Community Risk Assessment

Final Report
2024

OAKVILLE

OAKVILLE FIRE DEPT AVANCEZ

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Acronyms, Abbreviations, Definitions

ASHER	Active Shooter Hostile Event Response
BIA	Business Improvement Areas
CASARA	Civil Air Search and Rescue Association
CBRN	Chemical, Biological, Radiological or Nuclear
CBRNE	Chemical, Biological, Radiological, Nuclear or Explosive
CFB	Canadian Forces Base
CI	Critical Infrastructure
CN	Canadian National
COAST	Crisis Outreach and Support Team
COOP	Continuity of Operations Planning
CP	Canadian Pacific
CRA	Community Risk Assessment
EMCPA	Emergency Management and Civil Protection Act
GTA	Greater Toronto Area
HAZMAT	Hazardous Materials
HIRA	Hazard Identification and Risk Assessment
HUSAR	Heavy Urban Search and Rescue
JRCC	Joint Rescue Coordination Center
LVL	Laminated Veneer Lumber
LRT	Light Rail Transit
MCI	Mass casualty incident

MNRF	Ministry of Natural Resources and Forestry's
MPAC	Municipal Property Assessment Corporation
MW	Megawatt
NAICS	North American Industry Classification System
NFPA	National Fire Protection Association
OAAC	Older Adult Advisory Committee
OBC	Ontario Building Code
OFC	Ontario Fire Code
OFD	Oakville Fire Department
OFM	Office of the Fire Marshal
OTMH	Oakville-Trafalgar Memorial Hospital
OVERT	Ontario Volunteer Emergency Response Team
QEW	Queen Elizabeth Way
SAR	Search and Rescue
SARS	Severe Acute Respiratory Syndrome
The Town	Town of Oakville
TG	Technical Guideline
TOWARF	Town of Oakville Water Air Rescue Force

1.0 Introduction

The process of assessing community risk is receiving increased attention within the fire service in North America. Assessing community risk informs the understanding of local needs and circumstances which can then be applied to align the service levels provided by the Oakville Fire Department (OFD). The use of community risk assessment reflects a shift within the fire service towards opportunities to mitigate or avoid fire-related risks through proactive public education programs and fire inspection and enforcement programs.

This Community Risk Assessment (CRA) has been developed for the Town of Oakville (Town of Oakville) to comply with **Ontario Regulation 378/18: Community Risk Assessments (O. Reg. 378/18)**.

As required by **O. Reg. 378/18**, this CRA includes an analysis of nine mandatory profiles:

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; and
9. Past Loss and Event History Profile.

O. Reg. 378/18 requires all municipalities in Ontario to develop a CRA (prior to July 1, 2024) and use the CRA to "inform decisions about the provision of fire protection services." The findings of this CRA will directly inform the Town of Oakville's Fire Master Plan, with particular connections to fire prevention, public education, training, and emergency response.

Consistent with the regulation, this CRA should be reviewed annually and updated every five years or as needed.

1.1 Methodology

The methodology and analysis applied to develop this CRA are directly informed by the Office of the Fire Marshal (OFM) **Technical Guideline-02-2019[1] (TG-02-2019)** which 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. In addition to **TG-02-2019**, the methodology applied is informed by other current industry standards and best practices, including:

- OFM Comprehensive Fire Safety Effectiveness Model: Fire Risk Sub-Model;
- OFM Simplified Risk Assessment;
- National Fire Protection Association (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);
- Vision 20/20 Community Risk Assessment: A Guide for Conducting a Community Risk Assessment (Version 1.5, 2016); and
- Vision 20/20 Community Risk Reduction Planning: A Guide for Developing a Community Risk Reduction Plan.

The profiles are based on an analysis of several sources of information, including data provided by the Town, Statistics Canada, the OFM, and desktop research. This CRA also incorporates input provided by OFD.

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 defence through a risk treatment process. These are referred to as a '**key finding**' or an '**identified risk**'. 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 defence in order to inform the analysis and recommendations within the Fire Master Plan. More information on how the findings

[1] Revised February 2022.

and identified risks will be used to inform the FMP can be found in **Section 11.0 Applying Key Findings and Identified Risks**.

2.0 Geographic Profile

As referenced in **O. Reg. 378/18**, the geographic profile assessment includes analysis of the physical features of the community, including the nature and placement of features such as highways, waterways, railways, canyons, bridges, landforms and wildland-urban interfaces. These physical features may present inherent risks or potentially have an impact on fire department access or emergency response time. The following sections consider these geographic characteristics within the Town of Oakville.

2.1 Geographical Snapshot of Oakville

The geographic area of the Town of Oakville represents a land area of approximately 138.94 square kilometres (Statistics Canada 2022). Oakville is situated on the western shore of Lake Ontario and bordered by the City of Burlington to the southwest, the City of Mississauga to the northeast and the Town of Milton to the northwest. The Town is bisected by Highway 403, while Highway 407 spans the west side of the boundary. Multiple rail lines, including mixed-use corridors and mobility hubs run through the middle of the Town. Oakville is home to Bronte Creek Provincial Park, Glenorchy Conservation Area, and many parks and trails. 16 Mile Creek and 12 Mile Creek (also known as Bronte Creek), originate past the western boundary of the Town but flow easterly across the area to Lake Ontario. Lands west of Highway 407 are designated as Natural Heritage and Protected Countryside under the Greenbelt Plan. Other land use within the Town can be seen in **Figure 1**.

Figure 1, below, provides a land use schedule of the Town as found in the Town of Oakville's Official Plan. As shown, Oakville is largely urban with industrial areas along major transportation corridors. The Town also has rural settlement areas located primarily in the north and also along the west municipal boundary.

Figure 1: Town of Oakville Land Use Schedule

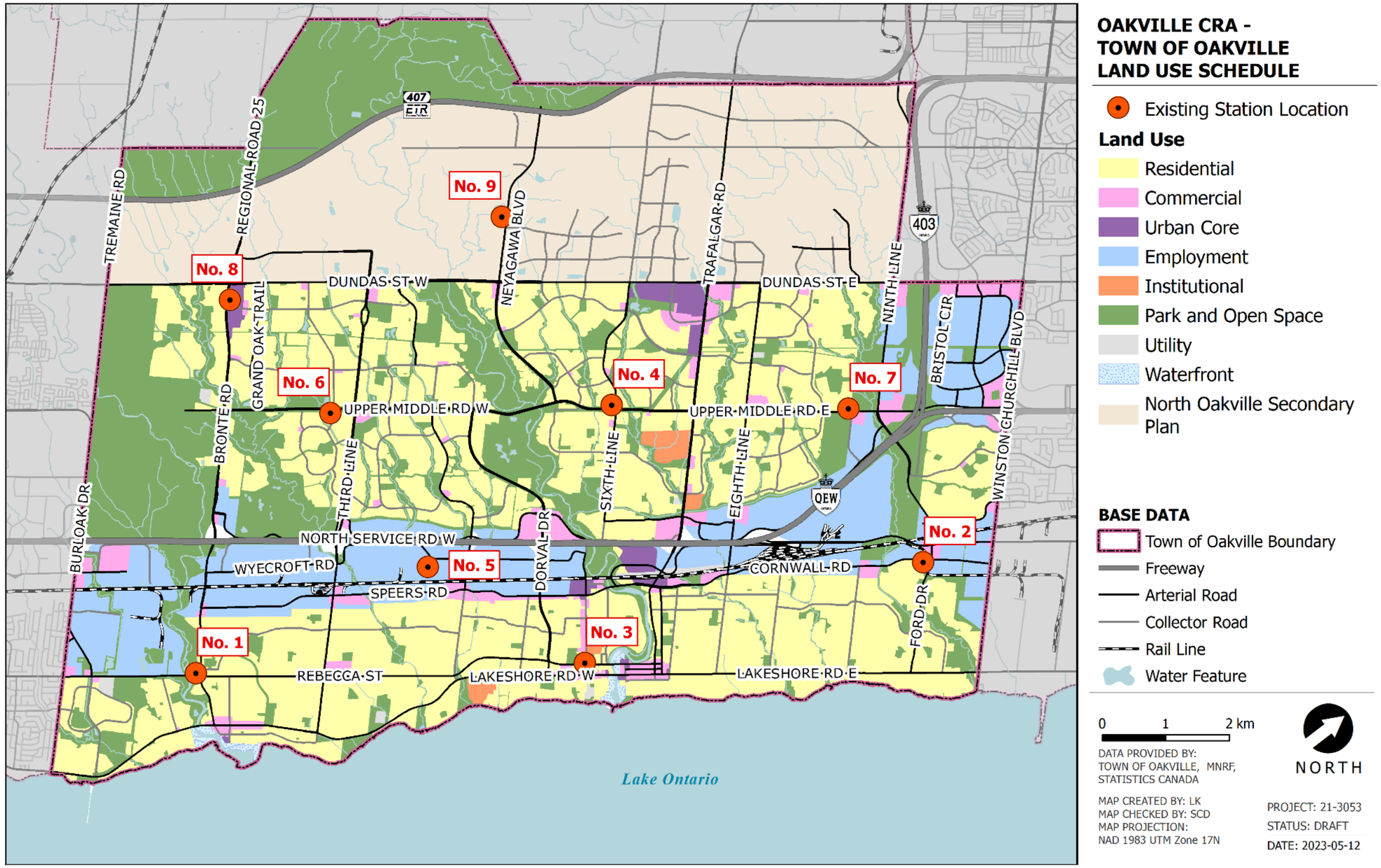


Figure Source: Town of Oakville Official Plan, Schedule F-K

2.2 Roads, Bridges and Rail

2.2.1 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; and therefore, it is valuable to consider where there may be a lack of connectivity due to road network design as well as other natural (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, the Town's transportation planning processes should include the OFD as a stakeholder to provide consideration to emergency service needs and challenges relating to the road network, traffic congestion, traffic calming and related topics.

Roads are also important from a risk and emergency response perspective because motor vehicle-related incidents often account for a large portion of a fire department's call volume. As described in **Section 10.2.2.3 – Spatial Modelling – Rescue Incidents** of this CRA, 2,149 calls were motor-vehicle related incidents (vehicle collisions and vehicle extrication combined), accounting for approximately 87.9% of all rescue calls responded to by the Oakville Fire Department during a five year period (2016 to 2020).

Located at the western end of Lake Ontario, Oakville is intersected by a number of provincial highways and freeways that act as gateways to other urbanized parts of Ontario. These highways and freeways include Highway 407, Highway 403/Queen Elizabeth Way (QEW) towards Toronto and Niagara.

Vehicle congestion on the Town's road network can contribute to delays in emergency response travel times. The major freeways and junctions of the of QEW, Highway 403 and Highway 407 experience high traffic volumes, which increase during peak commute hours and are a source of congestion.[2] Major highway routes and high traffic volumes provides an increased risk of motor vehicle collisions, and the potential for a transport incident involving dangerous good.

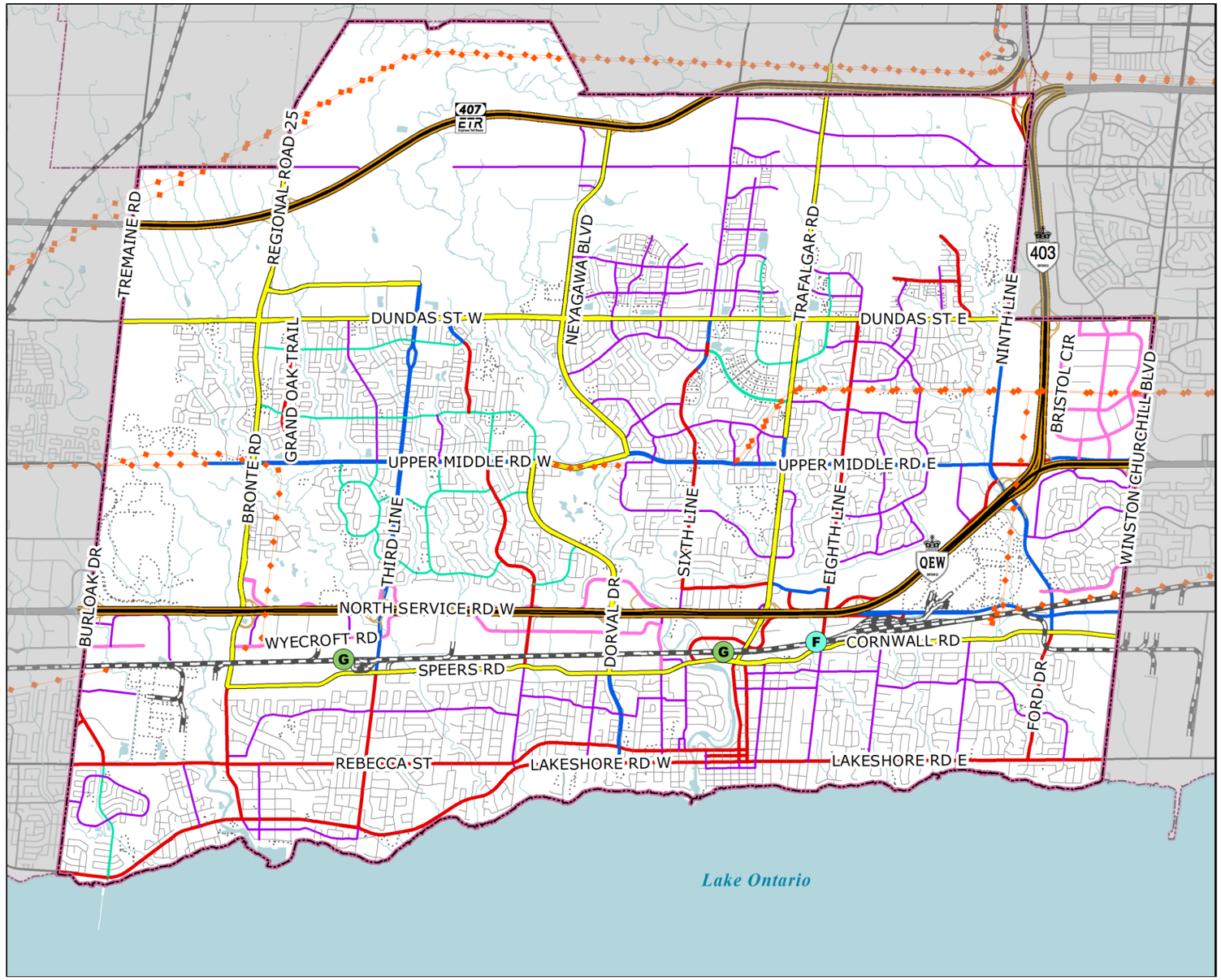
[2] Freeman Interchange. WSP. 2020. Retrieved August 7, 2020 from https://qew403freeman.ca/

Public transit in Oakville is provided by Oakville Transit and GO Transit. Oakville transit offers a conventional and accessible bus services. GO Transit provides bus and rail service from multiple locations along Highway 403 and 407.

The Town of Oakville's transportation facilities and hydro corridors are presented in **Figure 2.**

Identified Risk: Motor vehicle-related incidents on the existing road network represent 87.9% (2,149) of all rescue responses of the Oakville Fire Department.

Figure 2: Major Transportation Facilities and Hydro Corridors



OAKVILLE CRA - MAJOR TRANSPORTATION FACILITIES AND HYDRO CORRIDORS

- Freight Rail Station
- Passenger Rail Station
- Rail Line
- Hydro / Transmission Line

Road Class

- Freeway
- Freeway Ramp
- Regional Road
- Major Arterial
- Minor Arterial
- Industrial Arterial
- Major Collector
- Minor Collector
- Local Road
- Access Road

BASE DATA

- Town of Oakville Boundary
- Water Feature

0 1 2 km

NORTH

DATA PROVIDED BY:
TOWN OF OAKVILLE, MNRF, STATISTICS CANADA

MAP CREATED BY: LK
MAP CHECKED BY: SCD
MAP PROJECTION:
NAD 1983 UTM Zone 17N

PROJECT: 21-3053
STATUS: DRAFT
DATE: 2023-05-12

Figure Source: Town of Oakville Official Plan, Schedule C.

2.2.2 Bridges

Bridges are considered within a CRA for two main reasons: the potential for crossing restrictions for fire apparatus due to weight; and the potential for impact on network connectivity if a bridge is out of service.

There are several bridges in Oakville that cross the 12 Mile and 16 Mile Creek, which flow through to the south part of the Town and into Lake Ontario. These bridge overpasses are located on the following roadways:

There are three bridges which cross 12 Mile Creek:

- Rebecca Street;
- Lakeshore Road West; and
- Dundas Street.

There are five bridges which cross 16 Mile Creek:

- Dundas Street West;
- Upper Middle Road West;
- Speers Road;
- Randall Street; and
- Lakeshore Road East.

In addition to bridges that provide access over waterbodies, there are overpasses that cross the QEW/Highway 403 and are located on the following roadways:

- Dorval Drive;
- Third Line;
- Fourth Line;
- Trafalgar Road;
- Royal Windsor Drive;
- Burloak Drive; and
- Winston Churchill Drive.

There are also underpasses where the road passes under the QEW/Highway 403 located at:

- Bronte Road;
- Kerr Street; and
- Ford Drive.

If one or more of these bridges and/or over/underpasses were to be out of service, it could impact overall network connectivity and response times in the event of an emergency.

Key Finding: Bridges, with restrictions or closures, have the potential to reduce the connectivity of the Town's road network resulting in the potential for delays in emergency response times.

2.2.3 Rail

Rail lines are considered in this CRA for a few key reasons related to emergency services: firstly, the potential for a rail-based transport incident is a major consideration as a derailment or accident involving the goods being transported (hazardous materials) could occur, requiring hazardous materials response; and secondly, the physical barrier created by the rail infrastructure itself, such as a rail yard or the placement of rail infrastructure within and throughout a municipality can slow down emergency travel and overall response times.

The Town of Oakville has one prominent rail line, the Lakeshore West Line, which is owned by Metrolinx. The Lakeshore West line provide east-west connections between the City of Hamilton, Ontario and Union Station in Toronto, Ontario.

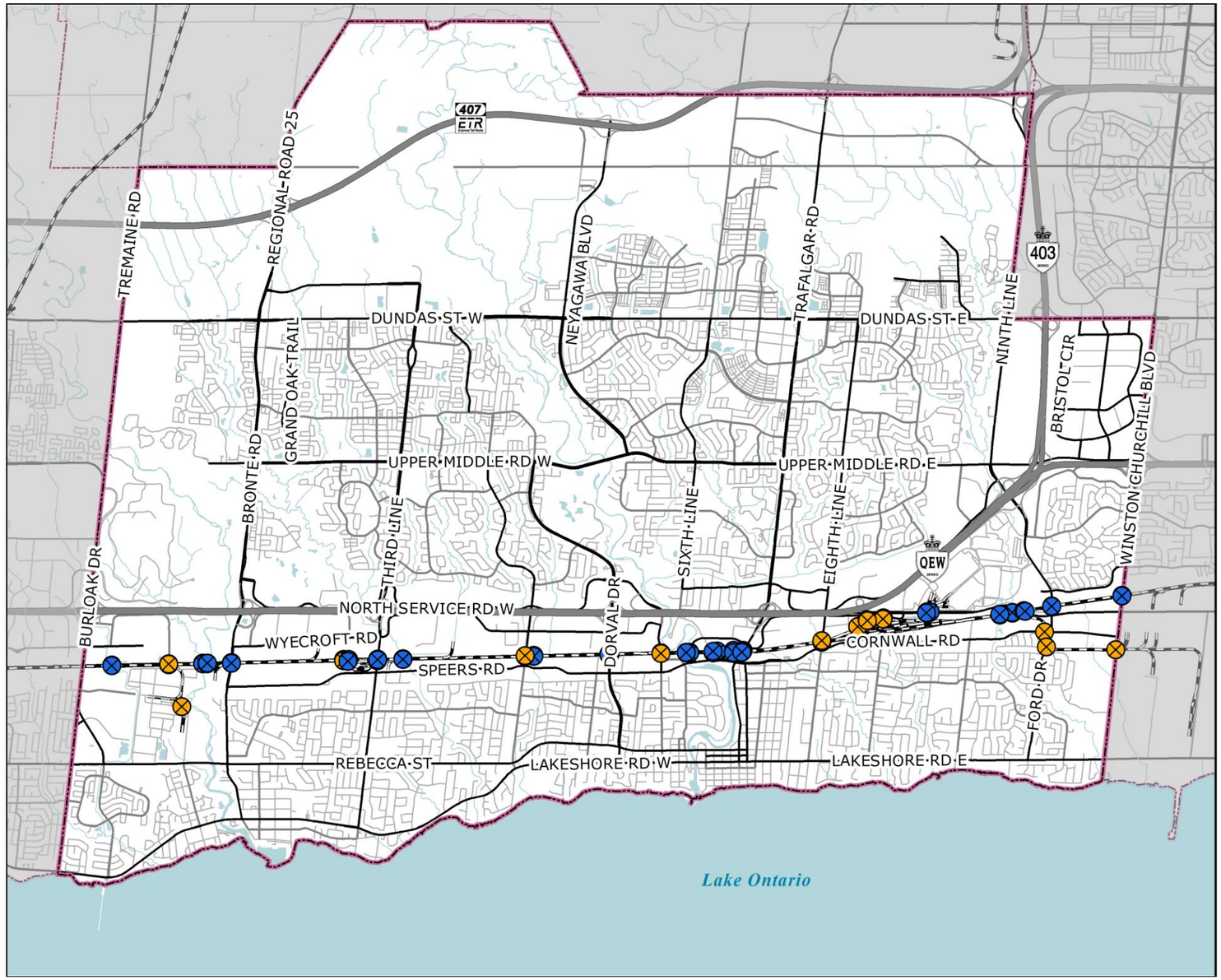
At-grade rail crossings (an intersection at which a road crosses a rail line at the same level) can create delays in emergency response by inhibiting emergency response. There are seven at-grade rail crossings within Town boundaries which can be seen in **Figure 3**. There is a cluster of at-grade rail crossings located parallel to Speers Road and Cornwall Road. The location of these rail crossings may delay emergency response times travelling north or south of these roads.

There are seven grade separated rail crossings located throughout the Town, as shown in **Figure 3** below as underpasses or overpasses. These crossings provide access for emergency response across the rail lines in the event that the rail line and at-grade crossings are blocked (e.g., rail incident).

We anticipate that the location of the preferred crossings will have an impact on emergency response travel times. Engagement regarding the location of at-grade crossings should include the Oakville Fire Department to provide consideration to emergency services demands and changes in service levels.

Key Finding: Grade-level rail crossings could create a physical barrier to the connectivity of the Town's road network that can potentially result in delays in emergency response times.

Figure 3: Railway Crossings



OAKVILLE CRA - RAIL CROSSINGS

Rail Line

Railway Crossing

- At Grade Crossings
- Grade Separated Crossings

BASE DATA

- Town of Oakville Boundary
- Freeway
- Freeway Ramp
- Arterial Road
- Collector Road
- Local Road
- Water Feature

0 1 2 km

NORTH

DATA PROVIDED BY: TOWN OF OAKVILLE, MNRF, STATISTICS CANADA

MAP CREATED BY: LK
MAP CHECKED BY: SCD
MAP PROJECTION: NAD 1983 UTM Zone 17N

PROJECT: 21-3053
STATUS: DRAFT
DATE: 2023-05-29

Figure Source: Town of Oakville Data, created by Dillon Consulting Limited.

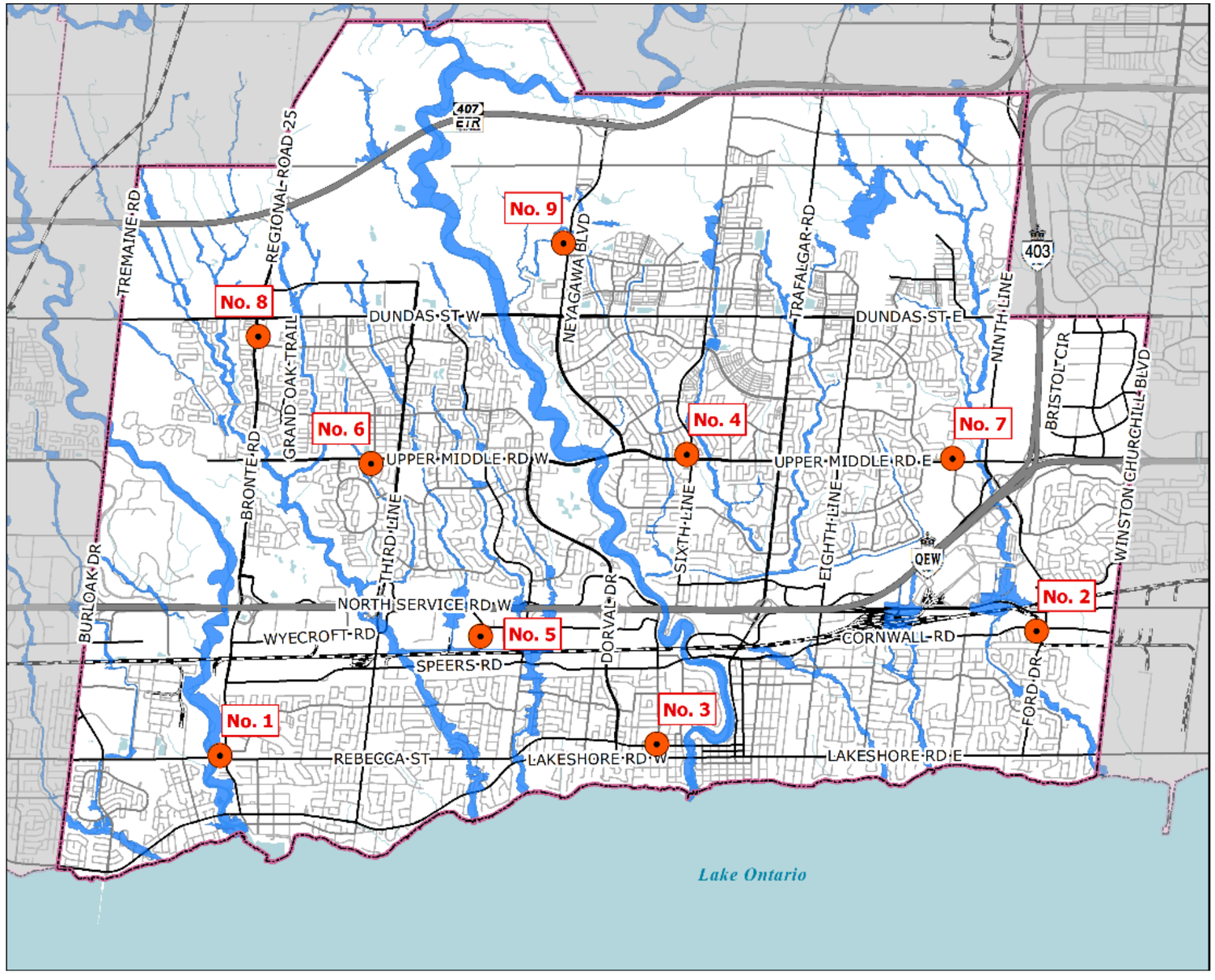
2.3 Waterways and Conservation Areas

2.3.1 Waterways

The Town of Oakville is located on the western side of Lake Ontario with a shoreline that supports residential dwellings, boating clubs, marinas, and many recreational areas. Several parks are located along the shoreline, including Sheldon Creek Park, Bronte Beach Park, Bronte Heritage Waterfront Park, Coronation Tannery Park, Lakeside Park, and Gairloch Gardens.

12 Mile Creek, 14 Mile Creek, 16 Mile Creek and Joshua's Creek are major waterways that originate at Lake Ontario and bisect the Town. Waterways are important from a risk perspective, in part, due to the recreational activities that take place in these settings and the natural hazards that they present, which could require specialized technical rescue emergency responses. There may also be natural hazards, such as flooding, associated with waterways. **Figure 4** below displays the location of floodplains throughout the Town. The floodplains are located along 12 Mile Creek, 14 Mile Creek, 16 Mile Creek and Joshua's Creek which creates the potential for specialized technical rescue emergency response.

Figure 4: Floodplain



OAKVILLE CRA - FLOODPLAIN

- Existing Station Location
- Floodplain

BASE DATA

- Town of Oakville Boundary
- Freeway
- Freeway Ramp
- Arterial Road
- Collector Road
- Local Road
- Rail Line
- Water Feature

0 1 2 km

NORTH

DATA PROVIDED BY:
TOWN OF OAKVILLE, MNRF

MAP CREATED BY: RR
MAP CHECKED BY: SCD
MAP PROJECTION:
NAD 1983 UTM Zone 17N

PROJECT: 21-3053
STATUS: DRAFT
DATE: 2023-05-29

Figure Source: Town of Oakville Data, created by Dillon Consulting Limited.

Identified Risk: The presence of 12 Mile Creek, 14 Mile Creek, 16 Mile Creek and Joshua's Creek flooding in low-lying areas.

Identified Risk: The presence of waterways within the Town, such as 12 Mile Creek, 14 Mile Creek, 16 Mile Creek and Joshua's Creek, creates a potential need for specialized ice and water rescue Services.

2.3.2 Marinas

Marinas present unique and complex fire safety risks and challenges to any fire department. Fires can result from the malfunction of electrical devices on board or due to incidents occurring during the dispensing of fuel where marinas offer on-site fueling. Some marinas may allow boat owners and passengers to occupy their vessel overnight which can present additional life safety risks for occupants. NFPA 303 Standard for Marinas and Boatyards includes a number of important topics related to creating a safe marine environment and is intended to provide a minimum level of safety from fire as well as electrical safety at marinas and boatyards.

Oakville's extensive shoreline provides many opportunities for marinas and harbours, where the three major harbours are owned by the Town: Bronte Harbour on 12 Mile/Bronte Creek, Bronte Outer Harbour on Lake Ontario, and Oakville Harbour on 16 Mile Creek. These harbours can accommodate several hundred sail and powerboats, with mooring dock and slips seasonally available, as well as boat launches.

2.3.3 Conservation Areas

Glenorchy Conservation Area is the only conservation area; however, Bronte Creek Provincial Park is also located within Oakville. Conservation Halton manages Glenorchy Conservation Area, a 401 hectare (ha) area located along the western boundary of the Town. This environmentally sensitive property contains 16 Mile Creek and Trafalgar Moraine, and has lookouts and both recreational extensive hiking trails. Bronte Creek Provincial Park has year-round recreational opportunities, of which includes hiking camping, fishing, swimming, cross-country skiing, snowshoeing, and tobogganing. There is potential for injury as a result of the activities taking place in these locations.

2.4 Wildland-Urban Interface

NFPA 1730 identifies wildland-urban interface as geography-based risk for consideration. This interface refers to the area of transition between unoccupied land and human development. This transition area can be comprised of a mix of woodlots, bush or grass.

The Ontario Ministry of Natural Resources and Forestry's (MNRF) Wildland Fire Assessment and Mitigation Reference Manual includes guidance on conducting a wildland fire assessment through a review of generalized MNRF wildland fire hazard mapping, planning authority mapping, [and] broad level site assessment. The Manual recommends that local planning authorities undertake a broad-level/municipal-wide wildland fire assessment. While this CRA considers available information to review this risk at a high level, this study does not reflect a wildland fire assessment as described within the Manual. However, it does review the generalized MNRF wildland fire hazard mapping.

The MNRF wildland fire hazard mapping (**Figure 5**) shows the areas where residential neighbourhoods in Oakville are located adjacent to wildland or grassland areas, or where there are concentrations of forest types that are at higher risk of wildland fire.

A review of fire loss data for the Town, for the period of 2016 to 2020, indicates there were 44 outdoor fires, 8.3% of all fires responded to by OFD (**Section 10.0 – Past Loss and Event History Profile**). There does not appear to be a high risk to wildlife in the Town related to forest cover, however, this type of hazard should continue to be monitored, especially in extreme heat events (**Section 6.0 – Hazard Profile**).

Figure 5: MNRF Wildland Fire Hazard Mapping

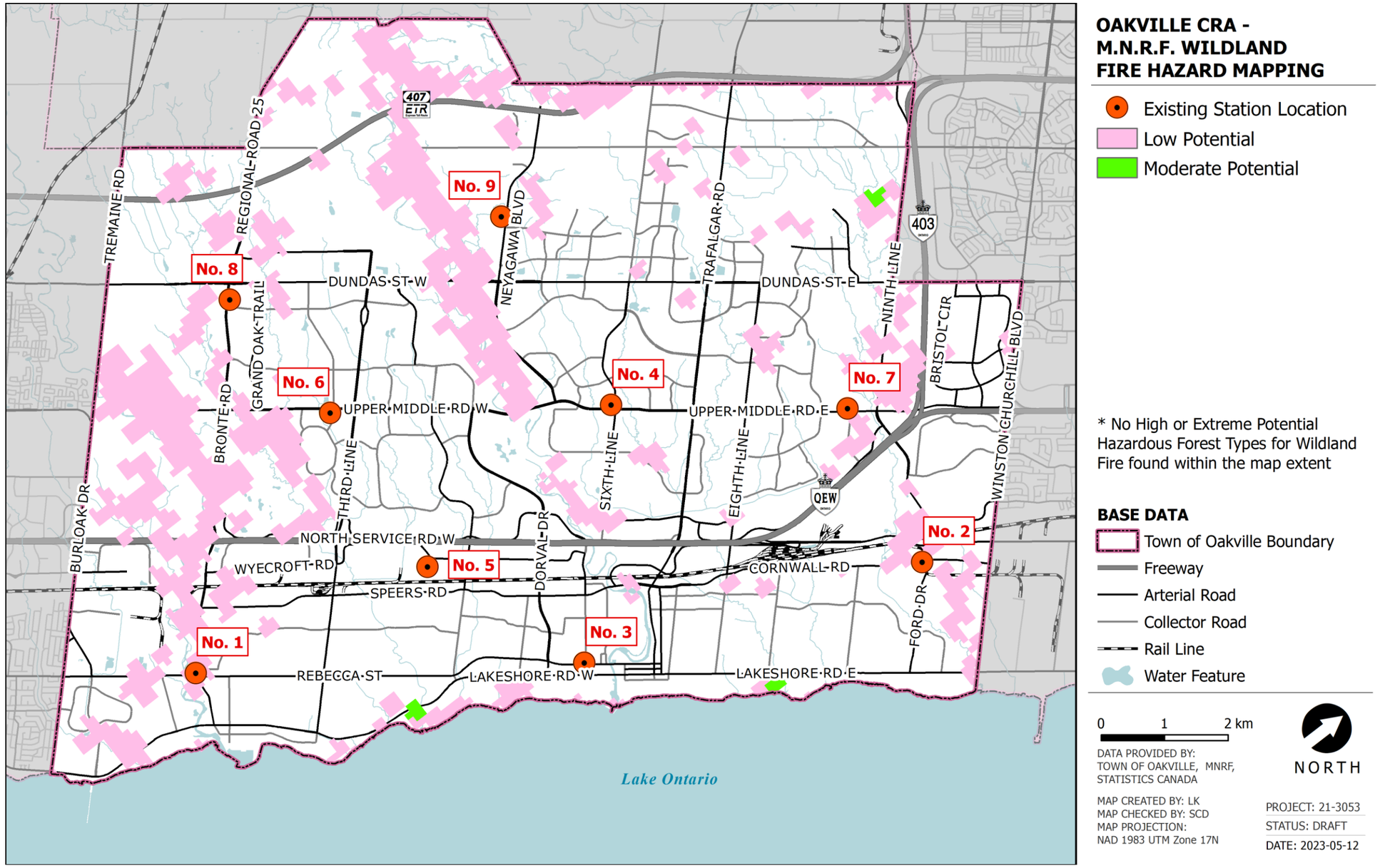


Figure Source: MNRF Data, created by Dillon Consulting Limited.

3.0 Building Stock Profile

As referenced in **O. Reg. 378/18**, the building stock profile assessment includes analysis of the types and uses of the building stock within the municipality. Important considerations include the number of buildings of each type, the number of buildings of each use and any building-related risks known to the fire service. There are potential fire risks associated with different types or uses of buildings given the presence or absence of fire safety systems and equipment at the time of construction and maintenance thereafter. This section considers these building characteristics within the Town of Oakville.

3.1 Ontario Building Code Occupancy Classifications

OFM **TG-02-2019** encourages fire departments to consider the potential fire-related risks associated with different building occupancy types and building uses. This includes consideration of each occupancy classification's prevalence within a community and the presence of fire and life safety systems and equipment. The Ontario Building Code (OBC) categorizes buildings by major occupancy classification. Utilizing the OBC major building occupancy classifications is consistent with the intent of **TG-02-2019** to provide a recognized definition and baseline for developing a community risk assessment.

The OBC is divided into six major building occupancy classifications (groups). Within each group the occupancies are further defined by division. The OBC major classification groups and divisions are presented in **Table 1**.

Table 1: OBC Major Occupancy Classifications

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

Source: Ontario Building Code[3]

3.2 OFM Fire Risk Sub-Model Occupancy Classifications

The Fire Risk Sub-model developed by the OFM utilizes the major group classifications (i.e., Group A, B, C, D, E, F), but does not use the detailed division classifications as included in the OBC. This strategy provides the ability to assess buildings within a community comparatively by major occupancy groups, thus providing a consistent and recognized definition for each major occupancy type. This strategy provides the opportunity for further analysis of a specific occupancy group. Subject to any site-specific hazards or concerns, occupancies within this group can be assessed individually and then included where required within the scope of the broader Community Risk Assessment. The OFM Fire Risk Sub-Model OBC classifications, definitions and associated fire related risks are presented in **Table 2** along with potential proactive measures to reduce risk within these occupancy types.

[3] Ontario Regulation 332/12: Building Code, Part III Fire Protection, Occupant Safety and Accessibility, Section 3.1.2.1.

Table 2: OFM Fire Risk Sub-Model Major Building Classifications

OBC Occupancy Classification	OFM Fire Risk Sub-Model Major Building Classifications	OFM Definitions	OFM Fire Related Risks	Proactive Measures for Reducing Risk
Group A	Assembly Occupancies	An assembly occupancy is defined as one that is used by a gathering of persons for civic, political, travel, religious, social, educational, recreational or like purposes or for the consumption of food or drink.	Assembly buildings are often occupied by a large number of 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 warrant 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; and • Pre-planning by fire suppression staff.
Group B	Care or Detention Occupancies	A care or detention occupancy means the occupancy or use of a building or part thereof by persons who: • Are dependent on others to release security devices to permit egress; • Receive special care and treatment; or • Receive supervisory care.	In addition to the presence of vulnerable occupants, these occupancies may contain quantities of various flammable/combustible liquids and gases, oxidizers and combustible furnishings that will impact the intensity of the fire if one should occur. The evacuation or relocation of patients, residents or inmates to an area of refuge during an emergency poses additional challenges in these facilities. It is essential to ensure that properly trained staff is available and prepared to quickly respond according to the facility's approved fire safety plan.	• Regular fire prevention inspection cycles; • Automatic fire detection and monitoring systems; • Approved Fire Safety Plan and staff training; and • Pre-planning by fire suppression staff.

OBC Occupancy Classification	OFM Fire Risk Sub-Model Major Building Classifications	OFM Definitions	OFM Fire Related Risks	Proactive Measures for Reducing Risk
Group C	Residential Occupancies	A residential occupancy is defined as one that is used by persons for whom sleeping accommodation is provided but who are not harboured or detained to receive medical care or treatment or are not involuntarily detained.	In Ontario, residential occupancies account for 70% of all structural fires and 90% of all fire deaths. Residential units that are located in multi-unit buildings, including secondary units in a house, pose additional risks due to egress and firefighting accessibility challenges.	• Home smoke alarm programs; • Public education programming including home escape planning; • Retro-fit and compliance inspection cycles for OFC compliance; • Pre-planning by fire suppression staff; and • Fire Drills as required by the OFC.
Group D	Business and 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 a large number of 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 located in a high-rise building pose additional risks due to egress and firefighting challenges.	• Regular fire prevention inspection cycles to maintain OFC compliance; • Targeted fire prevention inspections for OFC retro-fit compliance; • Staff training in fire prevention and evacuation procedures; • Public education programs; and • Pre-planning by fire suppression staff.
Group E	Mercantile	A mercantile occupancy is defined as one that is used for the displaying or selling of retail goods, wares or merchandise.	Larger mercantile occupancies such as department stores are generally occupied by a large number of people and contain high quantities of combustibles in the form of merchandise, furnishings and decorations. Customers may be unfamiliar with the building's exit locations and not know how to react in the event of an emergency. Additional hazards will be present in "big box" type stores that sell and store large volumes of combustible materials in bulk. These stores generally have similar properties to industrial warehouses with the additional hazard of higher number of occupants.	• Regular fire prevention inspection cycles; • Automatic fire detection and monitoring systems; • Approved Fire Safety Plan and staff training; and • Pre-planning by fire suppression staff.

OBC Occupancy Classification	OFM Fire Risk Sub-Model Major Building Classifications	OFM Definitions	OFM 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 low hazard (F3), medium hazard (F2) and high hazard (F1) based on its combustible content and the potential for rapid fire growth.	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; • Preplanning by fire suppression staff; and • Fire extinguisher training.

Source: OFM Fire Risk Sub-Model[4]

[4] Office of the Fire Marshall and Emergency Management. (2016, February). Comprehensive Fire Safety Effectiveness Model: Fire Risk Sub-Model. Retrieved from Ministry of the Solicitor General Website.

3.2.1 Town of Oakville Existing Major Building Classification Summary

Analysis of the Town's existing major building occupancy types was conducted through a review of Oakville's building stock data, as provided by the OFD. **Table 3** summarizes the Town's existing major building occupancy classifications.

As presented in **Table 3**, the majority of the Town's existing building stock is Group C – Residential Occupancies (91.77%) representing 57,119 residential occupancies.

The second largest occupancy type within the Town is classified as Other Occupancies, accounting for 5.64% of the Town's building stock and is closely followed by the Group F (all Divisions combined) at 1.10% of building stock. The Group D and E – Business/mercantile (640), represent 1.03% of the Town's building stock.

The Group B – Care or Detention Occupancies comprise 0.1% of the Town's building stock. This category includes the 59 registered vulnerable occupancies within the Town which are discussed further in **Section 3.7.1– Vulnerable Occupancies.**

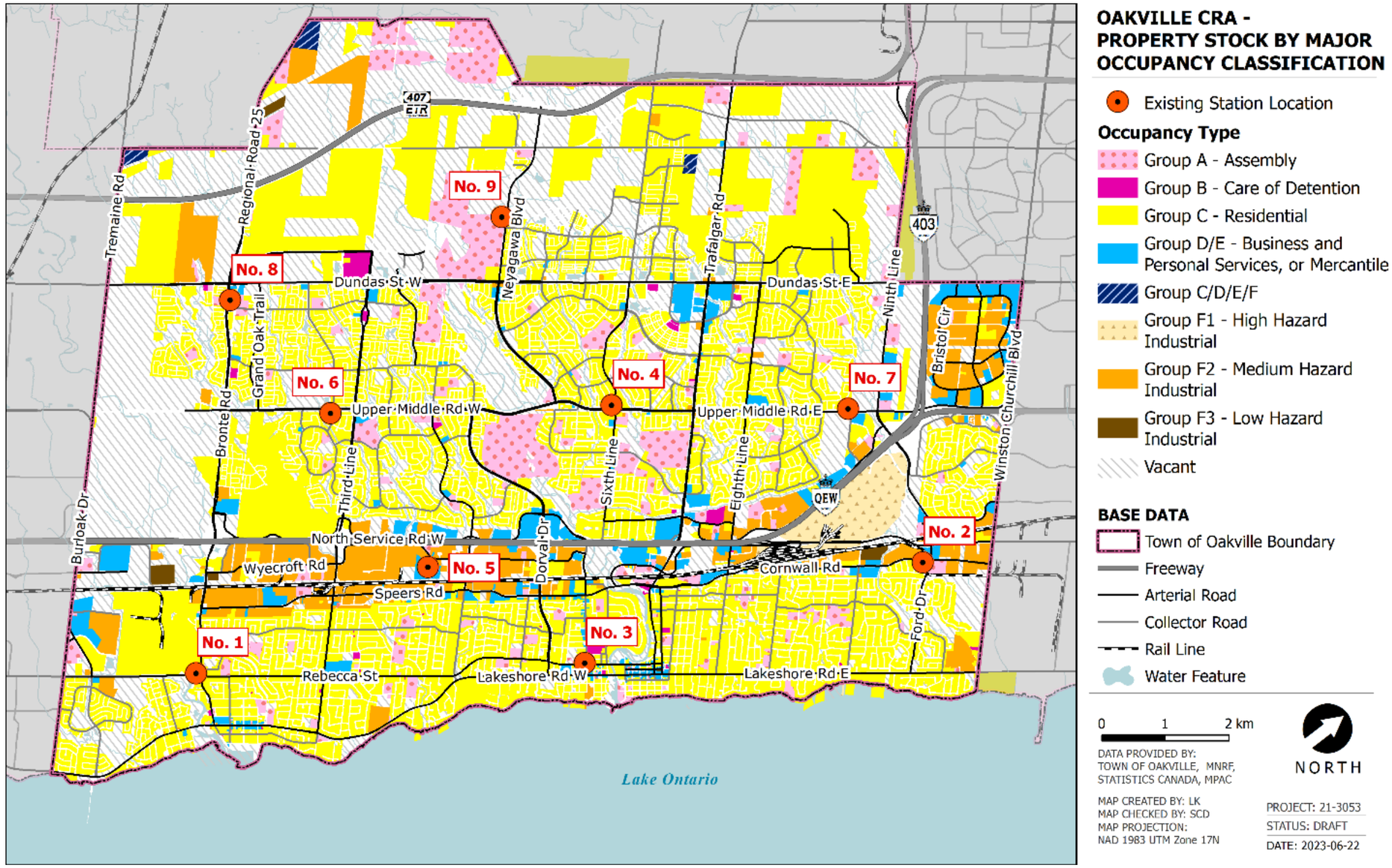
Table 3: Oakville Existing Building Stock

OBC Occupancy Classification	OFM Fire Risk Sub-Model Major Building Classifications	Number of Occupancies	Percentage of Occupancies
Group A	Assembly Occupancies	241	0.4%
Group B	Care or Detention Occupancies	59	0.1%
Group C	Residential Occupancies	57,119	91.7%
Group D and E	Business/Mercantile	640	1.0%
Group F Division 3	Low-Hazard Industrial	5	0.01%
Group F Division 2	Medium-Hazard Industrial	672	1.1%
Group F Division 1	High-Hazard Industrial	5	0.01%
Group F (all Divisions combined)	Industrial Occupancies	682	1.1%
Other	Other occupancies not classified in Ontario Building Code	3,512	5.6%
Total Occupancy Classification	**Total Building Classifications**	**62,283**	100%

Source: Town of Oakville/Municipal Property Assessment Corporation (MPAC).

Group C – Residential Occupancies represent the most prominent type of building occupancy type within the Town of Oakville, which is consistent with most municipalities across Canada. **Figure 6** illustrates the spatial distribution of the Town's Group C – Residential Occupancy property stock. Information provided by the OFM (as described in **Section 10.0** – **Past Loss and Event History Profile**) indicates that the majority of structure fires in the Town over the five-year period from January 1, 2016, to December 31, 2020, occurred within Group C – Residential Occupancies (77.1%). This equates to 242 structure fires. Group C – Residential Occupancies also represented 89.1% of the Town's total fire loss for the same period.

Figure 6: Property Stock by Major Occupancy Classification



OAKVILLE CRA - PROPERTY STOCK BY MAJOR OCCUPANCY CLASSIFICATION

Existing Station Location

Occupancy Type

- Group A - Assembly
- Group B - Care of Detention
- Group C - Residential
- Group D/E - Business and Personal Services, or Mercantile
- Group C/D/E/F
- Group F1 - High Hazard Industrial
- Group F2 - Medium Hazard Industrial
- Group F3 - Low Hazard Industrial
- Vacant

BASE DATA

- Town of Oakville Boundary
- Freeway
- Arterial Road
- Collector Road
- Rail Line
- Water Feature

0 1 2 km

DATA PROVIDED BY:
TOWN OF OAKVILLE, MNRF, STATISTICS CANADA, MPAC

MAP CREATED BY: LK
MAP CHECKED BY: SCD
MAP PROJECTION:
NAD 1983 UTM Zone 17N

NORTH

PROJECT: 21-3053
STATUS: DRAFT
DATE: 2023-06-22

Figure Source: Town of Oakville Data, created by Dillon Consulting Limited.

Identified Risk: Group C – Residential Occupancies represent 91.77% of the Town's existing building stock, and over the five-year period from January 1, 2016, to December 31, 2020, were associated with 77.1% of the structure fires within the Town.

Table 4 illustrates a comparison of the Town's existing Group C - Residential Occupancy building stock with that of the Province based on the 2020 Statistics Canada Census.

Table 4: Group C – Residential Building Stock Comparison

Structural Dwelling Type	Town Total Number of Dwellings	Town Total Percentage of Dwellings	Ontario Total Number of Dwellings	Ontario Total Percentage of Dwellings
Single-detached house	43,130	58.6%	2,942,990	53.6%
Apartment in a building that has five or more storeys	8,955	12.2%	984,665	17.9%
Movable dwelling	0	0%	14,985	0.3%
Other attached dwellings[5]	21,470	29.2%	1,548,560	28.2%
Semi-detached house	3,310	4.5%	303,260	5.5%
Row house	12,470	16.9%	505,265	9.2%
Apartment or flat in a duplex	950	1.3%	181,030	3.3%

[5] The category 'Other attached-dwelling' is a subtotal of the following categories: semi-detached house, row house, apartment or flat in a duplex, apartment in a building that has fewer than five storeys and other single-attached house.

Structural Dwelling Type	Town Total Number of Dwellings	Town Total Percentage of Dwellings	Ontario Total Number of Dwellings	Ontario Total Percentage of Dwellings
Apartment in a building that has fewer than five storeys	4,680	6.3%	548,785	10.0%
Other single-attached house	60	0.08%	10,220	0.2%
Total	**73,560**	**100%**	**5,491,205**	**100.0%**

Table Source: 2021 Census, Statistics Canada[6]

This analysis highlights that the Town has a higher percentage of single detached dwellings – 58.6% compared to the Province of 53.6%. However, the Town has a similar number of other attached dwellings (29.2% compared to the Province of 28.2%). Within the other attached dwellings category, 16.9% is comprised of row housing, which is higher compared to the Province of 9.2%. Additionally, 12.2% of the Town's building stock is comprised of Apartments which are defined as buildings that have five or more storeys. Refer to **Section 3.3 – Building Density and Exposure** for more information.

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) lists building density as a key factor for understanding potential fire risk with particular consideration given to core areas (downtown). Closely spaced buildings, typical of historic downtown core areas and newer infill construction, may have a higher risk of a fire spreading to an adjacent exposed building. In a built-up area with minimal

[6] Statistics Canada. 2022. (table). Census Profile. 2021 Census of Population. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released April 27, 2022. Statistics Canada 2021 Census of Population Page (accessed May 2, 2022).

building setbacks, a fire originating in one building could extend to a neighbouring structure due to the close proximity.

The close proximity of buildings can also impede firefighting operations due to the limited access for firefighters and equipment.

As shown in **Table 4**, the Town has a similar percentage of other attached dwellings of 29.2% compared to that of the Province of 28.2%.

The Town has a number of existing areas where the presence of building density and potential exposure as a result of minimal setbacks should be highlighted. These include the area south of Station 1 at Bronte Road and Lakeshore Road West, North and east of Station 3 between Kerr Street and Trafalgar Road. Other notable areas include the area surrounding Sheridan College on Trafalgar Road and in the Uptown Core along Oak Park Boulevard. These areas contain mixed use occupancies, including some Group C – Residential and commercial uses. These areas may also be further impacted by infill construction and intensification. Existing residential areas that include other attached dwellings such as townhouses, row houses and apartments with less than five storeys should be highlighted for potential exposure risks.

Key Finding: The Town includes areas of building stock that have higher density and, as such, greater potential for exposure in the event of a fire.

3.4 Building Age and Construction

The OBC was adopted in 1975, and the Ontario Fire Code (OFC) was adopted in 1981. Together, these two codes have provided the foundation for eliminating many of the inconsistencies in building construction and maintenance that were present before adoption.

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

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

- Occupancy;
- exits/means of egress including signs and lighting;
- fire alarm and detection equipment;

- fire department access; and
- inspection, testing, and maintenance.

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

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

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

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

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

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

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

Fire Growth Rate	Time in Seconds to Reach 1 MW	Time in Seconds to Reach 2 MW
Slow	600 seconds	848 seconds
Medium	300 seconds	424 seconds
Fast	150 seconds	212 seconds

Source: OFM, Operational Planning: An Official Guide to Matching Resource Deployment and Risk Workbook.[7]

In addition to building construction, fire growth rate depends on the flammability of the materials and contents within the building which introduce variances into the growth rates presented above. The impact of increasing fire growth rates is directly related to the time lapse from ignition to flashover when the combustible items within a given space reach a temperature that is sufficient high for them to auto-ignite. The graph in **Figure 7** (below) highlights the exponential increase in fire temperature and the potential for loss of property/loss of life with the progression of time.

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

Figure 7: Fire Propagation Curve

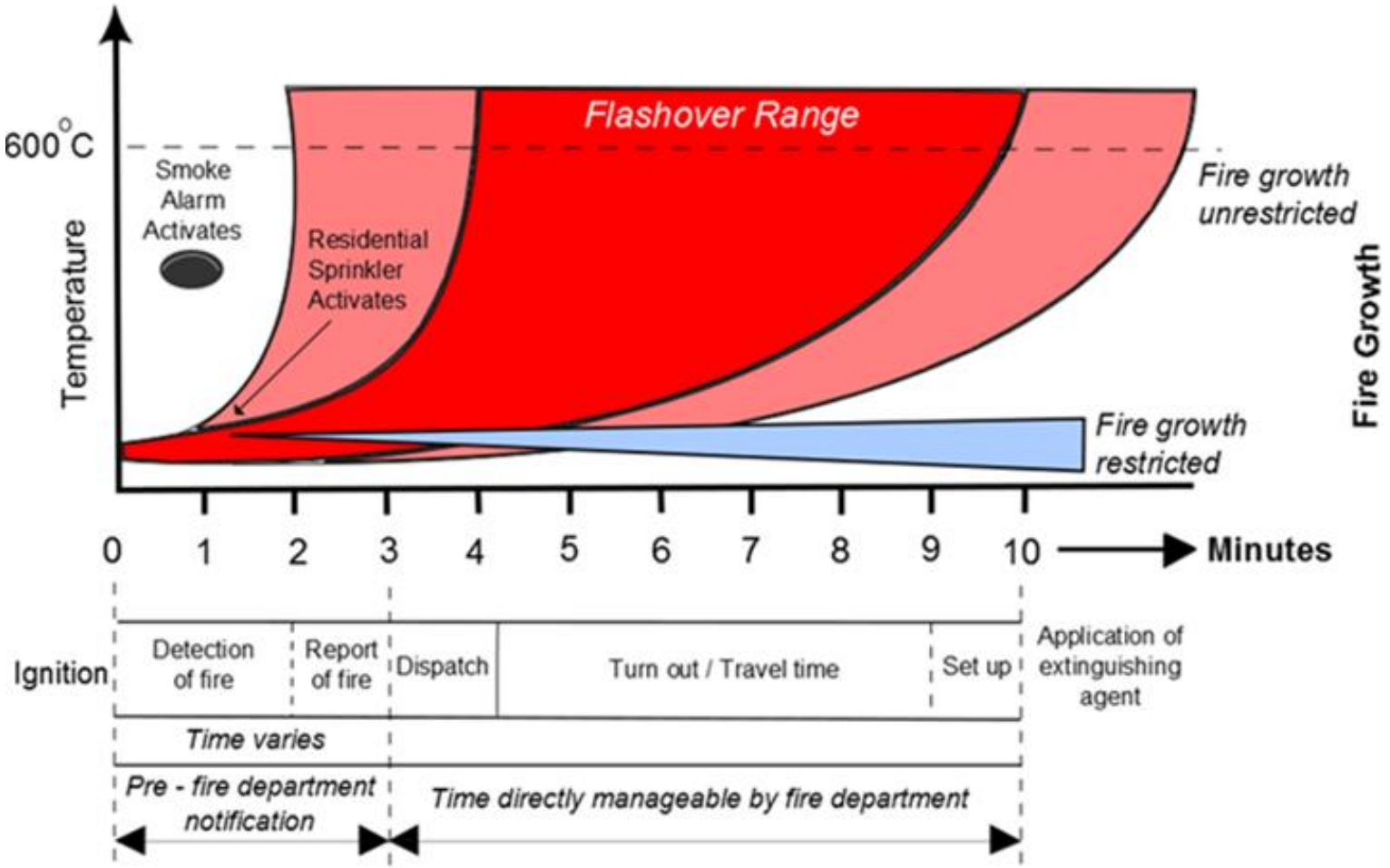


Figure Source: Fire Underwriters Survey "Alternative Water Supplies for Public Fire Protection: An informative Reference Guide for Use in Fire Insurance Grading" (May 2009) and NFPA "Fire Protection Handbook" (2001).

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 Community Risk Assessment. We note that tall buildings in Oakville have been subject to the OBC Part 9 Retrofit process, which provides for the upgrading of fire and life safety components of the buildings through retrofit.

Figure 8 illustrates the age of residential buildings (2021 Census Data) within the Town prior to the new codes. This analysis indicates that 27.03% of the Town's residential building stock was built prior to 1981, preceding the adoption of the 1981 OFC. This represents a fire risk within the community. **Figure 9** illustrates the spatial distribution of building age for all occupancy types in the Town. This figure shows that the majority of buildings located south of the QEW, between Bronte Road in the east and Winston Churchill Boulevard in the west, were built prior to 1981. The cluster of older buildings south of the QEW represent a fire risk within the community.

Figure 8: Period of Construction of Residential Dwellings – Oakville

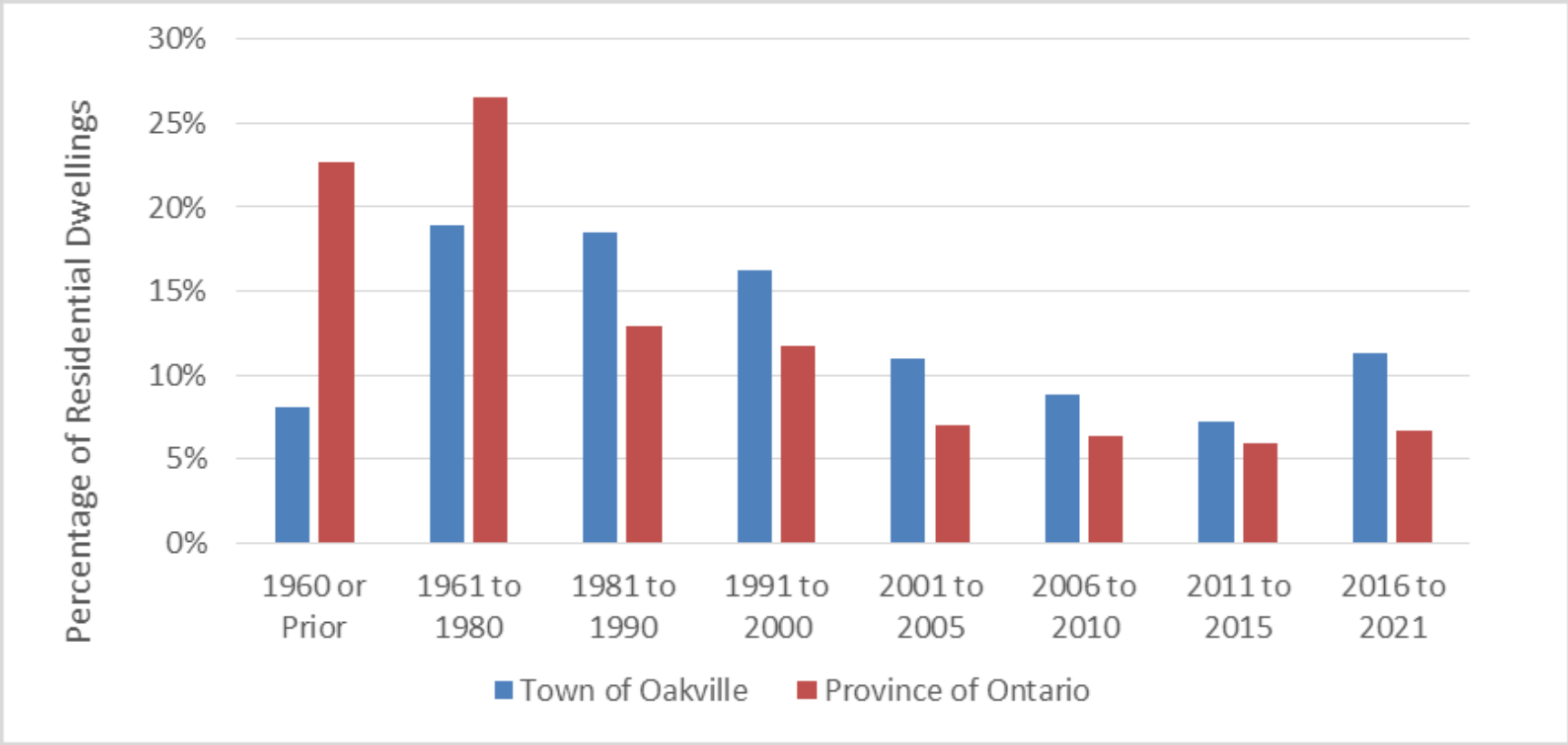


Figure Source: 2021, Census, Statistics Canada[8]

[8] Statistics Canada. 2022. (table). Census Profile. 2021 Census of Population. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released December 15, 2022.
https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (accessed January 11, 2023)

Figure 9: Building Age – All Occupancy Types, Town of Oakville

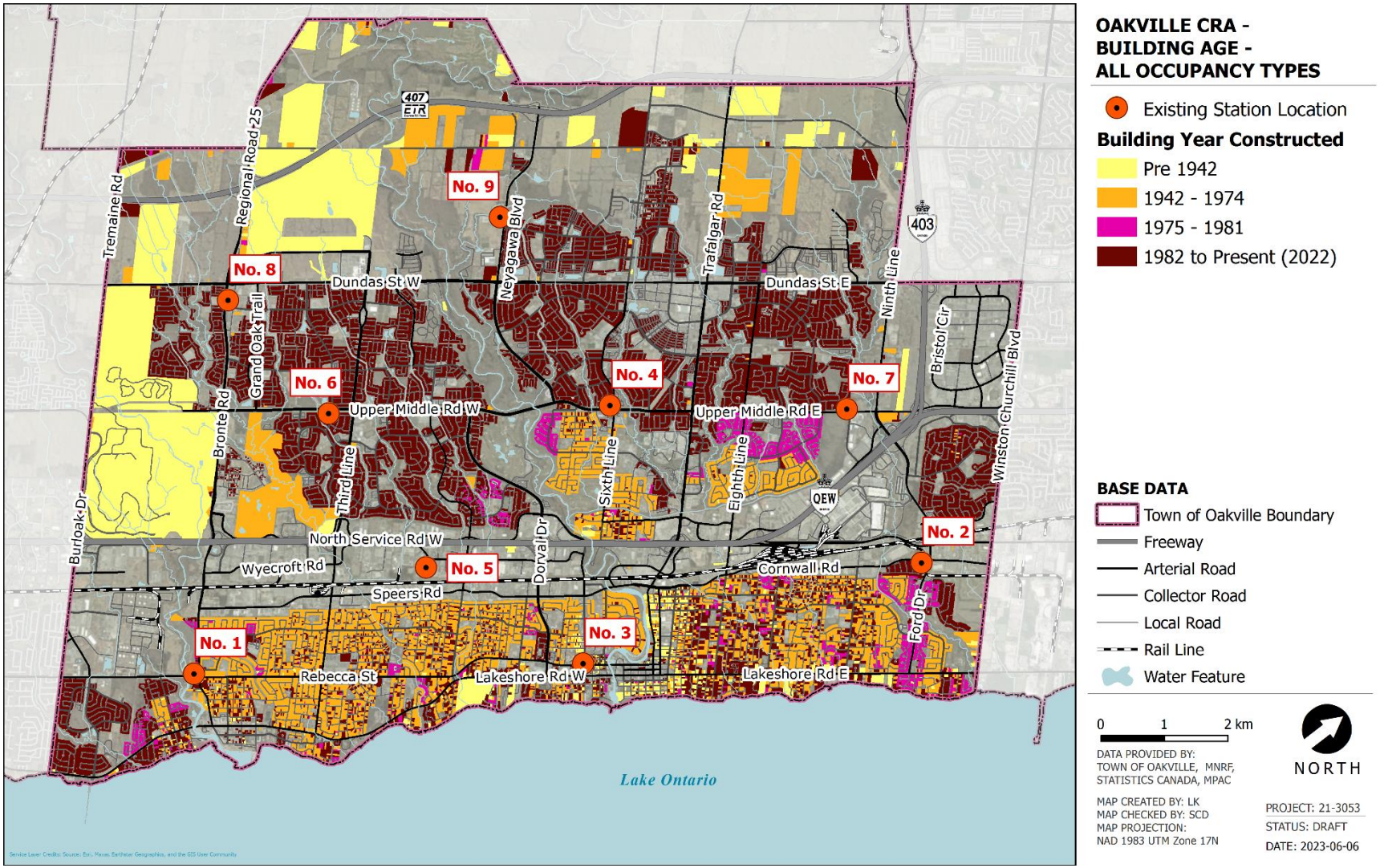


Figure Source: Town of Oakville Data, created by Dillon Consulting Limited

Identified Risk: The 2021 Census data indicates that 27.03% of the Town's Group C – Residential building stock was built prior to the introduction of the 1981 OFC.

3.4.1 Lightweight Construction

As of February 25, 2022, the OFM provided direction that requires available information documenting the presence and location of truss and lightweight wood frame construction systems (referred to as lightweight construction) be used to inform pre-planning activities by fire departments. Buildings with lightweight construction are considered a safety risk to responding firefighters as they are known to be susceptible to premature failure and rapid collapse under fire conditions. Pre-plans provide responding fire departments with awareness of the presence of lightweight construction, providing opportunity for proactive fire response strategies to protect the safety of responding firefighters.

The Town is working to identify buildings with lightweight construction, which have been constructed using wood framing. It is anticipated that OFD will continue to collect and document information on buildings with lightweight construction. This information can be updated within the CRA during the annual review and updating process. It is also anticipated that OFD will apply this information to their pre-planning program. Pre-planning will be discussed further within the Fire Master Plan.

Key Finding: The Town has several areas of new construction that can be assumed to include lightweight wood frame construction.

3.5 Building Height and Area

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

This can have a dramatic effect on smoke permeation throughout the common areas and individual units within the building. This can be directly related to the high percentage of deaths that occur in high-rise buildings as a result of smoke inhalation.

The nature of taller buildings also brings the presence of higher occupant loads and higher fuel loads due to the quantity of furnishings and building materials.

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

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

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

The following fire safety features of high buildings are required by the OBC for new buildings, and the OFC 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); and
- Fire protection system (automatic sprinklers, standpipes and hose cabinets, fire pumps, fire extinguishers, etc.).

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

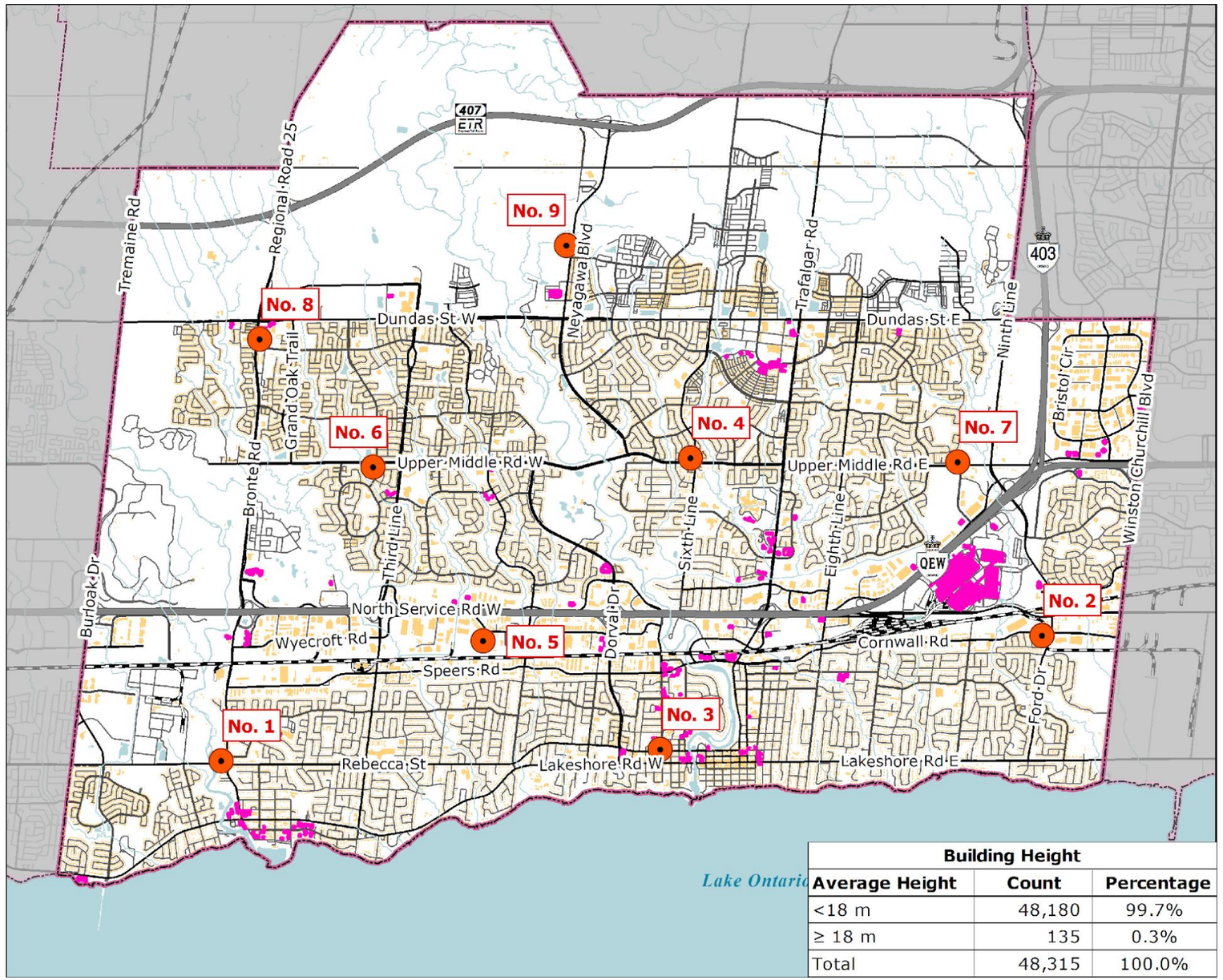
3.5.1 Mapping Building Height

As part of the data provided for this CRA, the Town provided building height data from which buildings with a height greater than 18 metres were identified, reflecting a high-rise occupancy as per Section 3.2.6 of the OBC for the purposes of this analysis, it has been assumed that buildings under 18 metres (roughly five storeys or less) are not considered high-rise. Buildings identified with a height at or in excess of 18 metres are illustrated in **Figure 10**.

In total, 135 buildings, as defined by the OBC, were identified as high-rise buildings. As shown, the buildings identified as high-rise are distributed throughout the urban area of the Town, primarily south of the QEW and north of Royal Windsor Drive. There are notable clusters of high-rise buildings located south of Station 1 at Bronte Road and Lakeshore Road West and east of Station 3 along Kerr Street south of Speers Road.

Identified Risk: The Town currently has 135 buildings defined by the OBC as high-rise buildings with a floor level 18 metres (59 feet) above grade, or six storeys. These buildings are distributed throughout the urban area.

Figure 10: Building Height



OAKVILLE CRA - BUILDING HEIGHT - ALL OCCUPANCY TYPES

Existing Station Location

Average Building Height

- < 18 m
- ≥ 18 m

BASE DATA

- Town of Oakville Boundary
- Freeway
- Arterial Road
- Collector Road
- Local Road
- Rail Line
- Water Feature

Note:
14,106 of the 62,421 building footprints within the municipality were not assigned height through this analysis

Building Height		
Average Height	**Count**	**Percentage**
<18 m	48,180	99.7%
≥ 18 m	135	0.3%
Total	48,315	100.0%

0 1 2 km

DATA PROVIDED BY:
TOWN OF OAKVILLE, MNRF, STATISTICS CANADA, MPAC

MAP CREATED BY: LK
MAP CHECKED BY: SCD
MAP PROJECTION:
NAD 1983 UTM Zone 17N

NORTH

PROJECT: 21-3053
STATUS: DRAFT
DATE: 2023-06-28

Figure Source: Town of Oakville Data, Created by Dillon Consulting Limited

3.5.2 Building Area

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

As part of the data collection process, Town staff were able to provide building footprint data for the Town of Oakville. The information presented in **Table 6** indicates that the majority of the Town's building stock (83.1%) has a total building area (footprint) of 2,500 square feet or less. This summary also indicates that 0.3% (217) buildings have an area greater than 50,000 square feet or approximately 4,655 square metres.

Table 6: Building Area

Building Size (Square Feet)	# of Buildings	% of all Buildings
0 to 2,500	51,890	83.1%
2,501 to 5,000	7,371	11.8%
5,001 to 10,000	1,934	3.1%
10,001 to 20,000	594	1.0%
20,001 to 50,000	415	0.7%
More than 50,000	217	0.3%
Total	**62,`421**	**100.0%**

Source: Town of Oakville

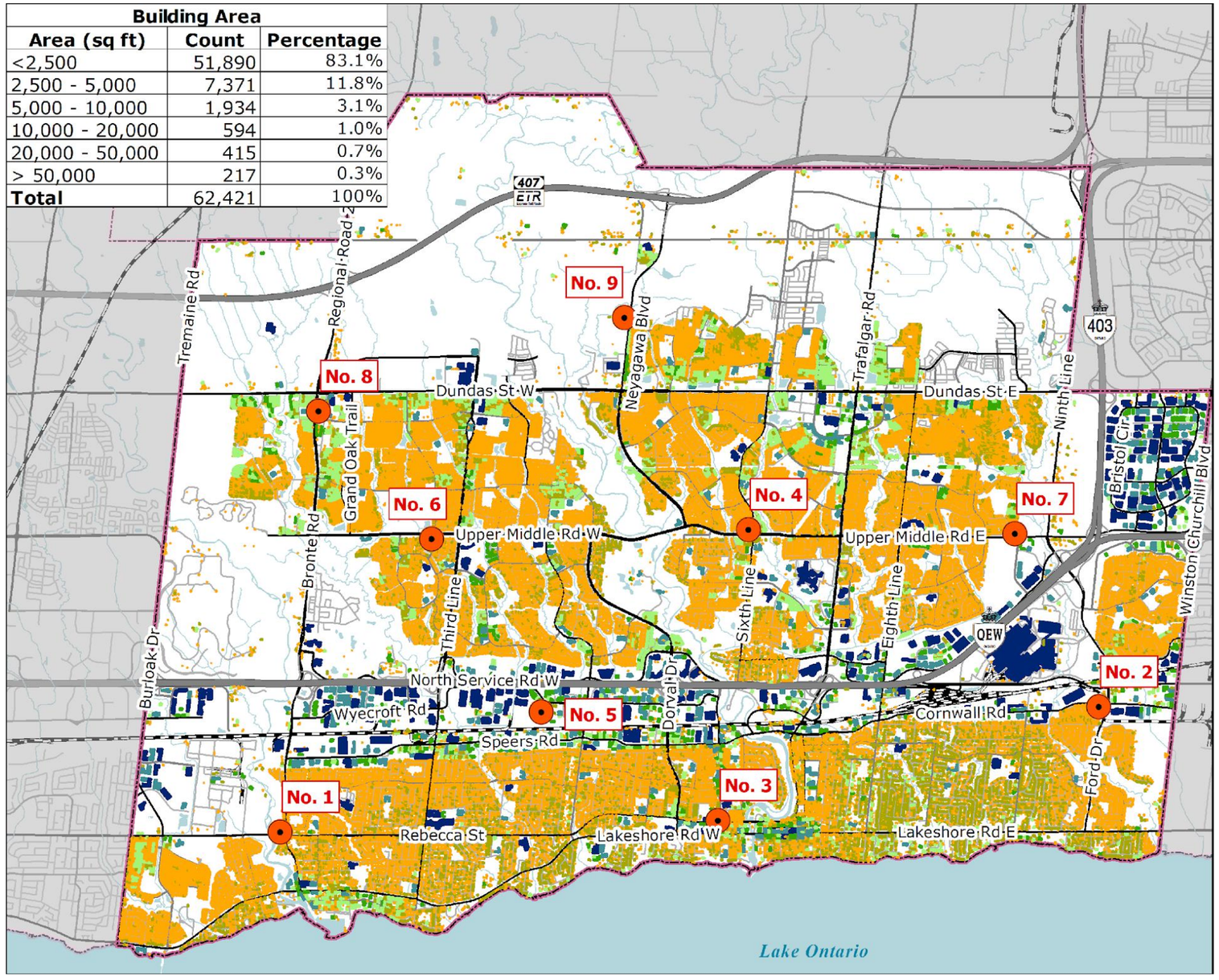
3.5.2.1 Mapping Building Area

Figure 11 illustrates that the buildings with a larger footprint are dispersed mainly through the urban and industrial areas of the Town. The buildings with a footprint of 50,000 square feet or more align with the industrial and employment areas adjacent to the QEW and Highway 403 and along Speers Road, Cornwall Road and Bristol Circle as seen in **Figure 1** and **Figure 2** of **Section 2.1 – Geographical Snapshot of Oakville**.

Identified Risk: The Town has 217 buildings with a total building area (footprint) that exceed 50,000 square feet (4,655 square metres). These buildings are predominantly located in the Business Industrial and Employment Corridor land use designations along the QEW, Highway 403, Bristol Circle, Cornwall Road, and Speers Road.

Figure 11: Building Area Locations

Building Area		
Area (sq ft)	**Count**	**Percentage**
<2,500	51,890	83.1%
2,500 - 5,000	7,371	11.8%
5,000 - 10,000	1,934	3.1%
10,000 - 20,000	594	1.0%
20,000 - 50,000	415	0.7%
> 50,000	217	0.3%
Total	62,421	100%



OAKVILLE CRA - BUILDING AREA

Existing Station Location

Building Area (sq ft)

- < 2,500
- 2,501 - 5,000
- 5,001 - 10,000
- 10,001 - 20,000
- 20,001 - 50,000
- > 50,000

BASE DATA

- Town of Oakville Boundary
- Freeway
- Freeway Ramp
- Arterial Road
- Collector Road
- Local Road
- Rail Line
- Water Feature

0 1 2 km

DATA PROVIDED BY: TOWN OF OAKVILLE, MNRF, STATISTICS CANADA

MAP CREATED BY: LK
MAP CHECKED BY: SCD
MAP PROJECTION: NAD 1983 UTM Zone 17N

NORTH

PROJECT: 21-3053
STATUS: DRAFT
DATE: 2023-06-28

Figure Source: Town of Oakville Data, created by Dillon Consulting Limited .

3.6 High Hazard Occupancies

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

3.6.1 High Hazard Occupancies

The OFD staff have identified 35 high hazard occupancies. The high hazard occupancies that were identified are listed in **Table 7** below. The high hazard occupancies are distributed across the Town and are associated with industrial and commercial uses.

Table 7: High Hazard Occupancies

Street #	Street Name	Facility Name/Organization
2770	Coventry Road	Virox Technologies Inc.
2140	Winston Park Drive	2140 Winston Park Drive
1155	South Service Road West	Recycling Facility
1201	North Service Road West	Recycling Facility
2725	Bristol Circle	Beachcomber Hot Tubs
1209	North Service Road East	Waste Connections of Canada
1252	Speers Road	Fireworks Canada
460	Wyecroft Road	Min-Chem Canada Ltd.
1257	Speers Road	1257 Speers Road
750	Weller Court	750 Weller Court
2714	Bristol Circle	Pinty's Delicious Foods
2225	Winston Park Drive	Tiama Extract

Street #	Street Name	Facility Name/Organization
2001	Speers Road West	Procor Limited
3280	South Service Road West	Burloak Technologies Inc.
1485	Speers Road	JemPack
801	McPherson Road	Suncor Bronte Distribution Terminal
2335	Speers Road	Monarch Plastics Corporation
2351	Upper Middle Road East	David Roberts Foods
2275	Bristol Circle	Composites One LLC
1400	South Service Road West	B F Goodrich
2860	Plymouth Drive	Polar Performance Materials
1	The Canadian Road	Oakville Assembly Complex
2481	Royal Windsor Drive	Mancor Canada Inc
1218	South Service Road West	Iron Mountain
2670	Plymouth Drive	Television Production Set
2195	North Service Road West	Mid-Halton Wastewater Treatment Plant
2510	Hyde Park Gate	Canadian Tire
400	Dundas Street East	Canadian Tire
1100	Kerr Street	Canadian Tire
3300	South Service Southwest	The Home Depot
2555	Bristol Circle	The Home Depot
99	Cross Avenue	The Home Depot
2311	Royal Windsor Drive	RONA Oakville
399	Speers Road	RONA Oakville
1465	Wallace Road	Chemtec International

Source: OFD

In addition to ensuring compliance to the requirements of the OBC and the OFC, there are operational strategies that a fire service can implement to address high hazard occupancies and 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.

Key Finding: OFD identified 35 High Hazard Occupancies within Oakville.

3.7 Occupancies with Potential High Fire Life-Safety Risk

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

3.7.1 Registered Vulnerable Occupancies

From an occupancy perspective, vulnerable occupancies contain vulnerable individuals who may require assistance to evacuate in the event of an emergency due to cognitive or physical limitations, representing a potential high-life safety risk. As part of its registry of vulnerable occupancies, the OFM defines vulnerable occupancy as any care occupancy, care and treatment occupancy, or retirement home regulated under the Retirement Homes Act.

These occupancies house individuals such as seniors or people requiring specialized care. 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.

Ontario Regulation 150/13: Fire Code, which amends **Ontario Regulation 213/07: Fire Code**, identifies vulnerable occupancies as care, care and treatment and retirement homes. This includes hospitals, certain group homes and seniors' residences and long-term care facilities. This regulation requires fire departments to perform annual inspection, approve and witness fire drill scenarios and file certain information regarding the occupancy with the Fire Marshal's office. A list of vulnerable occupancies is presented in **Table 8.** The geographic locations of these buildings are shown in **Figure 12.**

Table 8: Vulnerable Occupancies

Address	Building Name
380 Sherin Drive	Vistamere Retirement Residence
2222 Lakeshore Road West	Oakville Senior Citizen Residence
160 Bronte Road	Amica At Oakville
430 Winston Churchill Boulevard	Ian Anderson House
299 Randall Street	Trafalgar Lodge Residence Home
456 Trafalgar Road	Sunrise Assisted Living
345 Church Street	Churchill Place
25 Lakeshore Road West	The Kensington
53 Bond Street	Central West Specialized Development Services
37 Bond Street	Acquired Brain Injury Services
291 Reynolds Street	Wyndham Manors LTCC
203 Georgian Drive	Post Inn Village
180 Oak Park Boulevard	Chartwell Classic Oakville Retirement Residence
2140 Baronwood Drive	The Waterford Retirement Residence
2370 Third Line	West Oak Village LTCC
1459 Nottingham Gate	Oakville Trafalgar Memorial Hospital
3136 Dundas Street West	Palermo Village
496 Postridge Drive	Northridge Long Term Care
2160 Baronwood Drive	Chartwell Waterford Retirement Residence
407 Iroquois Shore Road	Infinity Care Homes Inc.
2370 Speers Road	Acclaim Health
1 Sixteen Mile Drive	VIVA Oakville Retirement Community
259 Robinson Street	March of Dimes
152 Wilson Street	Lion’s Dog Guides
2250 Speers Road	Acclaim Health
1434 Bridge Road	Oakville Community Living
188 Nelson Street	Oakville Community Living
1198 Rebecca Street	Oakville Community Living
221 Southwood Court	Oakville Community Living
225 Southwood Court	Oakville Community Living
319 Sherin Drive	Oakville Community Living
461 Sandmere Place	Oakville Community Living
356 Sayer Road	Oakville Community Living
238 Third Line	Oakville Community Living
246 Third line	Oakville Community Living

Address	Building Name
3138 Victoria Street	Oakville Community Living
2493 Waterford Street	Oakville Community Living
1383 Willowdown Road	Oakville Community Living
48 Washington Road	Oakville Community Living
314 Pinegrove	Oakville Community Living
298 Pinegrove	Oakville Community Living
1083 Pinegrove	Oakville Community Living
135 Caulder Avenue	Christian Horizons
300 Hickory Circle	Christian Horizons
403 Parklane Road	Christian Horizons
553 Lees Lane	Christian Horizons
1512 Rebecca Street	Central West Specialized Development Services
1486 Grand Boulevard	Central West Specialized Development Services
2160 8th Line	Latitude Child & Youth Services
532 Glenashton Drive	Latitude Child & Youth Services
396 Riverside Drive	Latitude Child & Youth Services
2775 Kingsway Drive	Oakville Childrens Home Ltd.
367 Glenashton Drive	Oakville Childrens Home Ltd.
484 Seaton Drive	Safe Management Group
261 Weighton Drive	Safe Management Group
260 Third Line	Safe Management Group
531 Swann Drive	Safe Management Group

Source: OFD

As indicated by the OFD, there are 59 vulnerable occupancies in the Town of Oakville. These include care occupancies, care and treatment occupancies and retirement homes. The areas east of Station 1 and Station 3 are shown to have higher numbers of vulnerable occupancies compared to other areas of the Town.

Identified Risk: The Town of Oakville currently has 59 registered vulnerable occupancies.

Figure 12: Locations of Vulnerable Occupancies

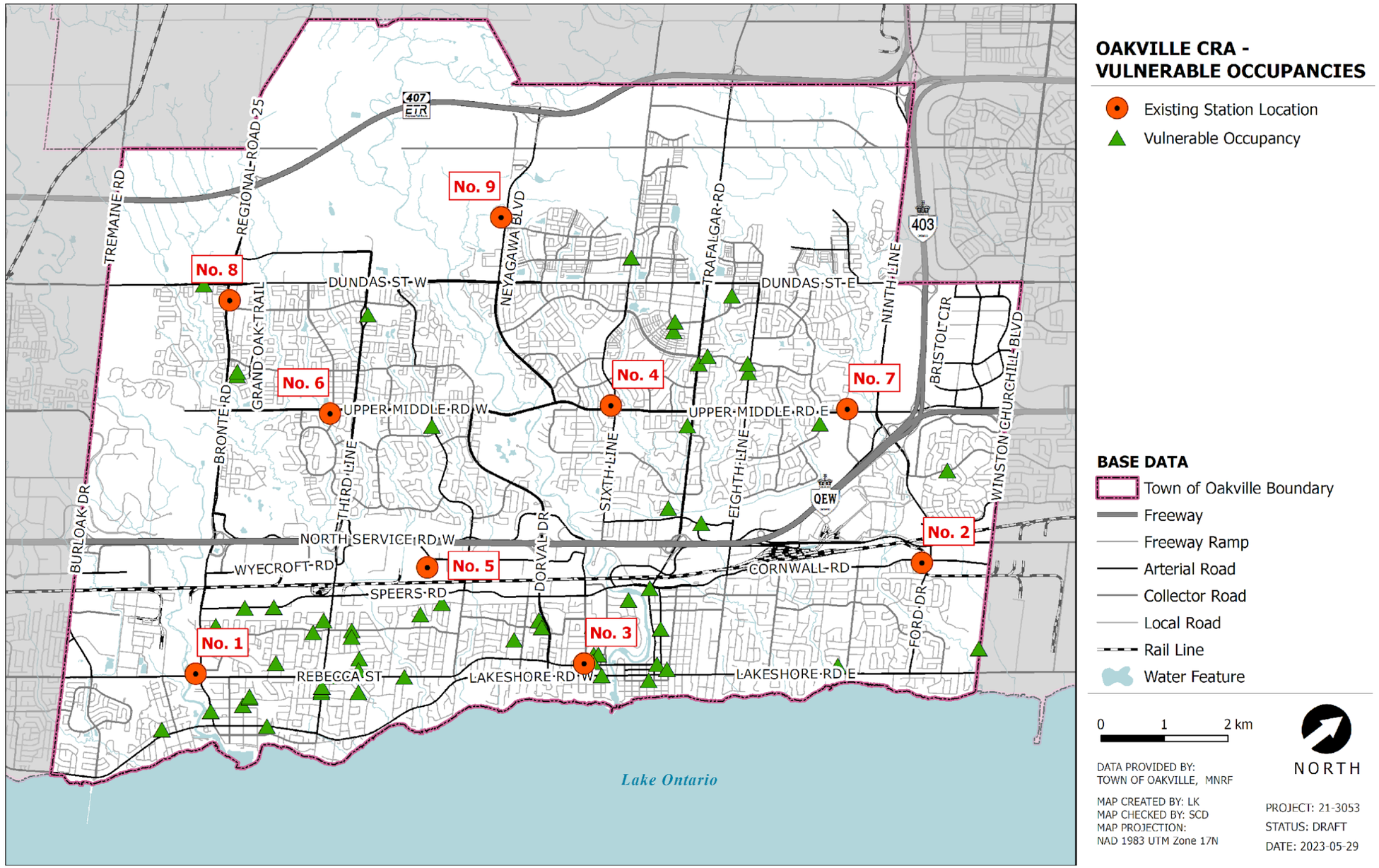


Figure Source: Town of Oakville Data, created by Dillon Consulting Limited

3.7.2 Other High Fire Life Safety Risk Occupancies

From the perspective of risk, and for the purposes of the services provided by the fire department, including enhanced and targeted fire inspections and public education programming, it can be valuable for a fire department to identify additional potential high fire life-safety risk considerations, including day care facilities and schools, where due to their age, children may have cognitive or physical limitations to preventing or delaying self-evacuation in the event of an emergency. For the purposes of this CRA, potential high life-safety risk occupancy considerations include schools and licensed day care facilities. Analysis of data provided by the OFD identified that there are 85 schools (elementary, secondary, and private combined) and 122 licensed daycares.

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

(Some of these activities are now legislated responsibilities under **O. Reg. 150/13: Fire Code** for those facilities classified as vulnerable occupancies.)

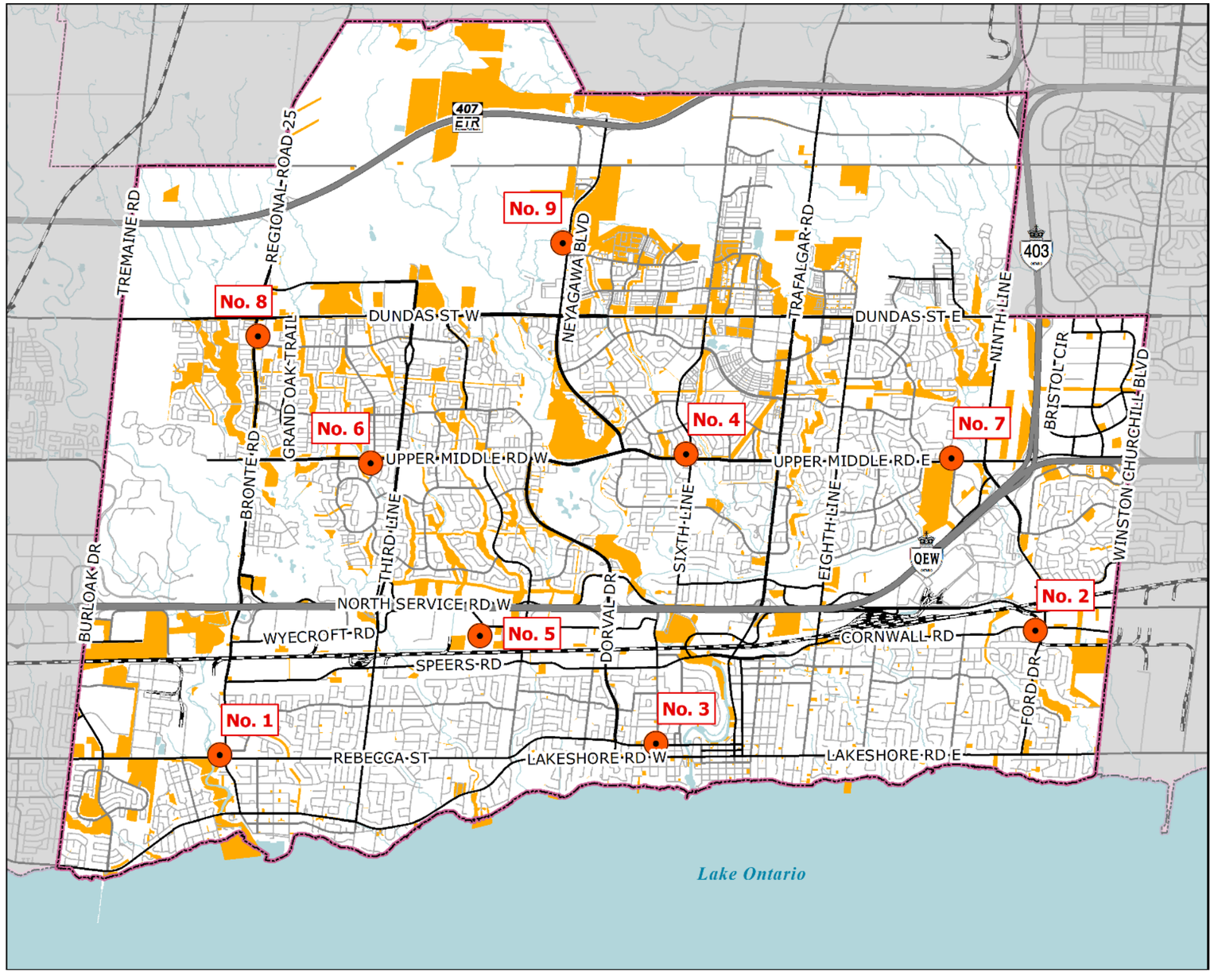
Key Finding: In addition to registered vulnerable occupancies, the Town has 85 schools and 122 identified licensed daycares, representing higher fire life-safety risks due to the number of children attending these facilities.

3.7.3 Vacant Buildings/Properties

Information provided by the Town indicates that there are a number of vacant buildings located throughout the community. The spatial distribution of the properties where these buildings are located is illustrated in **Figure 13** below. Vacant buildings can pose a fire risk for several reasons such as lack of building fire detection and sprinkler system maintenance, occupancy by unauthorized people or a degeneration of the building structure as a result of weather and lack of use.

Key Finding: The Town has identified a number of vacant buildings that may pose a fire risk.

Figure 13: Vacant Properties



OAKVILLE CRA - VACANT PROPERTIES

- Existing Station Location
- Vacant Properties (MPAC)

BASE DATA

- Town of Oakville Boundary
- Freeway
- Arterial Road
- Collector Road
- Local Road
- Rail Line
- Water Feature

0 1 2 km

DATA PROVIDED BY:
TOWN OF OAKVILLE, MNRF, STATISTICS CANADA, MPAC

NORTH

MAP CREATED BY: LK
MAP CHECKED BY: SCD
MAP PROJECTION:
NAD 1983 UTM Zone 17N

PROJECT: 21-3053
STATUS: DRAFT
DATE: 2023-05-29

Figure Source: Town of Oakville Data provided MPAC Data, created by Dillon Consulting Limited.

3.8 Historic or Culturally Significant Buildings

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

The Town of Oakville regulates a number of heritage homes and properties through the municipal register under the Ontario Heritage Act. The Town of Oakville Heritage Properties Register lists a total of 901 properties of known heritage resources, endorsed by Town Council. Of the 901 properties, 609 are designated under PART IV and V of the Ontario Heritage Act for their cultural value or interest.[9]

The Town has four notable Heritage Conservation Districts: Old Oakville Heritage Conservation District, First and Second Street Heritage Conservation District, Trafalgar Road Heritage Conservation District and the Downtown Oakville Heritage Conservation District. Pre-fire planning activities increase fire department personnel familiarity with buildings and areas of special interest. A fire department can help reduce the risk of fire within heritage properties through regularly scheduled fire safety inspections, enforcement of the OFC, regular review of fire safety plans for accuracy and encouraging facility owners to upgrade facilities as needed.

Key Finding: There are a large number of identified heritage buildings within Oakville, many of which were constructed prior to the introduction of the OFC.

[9] Heritage Register. (2022). Town of Oakville. Retrieved from https://www.oakville.ca/business/heritage-properties.html

4.0 Critical Infrastructure Profile

As referenced in **O. Reg. 378/18**, the critical infrastructure profile assessment includes analysis of the capabilities and limitations of critical infrastructure, including electrical distribution, water distribution, telecommunications, hospitals and airports. The following section considers these critical infrastructure characteristics within the Town of Oakville.

4.1 Critical Infrastructure in Oakville

Ontario's Critical Infrastructure Assurance Program defines critical infrastructure (CI) as "interdependent, interactive, interconnected networks of institutions, services, systems and processes that meet vital human needs, sustain the economy, protect public health, safety and security, and maintain continuity of and confidence in government."[10] The program also sets out ten critical infrastructure sectors, namely: continuity of government, financial institutions, food, water, health, energy and utilities, public safety and security, telecommunications, manufacturing and transportation networks. Infrastructure is a complex system of interconnected elements whereby failure of one could lead to the failure of others. The vulnerability of infrastructure is often connected to the degree to which one infrastructure component depends upon another. Therefore, it is critical that these elements be viewed in relation to one another and not in isolation.

For the purposes of this CRA, general considerations and concerns related to each CI sector as it pertains to the provision of fire protection services for each critical infrastructure sector are included in **Table 9**. Oakville specific CI concerns are described in greater detail within the text.

[10] Ministry of the Solicitor General. (2017). Critical Infrastructure. Retrieved from Emergency Management Ontario website

Table 9: Critical Infrastructure Considerations

CI Sector	Fire Related Issues/Concerns
Energy and Utilities	Within the Town of Oakville, Oakville Hydro ElectriTown Distribution Inc. and Hydro are the electriTown provider. Natural Gas is provided by Enbridge Gas. Energy and utility infrastructure is significant from the perspective of fire protection services for the following reasons: • The oil and natural gas subsector presents operational hazards to first responders, including spills and personal injury, firefighter exposure to toxic or hazardous materials via inhalation, skin contact, and/or ingestion; • There is potential for explosion and/or fire; • Gas and oil supply could be limited across the Town in the event of an emergency incident; • Firefighter safety considerations when responding to a fire at an electrical substation (e.g., high voltage electrical hazards and the presence of chemical hazards that are used to cool electrical conductors); and • Disruption to the electrical distribution system could disrupt emergency communication systems, or municipal power supply leading to a wide range of public health and safety concerns, requiring fire department assistance.
Finance	Financial infrastructure can include institutions such as banks or credit unions or automated teller machines (ATMs). In the event of a significant emergency, residents may not have access to their financial institutions and banking services.

CI Sector	Fire Related Issues/Concerns
Food	Food related infrastructure can include agriculture, major distribution centres or grocery stores, for example. Grocery stores and food distribution centres typically contain large amounts of ammonia used as a component of refrigeration systems. Fire responders should be aware of dangers related to an ammonia release and response protocols.
Government	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.
Health	Oakville Trafalgar Memorial Hospital is the only hospital within the Town, but there is one hospitals nearby in the City of Mississauga. A fire at a hospital would require complex evacuation procedures for a large number of immobile and medical device dependant individuals. Health care infrastructure is also significant from the perspective of fire protection services because a health-related emergency can increase demand for health care services, specifically ambulance services and medical response (e.g., tiered response).
Information and Communication Technology	There are several radio communication towers within Oakville. If wires or towers are compromised, the ability to communicate with emergency personnel could be extended, possibly leading to extended emergency response times.
Manufacturing	According to the 2021 Statistics Canada Census, manufacturing in the Town of Oakville accounts for 6.78% of local industry (see **Section 9.1 – Economic Sectors and Employers in** Oakville). 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.

CI Sector	Fire Related Issues/Concerns
Safety	There are nine fire stations in Oakville. Frequent or extreme emergency events could increase demand for emergency response services affecting the response capacity of the fire department.
Transportation	**Rail** The Town of Oakville has one prominent rail line that transects the community, operated by GO Transit. We note that there are two other rail lines: a CN rail line to the West and a CP rail line to the north. Although they are not within the boundaries of Oakville, they may create a risk due to their proximity to the Town and prevailing winds. 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; and • Major incidents resulting in long term recovery could delay daily shipment of goods and services, with potential negative affects to local economy.

CI Sector	Fire Related Issues/Concerns
Transportation	**Roads and Highways** Oakville is intersected by a number of provincial highways including Highway 403/QEW, Highway 407. In addition to the Provincial highways, the Town's road network is comprised of local, collector, arterial (Regional) and rural roads. Major highways 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; and • Traffic hazards (distracted drivers, high speed movement) present safety considerations for responding crews.
Transportation	**Air** Airports also present unique hazards related to aircraft and supporting infrastructure. In addition to those using this type of transportation these hazards can include aircraft crash incidents, the use of aircraft fuel and the transportation of dangerous goods. There are no airports in the Town of Oakville. However, there is a Heliport located at Oakville Trafalgar Memorial Hospital. Toronto Pearson International Airport is located east of Oakville's municipal boundary, in the City of Mississauga.

CI Sector	Fire Related Issues/Concerns
Water	Halton Region is responsible for treating and disinfecting drinking water for the Region. In addition to the Region, the Town of Oakville is also responsible for the operation and maintenance of the water distribution system with the Town, including watermains, valves, service connections and fire hydrants. Water supply is an essential component of firefighting and is accessible to the fire department through hydrant systems. A water supply shortage or damage to the distribution system could impede the fire department's ability or use of these systems. There are fire department considerations to areas without adequate water flow and supply (hydrants). These are discussed further in **Section 4.1.1 – Water Infrastructure – Hydrants** below.

4.1.1 Water Infrastructure – Hydrants

Oakville has a water supply system consisting of water treatment, water storage, and distribution, as well as numerous fire hydrants mostly in the urban area of the Town.

Water supply is essential for firefighting, accessible to the fire department through municipal water delivery systems, or the fire department itself (tanker shuttles). Equally important to the presence of water supply is the quantity of water available for fire protection purposes, referred to as fire flow. As described in the NFPA Glossary of Terms (2019 Edition), fire flow is "the flow rate of water supply measured at 20psi (137.9 kPa) residual pressure, that is available for firefighting." The control of structure fires in urban areas are typically delivered by hose lines supplied by a local water delivery system via hydrants.

A water supply shortage or water system disruption could impede the flow rate of water delivered to hydranted areas resulting in inadequate water supply and distribution needed for the delivery of fire protection services.

Where no municipal water systems exist, supplementary water supply sources are considered. It is a common occurrence for rural and undeveloped areas, not to have pressurized hydranted water supply systems.

Figure 14 illustrates the location of fire hydrants throughout Oakville and as shown, they are found primarily in the urban area of the Town. Alternatively, water for firefighting purposes may be provided by tanker shuttle and the use of reliable and accessible local water supplies, such as fire ponds if there was one on the property. According to the Fire Underwriter's Survey, an Accredited Superior Tanker Shuttle Service is a recognized equivalency to hydrant protection if it meets all the requirements for accreditation. In areas without municipal water supply, a fire department should consider a water servicing strategy or formal plan for those areas requiring water flow for firefighting. Oakville Fire Department does not currently hold Superior Tanker Shuttle Accreditation. If additional water tankers are required, Oakville Fire Department will call mutual aid for a tanker shuttle. Fire hydranted areas are discussed further in the Fire Master Plan Report.

Figure 14: Hydrants

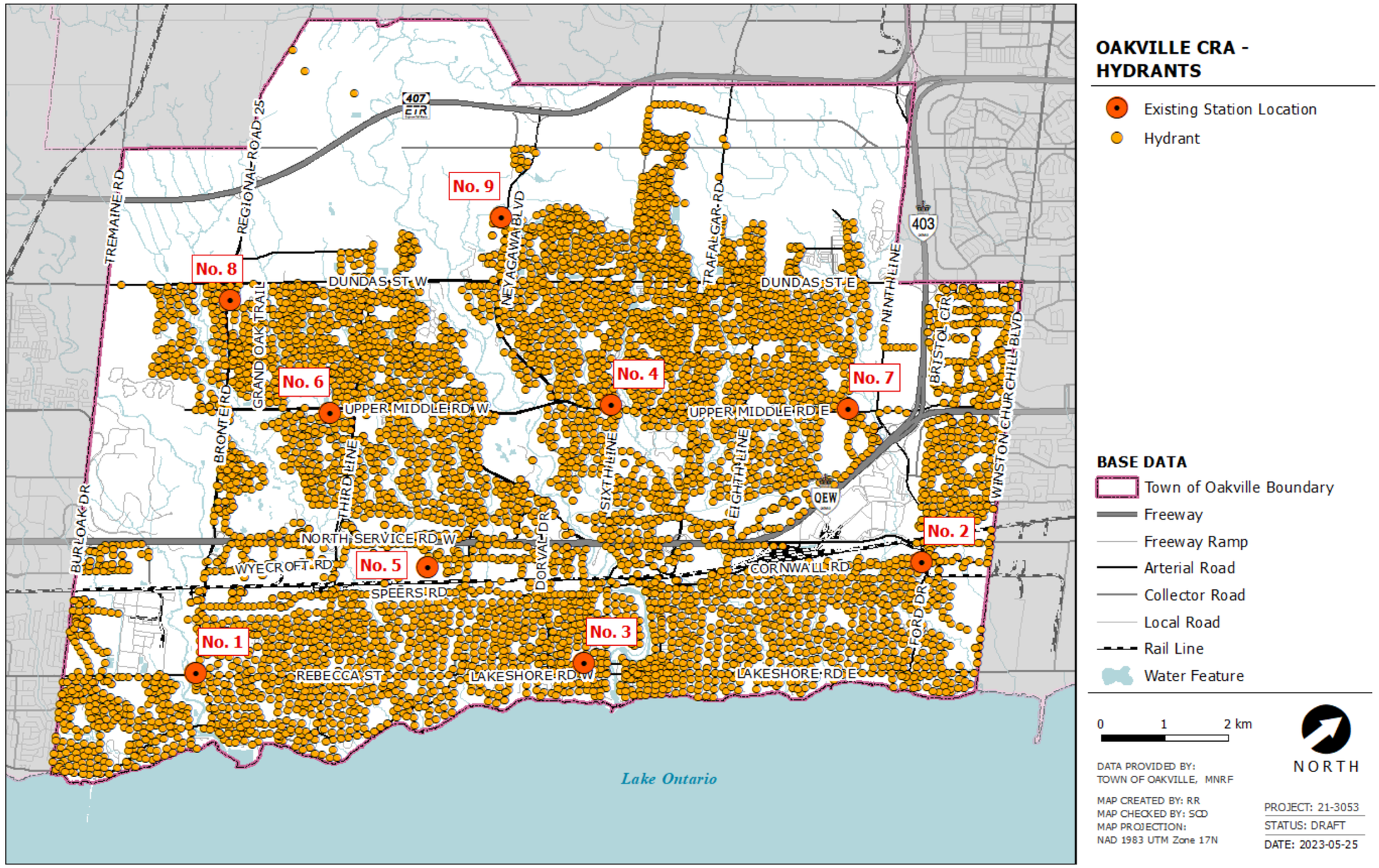


Figure Source: Town of Oakville Data, created by Dillon Consulting Limited.

4.1.2 Airport

Airports and airline facilities facilitate the movement of material goods and people, serving as gateways of connectivity to other municipalities and regions that can contribute to the economic growth and development of the Town. They play an essential role in trade, commerce and product distribution and provide a major mechanism through which people travel. Airports also present unique hazards related to aircraft and supporting infrastructure. In addition to those using this type of transportation these hazards can include the use of aircraft fuel and the transportation of dangerous goods.

Although, not located within the municipal boundary, there is a Heliport located the Oakville Trafalgar Memorial Hospital and one airport located in an adjacent municipality. Toronto Pearson International Airport is located east of Oakville in the City of Mississauga. The airport serves the Toronto metropolitan area by providing domestic and international flights. Fire Station 2 and 7 are the closest station that can provide fire protection services to Toronto Pearson International Airport.

Special Consideration: The Toronto Pearson International Airport and the Heliport at the Oakville Trafalgar Memorial Hospital both present a number of unique fire related risks associated with aircraft, supporting infrastructure and the potential transportation of dangerous gods requiring specialized fire protection services.

5.0 Demographic Profile

As referenced in **O. Reg. 378/18**, the demographic profile assessment includes analysis of the composition of the community's population, such as population size and dispersion, age, gender, cultural background, level of education, socioeconomic make-up and transient population. The following sections consider these demographic characteristics within the Town of Oakville.

5.1 Population and Dispersion

Over a twenty-year period (2001 to 2021), the Town of Oakville's population and total private dwellings has steadily increased. **Table 10** shows the rate of increase for both the population and total private dwellings.

Table 10: Historic Growth in Population and Households – Oakville

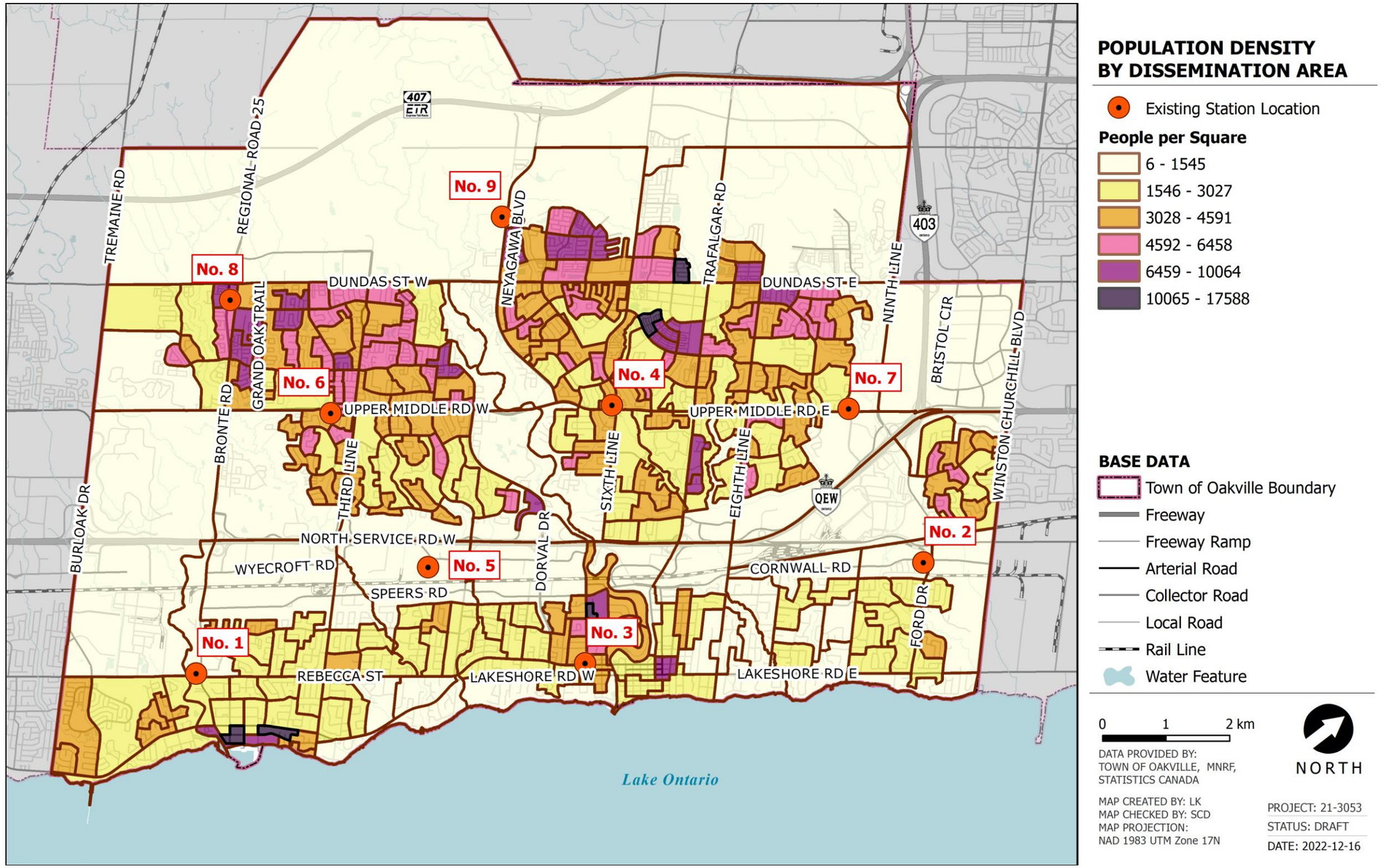
Year	Population	% Change	Total Private Dwellings	% Change
2001	144,738	No Data	49,260	No Data
2006	165,610	14.4%	56,580	14.9%
2011	182,520	10.2%	62,415	10.6%
2016	193,832	6.2%	68,617	9.9%
2021	213,759	10.3%	76,179	11.0%

Table Source: 2021, 2016, 2011, 2006, 2001 Census, Statistics Canada.

5.1.1 Mapping Population Dispersion

The dispersion of the population is presented in **Figure 15**. Areas of Oakville most densely populated are found within the Town's urban area, generally south of Highway 403/QEW and Dundas Street. More specifically, areas of the Town with the highest densities include part of the downtown along Kerr Street, and in the community of Bronte, centred on Lakeshore Road (east of Third Line).

Figure 15: Population Density – Town of Oakville



POPULATION DENSITY BY DISSEMINATION AREA

Existing Station Location

People per Square

- 6 - 1545
- 1546 - 3027
- 3028 - 4591
- 4592 - 6458
- 6459 - 10064
- 10065 - 17588

BASE DATA

- Town of Oakville Boundary
- Freeway
- Freeway Ramp
- Arterial Road
- Collector Road
- Local Road
- Rail Line
- Water Feature

0 1 2 km

NORTH

DATA PROVIDED BY: TOWN OF OAKVILLE, MNRF, STATISTICS CANADA

MAP CREATED BY: LK
MAP CHECKED BY: SCD
MAP PROJECTION: NAD 1983 UTM Zone 17N

PROJECT: 21-3053
STATUS: DRAFT
DATE: 2022-12-16

Figure Statistics Canada, 2021 Census Data, created by Dillon Consulting Limited.

5.2 Population Age and Gender

A community's population by age is an important factor in identifying specific measures to mitigate risks associated with a specific age group, such as seniors. Canada's aging population has been recognized as one of the most significant demographic trends. According to Statistics Canada, from 2011 to 2016 Canada experienced "the largest increase in the proportion of seniors since Confederation" due to the baby boomer generation reaching the age of 65. This trend has remained the same in 2021 as the baby boomer generation that is comprised of people aged 56 to 75 made up nearly a quarter of the population (24.9%). Another note is that there are more persons aged 65 and older (19.0%) than children aged 14 years and younger (16.3%) in Canada.[11]

Seniors (those 65 years and over) are considered to represent one of the highest fire risk groups across the province based on residential fire death rate (fire deaths per million of population). **Figure 16** illustrates the results of an analysis revised by the OFM's Fire Statistics in February 2022. Through this analysis, seniors are identified at an increased risk of fatality in residential occupancies when compared to other age groups. However, the fire death rate for seniors has been decreasing since 1997 according to Ontario residential fatal fires reporting.

[11] Statistics Canada. 2022. (table). Census Profile. 2021 Census of Population. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released December 15, 2022. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (accessed January 16, 2023).

Figure 16: 2011-2020 Residential Fire Death Rate by Age of Victim

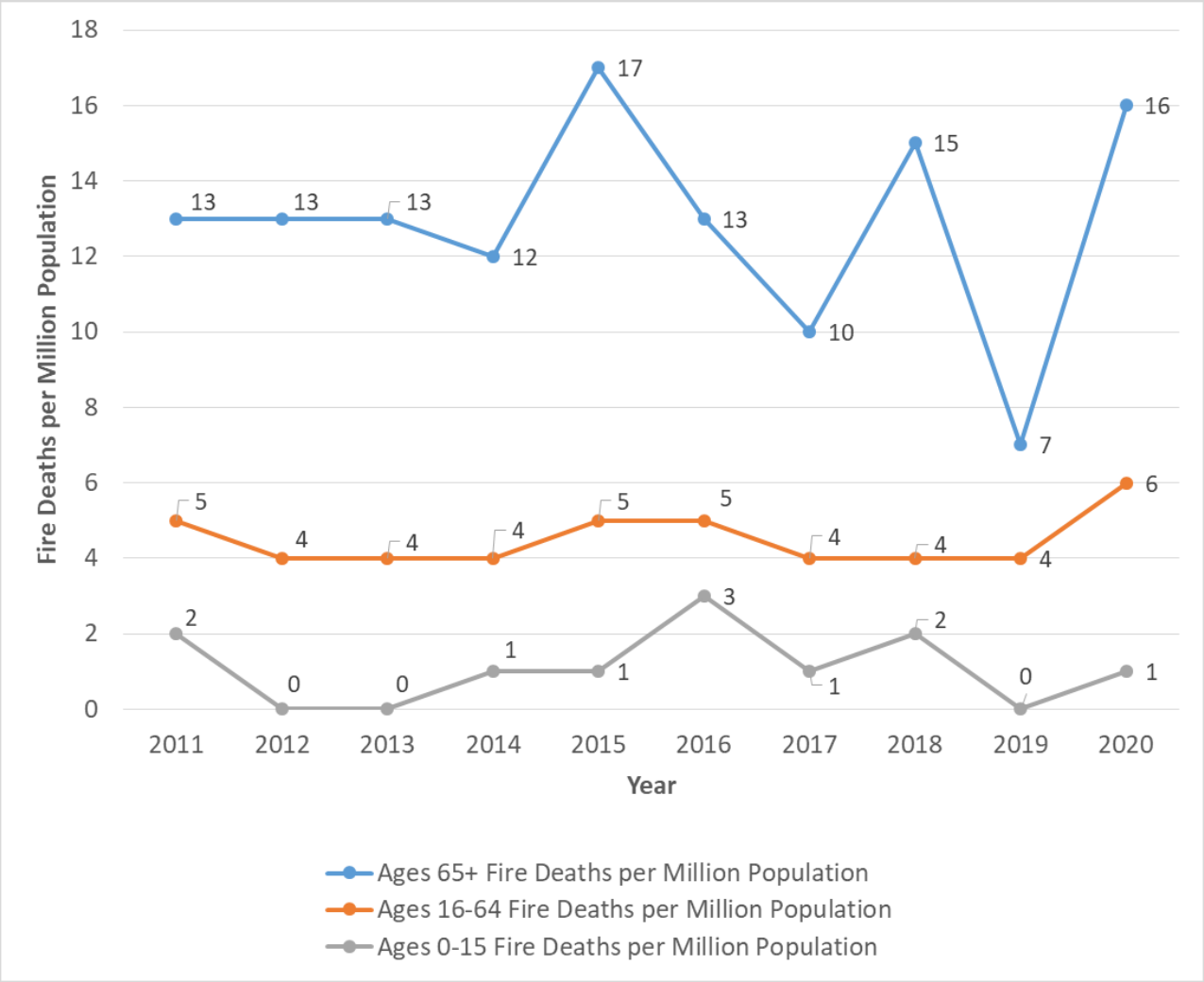


Figure Source: Adapted based on OFM reported residential fatal fires 2011 to 2020.[12]

The 2021 Census identifies a total population of 213,760 for the Town of Oakville. The age distributions of the Town's population and Ontario's population are summarized and compared in **Table 11**.

[12] Office of the Fire Marshal and Emergency Management. (Revised 2018, November). Ontario Residential Fatal Fires. Retrieved from Ministry of the Solicitor General Website

Table 11: Population by Age Group – Oakville and Ontario

Age	Town Population	Town Percentage of Population	Ontario Population	Ontario Percentage of Population
0 to 4 years	9,280	4.3%	683,515	4.8%
5 to 9 years	12,875	6.0%	764,430	5.4%
10 to 14 years	16,285	7.6%	803,850	5.7%
15 to 19 years	16,665	7.8%	801,850	5.6%
20 to 24 years	13,375	6.3%	895,600	6.3%
25 to 44 years	48,350	22.6%	3,794,800	26.7%
45 to 54 years	35,395	16.6%	1,835,850	12.9%
55 to 64 years	27,935	13.1%	2,006,735	14.1%
65 to 74 years	18,010	8.4%	1,504,495	10.6%
75 to 84 years	10,830	5.1%	794,595	5.6%
85 + years	4,760	2.2%	338,620	2.4%
Total	213,760	100.0%	14,223,945	100.0%
Median Age of the Population	42	No data	42	No data
Population aged 14 and under	38,435	18.0%	2,251,795	15.8%
Population aged 65 and over	33,595	15.7%	2,637,710	18.5%

Source: 2021 Census, Statistics Canada[13]

The youngest demographic (those 14 years of age and under) represents 18.0% of the Town's total population, slightly higher in comparison to the Province (15.8%). While at a lower risk of fatality in residential occupancies overall, when compared to seniors or adults, youth (aged 14 years and under) represent an important demographic for the purposes of public education. As a result, there is value in targeting public education and prevention programs to this demographic. Structured education programs consistently provided to children and youth can help to ingrain fire and life safety awareness and knowledge into future generations.

[13] Statistics Canada. 2017. Oakville, CY [Census subdivision], Ontario and Ontario [Province] (table). Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017. Statistics Canada 2016 Census Page (accessed October 19, 2021).

The percentage of the population aged 65 years and older in Oakville represents 15.7% of the total population, lower when compared to the Province (18.5%). An additional 13.1% of the Town's population falls between the age group of 55 and 64, who are aging towards the senior's demographic of 65 years of age and older. Based on historic residential fire fatality data, this population will become seniors who will be at greater risk. These demographic trends are important considerations for the development of informed targeted public education programs and risk reduction strategies within the community.

Key Finding: The 2021 Census data indicates that children aged 14 and under represent 18.0% of the Town's total population.

Identified Risk: Seniors (those 65 years and over) are considered to represent one of the highest fire risk groups across the Province based on residential fire death rate. According to the 2021 Census, seniors represent 15.7% of the Town's total population.

Key Finding: Of the Town's total population, 13.1% fall into the age range of 55 to 64, representing a cohort aging towards the seniors demographic of 65 years or older.

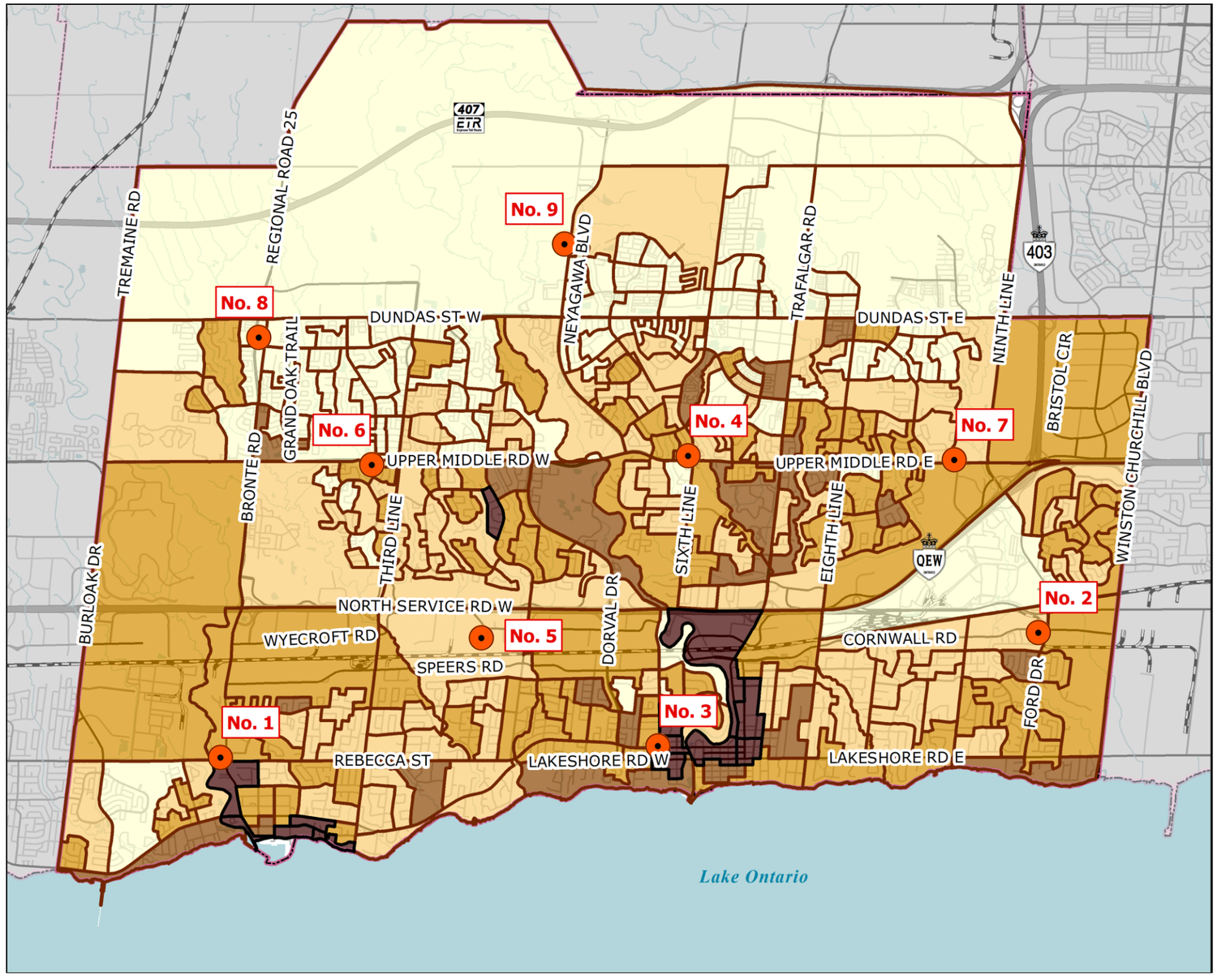
The distribution of both sexes by age for the Town of Oakville was reviewed. The proportion of males versus females is fairly even, as would be expected. When specific age groups are reviewed, there are minor variations. Based on these statistics, it is not anticipated that public education programming would be refined based on sex. The impact of sex ratio on public education programming would be more notable in a community with unique demographics such as those that have transient populations due to employment, for example.

5.2.1 Mapping Population Age

To understand the spatial distribution of population by age across the Town, 2021 Census data was mapped by dissemination area. **Figure 17** presents the distribution of the senior population (65 and older) and **Figure 18** shows the distribution of youth (0 to 14 years). **Figure 17** shows that a higher percentage of the population 65 years and older reside within notable clusters along Trafalgar Road in the downtown area and along Lakeshore Road, south of Rebecca Street in the community of Bronte. These areas with a higher concentration of seniors are in proximity to fire stations 1 and 3.

Figure 18 shows a higher proportion of youth (0 to 14 years) concentrated around Stations 8 and 9. There are also notable clusters around Fire Station 1, north of Fire Station 2, and centred along Dundas Street, particularly north of Dundas Street, between Neyagawa Boulevard and Ninth Line with the closest station being Fire Station 9.

Figure 17: Percentage of Population Aged 65 and Older by Dissemination Area



PERCENTAGE OF POPULATION AGED 65 PLUS YEARS OLD BY DISSEMINATION AREA

Existing Station Location

Percentage of Population Aged 65 Plus (Seniors)

- 3.64 - 10.67%
- 10.68 - 16.92%
- 16.93 - 23.47%
- 23.48 - 37.01%
- 37.02 - 75.88%

BASE DATA

- Town of Oakville Boundary
- Freeway
- Freeway Ramp
- Arterial Road
- Collector Road
- Local Road
- Rail Line
- Water Feature

0 1 2 km

NORTH

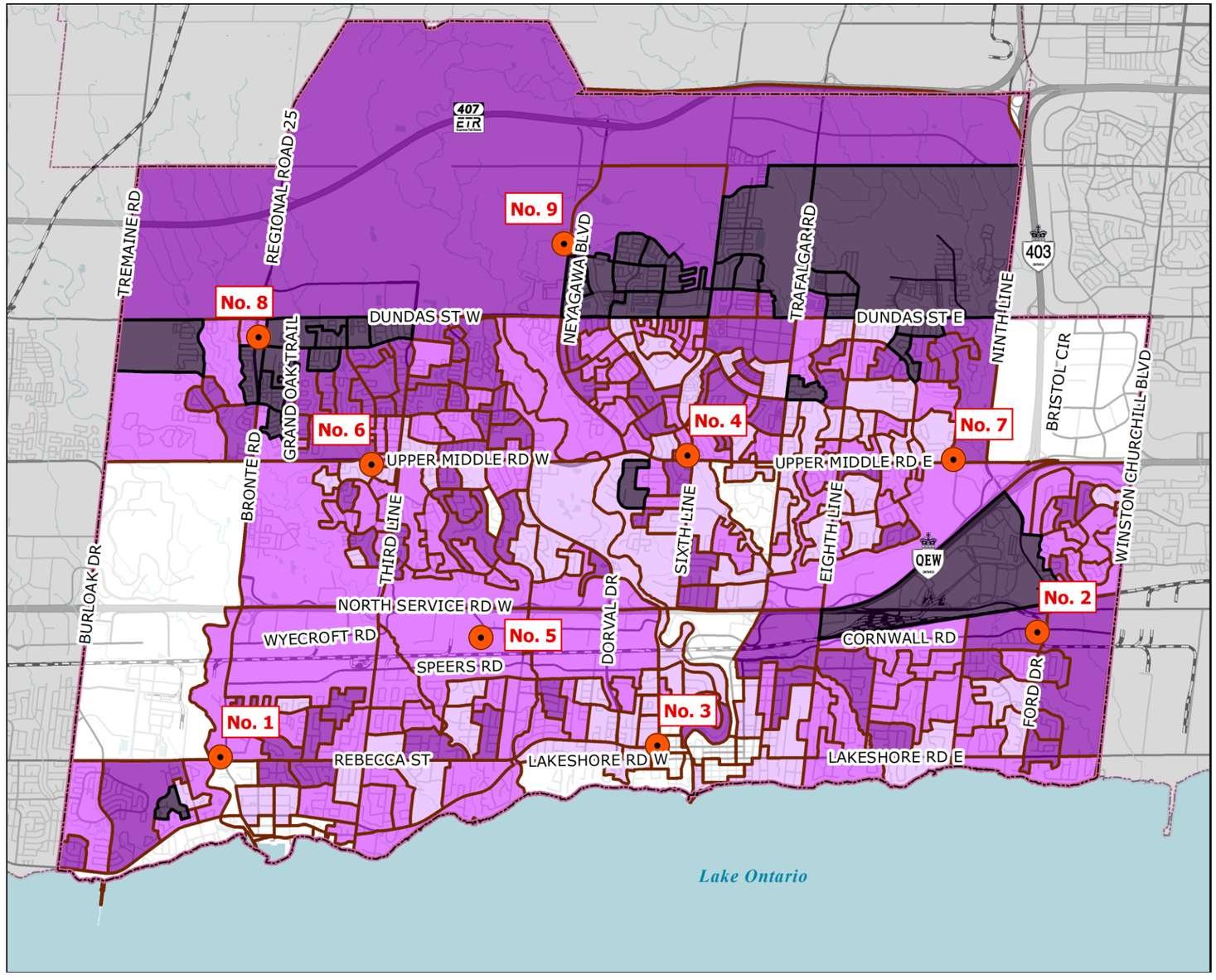
DATA PROVIDED BY:
TOWN OF OAKVILLE, MNRF, STATISTICS CANADA

MAP CREATED BY: LK
MAP CHECKED BY: SCD
MAP PROJECTION:
NAD 1983 UTM Zone 17N

PROJECT: 21-3053
STATUS: DRAFT
DATE: 2022-12-16

Figure Statistics Canada, 2021 Census Data, created by Dillon Consulting Limited.

Figure 18: Percentage of Population Age 0-14 Years Old by Dissemination Area



PERCENTAGE OF POPULATION AGED 0 - 14 YEARS OLD BY DISSEMINATION AREA

Existing Station Location

Percentage of Population 0 - 14 Years Old (Youth)

- 0.00 - 9.63%
- 9.64 - 15.22%
- 15.23 - 18.66%
- 18.67 - 23.29%
- 23.30 - 29.75%

BASE DATA

- Town of Oakville Boundary
- Freeway
- Freeway Ramp
- Arterial Road
- Collector Road
- Local Road
- Rail Line
- Water Feature

0 1 2 km

NORTH

DATA PROVIDED BY:
TOWN OF OAKVILLE, MNRF, STATISTICS CANADA

MAP CREATED BY: LK
MAP CHECKED BY: SCD
MAP PROJECTION:
NAD 1983 UTM Zone 17N

PROJECT: 21-3053
STATUS: DRAFT
DATE: 2022-12-16

Figure Statistics Canada, 2021 Census Data, created by Dillon Consulting Limited.

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 a number of ways and have direct and indirect impacts on fire risk. One such example is outlined in the OFM's Fire Risk Sub-Model. The Sub-Model makes reference to the relationship between income and 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 and consequence of a fire are not well understood, this CRA seeks to explore these factors.

5.3.1 Labour Force Status

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

Labour force status, shown in **Table 12** below, shows that the Town of Oakville has a higher labour force participation rate than the Province of Ontario (65.2% versus 62.8%).

Table 12: Labour Force Status – Oakville and Ontario

Status	Oakville Population	Oakville %	Ontario Population	Ontario %
In the Labour Force[14]	113,195	65.2%	7,399,200	62.8%
Employed	99,950	57.6%	6,492,895	55.1%
Unemployed	13,245	7.6%	906,310	12.2%
Not in the Labour Force	60,435	34.8%	4,383,620	37.2%
Total	**173,630**	**100.0%**	**11,782,820**	**100.0%**

Source: Statistics Canada, 2021 Census of Population[15]

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 generally more likely to be highly educated. In 2021, over two-thirds (68.3%) of Oakville residents had attained a university degree compared to 57.5% of all Ontarians aged 15 and over. Based on this national trend and for the purposes of this Community Risk Assessment it is assumed that a higher education leads to more disposable income and a lower fire risk. It is also assumed that households with more disposable income are more likely to invest in fire life safety products such as fire extinguishers and smoke alarms reducing the fire risk.

Table 13 displays educational attainment for the Town of Oakville and the Province of Ontario.

[14] The category 'In the Labour Force' is a subtotal of the following categories: employed and unemployed.

[15] Statistics Canada. 2022. (table). Census Profile. 2021 Census of Population. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released December 15, 2022. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (accessed January 12, 2023).

Table 13: Educational Attainment – Oakville and Ontario

Educational Attainment	Oakville Population	Oakville %	Ontario Population	Ontario %
No Certificate/Diploma/Degree	18,145	10.5%	1,799,890	15.3%
High School Diploma or Equivalent	36,890	21.2%	6,778,765	57.5%
Postsecondary Certificate; Diploma or Degree	118,590	68.3%	6,778,675	57.5%
Total	**173,625**	**100.0%**	**15,357,330**	**100.0%**

Source: 2021 Census, Statistics Canada[16]

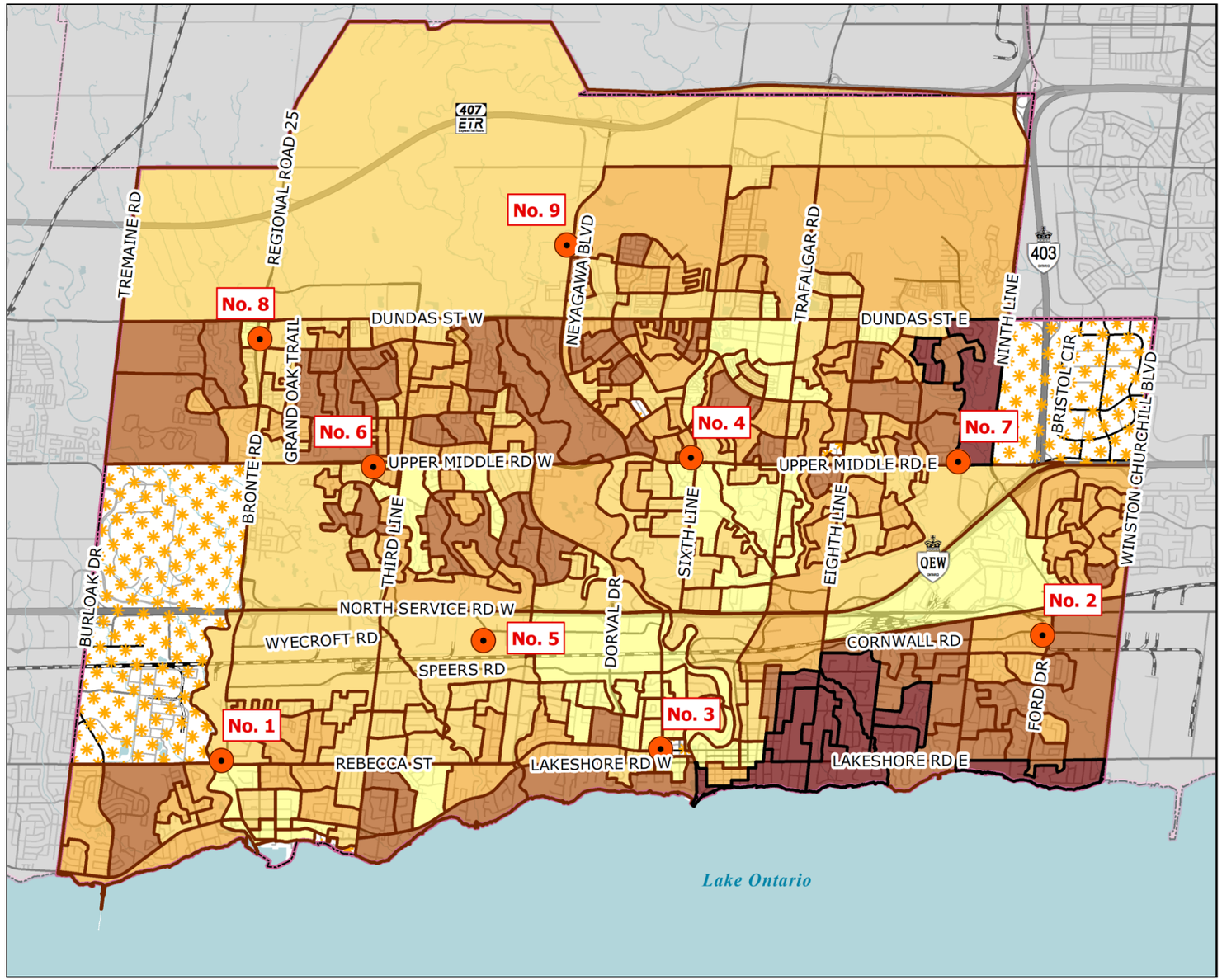
According to the 2021 Census, 68.3% of residents in Oakville have a postsecondary Certificate, Diploma or Degree, which is 10.8% higher than the Province. This is reflected by the median total income of $128,000 for households for Oakville in 2020 which was higher than the Provincial median total income per household of $91,000. This is likely a reflection of the business, sales, education, law and government services component within the local economy, and the higher employment levels in the Town.

5.3.2.1 Mapping Income

Median household income across the Town is displayed in **Figure 19**, indicating that households with a lower median income are found primarily in the areas southeast of the intersection of Upper Middle and Sixth Line. Other lower income areas are located southeast of Fire Station 1 and 6.

[16] Statistics Canada. 2022. (table). Census Profile. 2021 Census of Population. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released November 30, 2022. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (accessed November 30, 2022).

Figure 19: Median Total Income of Households in 2020 by Dissemination Area



MEDIAN HOUSEHOLD INCOME BY DISSEMINATION AREA

Existing Station Location

Median Household Income in 2020

- $34,000 - $98,000
- $98,001 - $137,000
- $137,001 - $172,000
- $172,001 - $226,000
- $226,001 - $336,000
- Data has been supressed or is not available

BASE DATA

- Town of Oakville Boundary
- Freeway
- Freeway Ramp
- Arterial Road
- Collector Road
- Local Road
- Rail Line
- Water Feature

0 1 2 km

DATA PROVIDED BY: TOWN OF OAKVILLE, MNRF, STATISTICS CANADA

MAP CREATED BY: LK
MAP CHECKED BY: SCD
MAP PROJECTION: NAD 1983 UTM Zone 17N

NORTH

PROJECT: 21-3053
STATUS: DRAFT
DATE: 2022-12-16

Figure Statistics Canada, 2021 Census Data, created by Dillon Consulting Limited.

5.3.3 Household Tenure, Occupancy, Suitability and Costs

Table 14 summarizes household statistics for the Town and the Province, including tenure, occupancy, suitability and costs.

Housing tenure reflects socioeconomic status whereby a low home ownership rate may reflect lower incomes in the community and a higher overall fire risk. The Town has a higher proportion of dwellings that are owned versus rented when compared to the Province (77.5% owned in Oakville versus 68.4% in the Province).

Occupancy reflects socioeconomic status whereby a higher proportion of multiple persons per household room may reflect lower income. There are 1,500 households (2.0% of total households) that have more than one person per room in Oakville. This reflects a lower percentage compared to the Province where 3.0% of households have more than one person per room.

The 2021 Census reports on **housing suitability** which, according to Statistics Canada, refers to whether a private household is a suitable accommodation according to the National Occupancy Standard. Suitable accommodations are defined by whether the dwelling has enough bedrooms based on the ages and relationships among household members. Based on this measure, 4.0% (or 2,945 households) are classified as "not suitable" within the Town, compared to 6.7% for the Province as a whole. From the perspective of housing suitability, the Town has a potentially lower fire risk.

The **cost of shelter** may also be indicative of the amount of disposable income within a household. Households with less disposable income have fewer funds to purchase household fire life safety items resulting in a higher risk. In Oakville, 26.4% of households spend 30% or more of the household total income on shelter costs. This is approximately 2.2% less than the Province, where 27.7% of households spend 24.2% or more of income on shelter costs.

Looking closer at shelter costs, the median value of dwellings in Oakville is $1,200,000.00 ($500,000 higher than the provincial median). The Town also has higher median monthly shelter costs for owned and rented dwellings than the Province.

Table 14: Household Tenure, Occupancy, Suitability and Costs – Oakville and Ontario

Type	Oakville	%	Ontario	%
Household Tenure	**Oakville**	**%**	**Ontario**	**%**
Owner	57,025	77.5%	3,755,720	68.4%
Renter	16,530	22.5%	1,724,970	31.4%
Total Households	73,560	100.0%	5,491,200	100.0%
Household Occupancy	**Oakville**	**%**	**Ontario**	**%**
One person or fewer per room	72,055	98.0%	5,328,575	97.0%
More than one person per room	1,500	2.0%	162,625	3.0%
Total Households	73,555	100.0%	5,491,200	100.0%
Housing Suitability	**Oakville**	**%**	**Ontario**	**%**
Suitable	70,615	96.0%	5,122,185	93.3%
Not suitable	2,945	4.0%	369,015	6.7%
Total Households	73,560	100.0%	5,491,200	100.0%
Shelter Costs	**Oakville**	**%**	**Ontario**	**%**
Spending less than 30% of household total income on shelter costs	53,810	77.6%	4,103,320	75.8%
Spending 30% or more of household total income on shelter costs	19,295	26.4%	1,312,095	24.2%
Total Households	73,105	100.0%	5,415,415	100.0%
Median value of dwellings	**$1,200,000**	None	**$700,000**	None
Median monthly shelter costs for owned dwellings	$2,080	None	**$1,440**	None
Median monthly shelter costs for rented dwellings	$2,040	None	**$1,300**	None

Source: 2021 Census, Statistics Canada[17]

[17] Statistics Canada. 2022. (table). Census Profile. 2021 Census of Population. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released October 26, 2022. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (accessed November 7, 2022).

5.4 Cultural Background and Language Considerations

Cultural background and language considerations can be factors for fire service providers to consider in developing and delivering programs related to fire prevention and public education. Communication barriers, in terms of language and the ability to read written material, may have an impact on the success of these programs. There may also be familiarity challenges related to fire safety standards within newcomer populations. A high proportion of immigrants may indicate the potential for unfamiliarity with local fire and life safety practices and/or may experience possible language barriers. As summarized in **Table 15**, the Town has a higher proportion of newcomers (41.2%) when compared to Ontario (30.0%).

Table 15: Immigration Status – Oakville and Ontario

Immigration Status	Oakville Population	Oakville %	Ontario Population	Ontario %
Non-Immigrants	119,590	56.4%	9,437,320	67.3%
Immigrants	87,340	41.2%	4,206,585	30.0%
Before 1980	15,260	7.2%	860,305	6.1%
1980 to 1990	8,250	3.9%	506,195	3.6%
1991 to 2000	14,425	6.7%	852,765	6.1%
2001 to 2010	9,970	4.7%	941,630	6.7%
2011 to 2015	12,900	6.1%	461,010	3.3%
2016 to 2021	15,490	7.3%	584,680	4.2%
Non-Permanent Residents	5,120	2.4%	387,850	2.8%
Total	212,050	100.0%	**14,031,755**	**100.0%**

Source: Statistics Canada, 2021 Census of Population.[18]

Knowledge of official languages based on the 2021 Census is included in **Table 16** for the Town of Oakville and Province of Ontario.

[18] Statistics Canada. 2022. (table). Census Profile. 2021 Census of Population. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released October 26, 2022. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (accessed November 7, 2022).

As shown in **Table 16**, 86.7% of the population in the Town have knowledge of English only, 11.0% possess knowledge of both English and French, and 150 people speak French only.

Table 16: Knowledge of Official Language – Oakville and Ontario

Language	Oakville Total	Oakville %	Ontario Total	Ontario %
English Only	184,520	86.7%	12,196,575	86.5%
French Only	150	0.1%	39,310	0.3%
English and French	23,390	11.0%	1,519,365	10.8%
Neither English nor French	4,855	2.3%	344,545	2.4%
Total Population (Non-Institutional)	**212,915**	**100.0%**	**14,099,790**	**100.0%**

Source: 2021 Census, Statistics Canada[19]

5.5 Transient Populations

Ontario Regulation 378/18 requires the consideration of "transient populations". This refers to the concept of population shift where the population within a community can shift at various times during the day or week or throughout the year. Population shift can be a result of a number of factors including employment, tourism, and education. In some municipalities, residents regularly leave the community for employment. This can contribute to increased traffic resulting in an increase in the number of motor vehicle collision calls. Other communities may be major tourist and vacation destinations resulting in large population shifts related to seasonal availability of tourism activities. This can result in an increased risk due to overnight tourism accommodation (sleeping) which can impact the demand for fire protection services. Educational institutions can attract a transient student population who commute to school daily or reside in dormitories or student housing on a seasonal basis.

Student accommodations and short-term rental units present unique fire safety issues that may be attributed to the conversion of houses into boarding houses or rooming

[19] Statistics Canada. 2022. (table). Census Profile. 2021 Census of Population. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released October 26, 2022. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (accessed November 7, 2022).

house type accommodations that do not conform to the OFC or OBC. These properties are not always known to the fire department, posing a challenge for fire prevention division staff responsible for fire code enforcement.

5.5.1 Tourism

An increase in tourism can result in an increased risk due to overnight tourism accommodation, which can impact the demand for fire protection services. There are several Town-hosted events each year and attractions that draw residents and non-residents to the Town of Oakville and to neighbouring communities. Some of the bigger annual events include:

- Downtown Oakville Jazz Festival;
- Art in the Park;
- Bronte Creek Maple Syrup Festival;
- Canada Day Celebration;
- Oakville Fall Fest; and
- Oakville Santa Clause Parade.

In addition, there are several tourist attractions found within the Town of Oakville that draws tourist throughout the year. These include:

- Oakville Museum;
- Parks, Trails and Conservation Areas (e.g., Oakville includes Bronte Creek Conservation Area, Bronte Heritage Waterfront Park, Gairloch Gardens; and
- Business Improvement Areas (Downtown Oakville, Village of Bronte and Kerr Village).

5.5.2 Education

Educational institutions are a key source for population shift in larger communities as they attract people from outside of the typical community. They are important to consider since they may have school-based residences, or contribute to a population that is not captured through the census.

Sheridan College has a campus within the Town on Trafalgar Road. There are several universities and colleges in neighbouring municipalities as well, within an attractive commuting distance, including the University of Toronto (Toronto and Mississauga

campuses), McMaster University (Hamilton), George Brown College (Toronto) and Humber College (Toronto).

5.5.3 Employment

Commuter populations represent a significant portion of Oakville's labour force. **Table 17** shows the commuting destination trends for the residents of Oakville based on 2021 Census data. It appears that a portion of the Town's labour force (4,900) commutes to a different census subdivision within the census division of residence. An additional 19,840 commute to a different census division within the province.

A shift in commuter population may impact the demand for fire protection services. These figures are important from a fire suppression standpoint as large numbers of people commuting in and out of the Town could increase the number of vehicle collision calls to which the fire department responds.

Table 17: Commuting Destinations – Town of Oakville

Commuting Destination[20]	Population
Commute within census subdivision of residence	21,685
Commute to a different census subdivision within census division of residence	4,900
Commute to a different census subdivision and census division within province or territory of` residence	19,840
Commute to a different province or territory	130
Total	**46,555**

Source: 2021 Census, Statistics Canada[21]

High commuter volumes (due to an individual's journey to work or school) can have a significant impact on transit and traffic, increasing the likelihood of vehicle collisions

[20] Commuting destination for the employed labour force aged 15 years and over in private households with a usual place of work – 25% sample data.

[21] Statistics Canada. 2022. (table). Census Profile. 2021 Census of Population. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released November 30, 2022. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (accessed November 30, 2022).

with the possibility of higher call volumes during peak commuting times in the morning and late afternoon. This could potentially impact emergency response times within the

Key Finding: The Town's commuter population presents a factor that may impact traffic congestion, and the potential occurrence of motor vehicle accidents within the Town.

6.0 Hazard Profile

As referenced in the **O. Reg. 378/18**, the hazard profile assessment includes analysis of the hazards within the community, including natural hazards, hazards caused by humans, and technological hazards to which fire departments may be expected to respond to. Hazardous incidents may have significant impact within the community. This section considers such hazards within the Town of Oakville.

6.1 Hazard Identification and Risk Assessment in Ontario (HIRA)

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. It is important to identify and consider these hazards from a fire risk, emergency response, and overall public safety perspective in order to assist local governments and emergency management personnel plan for the risks within their communities and take the appropriate action to reduce future losses.

Under the Emergency Management and Civil Protection Act (EMCPA), municipalities are required to 'identify and assess the various hazards and risks to public safety that could give rise to emergencies and identify the facilities and other elements of the infrastructure that are at risk of being affected by emergencies', 2002, c. 14, s. 4. The OFM recently released methodology guidelines outlining a process for the development of an HIRA program, to assist municipalities in assessing their local hazards and potential risks.

Current legislation requires an annual review and update of the municipally developed HIRA.

6.1.1 HIRA and the CRA

The OFM **TG-02-2019** and OFM "Question and Answers" provide guidance with respect to developing a community HIRA in the context of a Community Risk Assessment. The guidelines acknowledge that these processes are separate, but complementary. The OFM "Question and Answers" states that the CRA process "may result in decisions

about fire department responses to various types of emergencies identified in a completed HIRA".

A HIRA is a comprehensive process to identify the hazards to a community as a whole. A CRA provides an opportunity to examine the impact that these hazards would have on the services provided by a fire department. For the purposes of this CRA, a "fire protection services" lens will be applied to the top hazards as identified through the municipal led HIRA.

6.2 Town of Oakville Hazard Identification and Risk Assessment

The Town's Hazard Identification and Risk Assessment was last reviewed and updated in 2023. As a component of the risk assessment and risk analysis process, the top risks in Oakville were identified. The HIRA assigns likelihood and consequence levels to a list of hazards based on the potential for impacts to people, property and the environment. As a result of this analysis, the top hazards in the Town include emergencies relating to the following:

- Fog;
- Floods;
- Cyber Attacks;
- Tornados;
- Winter Weather (snowstorms, blizzards, and ice storms);
- Severe Storms (hail, lighting, wind, Hurricanes);
- Earthquakes or Land Subsidence/Liquefaction;
- Pandemic/Epidemics;
- Road Transportation Accidents;
- Transportation accidents involving hazards materials;
- Air/Military Aircraft or rail crashes;
- Chemicals (hazards material spills, and explosions);
- Electric power blackouts;
- Buildings or structural collapse;
- Large scale uncontrollable fires;
- Wildland Fire;
- Critical Infrastructure Failure (telecoms, computers, roads, infrastructure); and
- A breakdown in flow of essential services/supplies, or any combination thereof.

6.3 Impacts of Hazards on Fire Protection Services

To better understand the risks of hazards as they pertain to fire protection services, the Town's top hazards have been assessed to identify possible impacts on fire protection services. Many of the potential impacts are not unique to a jurisdiction. The results of this review as they pertain to the top hazards in the Town of Oakville are presented in **Table 18**.

Table 18: Impacts of Hazards on Fire Protection Services

Hazard (Town HIRA)	Possible Impact on Fire Protection Services
Floods	Properties located in the downtown core and low-lying areas are vulnerable to flooding. Town buildings, assets and equipment are likely to be damaged or be destroyed in flooding events. Road access to buildings can become impassible for emergency vehicles, thereby impeding fire and rescue efforts. New buildings built on low-lying lands must consider the impact on occupant evacuation as egress routes may become untenable.
Cyber Attacks	Cyber-attacks in the form of malicious attacks and data loss may have widespread effects on critical infrastructure in the health and telecom industries. These threats pose implications on the core functions of operations which can result in communication and the supply systems issues as well as serious damage to vital digital systems. Cyber-attacks on critical infrastructure operations, power supply and physical assets can lead to outages and malfunctions which can impact emergency response times.
Severe Weather (Windstorms, Lighting, Hail) and Tornados	Windstorms or severe weather events that are accompanied by high winds such as a tornado can cause varying levels of property or structural damage; disrupt multi-modal transportation services and interfere with the delivery of utilities (e.g., hydro) or other critical infrastructure (e.g., telecommunications). The damage to property and infrastructure caused by tornados, hail and lighting can obstruct first responder access to the road network, leading to a delay in emergency response times.

Hazard (Town HIRA)	Possible Impact on Fire Protection Services
Earthquakes	Earthquakes can cause varying levels of property damage and a substantial amount of widespread injuries/damage. Other consequences disruptions multi-modal transportation services and interfere with the delivery of utilities (e.g., hydro) or other critical infrastructure (e.g., telecommunications). The damage to property and infrastructure caused by earthquakes may lead to a delay in emergency response times due to obstructions to property and infrastructure caused by earthquakes.
Winter Weather (Snowstorms, Blizzards or Ice Storms)	Events of heavy snowfall, cold temperatures and high winds may cause issues related to the lack of visibility and dangerous ground conditions. Snow and ice accumulations which result from snowstorms and blizzards may also impact infrastructure. Freezing rain can weigh down electrical wires or branches causing them to break, blocking roadways and fire department or other first responder access leading to delayed emergency response and extended travel times. Downed electrical wiring presents electrical current exposure hazards which can cause injuries requiring medical assistance and overall damages to the electrical grid could lead to energy system disruption. Freezing rain also promotes dangerous driving conditions leading to motor vehicle collisions or crashes, driving emergency response call volume.

Hazard (Town HIRA)	Possible Impact on Fire Protection Services
Human Health Emergency – Pandemic	A pandemic could present significant challenges to first responders and the community causing potential fire department workplace absenteeism, and an increased demand for medical response and supplies. For example, during the severe acute respiratory syndrome (SARS) outbreak in Toronto, declared a medical state of emergency in March of 2003, of Toronto EMS's 850 paramedics, 436 were placed in a 10-day home quarantine, 62 developed SARS-like illnesses, and 4 developed suspected or probable SARS requiring hospitalization.[22] 2020 to present day is a more severe and wide-reaching human health emergency, the COVID 19 global pandemic. The impact of this current pandemic has been challenging for all aspects of community services and has had a number of impacts on members of the community, which are still being qualified and quantified. Throughout the two+ years of the COVID-19 pandemic, and despite two outbreaks in fire stations, OFD was able to maintain minimum daily staffing without an interruption to service levels, including conducting a recruit class.
Transportation Emergency/ Accidents – Road	Road and highway hazards include transportation emergencies involving vehicles on the road network. A transportation emergency along a road or highway could translate into partial or full closure of a road or major highway route or to the system as a whole with impacts that include injury or loss of life, environmental damage, hazardous materials leak, and/or economic loss. A road or highway emergency in Oakville could require hazardous materials response or other specialized rescue service from the fire department. Based on historical emergency call volume, rescue calls responded to by the OFD account for 9.2% of total emergency call volume (**Section 10.2.1.5**). Of those rescue calls, 87.9% pertain to motor vehicle related incidents (**Section 10.2.2.3**).

Hazard (Town HIRA)	Possible Impact on Fire Protection Services
Transportation Emergency – Rail	An incident involving a derailment or rail accident could be a significant emergency event within a community and could involve hazardous materials and/or dangerous goods. An emergency involving rail in Oakville could require hazardous materials response or other specialized rescue service from the OFD.
Air/Rail Crashes	In the event of air and rail transportation accidents, the concern pertains to the size of debris and the contents of what is being transported (e.g., humans, hazardous materials, etc.). For air travel, the size of debris falling onto the ground may lead to multiple fatalities and catastrophic damage. Rail crash concerns may include the location, whether it is easily accessible to emergency services, and whether it occurs in a populated area or blocks heavily used transportation corridors.

[22] Alexis Silverman, Andrew Simor, Mona R. Loutfy. (2004). Toronto Emergency Medical Services and SARS. Emerging Infectious Diseases., Volume 10(9): 1688–1689, doi: 10.3201/eid1009.040170.

Hazard (Town HIRA)	Possible Impact on Fire Protection Services
Chemical Incidents	A hazardous materials (HAZMAT) incident pertains to the unintentional release of materials that are capable of causing harm to humans or the environment. These incidents may occur as a result of transportation or industrial accidents. The effects of HAZMAT incidents may be immediately or delayed. Incidents in proximity to hospitals may require assistance from emergency services for evacuations, a shelter-in-place directive, decontamination, or injury/illness to staff, patients and the public.
Electric Power Blackouts	Electric power blackout can adversely affect large areas of the Town, and potentially surrounding municipalities. As a pre-emptive measure, each of OFD's nine fire stations are equipped with fixed or transportable emergency power generators to maintain station operations. Continuity of Operations Planning (COOP) ensure the timely delivery of fuel for uninterrupted generator function.
Building or Structural Collapse	Occurs when the structural integrity of the buildings fails and causes the structure to lose shape, cave in, flatten or reduce to debris. Structural collapse may occur suddenly as a result of a specific incident (e.g. earth quake) or may occur gradually over time. Building or structural collapse poses a safety risk to firefighters performing rescue operations.

Hazard (Town HIRA)	Possible Impact on Fire Protection Services
Large Scale Uncontrollable Fires	A fire is characterized by any instance of destructive and uncontrolled burning, including explosions. Responding to structure, outdoor and vehicle fires are a regular occurrence for a fire department. As discussed in **Section 10.0**, there were 314 structure fires, 44 outdoor fires, and 169 vehicle fires representing $41,275,195 in total dollar loss over a five-year period from 2016 to 2020 in the Town of Oakville. Large, uncontrollable fires have the potential to exhaust the resources of the Oakville Fire Department and may require the support of mutual aid from neighbouring fire service providers. These may be structures or other types of properties. The applicable fire suppression/explosion emergency response capabilities of OFD will be evaluated in the Fire Master Plan.
Wildland Fire	The applicable NFPA 1730 Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations (2019 Edition) identifies wildland-urban interface as geography-based risk for consideration. This interface refers to the area of transition between unoccupied land and human development. This transition area can be comprised of a mix of woodlots, bush or grass. As discussed in **Section 2.4**, there are several areas in the Town that are located adjacent to a wildland-urban interface presenting the potential for a wildland fire to occur. This CRA identifies wildland fires as an identified risk. The wildland fire emergency response capabilities of OFD will be evaluated in the Fire Master Plan.

Hazard (Town HIRA)	Possible Impact on Fire Protection Services
A breakdown in flow of essential services/ supplies, or any combination thereof	Prolonged interruptions to supply chains have negative implications to emergency services. Emergency services that are most effected are those that rely on medical devices, equipment, or pharmaceuticals that are distributed by external vendors. If redundancies are not in place, interventions may not be possible or costly if alternative supplies are required. An emerging challenge facing all fire departments are growing delays in receipt of new fire apparatus and increases in pricing. Supply chain shortages are forcing suppliers and manufacturers to push out delivery timelines for trucks by as much as 36 months.

Source: Town of Oakville's 2013 Hazard Identification and Risk Assessment.

Key Finding: The Town's 2013 Hazard Identification and Risk Assessment identifies hazards that could each impact the ability of the Town to deliver fire protection services.

7.0 Public Safety Response Profile

As required by **O. Reg. 378/18**, the Public Safety Response Profile includes analysis of the types of incidents responded to by other entities in the community, and those entities' responsibilities. 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 situation. The following sections consider these public safety response characteristics within the Town of Oakville.

7.1 Public Safety Response Agencies in the Town of Oakville

Public safety and response agencies refer to agencies and organizations that respond to specific types of incidents within a community that provide trained personnel and resources critical to upholding public safety. Each of these entities offer specialized skillsets in support of front-line operations. The types of response services offered might include fire protection, medical attention, rescue operations, policing activities or hazardous materials 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 19 lists the public safety response agencies within Oakville that will be able to assist in a collective emergency response effort and may contribute to the mitigation of risk within the community. Identifying the public safety response agencies within the community can help the fire service become familiar with other public safety response agencies and each agency's specific response capabilities.

Table 19: Public Safety Response Agencies

Identified Public Safety Response Agency	Types of Incidents They Respond To	Agency Role in Incident
Halton Regional Police Service	• Motor vehicle collisions; • Medical (respiratory or cardiac arrest); • Fire; • False fire; • Public assistance; • HAZMAT; • Chemical, biological, radiological or nuclear (CBRN); • Evacuations; • Technical rescue incidents; • Water rescue/marine distress; • Active shooter hostile event response (ASHER); and • Mass casualty incident (MCI).	• Traffic control, scene stabilization, investigation; • Patient contact, initial first aid, scene stabilization, investigation (of cause if criminal activity suspected); • Scene stabilization, evacuation, investigation (criminal) for HAZMAT/CBRN incidents; • Assist in coordinating public information; • Perform large-scale evacuations and secure the perimeter; • Technical rescues – scene and perimeter security; and • Three marine units active from April to October (boating season). Respond to marine distress and provide enforcement on the water.

Identified Public Safety Response Agency	Types of Incidents They Respond To	Agency Role in Incident
Victim Services – Halton Regional Police Service	• Homicide; • Attempt murder; • Serious assault (with a weapon, causing bodily harm, aggravated assault, kidnapping/abduction, forcible confinement); • Domestic violence; • Sexual assault; • Human trafficking; • Hate crimes; and • Crisis intervention.	• Emergency transportation costs; • Emergency childcare and dependent care for elderly or special needs dependents; • Emergency accommodation, meals and personal care items; • Emergency vision care; • Crime scene cleanup • Short-term counselling; • Services and related transportation costs immediately after a violent crime has occurred; • Funeral expenses for homicide victims; and • Access to counselling services.

Identified Public Safety Response Agency	Types of Incidents They Respond To	Agency Role in Incident
Halton Regional Paramedic Services	• Motor vehicle collisions; • Medical incidents; • Fire incidents; • False fire incidents; • Public assistance; • Hazardous materials/CBRN; • Evacuations; and • Technical rescues.	• Patient stabilization and reporting; • Patient stabilization, transport, reporting; • Standby for firefighter safety, patient stabilization, transport, reporting; • Standby for firefighter safety, patient stabilization, transport, reporting; • Assist in coordinating public information; and • Standby for firefighter safety, patient stabilization, transport, reporting.
Provincial Chemical/ Biological/ Radiological/ Nuclear/ Explosive/ HazMat	• CBRNE/Hazardous material incidents.	• Provide specialized expert (technician) Level 3 CBRNE Response Teams.
Halton Healthcare	• Act as a partner in Public Safety (receive emergency responses).	• Participate in the planning and exercise of emergency scenarios in Oakville.

Identified Public Safety Response Agency	Types of Incidents They Respond To	Agency Role in Incident
Town of Oakville Water Air Rescue Force (TOWARF), Western Lake Ontario, Canadian Coast Guard Auxiliary	• Seasonal response to off-shore marine search and rescue missions; and • Missing persons/boaters.	• Search and rescue support in western Lake Ontario; • Volunteer group, funded through the marina slip moorings; • Work in cooperation with other agencies and emergency services like the Canadian Forces, police, fire and ambulance under the coordination of Joint Rescue Coordination Center (JRCC); and • Patrol waters (April to October),
Civil Air Search and Rescue Association (CASARA) (several units across Ontario and Canada)	• Incidents requiring volunteer air search and rescue service throughout Southwestern Ontario; and • Military training exercises.	• Support Canada's Search and Rescue (SAR) program and to promote SAR Awareness; • May also be called upon to supply certified CASARA members trained as spotters onboard military aircraft; and • Tasked on SAR missions by the JRCC, located at Canadian Forces Base (CFB) Trenton.

Identified Public Safety Response Agency	Types of Incidents They Respond To	Agency Role in Incident
Ontario Volunteer Emergency Response Team (OVERT) – services available through request for assistance	• Large scale disasters that may require evacuation including floods, power outages, public health emergencies and more; • Incidents requiring technical rescue; and • Search and rescue/missing persons.	• Provides emergency assistance to first responders and emergency management agencies; • Incident command; • Ground and marine search and rescue; • Canine unit support; • Technical rescue; and • Communications.
Heavy Urban Search and Rescue (HUSAR) – Toronto Unit	• Urban building collapses; • Mudslides; • Forest fires; and • Other disasters.	• Search and rescue; • Communications; • Logistics; • Emergency medical assistance; • Canine search; and • Structural assessment.
Mississauga Fire and Emergency Services	• Trench rescues requiring Operations Level and Technician Level services	• Provides Operations Level and Technician Level services

7.1.1 Mutual Aid and Automatic Aid Agreements

Mutual aid agreements can provide additional depth of resources and response that may not have been dispatched as part of a municipality's initial response. These agreements establish a mutual relationship between multiple public safety and response agencies whereby emergency services and resources are shared to promote a more effective response and strengthen the depth of emergency response provided by a fire department. Currently, the OFD is a participant in a Mutual Aid Agreement for the Region of Halton.

Agreements between public safety and response agencies such as fire departments can also provide for initial or supplemental emergency response services. Automatic aid agreements are programs designed to provide and/or receive assistance from the closest available resource, regardless of municipal boundaries, on a day-to-day basis.

The Town does not currently provide or receive automatic aid through agreements.

Mutual and automatic aid agreements will be discussed further within the Fire Master Plan.

8.0 Community Services Profile

As referenced in **O. Reg. 378/18**, the community service 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 the Town of Oakville.

8.1 Community Services in the Town of Oakville

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 of a municipality 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 skillsets.

Investigating new community partnerships and strengthening existing ones may be an effective strategy for consideration towards enhancing the current public fire and life safety education program, fire inspection efforts and emergency response and recovery capabilities of the OFD. **Table 20** identifies community agencies, organizations and associations within Oakville.

Table 20: Community Service Agencies, Organizations and Associations

Community Service Agency	Types of Assistance Provided
Canadian Red Cross – Halton and Peel Regional Office (located in Mississauga)	In the event of a fire incident or emergency, the Oakville Branch of the Red Cross can provide temporary lodging, clothing and food to persons who cannot return to their home or, who cannot find alternate accommodations. In larger emergencies requiring evacuation, the organization has the capability to set up reception and information services to greet evacuees, provide information, provide family reunification and control facility access.
Salvation Army – Oakville Community Church	The Salvation Army is capable of providing both immediate and long-term recovery assistance in cooperation with Fire and Police Services. The Salvation Army's Emergency Disaster Services program can provide emergency food and hydration resources, emotional and spiritual care, donations management, social services, long-term recovery and training and volunteers. Lighthouse Emergency Centre provides safe, secure, short-term accommodations to males experiencing some type of housing crisis.
St. John's Ambulance (located in Oakville)	As a member of the Disaster Response Service Agencies, St. John's Ambulance Emergency Preparedness and Disaster Response Teams are integrated into the collective community disaster and emergency response and preparedness effort. The organization has the capacity to provide health care and first aid in reception centres, casualty care at the scene of an event, patient transportation, and evacuation assistance.

Community Service Agency	Types of Assistance Provided
Project Lifesaver – Halton Regional Police Service	Helps families to protect members who might wander or bolt, such as people living with Alzheimer's disease, Autism, Down Syndrome, Acquired brain injury or other cognitive impairment.
Oakville-Trafalgar Memorial Hospital (OTMH) Outpatient Clinic and Community Programs	Halton Healthcare Services provides a number of programs and services through OTMH, including urgent geriatric assessment and clinic, fracture clinic, home oxygen program, mental health services, and post emergency pediatric clinic.
Distress Centre Halton – Oakville Unit	The Centre a non-profit charitable organization that provides telephone (905-849-4541) and online support to people 365 days of the year. Trained volunteers operate the Distress Line which provides emotional support and encouragement, suicide risk assessment and prevention and community resource and referral information. The TeleCheck outbound call program supports isolated seniors, people struggling with mental health, caregivers, Alzheimer's patients, clients awaiting mental health services or people who need additional mental health support.
Canadian Mental Health Association, Crisis Outreach and Support Team (COAST) – Halton Region Branch Head Office located in Oakville	Provides telephone support and mobile intervention to persons who are in crisis and have a mental health concern. A mobile team of mental health professionals and trained plain-clothed police officers visit to help those in crisis and connect them with ongoing care.

Community Service Agency	Types of Assistance Provided
Local community faith-based organizations (Society of Saint Vincent de Paul, Salvation Army, Kerr Street Mission, Dar Foundation, Wesley Housing Services - Halton	Public fire safety messaging does not always reach community's most vulnerable populations. Partnering with local faith-based organizations can provide the OFD with the opportunity to improve its public education program as a method of information sharing to a wider audience within the Town. 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 the OFD 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.
Alcohol and Gaming Commission of Ontario	The OFD can partner with local organizations that may be able to provide additional support in the area of fire inspection and enforcement. For example, the Alcohol and Gaming Commission of Ontario may be able to assist in the enforcement of occupancy loads in nightclubs through after hour inspections. Establishing lines of communications and collaborative partnerships early on with agencies who share a common concern for people's welfare and safety can inform and strengthen the fire department's inspection and enforcement program.

Community Service Agency	Types of Assistance Provided
Farm and Food Care Ontario	As discussed in **Section 2.0 – Geographic Profile**, Oakville has a significant rural area north of Highway 407. Although farming exists on a small scale in Oakville, barn fires can be devastating incidents leading to loss of livestock, buildings, and equipment. Farm & Food Care Ontario operates a lending program of FLIR (heat sensing) modules to be used as a fire prevention and awareness tool by farmers to increase their awareness of fire safety, potential risks and prevention. The OFD could consider partnering with local agricultural organizations to bring awareness to some of these important resources.
Halton Catholic District School Board and Halton District School Board, and local private schools	As reported in **Section 5.2 – Population Age**, the 2021 Census data indicates that children aged 14 and under represent 17.7% of the Town's total population. The proportion of children in the Town is significant, especially when considering the opportunity for public education. This percentage supports 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.
Halton Children's Aid Society	The Halton Children's Aid Society is responsible for providing child protection services to children who live in Halton Region. It is common practice for this agency to investigate and inspect living conditions where there is a concern for a child's welfare. CAS workers may encounter property conditions that they feel warrant follow up by the OFD due to unsafe conditions or fire hazard related concerns.

Community Service Agency	Types of Assistance Provided
Senior Care Agencies (The Willow Foundation, Home and Community Care Support Services – Mississauga Halton, Older Adult Advisory Committee (OAAC), Halton Seniors Helpline, Acclaim Health)	As reported within **Section 5.2 – Population Age** of this CRA seniors (those 65 years and over) are considered to represent one of the highest fire risk groups across the Province based on residential fire death rate (fire deaths per mission of population). According to the 2021 Census, seniors represent 16.0% of the Town's total population and 26.6% of the Town's population fall into the age range of 45 to 64, representing a cohort aging towards the seniors demographic of 65 years or older. Agencies that provide at-home care and assisted living services to seniors can assist the OFD in identifying occupants who are at increased fire risk due to unsafe living conditions (e.g. absence of a working smoke alarm) which may require follow up or inspection.

Community Service Agency	Types of Assistance Provided
Community Development Halton	Community Development Halton is a community-based organization that is committed to social change within the Halton Region. This is accomplished through: • identifying community needs; • developing community awareness of identified trends and needs; • facilitating and supporting community response to identified trends and needs; • facilitating communication and coordinated planning between members of the community, local organizations and governments to develop ways to address these needs; and • advocating for change. A partnership between the fire department and Community Development Halton could aid in the facilitation of communicating public fire and life safety awareness to the public.
Links2Care (located in Oakville)	Links2Care provides social support to seniors and adults living with disability within Halton Region and the Mississauga area. The organization offers a home maintenance and repair program that helps seniors and those living with disabilities with tasks inside and outside of their home. The fire department can provide educational materials and awareness about the proper installation of smoke alarms and fire and life safety information to employees/volunteers of Links2Care who are responsible for home maintenance and repair.

9.0 Economic Profile

As referenced in **O. Reg. 378/18**, the economic profile assessment includes analysis of the economic sectors affecting the community that are critical to its financial sustainability. This involves economic drivers in the community that have significant influence on the ability of the community to provide or maintain service levels. The following sections consider these economic characteristics within the Town of Oakville.

9.1 Economic Sectors and Employers in Oakville

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 local economy and employment.

The workforce and economy of the Town of Oakville are characterized by the North American Industry Classification Systems (NAICS). **Table 21** displays the number of employees by industry. Industries are categorized as professional, scientific and technical services, retail trade, and finance and insurance as shown in **Figure 20**.

Table 21: Industry in Oakville – Labour Force by Industry

Industry	Number of Employees
Total – Labour force aged 15 years and over by industry – Sectors –NAICS 2017 – 25% sample data	113,190
Industry – Not Applicable	3,660
All industries	109,530

Figure 20: Industry in Oakville

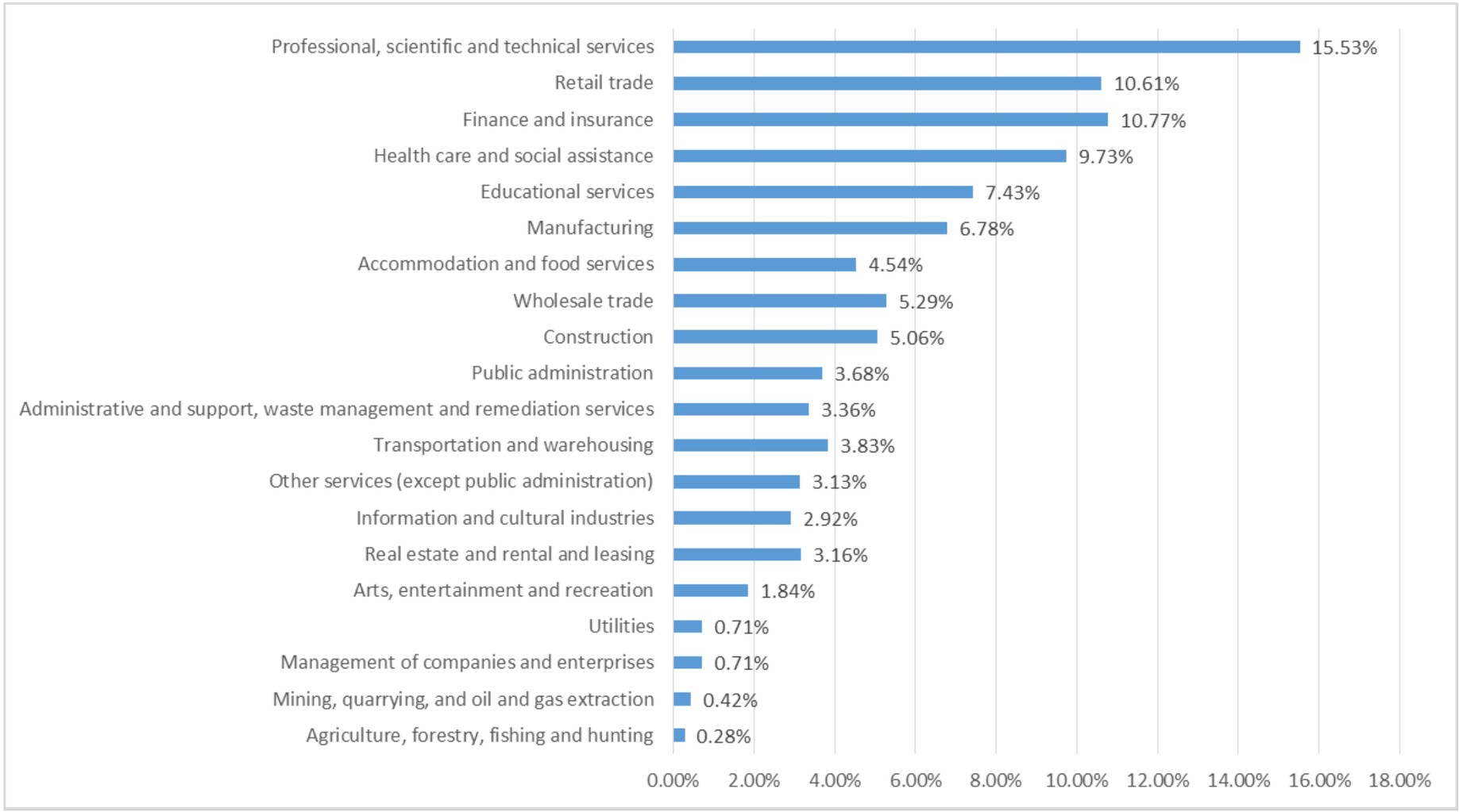


Figure Source: 2021 Census, Statistics Canada[23]

[23] Statistics Canada. 2022. (table). Census Profile. 2021 Census of Population. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released December 15, 2022. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (accessed January 10, 2023).

The Town of Oakville is located in Halton Region, within the Greater Toronto Area (GTA) on the shores of Lake Ontario. In 2021, the average household income was $180, 000 with a population of 231,000, making it Ontario's largest town by population. Oakville is a densely populated area that provides the benefits of an urban centre while maintaining its small-town character. Oakville has a strong and diversified economy, offering a great location for new and expanding businesses.

The community is home to the headquarters of leading industries including Ford Motor Company of Canada, Siemens Canada, Collins Aerospace, PwC, Aviva Canada, Rockstar Toronto and Geotab. Oakville has existing vacant employment land, allowing the community room to grow its business base and add new employment opportunities. Sheridan College's Oakville campus and access to the GO Train make Oakville an attractive place for people to live and expand business opportunities.

The Town of Oakville has introduced an Economic Development Strategy (2019 to 2024) to improve community liveability, attract new investment and support existing companies. This strategy includes attracting new investment and jobs, growing the local economy, and creating vibrant commercial districts. The plan focuses on attraction, retention, and expansion of companies through a variety of initiatives to improve Oakville's business improvement areas (BIAs). The Economic Development department is undertaking the development of a new 5-year Economic Development Strategy this year.

The major employers within the Town of Oakville are summarized in **Table 22**. These include employers with automotive manufacturing, education, insurance, engineering services, municipal government, and regional government organizations.

Table 22: Top Employers in Oakville

Employer	Number of Employees
Halton Healthcare	3,927
The Regional Municipality of Halton	3,847
Ford Motor Company of Halton	3,846
Sheridan College	3,147
Halton District School Board	2,227

Employer	Number of Employees
The Corporation of the Town of Oakville	1,923
Collins Aerospace – UTC Aerospace Systems	1,500
Halton Catholic District School Board	1,077
Geotab	1,000
Siemens Canada Ltd	780

Source: Halton Region Employment Survey, 2021[24]

Key Finding: The Town has identified top employers that contribute to the economic vitality of the community. If a fire were to occur at one of these facilities it could have a negative impact on the financial well-being of the Town.

[24] Invest Oakville. 2022. Top Employers. Economic Development, Town of Oakville. https://invest.oakville.ca/top-employers.html

10.0 Past Loss and Event History Profile

As referenced in **O. Reg. 378/18**, 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 the Town of Oakville.

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 the OFM's Standard Incident Reporting for the period of January 1, 2016, to December 31, 2020, in order to provide a comparison with Provincial fire loss data.

10.1.1 Total Fire Loss

Analysis of the total fire loss within the Town over the five-year period from January 1, 2016, to December 31, 2020, as displayed in **Table 23** includes three categories representing the primary types of fires and the total amount of dollar loss associated with these fires. This includes 314 structure fires, 44 outdoor fires, and 169 vehicle fires representing $41,275,195 in total dollar loss.

Over this five-year period, the Town averaged 105 fires and $8,255,039 in property loss per year. On average, 63 structure fires occur per year with an average structural fire property loss of $6,680,570 per year.

Table 23: Total Fire Loss – Town of Oakville

Year	Structure # of Fires	Structure Loss ($)	Outdoor # of Fires	Outdoor Loss ($)	Vehicle # of Fires	Vehicle Loss ($)	Total # of Fires	Total Loss ($)
2016	72	$9,470,580.00	15	$50,335.00	30	$584,510.00	117	$10,105,425.00
2017	65	$4,446,885.00	8	$12,220.00	27	$574,450.00	100	$5,033,555.00
2018	56	$4,158,480.00	6	$5,100.00	28	$580,500.00	90	$4,744,080.00
2019	56	$4,732,450.00	9	$19,405.00	48	$4,624,900.00	113	$9,376,755.00
2020	65	$10,594,455.00	6	$7,625.00	36	$1,413,300.00	107	$12,015,380.00
Total	**314**	**$33,402,850.00**	**44**	**$94,685.00**	**169**	**$7,777,660.00**	**527**	**$41,275,195.00**
% all fires	**59.6%**	**80.9%**	**8.3%**	**0.2%**	**32.1%**	**18.8%**	**N/A**	**N/A**
Average 2016 to 2020	**63**	**$6,680,570.00**	**9**	**$18,937.00**	**34**	**$1,555,532.00**	**105**	**$8,255,039.00**

Source: OFM Standard Incident reporting (2016 to 2020 data).

Table 24 compares the number of structure fires and the associated total property loss within the Town of Oakville for the period from January 1, 2016, to December 31, 2020, to the number of structure fires and total property loss that occurred across Ontario for the same period.

Structure fires accounted for 59.6% of all fires in Town of Oakville and 64.4% of all fires that occurred in the Province, over the five year period from January 1, 2016 to December 31, 2020. As such, structure fires accounted for the highest percentage of fires and total dollar loss for fires in the Town and in the Province. The average structure fire loss (2016 to 2020) as a percentage of all fire loss in Oakville was 59.8%, which is 4.6 percentage points lower than that of the Province.

Table 24: Structure Fires and Property Loss – Town of Oakville and Province of Ontario

Year	Oakville Structure Fires	Loss ($)	% All Fires	% All Dollar Loss	Ontario Structure Fires	Loss ($)	% All Fires	% All Dollar Loss
2016	72	$9,470,580.00	61.5%	93.7%	7,171	$654,764,771.00	66.1%	88.2%
2017	65	$4,446,885.00	65.0%	88.3%	6,683	$658,345,490.00	64.8%	89.1%
2018	56	$4,158,480.00	62.2%	87.7%	7,012	$734,340,655.00	63.4%	87.6%
2019	56	$4,732,450.00	49.6%	50.5%	6,715	$860,432,756.00	62.9%	88.7%
2020	65	$10,594,455.00	60.7%	88.2%	6,841	$790,693,587.00	64.5%	87.5%
Total for Structure Fires	**314**	**$33,402,850.00**	**59.6%**	**80.9%**	**34,422**	**$3,698,577,259.00**	**64.4%**	**88.2%**
Total for all Fire Loss	**527**	**$41,275,195.00**	**N/A**	**N/A**	**34,422**	**$3,698,577,259.00**	**N/A**	**N/A**
Average 2016-2020	**62.8**	**$6,680,570.00**	**59.8%**	**81.7%**	**6,884**	**$739,715,451.00**	**64.4%**	**88.2%**

Source: OFM Standard Incident Reporting (2016 to 2020 data).

Key Finding: Over the five-year period from January 1, 2016, to December 31, 2020, the Town averaged 63 structure fires per year.

10.1.2 Fires by Occupancy Type

This section assesses the structure fires that occurred over the period from January 1, 2016, to December 31, 2020, based on the type of occupancy. OFM's Standard Incident Reporting data was used to inform this analysis.

The data in **Table 25** indicates that during this period, Oakville experienced a total of 314 structure fires; 242 of these fires, or 77.1%, occurred in Group C – Residential occupancies, which exceeds the Provincial rate by 3.7 percentage points. These fires account for 89.1% of the Town's total fire loss for this period, which is 24.1 percentage points higher than that of the Province.

The second most significant source of property loss in the Town, accounting for 5.2% of structure fire loss and 4.1% of the total structure fires over the same period, is Group F – Industrial occupancies (lower than the Provincial structure fire loss within this occupancy type by 7.3%).

The third most significant source of property loss in the Town, accounting for 6.1% of structure fires and 3.0% structure fire loss over the same period, is Group E – Mercantile occupancies. In comparison, Group E – Mercantile occupancies make up 3.4% of Provincial structure fires and 5.1% of Provincial structure fire loss.

Some trends within this historical fire loss reporting for the Town could be explained by the distribution of building stock by major occupancy classification within the Town. For example, as found within **Section 3.0 – Building Stock** of this CRA, 91.77% of the building stock classified by the OBC is Group C – Residential. It is therefore reasonable to expect that Group C would account for the highest proportion of structure fires.

Table 25: Fires by OBC Major Occupancy Classification – Town of Oakville and Province of Ontario

Group	Occupancy Classification	Fires	Oakville % of Structure Fires	Oakville Fire Loss	Oakville % of Fire Loss	Ontario % of Structure Fires	Ontario % of Fire Loss
Group A	Assembly	**11**	3.5%	**$112,080.00**	0.3%	3.7%	4.9%
Group B	Care or Detention	**6**	1.9%	**$51,100.00**	0.2%	1.5%	1.1%
Group C	Residential	**242**	77.1%	**$29,750,105.00**	89.1%	73.4%	65.0%
Group D	Business and Personal Services	**11**	3.5%	**$471,000.00**	1.4%	2.5%	2.4%
Group E	Mercantile	**19**	6.1%	**$989,550.00**	3.0%	3.4%	5.1%
Group F	Industrial	**13**	4.1%	**$1,753,500.00**	5.2%	7.6%	12.5%
Other	Not Classified within the OBC	**10**	3.2%	**$95,515.00**	0.3%	5.3%	1.2%
Farm	Classified within the NFBC	**2**	0.6%	**$180,000.00**	0.5%	2.6%	7.9%
Total	**All Classifications**	**314**	**100.0%**	$33,402,850.00	**100.0%**	**100.0%**	**100.0%**

Source: OFM Standard Incident Reporting (2016 to 2020)

Key Finding: Over the five-year period from January 1, 2016, to December 31, 2020, structure fires occurring in Group C – Residential Occupancies account for 77.1% of total structure fires within the Town, which is 3.7% higher than the Province.

Key Finding: Over the five-year period from January 1, 2016, to December 31, 2020, structure fires occurring in Group E– Mercantile Occupancies account for 6.1% of total structure fires within the Town, which is 2.7% higher than the Province.

10.1.3 Civilian Fire Fatalities and Injuries

As shown in **Table 26**, according to OFM Standard Incident Reporting, over the five-year period from January 1, 2016, to December 31, 2020, there were 25 reported injuries and three reported fire fatalities within the Town of Oakville. The majority of injuries and all fatalities within the Town occurred in Group C – Residential Occupancies. This finding is consistent with the fire loss statistics by occupancy type, whereby the majority of fire losses within the Province and within the Town occurred in Group C – Residential occupancies.

Table 26: Civilian Fire Fatalities and Injuries by OBC Major Occupancy Classification – Town of Oakville

Group	Occupancy Classification	Injuries	Fatalities
Group A	Assembly	0	0
Group B	Care or Detention	0	0
Group C	Residential	24	3
Group D	Business and Personal services	0	0
Group E	Mercantile	0	0
Group F	Industrial	1	0
Other	Not Classified within the OBC	0	0
NBC	All Classifications and Other	0	0
All Groups	**Total**	**25**	**3**

Source: OFM Standard Incident reporting (2016 to 2020 data)

Identified Risk: Most reported fire related civilian injuries (24) occurred in Group C – Residential Occupancies.

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."[25] 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 OFM 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 27 presents the reported fire causes for the Town compared to the Province over the five year period from January 1, 2016 to December 31, 2020.

The "unintentional" category recognizes a number of the common causes of a fire that represent both human behavioural causes (e.g., playing with matches) and equipment failures (e.g., mechanical failure). In total, unintentional fire causes represented 77.1% of the 314 fires during this period (compared to 60.1% within the Province). This suggests a need for targeted education programs about fire causes and prevention. The leading cause of unintentionally set fires in Oakville was misuse of ignition source at 29.0% (91 fires), compared to 29.5% in the Province, followed by mechanical/electrical failure at 16.6% (52 fires), compared to 15.3% in the Province.

The "intentional" category recognizes the cause of a fire to be started for a specific reason. These are typically classified as arson fires, acts of vandalism, or to achieve personal gain through insurance payment for example. As indicated in **Table 27**, 5.1% of fires are reported as intentional (i.e., combined categories of arson and vandalism) within the Town over the five-year period from January 1, 2016, to December 31, 2020. This is lower than the Provincial total of intentional fires (7.8%).

In Oakville, the cause of 2.5% of fires was 'other', 3 percentage points lower than the Province, and the cause of 15.3% of fires was 'undetermined', 3.5 percentage points lower than the Province.

[25] Source: NFPA, Glossary of Terms, 2019 Edition.

Table 27: Reported Fire Cause – Town of Oakville and Province of Ontario

Nature	Fire Cause	Oakville # of Fires	Oakville % of Fires	Ontario # of Fires	Ontario % of Fires
Intentional	Arson	13	4.1%	2,148	6.2%
Intentional	Vandalism	3	1.0%	561	1.6%
Intentional	Other Intentional	0	0.0%	15	0.0%
Unintentional	Children Playing	2	0.6%	142	0.4%
Unintentional	Design/Construction/ Maintenance Deficiency	21	6.7%	2,380	6.9%
Unintentional	Mechanical/Electrical Failure	52	16.6%	5,271	15.3%
Unintentional	Misuse of Ignition Source	91	29.0%	10,167	29.5%
Unintentional	Other Unintentional	46	14.6%	2,399	7.0%
Unintentional	Undetermined	28	8.9%	2,838	8.2%
Unintentional	Vehicle Collision	2	0.6%	29	0.1%
Other	Other	8	2.5%	1,903	5.5%
Undetermined	Undetermined	48	15.3%	6,476	18.8%
Unknown, not reported	Unknown, not reported	0	0.0%	93	0.3%
Total	**All Causes**	**314**	**100.0%**	**34,422**	**100.0%**

Source: OFM Standard Incident Reporting (2016 to 2020 data).

Identified Risk: Of the fires occurring in the Town over the five-year period from January 1, 2016, to December 31, 2020, the leading cause of unintentionally set fires was due to misuse of ignition source at 29.0% (91 fires), compared to 29.5% in the Province.

Identified Risk: Of the fires occurring in the Town over the five-year period from January 1, 2016, to December 31, 2020, the second most common cause of unintentionally set fires was due to mechanical/electrical failure at 16.6% (52 fires), compared to 15.3% in the Province.

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 28** provides fire loss by source of ignition for the Town of Oakville and the Province.

For the period 2016 to 2020, the most common reported ignition sources within the Town are "cooking equipment" and "miscellaneous" both at 27.4% (higher than the Province by 10.5 percentage points and 17.3 percentage points, respectively), and "open flame tools/smokers' articles" at 13.7% (lower than the Province by 0.3 percentage points). This presents the opportunity to incorporate key messages relating to cooking and smoking in public education materials.

Table 28: Source of Ignition – Town of Oakville and Province of Ontario

Reported Ignition Source	Oakville # of Fires	Oakville % of Fires	Ontario # of Fires	Ontario % of Fires
Appliances	18	5.7%	1,528	4.4%
Cooking Equipment	86	27.4%	5,828	16.9%
Electrical Distribution	16	5.1%	2,991	8.7%
Heating Equipment, chimney etc.	21	6.7%	2,618	7.6%
Lighting Equipment	9	2.9%	1,047	3.0%
Open flame tools/smokers articles	43	13.7%	4,831	14.0%
Other electrical/mechanical	19	6.1%	1,734	5.0%
Processing Equipment	3	1.0%	440	1.3%
Miscellaneous	86	27.4%	3,474	10.1%
Exposure	3	1.0%	1,652	4.8%
Undetermined	10	3.2%	8,167	23.7%
Unknown, not reported			112	0.3%
Total	**314**	**100.0%**	**34,422**	**100.0%**

Source: OFM Standard Incident Reporting (2016 to 2020 data)

Key Finding: Of the fires occurring within the Town over the five-year period from January 1, 2016, to December 31, 2020, 27.4% of fires had a reported ignition source of cooking equipment, which is 10.5 percentage points higher than the Province (16.9%).

Key Finding: Of the fires occurring within the Town over the five-year period from January 1, 2016, to December 31, 2020, 27.4% of fires had a reported ignition source of "miscellaneous", which is 17.3 percentage points higher than the Province (10.1%).

Key Finding: Of the fires occurring within the Town over the five-year period from January 1, 2016, to December 31, 2020, 13.7% of fires had a reported ignition source of open flame/tools/smokers articles, which is 0.3 percentage points lower than the Province (14.0%).

10.1.6 Smoke Alarm Status Processing Equipment

In Ontario, smoke alarms are required on every level of a dwelling and between sleeping areas, notifying building occupants of a fire and allowing for prompt escape. As a result, smoke alarm programs and compliance are a key component of public education and fire prevention activities provided by the municipal fire departments across the Province.

Data is publicly available at the provincial level for the smoke alarm status in the event of a fire and municipalities collect smoke alarm status information and report it to the Province. This data was provided by the OFM as part of the CRA for both the Town of Oakville and the Province of Ontario over a five-year period from January 1, 2016, to December 31, 2020, for Group C - Residential occupancies. **Table 29** highlights whether a smoke alarm was present and operating on the floor or in the suite of fire origin.

Table 29: Smoke Alarm Presence and Operation on the Floor of Fire Origin – Town of Oakville and Province of Ontario

Smoke Alarm Status on Floor of Origin	Oakville 2016	Oakville 2017	Oakville 2018	Oakville 2019	Oakville 2020	Oakville Total	Oakville %	Ontario Total	Ontario %
No Smoke Alarm Present	10	3	4	7	10	**34**	**14.0%**	4,206	17.4%
Smoke Alarm Present and Operated	24	24	21	22	23	**114**	**47.1%**	10,805	44.6%
Smoke Alarm Present, Did Not Operate	7	11	7	7	6	**38**	**15.7%**	3,200	13.2%
Smoke Alarm Present, Operation Undetermined	9	5	6	3	5	**28**	**11.6%**	1,910	7.9%
Smoke Alarm Presence Undetermined	6	6	7	5	4	**28**	**11.6%**	4,052	16.7%
Unknown, Not Reported	0	0	0	0	0	**0**	**0%**	61	0.3%
Total	**56**	**49**	**45**	**44**	**48**	**242**	**100.0%**	24,234	100.0%

Source: OFM Standard Incident Reporting (2016 to 2020 data).

Over the five-year period from January 1, 2016 to December 31, 2020, there was no smoke alarm present for 14.0% of occurrences in the Town compared to 17.4% in the Province. A further 38 incidents (or 15.7%) had a smoke alarm present but it did not operate (compared to 13.2% in the Province). In 47.1% of occurrences in Oakville, a smoke alarm was present and operated. Undetermined smoke alarm presence or operation occurred in 23.2% of instances in the Town.

Provincial and local statistics support having a targeted and proactive smoke alarm program in place and suggest the need for increased enforcement strategies for those properties that are non-compliant. Further the number of non-operational smoke alarms suggest education specific to checking and testing smoke alarms is warranted.

Key Finding: Over the five-year period from January 1, 2016, to December 31, 2020, of the fire loss incidents in Group C – Residential occupancies, 14.0% of incidents did not have a smoke alarm present (compared to 17.4% in the Province).

Key Finding: Over the five-year period from January 1, 2016, to December 31, 2020, 47.1% of the fire loss incidents in Group C – Residential occupancies had a smoke alarm present and operating compared to 44.6% in the Province.

10.2 Town Event History

Event history seeks to apply the OFD's historic emergency call data to develop an understanding of community risk. Most of the analysis in this section is based on data provided by OFD for the time period from January 1, 2015, to December 31, 2021. This section provides a statistical assessment of historic emergency call volumes for the Town by different time segments (e.g., annual calls, monthly calls, weekly calls, daily calls).

The analysis included within this section also provides a detailed breakdown of calls by OFM response type. Data used in the analysis of call volume by type was sources from the OFM's Standard Incident Reporting because call volume by type is compared to the Province as a whole.

The volume and frequency of historic calls informs the understanding of response probability. The types of calls inform the potential consequences of OFD 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 – All Incident Types

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 the OFD for the time period from January 1, 2015, to December 31, 2021.[26]

10.2.1.1 Annual Emergency Call Volume – All Incident Types

The analysis of annual emergency call volume can be beneficial in garnering an understanding of where trends may be evolving, or changes in community emergency response demand may be occurring. A summary of the total number of emergency calls for the period from January 1, 2015 to December 31, 2021 is shown in **Figure 21**.

This analysis indicates an increase in the total emergency call volume within the Town over this period from 6,166 calls in 2015 to 6,983 calls in 2018 with a decrease in calls from 6,806 in 2019 to 6,366 in 2020. Call volume increased again in 2021 with 6,965 calls. This decrease in call volume in 2020 could be attributed to the unique circumstances of the COVID-19 pandemic resulting in an anomalous year of call volume. Overall, there was an average of 6,684 calls per year over this seven-year timeframe. Generally speaking, we expect the annual call volume to increase as the population of the Town increases with planned growth and development.

[26] The data used for the analysis is a compilation of each of the seven years (2015 to 2021) of unit response time reports. For the majority of statistics, only the first truck is considered; this is to ensure a single incident is not counted multiple times as this would not provide an accurate representation of the data. To determine which entries were the first truck entries, the dataset was sorted by Provincial Incident Number then by Arrival Time. The first entry for each incident number was included in the First Truck dataset. The second entry for each incident number was assumed to be the second truck. It should also be noted that calls from stations outside of Oakville were excluded from the analysis. Similarly, all calls with no response type code were excluded from response type analyses.

Figure 21: Annual Call Volume – All Incidents, January 1, 2015, to December 31, 2021

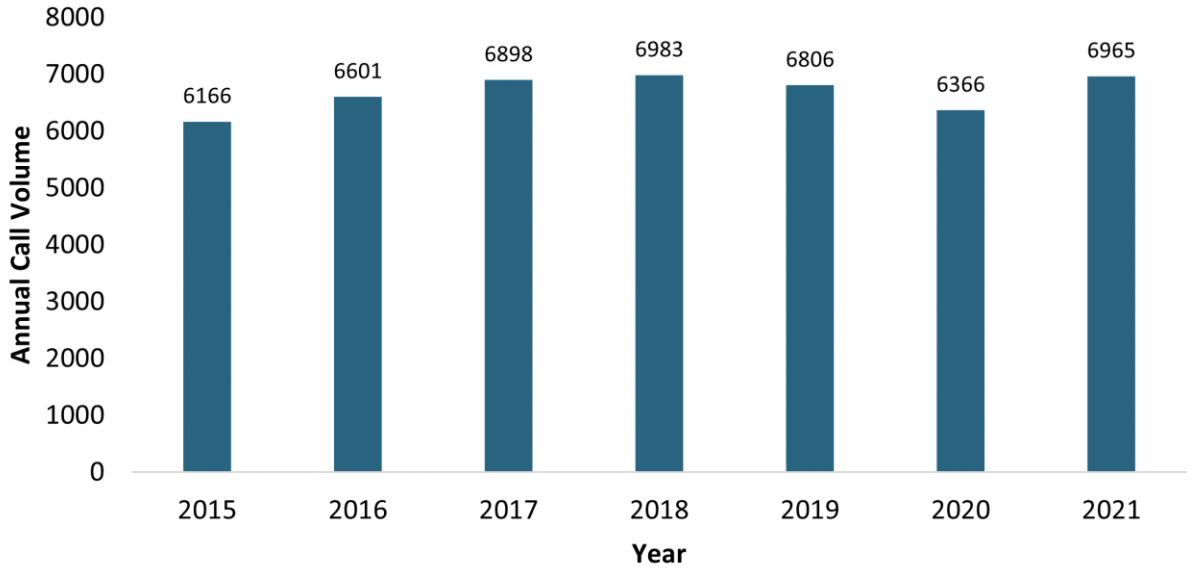


Figure Source: Oakville Fire Department Emergency Response Call Data.

Key Finding: Over the period from January 1, 2015, to December 31, 2021, the volume of emergency calls responded to by the Oakville Fire Department modestly increased between 2015 and 2021.

10.2.1.2 Monthly Average Emergency Call Volume – All Incident Types

The analysis of average emergency call volume for the period from January 1, 2015, to December 31, 2021, by month can be beneficial to identifying any potential variances that may be associated with seasonal trends related to activities such as more motor vehicle travel during summer months, or use of heating devices during winter months.

From January 1, 2015, to December 31, 2021, the OFD experienced an average monthly emergency call volume of 557 calls. **Figure 22** illustrates that the highest volume of emergency calls occurred in July, October and December, however there is a relatively even distribution of calls throughout the year.

Figure 22: Average Call Volume by Month – All Incidents, January 1, 2015, to December 31, 2021

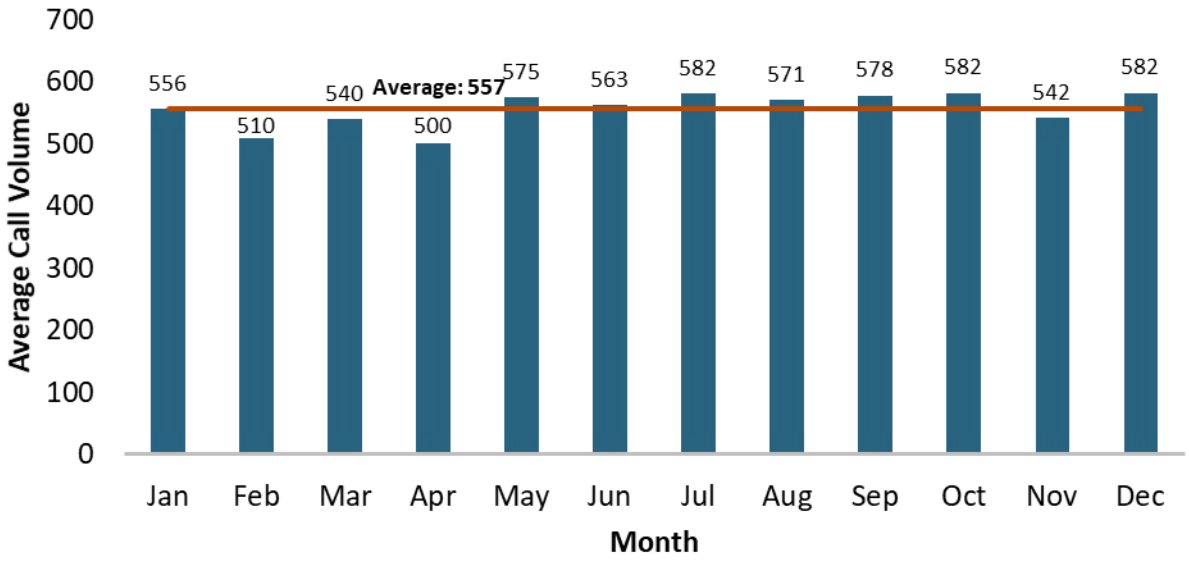


Figure Source: Oakville Fire Department Emergency Response Call Data (2015 to 2021).

10.2.1.3 Weekly Average Emergency Call Volume – All Incident Types

The analysis of average call volume for the period from January 1, 2015, to December 31, 2021, by day of the week as shown in **Figure 23** which illustrates that there is little variability in call volume by day of the week. The highest number of emergency calls occur Tuesdays, Fridays and Saturdays, while the lowest number of emergency calls occur on Mondays.

Figure 23: Average Call Volume by Day of Week – All Incidents, January 1, 2015, to December 31, 2021

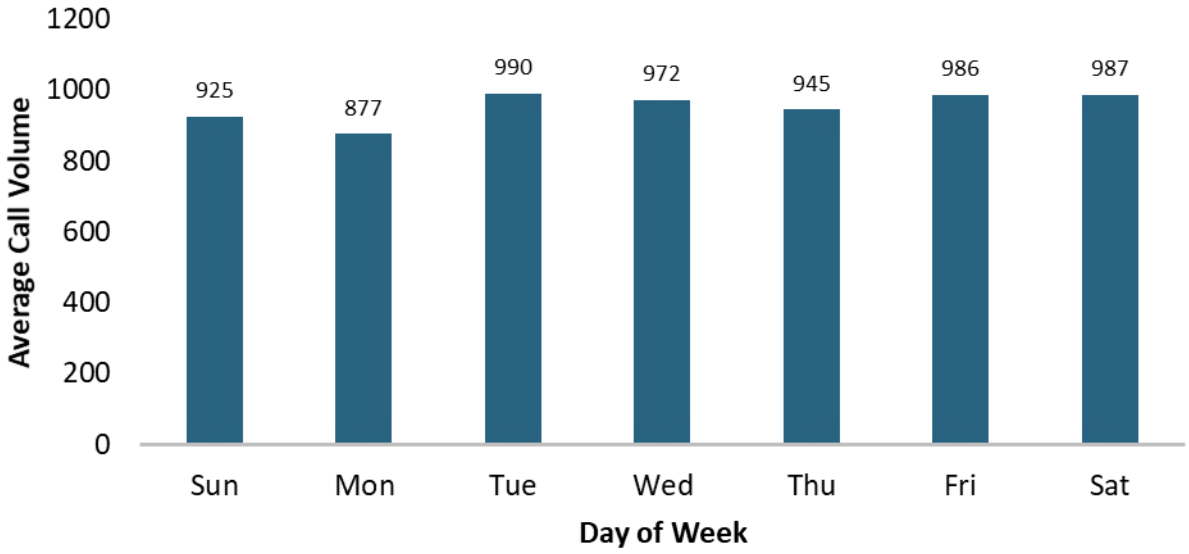


Figure Source: Oakville Fire Department Emergency Response Call Data (2015 to 2021).

10.2.1.4 Daily Emergency Call Volume – All Incident Types

Figure 24 indicates that for the period from January 1, 2015, to December 31, 2021, a higher emergency call volume is typically experienced between 8:00 AM and 8:00 PM. The lowest percentage of emergency call volume typically takes place between the hours of 1:00 AM and 6:00 AM when the majority of the population is typically sleeping.

Figure 24: Average Call Volume by Time of Day – All Incidents January 1, 2015, to December 31, 2021

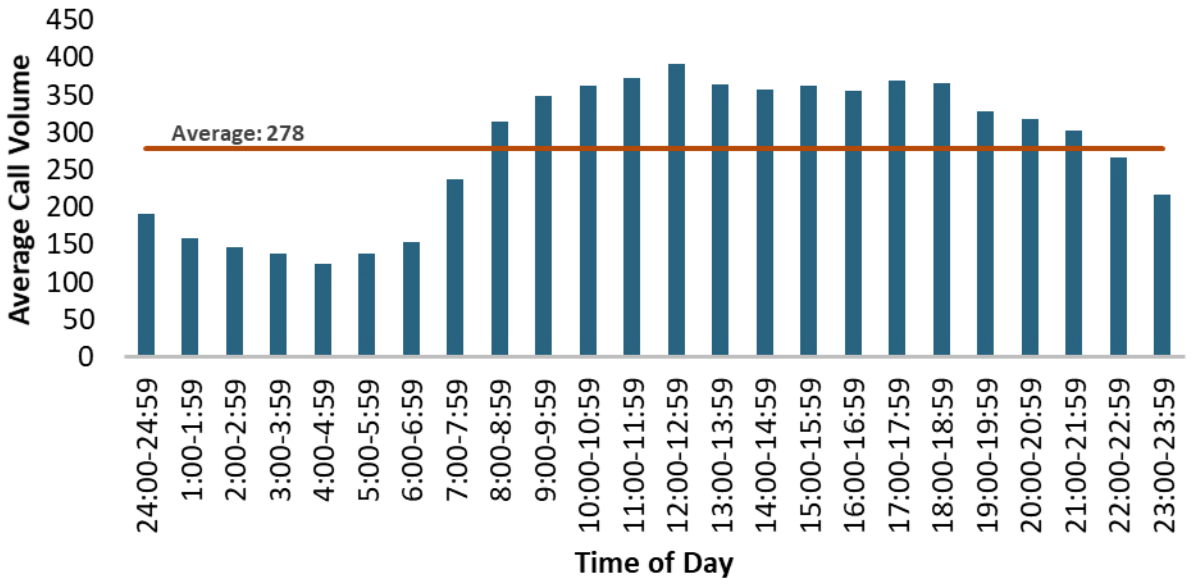


Figure Source: Oakville Fire Department Emergency Response Call Data (2015 to 2021).

10.2.1.5 Total Emergency Call Volume – All Incident Types

This section illustrates the analysis of all emergency call volumes for the Town of Oakville and the Province of Ontario for the period from January 1, 2016, to December 31, 2020 by OFM emergency response type. Note that data used in the analysis of call volume by type was sourced from the OFM's Standard Incident Reporting because call volume by type is compared to the Province as a whole. Data for 2021 for the Province as a whole is not currently available from OFM and therefore, the data used in this analysis is for January 1, 2016 to December 31, 2020.

Figure 25 illustrates that during this period, 51.5% of the total emergency calls that the OFD responded to were medical/resuscitator incidents (higher than the Province by 8.6 percentage points). Responding to false fire calls was the second highest percentage of total emergency calls representing 14.8% of the fire services' total emergency call volume (slightly lower than the Province by 1.4 percentage points). Rescue calls represent the third highest percentage of emergency call volume responded to by the OFD at 9.2% (lower than the Province by 1.8 percentage points).

Figure 25: Percentage of OFD Calls by OFM Response Type January 1, 2016, to December 31, 2020

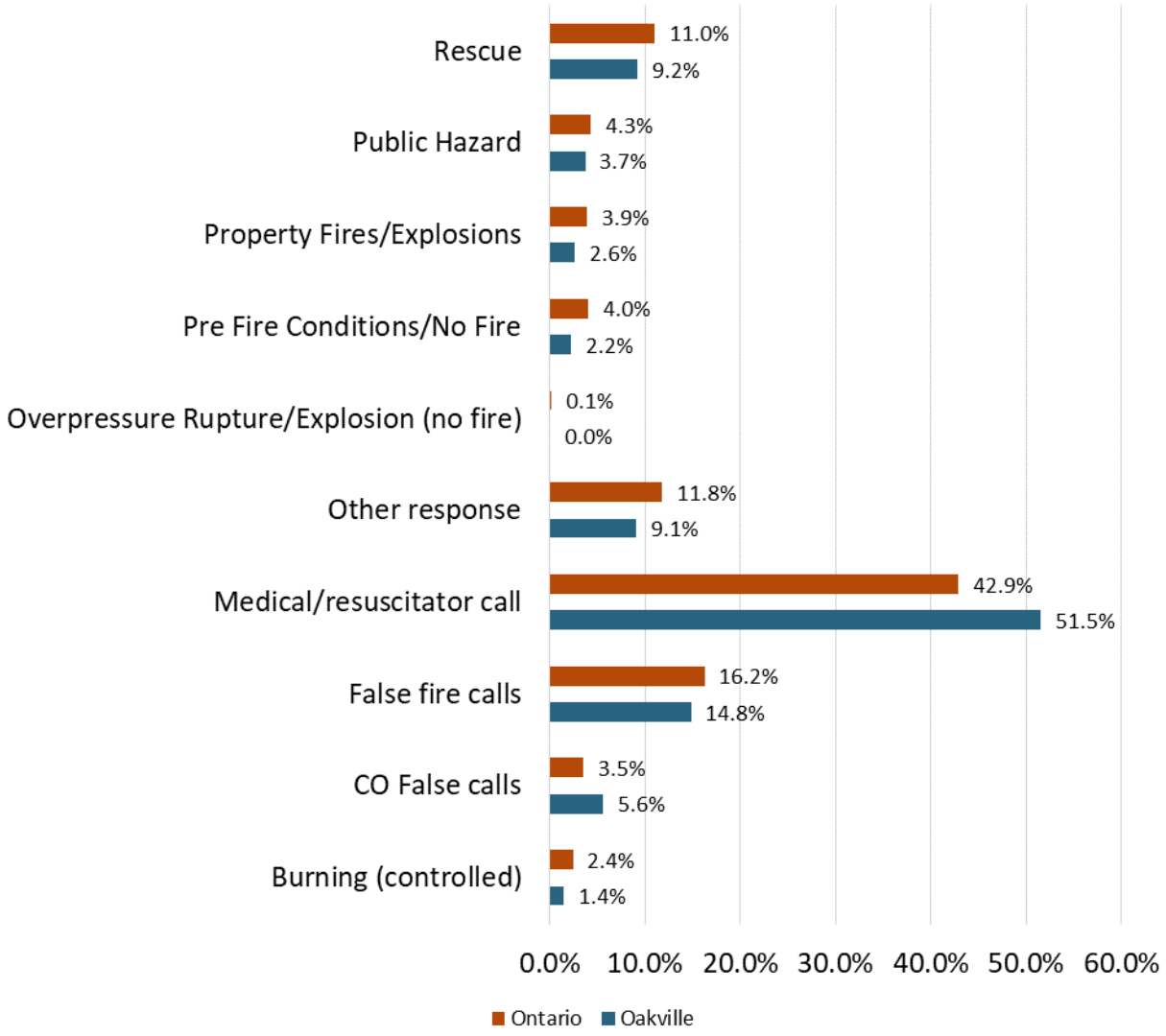


Figure Source: Office of the Fire Marshal and Emergency Management, Municipal Emergency Calls by Response Type Class.

Key Finding: For the period from January 1, 2016, to December 31, 2020, the highest percentage of emergency call volume responded to by Oakville Fire Department as defined by the OFM response types was medical/resuscitator calls representing 51.5% of total emergency call volume.

Key Finding: For the period from January 1, 2016, to December 31, 2020, the second highest percentage of emergency call volume responded to by Oakville Fire

Department as defined by the OFM response types was false fire calls representing 14.8% of total emergency call volume.

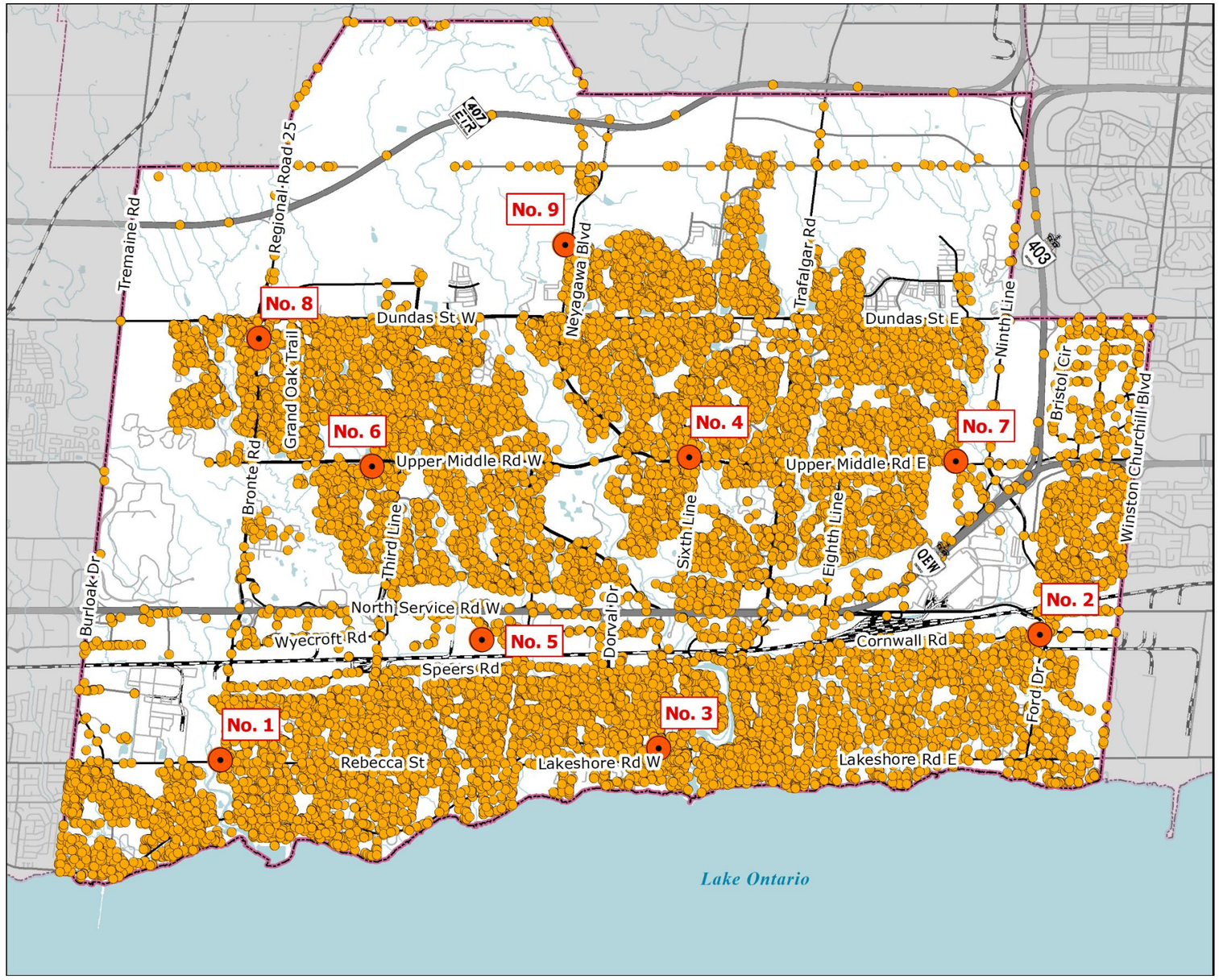
10.2.2 Emergency Call Volume – Spatial Modelling

The analysis within this section illustrates the distribution of the emergency call volume within the Town for the period from January 1, 2015, to November 2, 2022. The analysis includes the spatial distribution of all emergency incidents that occurred during this period based on the OFM response types including medical/resuscitator, rescue, false fire and fire/explosions incidents over this seven-year period.

10.2.2.1 Spatial Modelling – All Emergency Incidents

Figure 26 illustrates the distribution of all emergency incidents that occurred within the Town over this seven-year period. The model shows a wide distribution of emergency incidents across the Town with a prevalence of incidents throughout residential areas. The spatial concentration of all emergency incidents is shown in **Figure 27** below. There are pockets of areas with a high concentration of all emergency call types throughout the urban areas of the Town. Many of these areas correspond to higher density residential areas, or the Community Core Areas. The highest concentration of calls is found bounded by Dorval Drive, Lakeshore Road, Trafalgar Road and Speers Road/Cornwall Road, which includes Kerr Street Village and downtown Oakville. There is also a notable high concentration of all emergency call types northeast and southeast of Fire Station 4 approximately centred between Sixth Line and Trafalgar Road, and South of Rebecca Street, east of Bronte Road southeast of Fire Station 1.

Figure 26: Spatial Modelling – All Emergency Incidents



SPATIAL MODELLING - ALL EMERGENCY INCIDENTS

Existing Station Location

Call Location (Jan 1st 2015 to Nov 2nd, 2022)

Emergency Incident

BASE DATA

- Town of Oakville Boundary
- Freeway
- Freeway Ramp
- Arterial Road
- Collector Road
- Local Road
- Rail Line
- Water Feature

0 1 2 km

NORTH

DATA PROVIDED BY: TOWN OF OAKVILLE, MNRF

MAP CREATED BY: LK
MAP CHECKED BY: SCD
MAP PROJECTION: NAD 1983 UTM Zone 17N

PROJECT: 21-3053
STATUS: DRAFT
DATE: 2023-08-15

Figure Source: Oakville Fire Department Emergency Response Call Data (2015 to 2022).

Figure 27: Spatial Concentration – All Emergency Incidents

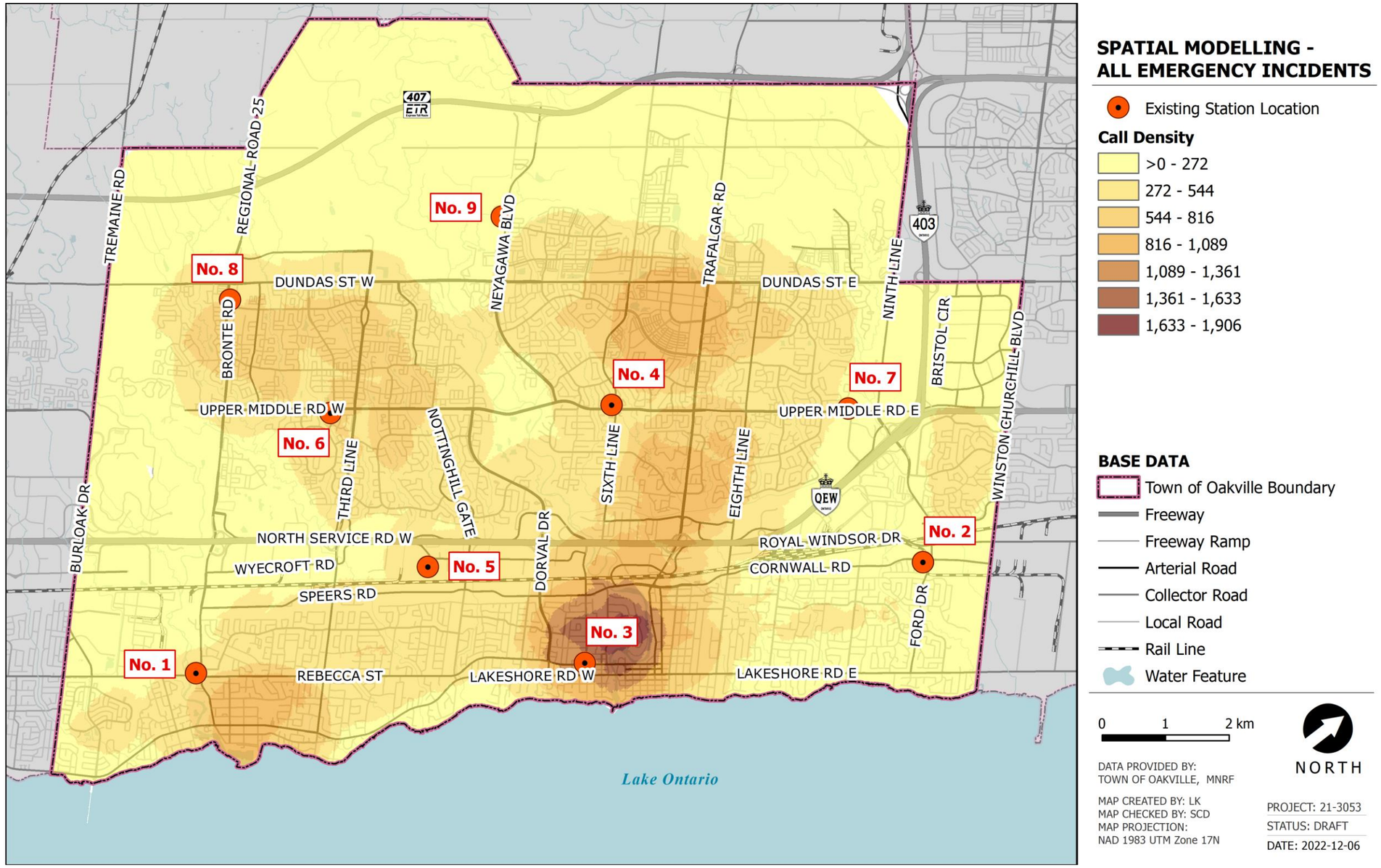
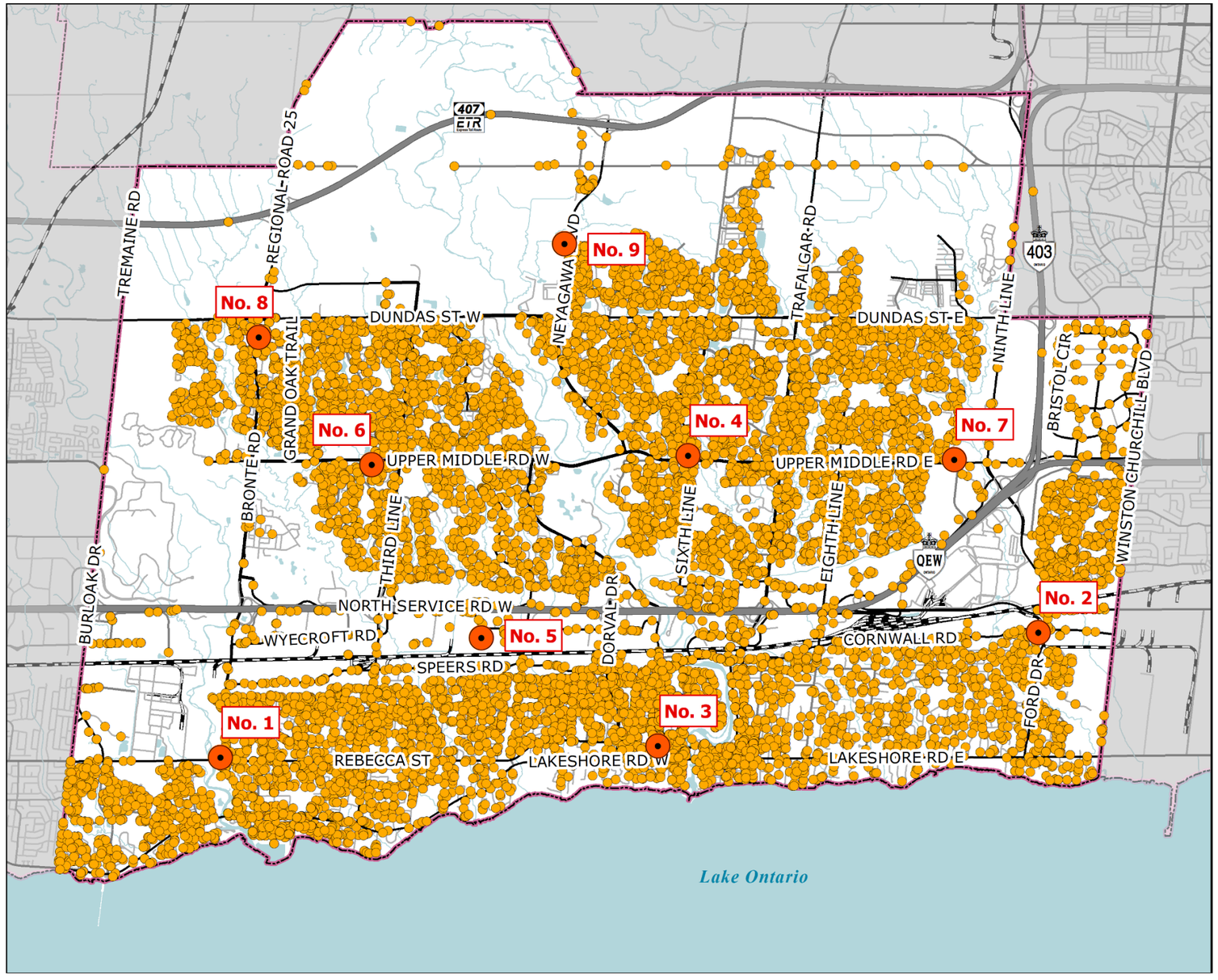


Figure Source: Oakville Fire Department Emergency Response Call Data (2015 to 2022)

10.2.2.2 Spatial Modelling – Medical/Resuscitator Incidents

Figure 28 illustrates the locations where the medical/resuscitator incidents occurred during the period from January 1, 2015, to November 2, 2022. **Figure 29** further illustrates the spatial concentration of medical/resuscitator calls over the seven-year period. Similar to all emergency incident types, there is a noticeable concentration of incidents in the downtown Oakville area, and northeast and southeast of Station 4 and Southeast of Station 1.

Figure 28: Spatial Modelling – Medical/Resuscitator Incidents



SPATIAL MODELLING - MEDICAL / RESUSCITATOR INCIDENTS

Existing Station Location

Call Location
(Jan 1st 2015 to Nov 2nd, 2022)

Medical / Resuscitator Call

BASE DATA

- Town of Oakville Boundary
- Freeway
- Freeway Ramp
- Arterial Road
- Collector Road
- Local Road
- Rail Line
- Water Feature

0 1 2 km

NORTH

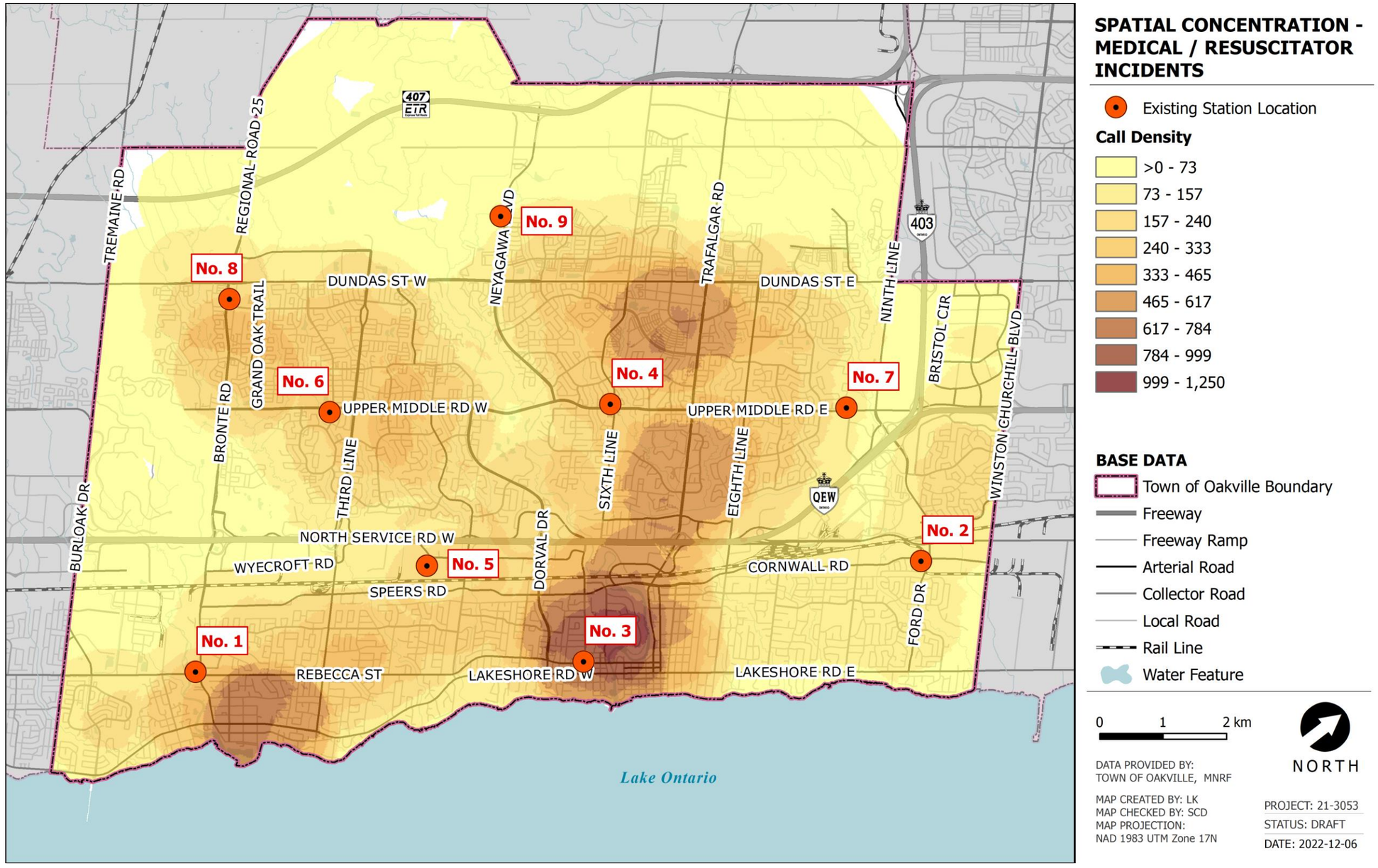
DATA PROVIDED BY:
TOWN OF OAKVILLE, MNRF

MAP CREATED BY: LK
MAP CHECKED BY: SCD
MAP PROJECTION:
NAD 1983 UTM Zone 17N

PROJECT: 21-3053
STATUS: DRAFT
DATE: 2022-12-06

Figure Source: Oakville Fire Department Emergency Response Call Data (2015 to 2022).

Figure 29: Spatial Concentration – Medical/Resuscitator Incidents



SPATIAL CONCENTRATION - MEDICAL / RESUSCITATOR INCIDENTS

Existing Station Location

Call Density

- >0 - 73
- 73 - 157
- 157 - 240
- 240 - 333
- 333 - 465
- 465 - 617
- 617 - 784
- 784 - 999
- 999 - 1,250

BASE DATA

- Town of Oakville Boundary
- Freeway
- Freeway Ramp
- Arterial Road
- Collector Road
- Local Road
- Rail Line
- Water Feature

0 1 2 km

NORTH

DATA PROVIDED BY:
TOWN OF OAKVILLE, MNRF

MAP CREATED BY: LK
MAP CHECKED BY: SCD
MAP PROJECTION:
NAD 1983 UTM Zone 17N

PROJECT: 21-3053
STATUS: DRAFT
DATE: 2022-12-06

Figure Source: Oakville Fire Department Emergency Response Call Data (2015 to 2022).

10.2.2.3 Spatial Modelling – Rescue Incidents

Figure 30 illustrates the locations where the rescue incidents occurred during the period from January 1, 2016, to December 31, 2020. **Table 30** presents a comprehensive analysis of rescue incidents that OFD responded to during this five-year period. The OFD experienced 2,446 calls for rescue services (shown in **Table 30**) of which 87.9% of the rescue incidents were related to vehicle collisions or vehicle extrication.

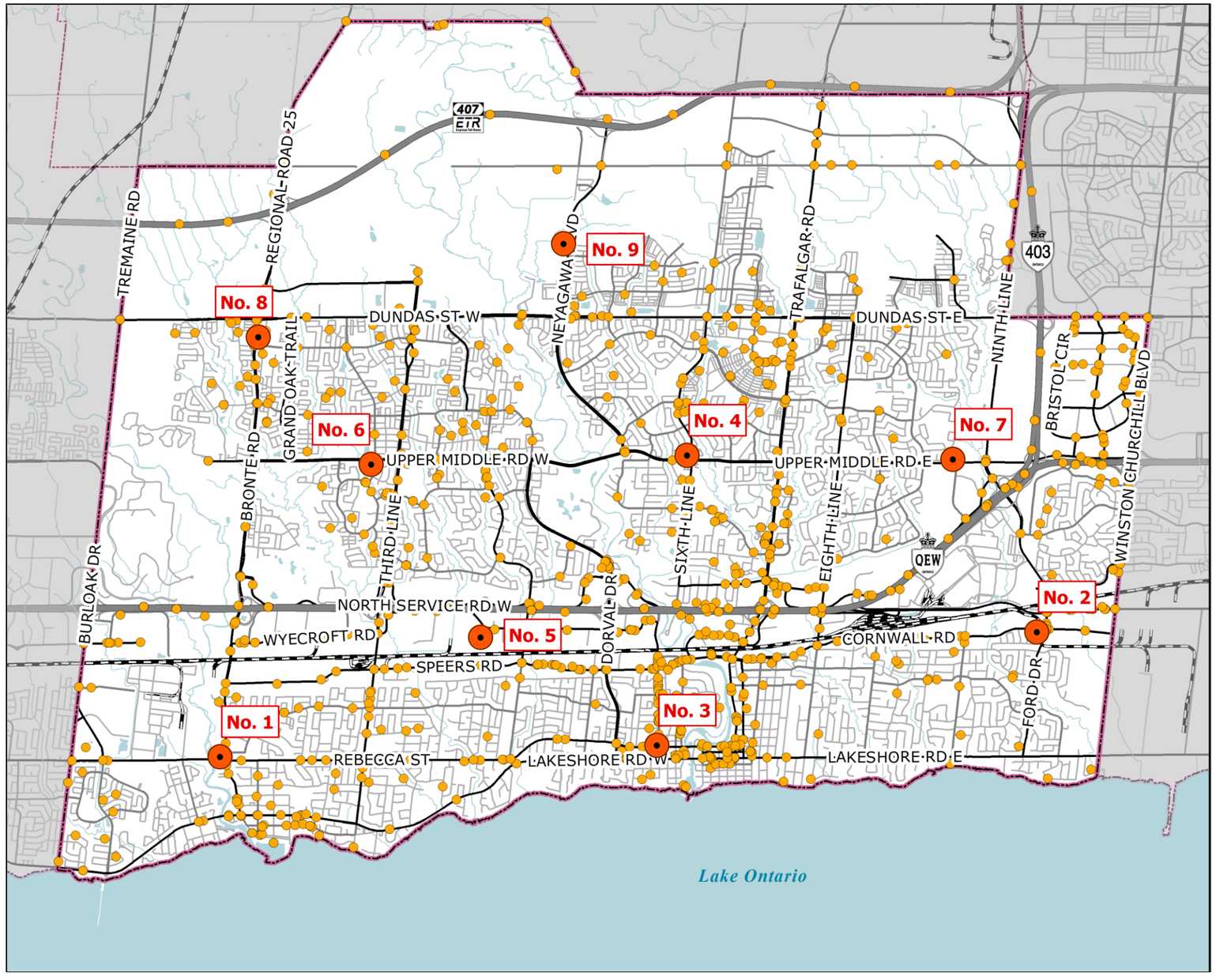
Table 30: Rescue Incidents – Analysis (January 1, 2016, to December 31, 2020)

Response Type	Number of Calls	% of Calls
Animal Rescue	5	0.2%
Building Collapse	1	0.0%
Commercial/Industrial Accident	5	0.2%
High Angle Rescue (non-fire)	5	0.2%
Home/Residential Accident	8	0.3%
Low Angle Rescue (non-fire)	16	0.7%
Other Rescue	50	2.0%
Persons Trapped in Elevator	158	6.5%
Rescue False Alarm	10	0.4%
Rescue No Action Required	31	1.3%
Trench Rescue (non-fire)	2	0.1%
Vehicle Collision	2104	86.0%
Vehicle Extrication	45	1.8%
Water Ice Rescue	1	0.0%
Water Rescue	5	0.2%
Total	**2446**	**100%**

Source: Oakville Fire Department Emergency Response Call Data.

The majority of the rescue incidents the OFD responds to are distributed along major arterial roads within the Town, and along the Queen Elizabeth Way. There is a noticeable prevalence of calls at along Kerr Street, Speers Road/Cornwall Road, Trafalgar Road, Lakeshore Road and QEW in the south-central part of the Town. **Figure 31** further illustrates the concentration of the historical rescue incidents throughout the Town.

Figure 30: Spatial Modelling – Rescue Incidents



SPATIAL MODELLING - RESCUE INCIDENTS

Existing Station Location

Call Location
(Jan 1st 2015 to Nov 2nd, 2022)

Rescue Call

BASE DATA

- Town of Oakville Boundary
- Freeway
- Freeway Ramp
- Arterial Road
- Collector Road
- Local Road
- Rail Line
- Water Feature

0 1 2 km

NORTH

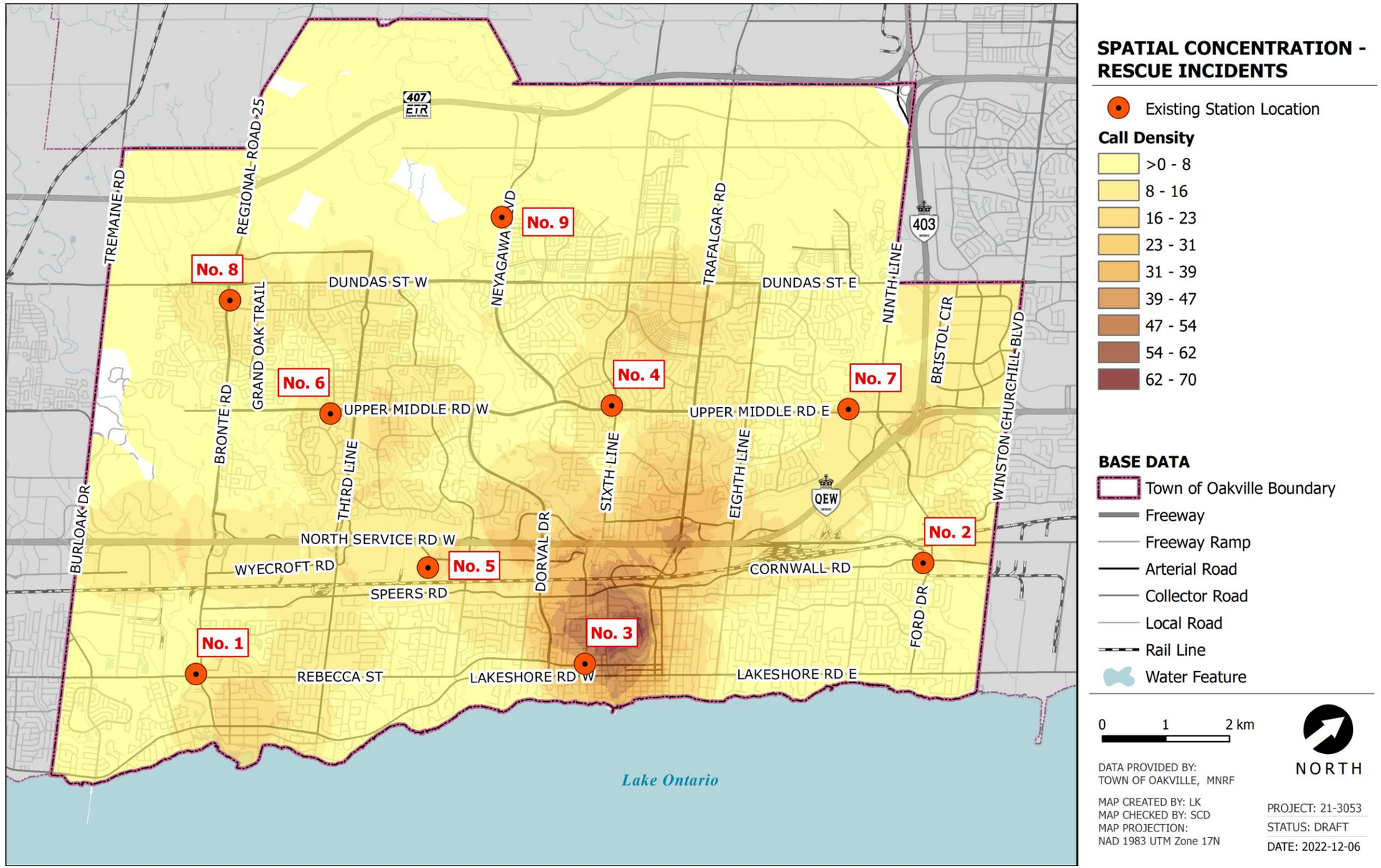
DATA PROVIDED BY:
TOWN OF OAKVILLE, MNRF

MAP CREATED BY: LK
MAP CHECKED BY: SCD
MAP PROJECTION:
NAD 1983 UTM Zone 17N

PROJECT: 21-3053
STATUS: DRAFT
DATE: 2022-12-06

Figure Source: Oakville Fire Department Emergency Response Call Data (2015 to 2022).

Figure 31: Spatial Concentration – Rescue Incidents



SPATIAL CONCENTRATION - RESCUE INCIDENTS

Existing Station Location

Call Density

- >0 - 8
- 8 - 16
- 16 - 23
- 23 - 31
- 31 - 39
- 39 - 47
- 47 - 54
- 54 - 62
- 62 - 70

BASE DATA

- Town of Oakville Boundary
- Freeway
- Freeway Ramp
- Arterial Road
- Collector Road
- Local Road
- Rail Line
- Water Feature

0 1 2 km

NORTH

DATA PROVIDED BY:
TOWN OF OAKVILLE, MNRF

MAP CREATED BY: LK
MAP CHECKED BY: SCD
MAP PROJECTION:
NAD 1983 UTM Zone 17N

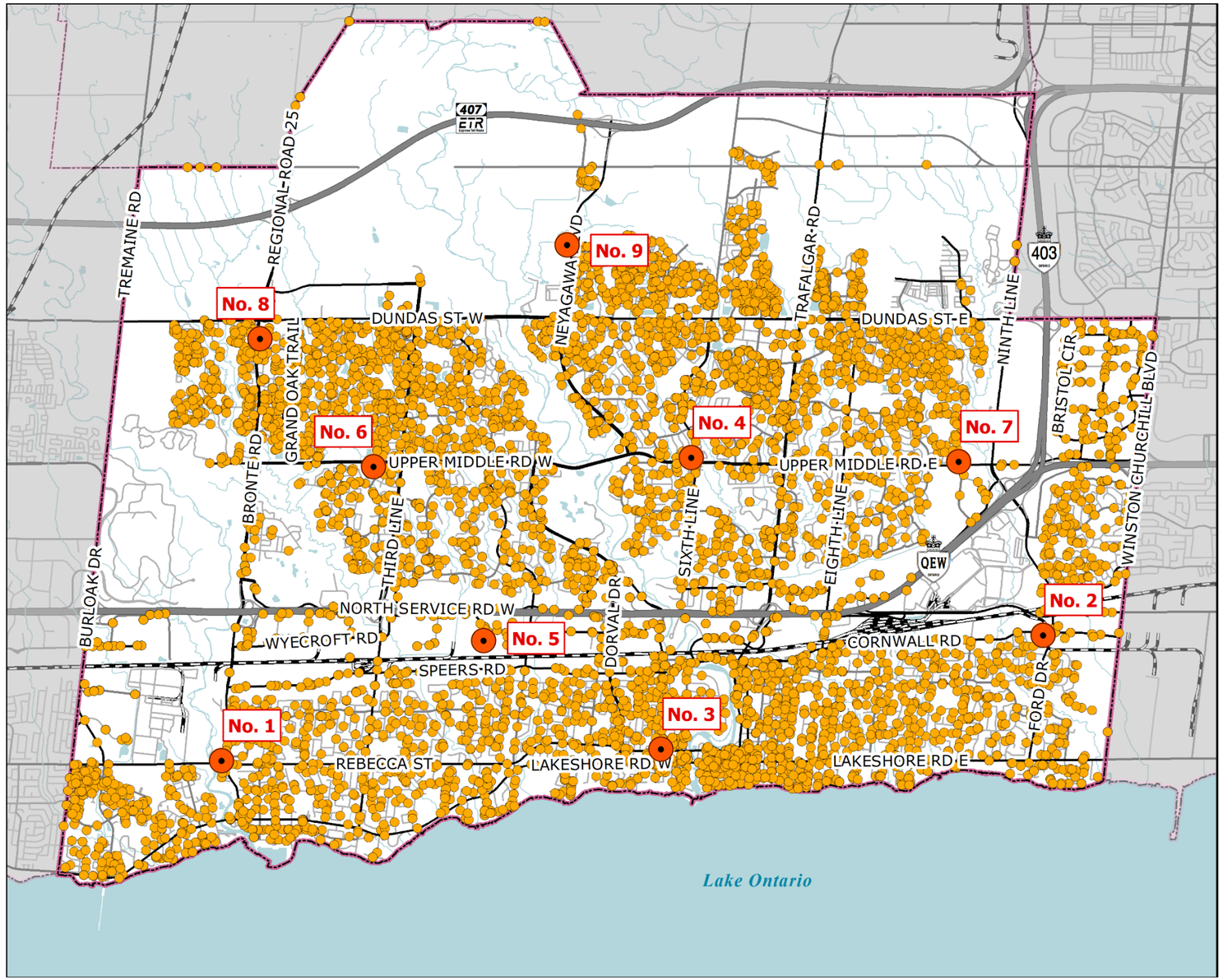
PROJECT: 21-3053
STATUS: DRAFT
DATE: 2022-12-06

Figure Source: Oakville Fire Department Emergency Response Call Data (2015 to 2022)

Spatial Modelling – False Fire Incidents

Figure 30 illustrates the locations where the false fire incidents occurred during the period from January 1, 2015, to November 2, 2022. During this time period false fire incidents accounted for 15.2% of OFD total emergency call volume. **Figure 31** identifies additional the concentration of false fire incidents. The figure indicates that false fire calls do happen across the Town, although there are concentrations of calls around Fire Stations 3, 5, 6 and 8.

Figure 30: Spatial Modelling – False Fire and CO Incidents



SPATIAL MODELLING - FALSE FIRE AND CO INCIDENTS

- Existing Station Location

Call Location (Jan 1st 2015 to Nov 2nd, 2022)

- False Fire or CO Call

BASE DATA

- Town of Oakville Boundary
- Freeway
- Freeway Ramp
- Arterial Road
- Collector Road
- Local Road
- Rail Line
- Water Feature

0 1 2 km

NORTH

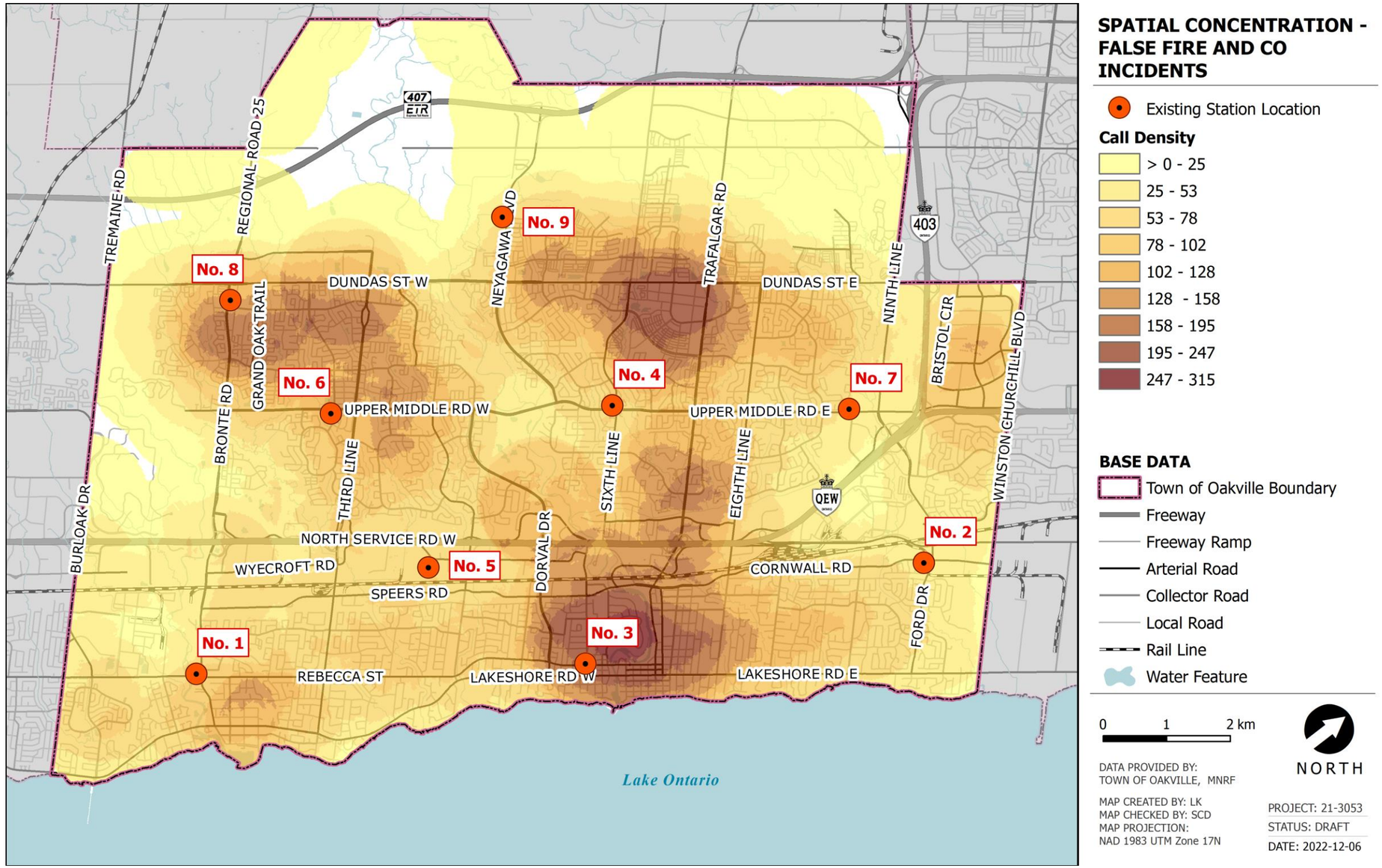
DATA PROVIDED BY: TOWN OF OAKVILLE, MNRF

MAP CREATED BY: LK
MAP CHECKED BY: SCD
MAP PROJECTION: NAD 1983 UTM Zone 17N

PROJECT: 21-3053
STATUS: DRAFT
DATE: 2022-12-06

Figure Source: Oakville Fire Department Emergency Response Call Data (2015 to 2022)

Figure 31: Spatial Concentration – False Fire and Co Incidents



SPATIAL CONCENTRATION - FALSE FIRE AND CO INCIDENTS

Existing Station Location

Call Density

- > 0 - 25
- 25 - 53
- 53 - 78
- 78 - 102
- 102 - 128
- 128 - 158
- 158 - 195
- 195 - 247
- 247 - 315

BASE DATA

- Town of Oakville Boundary
- Freeway
- Freeway Ramp
- Arterial Road
- Collector Road
- Local Road
- Rail Line
- Water Feature

0 1 2 km

NORTH

DATA PROVIDED BY:
TOWN OF OAKVILLE, MNRF

MAP CREATED BY: LK
MAP CHECKED BY: SCD
MAP PROJECTION:
NAD 1983 UTM Zone 17N

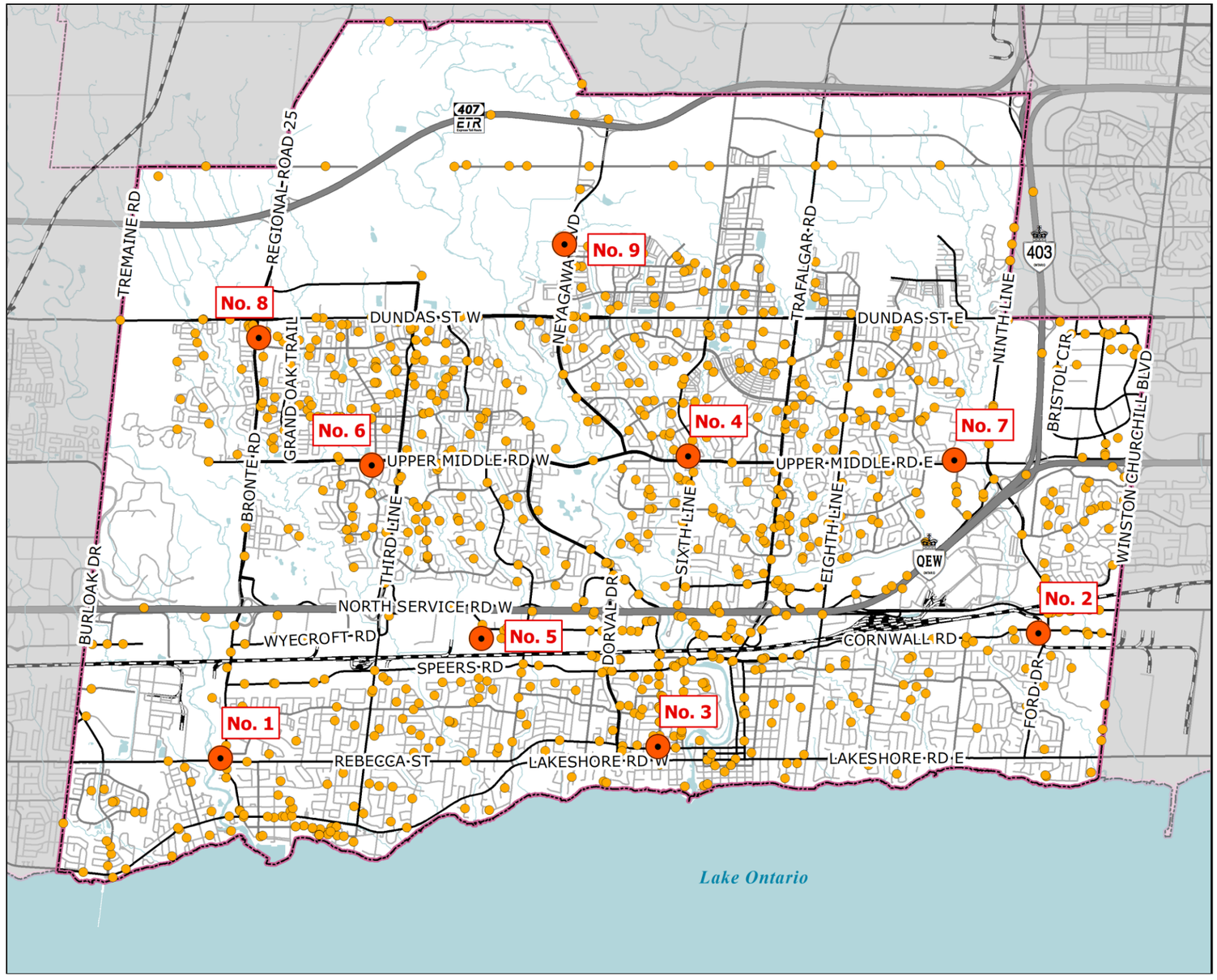
PROJECT: 21-3053
STATUS: DRAFT
DATE: 2022-12-06

Figure Source: Oakville Fire Department Emergency Response Call Data (2015 to 2022)

10.2.2.4 Spatial Modelling – Fire/Explosion Incidents

Figure 32 illustrates the locations where the fire/explosion incidents occurred during the period from January 1, 2015, to November 2, 2022. During this period property fire/ explosion incidents accounted for 2.4% of all OFD calls. **Figure 33** illustrates a concentration of fire/explosion incidents. These figures illustrate a wide distribution of incidents throughout the Town with a higher concentration in Downtown Oakville, southeast of Fire Station 4 and north of Fire Station 6.

Figure 32: Spatial Modelling – Fire/Explosion Incidents



SPATIAL MODELLING - FIRE / EXPLOSION INCIDENTS

- Existing Station Location

Call Location
(Jan 1st 2015 to Nov 2nd, 2022)

- Property Fire / Explosion Call

BASE DATA

- Town of Oakville Boundary
- Freeway
- Freeway Ramp
- Arterial Road
- Collector Road
- Local Road
- Rail Line
- Water Feature

0 1 2 km

NORTH

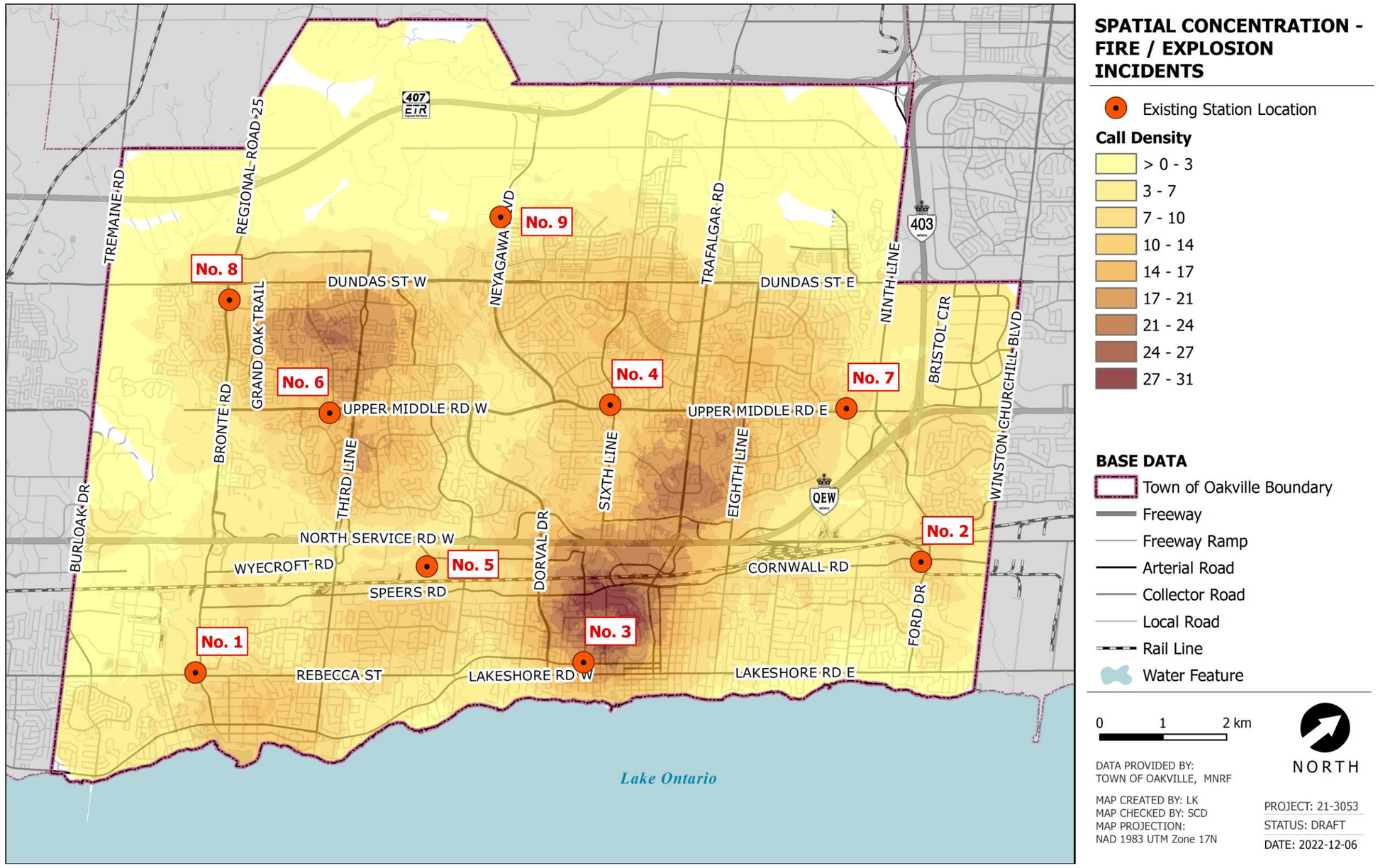
DATA PROVIDED BY:
TOWN OF OAKVILLE, MNRF

MAP CREATED BY: LK
MAP CHECKED BY: SCD
MAP PROJECTION:
NAD 1983 UTM Zone 17N

PROJECT: 21-3053
STATUS: DRAFT
DATE: 2022-12-06

Figure Source: Oakville Fire Department Emergency Response Call Data (2015 to 2022)

Figure 33: Spatial Concentration – Fire/Explosion Incidents



SPATIAL CONCENTRATION - FIRE / EXPLOSION INCIDENTS

Existing Station Location

Call Density

- > 0 - 3
- 3 - 7
- 7 - 10
- 10 - 14
- 14 - 17
- 17 - 21
- 21 - 24
- 24 - 27
- 27 - 31

BASE DATA

- Town of Oakville Boundary
- Freeway
- Freeway Ramp
- Arterial Road
- Collector Road
- Local Road
- Rail Line
- Water Feature

0 1 2 km

NORTH

DATA PROVIDED BY:
TOWN OF OAKVILLE, MNRF

MAP CREATED BY: LK
MAP CHECKED BY: SCD
MAP PROJECTION:
NAD 1983 UTM Zone 17N

PROJECT: 21-3053
STATUS: DRAFT
DATE: 2022-12-06

Figure Source: Oakville Fire Department Emergency Response Call Data (2015 to 2022)

10.2.3 Emergency Call Volume – Summary

The spatial analysis of the Town's historical emergency call volume for the period from January 1, 2015, to November 2, 2022, indicates a distribution of emergency call types relatively consistent with residential population density. The areas throughout the Town that have been identified having a higher concentration of emergency incidents include near Fire Station 3 on Kerr Street; Southeast of Station 1 south of Rebecca Street; Northeast of Station 4 along Trafalgar Road. The highest concentration of calls is found bounded by Dorval Drive, Lakeshore Road, Trafalgar Road and Speers Road/Cornwall Road, which includes Kerr Street Village and downtown Oakville. There are also notable high concentration of all emergency call type calls north east and southeast of Fire Station 4 approximately centred between Sixth Line and Trafalgar Road, and south of Rebecca Street, east of Bronte Road, southeast of Fire Station 1.

Key Finding: There are multiple areas with a high concentration of all emergency incident types, with the most notable area being centered around Kerr Street Village and downtown Oakville, north of Fire Station 3.

11.0 Applying Key Findings and Identified Risks

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 within the FMP in alignment with TG-02-2019, 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 of the key findings and identified risks and frames how they will be used to inform the FMP They are taken through a risk treatment process and aligned with the "Five E's" of Community Risk Reduction and three lines of defence in order to inform the analysis and recommendations within the Fire Master Plan as shown in **Figure 34**.

Figure 34: Risk Conclusions Application Process

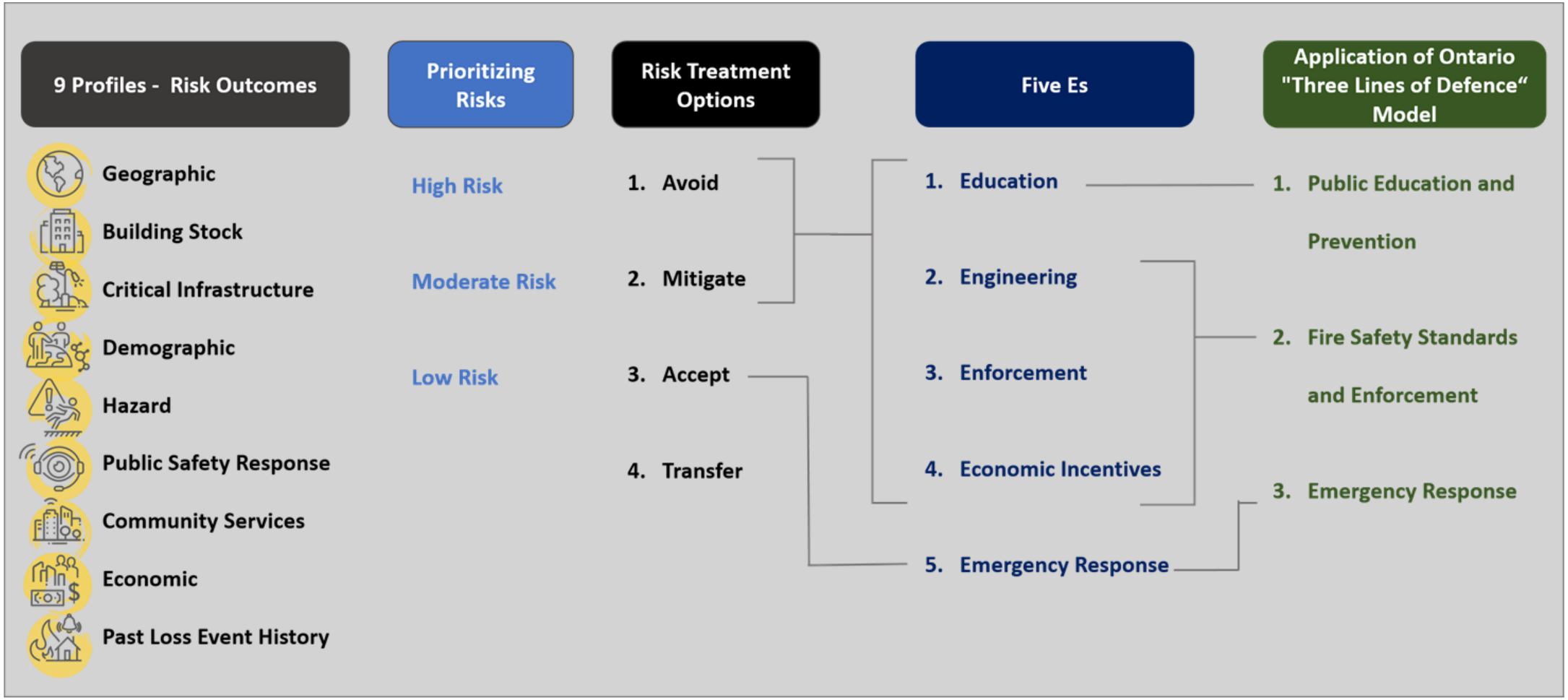


Figure Source: OFM Technical Guideline TG-02-2019, NFPA 1300 and OFM Three Lines of Defence Model, created by Dillon Consulting Limited.

11.1 Prioritizing Risks

NFPA 1300 and OFM TG-02-2019 identify that risks can be prioritized based on probability and consequence. OFM TG-02-2019 further emphasizes that all the risk findings and profiles should be considered together.

Following the probability and consequence levels identified by the OFME.M as described in the subsections below, the risk assignment process considers 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 the Fire Master Plan.

11.1.1 Risk Assignment Process Overview

The risk assignment methodology used as part of this CRA is informed by the OFM Technical Guideline (TG-02-2019 Community Risk Assessment Guideline).

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

1. Determine a probability level;
2. Determine a consequence level; and
3. Establish the risk level (i.e., low, moderate or high) for each based on the identified probability and consequence for each event.

The following sections provide additional insight into the assignment process.

11.1.1.1 Step 1 – Probability Levels

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 as a whole. The likelihood categories, and the values presented, follow OFM TG-02-2019 Community Risk Assessment Guideline. **Table 28** presents the probability levels and the adjusted descriptions.

Table 28: Probability Levels

Likelihood Category	Numerical Value	Description (Adjusted)
Rare	1	• May occur in exceptional circumstances; and • No incidents in the past 15 years.
Unlikely	10	• Could occur at some time, especially if circumstances change; and • Five to 15 years since the last incident.
Possible	100	• Might occur under current circumstances; and • One incident in the past five years.
Likely	1,000	• Will probably occur at some time under current circumstances; and • Multiple or recurring incidents in the past five years.
Almost Certain	10,000	• Expected to occur in most circumstances unless circumstances change; and • Multiple or recurring incidents in the past year.

Source: OFM TG-02-2019 Community Risk Assessment Guideline.

11.1.1.2 Step 2 – Consequence Levels

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:

1. **Life Safety:** Injuries or loss of life due to occupant and firefighter exposure to life threatening fire or other situations;
2. **Property Loss:** Monetary losses relating to private and public buildings, property content, irreplaceable assets, significant historic/symbolic landmarks and critical infrastructure due to fire;
3. **Economic Impact:** Monetary losses associated with property income, business closures, downturn in tourism, tax assessment value and employment layoffs due to fire; and
4. **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 as a result of fire or fire suppression activities.

Table 29 presents the consequence levels.

Table 29: Consequence Levels

Consequence Category	Numerical Value	Description
Insignificant	1	• No life safety issue; • Limited valued or no property loss; • No impact to local economy; and/or • No effect on 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; and/or • 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; and/or • 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 significant portion of the municipality; • 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.

Source: OFM TG-02-2019 Community Risk Assessment Guideline.

11.1.1.3 Step 3 – Risk Level

Once probability and consequence are determined the level of risk is calculated by multiplying the numerical values 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 direction on how to assign the probability and consequence of an event **Figure 35** shows the risk matrix for this CRA.

Figure 35: Risk Matrix

Probability \ Consequence		Insignificant	Minor	Moderate	Major	Catastrophic
		1	10	100	1,000	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

Figure Source: OFM TG-02-2019

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 30**. Where possible, quantitative data was used to inform the risk assignment as described in the rationale in the table. It is important to recognize that with the availability of new or updated data, the probability levels could change or be refined. It should also be recognized that, as identified in OFM **TG-02-2019**, "professional judgment based on experience should also be exercised in combination with historical information to estimate probability levels".[27] Similarly, OFM **TG-02-2019** acknowledges the role of professional judgment and reviews of past occurrences in determining consequence levels. The rationale provided for both probability and consequence takes into account information from the nine profiles, as OFM **TG-02-2019** supports consideration of the profiles together in order to inform decision making about the provision of fire protection services in the specific municipality/community.

[27] Source: OFM TG-02-2019 Community Risk Assessment Guideline, p.12

Table 30: Risk Assignment

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Motor vehicle-related incidents on the existing road network represent 87.9% (2,149) of all rescue responses of the Oakville Fire Department. (Geographic Profile)	Almost Certain	• OFD responded to a total of 2,149 calls pertaining to motor-vehicle related incidents over a five-year period (Event History). • Winter weather or extreme weather events could contribute to motor vehicle incidents (Hazard).	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.	**High**
The presence of 12 Mile Creek, 14 Mile Creek, 16 Mile Creek and Joshua's Creek flooding in low-lying areas. (Geographic Profile)	Likely	• Waterways in Oakville include 12 Mile Creek, 14 Mile Creek, 16 Mile Creek and Joshua's Creek flooding in low-lying areas. (Geographic). • Over a six-year period (2016 to 2021) five calls pertained to water rescue (an average of one water rescue calls per year) (Event History).	Minor	• Potential risk to life safety of individuals needing rescue.	**Low**
The presence of waterways within the Town, such as 12 Mile Creek, 14 Mile Creek, 16 Mile Creek and Joshua's Creek, creates a potential need for specialized ice and water rescue Services. (Geographic Profile)	Likely	• Waterways in Oakville include 12 Mile Creek, 14 Mile Creek, 16 Mile Creek and Joshua's Creek flooding in low-lying areas. (Geographic). • Over a six-year period (2016 to 2021) one call pertained to water ice rescue (Event History).	Minor	• Potential risk to life safety of individuals needing rescue.	**Low**

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Group C – Residential Occupancies represent 91.77% of the Town's existing building stock, and over the five-year period from January 1, 2016, to December 31, 2020, were associated with 77.1% of the structure fires within the Town. (Building Stock)	Almost Certain	• The majority of property stock (91.77%/57,119 occupancies) is Group C – Residential (Building Stock). • 242 fires (89.1%) over the five-year period (2016 to 2020) occurred in Group C – Residential (Past Loss).	Moderate	• Could pose a threat to the life safety of occupants. • Could result in moderate property loss. • Could pose a threat to small local businesses, and/or pose a threat to the quality of the environment. • Potential for vulnerable individuals including seniors and youth within Group C – Residential (Demographic). • Most reported fire-related civilian injuries (24) occurred in Group C – Residential (Past Loss). • Of the fire loss incidents in Group C – Residential occupancies 14.0% of incidents did not have a smoke alarm present and operating (Past Loss). • Potential for exposure risk depending on dwelling type and building age (Building Stock). • Potential presence and maintenance of fire protection equipment would influence consequence level (Building Stock). • As the Town continues to grow, construction may include increased numbers of multifamily dwellings and high-rise occupancies. (Building Stock). • The Town currently has 135 buildings defined by the OBC as high-rise buildings with a floor level 18 metres (59 feet) above grade, or six storeys. (Building Stock).	**High**

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
The 2021 Census data indicates that 27.03% of the Town's Group C-Residential building stock was built prior to the introduction of the 1981 OFC. (Building Stock)	Almost Certain	• The majority of property stock (91.77%/57,119 occupancies) is Group C – Residential (Building Stock). • 242 fires (89.1%) over the five-year period (2016 to 2020) occurred in Group C – Residential (Past Loss).	Moderate	• Could pose a threat to the life safety of occupants. • Could result in moderate property loss. • Could pose a threat to small local businesses, and/or pose a threat to the quality of the environment. • Occupants could be vulnerable individuals including seniors and youth within Group C – Residential (Demographic). • Most reported fire-related civilian injuries (24) and occurred in Group C – Residential (Past Loss). • Of the fire loss incidents in Group C – Residential occupancies 14.0% of incidents did not have a smoke alarm present and operating (Past Loss). • Potential for exposure risk depending on dwelling type and building age (Building Stock). • Potential presence and maintenance of fire protection equipment would influence consequence level (Building Stock).	**High**

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
The Town currently has 135 buildings defined by the OBC as high-rise buildings with a floor level 18 metres (59 feet) above grade, or six storeys. These buildings are distributed throughout the urban area. (Building Stock).	Almost Certain	• The majority of property stock (91.77%/57,119 occupancies) is Group C – Residential (Building Stock). • 242 fires (89.1%) over the five-year period (2016 to 2020) occurred in Group C – Residential (Past Loss).	Moderate	• Could pose a threat to the life safety of occupants. • Could result in moderate property loss. • Could pose a threat to small local businesses, and/or pose a threat to the quality of the environment. • Occupants could be vulnerable individuals including seniors and youth within Group C – Residential (Demographic). • Most reported fire-related civilian injuries (24) and occurred in Group C – Residential (Past Loss). • Of the fire loss incidents in Group C – Residential occupancies 14.0% of incidents did not have a smoke alarm present and operating (Past Loss). • Potential for exposure risk depending on dwelling type and building age (Building Stock). • Potential presence and maintenance of fire protection equipment would influence consequence level (Building Stock).	**High**

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
The Town has 217 buildings with a total building area (footprint) that exceed 50,000 square feet (4,655 square metres). These buildings are predominantly located in the Business Industrial and Employment Corridor land use designations along the QEW, Highway 403, Bristol Circle, Cornwall Road, and Speers Road. (Building Stock)	Almost Certain	• Group D – Business, Group E – Mercantile and Group F – Industrial or a mix of uses represent 2.13% of the Town's existing property stock (Building Stock). • Over the five-year period (2016 to 2020), Group D, E and F were associated with 43 (13.7%) of the structure fires within the Town (Past Loss). • Potential for presence and maintenance of fire protection equipment, for example, fire alarm system, sprinklers, etc. (Building Stock).	Major	• Due to the potential for these buildings to contain large volumes of combustible materials, as well as horizontal travel distances for fire suppression activities, an incident occurring could result in a large loss of life. • Could result in significant property damage. • Could result in significant threat to large businesses, local economy and tourism, and/or impact to the environment. • Potential for presence and maintenance of fire protection equipment, for example, fire alarm system, sprinklers, etc. (Building Stock). • Some of the identified occupancies may play a role in the economic well-being of the Town (Economic).	**High**

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
The Town of Oakville currently has 59 registered vulnerable occupancies. (Building Stock)	Possible	• These vulnerable occupancies may fall into different occupancy types such as Group B – Care or Detention or Group C – Residential (Building Stock). • Group B – Care or Detention occupancies represent 0.07% and Group C – Residential occupancies represent 91.77%of the Town's existing property stock (Building Stock). • 242 fires (89.1%) over the five-year period (2016 to 2020) occurred in Group C – Residential (Past Loss). • Ontario Regulation 150/13 requires fire departments to perform annual inspections and approve and witness fire drill scenarios which may influence the probability of a fire occurring in a vulnerable occupancy (Building Stock).	Catastrophic	• **Ontario Regulation 150/13** requires fire departments to perform annual inspections and approve and witness fire drill scenarios (Building Stock). • Presence and maintenance of fire protection equipment, for example, fire alarm system, sprinklers, etc. (Building Stock). • Most reported fire-related civilian injuries (24) and occurred in Group C – Residential (Past Loss). • Potential for vulnerable individuals including those who receive special care or treatment within a Group B occupancy (Building Stock).	**High**
Seniors (those 65 years and over) are considered to represent one of the highest fire risk groups across the Province based on residential fire death rate. According to the 2021 Census, seniors represent 15.7% of the Town's total population. (Demographics)	Almost Certain	• Seniors represent one of the most vulnerable demographics and are 15.1% (33,595 people) of the Town's population (Demographic). • The majority of property stock is Group C – Residential (Building Stock). • 242 fires (89.1%) over the five-year period (2016 to 2020) occurred in Group C – Residential (Past Loss.	Moderate	• Could pose a threat to the life safety of occupants. • Could result in moderate property loss. • Most reported fire-related civilian injuries (24) and occurred in Group C – Residential (Past Loss). • Of the fire loss incidents in Group C – Residential occupancies 14.0% of incidents did not have a smoke alarm present and operating (Past Loss). • Potential for exposure risk depending on dwelling type and building age (Building Stock). • Potential presence and maintenance of fire protection equipment would influence consequence level (Building Stock).	**High**

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Most reported fire related civilian injuries (24) occurred in Group C – Residential Occupancies. (Past Loss)	Almost Certain	• The majority of property stock (91.77%/57,119 occupancies) is Group C – Residential (Building Stock). • 242 fires (89.1%) over the five-year period (2016 to 2020) occurred in Group C – Residential (Past Loss).	Moderate	• Could pose a threat to the life safety of occupants. • Could result in moderate property loss. • Potential for vulnerable individuals including seniors and youth within Group C – Residential (Demographic). • Most reported fire-related civilian injuries (24) and occurred in Group C – Residential (Past Loss). • Of the fire loss incidents in Group C – Residential occupancies 14.0% of incidents did not have a smoke alarm present and operating (Past Loss). • Potential for exposure risk depending on dwelling type and building age (Building Stock). • Potential presence and maintenance of fire protection equipment would influence consequence level (Building Stock). • As the Town continues to grow, construction may include increased numbers of multifamily dwellings and high-rise occupancies. (Building Stock). • The Town currently has 135 buildings defined by the OBC as high-rise buildings with a floor level 18 metres (59 feet) above grade, or six storeys. (Building Stock).	**High**
Of the fires occurring in the Town over the five-year period from January 1, 2016, to December 31, 2020, the leading cause of unintentionally set fires was due to misuse of ignition source at 29.0% (91 fires), compared to 29.5% in the Province. (Past Loss)	Almost Certain	• Over the five-year period (2016 to 2020) 91 fires were caused by misuse of ignition source, an average of 18 fires of this type of cause per year (Past Loss).	Minor	• Potential risk to life safety of occupants. • Minor property loss. • Minimal disruption to business activity. • Minimal impact on general living conditions.	**Moderate**

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
Of the fires occurring in the Town over the five-year period from January 1, 2016 to December 31, 2020, the second most common cause of unintentionally set fires was due to mechanical/ electrical failure at 16.6% (52 fires), compared to 15.3% in the Province. (Past Loss)	Almost Certain	• Over the five-year period (2016 to 2020) 52 fires were caused by mechanical/ electrical failure, an average of 10 fires of this type of cause per year (Past Loss).	Minor	• Potential risk to life safety of occupants. • Minor property loss. • Minimal disruption to business activity. • Minimal impact on general living conditions Potential for exposure risk depending on dwelling type and building age (Building Stock). • Potential presence and maintenance of fire protection equipment would influence consequence level (Building Stock).	**Moderate**

11.2 Risk Treatment Options

NFPA 1300 – Standard on Community Risk Assessment and Community Risk Reduction Plan Development (2020 Edition) and the OFM **TG-02-2019** apply the process of identifying a risk treatment option for an identified risk. The risk treatment options include avoidance, mitigation, acceptance, and transfer. Further detail on these options can be found in **Table 31**. There are four risk treatment options:

1. Avoid;
2. Mitigate;
3. Accept; and
4. Transfer.

Table 31: Risk Treatment Options

Treatment Option	NFPA 1300 Description	OFM TG-02-2019 Description
Avoid	Eliminate the hazard.	Implementing programs and initiatives to prevent a fire or emergency from happening.
Mitigate	Reduce probability or impact (consequence) of the risk.	Implementing programs and initiatives to reduce the probability and/or consequence of a fire or emergency.
Accept	Take no actions.	No specific programs or initiatives will be implemented. Accept the risk and respond if it occurs.
Transfer	Transfer the risk to another party.	Transfer the impact and/or management of the risk to another organization or body.

Most of these options, if chosen by a fire department, will require some action or consideration as they pertain to fire protection services. As part of the application of the risk conclusions, a risk treatment option will be identified for each outcome followed by the application of the Five Es as described in the next section.

11.2.1 The 'Five Es' of Community Risk Reduction

NFPA 1300 - Standard on Community Risk Assessment and Community Risk Reduction Plan Development (2020 Edition) defines a Community Risk Reduction Plan as a "document that outlines the goals, objectives, programs, and resources used to reduce the risks identified by the community risk assessment".[28] Establishing service levels in regards to programs and resources in alignment with a CRA is required of Ontario municipalities as part of **Ontario Regulation 378/18**. As such, the recommendations of the FMP if implemented can be considered a part of community risk reduction plan since it includes a review of Fire Prevention and Public Education.

To apply the risk conclusions to the FMP, each risk conclusion ('key finding' or 'identified risk') will be reviewed through the lens of the "Five Es". The Five Es is a framework outlined in NFPA 1300 - Standard on Community Risk Assessment and Community Risk Reduction Plan Development (2020 Edition), and the Institution of Fire Engineers' Vision 20/20 National Strategy for Fire Loss Prevention. The Five Es are summarized in **Table 32**. They include:

1. Increasing awareness (Education);
2. Changes to the physical environment (Engineering);
3. Influencing change through economic incentives (Economic Incentives);
4. Enforcing legislation through inspection programs (Enforcement); and
5. Mitigating injury, illness and saving lives (Emergency Response).

[28] N.F.P.A. 1300, 3.3.6.

Table 32: Overview of the NFPA 1300 - Standard on Community Risk Assessment and Community Risk Reduction Plan Development (2020 Edition) Five "E's"

Five E's	Description
Education	Education influences audiences to refrain from risky or unhealthy behavior or take positive action to reduce risk.
Enforcement	Enforcement reduces risks through enforcing legislation through inspections and fines for noncompliance.
Engineering	Engineering includes incorporating new products and technology to modify the environment to prevent or mitigate injuries and deaths.
Economic Incentives	Economic incentives are typically offered to encourage better choices and changes in behaviour.
Emergency Response	Effective emergency response can mitigate the effects of unintentional injuries and save lives.

Source: Community Risk Reduction: Doing More with More, The NFPA Urban Fire and Life Safety Task Force, June 2016.

It is important to note that NFPA 1300 – Standard on Community Risk Assessment and Community Risk Reduction Plan Development (2020 Edition) discusses the application of the Five Es to develop specific goals and objectives to reduce risk. It also acknowledges that some strategies may require policy advocacy or legislative work. These are important considerations for a department but are beyond the purview of the recommendations found within a Fire Master Plan. As a result, the recommendations of the FMP will focus on ways to reduce risk from the perspective of the typical suppression and public education/prevention operations of the department. This includes a focus on a proactive reduction of risk through education, prevention, and enforcement with fire suppression as the fail-safe.

11.2.2 Risk Conclusions, Treatment Options, and the Five Es

When it comes to aligning service levels with risks that define local needs and circumstances, it is important to recognize that not all risk conclusions align with the services provided by a fire department in the same way. For this reason, the risk conclusions are categorized based on the identified treatment options and how they can be used to inform the activities, strategies, and services provided by the department

through the lens of the Five Es. This categorization will then be used to inform the Fire Master Plan. The purpose of the Five Es as they pertain to this study is shown in **Table 33.**

Table 33: Risk Analysis Conclusions – 5 E's Categorization

Five E's	Description	Purpose
Education	Education influences audiences to refrain from risky or unhealthy behavior or take positive action to reduce risk.	For consideration within the proposed Public Education Program
Enforcement	Enforcement reduces risks through enforcing legislation through inspections and fines for noncompliance.	For consideration within the proposed Inspection/Enforcement Program
Engineering	Engineering includes incorporating new products and technology to modify the environment to prevent or mitigate injuries and deaths.	For consideration within the proposed Fire Inspection and Enforcement Program
Economic Incentives	Economic incentives are typically offered to encourage better choices and changes in behaviour.	For consideration within the proposed Inspection/Enforcement Program
Emergency Response	Effective emergency response can mitigate the effects of unintentional injuries and save lives.	For consideration within the proposed Emergency Response Deployment Options

Table 34 presents the identified risks in a matrix format to indicate the ways in which the risks can be addressed by OFD and ultimately considered within the Fire Master Plan analysis and recommendations. The same process is applied to the key findings in **Table 35**.

For those risk conclusions that will not be considered within the FMP, the department should use the findings of the risk assessment to review other fire protection services provided by the department to help ensure compliance with **Ontario Regulation 378/18** (e.g., training, by-laws, fleet, equipment, all department policies and guidelines, etc.).

Table 34: Treatment Options and Five E's Categorization – Identified Risks

Profile	Identified Risk	Risk Level	Risk Treatment Option: Avoid Mitigate Accept Transfer	Education For consideration within the proposed Public Education Program	Enforcement For consideration within the proposed Inspection and Enforcement Program	Engineering For consideration within the proposed Inspection and Enforcement Program	Economic Incentive For consideration within the proposed Inspection and Enforcement Program	Emergency Response For consideration within the proposed Emergency Response Program
Geographic	Motor vehicle-related incidents on the existing road network represent 87.9% (2,149) of all rescue responses of the Oakville Fire Department.	**High**	Accept	No	No	No	No	Yes
Geographic	The presence of 12 Mile Creek, 14 Mile Creek, 16 Mile Creek and Joshua's Creek flooding in low-lying areas.	**Low**	Mitigate Accept	Yes	No	No	No	Yes
Geographic	The presence of waterways within the Town, such as 12 Mile Creek, 14 Mile Creek, 16 Mile Creek and Joshua's Creek, creates a potential need for specialized ice and water rescue Services.	**Low**	Mitigate Accept	Yes	No	No	No	Yes
Building Stock	Group C – Residential Occupancies represent 91.77% of the Town's existing building stock, and over the five-year period from January 1, 2016, to December 31, 2020 were associated with 77.1% of the structure fires within the Town.	**High**	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Building Stock	The 2021 Census data indicates that 27.03% of the Town's Group C-Residential building stock was built prior to the introduction of the 1981 OFC.	**High**	Mitigate Accept	Yes	Yes	No	No	Yes
Building Stock	The Town currently has 135 buildings defined by the OBC as high-rise buildings with a floor level 18 metres (59 feet) above grade, or six storeys. These buildings are distributed throughout the urban area	**High**	Mitigate Accept	Yes	Yes	Yes	Yes	Yes

Profile	Identified Risk	Risk Level	Risk Treatment Option: Avoid Mitigate Accept Transfer	Education For consideration within the proposed Public Education Program	Enforcement For consideration within the proposed Inspection and Enforcement Program	Engineering For consideration within the proposed Inspection and Enforcement Program	Economic Incentive For consideration within the proposed Inspection and Enforcement Program	Emergency Response For consideration within the proposed Emergency Response Program
Building Stock	The Town has 217 buildings with a total building area (footprint) that exceed 50,000 square feet (4,655 square metres). These buildings are predominantly located in the Business Industrial and Employment Corridor land use designations along the QEW, Highway 403, Bristol Circle, Cornwall Road, and Speers Road.	**High**	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Building Stock	The Town of Oakville currently has 59 registered vulnerable occupancies.	**High**	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Demographic	Seniors (those 65 years and over) are considered to represent one of the highest fire risk groups across the Province based on residential fire death rate. According to the 2021 Census, seniors represent 15.7% of the Town's total population.	**High**	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Past Loss and Event History	Most reported fire related civilian injuries (24) occurred in Group C – Residential Occupancies.	**High**	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Past Loss and Event History	Of the fires occurring in the Town over the five-year period from January 1, 2016, to December 31, 2020, the leading cause of unintentionally set fires was due to misuse of ignition source at 29.0% (91 fires), compared to 29.5% in the Province.	**Moderate**	Mitigate Accept	Yes	Yes	Yes	Yes	Yes

Profile	Identified Risk	Risk Level	Risk Treatment Option: Avoid Mitigate Accept Transfer	Education For consideration within the proposed Public Education Program	Enforcement For consideration within the proposed Inspection and Enforcement Program	Engineering For consideration within the proposed Inspection and Enforcement Program	Economic Incentive For consideration within the proposed Inspection and Enforcement Program	Emergency Response For consideration within the proposed Emergency Response Program
Past Loss and Event History	Of the fires occurring in the Town over the five-year period from January 1, 2016, to December 31, 2020, the second most common cause of unintentionally set fires was due to mechanical/electrical failure at 16.6% (52 fires), compared to 15.3% in the Province.	**Moderate**	Mitigate Accept	Yes	Yes	Yes	Yes	Yes

Table 35: Treatment Options and Five E's Categorization – Key Findings

Profile	Key Finding	Risk Treatment Option: Avoid Mitigate Accept Transfer	Education For consideration within the proposed Public Education Program	Enforcement For consideration within the proposed Inspection and Enforcement Program	Engineering For consideration within the proposed Inspection and Enforcement Program	Economic Incentive For consideration within the proposed Inspection and Enforcement Program	Emergency Response For consideration within the proposed Emergency Response Program
Geographic	Bridges, with restrictions or closures, have the potential to reduce the connectivity of the Town's road network resulting in the potential for delays in emergency response times.	Accept	No	No	No	No	Yes
Geographic	Grade-level rail crossings could create a physical barrier to the connectivity of the Town's road network that can potentially result in delays in emergency response times.	Accept	No	No	No	No	Yes
Building Stock	The Town includes areas of building stock that have higher density and, as such, greater potential for exposure in the event of a fire.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Building Stock	The Town has several areas of new construction that can be assumed to include lightweight wood frame construction.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Building Stock	OFD identified 35 High Hazard Occupancies within Oakville.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Building Stock	In addition to registered vulnerable occupancies, the Town has 85 schools and 122 identified licensed daycares, representing higher fire life-safety risks due to the number of children attending these facilities.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Building Stock	The Town has identified a number of vacant buildings that may pose a fire risk.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Building Stock	There are a great number of identified heritage buildings within Oakville, many of which were constructed prior to the introduction of the OFC.	Mitigate Accept	Yes	Yes	Yes	No	Yes
Demographic	The 2021 Census data indicates that children aged 14 and under represent 18.0% of the Town's total population.	Mitigate Accept	Yes	No	No	No	Yes

Profile	Key Finding	Risk Treatment Option: Avoid Mitigate Accept Transfer	Education For consideration within the proposed Public Education Program	Enforcement For consideration within the proposed Inspection and Enforcement Program	Engineering For consideration within the proposed Inspection and Enforcement Program	Economic Incentive For consideration within the proposed Inspection and Enforcement Program	Emergency Response For consideration within the proposed Emergency Response Program
Demographic	Of the Town's total population, 13.1% fall into the age range of 55 to 64, representing a cohort aging towards the seniors demographic of 65 years or older.	Mitigate Accept	Yes	No	No	No	Yes
Demographic	The Town's commuter population presents a factor that may impact traffic congestion, and the potential occurrence of motor vehicle accidents within the Town.	Accept Transfer	No	No	No	No	Yes
Hazard	The Town's 2013 Hazard Identification and Risk Assessment identifies hazards that could each impact the ability of the Town to deliver fire protection services.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Economic	The Town has identified top employers that contribute to the economic vitality of the community. If a fire were to occur at one of these facilities it could have a negative impact on the financial well-being of the Town.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Past Loss and Event History	Over the five-year period from January 1, 2016, to December 31, 2020, the Town averaged 63 structure fires per year.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Past Loss and Event History	Over the five-year period from January 1, 2016, to December 31, 2020, structure fires occurring in Group C – Residential Occupancies account for 77.1% of total structure fires within the Town, which is 3.7% higher than the Province.	Mitigate	Yes	Yes	Yes	No	Yes
Past Loss and Event History	Over the five-year period from January 1, 2016, to December 31, 2020, structure fires occurring in Group E– Mercantile Occupancies account for 6.1% of total structure fires within the Town, which is 2.7% higher than the Province.	Mitigate	Yes	Yes	Yes	Yes	Yes

Profile	Key Finding	Risk Treatment Option: Avoid Mitigate Accept Transfer	Education For consideration within the proposed Public Education Program	Enforcement For consideration within the proposed Inspection and Enforcement Program	Engineering For consideration within the proposed Inspection and Enforcement Program	Economic Incentive For consideration within the proposed Inspection and Enforcement Program	Emergency Response For consideration within the proposed Emergency Response Program
Past Loss and Event History	Of the fires occurring within the Town over the five-year period from January 1, 2016, to December 31, 2020, 27.4% of fires had a reported ignition source of cooking equipment, which is 10.5 percentage points higher than the Province (16.9%).	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Past Loss and Event History	Of the fires occurring within the Town over the five-year period from January 1, 2016, to December 31, 2020, 27.4% of fires had a reported ignition source of “miscellaneous”, which is 17.3 percentage points higher than the Province (10.1%).	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Past Loss and Event History	Of the fires occurring within the Town over the five-year period from January 1, 2016, to December 31, 2020, 13.7% of fires had a reported ignition source of open flame/tools/smokers articles, which is 0.3 percentage points lower than the Province (14.0%).	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Past Loss and Event History	Over the five-year period from January 1, 2016, to December 31, 2020, of the fire loss incidents in Group C – Residential occupancies, 14.0% of incidents did not have a smoke alarm present (compared to 17.4% in the Province).	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Past Loss and Event History	Over the five-year period from January 1, 2016, to December 31, 2020, 47.1% of the fire loss incidents in Group C – Residential occupancies had a smoke alarm present and operating compared to 44.6% in the Province.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes

Profile	Key Finding	Risk Treatment Option: Avoid Mitigate Accept Transfer	Education For consideration within the proposed Public Education Program	Enforcement For consideration within the proposed Inspection and Enforcement Program	Engineering For consideration within the proposed Inspection and Enforcement Program	Economic Incentive For consideration within the proposed Inspection and Enforcement Program	Emergency Response For consideration within the proposed Emergency Response Program
Past Loss and Event History	Over the period from January 1, 2015, to December 31, 2021, the volume of emergency calls responded to by the Oakville Fire Department modestly increased between 2015 and 2021.	Mitigate Accept	Yes	Yes	Yes	No	Yes
Past Loss and Event History	For the period from January 1, 2016, to December 31, 2020, the highest percentage of emergency call volume responded to by Oakville Fire Department as defined by the OFM response types was medical/resuscitator calls representing 51.5% of total emergency call volume.	Accept	No	No	No	No	Yes
Past Loss and Event History	For the period from January 1, 2016, to December 31, 2020, the second highest percentage of emergency call volume responded to by Oakville Fire Department as defined by the OFM response types was false fire calls representing 14.8% of total emergency call volume.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Past Loss and Event History	There are multiple areas with a high concentration of all emergency incident types, with the most notable area being centered around Kerr Street Village and downtown Oakville, north of Fire Station 3.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes