Parkland County

COMMUNITY RISK ASSESSMENT

Final Report

May 1, 2025

Presented to:

PARKLAND COUNTY
FIRE SERVICES

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PREFACE

This Community Risk Assessment will serve as a foundational document to inform and direct the development of a municipal Fire Services Master Plan for Parkland to address the strengths, threats and vulnerabilities that are unique to Parkland, to protect lives, the environment and property.

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ACRONYMS

Acronym	Definition
CEMP	Community Emergency Management Program
CI	Critical Infrastructure
CRA	Community Risk Assessment
HIRA	Hazard Identification and Risk Assessment
MVC	Motor Vehicle Collision
NBC	National Building Code
NFC	National Fire Code
NFPA	National Fire Protection Association
PCFS	Parkland County Fire Service
PPE	Personal Protective Equipment

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EXECUTIVE SUMMARY

Introduction

A Community Risk Assessment (CRA) is a process used to identify, evaluate, and prioritize potential 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. It involves gathering information, analyzing data, and engaging with stakeholders to understand the potential threats and vulnerabilities that could lead to various types of emergencies or disasters. The goal of a CRA is to inform emergency management and response agencies to enhance community resiliency and reduce the impact of potential future emergencies.

Community Risk Assessment Process

As per NFPA 1300, there are nine (minimum) mandatory profiles that must be examined during the development of the community's CRA. This CRA will examine the nine mandatory profiles 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 within and external to 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 five-step process of a CRA development as outlined in the table below.

Table 1: Five-step process of a CRA

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 Ranking and Risk Treatment	Assign each risk a ranking score and potential treatment options to accept, avoid, mitigate, or transfer the risk.

The results of the five-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, while key findings may be noted as strengths in the community's current response model and/or trends to be monitored.

The identified risks and key findings of Parkland's CRA are summarized in the next section and a full analysis of the risk assessment process is outlined 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 on 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.

Table 2: Summary of Identified Risks

No.	Profile	Identified Risk	Risk Level	Rationale
1	Geographic	Roads leading to residential properties are largely graveled in rural areas. Although roads in the County are well maintained, gravel roads may slow response times and present challenges for apparatus during a response, including the threat of damage or accidents. Maintenance of gravel roads in winter months can also be challenging and slow response times and increase risks.	Moderate	• 1250 km. of gravel roads • 800 km of paved/asphalt roads • Area experiences annual winter weather including ice and snow • Potential risk to life safety • Possible minor property loss
2	Geographic	The road network is a contributor to emergency call volume due to motor vehicle collisions and vehicle fires.	Moderate	• PCFS responded to 1674 motor-vehicle related incidents between 2019 – 2023. This represents (35.6%) of all calls.
3	Geographic	There is an elevated risk of a major spills and dangerous goods incident along Hwy 16 being the main highway linking Parkland and Edmonton	Moderate	• No major releases reported in Parkland, however, 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. • Over half of all dangerous goods release incidents occurred on roadways. • Threat to life safety, moderate property, and environmental damages

No.	Profile	Identified Risk	Risk Level	Rationale
4	Geographic	The transportation of agricultural chemicals along roadways may pose the risk of an environmental spill.	Low	• No major releases reported in the County, 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 Alberta1 • Over half of all dangerous goods release incidents occurred on roadways. Over half of all dangerous goods release incidents occurred on roadways • Minor to moderate property, and environmental damage
5	Geographic	During peak commuting times, the highest risk of motor vehicle collisions is likely to occur.	Moderate	• MVSs occur annually throughout the County • From January 1, 2019, to December 31, 2023, there were 1441 motor vehicle collisions • Potential threat to life safety • Minor property loss
6	Geographic	CN rail lines operate a track that runs from Edmonton extending west throughout Parkland that presents a risk related primarily to the movement of dangerous goods. At grade level rail crossings have the potential to create a physical barrier to connectivity to the roadway network, causing delays in response time.	High	• There is a major railway line that traverses along Highway 16, intersection with the local road networks. • Delays in response time could have impact on response outcomes • From January 1, 2019, to December 31, 2023, there were 5 train rail collisions and 2 train rail fires

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

No.	Profile	Identified Risk	Risk Level	Rationale
7	Geographic	Uncontrolled at grade rail crossings pose an increased threat of a motor vehicle collision	Moderate	• There have been nine reportable (to transport Canada) crossing collisions in Canada since 2018 • Five reports of train and vehicle collisions in 2023 • Two fatal collisions in Alberta in 2021 • Threat to life safety
8	Geographic	There is a high degree of risk to the public and the environment associated with a train derailment; with or without the release of dangerous goods	High	• Parkland has experienced a number of train derailments, most notably the Gainford derailment in 2013 • In comparison to the number of trains travelling across the province, there is an increased probability of a train derailment in Parkland. • There is potential loss of life and major property and environmental damages
9	Geographic	There is an increased risk of ice and water rescue along Wabamun Lake, Isle Lake and the north Saskatchewan river due to natural hazards necessitating swift emergency evacuations and recreational boating and other activity on the water	Moderate	• There is 1 marina located in Parkland located on Wabamun Lake • PCFS reported a total of 36 water and/or ice rescues and 24 Watercraft in distress incidents during the period of January 2019 and December 2023. • Possible to have concurrent calls • Potential risk to life safety
10	Geographic	There is a considerable risk of wildland fires in areas of urban interface. The landscape surrounding the town is primarily agricultural, and increasing development in natural areas increases the threat of wildfire impinging on the town.	High	• No major losses to date. • Resources may be unavailable to assist during busy seasons. • From January 1, 2019, and December 31, 2023, PCFS responded to 586 outside fires.

No.	Profile	Identified Risk	Risk Level	Rationale
11	Building Stock	As with most jurisdictions, residential buildings account for the majority of building stock in Parkland and are the most common building involved in structural fires and attribute to the most fatalities and injuries To meet the projected housing demands associated with the population growth in the town, increased fire-risk potential will also increase in those areas.	High	• Residential fires occur annually in Parkland. • High Density development in Parkland identified in existing hamlets and developed areas expect to see an increase in population to between 42,700 and 50,000 by 2044. • Exposure fires are common in residential areas • Potential for large loss of life and significant property damage including businesses in medium density areas
12	Building Stock	Data provided by the 2021 census indicates that 30.50% of Parkland's building stock was built prior to 1981, preceding the 1984 fire code. This represents a significant fire risk within the community.	High	• 30.50% of Parkland's building stock was built prior to 1981. • No data on number of fires as related to building age however residential fires account for most fires in Parkland and assumption can be made that at least one fire has occurred in these identified buildings. • The increase in both housing and commercial properties will increase service demand levels • Potential for loss of life • Potential for moderate property damage and loss of business • In Alberta, there were 1724 incidents where a smoke alarm was present but in 1062 of those incidents, the smoke alarm did not operate.
13	Building Stock	The number of new homes being built with lightweight construction poses a risk to firefighter safety and can hinder the ability for occupants to safely evacuate in a timely fashion.	Moderate	• No data on the number of homes being built with lightweight construction but this is recognized to be on the increase since implementation in the current building code. • Potential for loss of life • Increased property loss with a high-density residential fire.

No.	Profile	Identified Risk	Risk Level	Rationale
14	Building Stock	There are several properties within Parkland that have a potentially high fuel load and therefore an increased high fire risk. Agricultural operations contribute to this risk.	Moderate	• Between January 1, 2019, and December 31, 2023, PCFS responded to 274 structure fires which included responses to industrial occupancies. • Concentrate of industrial properties with high fuel load in the Atchison industrial area. • A large industrial fire could result in large losses • Potential for large loss of life
15	Building Stock	Parkland currently has one (1) registered vulnerable occupancies	Moderate	• No 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.
16	Critical Infrastructure Profile	The Capital Regional Parkland Water Services Commission, through EPCOR, provides water services to residents of Parkland. Parkland makes sure that the reservoirs are topped up so they can maintain residential water usage and firefighting water needs. The fire service must be reliant on alternate water sources and have a water servicing strategy in place.	Moderate to High	• Water shortages can occur during summer months and elevated temperatures • EPCOR closely monitors the river runoff levels but should they become critically low, EPCOR will notify their partners for implementing water restrictions. • Increased development within Parkland will increase strain on water resources • Water shortage threatens firefighting operations and could have significant consequences to property and life • As per the PCFS WILD Water Commission utilizes a single water main to deliver water to Parkland reservoirs. Small leaks and maintenance can cause disruptions and water restrictions.

No.	Profile	Identified Risk	Risk Level	Rationale
17	Critical Infrastructure	Transmountain Pipeline runs through Parkland	Moderate	• Transmountain Pipeline has 285 km of pipeline. • The pipeline spans from Spruce Grove to Hinton north of Wabamun Lake • There are 4 pump stations, and • 16 major trenchless crossings • There are no notable incidents that created safety concerns/ hazards within the community • The Trans Mountain Pipeline has an Emergency Response Organization based on a three-tier response structure. Although Level 1 and Level 2 incidents would be handled by the Company, Level 3 incidents being a major emergency such as: - Uncontrolled leak - Spill on a watercourse - Large fire at an operating facility or office building - Fatality or serious injury to an employee, contractor, or the public - Spill of hazardous substances • Would require Emergency Services such as (police, fire ambulance and other regulatory authorities
18	Demographic Profile	The population of Parkland has steadily increased with a continued anticipated growth. Rapid changes in population and development can contribute to increased risk and potential increase in call volume and service level demands.	Moderate	• Parkland anticipated considerable population growth within the next ten years • Any growth and new development could change service level demands • Threat to life safety and potential for moderate loss

No.	Profile	Identified Risk	Risk Level	Rationale
19	Demographic Profile	Parkland has 18.07% of the population aged 65+ compared to 14.76% for Alberta. Seniors are considered to represent on e of the highest fire risk groups across the province based on residential fire death rate.	Low	• The majority of seniors reside in hamlets and developed areas within Parkland. • Historically across the province this group represents the highest fire fatalities • Seniors are more likely to live in high density housing • Threat to life safety and potential for moderate loss.
20	Demographic Profile	Of Parkland's population, 18.15% 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 great fire fatality risk.	High	• County's population will increasingly age • Historically across the province this group represents the highest fire fatality • With increasing number of seniors, the threat of an injury or fatality due to fire increases • Seniors more likely to live in high density housing • Threat to life safety and potential for moderate loss
21	Demographic Profile	Parkland has lower proportion of newcomers/immigrants (7.51%) when compared to Alberta (23.24%)	High	• Parkland has a lower proportion of newcomers/immigrants (7.51%) when compared to Alberta (23.24%) • Communication barriers, in terms of language and the ability to read written material, may have an impact on the success of these programs • 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
22	Demographic Profile	Nearly (5.74%) of the population commutes to a different census division within the province. This is 1.56%) more than that of the provincial commuters (4.18%)	Moderate	• (5.74%) of the population commutes to a different census division (520 people) • (79%) of the labour force begins their commute between the hours of 7 and 9 a.m., and therefore the risk of motor vehicle collision (MVC) calls is likely to be greatest during this time

No.	Profile	Identified Risk	Risk Level	Rationale
23	Economic Profile	The risk of a single fire or emergency event having a large impact on the community is moderate risk.	Moderate	• Downturns in agriculture have happened • Significant threat to businesses, local economy, employment • Processing and other activities that involve various ignition sources often occur in manufacturing occupancies. Manufacturing facilities constitute a special fire hazard due to high levels of combustible, flammable or explosive content and the possible presence of oxidizing chemicals and gases. • With the increased use and storage of devices which utilize lithium-ion batteries, there is an increased risk that a fire involving these batteries could exhaust the water and human resources of PCFS. • Amazon provides income to many residents within Parkland. • A single train derailment and major traffic disruptions may have a significant impact on the County's economic stability. • A disruption in the agriculture or oil and gas industry may not does have large implications on the economic wellbeing of the region itself, however, disruptions could result in secondary issues often associated with the loss of an economy such as homelessness, addiction, mental health, and medical emergencies. As previously discussed, the economic wellbeing of a community also has a correlated effect on fire
24	Past Loss and Event History	Over the five-year period from January 1, 2018, and December 31, 2022, the most reported ignition sources within Parkland were related to electrical equipment	Moderate	• Between January 1, 2019, and December 31, 2023, there were 84 fires related to Electrical Hazards. • 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.

No.	Profile	Identified Risk	Risk Level	Rationale
25	Past Loss and Event History	Over the five-year period from January 1, 2018, and December 31, 2022, only (21%) of incidents had a smoke alarm present and only (38%) of those incidents did the smoke alarm activate.	Moderate	• There were 1062 incidents where a smoke alarm was present but did not operate or it could not be confirmed that it operated. • There were no smoke alarms present in 6248 incidents.
26	Past Loss and Event History	Over the period from January 1st, 2019, to December 31st, 2023, the volume of emergency calls responded to by PCFS increased by 18.9%	Moderate	• 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 property losses and life safety

Table 3 Summary of Key Findings

No.	Key Finding
	Geographic Profile
1	The County currently does not have a Transportation Master Plan which would be an invaluable tool in aiding community risk assessments to maintain an awareness of road conditions throughout the County and how they may impact response times and service levels.
2	With Highway 16 being a direct route from Parkland to Edmonton, there is an elevated risk of a dangerous goods release that could impact the public and environment.
3	With highway 16 bisecting Parkland, it creates a physical barrier that could result in delays in emergency response times
4	There are risks associated with the potential for interactions between rail traffic and vehicular traffic or pedestrian traffic within Parkland.
5	Bridges, with restrictions or closures for repairs, have the potential to create physical barriers to emergency response times and reduce the connectivity of Parkland's road network resulting in the potential for delays in emergency response times.
6	Grade level rail crossings could create a physical barrier to the connectivity of Parkland's road network that can potentially result in delays in emergency response times
	Building Stock Profile
7	The County fire services should be aware of the presence of lightweight construction and informed of the dangers. This should be built into the fire service pre-planning program.
8	Parkland is expected to see a population growth of between 10,495 and 17,795 by 2044 resulting in an increased in building stock to house that population growth. Parkland has 11,925 buildings classified as "C" occupancy. 88.47% of those buildings are single detached.
9	In Parkland the development proposals and anticipated growth will be in existing hamlets and developed areas. It is anticipated that this growth will result in a number of high buildings.
10	There are no designated heritage buildings within Parkland.
11	Although Parkland is primarily rural with limited residential housing, increasing demands will result in both residential and commercial growth. A high-density housing and infill construction increases the County's fire risk.
12	In addition to registered vulnerable occupancies Parkland has 4 schools K – up.

No.	Key Finding
	Critical Infrastructure
13	The most pertinent risk arising from utilities relates to fallen power lines. Between 2018 and 2022 PCFS responded to 25 calls for fallen power lines which is 25.77% of all public hazard calls. PCFS responded to 84 electrical hazard incidents between January of 2019 and December of 2023.
	Demographic Profile
14	The 2021 Census data indicates that children aged 14 represent 17.78% of Parkland'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
15	The population of adults over the age of 65 in Parkland represents 18.07% of the total population. There is 18.15% of adults between the 55 and 64 age group. There is value in targeting public education and prevention to this demographic.
16	In Parkland, 98.44% of the population knows only English, while only a small percentage (.11%) are proficient in both English and French.
17	The majority of the Indigenous population reported as single Indigenous identify as either First Nations, Metis, or Inuk (Inuit). Of the Indigenous population in Parkland, 29% (650) were First Nations people, 66.13%% (1435) were Metis, and 2.07% (45) were Inuit. These populations should be monitored as new Census data becomes available for consideration when planning public education programs and materials.
18	When comparing housing tenure for Parkland to that of the Province, Parkland appears to have a lower fire risk.
19	The low proportion of immigrants in the area, and statistics regarding spoken languages, suggest that there are no concerns with cultural and language barriers in understanding fire safety messages, warnings, practices etc.
20	The County's commuter population presents a factor that may impact traffic congestion, and the potential occurrence of motor vehicle accidents with the County on major routes.
21	Parkland has lower proportion of newcomers/immigrants (7.51%) when compared to Alberta (23.24%)

No.	Key Finding
	Hazard Profile
22	Parkland's 2021 Hazard Identification and Risk Assessment (HIRA) identifies the top hazards as listed below that could impact the ability of PCFS to deliver fire protection services: • Hazmat Rail/Road • Forest Fire • Oil or natural gas release • Hazmat (Fixed Site) – Pipeline-Storage Facility • Tornados • Blizzards • Farm Animal Disease • Major Road Accident
	Economic Profile
23	Parkland has identified top employers that contribute to the economic vitality of the community. The majority of these are industrial type manufacturing plants. If a fire were to occur at one of these facilities it could have a negative impact on the financial well-being the community. Consideration should be given to proactive industrial fire safety programming.
	Past Loss & Event History Profile
24	Between January 1, 2018, and December 31, 2022, the number of fires within Parkland remained consistent year over year, however the total loss varies significantly in some years.
25	Parkland has a significantly lower number of exposure fires when compared to the province, likely attributed to lower density residential areas.
26	Over the period from 2013 to 2022, the highest number of fires were caused by electrical equipment.
27	There was a (18.9%) increase in the call volume from 2019 to 2023.
28	Over the five-year period from January 1, 2018, and December 31, 2022, (35.6% of the total emergency calls that PCFS responded to were motor vehicle incidents.
29	The peak call time in Parkland is between the hours of 6 a.m. and 11 p.m., reaching a peak at 5 p.m.
30	Fire Loss and injury/death data when compared to the provincial averages, would suggest that Parkland may experiences a lower rate of injuries associated with fire, however, further analysis using statistics from a comparable municipality to that of Parkland would provide more conclusive results.

SECTION 1
INTRODUCTION

1.1 Background

This Community Risk Assessment (CRA) has been developed for Parkland County (Parkland) as a foundational document to inform the Fire Service Master Plan (FSMP) being developed and any other future programs and standards being developed for Parkland, 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.

The methodology and analysis utilized to develop this CRA has been directly informed by NFPA 1300 that recognizes the value of understanding the fire risk within a community, and the importance of developing fire risk reduction and mitigation strategies in addition to providing fire suppression services. The CRA would serve as a living document which would include regular (e.g. annual) review and updates to the CRA's data and information.

1.2 Purpose

The primary purpose of this CRA is twofold:

1. To develop a Community Risk Assessment for Parkland to identify the fire related risks within the community; and
2. To utilize the risk conclusions of the Community Risk Assessment to inform comprehensive analyses of the existing, and future fire protection needs of Parkland.

1.3 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
   - NFPA 1300, Standard on Community Risk Assessment and Community Risk Reduction Plan Development (2020 Edition)
   - NFPA 1730, Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations (2019 Edition)
2. Vision 20/20 Community Risk Assessment: A Guide for Conducting a Community Risk Assessment (Version 1.5, 2016)
3. 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:

1. Geographic Profile
2. Building Stock Profile
3. Critical Infrastructure Profile
4. Demographic Profile
5. Public Safety and Response Profile
6. Community Services Profile
7. Hazard Profile
8. Economic Profile
9. 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 Parkland, Parkland County Fire Services (PCFS), Statistics Canada, Office of the Fire Commissioner, and desktop research.

The mandatory profile analyses result in a series of risk related conclusions that will be used to inform service levels or other strategies in alignment with the three lines of defense through a risk treatment process. These are referred to as a '**key finding**' or an '**identified risk**.'

Identified Risks: These are hazards or risks that currently exist within a community and could potentially be worsened in the event of an emergency, leading to a detrimental impact on the community, the Fire Department or both. Risks may arise from specific hazards identified in individual profiles or from compounded risks that span multiple profiles. The risk level is determined by evaluating the probability and potential consequences of each risk, which in turn guides how the Fire Department resources are allocated.

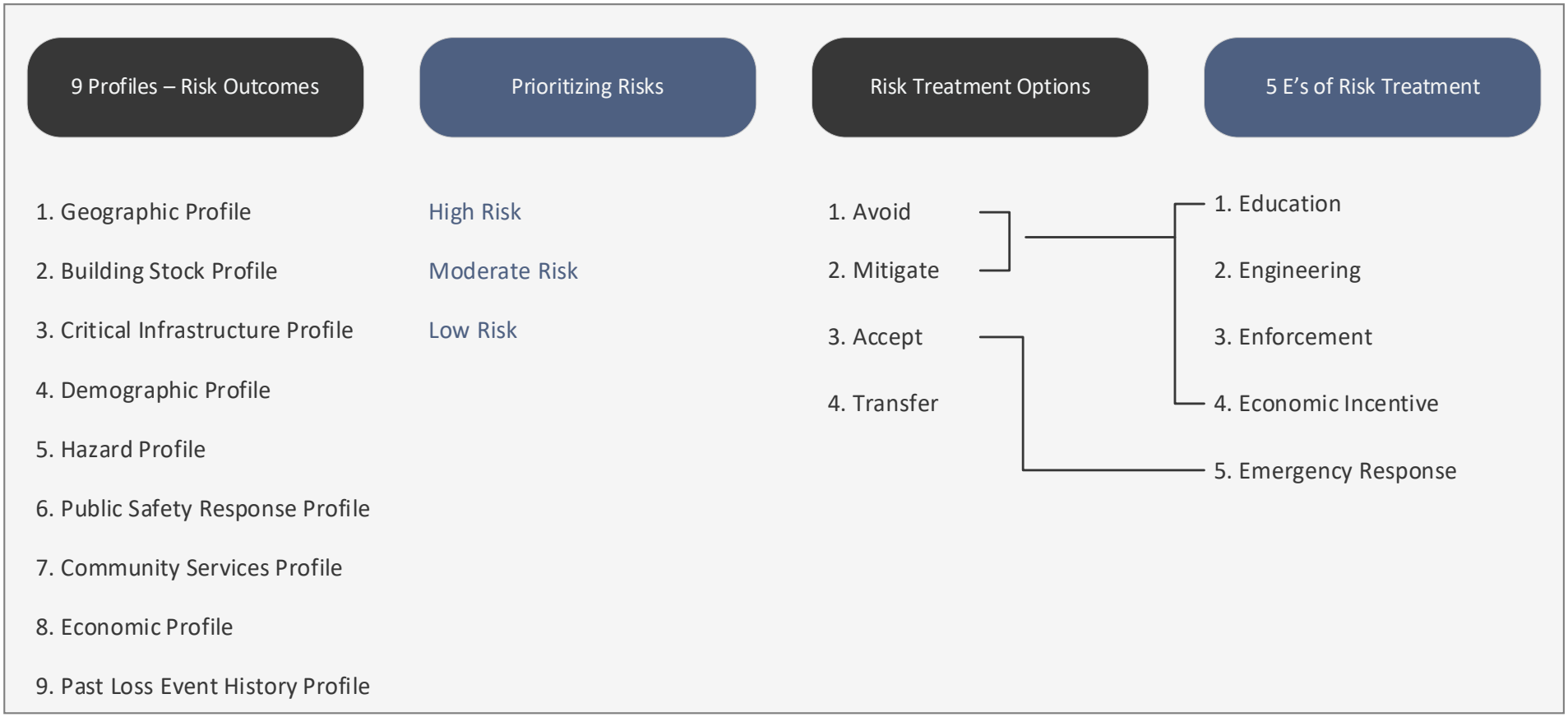
Key Findings: These are future trends or developments that should be closely monitored. While these concerns may not currently qualify as identified risks requiring immediate action, they are significant enough to be flagged, monitored, and reviewed as part of the annual CRA update.

Those findings referred to as an 'Identified Risk' are taken through a risk assignment process to assist with risk prioritization. In specific circumstances, being those that involve additional jurisdictional or legislative considerations, a risk-related conclusion is referred to as a Special Consideration. All risk-related conclusions will be taken through a risk treatment process and aligned with the three lines of defense to inform decision making. Figure 2 illustrates the risk treatment process.

Figure 1: Community Risk Profiles and Sub-topics

COMMUNITY RISK ASSESSMENT PROFILES AND SUB-TOPICS								
Geographic	**Building Stock**	**Critical Infrastructure**	**Demographics**	**Hazards**	**Public Safety Response**	**Community Services**	**Economic**	**Past Loss & Event History**
• Road network • Bridges • Railways • Airport • Natural features and landforms • Wildland Urban Interface	• Property stock by occupancy type • Building age, construction • Building density and exposure • Building height and area • Potential high fire risk occupancies • Historically or culturally important features	• Food and water • Oil and natural gas • Electricity • Telecommunications • Public safety and security • Continuity of government • Transportation • Health • Financial institutions	• Population and dispersion • Age • Gender • Socioeconomic circumstances • Ethnic and cultural considerations • Transient populations	• Hazard Identification and Risk Assessment (HIRA)	• Public safety response agencies within the community	• Community service agencies, organizations, and associations	• Major employers and economic sectors	• Overall fire loss • Fire loss by occupancy type • Civilian fire deaths and injuries • Fire cause and ignition • Smoke alarm status • Call volume • Call types

Figure 2: Risk Treatment Process



The analysis presented within this CRA has been informed by a wide range of data sources. 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 stated as reflecting 100%, may show a minor variance based on the use of only the nearest 1/100 (hundredth) decimal points.

SECTION 2
GEOGRAPHIC PROFILE

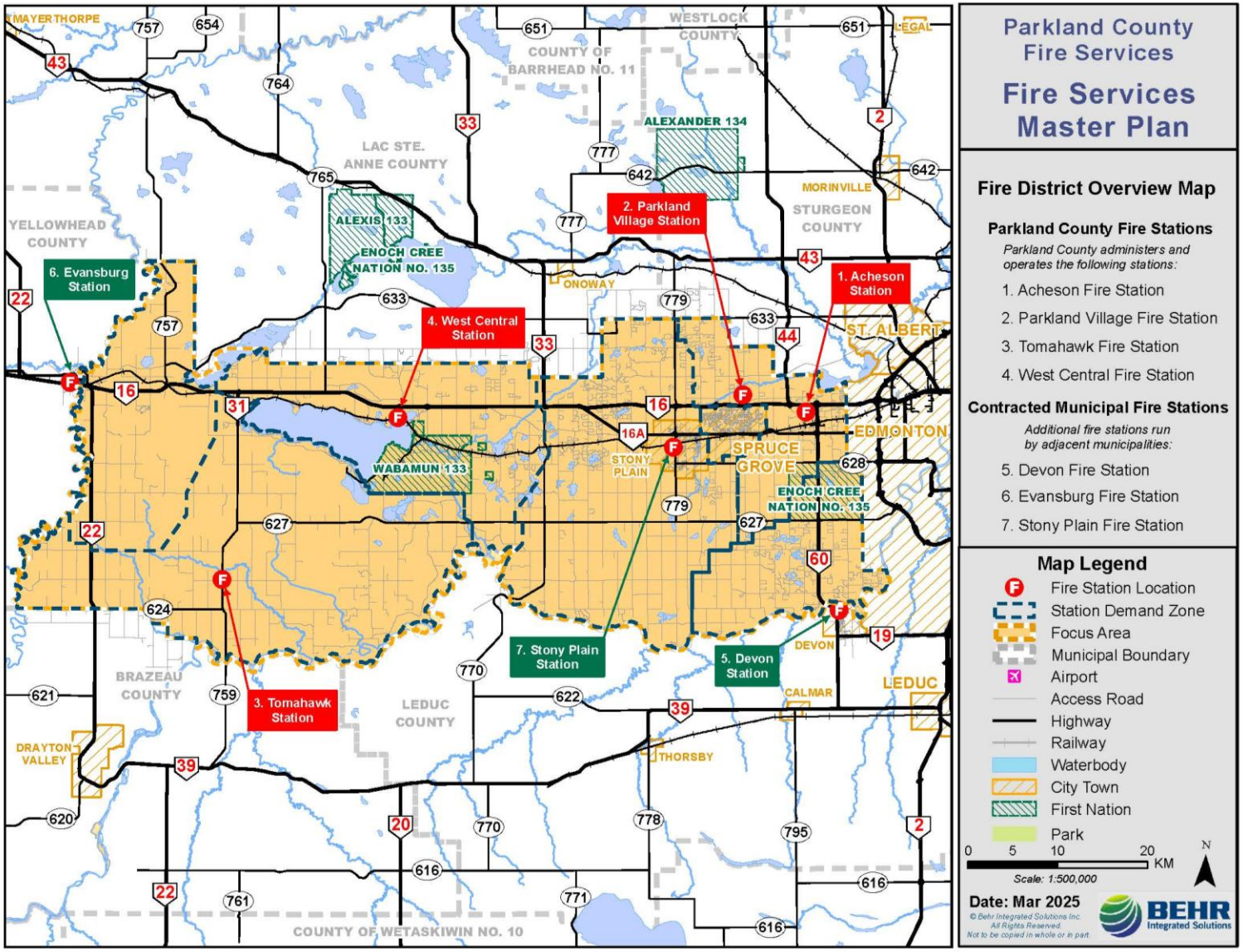
The geographic profile of a community is an assessment of the physical features of a community, such as highways, waterways, railways, bridges, landforms, quarries, and wildland-urban interfaces, which may present inherent risks to the community and affect emergency services' access to incidents and response capabilities. This section contains a detailed analysis of these geographical features for Parkland to assist in determining the type and level of fire protection services needed for the community and any potential impacts these features may pose on service delivery.

2.1 Geographic Overview

Parkland is a municipal district located in central Alberta. Parkland covers an area of approximately 240,000 hectares (593,000 acres) that is a predominantly rural region with a population of about 32,205 residents, according to the 2021 Census. Parkland has a population density of 13.6 people per square kilometer and maintains a spacious and rural character, typical of many agricultural and suburban communities in Alberta. Parkland includes cities, hamlets, and farmland. The City of Spruce Grove, Town of Stony Plain, and Summer Villages of Seba Beach, Kapasiwin, Lakeview, Betula Beach, Point Alison, Village of Spring Lake; Enoch Cree First Nation and Paul First Nation are located adjacent to the County. The cities of Spruce Grove and Stony Plain are important local hubs. Spruce Grove, the 9th largest city in Alberta has a population of just under 38,000 and continues to be a rapidly growing urban center. Stony Plain has a population of 17,993. In terms of proximity to major cities, Parkland benefits from its close location to Edmonton, which lies just 20 kilometers east of Parkland's border. This proximity gives residents access to a broader range of urban amenities while allowing Parkland to maintain its rural identity.

Transportation through Parkland is facilitated by several major highways, most notably Highway 16, also known as the Yellowhead Highway, which runs east-west through the northern part of Parkland. Highway 16 connects Parkland to Edmonton and serves as a critical route for both commuters and commercial traffic. Highway 16A offers an alternate route through the towns of Stony Plain and Spruce Grove, providing further access to local communities. Highway 43, another key route, connects Parkland to northern Alberta.

Map 1: Parkland Overview Map



Parkland County Fire Services
Fire Services Master Plan

Fire District Overview Map

Parkland County Fire Stations

Parkland County administers and operates the following stations:

1. Acheson Fire Station
2. Parkland Village Fire Station
3. Tomahawk Fire Station
4. West Central Fire Station

Contracted Municipal Fire Stations

Additional fire stations run by adjacent municipalities:

5. Devon Fire Station
6. Evansburg Fire Station
7. Stony Plain Fire Station

Map Legend

- Fire Station Location
- Station Demand Zone
- Focus Area
- Municipal Boundary
- Airport
- Access Road
- Highway
- Railway
- Waterbody
- City Town
- First Nation
- Park

0 5 10 20 KM

N

Scale: 1:500,000

Date: Mar 2025

BEHR Integrated Solutions

2.1.1 Road Network

Road networks and transportation systems provide fire services with access throughout a community when responding to emergency calls. The road network is how fire apparatus travel through a municipality; therefore, it is valuable to consider areas where there may be a lack of connectivity due to road network design, as well as other natural barriers (e.g. rivers, lakes, etc.) or human-made barriers (e.g. rail lines, traffic calming measures, etc.). Road networks can also contribute to vehicle congestion, causing delays in emergency response travel times. Where possible, Parkland's transportation planning processes should include PCFS as a stakeholder to provide consideration for emergency services' needs and challenges relating to the road network, traffic congestion, and traffic calming and related topics.

Roads are also important from a risk and emergency response perspective because motor vehicle-related incidents are often a common source of emergency call volume within a municipality.

Parkland oversees a network of local roads totaling 2,050 kilometers, comprising of asphalt and gravel road surfaces. Of this total:

- 1,250 kilometers (61%) consist of gravel roads.
- 800 kilometers (39%) are asphalt roads.

Parkland has implemented a Major Road Rehabilitation Program and takes a lifecycle management approach to road maintenance and improvements and employs strategic rehabilitation as needed rather than wait for roads to deteriorate to the point of requiring replacement.

Parkland has responsibility for Range Roads, County Roads, and some Subdivision Roads. The province oversees the maintenance and construction of Highways within Parkland.

The network of provincial highways and county roads link Parkland to neighboring municipal districts, County of Leduc, Yellowhead County, Sturgeon County, Brazeau County, Lac Ste. Anne County. Highway 16 serves as a primary route, east-west through Parkland, and is supported by Highway 43 that runs north out of its jurisdiction. Since all provincial highways are designated dangerous goods routes, traffic carrying various hazardous materials passes through Parkland regularly, highlighting the importance of safe transportation.

Although unlikely, an incident involving a dangerous goods release is possible along these highways. Incidents involving rail, roads, and highways, involving dangerous goods were listed as an extreme threat on Parkland's 2020 County Emergency Response Plan.

2.1.2 Bridges and Culverts

Bridges must be considered when conducting a CRA, as they can create physical barriers to emergency responses and negatively impact response times. An apparatus may face restrictions from crossing, such as load limitations, or roadway connectivity may be disrupted if a bridge is out of service for maintenance or repairs. Incidents occurring on a bridge pose increased risks, including spills, congestion, and difficulty accessing the scene. Such incidents may also necessitate specialized skills and equipment for slope rope rescue operations.

According to Parkland's Stormwater Management Master Plan (2023), there are approximately 34 bridges and 87 bridge-sized culverts.

2.1.3 Rail

At-grade rail crossings, intersections where a road crosses a rail line at the same level, can cause delays in emergency response by obstructing roadway access and pose a threat of dangerous collisions with motor vehicles. Moreover, the physical barriers created by rail infrastructure, such as rail yards or the placement of tracks, grade separations, and level crossings, can significantly impact emergency services travel times and overall response times throughout a community. Additionally, the frequency of trains passing through a community and the nature of goods they transport pose varying degrees of risk, including the potential for derailments and releases of hazardous materials.

Running east-west through the entirety of Parkland, Canadian National Railway (CN) operates track that runs from a terminal in Edmonton, AB, extending west through the area. Passing through the northern region of Parkland, it primarily traverses along Highway 16, intersecting with the local road networks at approximately 56 at-grade crossings. This railway is used to transport industrial products such as grain, plastics, lumber, and oil and gas products. Railways can transport large containers of dangerous goods. Although the likelihood of a derailment and subsequent release of hazardous materials is low, such an incident could have significant repercussions, necessitating a specialized emergency response.

The transportation of dangerous goods along these routes, especially through populated areas, poses risks to public safety. Moreover, the rail crossing over, and along, the Wabamun Lake raises concerns about potential environmental impacts and contamination of waterways and surrounding ecosystems. Establishing information-sharing practices between railway operators and emergency responders can enhance awareness of the types and frequencies of dangerous goods being transported through the region.

2.2 Waterways and Marinas

Waterways in Parkland, including Wabamun Lake, Isle Lake, and the north Saskatchewan river present natural hazards such as flooding, ice jams, and erosion, necessitating swift evacuations and rescue responses. Responders require specialized technical rescue training and equipment to handle emergencies, especially in water bodies used for recreational activities, which see heightened activity during the summer season. Wabamun Lake sees many recreational activities in the summer months including boating, fishing, and swimming.

There is one marina located on Wabamun Lake in Parkland.

Waterfront activities increase the risk of an incident both on the water and along the shorelines. PCFS reported a total of 36 water and/or ice rescues and 24 Watercraft in distress incidents over the period of January 2019 – December 2023.

2.3 Geographic Profile – Identified Risks and Key Findings

Table 4: Geographic Profile - Identified Risks and Key Findings

Identified Risk / Key Finding	Rationale
Identified Risk	Roads leading to residential properties are largely graveled in rural areas. Although roads in the County are well maintained, gravel roads may slow response times and present challenges for apparatus during a response, including the threat of damage or accidents. Maintenance of gravel roads in winter months can also be challenging and slow response times and increase risks.
Identified Risk	The road network is a contributor to emergency call volume due to motor vehicle collisions and vehicle fires.
Identified Risk	There is an elevated risk of a major spills and dangerous goods incident along Hwy 16 being the main highway linking Parkland and Edmonton
Identified Risk	The transportation of agricultural chemicals along roadways may pose the risk of an environmental spill.
Identified Risk	During peak commuting times, the highest risk of motor vehicle collisions is likely to occur.
Identified Risk	CN rail lines operate a track that runs from Edmonton extending west through Parkland that presents a risk related primarily to the movement of dangerous goods. At grade level rail crossings have the potential to create a physical barrier to connectivity to the roadway network, causing delays in response time.
Identified Risk	Uncontrolled at grade rail crossings pose an increased threat of a motor vehicle collision

Identified Risk / Key Finding	Rationale
Identified Risk	There is a high degree of risk to the public and the environment associated with train derailment; with or without the release of dangerous goods
Identified Risk	There is an increased risk of ice and water rescue along Wabamun Lake, Isle Lake and the north Saskatchewan river due to natural hazards necessitating swift emergency evacuations and recreational boating and other activity on the water
Identified Risk	There is a considerable risk of wildland fires in areas of urban interface. The landscape surrounding the town is primarily agricultural, and increasing development in natural areas increases the threat of wildfire impinging on the town.
Key Finding	With Highway 16 being a direct route from Parkland to Edmonton, there is an elevated risk of a dangerous goods release that could impact the public and environment.
Key Finding	Bridges, with restrictions or closures for repairs, have the potential to create physical barriers to emergency response times and reduce the connectivity of Parkland's road network resulting in the potential for delays in emergency response times.
Key Finding	There are risks associated with the potential for interactions between rail traffic and vehicular traffic or pedestrian traffic within Parkland.
Key Finding	Grade level rail crossings could create a physical barrier to the connectivity of Parkland's Road network that can potentially result in delays in emergency response times.

SECTION 3
BUILDING STOCK PROFILE

A building stock profile assessment includes an analysis of the types and uses of the building stock within a municipality. Important considerations include the number, type, and use of buildings, as well as any building-related risks known to the fire service. There is potential fire risks associated with different types or uses of buildings, depending on the presence or absence of fire safety systems and equipment at the time of construction and maintenance thereafter. This section examines these building characteristics within Parkland.

3.1 National Building Code Occupancy Classifications

A building stock profile assessment includes an analysis of the types and uses of the building stock within Parkland and the potential fire risks. This involves assessing the prevalence of each occupancy classification within a community and the presence of fire and life safety systems and equipment.

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.

Table 5: 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

Table Source: National Building Code (NBC) of Canada – 2019 Alberta Edition

3.2 Fire Risk Model 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 enables comparative assessment of buildings within a community by major occupancy groups, ensuring consistent and recognized definitions for each major occupancy type. Moreover, it allows for further analysis of specific occupancy groups. Occupancies within a group can be individually assessed, subject to any site-specific hazards or concerns, and included within the broader scope of the CRA as needed.

Table 6 below provides an overview of the major occupancy groups, their definitions, related fire risks and high-level risk reduction strategies.

Table 6: Fire Risk - Model Major Building 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 people 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. • Fire Drills as required by the NFC.

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 people 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 are 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. • Fire Drills as required by the NFC.

NBC Occupancy Classification	NBC Major Building Classifications	Definitions	Fire Related Risks	Proactive Measures for Reducing Risk
Group C	Residential Occupancies	A residential occupancy is defined as one that is used by people for whom sleeping accommodation is provided but who are not harbored or detained to receive medical care or treatment or are not involuntarily detained.	In Alberta, residential occupancies account for 70% of all structural fires and 90% of all fire deaths. 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 includes home escape planning. • Retro-fit and compliance inspection cycles for NFC compliance. • Pre-planning by fire suppression staff.

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 NFC retrofit compliance. • Staff training in fire prevention and evacuation procedures. • Public education programs. • Pre-planning by fire suppression staff.

NBC Occupancy Classification	NBC Major Building Classifications	Definitions	Fire Related Risks	Proactive Measures for Reducing Risk
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 do 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 a 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: 1. low hazard (F3) 2. 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.

3.2.1 Parkland Existing Major Building Stock Classification Summary

Analysis of Parkland's major building occupancy types was conducted using data provided by the municipal assessment of Parkland, municipal development plans, and data from the 2021 census[2]. Table 7 provides a summary of Parkland's existing major building occupancy classifications.

The majority of Parkland's existing property stock is comprised of Group C - Residential Occupancies and 88.5% of those are single-detached homes.

Table 7: Existing Major Building Classification Summary

NBC Occupancy Classification	Major Building Classifications	Number of Occupancies
Group A	Assembly Occupancies	186
Group B	Care or Detention Occupancies	NA
Group C	Residential Occupancies - Total	11,915
Group C	Residential Occupancies – Single Detached	10,550
Group C	Residential Occupancies – Semi-Detached House	100
Group C	Residential Occupancies – Row House	20
Group C	Residential Occupancies – fewer than five stories	35
Group C	Residential Occupancies – five or more storeys	0
Group C	Other single-attached house	10
Group C	Mobile Homes / Trailers	1195
Groups D & E	Commercial	*NA*
Group F (all Divisions combined)	Industrial Occupancies	*NA*

**Source for breakdown is data provided by Parkland, municipal development plans and 2021 Census.*

***Note:** Group B, D & E and F's information was not available.*

[2] *Government of Canada, Statistics Canada. (2023, November 15). Profile table, Census Profile, 2021 Census of Population - Parkland, County (TP) [Census subdivision], Alberta.*

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. There is a minor discrepancy with respect to residential occupancies five storeys or more. The 2021 census data indicate there are 5 dwelling in building 5 storeys or more, however the fire department indicated that they do not have any dwelling units as such. This does not impact the risk analysis provided.

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 fire and life safety issues addressed by the codes include:

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

In many cases, the age and construction of a building can be directly associated with whether it was constructed before or after the introduction of these codes. For instance, during the late 19th and early 20th centuries, balloon frame construction was common, allowing exterior walls to extend continuously from the main floor to the roof, often through multiple stories. This construction method facilitated unobstructed fire and smoke spread from the basement to the roof, resulting in rapid fire propagation without occupants' or firefighters' knowledge. 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 recognize modern construction techniques such as lightweight wood frame construction, including the use of wood trusses and laminated veneer lumber. While these techniques and materials enhance construction efficiency and cost-effectiveness, they pose different challenges to firefighters compared to historical methods. For example, lightweight wood frame construction relies on structural components working together, so if one component fails due to exposure to high heat or fire, the entire roof system may fail. Lightweight construction is discussed further, later in this section.

Table 8 lists fire growth rates measured by the time it takes for a fire to reach one-megawatt (MW). Fire growth rate varies depending on the flammability of materials and contents within the building, introducing variances into the presented growth rates.

Table 8: Time to Reach 1 MW Fire Growth Rates in the Absence of Fire Suppression

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)

The impact of increasing fire growth rates is directly related to the time lapse from ignition to flashover, where combustible items within a given space reach a temperature high enough for them to auto-ignite. Figure 3 (below) illustrates the exponential increase in fire temperature over time and the potential for property loss and loss of life.

Figure 3: Fire Propagation Curve

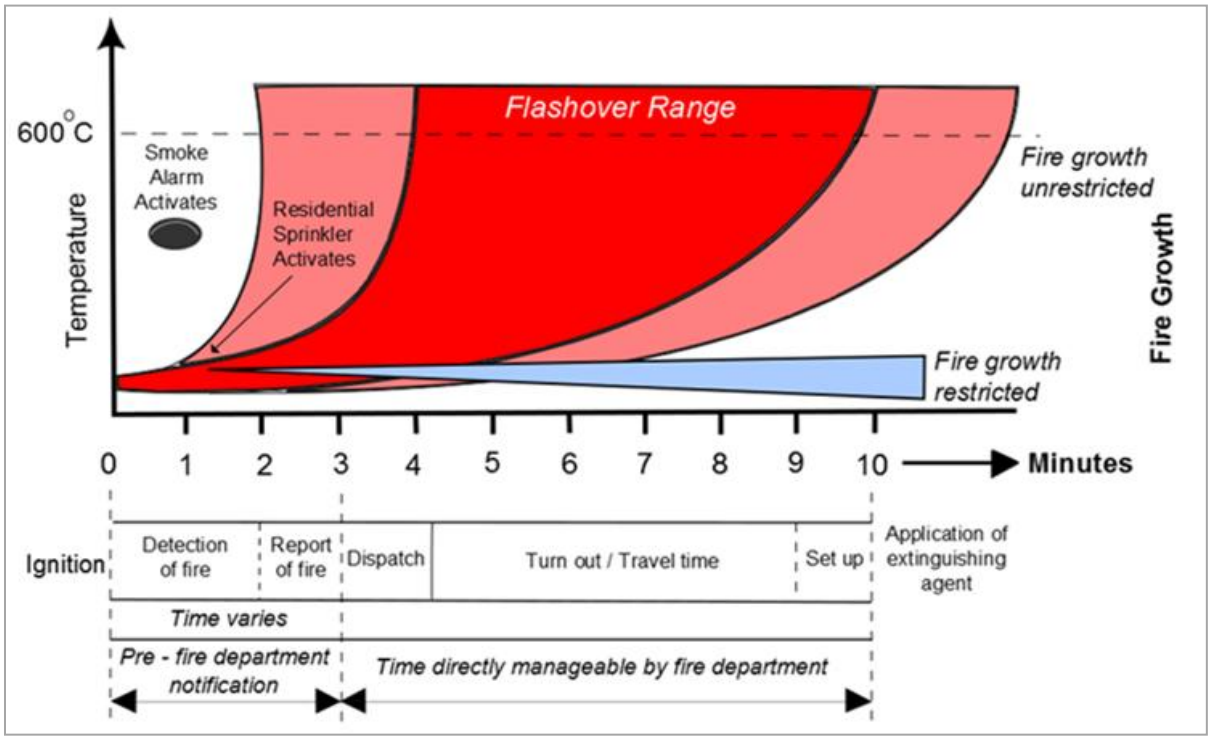


Figure Source: Fire Underwriters Survey "Alternative Water Supplies for Public Fire Protection: An informative Reference Guide for Use in Fire Insurance Grading" (May 2009) and NFPA "Fire Protection Handbook" (2001)

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 CRA.

Table 9 provides a summary of the age of the building stock within Parkland prior to the adoption of the Alberta building and fire codes. This analysis suggests that 30.50% of Parkland's building stock was constructed between 1961 and 1981, preceding the adoption of the 1984 fire code. This represents a significant fire risk within the community, as it is comparatively greater than the provincial average of 26.45%.

Table 9: Occupied Private Dwellings by Period of Construction – Parkland and Alberta

Period of Construction	Parkland Dwellings	Parkland % of Dwellings	Alberta Total Number of Dwellings	Alberta % of Dwellings
Prior to 1960	720	6.03	168,925	10.34
1961-1980	3,645	30.50	428,655	26.25
1981-1990	1,645	13.77	188,550	11.54
Total prior to 1991	6,010	50.29	786,130	48.13
1991-2000	2,190	18.33	224,315	13.73
2001-2005	1,045	8.74	152,840	9.36
2006-2010	1,250	10.46	168,905	10.34
2011-2015	880	7.36	161,095	9.86
2016-2021	575	4.81	139,935	8.57
Total 1991-2021	5,940	49.71	847,090	51.87
Total Dwellings*	11,950	100.00	1,633,220	100.00
**Total occupied private dwellings 25% sample data*				

Table Source: 2021 Census

3.2.2 Lightweight Construction

As part of building stock profile, the introduction of light weight truss construction was introduced into the home building construction in late 1980's and are prevalent in most new home construction. Buildings with lightweight construction pose a safety risk to responding firefighters due to their susceptibility to premature failure and rapid collapse under fire conditions. Pre-plans provide responding fire departments with awareness of the presence of lightweight construction, enabling proactive fire response strategies to protect the safety of firefighters.

The use of lightweight truss construction in residential homes became predominate in the 1980's. It should be considered that all residential dwellings (single detached) should be built with lightweight construction. Parkland should ensure to identify all buildings with lightweight construction, primarily those constructed using wood framing. It is anticipated that Parkland will collect and document information on buildings with lightweight construction to update the CRA during the annual review and updating process. Furthermore, it is expected that the PCFS will integrate this information into their pre-planning program.

3.3 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) highlights building density as a crucial factor for understanding potential fire risk, particularly in core areas like downtown districts. Closely spaced buildings, typical of historic downtown core areas and newer infill construction, may pose a higher risk of fire spreading to adjacent exposed buildings. In densely built-up areas with minimal building setbacks, a fire originating in one building could extend to neighboring structures due to their proximity. Moreover, the proximity of buildings can impede firefighting operations by limiting access for firefighters and equipment.

As per the 2021 census, nearly all the residential building stock in Parkland is composed of single-detached dwellings (88.4%). Parkland has a population density of 13.6 per square kilometre. Between 2016 and 2021, there was reportedly a small reduction in the total population. Occupied private dwellings during this time reduced from 880 between 2011 and 2015, to 575. This was consistent with the Provincial statistics which also saw a reduction during the same time period. Basic firefighting practices prioritize the protection of exposures as a primary function and consideration during fire and emergency service responses. As mentioned earlier, older developments as well as new infill projects may present increased exposure risks due to higher building density.

Table 10 below illustrates a comparison of Parkland's existing Group C – residential building stock with that of the province, based on the 2021 Statistics Canada Census. Table 10 is an indication of the number of dwelling types, whereas Table 7 above is an indication of the number of building/occupancy types driven by the NBC classifications.

Table 10: Group C Residential Building Stock Comparison

Dwelling Type	Parkland	%	Alberta	%
Single Detached	10,550	88.47	994,565	63.82
Semi-Detached	100	0.84	98,740	6.3
Row House	20	0.17	127,735	8.3
Apartment or flat in a duplex	10	0.08	43,730	2.8
Apartment < 5 Storeys	35	0.29	247,030	15.83
Apartment > 5 Storeys	0	0.00	0	0.00
Other single-attached house	10	0.08	1,215	0.05
Moveable dwelling	1,195	10.02	45,325	2.9
Total	11,925	100.00	1,558,340	100.00

Table Source: 2021 Census, Statistics Canada

This analysis highlights that Parkland has a higher percentage of single detached houses (88.4%) compared to that of the province at 60.90%. Parkland currently has a much lower percentage of mid- and low-rise occupancies as compared to the province, however as described in the next section, Parkland is expected to see an increase in population growth somewhere between 42,700 to 50,000 by 2044.[3]

3.4 Building Growth

A snapshot of development in Parkland over the next decade, according to the 2017 Municipal Development Plan, projects a population growth of between 10,495 (32.59%) and 17,795 (55.26%) by 2044. This growth is identified in existing hamlets and developed areas. Intensification and increasing densification of existing hamlets will be considered by the County through implementation of Hamlet Area Redevelopment Plans. This additional growth does not appear significant enough to impact the overall community risk to Parkland.

3.5 Building Height and Area

3.5.1 Building Height

The building height is a characteristic that can make firefighting operations difficult. Several factors contribute to these challenges, including density and the number of occupancies, vertical stacking that allows for vertical air movement, and the movement of smoke, heat, and fire upwards. Additionally, access for firefighting on upper floors, including suppression activities, rescue, and evacuation, can be problematic.

[3] *2017 Parkland Municipal Development Plan*

It is important to note that terms like "high rise," "tall buildings," and "high buildings" have various meanings. For the purposes of developing this Community Risk Assessment (CRA), the NBC/NFC definition has been used to analyze building height within Parkland 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.)

Parkland does not have any tall or high buildings in their municipality.

3.5.2 Building Area

Building area can pose comparable challenges to those present in taller buildings. Horizontal travel distances, rather than vertical, can lead to extended response times for firefighters attempting rescue or fire suppression activities. Large buildings, such as industrial plants, warehouses, department stores, and big box stores, often contain significant volumes of combustible materials. Many of these occupancies also use high rack storage, making fires within these systems difficult to access and increasing the risk of collapse, which can endanger firefighter safety.

3.6 Potential High-Fire Risk Occupancies

Potential high-fire risk occupancy is another factor to consider within a municipality's building stock. High fire risk can be associated with a combination of factors, including building density (exposure), building age, and construction. Fuel load refers to the quantity and type of combustible content and materials within a building, encompassing combustible contents, interior finishes, and structural materials. Combustible content typically poses the greatest potential fire loss risk, as higher fuel loads increase the likelihood of ignition and severity of fires.

In many communities, large amounts of fuel load can be concentrated within a single occupancy, such as a building supply business, retail warehouse, a large multi-unit residential building, or a historic downtown core. This section of the CRA will primarily focus on fuel load for industrial occupancies.

3.6.1 Fuel Load Concerns

Buildings with potential fuel load concerns are identified in Table 11. These include buildings housing materials such as oxidizers and flammable and combustible liquids and chemicals.

Table 11: Potential High Fire Risk Occupancies

Company/Facility Name	Location	Risk Description
Amazon	Acheson	Large warehouse, high fire load, flammable/combustible products for retail
North America Construction Group	Acheson	Heavy Equipment & Mining
Stihl	Acheson	Power Equipment Center
Canfor	Acheson	Lumber, Pulp, Paper & Sustainable Wood Products
Fountain Tire	Acheson	Distribution Center
Standard General	Acheson	Aggregate Products
The Home Depot	Acheson	Home design products, tools, and services
Viterra	Acheson	Grain & Special Crops Facilities; Port Terminals; Oilseed Processing, Grower Programs
Drax	Entwistle	Wood Pellet Manufacturing

In addition to ensuring compliance with the requirements of the NBC-AB and 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.

It is important to note that the increasing number of warehouses and industry that store flammable/combustible products is constantly increasing especially when it comes to the storage and use of lithium-ion battery devices, chargers etc.

3.6.2 Occupancies with Potential High-Fire Safety Risk

Fire risk affects individuals differently, and some people are more vulnerable to fire injury or fatality than others. Parkland is also seeing an increase in the number of multi-generational homes. Multi-generational homes often have vulnerable individuals who may be unable to self-evacuate during a fire or require assistance in their evacuation efforts. Identifying the location and number of vulnerable individuals or occupancies within the community offers insight into the magnitude of this demographic within a community.

3.6.3 Registered Vulnerable Occupancies

From an occupancy perspective, vulnerable occupancies house individuals who may require assistance to evacuate during an emergency due to cognitive or physical limitations, presenting a potential high-life safety risk.

It is essential to note that not all vulnerable individuals reside in vulnerable occupancies. For example, some seniors who are vulnerable due to physical limitations may live independently or in subsidized housing, making them a key demographic to reach.

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. Currently Parkland has one registered Vulnerable Occupancy. With growth and an aging population, continual inflation increases and the lack of already established Registered Vulnerable Occupancies, Parkland can anticipate more residents requiring assistance to evacuate during an emergency. A list of vulnerable occupancies is presented in Table 12.

Table 12: Vulnerable Occupancies

Property Name	Occupancy Type	Location
Everglades Special Care Lodge	Assisted Living	53215 Range Road 21, Parkland County

3.6.4 Other High-Fire Life Safety Risk Occupancies

From a risk perspective, it is valuable for a fire service to identify additional potential high fire life-safety risk considerations. This includes day care facilities and schools, where children, due to their age and potential cognitive or physical limitations, may face challenges in self-evacuation during emergencies. For the purposes of this CRA, potential high life-safety risk occupancy considerations encompass schools and licensed day care facilities. It is worth noting that many schools also offer before and after-school childcare services for children aged 4-12, as well as childcare centers for infants to pre-school-aged children.

Table 13: Schools

	Occupancy Type	Location
Duffield School	K –9	Duffield
Entwistle School	K –9	Entwistle
Tomahawk School	K –9	Tomahawk
Wabamun School	K – 9	Wabamun
Muir Lake School	K – 9	Parkland
Graminia School	K – 9	Parkland
Blueberry School	K – 9	Parkland
Parkland Village School	K - 6	Parkland
New Testament Baptist School	1 - 9	Parkland
Bright Bank Academy	K - 5	Parkland

Table source: Parkland School website

Conducting pre-planning activities for all occupancies with vulnerable occupants is beneficial for fire services. These activities increase fire service personnel's familiarity with buildings of special interest and help reduce the risk faced by vulnerable individuals or vulnerable occupancies. Fire services can perform regularly scheduled fire safety inspections, approve and witness fire drill scenarios, provide public education on fire safety issues, conduct pre-planning exercises to increase familiarity with facilities, review fire safety plans for accuracy, encourage facility owners to update facilities as needed, provide staff training, and conduct fire drills.

3.7 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 Community Risk Assessment. Such buildings or facilities may be keystone features of the community, providing a sense of heritage, place, and pride, and contributing to the overall importance of

the community. Regular fire inspections of these buildings are essential, especially if they serve as tourism destinations, as fire incidents could have significant economic impacts.

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.

This register encompasses properties designated for preservation under Section 29, Part IV, as well as those recognized by the Council for their cultural heritage significance under Section 27, Part IV. Properties listed under Section 27 require Council approval prior to demolition. Parkland has NO properties designated as heritage through its municipal Building Stock Profile – Identified Risks and Key Findings.

3.8 Building Stock Profile – Identified Risks and Key Findings

Table 14: Building Stock Profile – Identified Risks and Key Findings

Identified Risk / Key Finding	Rationale
Identified Risk	Residential buildings account for the majority of building stock in Parkland and are the most common building involved in structural fires and attribute to the most fatalities and injuries
Identified Risk	Data provided by the 2021 census indicates that 30.50% of Parkland's building stock was built prior to 1981, preceding the 1984 fire code. This represents a significant fire risk within the community.
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 to safely evacuate in a timely fashion.
Identified Risk	There are several properties within Parkland that have a potentially high fuel load and therefore an increased high fire risk. Agricultural operations contribute to this risk.
Key Finding	Parkland currently has one (1) registered vulnerable occupancies
Key Finding	In addition to registered vulnerable occupancies Parkland has 4 schools K – up.
Key Finding	Data indicates that 63.4% of residential dwellings were constructed post 1980, which increase the possibility of light weight truss construction in these homes.

SECTION 4
CRITICAL INFRASTRUCTURE PROFILE

Critical infrastructure refers to the systems, facilities, and assets crucial for the functioning of society and the economy. The following section considers these critical infrastructure characteristics within Parkland.

4.1 Critical Infrastructure in Parkland

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. 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. Infrastructure is a complex system of interconnected elements where the failure of one could lead to the failure of others. The vulnerability of infrastructure is often linked 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, Parkland-specific CI concerns are described in greater detail below.

4.1.1 Water Servicing & Infrastructure

EPCOR supplies potable water to several Water Commissions whose membership consists of the municipalities served by these Commissions. One of these Commissions is the Capital Region Parkland Water Commission (CRPWSC), whose members include the City of Spruce Grove, the Town of Stony Plain, and Parkland. From the CRPWSC, the County supplies potable and firefighting water to the Acheson Industrial Area and the Big Lake country residential subdivisions.

The CRPWSC also connects to the West Interlake District Water Services Commission (WILD) whose membership consists of 12 municipalities, one of which is also Parkland. Appendix C shows the map of the WILD Water Services Commission service area. From the WILD Commission, the County supplies potable and firefighting water to the hamlets of Wabamun and Entwistle. According to the PCFS a single line supplies the Parkland reservoirs with potable water. Small leaks and maintenance have caused disruptions and water restrictions to the county.

There is a water shortage plan in place in the event of any water disruptions or low reservoirs located in the County. Water restriction or bans are triggered at various levels depending on the extent of the shortages. A full communications strategy is addressed as part of the overall plan.

Water supply is a critical infrastructure essential for firefighting. Access to a reliable water delivery system is crucial for effective service delivery. Therefore, alternative water sources such as dry hydrants, tanks, reservoirs, rivers, and lake water must be preplanned.

Currently Parkland has a total of 5 potable water reservoirs as described in the table below.

Table 15: Parkland Water Reservoirs

Name	Location	Capacity (m3)	Fed by
Acheson Zone 3 Reservoir	27021 Ellis Road, Acheson	5000	CRPWSC
Acheson Zone 4 Reservoir	25607 Acheson Road, Acheson	9000	CRPWSC
Wabamun Lower Reservoir	5122 53 Street, Wabamun	500	WILD
Wabamun Upper Reservoir	North of highway 16	1000	Parkland County from lower reservoir
Entwistle Reservoir	4524 49 Street, Entwistle	1500	WILD

4.1.2 Stormwater & Sanitary Servicing & Infrastructure

Stormwater facilities are engineered to gather and regulate runoff from precipitation, including rain and snowmelt, thereby reducing the risk of flooding, erosion, and damage to property and infrastructure. Storm sewers, which are underground pipelines, are designed to collect and transport stormwater runoff to nearby water bodies such as rivers and lakes. By preventing stormwater from flooding streets and buildings, storm sewers help manage water quality and quantity in natural water bodies.

Stormwater services play a critical role in managing and controlling the flow of stormwater runoff during precipitation events, mitigating challenges and impacts associated with flooding. This becomes especially relevant when considering the effects of climate change.

According to the 2023 Stormwater Master Plan, stormwater is operated by Parkland which consists of a natural system made up of watercourses, wetlands, creeks, lakes, and rivers[4]. Residential developments in Parkland typically minimize the amount of grading, which allows natural drainage paths and watercourses to operate naturally.

This plan was driven by continued drainage issues. Any disruption to the operation of stormwater facilities and storm sewers can have significant impacts on public safety, property, and the environment. For instance, malfunctioning storm sewers can lead to flooding, property damage, and health hazards such as waterborne diseases. Therefore, stormwater infrastructure is classified as critical and requires protection and maintenance to ensure proper functioning during extreme weather events.

There are two types of wastewater services in Parkland: municipally owned and operated and private sewage disposal. Gravity: Most common in urban type areas and requires less maintenance. Septic tanks and pumps are not needed. Low pressure: most common in rural areas and requires customers to use septic tanks and pumps. Only the liquid wastewater is discharged into the sewer main. Solids must be trucked away for proper disposal. There are seven Municipal sewer systems in Parkland.

The proper operation of sanitary sewer systems is essential for preventing the spread of diseases, safeguarding public health, and preserving the environment. Any disruption to sanitary sewer operations can result in significant impacts on public health and the environment, underscoring the need to recognize them as part of critical infrastructure.

4.1.3 Transportation Infrastructure

Transportation infrastructure encompasses highways, railways, airports, seaports, and public transit systems. It plays a crucial role in enabling economic activity, ensuring public safety, facilitating social mobility, and promoting environmental sustainability. Disruptions to transportation infrastructure can have significant impacts on the functioning of municipalities and the economy, underscoring the importance of protecting and maintaining it.

The following section offers an overview of Parkland's transportation infrastructure. Additional details on the transportation systems in Parkland are provided in the Geographic Profile.

[4] *2023 Parkland Stormwater Master Plan*

4.1.3.1 Roads & Highways

As described in the Geographic Profile, Parkland has a network of interconnected local roads that intersect with essential highways linking it to neighboring regions, including Edmonton. Highway 16 serves as a primary route, supported by Highway 43, Highway 16A, Highway 29, Highway 60, as well as major County-level roads.

Major highways and roads are of concern from the perspective of fire protection services due to the following factors:

- Incidents involving hazardous materials transport
- Motor vehicle collisions driving fire department and ambulance call volume
- Multi-lane and vehicle collisions can obstruct lane access for responding apparatus
- Traffic hazards (distracted drivers, high-speed movement) present safety considerations for responding crews.

PCFS responded to 1674 motor-vehicle related incidents between 2019 – 2023. This represents (35.6%) of all calls.

4.1.3.2 Rail

Running east-west through the entirety of Parkland, Canadian National Railway (CN) operates track that runs from a terminal in Edmonton, AB, extending west through Parkland. Passing through the northern region of Parkland, it primarily traverses along Highway 16, intersecting with the local road network at various level crossings. Rail lines and operations are of concern from the perspective of fire protection services due to the following factors:

- Accidents involving transportation of hazardous cargo could result in release hazardous material requiring hazardous materials response
- Potential for explosions, fires, and destabilization of surrounding structures
- For passenger train derailments or collisions, passenger and rail employee extrication and technical rescue may be required
- Difficulty accessing scene
- Major incidents resulting in long term recovery could delay daily shipment of goods and services, with potential negative affects to local economy.
- Potential risk for grass and brush fires along the track areas and threat to adjacent residential properties

4.1.3.3 Airports

There is one listed airport within Parkland. The Edmonton Parkland Executive Airport is a privately operated airport offering a variety of aviation services. The Edmonton Parkland Executive Airport is located on Range Road 270 in Parkland. Villeneuve Airport is located 5 km from Parkland. It should also be noted that the Edmonton International Airport is located approximately 69 km from Parkland's southern boundary. Airports and their operations are of concern from the perspective of fire protection services due to the following factors:

- Accidents involving planes during landing and takeoff
- Difficulty in locating and accessing scenes
- Requirement for technical rescues of passengers
- Potential for fire or destabilization of structures if impacted by a plane
- Consideration of water rescue techniques in the event of an incident in Wabamun Lake

4.1.4 Energy and Communications Infrastructure

Energy infrastructure comprises the systems, facilities, and assets involved in generating, transmitting, and distributing electricity, and gas within the municipality.

Energy and utility infrastructure are significant considerations for fire protection services due to several reasons:

- The natural gas subsector poses operational hazards to first responders, including leaks, personal injury, and exposure to toxic or hazardous materials.
- PCFS would have a limited role in oil/gas sector responses as these facilities have their own response plans and technical support.
- There is potential for explosion and/or fire within these facilities
- Emergency incidents could result in limited gas supply across Parkland
- Firefighter safety is a concern when responding to fires at electrical substations, which may involve high-voltage electrical hazards, and the presence of chemicals used to cool electrical conductors
- Disruptions to the electrical distribution system could affect emergency communication systems and municipal power supply, leading to various public health and safety concerns requiring fire department assistance

Communications infrastructure is also considered critical infrastructure because it provides essential connectivity and communication services for daily life and the economy. This includes systems, facilities, and assets enabling the transmission and reception of voice, data, and video communications.

In Parkland, the combined energy and communications infrastructure includes power lines and towers, pipelines, transmission lines, communications fiber lines and towers. These components play vital roles in maintaining connectivity, facilitating communication, and supporting emergency response efforts within Parkland.

The most pertinent risk arising from these utilities relates to fallen power lines. Between 2018 and 2022 PCFS responded to 25 incidents for fallen hydro lines which is 25.77% of all public hazard calls.

4.1.5 Other Critical Infrastructure Considerations

General considerations and concerns related to each CI sector as it pertains to the provision of fire protection services for other critical infrastructure sectors are included in Table 16.

Table 16: Other Critical Infrastructure Overview

Sector	Identified Critical Infrastructure	Issues / Concerns
Health	Long-Term Care	• Disrupting large numbers of people with mobility issues • Potential communication issues • Need for specialized medical equipment • There is one (1) vulnerable occupancy in Parkland
Health	Outbreak/Illness	• A major outbreak or illness can create unexpected shortages in the workforce • Reduced staffing can result in an inability to run an apparatus, as well as affect ambulance and police services for widespread illnesses • Illnesses and outbreaks can also increase medical calls in Parkland and have an increased cost in replenishing medical PPE
Health	Health Centres	• There is one major hospital near Parkland, Westview Health Centre located in Stony Plain. In addition, there is one medical center located in Spruce Grove, Grove Medical Center. There are numerous privately owned and operated walk-in clinics and doctors' offices in or near Parkland
Food	Food Supply and Demand	• Food related infrastructure can include agriculture, major distribution centers or grocery stores. • Grocery stores and food distribution centers typically contain large amounts of ammonia used as a component of refrigeration systems • Fire responders should be aware of dangers related to ammonia release and response protocols.
Safety	Fire and Emergency Services	• There are four (4) fire stations located in Parkland: • Acheson, Parkland Village, Tomahawk and West Central. Additional fire stations run by adjacent municipalities include Devon, Evansburg, Spruce Grove and Stony Plain. • Frequent or extreme emergency events could increase demand for emergency response services affecting the response capacity of the fire department
Government	Municipal Government	• Municipal government closed due to extreme weather, cyber-attack, health emergencies, location, civil disruption causes disruption to decision making, financial support, declaration of emergencies etc. • Business Continuity Plan are essential during these incidents as municipal services are often interconnected, therefore the failure of one may lead to the failure or damage to other services or loss of continuity of operations

Sector	Identified Critical Infrastructure	Issues / Concerns
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 financial impact on running apparatus, as well as the ability to obtain/replenish PPE
Manufacturing	Industrial Sites	• According to the 2021 Statistics Canada Census, manufacturing in Parkland accounts for a small amount in local industry. Processing and other activities that involve various ignition sources often occur in these occupancies. Manufacturing facilities constitute a special fire hazard due to high levels of combustible, flammable or explosive content and the possible presence of oxidizing chemicals and gases. The increased use of Lithium-ion battery operated devices and storage also poses a special fire hazard due to the difficulty in controlling these types of fires. A large loss fire in these types of occupancies can also affect employment stability and economic loss to the county

4.2 Critical Infrastructure – Identified Risks and Key Findings

Table 17: Critical Infrastructure – Identified Risks and Key Findings

Identified Risk / Key Finding	Rationale
Identified Risk	The Capital Regional Parkland Water Services Commission, through EPCOR, provides water services to residents of Parkland. Parkland makes sure that the reservoirs are topped up so they can maintain residential water usage and firefighting water needs. The fire service must be reliant on alternate water sources and have a water servicing strategy in place.
Identified Risk	Transmountain Pipeline runs through Parkland
Key Finding	Between 2018 and 2022 PFRS responded to 25 calls for fallen powerlines which is 25.77% of all public hazard calls.
Key Finding	There is one registered private airport in Parkland. Villeneuve Airport is located 5 km from Parkland and the Edmonton International Airport is only 69 Km. from Parkland. There are potential risks related to airplane incidents.
Key Finding	The Capital Regional Parkland Water Services Commission, through EPCOR, provides water services to residents of Parkland. Parkland makes sure that the reservoirs are topped up so they can maintain residential water usage and firefighting water needs. EPCOR closely monitors the river runoff levels but should they become critically low, EPCOR will notify their partners for implementing water restrictions.

SECTION 5
DEMOGRAPHIC PROFILE

The demographic profile assessment includes an 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 Parkland.

5.1 Population and Dispersion

Table 18 highlights the significant growth experienced by Parkland over a twenty-year period from 2001 to 2021, in both population and total private dwellings. The most substantial increases occurred between 2001 and 2006, with a change of 7.30% in population and 20.39% in total private dwellings.

Table 18: Historic Growth in Population and Households – Parkland

Year	Population	% Change	Total Private Dwellings	% Change
2001	27,330	2.57	9,190	14.23
2006	29,325	7.30	11,064	20.39
2011	30,568	4.24	12,150	9.82
2016	32,737	7.10	12,910	6.26
2021	32,205	-1.63	13,544	4.91

Table Source: 1996-2021 Census, Statistics Canada

5.1.1 Population Age

Identifying a community's population by age category is a core component of developing the CRA and identifying specific measures to mitigate risks associated with a specific age group, such as seniors. The 2021 Census identifies a total population of 32,205 for Parkland. The age distributions of Parkland's population and Alberta's population are compared in Table 19.

Table 19: Population by Age Group – Parkland and Alberta

Age	Parkland Population	Parkland %	Alberta Population	Alberta %
0 to 4 years	1,455	4.52	250,250	5.87
5 to 9 years	2,045	6.35	278,810	6.54
10 to 14 years	2,225	6.91	280,585	6.58
15 to 19 years	2,030	6.30	249,765	5.86
20 to 24 years	1,390	4.32	248,740	5.84
25 to 29 years	1,180	3.66	275,465	6.46
30 to 34 years	1,615	5.01	323,260	7.58
35 to 39 years	1,990	6.18	338,945	7.95
40 to 44 years	2,130	6.61	307,665	7.22
45 to 49 years	2,130	6.61	277,770	6.52
50 to 54 years	2,350	7.30	262,770	6.16
55 to 59 years	2,965	9.21	274,150	6.43
60 to 64 years	2,880	8.94	265,240	6.22
65 to 69 years	2,395	7.44	217,270	5.10
70 to 74 years	1,605	4.98	163,890	3.84
75 to 79 years	1,005	3.12	105,520	2.48
80 to 84 years	515	1.60	70,160	1.65
85 to 89 years	215	0.67	44,670	1.05
90 to 94 years	75	0.23	21,430	0.50
95 to 99 years	10	0.03	5,480	0.13
100 +	0	0.00	795	0.02
Total	32,205	100.00	4,262,630	100.00
Median Age of the Population	50.4		41.6	
Population aged 14 and under	5,725	17.78	809,645	18.99
Population aged 65 and over	5,820	18.07	629,215	14.76
Population aged 55 to 64	5,845	18.15	539,390	12.65

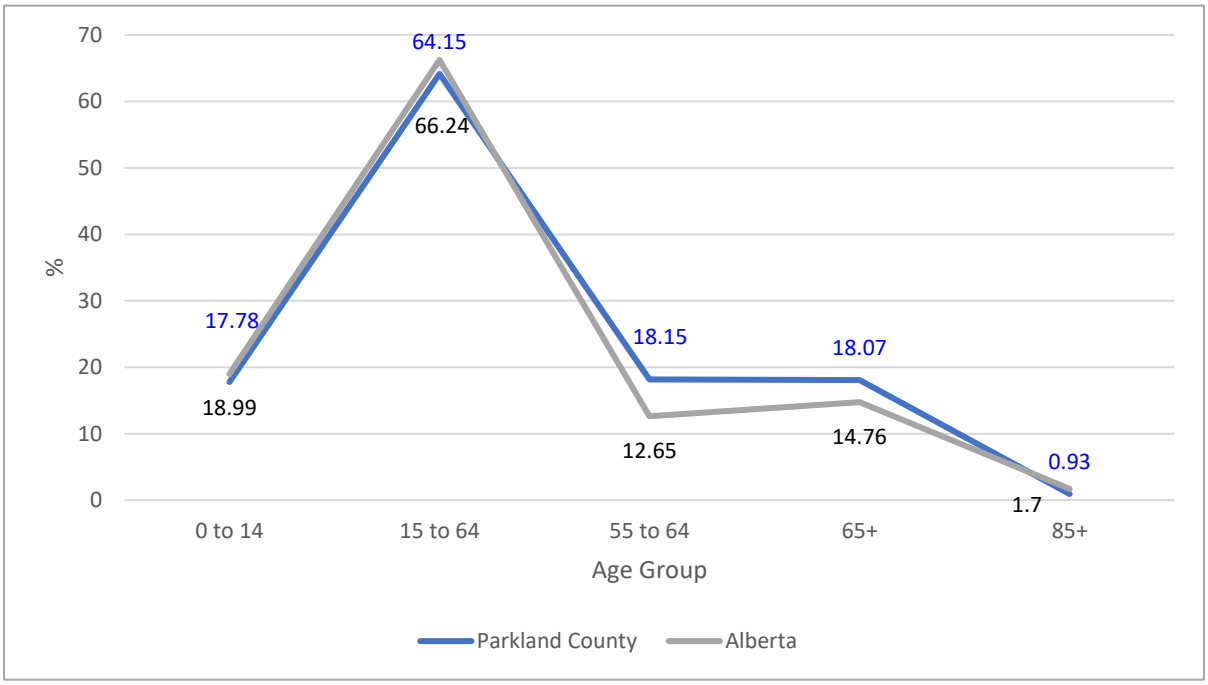
Table Source: 2021 Census, Statistics Canada

The youngest demographic, comprising individuals aged 14 years and under, accounts for 17.78% of Parkland's total population, slightly lower than the province's figure of 18.99%. Although they face a lower risk of fatality in residential occupancies compared to seniors or adults, youth in this age group remain an essential demographic for public education efforts. Therefore, directing public education and prevention programs toward this demographic holds significant value. Implementing structured education programs consistently for children and youth can effectively embed fire and life safety awareness and knowledge into future generations. It is noted that there is one public elementary school in Parkland. Those in secondary school and catholic elementary are transported outside Parkland, providing access to this age demographic directly through the school system is difficult and will rely on neighbouring fire services to provide this public education through the school network.

The percentage of the population aged 65 years and older in Parkland represents 18.07% of the total population, which is 3.39% higher the province's rate of 14.76%. Additionally, 18.15% of Parkland's population falls between the ages of 55 and 64, gradually aging into the senior demographic of 65 years and older which is 12.65% higher than that of the province. This highlights the significance of implementing early intervention and prevention programs to mitigate fire risks as this cohort transitions into the senior demographic. Based on historic residential fire fatality data, this population faces greater risks. These demographic trends emphasize the importance of developing informed, targeted public education programs and risk reduction strategies within the community.

Figure 4 illustrates the age group comparisons between Parkland and Alberta.

Figure 4: Percent of Population by Age Group – Parkland and Alberta



A community's population by age is an important factor in identifying specific measures to mitigate risks associated with age groups, such as seniors. Canada's aging population has emerged as one of the most significant demographic trends. According to Statistics Canada, from 2016 to 2021, Canada experienced a notable increase in the proportion of seniors since Confederation, primarily due to the baby boomer generation reaching the age of 65. Presently, there are more Canadians over the age of 65, accounting for 18.98% of the population, than there are children aged 14 years and younger, who make up 16.25%.

Seniors, defined as individuals aged 65 years and over, are regarded as one of the highest fire risk groups across the province, based on the residential fire death rate (fire deaths per million of population). Figure 5 *Population Distribution* illustrates the number of fire deaths in Alberta, between 2011 and 2020, and combining these sets of information assists in highlighting seniors' increased vulnerability to fatality in residential occupancies compared to other age groups.

5.1.2 Population Age by Dissemination Area

Further analysis of age-based population distribution is illustrated in Figure 5 and Figure 6, portraying the distribution across dissemination areas.

Figure 5: Population Distribution Ages 0-14

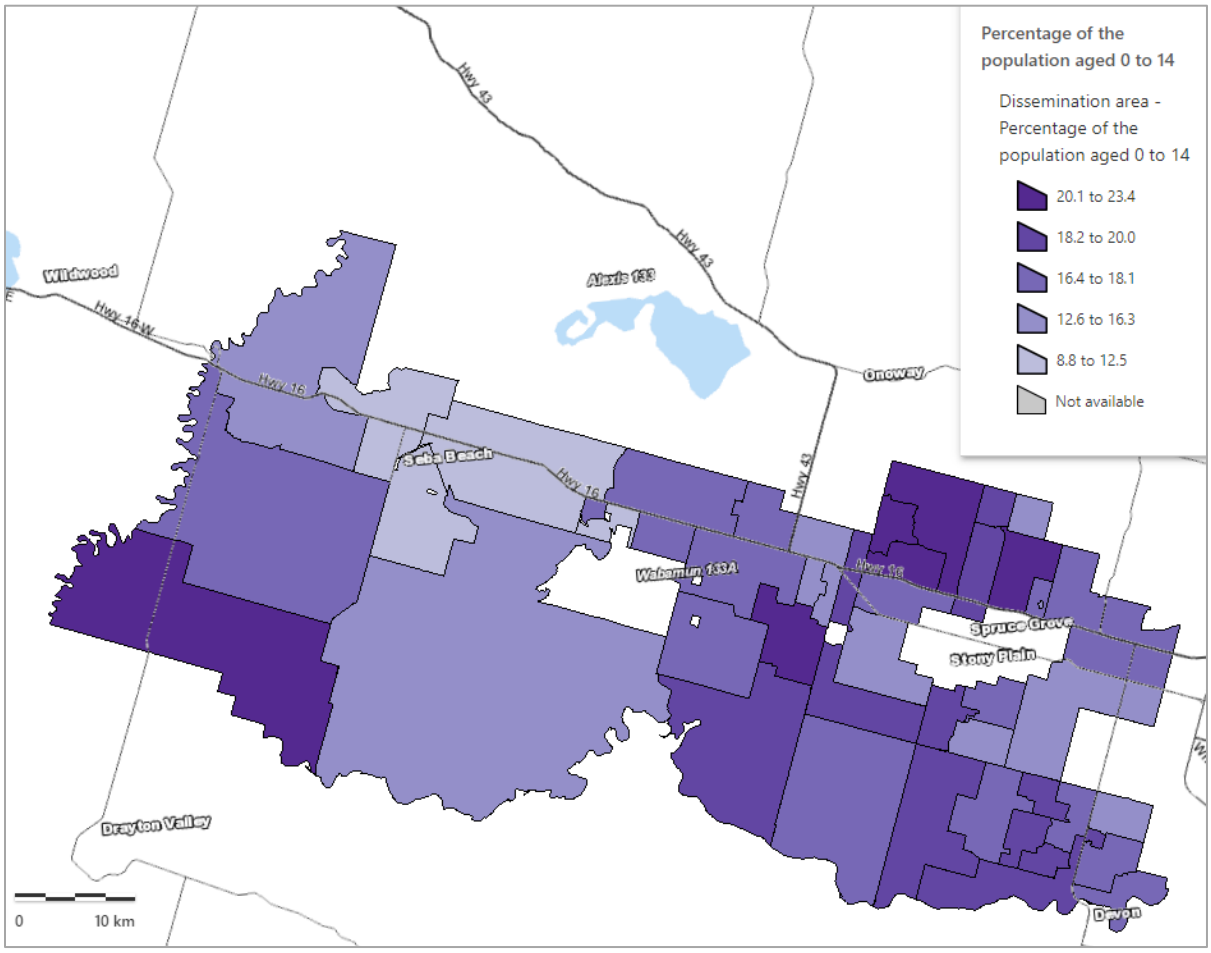


Figure Source: 2021 Census, Statistics Canada

Figure 6: Population Distribution Age 65 and Over

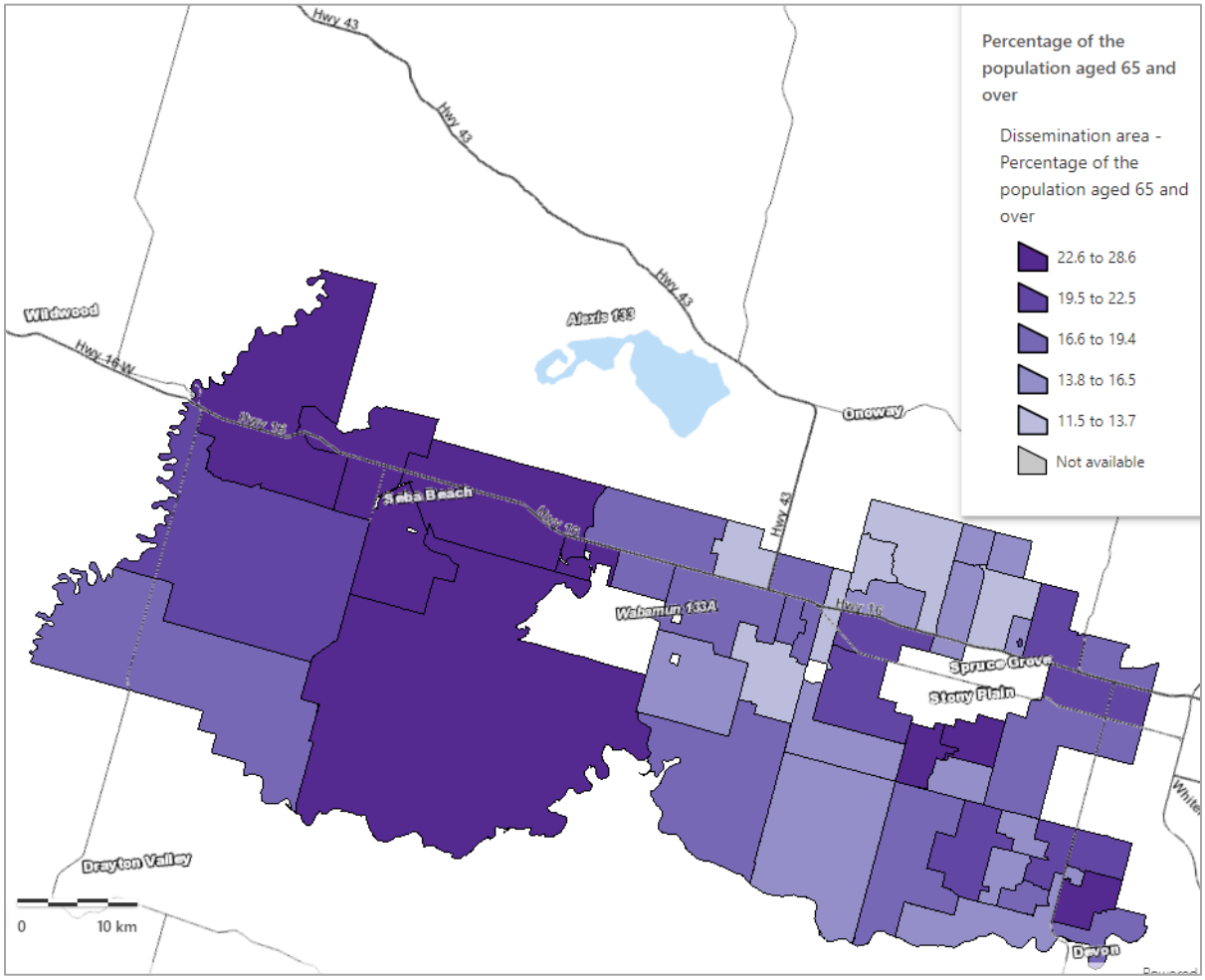


Figure Source: 2021 Census, Statistics Canada

5.2 Gender

NFPA 1730: Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations (2019 Edition) integrates gender considerations into Community Risk Assessments, acknowledging historical data indicating a higher incidence of fire-related injuries or fatalities among males. In Parkland, Table 20 outlines the gender distribution by age, with males representing 51.98% and females 48.07%, closely aligning with the provincial gender ratio of 49.92% men and 50.08% women. These statistics generally reflect provincial trends, suggesting that gender-based refinements in public education programming in Parkland may not be necessary.

Table 20: Gender Distribution by Age Group – Parkland

Age Group	Population	Total %	Male	%	Female	%
0 to 4 years	1,455	4.52	750	2.33	705	2.19
5 to 9 years	2,045	6.35	1,090	3.38	955	2.97
10 to 14 years	2,225	6.91	1,155	3.59	1,065	3.31
15 to 19 years	2,030	6.30	1,070	3.32	960	2.98
20 to 24 years	1,390	4.32	725	2.25	660	2.05
25 to 29 years	1,180	3.66	635	1.97	550	1.71
30 to 34 years	1,615	5.01	805	2.50	810	2.52
35 to 39 years	1,990	6.18	995	3.09	995	3.09
40 to 44 years	2,130	6.61	1,100	3.42	1,035	3.21
45 to 49 years	2,130	6.61	1,100	3.42	1,035	3.21
50 to 54 years	2,350	7.30	1,190	3.70	1,160	3.60
55 to 59 years	2,965	9.21	1,500	4.66	1,470	4.56
60 to 64 years	2,880	8.94	1,525	4.74	1,360	4.22
65 to 69 years	2,395	7.44	1,250	3.88	1,145	3.56
70 to 74 years	1,605	4.98	850	2.64	760	2.36
75 to 79 years	1,005	3.12	565	1.75	440	1.37
80 to 84 years	515	1.60	285	0.88	230	0.71
85 to 89 years	215	0.67	115	0.36	100	0.31
90 to 94 years	75	0.23	30	0.09	40	0.12
95 to 99 years	10	0.03	5	0.02	5	0.02
100 +	0	0.00	0	0.00	0	0.00
Total	32,205	100	16,740	51.98	15,480	48.07

Table Source: 2021 Census, Statistics Canada

5.3 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
- Immigrant status
- Educational attainment
- Household tenure, occupancy, suitability, and cost

5.3.1 Labour Force Status

Those who are economically disadvantaged, including low-income families, the homeless and 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.

- The 1981 report, "Fire-Cause Patterns for Different Socioeconomic Neighborhoods in Toledo, Ohio," determined that the incendiary fire rate in low-income neighborhoods is 14.4 times higher compared to areas with the highest median income. Further, fires caused by smoking and children playing occurred at rates 8.5 and 14.2 times higher, respectively.
- Single-parent families are more economically challenged since 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 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.

Labour force status is an 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 labor 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).

Table 21 details the labor force statistics for Parkland compared to Alberta. Despite a similar participation rate of 65.08% in Parkland and 68.01% provincially, Parkland presents a slightly lower employment rate of 58.72% compared to Alberta's 60.17%, along with a lower unemployment rate of 9.80% versus 11.53% in Alberta. Parkland also exhibits a higher percentage of individuals not in the labor force at 34.92% compared to Alberta's 31.99%.

Table 21: Labour Force Status – Parkland and Alberta

Status	Parkland Population	Alberta Population
In the Labour Force*	17,135	2,295,380
Employed	15,460	2,030,730
Unemployed	1,680	264,650
Not in the Labour Force	9,195	1,079,750
Total	26,330	3,375,130
Participation Rate	65.08	68.01
Employment Rate	58.72	60.17
Unemployment Rate	9.80	11.53

Table Source: 2021 Census, Statistics Canada

**Total - Population aged 15 years and over by labour force status*

5.3.2 Educational Attainment

The relationship between educational attainment and income is complex. An analysis conducted by Statistics Canada has found that high-income Canadians are more likely to be highly educated. Approximately two thirds (67.10%) of the top 1% had attained a university degree compared to 20.90% of all Canadians aged 15 and over.

Based on this national trend and for the purposes of this Community Risk Assessment, it is assumed that higher education leads to more disposable income and a lower fire risk. It is also assumed that households with higher disposable income are more likely to invest in fire life safety products such as fire extinguishers and smoke alarms, reducing the fire risk.

Table 22 compares educational attainment levels between Parkland and the Province of Alberta using 2021 Census data. The data indicates that Parkland residents have lower educational attainment compared to the provincial average. Parkland exhibits both a higher-than-average percentage of individuals without a certificate, diploma, or degree (12.57% compared to the provincial average of 11.33%) and a lower-than-average percentage of residents with a high school diploma, as well as those holding a postsecondary certificate, diploma, or degree, in comparison to provincial averages. This trend suggests increased awareness of fire safety practices and potentially correlates with lower rates of accidental fires due to negligence.

Table 22: Educational Attainment – Parkland and Alberta

Educational Attainment	Parkland Total	Parkland %	Alberta Total	Alberta %
No Certificate / Diploma / Degree	5,085	12.57	595,665	11.33
High School Diploma or Equivalent	21,245	52.52	2,779,465	52.89
Postsecondary Certificate; Diploma or Degree	14,120	34.91	1,880,185	35.78
Total	40,450	100.00	5,255,315	100.00

Table Source: 2021 Census, Statistics Canada

5.3.3 Median Income

Table 23 presents median income statistics for Parkland in 2020, showing higher income levels compared to the Alberta averages. The median individual income in Parkland was $47,600, which reflects an 5.88% difference compared to Alberta's median individual income of $44,800. Similarly, the median household income in Parkland was $115,000, indicating a more significant 16.52% difference from Alberta's median household income of $96,000. Higher median incomes in Parkland may indicate a more affluent community with better-resourced households, potentially leading to improved fire prevention measures and safer living conditions. However, higher income levels can also correspond to larger, more valuable properties that may pose unique challenges for firefighting and rescue operations in the event of emergencies.

Table 23: Median Income of Parkland and Alberta - 2020

Geography	Median Income Individual	Median Income Household
Parkland	$47,600	$115,000
Alberta	$44,800	$96,000
% Difference	5.88%	16.52%

Table Source: 2021 Census, Statistics Canada

5.3.3.1 Income Decile Groups

Income can also be examined through the lens of income decile groups, which offer a rough ranking of an individual's economic status based on their relative position in the Canadian distribution of adjusted after-tax income of economic families, as defined by Statistics Canada.

Table 24 presents data on economic family income decile groups for the population in private households in Parkland compared to Alberta. In Parkland, 34.94% of the population falls within the bottom half of the income distribution, while 65.06% are in the top half. This distribution follows the same trend as Alberta, where a larger proportion (54.65%) is in the upper half of the income distribution, and 45.35% are in the bottom half. Parkland does however have a higher percentage of the population among the top half of the distribution compared to that of the province. These statistics indicate a higher concentration of higher-income households in Parkland compared to the provincial average, which can influence the community's economic resilience and potentially impact fire risk and emergency preparedness. Understanding income distribution within the community is crucial for the fire department's risk assessment and resource allocation efforts.

Table 24: Economic Family Income Decile Group for the Population in Private Households – Parkland and Alberta

Decile Group	Parkland Total	Parkland %	Alberta Total	Alberta %
In the bottom half of the distribution	11,165	34.94	1,894,410	45.35
In the top half of the distribution	20,790	65.06	2,283,310	54.65
Total	31,955	100.00	4,177,720	100.00

Table Source: 2021 Census, Statistics Canada

5.3.4 Housing Tenure

Housing tenure, particularly the rate of homeownership, serves as a significant indicator of socioeconomic status within a community. A higher rate of homeownership often suggests greater wealth, stability, and higher incomes, whereas a higher rate of rental properties may reflect lower incomes and socioeconomic challenges.

Lower homeownership rates are associated with higher fire risk due to several factors. Homeowners typically invest in property maintenance and are more likely to have access to fire prevention resources and insurance. In contrast, rented properties may experience higher turnover rates, potentially leading to neglect of fire safety measures by tenants or landlords.

According to Table 25, in Parkland, the majority of households (92.09%) are owned, while only a small percentage (7.91%) are rented. This ownership trend is notably higher than the provincial average, where 70.87% of households are owned and 28.48% are rented. The high rate of homeownership in Parkland can significantly influence community stability and investment in property maintenance, indirectly impacting fire risk and emergency response dynamics.

Table 25: Household Tenure – Parkland and Alberta

Household Tenure	Parkland Total	Parkland %	Alberta Total	Alberta %
Owner	11,000	92.09	1,157,495	70.87
Renter	945	7.91	465,220	28.48
Provided by Government, First Nation, or Indian Band	0	0.00	10,505	0.64
Total	11,945	100.00	1,633,220	100.00

Table Source: 2021 Census, Statistics Canada

5.3.4.1 Occupancy

A higher proportion of multiple persons per household can contribute to increased fire risk and potential fire loss. As shown in Table 26, Parkland has a higher proportion of households with two or more occupants (82.87%) compared to the provincial rate (74.04%). This higher occupancy density within households can elevate the risk of fire incidents.

Table 26: Household Occupancy

Household Occupancy	Parkland Total	Parkland %	Alberta Total	Alberta %
1 Person	2,040	17.13	424,055	25.96
2 Persons	4,990	41.90	551,420	33.76
3 Persons	1,700	14.27	249,135	15.25
4 Persons	1,870	15.70	243,400	14.90
5 Persons or more	1,310	11.00	165,215	10.12
Total	11,910	100.00	1,633,225	100.00

Table Source: 2021 Census, Statistics Canada

5.3.4.2 Suitability

The 2021 Census data, as presented in Table 27, indicates that Parkland has a notably lower percentage of housing deemed unsuitable compared to Alberta as a whole. Specifically, only 1.67% of Parkland's housing is classified as not suitable, contrasting with 4.67% in the province. Housing suitability is determined based on whether the dwelling has adequate bedrooms relative to the ages and relationships among household members, according to the National Occupancy Standard. This discrepancy suggests that Parkland has a lower fire risk from the perspective of housing suitability compared to the province.

Table 27: Household Suitability – Parkland and Alberta

Housing Suitability	Parkland Total	Parkland %	Alberta Total	Alberta %
Suitable	11,745	98.33	1,556,960	95.33
Not suitable	200	1.67	76,260	4.67
Total	11,945	100.00	1,633,220	100.00

Table Source: 2021 Census, Statistics Canada

5.3.4.3 Housing Costs

The cost of housing often reflects a household's disposable income, which can influence their ability to invest in household fire safety measures. In Parkland, where fewer households (16.11%) spend 30% or more of their income on housing compared to Alberta (21.25%), as shown in Table 28, there may be more financial flexibility for fire safety investments.

Despite higher housing values in Parkland compared to Alberta, as referenced in Table 29, the median monthly shelter costs for rented dwellings are comparable, while for owned dwellings, Parkland costs are lower. This affordability may allow residents to allocate more resources to fire safety measures, potentially lowering fire risk.

Table 28: Shelter Costs – Parkland and Alberta

Shelter Costs	Parkland Total	Parkland %	Alberta Total	Alberta %
Spending less than 30% of household total income on shelter costs	9,635	83.89	1,251,370	78.75
Spending 30% or more of household total income on shelter costs	1,850	16.11	337,585	21.25
Total	11,485	100.00	1,588,955	100.00

Table Source: 2021 Census, Statistics Canada

Table 29: Median Costs – Parkland and Alberta

Median Costs	Parkland	Alberta
Median value of dwellings	$500,000	$400,000
Median monthly shelter costs for owned dwellings	$1,420	$1,600
Median monthly shelter costs for rented dwellings	$1,310	$1,280

Table Source: 2021 Census, Statistics Canada

5.4 Cultural Background, Language Considerations

In Parkland, where the proportion of newcomers is significantly lower (7.51%) compared to Alberta (23.24%), cultural background and language considerations remain crucial factors for fire service providers when developing and delivering fire prevention and public education programs. While the immigrant population is smaller, communication barriers, including language proficiency and literacy levels, continue to be important to address. Even with a lower proportion of newcomers, there may still be familiarity challenges related to fire safety standards within immigrant populations. Therefore, targeted education initiatives are necessary to ensure that all residents, regardless of cultural background or language proficiency, have access to essential fire safety information and resources.

To analyze the data on immigration status for the CRA, we can consider several factors:

- Population Composition: The data provides insights into the immigration status of the population in Parkland. Most residents (92.30%) are non-immigrants, indicating a high proportion of individuals who were born in Canada or have Canadian citizenship.

- Immigrant Population: Although immigrants make up a small percentage (7.51%) of the population, their presence is notable. Understanding the characteristics and needs of immigrant communities is essential for assessing vulnerability and resilience to hazards, as these populations may have unique cultural, linguistic, and socioeconomic factors that influence their risk exposure and coping capacities.
- Temporal Patterns: Examining the temporal distribution of immigration reveals trends in population movement over time. While most immigrants arrived before 1980, there are smaller cohorts who arrived in subsequent decades, with a slight increase in immigration from 2001 to 2010. Understanding the timing of immigration can help identify potential cohorts of newcomers who may require targeted support in hazard preparedness and resilience-building efforts.
- Permanent Residents: The low presence of non-permanent residents (0.19%) suggests a small transient population within the city. These individuals may have different risk profiles and vulnerabilities compared to permanent residents, requiring tailored approaches to hazard risk assessment and mitigation.
- Integration and Adaptation: Assessing the integration and adaptation experiences of immigrant and non-permanent resident populations is crucial for understanding their capacity to cope with hazards. Factors such as language proficiency, access to social networks, and familiarity with local emergency response systems can influence their ability to effectively respond to and recover from disasters.

By understanding the diverse needs and characteristics of immigrant and non-permanent resident communities, emergency management agencies and local authorities can develop targeted strategies to enhance community resilience and ensure equitable access to hazard preparedness resources and support services.

Table 30 summarizes the immigration status of Parkland's population.

Table 30: Immigration Status – Parkland and Alberta

Immigration Status	Parkland Total	Parkland %	Alberta Total	Alberta %
Non-immigrants	29,555	92.30	3,141,915	75.21
Immigrants	2,405	7.51	970,970	23.24
Before 1980	860	35.76	127,275	13.11
1980 to 1990	380	15.80	91,320	9.41
1991 to 2000	375	15.59	126,605	13.04
2001 to 2010	495	20.58	239,260	24.64
2011 to 2015	190	7.90	193,335	19.91
2016 to 2021	100	4.16	193,175	19.90

Immigration Status	Parkland Total	Parkland %	Alberta Total	Alberta %
Non-permanent residents	60	0.19	64,830	1.55
Total	32,020	100.00	4,177,715	100.00

Table Source: 2021 Census, Statistics Canada

Table 31 provides insights into language demographics in Parkland and Alberta based on the 2021 Census. In Parkland, 98.44% of the population knows only English, while only a small percentage (0.11%) are proficient in both English and French. Additionally, only 0.11% have no knowledge of English or French. However, an exploration into visible minorities reveals Parkland's diverse landscape.

Table 31: Knowledge of Official Language – Parkland and Alberta

Language	Parkland Total	Parkland %	Alberta Total	Alberta %
English Only	31,605	98.44	4,078,135	96.60
French Only	430	1.34	64,440	1.53
English and French	35	0.11	15,525	0.37
Neither English nor French	35	0.11	63,735	1.51
Total (non-institutional)	32,105	100.00	4,221,835	100.00

Table Source: 2021 Census, Statistics Canada

Figure 7 provides a breakdown on the different visible minorities within Parkland. The predominant minority group is Black, followed by South Asian, Chinese, and Filipino. Beyond these top minority groups, there is a notable presence of others contributing to the diversity of Parkland. As Parkland grows, it is important to address potential ethnic or communication barriers arising from this diversity to ensure effective community engagement and emergency communication strategies.

Figure 7: Visible Minorities – Parkland

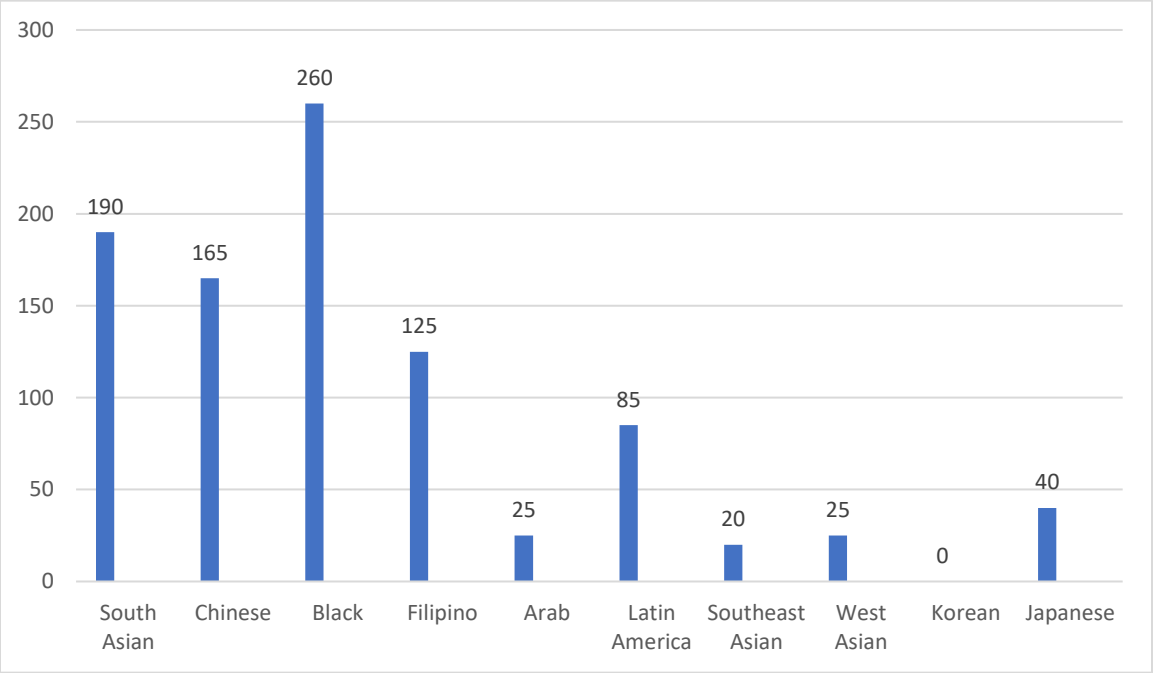


Table Source: 2021 Census, Statistics Canada

5.5 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 shifts can stem from factors like employment, tourism, and education. In some municipalities, residents routinely leave for work, contributing to increased traffic and more motor vehicle collisions. Other communities may serve as major tourist destinations, leading to significant population fluctuations based on seasonal tourism activities. This can heighten the demand for fire protection services, especially concerning overnight tourism accommodations. Additionally, educational institutions can draw transient student populations who commute daily or reside in dormitories or student housing seasonally.

Student accommodations and short-term rental units present distinct fire safety challenges, often arising from the conversion of houses into boarding houses or rooming house accommodations that do not adhere to the National Building Code (NBC). Identifying these properties poses a challenge for fire prevention division staff tasked with enforcing fire codes.

5.5.1 Commuter Populations

Commuter populations represent a significant portion of Parkland's labour force. Table 32 shows the commuting destination trends for the residents of Parkland based on 2021 Census data. Among Parkland's labour force, 17.65% commute locally within their census subdivision (CSD) of residence, while 75.84% travel to nearby areas within the same Census Division (CD). Additionally, 5.74% of Parkland residents commute to other locations within the same province, a proportion that is slightly higher that Alberta's rate of 4.18%.

Table 32: Commuting Destinations – Parkland and Alberta

Commuting Destination*	Parkland Labour Force	%	Alberta Labour Force	%
Commute within census subdivision (CSD) of residence	1,600	17.65	902,040	71.63
Commute to a different CSD within Census Division (CD) of residence	6,875	75.84	292,360	23.22
Commute to a different CSD and CD within province or territory of residence	520	5.74	52,590	4.18
Commute to a different province or territory	70	0.77	12,315	0.98
Total	9,065	100.00	1,259,305	100.00

Table Source: 2021 Census, Statistics Canada

**Commuting destination for the employed labour force aged 15 years and over in private households with a usual place of work - 25% sample data*

Table 33 provides insights into the timing of commutes to work among Parkland residents aged 15 years and over. The data reveals that most commuters leave for work during peak morning hours, with 45.38% departing between 7 AM and 8:59 AM. Additionally, a significant portion of commuters (24.11%) begin their journeys between 6 AM and 6:59 AM. These patterns emphasize the significance of understanding peak commuting times for emergency planning, particularly during periods of high travel activity when motor vehicle collision calls are more likely.

Table 33: Time of Commute to Work

Time Leaving for Work*	Labour Force	%
Between 5 AM and 5:59 AM	1,170	9.66
Between 6 AM and 6:59 AM	2,920	24.11
Between 7 AM and 7:59 AM	3,465	28.61
Between 8 AM and 8:59 AM	2,030	16.76
Between 9 AM and 11:59 AM	1,050	8.67
Between 12 PM and 4:59 AM	1,475	12.18
Total	12,110	100.00

Table Source: 2021 Census, Statistics Canada

**Total time leaving for work for the employed labour force aged 15 years and over with a usual place of work or no fixed workplace address - 25% sample data*

5.5.2 Tourism

An increase in tourism can lead to heightened demand for fire protection services, particularly with overnight accommodations. Parkland hosts several events and attractions annually, drawing both residents and non-residents. These events, which include annual festivals and gatherings, contribute to increased foot traffic and activity within the community. The Parkland and Wabamun Lake area attract outside visitors for berry picking, biking, bird watching, camping, fishing, golf, boating and other recreational water and winter activities. Indigenous Population

Parkland has an Indigenous population (6.78%) that is consistent to Alberta's population of 6.81%. The majority of those identifying as Indigenous in Parkland report a single Indigenous identity, with 98.39% of these individuals having a single Indigenous response. Of these, the majority identify as Métis (66.13%) or First Nations (29.95%). Given these demographics, it is crucial to monitor these populations closely, especially with new Census data, to inform the planning of public education programs and materials that cater to the unique needs and perspectives of Indigenous communities in Parkland.

Table 34 provides insights into the Indigenous population within Parkland compared to the province.

Table 34: Indigenous Population – Parkland and Alberta

Indigenous Identity	Parkland Total	Parkland %	Alberta Total	Alberta %
Indigenous Identity	2,170	6.78	284,470	6.81
Single Indigenous Responses	2,135	98.39	276,060	97.04

Indigenous Identity	Parkland Total	Parkland %	Alberta Total	Alberta %
First Nations	650	29.95	145,640	51.20
Métis	1,435	66.13	127,470	44.81
Inuk (Inuit)	45	2.07	2,945	1.04
Multiple Indigenous Responses	10	0.46	4,785	1.68
Indigenous Responses not specifically listed above	30	1.38	3,620	1.27
Non-Indigenous Identity	29,850	93.22	3,893,245	93.19
Total	32,020		4,177,705	
Registered or Treaty Indian	480	1.50	126,530	3.03
Not a Registered or Treaty Indian	31,545	98.52	4,051,185	96.97

Table Source: 2021 Census, Statistics Canada

5.6 Demographic Profile – Identified Risks and Key Findings

Table 35: Demographic Profile – Identified Risks and Key Findings

Identified Risk / Key Finding	Rationale
Identified Risk	The population of Parkland has steadily increased with a continued anticipated growth. Rapid changes in population and development can contribute to increased risk and potential increase in call volume and service level demands.
Identified Risk	Parkland has 18.07% of the population aged 65+ compared to 14.76% for Alberta. Seniors are considered to represent on e of the highest fire risk groups across the province based on residential fire death rate.
Identified Risk	Of Parkland's population, 18.15% 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 great fire fatality risk.
Key Finding	Parkland has lower proportion of newcomers/immigrants (7.51%) when compared to Alberta (23.24%)
Identified Risk	Nearly (5.74%) of the population commutes to a different census division within the province. This is 1.56%) more than that of the provincial commuters (4.18%)
Key Finding	The population of the County has increased with continued anticipated growth. Rapid changes in population and development can affect the service level needs of the County.

SECTION 6
HAZARD PROFILE

6.1 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 Parkland.

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 to reduce future losses.

6.1.1 Parkland Emergency Response Plan Risk Assessment

A CRA provides an opportunity to examine the results of a community emergency management program (CEMP) risk assessment 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. As a component of the risk assessment and risk analysis process, the top hazards in the community were identified as a part of the risk assessment conducted by Parkland in 2020. Hazards were assigned a risk score and risk level ranking from extreme to very low, depending on their probability and consequence. Parkland is current in the process of updating the HIRA. As a result of this analysis, it shows the top hazards that were identified: (note some hazards were grouped together based on similar risks):

- Hazmat Rail/Road
- Forest Fire
- Oil or natural gas release
- Hazmat (Fixed Site) – Pipeline-Storage Facility
- Tornados
- Blizzards
- Farm Animal Disease
- Major Road Accident

To better understand the risks of hazards as they pertain to fire protection services, the top hazards have been assessed to identify 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 36.

Table 36: Impacts of Hazards on Fire Protection Services

Hazard	Possible Impact
HAZMAT Transportation Rail, Road	Overall Impact 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. Could result in transportation disruption and road closure and required detours. 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 and Hazardous material training. Requires support from rail owners. May require securing a large scene and additional support from mutual aid partners. Ensure mutual aid agreements are in place
Forest Fire (Wildfire)	Overall Impact Serious Injury or fatality. Could require small or large-scale evacuation of homes, business, schools etc. Could result in transportation disruption and road closures and required detours. Fire Services Depending on the severity and scale of fire incident, could pose secondary risk to firefighters on-scene. Must have extensive wildfire response training. Must maintain mutual aid agreements with neighbouring response agencies and Alberta Wildfire. Must maintain contract agreements with specialized response services such as helicopter, sprinkler, and pumping services.
Oil and Gas Emergency	Overall Impact Serious injury or fatality. Possible secondary emergencies such as fire or explosion. Could require small- or large-scale evacuation of homes, businesses, school etc. Could result in transportation disruption and road closure and required detours. Fire Services PCFS would be responding on behalf of the County, however, these facilities have their own trained designated first responders who can respond and control Level 1 and Level 2 incidents. If an incident meeting the criteria of Level 3 occurs, outside agencies and assistance would be required. Possible secondary emergencies such as fire or explosion. Could require small- or large-scale evacuation of homes, businesses, school etc. Must have specialized training. May require additional support from mutual aid partners. May require co-ordination of emergency response plans among governmental units, businesses and first responders.

Hazard	Possible Impact
Hazmat (Fixed Site) – Pipeline-Storage Facility	Overall Impact 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. Could result in transportation disruption and road closure and required detours. Fire Services Depending on the severity and type of incident, could pose secondary risk to firefighters on-scene. 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. Must have hazardous material training. May require additional support from mutual aid partners. May require co-ordination of emergency response plans among governmental units, businesses and first responders.
Tornado High Wind	Overall Impact Above ground power lines could impact buildings or roads and winds could take down communication towers. Life safety risk, in particular to vulnerable population. Multiple areas of damage 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. Continued coordination of emergency response and operations plans among governmental units and first responders. Multiple locations requiring additional resources and the necessity for unified command and inter-agency collaboration
Blizzards	Overall Impact Above ground power lines could be impacted along with road treatments, debris clearing, salt gravel or other road treatment supplies. Increase in call volume due to vehicular incidents, rescues. May require short-term shelters for residents 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. Continued coordination of emergency response and operations plans among governmental units and first responders. Multiple locations may be requiring additional resources simultaneously.

Hazard	Possible Impact
Farm Animal Infectious disease	Overall Impact Farm stability 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 First responders must be educated on local protocols during localized emergencies during outbreaks. Fire services currently take on a large number of medical calls. PPE can be severely limited and supply chain issues for all equipment can impact operations. Planned programming related to inspections and public education may need to be delayed or modified.
Major Road Accident emergency	Overall Impact Threat to life safety. Impact to road network, downed power lines and vehicular fires. Fire Services Pose secondary threat to responders of fire or explosion. Delayed response in accessing scene. May require support for high number of injuries/fatalities and/or rescues.

Table Source: Parkland, Community Emergency Management Program, 2020

6.2 Hazard Profile – Identified Risks and Key Findings

Table 37: Hazard Profile – Identified Risks and Key Findings

Identified Risk / Key Finding	Rationale
Key Finding	Parkland's 2021 Hazard Identification and Risk Assessment (HIRA) identifies the top hazards as listed below that could impact the ability of PCFS to deliver fire protection services: • Hazmat Rail/Road • Forest Fire • Oil or natural gas release • Hazmat (Fixed Site) – Pipeline-Storage Facility • Tornados • Blizzards • Farm Animal Disease • Major Road Accident

SECTION 7
PUBLIC SAFETY RESPONSE PROFILE

7.1 Public Safety Response Agencies in Parkland

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. These entities could include police, ambulance, fire, and other entities that may be tasked with or able to assist in some capacity the collective response to an emergency. The following sections consider these public safety response characteristics within Parkland.

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 offers 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 38 lists the public safety response agencies who could be able to assist Parkland 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 38: Public Safety Response Agencies

Public Safety Response Agency	Types of Incidents they Respond to	Agency Role in Incident
Parkland Fire Services	• Fire Suppression • Medical response • Rescue (MVC) • Inspections • Investigations	• Firefighting • Typically, fires on scene medical response • Rescue/vehicle extrication
Parkland Municipal Enforcement Services	• Violations of county by-laws and provincial traffic act, Gaming, Liquor and Cannabis Act • Violations of Fish and Wildlife legislation	• Protecting county road infrastructure • Enforcing traffic infractions on county roads • Coordinating with the Emergency Response Plan and Emergency Operations Centre • Providing information on legislation and county bylaws to industry, as well as the general public • Inspecting properties for the County of Parkland • Aiding the RCMP, Sheriff and Conservation Officer's, and Fish & Wildlife
Royal Canadian Mounted Police (RCMP)	• Federal provincial and municipal law infractions • Traffic calls, emergency calls, crowd control, public assistance • Major crimes i.e., homicide, kidnapping, organized crime • Investigations • complaints	• Enforcing Criminal Code • Enforcing Municipal By-laws • Investigating cross-jurisdictional and major crimes • Offender transport
Alberta Fire Commissioner	• Fire	• Assistance with managing fire and obtaining resources beyond capability of county

Public Safety Response Agency	Types of Incidents they Respond to	Agency Role in Incident
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/County • Liaise with the Medical Officer of Health to help facilitate medical services
Alberta Health Services (Edmonton Zone)	• 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	• Provide information and instructions to the population on matters concerning public health • Protect the health of the community from inherent health threats by enforcing the applicable legislation. • Continued delivery of established programs to ensure continuity of care and general health protection
Victim Services Unit FCSS Turning Points Program	• Serious assault • Domestic violence • Sexual assault • Stalking • Violent Crimes	• Immediate crisis response • Vitim assistance • Victim support and needs assessment
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
Ministry of Jobs, Economy, and Trade	• Industrial accidents • Workplace critical injuries and deaths	• Investigate worker injury or death

Public Safety Response Agency	Types of Incidents they Respond to	Agency Role in Incident
Ministry of Forestry and Parks	• Large wildland fires	• Assist in mitigating and combating wildland fires
Ministry of Transportation and Economic Corridors	• Major/large vehicle incidents on King's Highways	• Traffic control • Assist with repair and cleanup
Alberta Emergency Management Agency	• Large-scale emergencies requiring declaration of state of local emergency	• Provincial level support • Communication
CN Rail Police	• Rail emergencies (on and off board) • Rail security incidents on and off board • Promote rail safety • Protect infrastructure	• Oversee response to all rail emergencies. • Liaise with and support municipal or provincial fire and emergency services as needed for large incidents
Alberta Seniors, Community and Social Services	• Attend incidents involving the displacement of people	• Provide temporary emergency shelter • Warming/ cooling centres • Long-term evacuation accommodations • Address food, clothing needs and personal services.

7.1.1 Fire Protection Services Agreements and Plans

Large emergency events can quickly overwhelm the response capacity of most community fire departments in Alberta. 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.

Parkland has formal Fire Service Agreements with:

- Town of Stony Plain
- Town of Devon
- Yellowhead County
- City of Edmonton
- County of Lac St. Anne
- Enoch Cree Nation
- Paul Band First Nations
- Alberta Forestry

The principal purpose for entering into these agreements is to promote and ensure that adequate and coordinated resources are made available when requested from, or by a neighbouring County 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.

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.

SECTION 8
COMMUNITY SERVICES PROFILE

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 department responds. The following sections consider these community service characteristics within Parkland.

8.1 Community Services

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 39 lists the community agencies and non-government organizations (NGOs) available to Parkland.

Table 39: Community Service Agencies

Community Service Agency	Type of Assistance Provided
Local School Boards: • Conseil Scolaire Francophone Centre Nord • Evergreen Catholic Separate School Division • Living Waters Christian Academy • Parkland School Division • STAR Catholic	The 2021 Census data indicates that children aged 14 and underrepresent 17.78% of Parkland's total population. The proportion of children in Parkland should be considered as an opportunity for public education. These numbers support the development of enhanced public education programming that targets children/youth of all ages. Partnering with school boards and other agencies that work with children can provide opportunity for fire and life safety education.
Salvation Army – Edmonton	The Salvation Army can provide both immediate and long-term recovery assistance in cooperation with Fire and Police Services. The Salvation Army also provides information and referral to other agencies, camps, disaster services and counselling.
Parkland Paramedic Services	Provides basic and advance medical care for first aid emergencies at public events. They are also able to provide volunteer support in the event of emergency situations such natural or human disasters.
Victim Services of Stony Plain, Spruce Grove	Provides immediate on-site crisis, trauma, safety & support services to victims of crime and tragic circumstances
YMCA of Northern Alberta, Edmonton	Provides a variety of employment services as well as youth programming.
Big Brothers & Sisters of Parkland, Stony Plain	Provides various mentoring programs for youth ageing from 6 to 24.
Parkland Family and Community Support Services (FCSS)	Helps youth, seniors and families adopt healthy lifestyles and improve quality of Life.
Parkland Food Bank – Spruce Grove	Exists to provide emergency food assistance to those living in Spruce Grove, Stony Plain and the County of Parkland.

Community Service Agency	Type of Assistance Provided
Local community faith-based organizations	Public fire safety messaging does not always reach community's most vulnerable populations. Partnering with local faith-based organizations can provide PCFS with the opportunity to improve its public education program as a method of information sharing to a wider audience within Parkland. This type of opportunity could involve distributing printed materials with fire safety messaging and smoke alarm installation information among the congregation, or faith-based leaders may allow representatives from PCFS to address congregations at faith-based events with fire safety messaging in person. These organizations may also be able to identify residents within the community who are at great risk of fire danger due to substandard housing or hoarding.
Parkland Turning Points Society	Provides educational and counselling services for men, women, children, and families to increase community awareness of family violence and its effects on men, women, and children.

SECTION 9
ECONOMIC PROFILE

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 a significant influence on the ability of the community to provide or maintain service levels. The following sections consider these economic characteristics within Parkland.

9.1 Economic Sectors and Employers in Parkland

The top industries that contribute to the economic base of Parkland are summarized in Figure 8. According to the Statistics Canada 2021 Census, Construction, Retail Trade, Health Care and Social Assistance, Professional, Scientific, and Technical Services, and Mining, Quarrying, and Oil and Gas Extraction are the top contributing industries to Parkland's economic base.

Figure 8: Parkland Top Industries

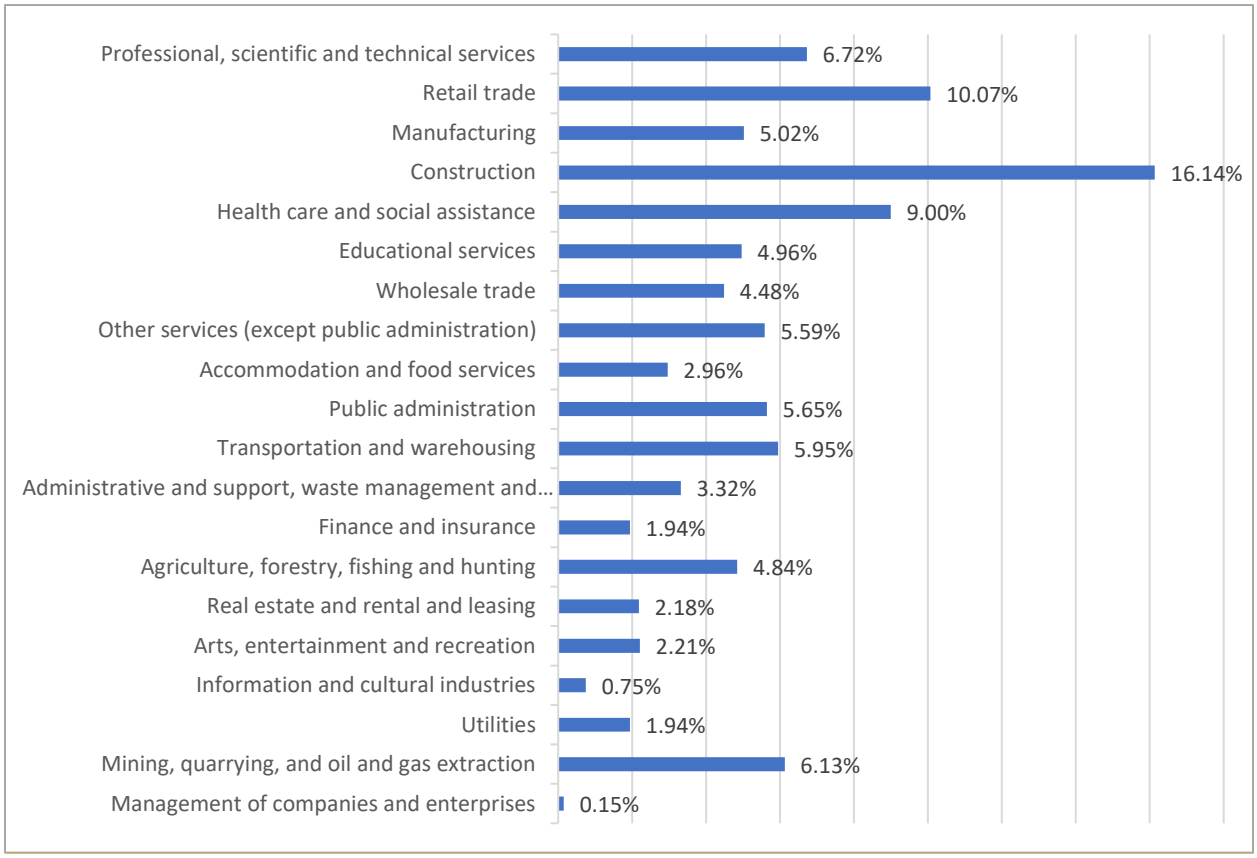


Figure Source: 2021 Census, Statistics Canada

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.

Parkland has identified the following major employers as shown below in Table 40.

Table 40: Major Employers in Parkland

Company	Service/Product	Address
Amazon	Consumer Distribution Center	Acheson
Champion Pet Foods	Pet Food	Acheson
Overwaitea Food Group/TCL Supply Chain	Grocery retailer	Acheson
TransAlta	Generation Plan	Closer to Wabamun
Standard General	Major Civil Construction Contractor	Acheson

Parkland has identified several major employers in various industries in the private sector, several of them being in the manufacturing industry. Certain industrial operations may have increased fuel loads and conduct higher risk activities. Proactive inspections should target these facilities to ensure compliance with codes, maintenance, and emergency planning requirements.

9.2 Economic Profile – Identified Risks and Key Findings

Table 41: Economic Profile – Identified Risks and Key Findings

Identified Risk / Key Finding	Rationale
Identified Risk	The risk of a single fire or emergency event having a large impact on the community is a moderate risk.

SECTION 10
PAST LOSS & EVENT HISTORY PROFILE

The past loss and event history profile assessment includes analysis of the community's past emergency response experience, including an analysis of the number and types of emergency responses, 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 Parkland.

10.1 Past Loss

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 data provided by Parkland Fire and Emergency Services and the Office of the Fire Commissioner's 10-year statistical report for the Parkland from 2013-2022.

10.1.1 Total Fire Loss

The analysis of total fire loss in Parkland over the five-year period from 2018 to 2022,

Table 42 highlights total fires and fire loss in that five-year period. Two primary types of fires were structure fires and vehicle fires. On average, based on that 5-year period, Parkland experienced 36.2 fires per year and incurred approximately $7,840,969 in property loss annually.

Table 42: Total Fire Loss – Parkland

Year	Fires	Loss ($)	Alberta Fires	Loss ($)
2018	34	$3,593,850	3541	$378,166,306
2019	42	$7,901,207	3425	$347,107,617
2020	48	$10,417,131	3412	$46,5615,727
2021	27	$12,744,923	4682	$539,064,785
2022	30	$4,547,737	3608	$504,519,547
Total	181	$39,204,848	18,668	$2,234,473,982
% of All Fires Alberta	.00969%	.0175%		
Average per year	36.2	$7,840,969	3733.6	$446,894,796

Table Source: Alberta Fire Commission 10 – year loss by Municipality: 2013 - 2022

10.1.2 Fires by Occupancy Type

This section examines structure fires occurring from January 1st, 2013, to December 31st, 2022, categorized by occupancy type. Over this period, Parkland experienced a total of 184 structure fires. Notably, 73% (134) of these fires occurred in Group C-Residential Occupancies.

The second most substantial source of property loss was Group F – Industrial occupancies, representing 21.2% of structure fires and 54.183% of total structure fire loss during this period (*Table 43*). Data retrieved from the Alberta Fire Commissioner did not specify whether the Farm Facility was a Farming Operation or storage, and these fires are captured within the industrial occupancy category.

Table 43: Fires by Major Occupancy Type – 2013-2022

Group	Occupancy Classification	# of Fires	Parkland % of Structure Fires	Parkland Structure Fire Loss	Parkland % of Structure Fire Loss
A	Assembly	1	.5%	$5,000	.004%
B	Care & Detention	0	0.00	$0	0.00
C	Residential	134	73%	$43,562,506	42.868%
D	Business & Personal Services	7	3.8%	$2245114	.221%
E	Mercantile	0	0.00	$0	0.00
F	Industrial	39	21.2%	$55,060,964	54.183%
Other	Not Classified in OBC	3	1.5%	$750,502	0.073%
Farm	Classified in the OBC	0	0.00	$0	0%
	Total	184	100%	$101,619,085	100.00

Table Source: Alberta Fire Commissioner Fire Loss 2013 - 2022[5]

10.1.3 Civilian Fatalities and Injuries

As shown in Table 44, according to data from the Fire Commissioner, spanning from January 1st, 2018, to December 31st, 2022, there were 1 reported fatality and 7 injuries within Parkland. Notably, these numbers are considered low to the total identified by the provincial statistics. Neither Parkland records nor Alberta Fire Commission records show the type of occupancy that these injuries and deaths occur.

[5] *Ibid*

Table 44: Civilian Fire Fatalities and Injuries Parkland and Alberta

Year	Parkland Fires	Parkland Deaths	Parkland Injuries	Alberta Fires	Alberta Deaths	Alberta Injuries
2018	34	0	4	3541	32	124
2019	42	0	0	3425	26	76
2020	48	1	1	3412	11	99
2021	27	0	0	4682	38	125
2022	30	0	2	3608	45	102
Total	181	1	7	18,668	152	526
% of All Fires Alberta	.00969%	.0066%	.013%			

Table Source: Alberta Fire Commission 10 – year loss by Municipality: 2013 - 2022

10.1.4 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.” 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. Within NBC fire loss reporting, there are four categories of cause used to classify the cause of a fire. These include intentional, unintentional, other, and undetermined. Table 45 presents the reported fire causes for Parkland compared to the province over the five-year period from January 1st, 2013, to December 31st, 2022.

The analysis of fire causes in Parkland, as detailed in 45, reveals various factors contributing to fires over the period examined. The cause of almost 45% of fires were found to be undetermined/unknown. This rate of undetermined causes is 18% higher than the provincial average. Determining the cause of fires can assist fire services in developing public education programs to reduce or prevent future incidents. It could also help identify trends that may indicate a need for targeted enforcement.

The "intentional" category includes fires started for a specific reason, typically classified as arson, acts of vandalism, or for personal gain through insurance claims. According to the data, Parkland had 5 (3%) intentional fires being arson/set fires or acts of vandalism, during this ten-year period. In contrast, the provincial total for intentional fires was 7%. This indicates that Parkland has a lower rate of intentional fires compared to the province, or the higher number of undetermined fires might have obscured these intentional fires.

The "unintentional" category represents common causes of fires, including human behavioral causes (e.g., misuse of ignition sources) and equipment failures (e.g., mechanical failure). Unintentional fire causes represented 97% of all reported fires in Parkland during this period, compared to 93% for the province. The leading causes of unintentional fires in Parkland were Heating Equipment (13%) and mechanical/electrical failures 10%), compared to 4% and 7%, respectively, in the province.

Table 45: Reported Home Fire Cause – Parkland and Alberta – 2013-2022

Fire Cause Parkland	Parkland # of Fires	Parkland % of Fires	Alberta # of Fires	Alberta % of Fires
Appliance/Equipment Related	5	3%	353	1%
Arson/Set Fire	5	3%	1841	7%
Candle (accident)	1	0%	269	1%
Child Fireplay	0	0%	78	0%
Clothes Dryer	2	1%	274	1%
Cooking	10	7%	3261	13%
Electrical Distribution Equipment	14	10%	1785	7%
Exposure Fire	0	0%	4937	21%
Flammable Gas Ignition	1	0%	88	0%
Flammable/Comb. Liquid Ignition	1	0%	150	0%
Heating Equip related	18	13%	1071	4%
Inadequate Control of Open Fire	1	0%	44	0%
Light/Fluorescent Bulb	3	2%	185	0%
Match/Lighter not used from Smoking	0	0%	126	0%
Other Causes/Unknown	59	45%	6522	27%
Smoking	6	4%	2276	9%
Welding/Torch Too Close	3	2%	78	0%
Total	129	100%	23,3338	100%

Table Source: Alberta Fire Commission 10 – year loss by Municipality: 2013 - 2022

10.1.5 Ignition Source

According to the 2019 NFPA Glossary of Terms, ignition source is defined as "any item or substance capable of an energy release of type and magnitude sufficient to ignite any flammable mixture of gases or vapors that could occur at the site or onboard the vehicle." Table 46 provides fire loss by source of ignition for Parkland and the province. Again, similar to reported fire cause, in 73% of fires, the ignition source was reported as undetermined. Determining source can assist fire services in the development of public education program to reduce or prevent future events. It could also lead to trends that may indicate greater targeted enforcement needs or identify concerns to the Alberta Fire Commissioner for review by their Technical Services section.

The top ten sources of ignition are listed in Table 46. Efforts to enhance data collection and investigation methods could help reduce the number of undetermined cases, providing valuable insights for fire prevention and safety initiatives.

Table 46: Top Ten Sources of Ignition – Parkland – 2013-2022

Reported Ignition Source	Parkland # of Fires	Parkland % of Fires	Parkland $loss
Electrical Equipment – unclassified or unknown	10	4.5%	$1,743,889
Internal Combustion Engine – includes exhaust system	9	4%	$286,101
Permanent Electric Wiring, Cable – includes junction box, power line	7	3%	$457,233
Electrical Distribution Equipment – unclassified or unknown	6	3%	$3,808,088
Heating Equipment – unclassified or unknown	6	3%	$4,092,286
Hot ashes, Embers – not associated with smokers' materials	6	3%	$781,000
Miscellaneous Igniting Object – Unclassified	6	3%	$2,769,739
Appliances and Equipment – unclassified or unknown	5	2%	$524,500
Bearing, belting conveyor, brake	5	2%	$118,000
Igniting Object – cannot be determined	165	73%	$25,637,481
Total	225	100.00	$40,218,317

Table Source: Alberta Fire Commissioner – Fire Causes 2013 - 2022

10.1.6 Smoke Alarm Status

In the Province of Alberta, smoke alarms serve as crucial safety measures, mandated on every level of residential dwellings to act as the first line of defense against fires. Therefore, smoke alarm programs and compliance initiatives are integral components of public education and fire prevention efforts led by municipal fire services. Data regarding smoke alarm status during fire incidents is collected and reported by municipalities to the province, with information publicly available for analysis. Table 47 shows that over a five-year period from January 1st, 2018, to December 31st, 2022, in Group C - Residential occupancies, Alberta reported that in 78% of fires responded to, there was no smoke alarm present.

As Parkland was unable to provide this detailed data, full analysis of this information cannot be completed. Efforts to enhance data collection and investigation methods could help reduce the number of undetermined cases, providing valuable insights for fire prevention and safety initiatives.

Table 47: Home Fires by Smoke Alarm Activation Alberta– 2018-2022

Smoke Alarm Installation	# of Fires	% of Fires	Deaths	% of Deaths	Injuries	% of Injuries	$ Losses	% of Losses
Installed	1724	21	44	36	169	45	292,563,872.00	22
Not installed	6268	78	75	63	202	54	492,563,872.00	77
Total	7992	99	119	99	371	99	785,127,744.00	99
Smoke Alarm Activation	**# of Fires**	**% of Fires**	**Deaths**	**% of Deaths**	**Injuries**	**% of Injuries**	**$ Losses**	**% of Losses**
Activated	662	38	8	18	91	53	101,241,905.00	34
Activation- Unknown	600	34	26	59	45	26	152,643,296.00	52
Not Activated	462	26	10	22	33	19	38,678,671.00	13
Total	1724	98	44	99	169	98	292,563,872.00	99
Alarm Assistance to Occupants	**# of Fires**	**% of Fires**	**Deaths**	**% of Deaths**	**Injuries**	**% of Injuries**	**$ Losses**	**% of Losses**
Alarm assisted evacuation	457	69	1	12	71	71	80,560,690.00	79
Alarm did not assist occupants to evacuate	53	8	2	25	10	10	693,530.00	0
Not applicable/no occupants	113	17	5	0	4	4	15,490,612.00	15
Occupant evacuation unknown	39	5	0	62	6	6	4,497,073.00	4
Total	662	99	8	99	91	91	101,241,905.00	98
Reasons Alarms Did Not Assist	**# of Fires**	**% of Fires**	**Deaths**	**% of Deaths**	**Injuries**	**% of Injuries**	**$ Losses**	**% of Losses**
Alarm inaudible	2	3	0	0	0	0	51,500.00	7
Physical/mental challenge	3	5	1	50	0	0	118,040.00	17
Unable to evacuate (age-related)	1	1	0	0	0	0	100.00	0
Under influence of drugs/alcohol	16	30	1	50	6	60	335,090.00	48
Unnecessary to evacuate	31	58	0	0	4	40	188,800.00	27
Total	53	97	2	100	10	100	693,530.00	99
Reasons Alarms Not Activated	**# of Fires**	**% of Fires**	**Deaths**	**% of Deaths**	**Injuries**	**% of Injuries**	**$ Losses**	**% of Losses**
AC not connected/disabled	35	7	0	0	6	18	5,252,335.00	13
Dead battery	23	4	2	20	3	9	4,493,101.00	11
Mechanical failure	39	8	5	50	3	9	6,319,915.00	16
No battery	31	6	2	20	3	9	3,102,211.00	8
Not enough smoke	325	70	1	10	18	54	18,620,085.00	48
Unsuitable location	9	1	0	0	0	0	891,024.00	2
Total	462	96	10	100	33	99	38,678,671.00	98

Table Source: Alberta Fire Commissioner – Home Fires by Smoke Alarm Operation 2018-2022

10.2 Event History

Event history seeks to apply PCFS historic emergency call data to develop an understanding of community risks. This section provides a statistical assessment of historic emergency call volumes for Parkland. The analysis included within this section also provides a detailed breakdown of calls by response type. The data used in this analysis was for all historical calls for the five-year period from January 1st, 2019, to December 31st, 2023. This section provides a statistical assessment of historic emergency call volumes for Parkland. The volume and frequency of historic calls informs the understanding of response probability. The types of calls inform the potential consequences of PCFS responses and calls for service. The combined consideration of these elements provides an understanding of community risk, based on past calls for service.

10.2.1 Emergency Call Volume

This section illustrates the historical emergency call volume by year, month, day of week, and time of day for all types of incidents responded to by PFRS for the time from January 1st, 2019, to December 31st, 2023.

10.2.1.1 Annual 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, 2019, to December 31st, 2023, is shown in Figure 9. This analysis identifies an increase in the total emergency call volume within Parkland over this period from 859 calls in 2019 to 1054 calls in 2023. This represents a total increase of 18.5% over this five-year period with an average of 939 calls per year. There was a 14% increase in the call volume from 2019 to 2021, and a 5.7% increase from 2021 to 2023. These trends appear to be related to an increase in motor vehicle incidents, false alarms, and actual fire incidents. These should be monitored year by year to evaluate further increases/ decreases.

Figure 9: Annual Call Volume – All Incidents January 1st, 2019, to December 31st, 2023

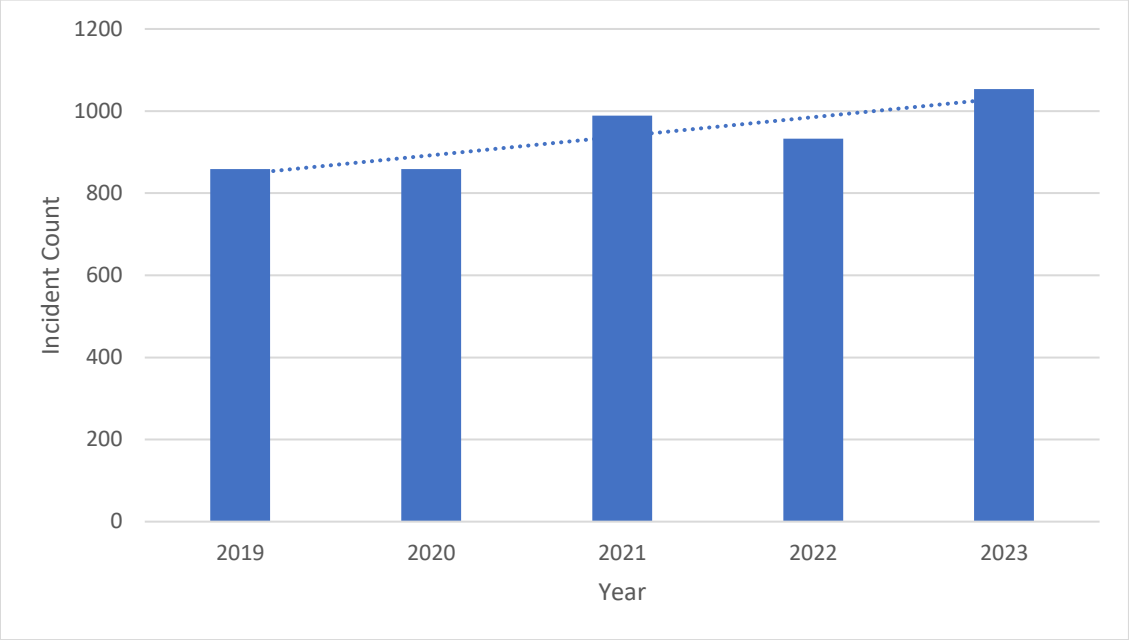


Figure Source: Dashboard data for Parkland[6]

10.2.1.2 Daily Emergency Call Volume – All Incident Types

For the period from January 1st, 2019, to December 31st, 2023, emergency call volume typically increases between 6:00 AM and 11:00 PM, reaching its peak at 5:00 PM (See Figure 10). The lowest percentage of emergency calls typically occurs between 12:00 AM and 6:00 AM, aligning with typical trends observed during commuting hours and reduced activity when most of the population is asleep.

[6] *Ibid*

Figure 10: Total Call Volume by Time of Day – All Incidents January 1st, 2019, to December 31st, 2023

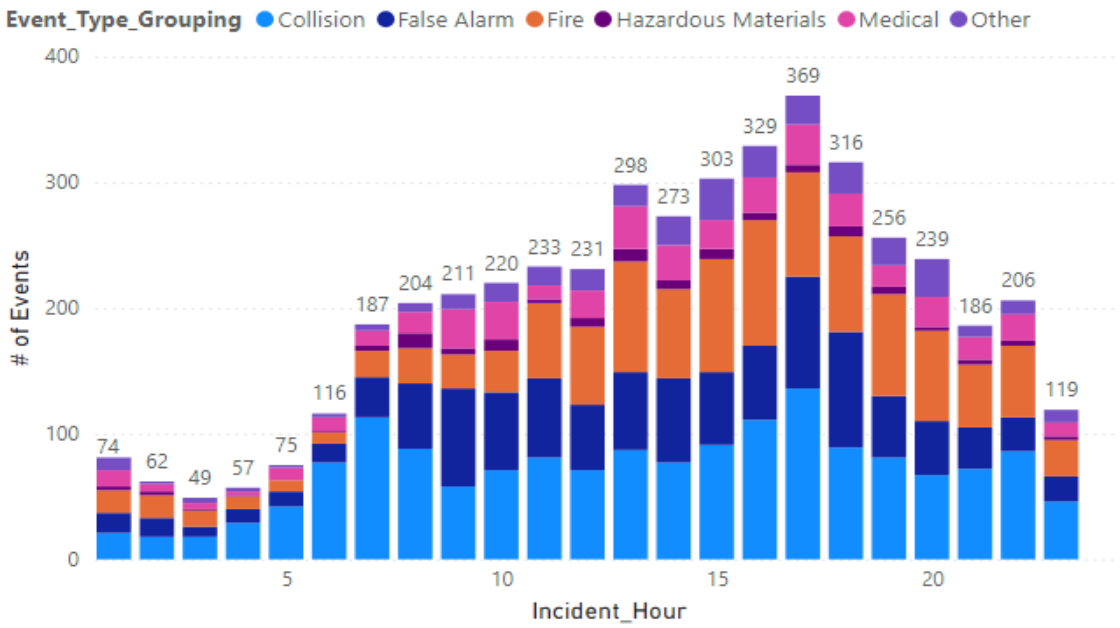
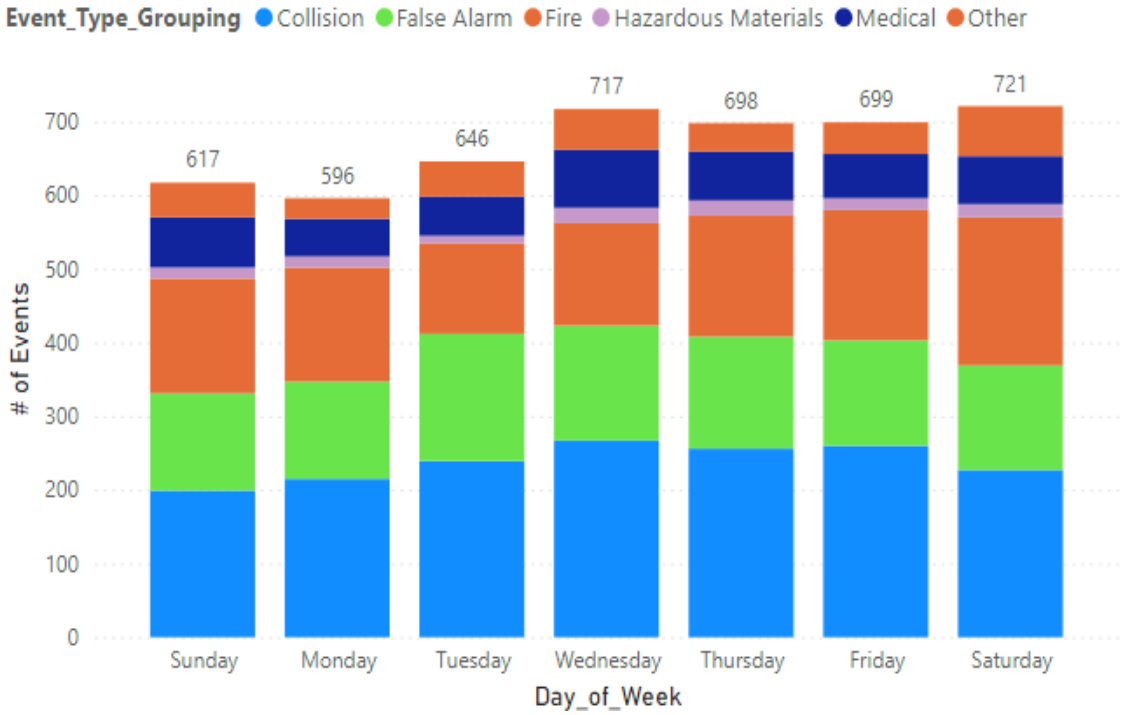


Figure Source: Dashboard data for Parkland[7]

An analysis of the call volume by day of the week reveals a consistent frequency of incidents, with slight increases noted on Wednesday thru Saturdays. These trends are anticipated for Saturday, reflecting heightened recreational activities and increased traffic throughout Parkland.

[7] *Ibid*

Figure 11: Total Call Volume by Day of the Week



10.2.1.3 Call Type – All Incident Types

This section analyzes all emergency call volume for the period from January 1st, 2019, to December 31st, 2023. Table 48 illustrates that during this period 35.60% of the total emergency calls that PCFS responded to were motor vehicle incidents mostly attributed to motor vehicle collisions. Responding to fire incidents was the second highest percentage representing 23.82% of the department's total emergency call volume. This includes structure fires, outdoor fires, smoke investigations and controlled burning. During this five-year period, only 2.47% of emergency calls were categorized as Hazardous Materials. The number of False Alarms reported over this 5-year period was 1030 which is 21.90% of the total calls. Table 49 provides a breakdown of all calls.

Table 48: Total Number of Incidents – Summary - January 1st, 2019, to December 31st, 2023.

Incident Type	2019	2020	2021	2022	2023	5-year
Motor Vehicle	327	307	330	361	349	1674
False Alarm	188	223	172	203	244	1030
Fire	157	175	322	194	272	1120
Hazardous material	20	30	17	18	31	116
Medical	110	63	70	107	92	442
Other	57	61	88	51	72	320
Total	859	859	999	934	1060	4702

Table Source: Parkland

Table 49: Total *Number of Incidents – Breakdown - January 1st, 2019, to December 31st, 2023*

Incident Type	2019	2020	2021	2022	2023	Total
Medical Co-Response	110	63	70	107	92	442
False Alarm	188	223	172	203	244	1030
Hazardous Materials						
Gas Leak/ Gas Odor	12	23	10	11	24	80
Fuel Spill	3	5	5	3	3	19
Hazmat	5	0	2	3	4	14
Odor	0	2	0	1	0	3
Other Requests for Service						
Aircraft Emergency	1	0	0	0	1	2
Train and Rail Fire	0	1	1	0	0	2
Lightning Strike	0	0	0	0	1	1
High Angle Rescue	1	1	4	1	2	9
Bomb Threat	0	0	0	1	0	1
Suspicious Package	0	0	0	1	0	1
Water Rescue	7	9	12	4	4	36
Watercraft in distress	3	7	4	3	7	24
Mutual Aid RCMP	5	2	5	0	1	13
Mutual Aid Utilities	0	0	0	1	0	1
Mutual Aid / Assist Outside Agency	6	11	20	10	13	60
Citizen Assist / Service	25	13	11	18	16	83
Elevator/ Escalator	1	0	0	0	2	3
Electrical Hazard	8	17	22	12	25	84
Other not identified	0	0	9	0	0	9
Motor Vehicle Incidents						
Motor Vehicle Collision	286	263	291	299	302	1441
Vehicle Fire	39	43	34	57	44	217
Extrication	1	0	4	4	2	11
Train rail Collision	1	1	1	1	1	5
Fire						
Outside Fire	64	67	197	101	157	586
Structure Fire	52	58	50	58	56	274
Smoke Investigation	17	14	50	19	35	135
Outside Fire -Controlled Burn	20	34	25	14	24	117
Explosion	4	2	0	2	0	8
Total	859	859	999	934	1060	4702

Table Source: Response data from Parkland[8]

[8] *Ibid*

10.3 Past Loss & Event History Profile – Identified Risks and Key Findings

Table 50: Past Loss & Event History Profile – Identified Risks and Key Findings

Identified Risk / Key Finding	Rationale
Identified Risk	Over the five-year period from January 1, 2018, and December 31, 2022, the most reported ignition sources within Parkland were related to electrical equipment
Identified Risk	Over the five-year period from January 1, 2018, and December 31, 2022, only (21%) of incidents had a smoke alarm present and only (38%) of those incidents did the smoke alarm activate.
Identified Risk	Over the period from January 1st, 2019, to December 31st, 2023, the volume of emergency calls responded to by PCFS increased by 18.9%
Key Finding	Provincial statistics indicate that smoke alarms are present and active in only 38% of residential fires.
Key Finding	There has been a steady increase in call volume from 2019 to 2023 which primarily relates to vehicle collisions, false alarms, and actual fire incidents. This trend should be monitored.
Key Finding	Over the five-year period from January 1st, 2019, to December 31st, 2023, PFRS responded to 71rescue incidents.
Key Finding	Over the five-year period from January 1st, 2013, to December 31st, 2022, 45% of the reported fires had an undetermined cause of fire.

Table Source: Response data from Parkland, Alberta Fire Commissioner – 2013 - 2022

SECTION 11
IDENTIFIED RISKS AND RISK TREATMENTS

The purpose of a CRA is to identify risks that are then used to inform decision-making regarding the provision of fire protection services. The analysis throughout this CRA identifies 'Key Findings' and 'Identified Risks' to be considered. This section takes the identified risk conclusions (both the key findings and the identified risks) through a risk assignment process to assist in the prioritization of risks, as well as a risk treatment process. This section of the CRA brings together all the key findings and identified risks. They are taken through a risk treatment process and aligned with the "Five E's" of Community Risk Reduction and three lines of defence to inform the analysis and recommendations for within a Fire Services Master Plan or other strategic document as shown in Figure 12.

Figure 12: Risk Conclusions Application Process: Risk Conclusions Application Process

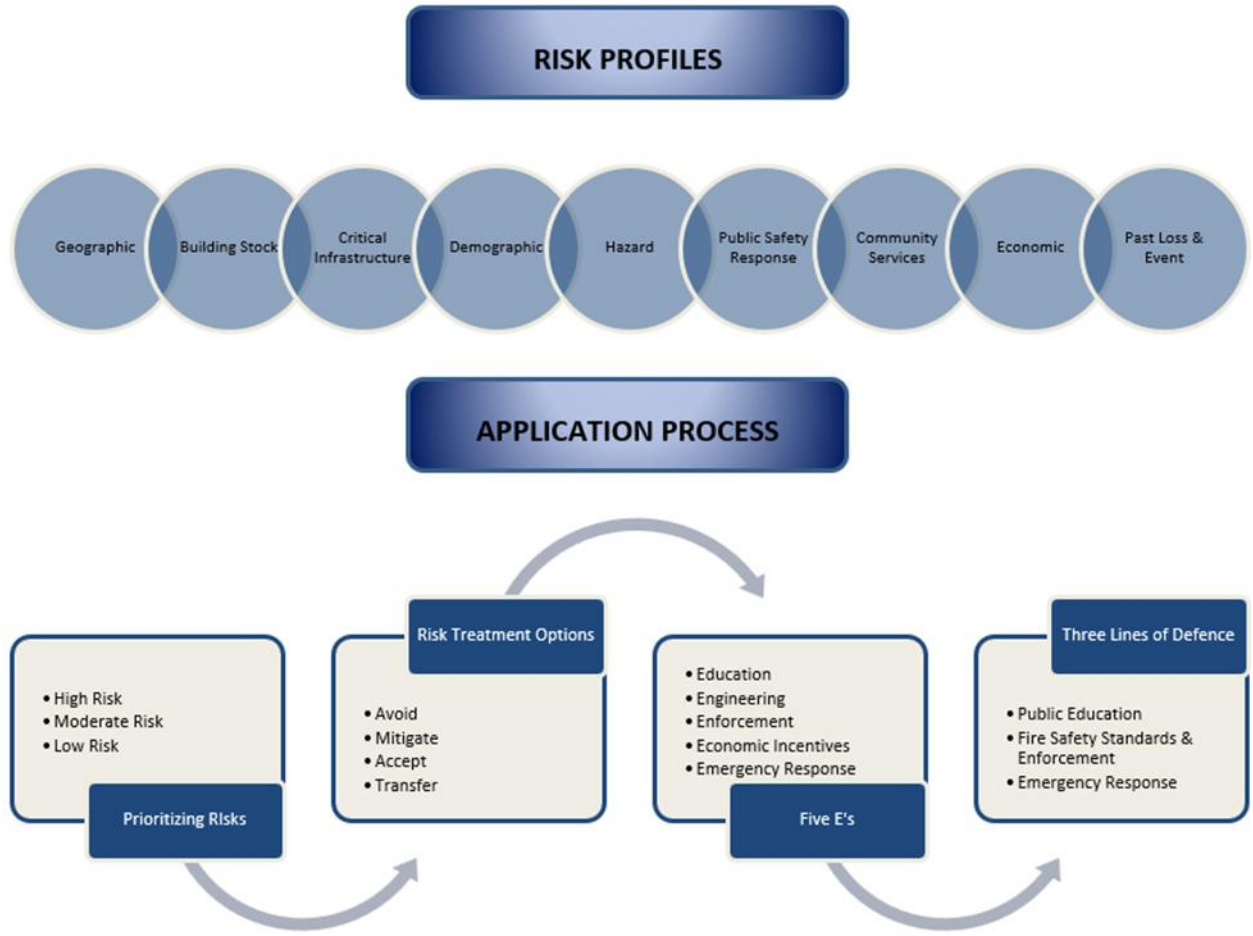


Figure Source: Adapted from NFPA 1300[9]

[9] *Office of the Fire Marshal, Community Risk Assessment Technical Guideline TG 02-2019, Section 6, Pg 16 & NFPA 1300, 2020 Edition, Annex A.6.3.3.2(4)*

11.1 Prioritizing Risk

Following the probability and consequence levels 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 Fire Services Master Plan.

11.1.1 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 51 presents the probability levels and the adjusted descriptions.

Table 51: Probability Level

Likelihood Category	Numerical Value[10]	Description
Rare	1	• May occur in exceptional circumstances • No incidents in the past 15 years
Unlikely	10	• Could occur at some time, especially if circumstances change • 5 to 15 years since last incident
Possible	100	• Might occur under certain circumstances • 1 incident in the past 5 years
Likely	1,000	• Will occur at some time under current circumstances • Multiple or recurring incidents in the past 5 years
Almost Certain	10,000	• Expected to occur unless circumstances change • Multiple or recurring incidents in the past year

Table Source: OFM TG 02-2019[11]

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.

[10] *Numeric scales are taken from Dillon Consulting, The Corporation of the City of Mississauga Community Risk Identification: Introduction and Methodology, July 2017*

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

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 52 presents the consequence levels.

Table 52: Consequence Levels

Likelihood Category	Numerical Value[12]	Description
Insignificant	1	• No life safety issue • Limited value or no property loss • No impact to local economy • No effect of general living conditions
Minor	10	• Potential risk to life safety of occupants • Minor property loss • Minimal disruption to business activity and/or Minimal impact on general living conditions
Moderate	100	• Threat to life safety of occupants • Moderate property loss • Poses threat to small local businesses • Could pose threat to quality of the environment
Major	1,000	• 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 local residents and businesses
Catastrophic	10,000	• Significant loss of life • Multiple property damage to a significant portion of Parkland • Long term disruption of businesses, local employment, and tourism and/or Environmental damage that would result in long-term evacuation of local residents and businesses

Table Source: OFM TG 02-2019[13]

[12] *Numeric scales are taken from Dillon Consulting, The Corporation of the City of Mississauga Community Risk Identification: Introduction and Methodology, July 2017*

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

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 by multiplying the numerical values[14] for probability and consequence. The relationship between probability and consequence as it pertains to risk levels can be 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 53 shows the risk matrix for this CRA.

Table 53: Probability & Consequence Risk Matrix

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

Table Source: Ontario OFM TG 02-2019[15]

11.1.2 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 Table 54. Where possible, quantitative data was used to inform the risk assignment as described in the rationale in the table.

[14] *Numeric scales are taken from Dillon Consulting, The Corporation of the City of Mississauga Community Risk Identification: Introduction and Methodology, July 2017*

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

Table 54: Risk Assignment

Profile	Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Geographic	Roads leading to residential properties are largely grave in rural areas. Although roads in the County are well maintained, gravel roads may slow response times and present challenges for apparatus during a response, including the threat of damage or accidents. Maintenance of gravel roads in winter months can also be challenging and slow response times and increase risks.	Almost Certain	• 1250 km. of gravel roads • 800 km of paved/asphalt roads • The area experiences annual winter weather, including ice and snow •	Moderate	• Potential for risk to life safety of occupants of motor vehicles • Potential risk for property loss • Could pose a threat to small local business • Could pose a threat to the quality of the environment • Consequence level could be impacted by the magnitude of a hazard event	Moderate
Geographic	The road network is a contributor to emergency call volume due to motor vehicle collisions and vehicle fires.	Possible	• PCFS responded to 1674 motor-vehicle related incidents between 2019 – 2023. This represents (35.6%) of all calls.	Major	• Potential for risk to life safety of occupants of motor vehicles • Potential risk for property loss • Could pose a threat to small local business • Could pose a threat to the quality of the environment • Consequence level could be impacted by the magnitude of a hazard event	Moderate

Profile	Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Geographic	There is an elevated risk of a major spill and dangerous goods incident along Hwy 16 being the main highway linking Parkland and Edmonton	Possible	• No major releases reported in Parkland, however, dangerous goods releases on highways occur annually.	Moderate	• Report (2018) from Statistics Canada indicates there were 464 incidents involving dangerous goods in Canada, 48.5% of which occurred in Alberta. • Over half of all dangerous goods release incidents occurred on roadways. • Threat to life safety, moderate property, and environmental damages	Moderate
Geographic	The transportation of agricultural chemicals along roadways may pose the risk of an environmental spill.	Possible	• No major releases reported in Parkland, however, dangerous goods releases on highways occur annually.	Moderate	• Report (2018) from Statistics Canada indicates there were 464 incidents involving dangerous goods in Canada, 48.5% of which occurred in Alberta. • Over half of all dangerous goods release incidents occurred on roadways. • Threat to life safety, moderate property, and environmental damages	Low

Profile	Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Geographic	During Peak commuting times, the highest risk of motor vehicle collisions is likely to occur	Almost Certain	• Motor vehicle collisions occur annually throughout the County	Moderate	• From January 1, 2019, to December 31, 2023, there were 1441 motor vehicle collisions • Potential threat to life safety • Minor property loss	Moderate
Geographic	CN rail lines operate a track that runs from Edmonton extending west through Parkland that presents a risk related primarily to the movement of dangerous goods. At grade level rail crossings have the potential to create a physical barrier to connectivity to the roadway network, causing delays in response time.	Possible	• There is a major railway line that traverses along Highway 16, intersection with the local road networks. • Delays in response time could have impact on response outcomes	Moderate	• From January 1, 2019, to December 31, 2023, there were 5 train rail collisions and 2 train rail fires	High
Geographic	Uncontrolled at grade, rail crossings pose an increased threat of a motor vehicle collision	Possible	• There have been nine reportable (to transport Canada) crossing collisions in Canada since 2018 • Five reports of train and vehicle collisions in 2023	Moderate	• Two fatal collisions in Alberta in 2021 • Threat to life safety	High

Profile	Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Geographic	There is a high degree of risk to the public and the environment associated with train derailment; with or without the release of dangerous goods	Possible	• Parkland has experienced a number of train derailments, most notably the Gainford derailment in 2013 • In comparison to the number of trains travelling across the province, there is an increased probability of train derailment in Parkland.	High	• There is potential loss of life and major property and environmental damages	High
Geographic	There is an increased risk of ice and water rescue along Wabamun Lake, Isle Lake and the north Saskatchewan river due to natural hazards necessitating swift emergency evacuations and recreational boating and other activity on the water	Possible	• There is a marina located in Parkland located on Wabamun Lake • Waterfront activities increase the risk of an incident both on the water and onshore. PFRS reported a total of 36 water and/or ice rescues and 24 Watercraft in distress incidents in the past 5 years.	Moderate	• Possible to have concurrent calls • Potential risk to life safety	Moderate

Profile	Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Geographic	There is a considerable risk of wildland fires in areas of urban interface. The landscape surrounding the town is primarily agricultural, and increasing development in natural areas increases the threat of wildfire impinging on the town.	Possible	• The province has experienced drier summer months over the past years that have resulted in drought conditions • Parkland has a large proportion of agricultural and green space lands • Railways travelling through the municipality has caused several grass and brush fires along the rail tracks	Moderate	• Could result in moderate loss of property to adjacent properties • Could pose a threat to the life safety of occupants • Could pose a threat to small local businesses, and/or pose a threat to the quality of the environment • Some areas are difficult to access, allowing the fire to increase prior to suppression activities beginning • No major losses to date • Resources may be unavailable to assist during busy seasons. • From January 1, 2019, and December 31, 2023, PCFS responded to 586 outside fires	High

Profile	Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Building Stock and Past Loss and Event History	As with most jurisdictions, residential buildings account for the majority of building stock in Parkland and are the most common building involved in structural fires and attribute to the most fatalities and injuries To meet the projected housing demands associated with the population growth in the town, increased fire-risk potential will also increase in those areas.	Almost Certain	• The majority of Parkland's existing property stock is comprised of single detached Group C - Residential Occupancies (88.4%) • In Alberta, a high majority of fire deaths and injuries occur in Group C residential occupancies	Moderate	• Residential fires occur annually in Parkland. • High Density development in Parkland identified in existing hamlets and developed areas expect to see an increase in population to between 42,700 and 50,000 by 2044. • Exposure fires are common in residential areas • Potential for large loss of life and significant property damage including businesses in medium density areas	High

Profile	Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Building Stock	This analysis suggests that 30.50% of Parkland's building stock was constructed before 1981, preceding the adoption of the 1984 fire code. This represents a significant fire risk within the community, as it is comparatively greater than the provincial average of 26.45%.	Almost Certain	• Alberta Fire Commissioner statistics indicate that smoke alarms were present and activated in 38% of residential fires.	Moderate	• 30.50% of Parkland's building stock was built prior to 1981. • No data on number of fires as related to building age however residential fires account for most fires in Parkland and assumption can be made that at least one fire has occurred in these identified buildings. • The increase in both housing and commercial properties will increase service demand levels • Potential for loss of life • Potential for moderate property damage and loss of business • In Alberta, there were 1724 incidents where a smoke alarm was present but in 1062 of those incidents, the smoke alarm did not operate.	High

Profile	Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Building Stock	The number of new homes being built with lightweight construction poses a risk to firefighter safety and can hinder the ability for occupants to safely evacuate in a timely fashion.	Possible	• No data on the number of homes being built with lightweight construction but this is recognized to be on the increase since implementation in the current building code.	Moderate	• Potential for loss of life • Increased property loss with a high-density residential fire.	Moderate
Building Stock	There are several properties within Parkland that have a potentially high fuel load and therefore an increased high fire risk. Agricultural operations contribute to this risk	Possible	• Although industrial fires are rare, the impact and outcome of a fire is high.	Major	• Significant threat to businesses, local economy, and tourism • Impact on the environment could result in a short term, partial evacuation of residents and businesses • Prolonged disruptions to supply chains	Moderate
Building Stock	Parkland currently has (1) one registered vulnerable occupancy.	Possible	• Vulnerable occupancies require regular inspections to ensure that compliance to the Alberta Fire Code is maintained • Vulnerable occupancies may house individuals with various mobility issues requiring detailed plans in the event of a fire in the building	Moderate	• No 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.	Moderate

Profile	Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Critical Infrastructure	The Capital Regional Parkland Water Services Commission, through EPCOR, provides water services to residents of Parkland. Parkland makes sure that the reservoirs are topped up so they can maintain residential water usage and firefighting water needs. The fire service must be reliant on alternate water sources and have a water servicing strategy in place.	Almost Certain	• Water supply is essential for fire suppression operations • No municipal water infrastructure requires alternative sources including tanker shuttles and water bodies such as reservoirs, rivers, and lakes	Moderate	• Water shortages can occur during summer months and elevated temperatures • EPCOR closely monitors the river runoff levels but should they become critically low, EPCOR will notify their partners for implementing water restrictions. • Increased development within Parkland will increase strain on water resources • Water shortage threatens firefighting operations and could have significant consequences for property and life • As per the PCFS WILD Water Commission utilizes a single water main to deliver water to Parkland reservoirs. Small leaks and maintenance can cause disruptions and water restrictions	Moderate to High

Critical Infrastructure	Transmountain Pipeline runs through Parkland	Possible	• Transmountain Pipeline has 285 km of pipeline. • The pipeline spans from Spruce Grove to Hinton north of Wabamun Lake • There are 4 pump stations, and • 16 major trenchless crossings There are no notable incidents that created safety concerns/ hazards within the community	Low	• Transmountain Pipeline has 285 km of pipeline. • The pipeline spans from Spruce Grove to Hinton north of Wabamun Lake • There are 4 pump stations, and • 16 major trenchless crossings • There are no notable incidents that created safety concerns/ hazards within the community • The Trans Mountain Pipeline has an Emergency Response Organization based on a three-tier response structure. Although Level 1 and Level 2 incidents would be handled by the Company, Level 3 incidents being a major emergency such as: o Uncontrolled leak o Spill on a watercourse o Large fire at an operating facility or office building o Fatality or serious	Low

Profile	Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
					injury to an employee, contractor, or the public ○ Spill of hazardous substances • Would require Emergency Services such as (police, fire ambulance and other regulatory authorities	
Demographic Profile	The population of Parkland has steadily increased with a continued anticipated growth. Rapid changes in population and development can contribute to increased risk and potential increase in call volume and service level demands.	Possible	• Parkland anticipated considerable population growth within the next ten years	Low	• Any growth and new development could change service level demands • Threat to life safety and potential for moderate loss	Moderate

Profile	Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Demographic	Parkland has 18.07% of the population aged 65+ compared to 14.76% for Alberta. Seniors are considered to represent one of the highest fire risk groups across the province based on residential fire death rate.	Almost Certain	• Canada's aging population has been recognized as one of the most significant demographic trends. • The majority of seniors reside in hamlets and developed areas within Parkland. • Historically across the province this group represents the highest fire fatalities • Seniors are more likely to live in high density housing	Moderate	• Could pose a threat to the life safety of occupants • Could result in moderate property loss • Potential for exposure risk depending on dwelling type and building age • Potential presence and maintenance of fire protection equipment would influence consequence level	High
Demographic	Of Parkland's population, 18.15% 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 great fire fatality risk.	Likely	• County's population will increasingly age • Historically across the province this group represents the highest fire fatality • With increasing number of seniors, the threat of an injury or fatality due to fire increases • Seniors more likely to live in high density housing	Moderate	• Threat to life safety and potential for moderate loss	High

Profile	Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Demographic	Parkland has lower proportion of newcomers/immigrants (7.51%) when compared to Alberta (23.24%)	Possible	• Parkland has a lower proportion of newcomers/immigrants (7.51%) when compared to Alberta (23.24%) • Communication barriers, in terms of language and the ability to read written material, may have an impact on the success of these programs	Moderate	• 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	High
Demographic	Nearly (5.74%) of the population commutes to a different census division within the province. This is 1.56%) more than that of the provincial commuters (4.18%)	Likely	• (5.74%) of the population commutes to a different census division (520 people)	Moderate	• (79%) of the labour force begins their commute between the hours of 7 and 9 a.m., and therefore the risk of motor vehicle collision (MVC) calls is likely to be greatest during this time	Moderate

Economic Profile	The risk of a single fire or emergency event having a large impact on the community is moderate risk.	Possible	• Downturns in agriculture have happened • Significant threat to businesses, local economy, employment • Processing and other activities that involve various ignition sources often occur in manufacturing occupancies. Manufacturing facilities constitute a special fire hazard due to high levels of combustible, flammable or explosive content and the possible presence of oxidizing chemicals and gases.	Moderate	• With the increased use and storage of devices which utilize lithium-ion batteries, there is an increased risk that a fire involving these batteries could exhaust the water and human resources of PCFS. • Amazon provides income to many residents within Parkland. • A single train derailment and major traffic disruptions may have a significant impact on the County's economic stability. • A disruption in the agriculture or oil and gas industry may not does have large implications on the economic wellbeing of the region itself, however, disruptions could result in secondary issues often associated with the loss of an economy such as homelessness, addiction, mental health, and medical emergencies. As previously discussed, the economic wellbeing of a	Moderate

Profile	Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
					community also has a correlated effect on fire	
Past Loss and Event History	Over the five-year period from January 1, 2018, and December 31, 2022, the most reported ignition sources within Parkland were related to electrical equipment	Almost Certain	• Provincially, civilian fire related injuries, and civilian fire related fatalities occurred in residential occupancies. • Between January 1, 2019, and December 31, 2023, there were 84 fires related to Electrical Hazards. • Fires caused by electrical distribution equipment reported annually	Moderate to Major	• Could pose a threat to the life safety of occupants • Could result in moderate property loss • Potential for exposure risk depending on dwelling type and building age • Potential presence and maintenance of fire protection equipment would influence consequence level • Depending on occupancy type could have a moderate or major impact to life safety and property loss.	Moderate
Past Loss and Event History	Over the five-year period from January 1, 2018, and December 31, 2022, only (21%) of incidents had a smoke alarm present and only (38%) of those incidents did the smoke alarm activate.	Likely	• There were 1062 incidents where a smoke alarm was present but did not operate or it could not be confirmed that it operated. • There were no smoke alarms present in 6248 incidents.	Moderate	• Potential presence and maintenance of smoke alarms would influence consequence level • potential for large loss of life, significant property damage,	Moderate

Profile	Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Past Loss and Event History	Over the period from January 1st, 2019, to December 31st, 2023, the volume of emergency calls responded to by PCFS increased by 18.9%	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 property losses and life safety	Moderate

11.2 Risk Treatment

Risk treatment 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. The risk treatment options include avoidance, mitigation, acceptance, and transfer. *(See Table 55)*

Table 55: 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)

Table Source: Ontario OFM TG 02-2019[16]

Recommendations of a Fire Services Master Plan 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 56 identifies and describes each of the 5 Es of risk mitigation.

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

Table 56: 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 Es 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[17]

Table 57 summarizes the identified risks and presents ways in which the risks can be addressed by PCFS and considered within the Fire Services Master Plan analysis and recommendations.

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

Table 57: Identified Risk Treatment

Profile	Identified Risk	Risk Level	Risk Treatment Option	Education	Enforcement	Engineering	Economic Incentives	Emergency Response
Geographic	Roads leading to residential properties are largely graveled in rural areas. Although roads in the County are well maintained, gravel roads may slow response times and present challenges for apparatus during a response, including the threat of damage or accidents. Maintenance of gravel roads in winter months can also be challenging and slow response times and increase risks.	Moderate	Accept	No	No	No	No	Yes
Geographic	The road network is a contributor to emergency call volume due to motor vehicle collisions and vehicle fires.	Moderate	Accept	No	No	No	No	Yes
Geographic	There is an elevated risk of a major spills and dangerous goods incident along Hwy 16 being the main highway linking Parkland and Edmonton	Moderate	Accept	No	No	No	No	Yes
Geographic	The transportation of agricultural chemicals along roadways may pose the risk of an environmental spill.	Low	Accept	No	No	No	No	Yes
Geographic	During peak commuting times, the highest risk of motor vehicle collisions is likely to occur.	Moderate	Accept	No	No	No	No	Yes

Profile	Identified Risk	Risk Level	Risk Treatment Option	Education	Enforcement	Engineering	Economic Incentives	Emergency Response
Geographic	CN rail lines operate a track that runs from Edmonton extending west through Parkland that presents a risk related primarily to the movement of dangerous goods. At grade level rail crossings have the potential to create a physical barrier to connectivity to the roadway network, causing delays in response time.	High	Accept	No	No	No	No	Yes
Geographic	Uncontrolled at grade rail crossings pose an increased threat of a motor vehicle collision	Moderate	Mitigate	Yes	No	Yes	No	Yes
Geographic	There is a high degree of risk to the public and the environment associated with a train derailment; with or without the release of dangerous goods	High	Mitigate	Yes	No	No	No	Yes
Geographic	There is an increased risk of ice and water rescue along Wabamun Lake, Isle Lake and the north Saskatchewan river due to natural hazards necessitating swift emergency evacuations and recreational boating and other activity on the water	Moderate	Mitigate	Yes	Yes	No	No	Yes

Profile	Identified Risk	Risk Level	Risk Treatment Option	Education	Enforcement	Engineering	Economic Incentives	Emergency Response
Geographic	There is a considerable risk of wildland fires in areas of urban interface. The landscape surrounding the town is primarily agricultural, and increasing development in natural areas increases the threat of wildfire impinging on the town.	High	Mitigate	Yes	Yes	No	No	Yes
Building Stock	As with most jurisdictions, residential buildings account for the majority of building stock in Parkland and are the most common building involved in structural fires and attribute to the most fatalities and injuries To meet the projected housing demands associated with the population growth in the town, increased fire-risk potential will also increase in those areas.	High	Mitigate	Yes	Yes	Yes	No	Yes
Building Stock	Data provided by the 2021 census indicates that 30.50% of Parkland's building stock was built prior to 1981, preceding the 1984 fire code. This represents a significant fire risk within the community.	High	Mitigate	Yes	Yes	No	No	Yes
Building Stock	The number of new homes being built with lightweight construction poses a risk to firefighter safety and can hinder the ability for occupants to safely evacuate in a timely fashion.	Moderate	Mitigate	Yes	Yes	Yes	No	Yes

Profile	Identified Risk	Risk Level	Risk Treatment Option	Education	Enforcement	Engineering	Economic Incentives	Emergency Response
Building Stock	There are several properties within Parkland that have a potentially high fuel load and therefore an increased high fire risk.	Moderate	Mitigate	Yes	Yes	Yes	No	Yes
Building Stock	Parkland currently has (1) registered vulnerable occupancy.	Moderate	Mitigate	Yes	Yes	Yes	Yes	Yes
Critical Infrastructure	The Capital Regional Parkland Water Services Commission, through EPCOR, provides water services to residents of Parkland. Parkland makes sure that the reservoirs are topped up so they can maintain residential water usage and firefighting water needs. The fire service must be reliant on alternate water sources and have a water servicing strategy in place.	Moderate to High	Mitigate	No	No	No	No	Yes
Critical Infrastructure	Transmountain Pipeline runs through Parkland	Low	Accept	No	No	No	No	Yes
Demographic	The population of Parkland has steadily increased with a continued anticipated growth. Rapid changes in population and development can contribute to increased risk and potential increase in call volume and service level demands.	Moderate	Mitigate	Yes	Yes	Yes	No	Yes

Profile	Identified Risk	Risk Level	Risk Treatment Option	Education	Enforcement	Engineering	Economic Incentives	Emergency Response
Demographic	Parkland has 18.07% of the population aged 65+ compared to 14.76% for Alberta. Seniors are considered to represent on e of the highest fire risk groups across the province based on residential fire death rate.	High	Mitigate	Yes	Yes	Yes	No	Yes
Demographic	Of Parkland's population, 18.15% 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 fatality risk.	High	Accept	Yes	No	No	No	Yes
Demographic	Parkland has lower proportion of newcomers/immigrants (7.51%) when compared to Alberta (23.24%)	High	Accept	Yes	Yes	No	No	Yes
Demographic	Nearly (5.74%) of the population commutes to a different census division within the province. This is 1.56%) more than that of the provincial commuters (4.18%)	Moderate	Accept	No	Yes	No	No	Yes
Economic	The risk of a single fire or emergency event having a large impact on the community is moderate, risk	Moderate	Accept	No	No	No	No	Yes

Profile	Identified Risk	Risk Level	Risk Treatment Option	Education	Enforcement	Engineering	Economic Incentives	Emergency Response
Past Loss & Event History	Over the five-year period from January 1, 2018, and December 31, 2022, the most reported ignition sources within Parkland were related to electrical equipment	Moderate	Mitigate	Yes	Yes	Yes	Yes	Yes
Past Loss & Event History	Over the five-year period from January 1, 2018, and December 31, 2022, only (21%) of incidents had a smoke alarm present and only (38%) of those incidents did the smoke alarm activate.	Moderate	Mitigate	Yes	Yes	Yes	Yes	Yes
Past Loss & Event History	Over the period from January 1st, 2019, to December 31st, 2023, the volume of emergency calls responded to by PCFS increased by 18.9%	Moderate	Mitigate	Yes	Yes	No	No	Yes

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