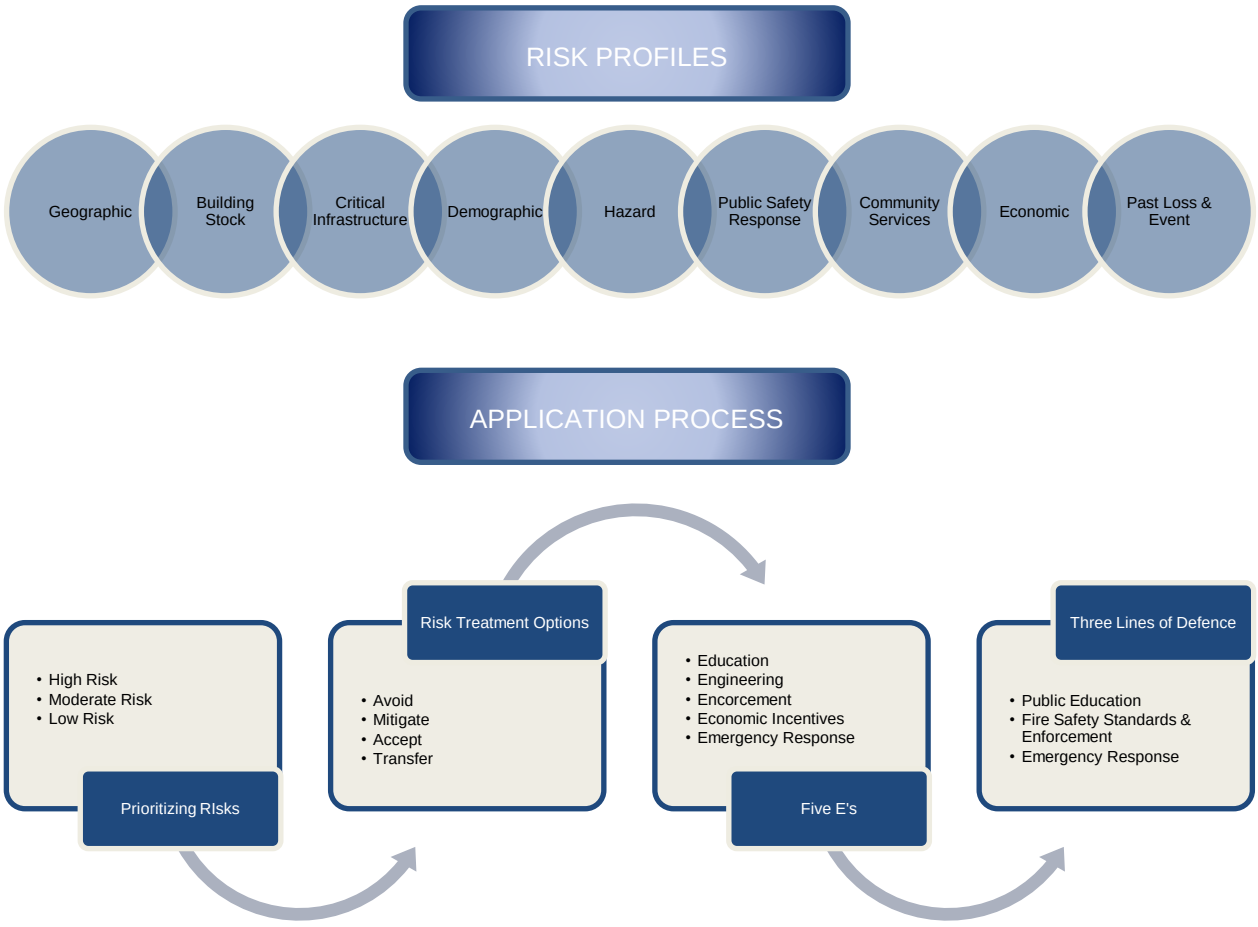
SECTION 12
IDENTIFIED RISKS AND RISK TREATMENTS

12.1 Prioritizing Risk

Following the probability and consequence levels as described in the subsections below, the risk assignment process considers the probability and consequence of each identified risk. This will result in each risk having a risk level (e.g., low, moderate, or high) assigned. These risk levels will then be used to assist in the prioritization of risks as part of a FSMP.

This section of the CRA brings together all the key identified risks and, where applicable takes them through a risk treatment process aligned with the "Five E's" of Community Risk Reduction as outlined by NFPA 1300, and three lines of defense to inform the analysis and recommendations for within a FSMP or another strategic document as shown in Figure 17.

Figure 17: Risk Conclusions Application Process



Source: Adapted from NFPA 1300

12.1.1 Risk assignment Process Overview

There are three steps included in the risk assignment exercise used for this CRA:

1. **Determine a probability level:** The probability of a fire or emergency event occurring can be estimated in part based on historical experience of the community and that of the province. Table 45 presents the probability levels and the adjusted descriptions.

Table 45: Probability Level

Likelihood Category	Description
Rare	• May occur in exceptional circumstances No incidents in the past 15 years
Unlikely	• Could occur at some time, especially if circumstances change 5 to 15 years since last incident
Possible	• Might occur under certain circumstances 1 incident in the past 5 years
Likely	• Will probably occur at some time under current circumstances Multiple or recurring incidents in the past 5 years
Almost Certain	• Expected to occur unless circumstances change Multiple or recurring incidents in the past year

Source: OFM TG 02-2019[31]

2. **Determine a consequence level:** The consequences of an emergency event relate to the potential losses or negative outcomes associated with the incident. There are four components that should be evaluated in terms of assessing consequence. These include:
   a) Life Safety: Injuries or loss of life due to occupant and firefighter exposure to life threatening fire or other situations.
   b) Property Loss: Monetary losses relating to private and public buildings, property content, irreplaceable assets, significant historic/symbolic landmarks, and critical infrastructure due to fire.
   c) Economic Impact: Monetary losses associated with property income, business closures, downturn in tourism, tax assessment value and employment layoffs due to fire.
   d) Environmental Impact: Harm to human and non-human (e.g., wildlife, fish, and vegetation) species of life and general decline in quality of life within the community due to air/water/soil contamination because of fire or fire suppression activities. Table 46 presents the consequence levels.

[31] *Office of the Fire Marshal, Community Risk Assessment Technical Guideline TG 02-2019, Section 4.1, Pg 13*

Table 46: Consequence Levels

Consequence Category	Description
Insignificant	• No life safety issue • Limited value or no property loss • No impact to local economy • No effect of general living conditions
Minor	• Potential risk to life safety of occupants • Minor property loss • Minimal disruption to business activity and/or • Minimal impact on general living conditions
Moderate	• Threat to life safety of occupants • Moderate property loss • Poses threat to small local businesses • Could pose threat to quality of the environment
Major	• Potential for large loss of life • Would result in significant property damage. • Significant threat to businesses, local economy, and tourism Impact to environment would result in a short term, partial evacuation of residents and businesses
Catastrophic	• Significant loss of life • Multiple property damage to significant portion of the municipality • Long term disruption of businesses, local employment, tourism • Environmental damage that would result in long-term evacuation of residents and businesses

Source: OFM TG 02-2019[32]

3. **Establish the risk level:** (i.e., low, moderate, or high) for each risk based on the identified probability and consequence for each event. Once probability and consequence are determined, the level of risk is calculated as it pertains to risk levels illustrated in a risk matrix. In a risk matrix, probability and consequence are defined on separate scales with varying descriptors providing directions on how to assign the probability and consequence of an event. Table 47 shows the risk matrix for this CRA.

[32] *Office of the Fire Marshal, Community Risk Assessment Technical Guideline TG 02-2019, Section 4.2 pg. 14*

Table 47: Probability & Consequence Risk Matrix

Probability/ Consequence	Insignificant 1	Minor 10	Moderate 100	Major 1,000	Catastrophic 10,000
Almost Certain	Moderate	Moderate	High	High	High
Likely	Moderate	Moderate	Moderate	High	High
Possible	Low	Moderate	Moderate	Moderate	High
Unlikely	Low	Low	Moderate	Moderate	Moderate
Rare	Low	Low	Low	Moderate	Moderate

Source: OFM TG 02-2019[33]

12.1.2 Assigned Risk Levels

The purpose of assigning a risk level is to assist in the prioritization of the range of risks that were identified as part of this CRA. The results of the risk assignment process are presented in the following table. Where possible, quantitative data was used to inform the risk assignment as described in the rationale in the table.

[33] *Office of the Fire Marshal, Community Risk Assessment Technical Guideline TG 02-2019, Appendix B Pg B1*

Table 48: Identified Risks and Risk Assignment

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Geographic Profile					
Approximately 60% (6,759) of commuters travel from Okotoks to the City of Calgary for work, and 60% of all commuter's commute between the hours of 6:00 a.m. and 8:00 a.m., increasing the risk of MVCs along major routes, particularly during these times. Call volume by time of day (Section 11.2.1.2) reflects an increase in call volume during these times, as well as a moderate increase between 5 P.M. and 6 P.M. before declining, which may be indicative of commuters returning from the city.	Almost Certain	• 60% of commuters from the town travelling to the city at the same time • Motor vehicle collisions account for 5% of calls over last 5 years • Motor vehicle collisions occur annually • Between hours of 6 A.M. and 9 A.M. there is a noticeable increase in call volume	Minor	• Potential risk to life safety • Property loss is typically minor • Minimal disruptions	Moderate
The town has an extensive dangerous goods bylaw to prevent major spills in central parts of town. Incidents can still occur on major routes however, including Highway 2A over Sheep River.	Unlikely	• No major releases reported in the town, however provincially dangerous goods releases on highways occur annually. • Report (2018) from Statistics Canada indicates there were 464 incidents involving dangerous goods in Canada, 48.5% of which occurred in Alberta[34]. • Over half of all dangerous goods release incidents occurred on roadways.	Moderate	• Over half of all dangerous goods release incidents occurred on roadways. • Threat to life safety, moderate property, and environmental damage.	Moderate

[34] *As retrieved from Dangerous goods incidents in Canada, 2018 (statcan.gc.ca)*

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Geographic Profile					
At grade level rail crossings have the potential to create a physical barrier to connectivity to the roadway network, causing delays in response time. There are six at-grade rail crossings throughout the town.	Possible	• Trains can pass through the town at any time • Alternate routes exist however timing unknown	Minor	• Delay in response times could have impact on outcome of response	Low
There is a low probability, however, a high degree of risk to the public and the environment associated with a train derailment in the area; with or without a release of dangerous goods.	Unlikely	• July 2022 train carrying grain derailed near Bassano Alberta • December 2022 train derailed near Taber Alberta • 2018 three trains derailed in southern Alberta • In comparison to number of trains travelling across the province, frequency of derailment is low	Major	• Potential for large loss of life • Potential for major property or environmental damage, particularly along Sheep River which serves as the town's drinking water supply	Moderate
Given the location of the Okotoks Regional Airport, within a residential area, there is a possibility of an air incident requiring a response from OFR and could directly or indirectly (reduced service levels) affect the town.	Possible	• Between 2007 and 2019 there have been 9 reported incidents at the Okotoks airport, including one fatality	Moderate	• Potential threat to life safety • Moderate loss of property damage (small planes)	Moderate

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Geographic Profile					
Areas around Sheep River are frequented by residents of the town and visitors for recreational activity that may pose the risk of injury and/or rescue. Some areas along the river are difficult or impossible to reach by apparatus.	Almost Certain	• Water and ice rescues occur annually	Minor	• Potential risk to life safety • Property damage not expected	Moderate
With only two crossings bridging the north and south portions of the town, Sheep River could pose a challenge to response times if either were unavailable.	Unlikely	• There are stations on both sides of the river • Possible to have concurrent calls • Mutual aid agreements do exist • No scheduled major maintenance of the bridge	Moderate	• Potential risk to life safety • Moderate property damage for extensive delays	Moderate
Despite flood mitigation efforts, portions of the town are in a flood hazard area, including popular, high density recreational and residential areas.	Likely	• Last major flood event in 2013 • Several significant floods in past • Climate change increasing frequency of severe weather	Major	• Could cause extensive damage and disruptions • Overland flooding in nearby areas could have indirect impact on town and emergency services	High
The town has an extensive network of trails frequented by visitors on a regular basis. Some portions of the trail are inaccessible or difficult to access by vehicle or apparatus, which could impede a rescue response.	Almost Certain	• Rescue calls occur annually • No statistics on how many calls delayed by access although possible	Minor	• Threat to life safety • No or minimal property damage expected	Moderate

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Geographic Profile					
There is a considerable risk of a grass fire in areas of urban interface. The landscape surrounding the town is primarily agricultural, and increasing development in natural areas increases the threat of a wildfire impinging on the town.	Almost Certain	• Multiple grass fires around Calgary and Okotoks areas in 2023	Major	• No major losses to date however wildfires increasingly burning more area in recent years and in particular 2023. • Resources may be unavailable to assist during busy seasons	High
Building Stock Profile					
As with most jurisdictions, residential buildings account for the majority of the stock in Town of Okotoks and are the most common building involved in structural fires and attribute to the most fatalities and injuries.	Almost Certain	• Residential fires occur annually in the town • There have been 8 injuries and one fatality in the town between 2018 and 2022	Moderate	• Potential for loss of life • Moderate property loss	High
In order to meet the projected housing demands associated with population growth in the town, new developments will primarily be of medium density housing, therefore increasing the fire-risk potential in these areas.	Likely	• Residential fires account for most number of fires in Okotoks • Exposure fires are a common cause of fire in Okotoks	Major	• Potential for large loss of life and significant property damage including businesses in medium density areas	High
Extensive residential and mixed-use development in the southeast and northern portion of the town could increase fire risk and service demands in these areas.	Almost Certain	• The increase in both housing and commercial properties will increase service demand levels • Residential fires occur annually in the town	Moderate	• Potential for loss of life • Moderate property damage to residential and loss of business	High

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Building Stock Profile					
Data provided by the 2021 census indicates that more than 11.17% of the town's residential building stock was built prior to the introduction of the 1984 fire code and at least 2.24% of the building stock was built prior to the introduction of the building code.	Almost Certain	• No data on number of fires as related to building age however residential fires account for most fires in Okotoks, assumed may affect at least one building under these conditions	Moderate	• Potential for loss of life • Potential for moderate property damage and loss of business	High
The number of new homes being built with lightweight construction poses a risk to firefighter safety and can hinder the ability for occupants safely evacuate in a timely manner.	Almost Certain	• The presence of lightweight construction has proven to increase the rate and severity of residential fires • Lightweight truss systems have been proven to collapse more quickly and causing loss of life of firefighters and occupants	Moderate	• Potential for loss of life • Potential for moderate property damage	High
There are no buildings over four storeys in the town, however there are plans to develop a 6-storey residential building in a newly proposed neighbourhood in the southwestern portion of the town.	Possible	• The development is proposed to be built • Newly constructed residential units and multi-storey residential units have increased fire detection and suppression systems	Moderate	• Potential for loss of life • Increased property loss with a high-density residential fire	Moderate
There are several properties within the town that have a potentially high fuel load and therefore an increased fire risk.	Unlikely	• No reported industrial fires in last 5 years • Small number of properties with high fuel load	Major	• A large industrial fire could result in large losses • Potential for large loss of life	Moderate

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Building Stock Profile					
There are four assisted living/senior residences in the town.	Unlikely	• One reported fire in a care facility between 2018 and 2022. • Increased risk due to mobility and communication challenges.	Major	• There is a potential for high loss of life if a fire were to occur in one of these occupancies.	Moderate
In addition to registered vulnerable occupancies the town has 17 schools (including preschools and kindergarten schools) and three licensed childcare facilities that represent higher fire life-safety risks.	Likely	• There was one reported fire at a care occupancy and three at an assembly occupancy in the last 5 years	Minor	• Threat to life safety • Schools are sprinklered, many exists and practice routine drills	Moderate
Critical Infrastructure Profile					
The town's water supply capacity is increasingly threatened by hot and dry summer months, lowering the water tables, and coupled with increasing demand during these periods. The shortage in supply could threatened the availability of water to ensure an appropriate level of fire protection for larger fire suppression events.	Almost Certain	• Water shortages occurred 5 times (2015, 2017, 2021, 2022, 2023) during summer months • Town reservoirs have a limited supply of water can only stave off short periods of high demand. • More development in the town will further strain water resources	Major	• Water shortages which threaten firefighting could have significant consequences to property and life	High
Watermain sections along North Railway Street have been the site of recent watermain breaks. According to the most recent Water Master Plan, cast iron watermains in that area (see Figure 9) are reaching their ESL and should undergo upgrades as the risk of failure is increasing.	Likely	• Several reported breaks in the last 5 years • Infrastructure is aging and expected to deteriorate if not replaced	Minor	• Minor property loss • Threat to some businesses	High

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Critical Infrastructure Profile					
The town's 3N water reservoir requires rehabilitation work. Reservoirs can be greatly and quickly impacted by events such as water main breaks, drought and high temperatures which consequently can have an immediate and critical impact on firewater availability.	Likely	• Failure at reservoir in the past resulted in immediate water outages • Reservoir is scheduled for maintenance - if circumstances change threat reduced • Water shortages occurred 5 times (2015, 2017, 2021, 2022, 2023) during summer months • Town reservoirs have a limited supply of water can only stave off short periods of high demand. • More development in the town will further strain water resources	Moderate	• A major outage could pose a firefighting risk to areas served by the reservoir • There are alternate means of transporting water and backup systems	Moderate
Demographic Profile					
The population of the town has steadily increased, with a continued anticipated growth. Rapid changes in population and development can affect service level needs of the town.	Almost Certain	• The town anticipates continued growth	Moderate	• Threat to life safety and potential for moderate loss	Moderate
Seniors (those 65 years and over) are considered to represent one of the highest fire risk groups across the province based on residential fire death rate. The percentage of the population aged 65 years and older in the town represents 14.78% of the total population.	Almost Certain	• Historically across the province this group represents the highest fire fatality • One reported fire in a care facility in the last 5 years	Moderate	• Threat to life safety and potential for moderate loss	High

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Demographic Profile					
Of the town's population, 11.82% fall into the age range of 55 to 64, representing a potential future increase as this cohort will age towards 65+. Based on historic residential fire fatality data, this population will become greater fire fatality risk.	Almost Certain	• Historically across the province this group represents the highest fire fatality • One reported fire in a care facility in the last 5 years • Seniors more likely to live in high density housing	Moderate	• Threat to life safety and potential for moderate loss	High
The majority of residences in Canada with only one inhabitant are 85 and older. There are 895 residents in this age range in the Town of Okotoks, although there is no data on how many live alone.	Unlikely	• Seniors living along have an increased fire-safety risk • There are a low number of seniors relative to the general population • It is unknown how many seniors over 85 live alone in the Town of Okotoks	Minor	• Threat to life safety • Minor property loss	Low

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Hazard Profile					
The town's 2021 Hazard Identification and Risk Assessment (HIRA) identifies the top hazards listed below that could impact the ability of OFR to deliver fire protection services: • Flood (watercourse, heavy rain) • Urban Wildland Interface (UWI) Fire • Human health emergency (pandemic) • Drought/water shortage • Tornado • HAZMAT spill – fixed site/transportation • Civil disturbance • Extreme winter weather (extreme cold, ice storm, blizzard etc.)	Almost Certain	• Most of the hazards listed in the town's HIRA have an annual impact on the town.	Minor	• Most of the hazards listed in the town's HIRA do occur annually with some minor disruptions and added challenges i.e., weather, road conditions. • Potential for major disruptions and losses associated with less frequent but more severe incidents.	Moderate
Past Loss and Event History					
Preliminary data would suggest that when compared to provincial averages, the town may experience a higher rate of injuries associated with residential fires, however further analysis using statistics from a comparable municipality to that of Okotoks would provide more conclusive results.	Likely	• Estimates indicate 10% of residential fires in Okotoks resulted in injury compared to 4% in the province	Minor	• Potential threat to life safety and loss of life	Moderate
The leading reported cause of fire in the Town of Okotoks is cooking.	Almost Certain	• Fires caused by electrical distribution equipment reported annually	Major	• Depending on occupancy type could have a moderate or major impact to life safety and property loss	High

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Past Loss and Event History					
Over the period from January 1st, 2018, to December 31st, 2022, the volume of emergency calls responded to by OFR increased by 19.40%.	Almost Certain	• The call volume has steadily increased • Anticipated growth in the community will lead to an increase in call volume	Moderate	• If service levels do not keep pace with development, there is an increased risk to losses and life safety	High
The peak call time in the town is between the hours of 9 A.M. and 7 P.M.	Almost Certain	• MVC during this time reported annually	Minor	• Potential threat to life safety and loss of life • Minor property damage and disruption	Moderate

12.2 Risk Treatment

OFM-TG-02-2019 applies the process of identifying a risk treatment option for an identified risk for the purpose of establishing goals, objectives, strategies, and programs for further proposed fire protection services to be provided/examined or explored through the development of a FSMP or community risk reduction plan. Risk treatment options fall under four widely accepted risk management categories of avoidance, mitigation, acceptance, and transfer. (See Table 49).

Table 49: Risk Treatment Options

Treatment Option	Description
Avoid	Implementing programs and initiatives to prevent a fire or emergency from happening.
Mitigate	Implementing programs and initiatives to reduce the probability and/or consequence of a fire or emergency.
Accept	After identifying and prioritizing a risk, the fire service determines that no specific programs or initiatives will be implemented to address this risk.
Transfer	The fire service transfers the impact and/or management of the risk to another organization or body. (i.e. fire protection agreements, automatic aid)

Source: OFM TG 02-2019[35]

Risk management strategies should focus on ways to proactively reduce risk through education, prevention, and enforcement with fire suppression as the fail-safe. The Five Es is a framework outlined in NFPA 1300, and the Institution of Fire Engineers' Vision 20/20 National Strategy for Fire Loss Prevention, is a tool that helps to provide a lens through which identified risks can be reviewed to inform and support the Fire Services Master Plan. Table 50 identifies and describes each of the 5 Es of risk mitigation.

[35] *Office of the Fire Marshal, Community Risk Assessment Technical Guideline TG 02-2019, Section 6 pg. 16*

Table 50: 5 Es of Risk Mitigation

Mitigation Type	Description
Education	Aims to provide information that creates awareness and knowledge and subsequently changes behaviour.
Enforcement	Intended to correct negative human behaviour through legislation such as the National Building Code and the National Fire Code.
Engineering	When education does not change an individual's behavior, this component removes the human factor and introduces technology to improve safety such as smoke alarms.
Economic Incentives	Provided to reinforce positive impacts (e.g., insurance discounts or tax levy reductions) and discourage negative impacts (e.g., fines and charges)
Emergency Response	Necessary only if the first 4 E's are unsuccessful and a fire incident occurs. The level of service for a community is determined by Council based on the needs and circumstances identified locally.

Source: Adapted from NFPA 1300 & Vision 20/20[36]

Table 51 summarizes the identified risks and present ways in which the risks can be addressed by OFR and ultimately considered within the FSMP analysis and recommendations.

[36] *NFPA 1300, 2020 Edition, Annex A.6.3.3.2(4)*

Table 51: Identified Risk Treatment

Identified Risk	Risk Level	Treatment Option	Education	Enforcement	Engineering	Economic Incentives	Emergency Response	Risk Treatment
Geographic Profile								
Approximately 60% (6,759) of commuters travel from Okotoks to the City of Calgary for work, and 60% of all commuter's commute between the hours of 6:00 a.m. and 8:00 a.m., increasing the risk of MVCs along major routes, particularly during these times. Call volume by time of day (Section 11.2.1.2) reflects an increase in call volume during these times, as well as a moderate increase between 5 P.M. and 6 P.M. before declining, which may be indicative of commuters returning from the city.	Moderate	Accept and Mitigate	No	No	No	No	Yes	Mitigate Risk - Implement appropriate response protocols, standard operating guidelines, and activities. Ensure appropriate staffing levels at peak times.

Identified Risk	Risk Level	Treatment Option	Education	Enforcement	Engineering	Economic Incentives	Emergency Response	Risk Treatment
Geographic Profile								
The town has an extensive dangerous goods bylaw to prevent major spills in central parts of town. Incidents can still occur on major routes however, including Highway 2A over Sheep River.	Moderate	Mitigate	No	No	No	No	Yes	Mitigate Risk – Implement appropriate response protocols, standard operating guidelines, and activities. Continue to implement awareness level hazardous materials training in accordance with NFPA standards. Review existing dangerous goods bylaw.
At grade level rail crossings have the potential to create a physical barrier to connectivity to the roadway network, causing delays in response time. There are six at-grade rail crossings throughout the town.	Low	Accept and Mitigate	No	No	No	No	Yes	Mitigate Risk – Knowing the locations of at grade crossings and alternate routes can provide for better planning in the event a route is blocked.

Identified Risk	Risk Level	Treatment Option	Education	Enforcement	Engineering	Economic Incentives	Emergency Response	Risk Treatment
Geographic Profile								
There is a low probability, however, a high degree of risk to the public and the environment associated with a train derailment in the area; with or without a release of dangerous goods.	Moderate	Accept and Mitigate	No	No	No	No	Yes	Mitigate Risk – Implement appropriate response protocols, standard operating guidelines, and activities. Continue to implement awareness level hazardous materials training in accordance with NFPA standards. Continue communications with CP rail.
Given the location of the Okotoks Regional Airport, within a residential area, there is a possibility of an air incident requiring a response from OFR and could directly or indirectly (reduced service levels) affect the town.	Moderate	Accept and Mitigate	No	No	No	No	Yes	Mitigate Risk – Implement appropriate response protocols, standard operating guidelines, and activities.
Areas around Sheep River are frequented by residents of the town and visitors for recreational activity that may pose the risk of injury and/or rescue. Some areas along the river are difficult or impossible to reach by apparatus.	Moderate	Mitigate	Yes	No	Yes	No	Yes	Mitigate Risk – Implement appropriate response protocols, standard operating guidelines, and activities.

Identified Risk	Risk Level	Treatment Option	Education	Enforcement	Engineering	Economic Incentives	Emergency Response	Risk Treatment
Geographic Profile								
With only two crossings bridging the north and south portions of the town, Sheep River could pose a challenge to response times if either were unavailable.	Moderate	Mitigate	No	No	Yes	No	Yes	Mitigate Risk – OFR should be informed of any development projects that will impact these crossings in order to review service levels and mutual aid agreements in place.
Despite flood mitigation efforts, portions of the town are in a flood hazard area, including popular, high density recreational and residential areas.	High	Accept and Mitigate	Yes	No	Yes	No	Yes	Accept and Transfer Risk - Implement appropriate response protocols, standard operating guidelines, and activities. Ensure public education (signage, education) of safe water recreation and closures, particularly targeted during hazardous times.
The town has an extensive network of trails frequented by visitors on a regular basis. Some portions of the trail are inaccessible or difficult to access by vehicle or apparatus, which could impede a rescue response.	Moderate	Mitigate	Yes	No	Yes	No	Yes	Mitigate Risk -Implement appropriate response protocols, standard operating guidelines, and activities. Ensure public education (signage, education) of safe water recreation and closures, particularly targeted during hazardous times.

Identified Risk	Risk Level	Treatment Option	Education	Enforcement	Engineering	Economic Incentives	Emergency Response	Risk Treatment
Geographic Profile								
There is a considerable risk of a grass fire in areas of urban interface. The landscape surrounding the town is primarily agricultural, and increasing development in natural areas increases the threat of a wildfire impinging on the town.	High	Accept and Mitigate	Yes	Yes	Yes	No	Yes	Accept and Mitigate Risk - Ensure public knowledge (signage, education) of proper fire safety and fire bans (when in effect). Consider enforcement actions to reduce occurrence of unsafe practices. Consider FireSmart and building practices in areas of wildland urban interface.
Building Stock Profile								
Identified Risk: As with most jurisdictions, residential buildings account for the majority of the stock in Town of Okotoks and are the most common building involved in structural fires and attribute to the most fatalities and injuries.	High	Mitigate	Yes	Yes	Yes	No	Yes	Mitigate Risk – Implement appropriate response protocols, standard operating guidelines, and activities. Ensure public education/campaigns of fire safety in the home i.e., smoke detectors.

Identified Risk	Risk Level	Treatment Option	Education	Enforcement	Engineering	Economic Incentives	Emergency Response	Risk Treatment
Building Stock Profile								
In order to meet the projected housing demands associated with population growth in the town, new developments will primarily be of medium density housing, therefore increasing the fire-risk potential in these areas.	High	Accept and Mitigate	No	No	Yes	No	Yes	Mitigate Risk – Implement appropriate response protocols, standard operating guidelines, and activities. Ensure public education/campaigns of fire safety in the home i.e., smoke detectors.
Extensive residential and mixed-use development in the southeast and northern portion of the town could increase fire risk and service demands in these areas.	High	Mitigate Risk	Yes	Yes	Yes	No	Yes	Mitigate Risk – Implement appropriate response protocols, standard operating guidelines, and activities. Ensure public education/campaigns of fire safety in the home i.e., smoke detectors.
Data provided by the 2021 census indicates that more than 11.17% of the town's residential building stock was built prior to the introduction of the 1984 fire code and at least 2.24% of the building stock was built prior to the introduction of the building code.	Moderate	Mitigate	Yes	No	No	No	Yes	Mitigate Risk – Ensure training includes awareness of dangers of lightweight construction in newer residential areas.

Identified Risk	Risk Level	Treatment Option	Education	Enforcement	Engineering	Economic Incentives	Emergency Response	Risk Treatment
Building Stock Profile								
There are no buildings over four storeys in the town, however there are plans to develop a 6-storey residential building in a newly proposed neighbourhood in the southwestern portion of the town.	Moderate	Mitigate	Yes	Yes	Yes	Yes	Yes	Mitigate Risk – OFR should be involved in development planning of structures greater than five storeys. Ensure proactive inspections, enforcements, and potential incentives for new structures.
There are several properties within the town that have a potentially high fuel load and therefore an increased fire risk.	Moderate	Accept and Mitigate	Yes	Yes	Yes	No	Yes	Mitigate Risk - These properties should be routinely inspected (where applicable) to ensure they are being properly maintained, have adequate fire water, suppression equipment, evacuation procedures, emergency plans and are conducting evacuation drills.

Identified Risk	Risk Level	Treatment Option	Education	Enforcement	Engineering	Economic Incentives	Emergency Response	Risk Treatment
Building Stock Profile								
There are four assisted living/senior residences in the town.	Moderate	Accept and Mitigate	Yes	Yes	Yes	No	Yes	Mitigate Risk - These properties should be routinely inspected (where applicable) to ensure they are being properly maintained, have adequate fire water, suppression equipment, evacuation procedures, emergency plans and are conducting evacuation drills.
In addition to registered vulnerable occupancies the town has 17 schools (including preschools and kindergarten schools) and three licensed childcare facilities that represent higher fire life-safety risks.	High	Accept and Mitigate	Yes	Yes	Yes	No	Yes	Mitigate Risk - These properties should be routinely inspected (where applicable) to ensure they are being properly maintained, have adequate fire water, suppression equipment, evacuation procedures, emergency plans and are conducting evacuation drills. Consideration for implementation of bylaw and/or other standards to track the location of these residences.

Identified Risk	Risk Level	Treatment Option	Education	Enforcement	Engineering	Economic Incentives	Emergency Response	Risk Treatment
Critical Infrastructure Profile								
The town's water supply capacity is increasingly threatened by hot and dry summer months, lowering the water tables, and coupled with increasing demand during these periods. The shortage in supply could threatened the availability of water to ensure an appropriate level of fire protection for larger fire suppression events.	High	Avoid	Yes	No	Yes	No	Yes	Mitigate Risk – Assess vulnerable areas and determine fireflow requirements ahead of low water events. OFR involved in planning of new developments and replacement of infrastructure.
Watermain sections along North Railway Street have been the site of recent watermain breaks. According to the most recent Water Master Plan, cast iron watermains in that area (see Figure 9) are reaching their ESL and should undergo upgrades as the risk of failure is increasing.	High	Avoid	Yes	No	Yes	No	Yes	Mitigate Risk – Assess vulnerable areas and determine fireflow requirements/deficiencies ahead of a mainbreak event. OFR involved in planning of replacement of infrastructure.

Identified Risk	Risk Level	Treatment Option	Education	Enforcement	Engineering	Economic Incentives	Emergency Response	Risk Treatment
Critical Infrastructure Profile								
The town's 3N water reservoir requires rehabilitation work. Reservoirs can be greatly and quickly impacted by events such as water main breaks, drought and high temperatures which consequently can have an immediate and critical impact on firewater availability.	High	Avoid	Yes	No	Yes	No	Yes	Mitigate Risk – Assess vulnerable areas and determine fireflow requirements/deficiencies ahead of a failure event. OFR involved in planning of replacement of infrastructure.
Demographic Profile								
The population of the town has steadily increased, with a continued anticipated growth. Rapid changes in population and development can affect service level needs of the town.	High	Mitigate Accept	No	No	Yes	No	Yes	Mitigate Risk – Ensure safe building practices with increased inspection and enforcement. Review services levels.

Identified Risk	Risk Level	Treatment Option	Education	Enforcement	Engineering	Economic Incentives	Emergency Response	Risk Treatment
Demographic Profile								
Seniors (those 65 years and over) are considered to represent one of the highest fire risk groups across the province based on residential fire death rate. The percentage of the population aged 65 years and older in the town represents 14.78% of the total population.	Moderate	Mitigate	Yes	Yes	Yes	No	Yes	Mitigate Risk - Education and prevention activities should be largely focused on this age group. Ensure inspections and potential enforcement actions in senior assisted living residences.
Of the town's population, 11.82% fall into the age range of 55 to 64, representing a potential future increase as this cohort will age towards 65+. Based on historic residential fire fatality data, this population will become greater fire fatality risk.	Moderate	Mitigate	Yes	No	Yes	No	Yes	Mitigate Risk - Education and prevention activities should be largely focused on this age group. Ensure inspections and potential enforcement actions in senior assisted living residences.
The majority of residences in Canada with only one inhabitant are 85 and older. There are 895 residents in this age range in the Town of Okotoks, although there is no data on how many live alone.	Low	Mitigate	Yes	No	No	No	Yes	Mitigate Risk – Target this population for educational awareness such as in home smoke detectors etc.

Identified Risk	Risk Level	Treatment Option	Education	Enforcement	Engineering	Economic Incentives	Emergency Response	Risk Treatment
Hazard Profile								
The town's 2021 Hazard Identification and Risk Assessment (HIRA) identifies the top hazards listed below that could impact the ability of OFR to deliver fire protection services: • Flood (watercourse, heavy rain) • Urban Wildland Interface (UWI) Fire • Human health emergency (pandemic) • Drought/water shortage • Tornado • HAZMAT spill – fixed site/transportation • Civil disturbance • Extreme winter weather (extreme cold, ice storm, blizzard etc.)	High	Accept and Mitigate	Yes	No	Yes	No	Yes	Accept Risk – Implement appropriate response protocols, standard operating guidelines, and activities.

Identified Risk	Risk Level	Treatment Option	Education	Enforcement	Engineering	Economic Incentives	Emergency Response	Risk Treatment
Past Loss and Event History								
Preliminary data would suggest that when compared to provincial averages, the town may experience a higher rate of injuries associated with residential fires, however further analysis using statistics from a comparable municipality to that of Okotoks would provide more conclusive results.	High	Avoid	Yes	No	Yes	No	Yes	Avoid Risk - Education and prevention activities should be largely focused on this phenomenon.
The leading reported cause of fire in the Town of Okotoks is electrical distribution equipment.	Major	Mitigate	Yes	Yes	Yes	No	Yes	Avoid Risk - Education and prevention activities should be largely focused on this phenomenon.
Over the period from January 1st, 2018, to December 31st, 2022, the volume of emergency calls responded to by OFR increased by 19.40%.	Moderate	Mitigate	No	No	No	No	Yes	Avoid Risk: OFR must monitor call volume and adjust service levels accordingly in anticipation of increasing populations.
The peak call time in the town is between the hours of 9 A.M. and 7 P.M.	Moderate	Mitigate	No	No	No	No	Yes	

SECTION 13
CONCLUSION

In conclusion, a community risk assessment is a vital tool for understanding and mitigating potential threats and vulnerabilities that may impact the well-being and safety of a community. Through the systematic identification and analysis of hazards, vulnerabilities, and capacities, this process empowers communities to make informed decisions and take proactive measures to enhance their resilience.

The insights gained from a community risk assessment enables local authorities and organizations to prioritize resource allocation, plan for emergency response, and implement preventative measures effectively. Moreover, it helps communities build a culture of preparedness and fosters a sense of unity, ensuring that everyone is working together to minimize risks and enhance overall safety.

In a world where communities face a wide range of challenges, from natural disasters to public health crises and beyond, the importance of a community risk assessment cannot be overstated. It is a proactive step toward creating resilient communities that are better equipped to navigate the complexities of our rapidly changing world while safeguarding the well-being of their residents.

APPENDICES

Appendix A: List of Figures, Maps, and Tables

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Figures

Maps

Tables