City of Peterborough

To:	**Members of the Finance Committee**
From:	**Chris Snetsinger, Fire Chief**
Meeting Date:	**November 22, 2021**
Subject:	**Fire Services Suppression Staffing Report CAOFS21-006**

Purpose

A report and presentation by Dillon Consulting to advise Council of the need to improve the depth of response for Peterborough Fire Services (PFS).

Recommendations

That Council approve the recommendations outlined in Report CAOFS21-006, dated November 22, 2021 of the Fire Chief as follows:

a) That Council add eight (8) firefighter FTEs and one Training Officer FTE to the 2022 budget to be hired starting March 1, 2022.

b) That Council receive the City of Peterborough Fire Services Staffing Review and Peer Comparison by Dillon Consulting, attached as Appendix A, and request that the Fire Chief bring staffing recommendations forward in future budget cycles to increase the complement of Firefighters in a phased in approach.

Budget and Financial Implications

The Budget and Financial implications were listed in the Below the Line chart on page 248 of the 2022 Highlights Book. The following is updated information. The cost of hiring 8 Firefighter Full Time Equivalents (FTEs) as of March 1, 2022 is $535,846. The cost of hiring 1 Training Officer as of March 1, 2022 is $132,909. These amounts are offset by

some reductions in budget lines for a net 2022 amount of $399,363. These amounts would be annualized in the 2023 operating budget.

If this is approved by Council, the % increase is 0.22. If no other changes were made to the 2.75% All-inclusive increase in the 2022 Budget deliberations, the overall increase would be 2.97%. Other increases in FTEs would be phased in and brought forward for Council deliberation in future budgets.

Background

Report CAOFS20-004, Fire Station Location Selection and Project Next Steps, provided an update on the location for the replacement of Station 2 and recommended next steps. While completing the review, Dillon Consulting (Dillon) noted future deployment requirements for Fire Services should continue to be reviewed. Once the Station 2 Study was complete, Dillon was engaged to examine the Fire Services emergency response and fireground staffing.

Changing Risk

The City continues to grow in subdivisions and, with residential intensification, in high-rise buildings. According to the Hemson Development Charges Report 2019, development will add an estimated 10,543 people to the City by 2025.

This past year with recent fires, the need for a greater depth of response has become evident with increasing delays on response time targets. The addition of more outlying subdivisions and dense development with six-storey or higher buildings, presents more challenges to firefighting. It results in larger time-to-task and response time delays to perform critical functions. Simultaneous alarms for fires have grown this past year and the changing risk to the City will only add to the strain on the Fire Service.

NFPA Standard

The National Fire Protection Association (NFPA) establishes a standard for emergency response for full time fire departments, NFPA 1710. This standard sets out critical task functions for response to a fire and appropriate staffing levels. A recent update to this standard has increased the recommended staffing level to allow for greater safety on the fireground. NFPA standards are used by the Ministry of Labour as best firefighting practices in Ontario. The Dillon report shows that the Fire Service is not meeting the updated standard and that the service is falling behind industry best practice regarding depth of response.

Staffing

Staffing for Fire Services is set out in the Collective Agreement. There has been no increase in fireground staffing or training since 1967.

The Dillon staffing report indicates that the staffing complement per shift should be increased, and a phased in approach over five to six years is being recommended. The first step is to add 8 FTEs (which would provide 2 FTEs per shift) and 1 FTE Training Officer.

PFS currently has 1 FTE Training Officer. With the additional Firefighters, the workload will increase considerably and there will be a requirement for 1 additional Training Officer to assist with meeting the ongoing legislated requirements for training Firefighters.

2022 Budget

The Dillon Report is dated August 17, 2021. The recommendations of the review were not known in July 2021 when Report CLSFS21-022 2022 Budget Guidelines was prepared, and such a significant amount could not be incorporated into the 2.75% Guideline provided by Council.

The net amount included in the Below the Line section of the Highlights Book on page 248 proposes a starting date of March 1, 2022 for the 8 FTEs and the Training Officer. This would coincide with an annual recruitment process when other replacement Fire Suppression staff are typically hired. There are some reductions in other salary lines if the FTEs are hired on this date such as a reduction in the number of Floating FTEs that are hired to reduce Call Backs during the key vacation months and an assumption that the Training Officer will be hired from within, which will result in a reduction in salary for a new Firefighter Recruit compared to an existing First Class Firefighter.

Summary

The Dillon Consulting Staffing Review and Peer Comparison Report by Dillon Consulting has shown a need to improve the depth of response to meet the NFPA 1710 standard. The phased in approach over a number of years will address the changing risk to the City as growth and intensification continues.

Submitted by,

Chris Snetsinger
Fire Chief

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Attachments:
Appendix A – City of Peterborough Fire Services Staffing Review and Peer Comparison

DILLON CONSULTING

CITY OF PETERBOROUGH

Fire Services Staffing Review and Peer Comparison

Final Report

August 2021 – 21-2101

August 17, 2021

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Attention: Chris Snetsinger, Fire Chief

Fire Services Staffing Review and Peer Comparison

We are very pleased to provide our report of the Peterborough Fire Services Staffing Review and Peer Comparison. The focus of this study was an assessment of the depth of response the fire service can provide to the municipality and to compare that level of service to industry best practices and peer comparable municipalities. The report includes staffing recommendations for senior management of the municipality and for Peterborough Council consideration.

It has been a pleasure to work with you and your staff and if we can be of further assistance, please contact us.

Sincerely,

DILLON CONSULTING LIMITED

Claudio Covelli, M.A.
Senior Consultant

CC:mjm

Our file: 21-2102

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1.0 Introduction

Dillon Consulting Limited (Dillon) was previously retained by the City of Peterborough (City) to complete the Fire Station 2 Location Review (June 19, 2020). While the focus of that work was the relocation of the station, it did highlight a need to improve the depth of response provided by the Peterborough Fire Service (P.F.S.). One of the measure of the depth of response applied is the National Fire Protection Association's (N.F.P.A.) 1710 standard, Single Family Dwelling Initial Full Alarm. There are also other N.F.P.A 1710 measures for other higher risk occupancies (e.g. high rise buildings). Growth in the City of Peterborough is forecast to continue to increase and this need for an enhanced depth of response will become more pronounced.

It will be important that the P.F.S. respond to the changing nature of the risk within the City. This includes the potential for an increase in call volume as the population of Peterborough grows, and increases in higher densities through infill development and multi-storey buildings. This change in the nature of risk makes depth of response increasingly important.

The City retained Dillon to examine staffing options that could help address this existing need and position it for future growth. This staffing review is supported by a peer comparison of comparable municipal fire departments based on municipal and fire related statistics.

1.1 Background

The Fire Station 2 Location Review (June 19, 2020) evaluated options for the relocation of Station 2, one of three existing fire stations. To support the assessment, the analysis evaluated five potential Station 2 locations. Included in the assessment was consideration of a potential future fourth fire station. This review presented analyses that considered the existing fire suppression emergency response capabilities of the P.F.S as measured against the N.F.P.A. 1710 performance benchmarks. This analysis considered the applicable legislation, industry guidelines and standards representing current industry best practices. It was also undertaken within the context of future growth within the City of Peterborough.

The report compared the existing Station 2 location response capabilities to five identified sites using the fire suppression emergency response performance benchmarks as measured by the N.F.P.A 1710's Initial Arriving Company, Second Arriving Company and the Single Family Dwelling Initial Full Alarm Assignment criteria.

Additionally, as found within a February 16, 2010 report to the Committee of the Whole, it was identified that there was a need for the potential addition of a fourth fire station to provide fire suppression services to the City of Peterborough. This report identified that a fourth station in the east City may be required in response to anticipated growth. For over five years, funding has been allocated in the City's capital budget for the addition of a fourth station recognizing this potential need. The

addition of a fourth station was also identified within the 2019 City-Wide Development Charges Background Study. Therefore, the Fire Station 2 Location Review report included a comparison between a three station model and a four station model. It was important to test alternative Station 2 relocation sites both in the context of a three station model and a potential future four station model to ensure a robust location was selected for the relocation of Station 2.

Following this study and additional assessment of the requirements of each site for the relocation of Fire Station 2, the City of Peterborough Council approved the relocation of the the existing Station 2 to a site identified as the Northcrest site. This is important background as the staffing review undertaken as part of this report is largely based on Station 2 relocated to the Northcrest site.

2.0 Applicable Legislation, Standards and Industry Best Practices

This staffing review study was conducted in consideration of the applicable legislation including the **Fire Protection and Prevention Act, 1997** (F.P.P.A.), the **Occupational Health and Safety Act, R.S.O. 1990** (O.H.S.A.), industry guidelines as authored by the **Office of the Fire Marshal and Emergency Management** (O.F.M.E.M.), industry standards as authored by the **National Fire Protection Association** (N.F.P.A.) and Dillon's knowledge of current industry best practices as garnered from our experience in working with other municipalities in Ontario and across Canada.

2.1 Fire Protection and Prevention Act

Within the Province of Ontario, the relevant legislation for the operation of a fire department and the delivery of fire protection services are contained within the Fire Protection and Prevention Act, 1997 (F.P.P.A.). The F.P.P.A. establishes that a municipality shall:

(a) Establish a program in the municipality which must include public education with respect to fire safety and certain components of fire prevention; and,

(b) Provide such other fire protection services as it determines may be necessary in accordance with its needs and circumstances.

2.1.1 Ontario Regulation 378/18: Community Risk Assessments

On July 1st, 2019 the Province of Ontario enacted Ontario Regulation 378/18 – Community Risk Assessments (O. Reg. 378/18) as an act empowered by the F.P.P.A. This new regulation requires every municipality in the province to develop a Community Risk Assessment (C.R.A.) by July 1st, 2024. A municipality must 'use its community risk assessment to inform decisions about the provision of fire protection services'[1].

As prescribed by the O. Reg. 378/18 a C.R.A. must include an assessment of nine mandatory profiles including:

1. Geographic Profile;
2. Building Stock Profile;
3. Critical Infrastructure Profile;
4. Demographic Profile;
5. Public Safety and Response Profile;

[1] Ontario Regulation 378/18 Community Risk Assessments, Mandatory Use 1.(b)

6. Community Services Profile;
7. Hazard Profile;
8. Economic Profile; and,
9. Past Loss and Event History Profile.

The new O. Reg. 387/18 replaces the Simplified Risk Assessment (S.R.A.) requirements contained within the F.P.P.A. It will be important for the City of Peterborough to complete a community risk assessment in accordance with O. Reg. 378/18 in order to identify risk and the needs and circumstances of the Peterborough community. The findings of a C.R.A. can further inform the City's decision making process in regards to the provision of fire protection services, especially as the City continues to experience rapid growth.

2.2 Occupational Health and Safety Act

The Occupational Health and Safety Act, R.S.O. 1990 requires every employer to, "take every precaution reasonable in the circumstances for the protection of the worker".[2] The O.H.S.A. provides for the appointment of committees, and identifies the Ontario Fire Services Section 21 Advisory Committee as the advisory committee to the Minister of Labour with the role and responsibility to issue guidance notes to address firefighter-specific safety issues within Ontario. These guidelines are referred to as Section 21 Firefighter Guidance Notes.

2.3 National Fire Protection Association (NFPA)

The National Fire Protection Association (N.F.P.A.) is an international non-profit organization that was established in 1896. The organization's mission is to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating consensus, codes and standards, research, training, and education. With a membership that includes more than 70,000 individuals from nearly 100 nations, N.F.P.A. is recognized as one of the world's leading advocates of fire prevention and an authoritative source on public fire safety.

N.F.P.A. is responsible for 300 codes and standards that are designed to minimize the risk and effects of fire by establishing criteria for building, processing, design, service, and installation in the United States, as well as many other countries. It has more than 200 technical code and standard development committees that are comprised of over 6,000 volunteer seats. Members vote on proposals and revisions in a process that is accredited by the American National Standards Institute (A.N.S.I.). Over the past decade, the Ontario fire service has been transitioning to the use of N.F.P.A. standards to guide many of the services they provide.

[2] Occupational Health and Safety Act, R.S.O. 1990, c. O.1 Part III s. 25(2)(h)

The N.F.P.A. 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments (2020 Edition) was utilized to inform the fire suppression deployment analysis within this study.

2.3.1 N.F.P.A. 1710 Standard (2020 Edition)

The **N.F.P.A. 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments (2020 Edition)** provides fire suppression staffing performance benchmarks for municipalities that utilize only career (full-time) firefighters. This standard identifies minimum firefighter deployment benchmarks based on the fire risks present within a range of building occupancy types and fire related risks. The N.F.P.A. 1710 Standard includes the following fire suppression deployment models based on the type of building occupancy and potential fire risks present:

- Initial Arriving Company (e.g. pumper);
- Second Arriving Company;
- Single-Family Dwelling Initial Full Alarm Assignment;
- Open-Air Strip Shopping Center Initial Full Alarm Assignment;
- Apartment Initial Full Alarm Assignment; and
- High-Rise Full Alarm Assignment.

For the purposes of this study, the evaluation includes detailed consideration of the Initial Arriving Company, Second Arriving Company, and Single-Family Dwelling Initial Full Alarm Assignment performance benchmarks. It should however, be noted that for higher risk occupancies (e.g. apartment buildings, high rise buildings) the staffing requirements are higher. For example, for a three-storey apartment building, the minimum staffing requirements are 27 firefighters (28 if an aerial device is used). For high-rise apartment buildings, staffing is even higher. Staffing becomes increasingly important for municipalities where the density of development increases with apartment buildings and high-rises and this has to factor into the staffing requirements.

2.3.1.1 Initial Arriving Company

The Initial Arriving Company is commonly referenced within the fire service as the initial responding apparatus deployed to respond to an emergency incident (typically a pumper). Fire service leaders and professional regulating bodies have agreed that until a sufficient number of firefighters are initially assembled on-scene, initiating tactics such as entry into the building to conduct search and rescue, or initiating interior fire suppression operations are not safe practices. If fewer than four firefighters arrive on scene, they must wait until a second apparatus, or additional firefighters arrive on scene to have sufficient staff to commence these initial activities.

Within the N.F.P.A. 1710 Standard, an 'Initial Arriving Company' is referenced as an 'Engine Company' with a minimum staffing of four firefighters whose primary functions are to pump and deliver water and perform basic firefighting at fires, including search and rescue.

The N.F.P.A. 1710 fire suppression deployment model for the initial arriving company requires a minimum of four firefighters arriving on scene with an 'Engine Company' within a four minute (240 seconds) travel time to 90% of the fire suppression incidents.

2.3.1.2 Second Arriving Company

The N.F.P.A. 1710 Standard (2020 Edition) includes a new performance benchmark for the deployment and arrival of the second responding apparatus. The standard does not reference a specific type of apparatus for the second arriving company but does require that it be staffed with a minimum of four firefighters. The term 'company' in this standard can be defined as "being usually organized and identified as engine companies, ladder companies, rescue companies, squad companies or multi-functional companies".[3]

The N.F.P.A. 1710 fire suppression deployment model for the second arriving company requires a minimum of four firefighters arriving on scene with a 'Second Company' within a six minute (360 seconds) travel time to 90% of the fire suppression incidents.

2.3.1.3 Single-Family Dwelling - Initial Full Alarm Assignment

In comparison to the deployment of an 'Initial Arriving Company' the term 'Initial Full Alarm Assignment' refers to "those personnel, equipment, and resources ordinarily dispatched upon notification of a structure fire".[4] An initial full alarm assignment represents the 'total' number of firefighters initially deployed to a structure fire.

In this deployment standard, a single-family dwelling is defined as "a typical 2,000 ft2 (186 m2) two-story single-family dwelling without basement and with no exposures".[5] This definition is a further example of the broad definitions utilized by the N.F.P.A. that in this instance may not necessarily represent the definition of a typical single-family dwelling in Ontario. Most single-single family dwellings in Ontario have basements to accommodate heating systems and more.

The N.F.P.A. 1710 fire suppression deployment model for an initial full alarm assignment to a single-family dwelling includes a minimum deployment of 16 firefighters (17 if an aerial device is used)

[3] N.F.P.A. 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments (2020 Edition) Chapter 3 Definitions, Section 3.3.15

[4] N.F.P.A. 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments (2020 Edition) Chapter 3 Definitions, Section 3.3.40 Initial Full Alarm Assignment

[5] N.F.P.A. 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments (2020 Edition) Chapter 5 Fire Department Services, Section 5.2.4.1.1

described as the 'total effective response force' arriving on scene within an eight minute (480 second) travel time to 90% of the fire suppression incidents in this occupancy type.

3.0 Staffing Review

This section identifies staffing options for P.F.S. Senior Staff and Council consideration that enhance the initial alarm depth of response coverage and positions the department for future growth. These options are presented in the form of scenarios that take into account existing and future conditions.

3.1 Peterborough Fire Services Overview

The Peterborough Fire Services is recognized within the industry as being a "Career Fire Department". This definition is based solely on the fire suppression deployment capabilities of the fire department that utilizes career (full-time) firefighters who are immediately available to deploy. The P.F.S. is organized into five divisions including administration, fire prevention and public education, training, communications, and fire suppression. The current complement of staff results in a minimum of 15 firefighters on duty at all times.

The P.F.S. provides a wide range of fire protection services to the community, including public fire and life safety education programs, fire inspections, investigation and enforcement, emergency medical services, water rescue, auto extrication, hazardous materials response and more.

The current fire suppression deployment model utilizes three fire stations strategically located throughout the City. **Table 1** lists the geographical locations of the City's three current fire stations. As mentioned in **Section 1.1** of this report, the City of Peterborough has decided to relocate the existing Station 2 to the Northcrest site located at 100 Marina Boulevard.

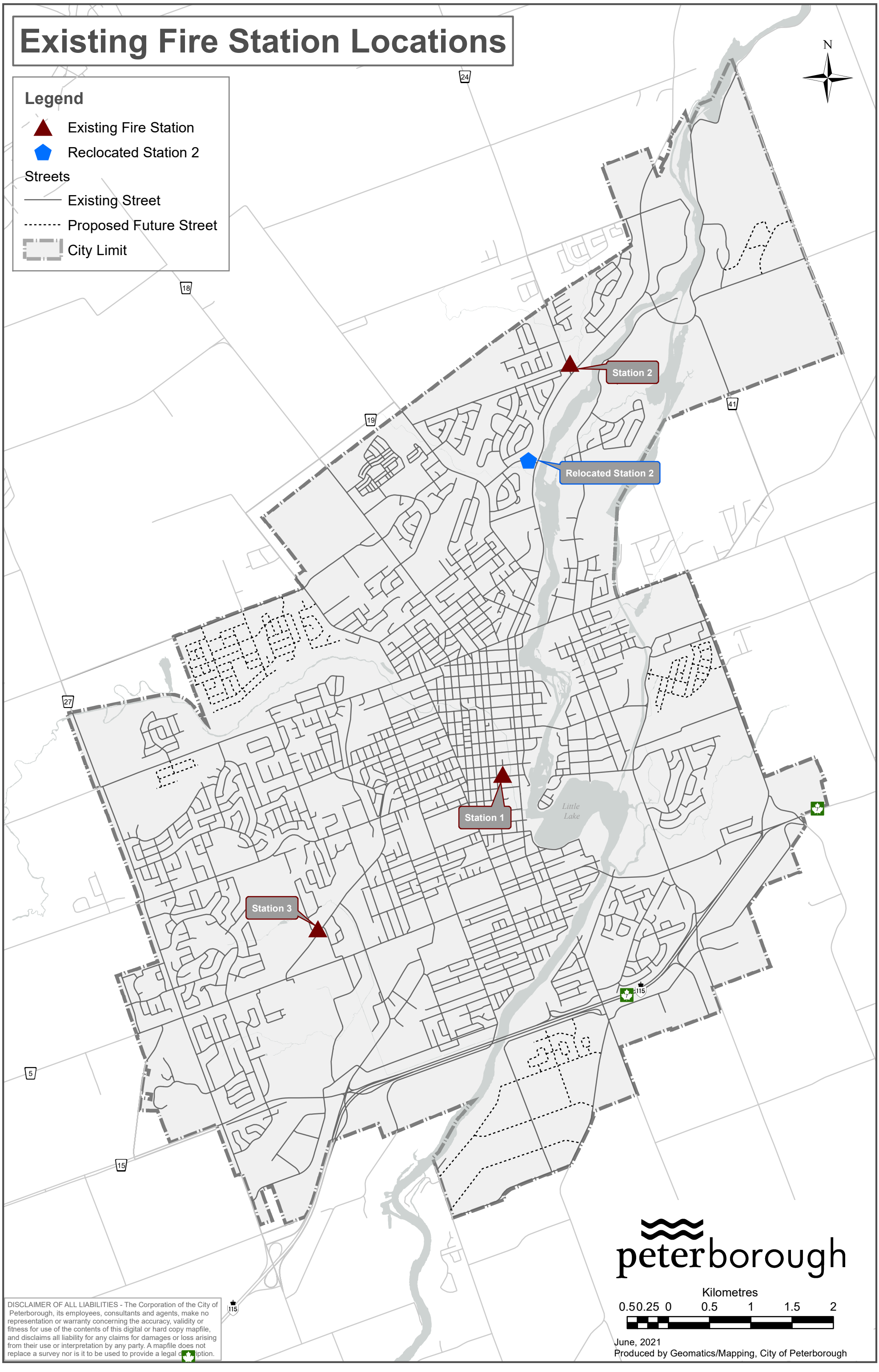
Table 1: Fire Station Locations

Station	Address
Station 1	10 Sherbrooke Street, Peterborough
Station 2	161 Carnegie Street, Peterborough (current location)
Station 2	100 Mariana Boulevard, Peterborough (relocated location)
Station 3	839 Clonsilla Avenue, Peterborough

Figure 1 below illustrates the existing fire station locations as summarized in **Table 1,** as well as the relocated Station 2 site.

Figure 1

Existing Fire Station Locations



3.1.1 Collective Agreement 2020-2024

The collective agreement between the City of Peterborough and the Peterborough Professional Fire Fighters Association Local # 169 of the International Association of Fire Fighters contains articles that relate to suppression division staff. Applicable to this report are the following excerpts:

- The minimum staffing shall be no less than fifteen (15) full-time professional Fire Fighters on duty per shift. This means fifteen (15) Fire Fighters from the Suppression Division including Fire Fighters, Captains and Platoon Chief;
- The minimum staffing of the Suppression Division shall be eighty (80) full-time professional Fire Fighters; and
- A minimum of four (4) full time professional fire fighters shall be assigned to each front line pumper vehicle. At least one of these vehicles will be assigned to each station.

3.1.2 Existing Fire Suppression Deployment Model

The existing P.F.S. fire suppression deployment model includes sustaining a minimum of 15 full-time firefighters on duty at all times. These firefighters are deployed from the City's three existing fire stations that are strategically located across the City. **Table 2** illustrates the current distribution of apparatus and staffing at each of the City's fire stations.

Table 2: Existing P.F.S. Fire Suppression Deployment Model

Station	Apparatus	Minimum Staffing
1	Pumper	4
	Command	2
	Aerial	1
2	Pumper	4
3	Pumper	4
	# of Firefighters on Duty	**15**

The City's current fire suppression deployment model ensures the response of an "Initial Arriving Company" with a minimum staffing of four firefighters as referenced in the N.F.P.A. 1710 Standard and the collective agreement by staffing all first-due apparatus (i.e. pumper) in each of the City's three existing fire stations with a minimum of four firefighters at all times.

3.2 G.I.S. Modelling Methodology

The fire suppression response modelling was conducted by City of Peterborough staff using a Geographic Information Systems (G.I.S.) tool This included using relevant base road information, such as road length and road classification to simulate the future emergency response fire suppression

deployment capabilities of the P.F.S. navigating the City's road network. To reflect future emergency response, the road network was updated to include future roads identified by the City to accompany future growth. These future roads reflect the identified growth areas including the Lily Lake subdivision (in the west), the Lift Lock subdivision (in the east), Cold Springs area (in the south), and some potential growth at Trent University as identified in consultation with City Planning and Development Services.

The historic call locations for emergency response incidents for the period from January 1, 2015 to December 31, 2019 were added to the model and their location and travel times to incidents were utilized to calibrate the model. Calibrating the model is an iterative process whereby the posted speeds in the model are adjusted to match and reflect historic travel times of the first responding apparatus for all calls with an emergency response code.

Table 3 identifies the current posted speeds for the existing road network and the adjusted modelled speeds to reflect the actual historical response capabilities of the P.F.S. The G.I.S. calibrated model was then used to assess the applicable fire suppression performance for alternative staffing options.

Table 3: GIS Model Calibration

Posted Speed Limit (km/hr)	Modelled Speed (km/hr)
40	39
50	39
60	50
70	60
80	70
100	90

3.3 Existing and Future Conditions Modelling

The following sections detail our analysis of the existing emergency response fire suppression deployment capabilities of the P.F.S. as well as the future fire suppression deployment capabilities with the addition and distribution of additional firefighters that reflect increasing depth of response.

The analysis was carried out using Esri's Network Analyst, G.I.S. tool developed specifically for the purpose of assessing networks, such as roads. Various G.I.S. modelling scenarios were developed to assess the P.F.S. existing emergency response coverage, including the Initial Arriving Company, Second Arriving Company and Initial Full Alarm Assignment in comparison to the applicable N.F.P.A. 1710 Standard performance benchmarks.

Table 4 summarizes the response coverage results for Initial Arriving Company, Second Arriving Company and Initial Full Alarm Assignment for all of the scenarios assessed. A description of each scenario is provided below. It is important to note that for the purposes of this study, all staffing scenarios (1 through 6) have been modelled using the new Northcrest Station 2 location. In each

scenario, all stations have a minimum of a Pumper apparatus staffed with four firefighters. They differ in the additional staffing provided in each scenario.

Table 4: City of Peterborough Relocated Station 2 Model Runs

Options*	Initial Arriving			Second Arriving			Full Alarm		
	4 FFs; 4 min; 1 Truck			8 FFs; 6 min; 2 Trucks			16 FFs; 8 min; 4 Trucks		
	% Historic Calls Covered	% Municipal Area Covered	% Road Length Covered	% Historic Calls Covered	% Municipal Area Covered	% Road Length Covered	% Historic Calls Covered	% Municipal Area Covered	% Road Length Covered
Scenario 1: Existing Conditions (3 Stations) (A=1; C=2 at Stn.1) (15FF)	75.8**	39.3	51.3	69.6	28.0	39.7	0.0	0.0	0.0
Scenario 2: Future Do-Nothing (3 Stations) (A=1; C=2 at Stn.1) (15FF)	75.8	39.3	47.5	69.6	27.8	39.7	0.0	0.0	0.0
Scenario 3: Future Conditions (3 Stations) (A=4; C=1 at Stn.1) (17FF)	75.8	39.3	47.5	77.6	40.6	50.7	38.9	10.1	17.4
Scenario 4: Future Conditions (3 Stations) (A=4; P2=1; C=2 at Stn.1) (19FF)	75.8	39.3	47.5	77.6	40.6	50.7	38.9	10.1	17.4
Scenario 5: Future Conditions (3 Stations) (A=4; P2=3; C=2 at Stn.1) (21FF)	75.8	39.3	47.5	77.6	40.6	50.7	85.5	53.9	64.1
Scenario 6: Future Conditions (4 Stations) (A=4; C=1 at Stn.1; P=4 at Stn.4) (21FF)	79.2	48.6	56.1	77.9	40.8	51.0	67.6	33.0	41.9

* All options have Station 2 at Northcrest. Stations 1, 2, 3 and 4 (Scenario 6 only) have a Pumper with 4 FF in all options. In addition "A" refers to an Aerial apparatus; "C" refers to the Command unit and "P" refers to a Pumper apparatus.

**Green highlight indicates the model runs that have been mapped below.

3.3.1 Scenario 1: Existing Conditions (3 Stations) (A-=1; C=2 at Stn. 1) (15FF)

The calibrated road network, combined with the existing fire station locations (Stations 1 and 3) and relocated Station 2 location, was used to build a graphical (map-based) display of the existing emergency response performance capabilities of the P.F.S. These results represent the emergency response coverage that can be provided for the Initial Arriving Company.

The existing emergency response fire suppression deployment capabilities of the P.F.S. Initial Arriving Company were assessed in comparison to the N.F.P.A. 1710 Standard performance benchmark of "Four firefighters arriving on scene within a four minute travel time to 90% of fire suppression incidents". **Figure 2** illustrates the locations of the historical emergency calls for the period from January 1, 2015 to December 31, 2019. This model indicates that within a four minute travel time, the Initial Arriving Company was able to provide emergency response coverage to 75.8% of historical emergency calls, 39.3% of the municipal area, and 51.3% of the road network within the City.

Figure 2

Existing Conditions - 3 Stations - 15FF
Initial Arriving Company

3 Pumpers = 4 FF each
Additional @ Stn 1: Aerial = 1 FF, Command = 2 FF

4 Firefighters in 4 Minutes of Travel Time	
% Historic Calls Covered	75.8%
% Municipal Area Covered	39.3%
% Road Length Covered	51.3%

Legend

- Existing Fire Station 1
- Relocated Station 2
- Existing Fire Station 3
- Existing Street
- City Limit

Coverage in Minutes

- 0 - 4
- 4 - 6
- 6 - 8
- 8 - 10

peterborough

Kilometres
0.50.25 0 0.5 1 1.5 2

June, 2021
Produced by Geomatics/Mapping, City of Peterborough

As shown in **Table 4**, analysis of existing conditions also indicates that within a six minute travel time the Second Arriving Company was able to provide emergency response coverage to 69.6% of historical emergency calls, 28.0% of the municipal area, and 39.7% of the road network within the City.

At present, based on the fire services' current minimum staffing of 15 full-time firefighters on duty at all times, the P.F.S. is unable to achieve the benchmark of 16 firefighters arriving on scene within an eight minute travel time for initial full alarm assignment. This highlights the challenge with the depth of response capabilities of the P.F.S.

3.3.2 Scenario 2: Future Do-Nothing (3 Stations) (A=1; C=2 at Stn.1) (15FF)

Scenario 2 is a do-nothing scenario whereby additional planned growth is included in the model, but no additional fire suppression personnel are added to the P.F.S. **Table 4** indicates that similar to Scenario 1: Existing Conditions, within a four minute travel time the Initial Arriving Company can provide emergency response coverage to 75.8% of historical emergency calls, 39.3% of the municipal area, and 47.5% of the road network within the City. Overall, there is only a slight difference in the percentage of road length covered between the existing conditions scenario and the future do-nothing scenario.

Within a six minute travel time, the Second Arriving Company can provide emergency response coverage to 69.6% of historical emergency calls, 27.8% of the municipal area, and 39.7% of the road network within the City.

Based on a minimum staffing of 15 full-time firefighters on duty at all times in a future do-nothing scenario, the P.F.S. is unable to achieve the benchmark of 16 firefighters arriving on scene within an eight minute travel time for initial full alarm assignment.

3.3.3 Scenario 3: Future Conditions (3 Stations) (Aerial=4; Command Unit=1 at Stn.1) (17FF)

Scenario 3 is characterized by the addition of ten firefighters resulting in a minimum of two additional firefighters on duty at all times for a minimum staffing of 17 full-time firefighters. All pumper apparatus at each station are staffed with four firefighters, similar to Scenarios 1 and 2, however, the aerial at Station 1 in Scenario 3 is also staffed with four firefighters (instead of one) and the command vehicle at Station 1 is staffed with one firefighter (instead of two).

As identified in **Table 4**, the addition of two firefighters to the total minimum staffing on duty at all times does not strengthen the emergency response capabilities of the initial arriving company. Since the additional staff are located in Station 1 where there is already a staffed Pumper, the initial arriving apparatus coverage is the same. There is however, a significant increase in emergency response capability of the Second Arriving Company, which based on the modelling, can provide emergency response coverage to 77.6% of historical emergency calls, 40.6% of the municipal area, and 50.7% of the road network within the City.

Figure 3 illustrates the future conditions initial full alarm assignment capabilities of the P.F.S. based on projected community growth and the associated planned future road network. The analysis indicates that with the additional of ten firefighters (with two additional firefighters added to the minimum number of staffing on duty at all times), the P.F.S. is able to deploy an Initial Full Alarm Assignment including 16 firefighters within an eight minute travel time to 38.9% of historical emergency calls, 10.1% of the municipal area and 17.4% of the future road network within the City. Having an additional apparatus staffed with four firefighters should be considered an immediate high priority. It allows the department to muster the resources for an Initial Full Alarm from the on-duty staffing.

Future Conditions - 3 Stations - 17FF Initial Full Alarm

3 Pumpers = 4 FF each
Additional @ Stn 1: Aerial = 4 FF, Command = 1 FF

16 Firefighters in 8 Minutes of Travel Time	
% Historic Calls Covered	38.9%
% Municipal Area Covered	10.1%
% Road Length Covered	17.4%

Legend

- 1 Existing Fire Station 1
- 2 Relocated Station 2
- 3 Existing Fire Station 3
- City Limit
- Existing Street
- Future Street
- 16 FF Arriving in 8 minutes

N

Woodland Dr
Pioneer Rd
Nassau Mills Rd
Armour Rd
Carnegie Av
University Rd
Cumberland Av
Water St
Hillard St
Towerhill Rd
Chemong Rd
Parkhill Rd E
Lily Lake Rd
Fairbairn St
George St N
Television Rd
McDonnel St
Water St
Reid St
Hunter St W
Hunter St E
Parkhill Rd W
Charlotte St
Rubidge St
George St N
Brealey Dr
Sherbrooke St
Park St N
Little Lake
Ashburnham Dr
Lansdowne St E
Monaghan Rd
Aylmer St S
George St S
Clonsilla Av
River Rd S
The Parkway
Park St S
Lansdowne St W
The Queensway
Erskine Av
Kennedy Rd
Bensfort Rd
Crawford Dr
Johnston Dr
Brealey Dr
Sir Sandford Fleming Dr
Airport Rd
The Parkway
115
5

peterborough

Kilometres
0.50.25 0 0.5 1 1.5 2

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Overall, the addition of two firefighters to the total minimum fire suppression staffing improves the initial full alarm assignment response capabilities of the P.F.S.

3.3.4 Scenario 4: Future Conditions (3 Stations) (A=4; P2=1; C=2 at Stn.1) (19FF)

In Scenario 4, 20 firefighters have been added to the fire suppression division with four additional firefighters on duty at all times resulting in a minimum staffing of 19 full-time firefighters. This is a total of ten additional firefighters over Scenario 3, resulting in two additional firefighter on-duty at all times. All pumps at each station are staffed with four firefighters, similar to Scenarios 1, 2, and 3, however, the aerial at Station 1 in Scenario 4 is staffed with four firefighters and the command vehicle at Station 1 is staffed with two firefighters. There is also an additional pump located at Station 1, staffed with one firefighter.

In this scenario, there is no improvement to the initial arriving company, the second arriving company or initial full alarm assignment. However, the addition of two firefighters on duty at all times provides additional resources on scene enhancing the capabilities of the P.F.S. and can be viewed as interim step towards the next scenario.

3.3.5 Scenario 5: Future Conditions (3 Stations) (A=4; P2=3; C=2 at Stn.1) (21FF)

Scenario 5 is characterized by the addition of 30 firefighters to the fire suppression division with six additional firefighters on duty at all times resulting in a minimum staffing of 21 full-time firefighters. This is a total of ten additional firefighters over Scenario 4, resulting in two additional firefighter on-duty at all times. All pumps at each station are staffed with four firefighters, similar to Scenarios 1, 2, 3 and 4, however, the aerial at Station 1 in Scenario 5 is staffed with four firefighters and the command vehicle at Station 1 is staffed with 2 firefighters. There is a second pump positioned at Station 1, staffed with three firefighters.

In this scenario, there is no improvement to the initial arriving company or the second arriving company. As shown in **Figure 4**, the emergency response capabilities of the P.F.S. improve for the initial full alarm assignment benchmark of 16 firefighters on scene within eight minutes of travel time. The additional of 30 firefighters (with six additional firefighters added to the minimum number of staffing on duty at all times) improves the initial full alarm assignment capabilities of the P.F.S. whereby 85.5% of historical emergency calls, 53.9% of the municipal area and 64.1% of the future road network within the City are covered. This is a significant improvement in the depth of coverage for the municipality.

Future Conditions - 3 Stations - 21FF Initial Full Alarm

3 Pumpers = 4 FF each
Additional @ Stn 1: Aerial = 4 FF, Command = 2 FF, 2nd Pumper = 3 FF

16 Firefighters in 8 Minutes of Travel Time	
% Historic Calls Covered	85.5%
% Municipal Area Covered	53.9%
% Road Length Covered	64.1%

Legend

- City Limit
- 1 Existing Fire Station 1
- 2 Relocated Station 2
- 3 Existing Fire Station 3
- Existing Street
- Future Street
- 16 FF Arriving in 8 minutes

N

Woodland Dr, Pioneer Rd, Nassau Mills Rd, Armour Rd, Carnegie Av, University Rd, Cumberland Av, Water St, Hillard St, Towerhill Rd, Chemong Rd, Lily Lake Rd, Fairbairn St, George St N, Parkhill Rd E, Parkhill Rd W, McDonnel St, Reid St, Hunter St W, Hunter St E, Television Rd, Charlotte St, Rubidge St, Brealey Dr, Sherbrooke St, Park St N, Monaghan Rd, Ashburnham Dr, Lansdowne St E, Clonsilla Av, The Parkway, Park St S, River Rd S, Lansdowne St W, The Queensway, Erskine Av, Kennedy Rd, Bensfort Rd, Crawford Dr, Johnston Dr, Sir Sandford Fleming Dr, Airport Rd

Little Lake

peterborough

Kilometres
0.5 0.25 0 0.5 1 1.5 2

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3.3.6 Scenario 6: Future Conditions (4 Stations) (A=4; C=1 at Stn.1; P=4 at Stn.4) (21FF)

Scenario 6 includes a four station model, with a fourth station positioned on the east side of the City, and the addition of 30 firefighters are added to the department with six additional firefighters on duty at all times. This results in a minimum staffing of 21 full-time firefighters. All pumper vehicles at each station are staffed with four firefighters, similar to Scenarios 1, 2, 3, 4, and 5. The aerial at Station 1 in Scenario 6 is staffed with four firefighters and the command vehicle at Station 1 is staffed with one firefighter. There is a pumper added to the proposed Station 4 location, staffed with four firefighters. Station 4 is assumed to be located in the vicinity of Ashburnham Drive and Lansdowne Street East.

Figure 5 illustrates the results of the initial arriving company for Scenario 6. A four station model produces better response coverage for the initial arriving company and slightly better coverage for the second arriving company in comparison to the other scenarios. The relocation on the east side of the river allows Station 4 pumper to cover the area around the station that it can reach in four minutes, adding to area not previously covered in four minutes.

The addition of a pumper vehicle and four firefighters in the fourth station, increases the minimum staffing to 21 firefighters and enables the City to meet the performance benchmark for initial full alarm assignment. However, as shown in **Table 4**, the percentage of historical calls, municipal area and road length covered decreases from the three station model of Scenario 5 (also with a minimum of 21 firefighters on duty). **Figure 6** illustrates the results for the initial full alarm response. This is due to the fourth station and the crew housed there being further away from where the majority of the calls and resources that are located more centrally. This decrease can be attributed to the need for fire services personnel to travel further distances from the Station 4 area located on the east side of the City.

The added initial response coverage is a worthwhile trade-off associated with staffing a pump in a new Station 4. It has the added operational advantage of having resources on the east side of the river should one of the bridge crossing be blocked during an emergency incident.

Future Conditions - 4 Stations - 21FF
Initial Arriving Company

4 Pumpers = 4 FF each
Additional @ Stn 1: Aerial = 4 FF, Command = 1 FF

4 Firefighters in 4 Minutes of Travel Time	
% Historic Calls Covered	81.1%
% Municipal Area Covered	49.7%
% Road Length Covered	57.3%

Legend

- 1 Existing Fire Station
- 2 Relocated Station 2
- 3 Existing Fire Station 3
- 4 Potential Station 4
- City Limit
- Existing Street
- Future Street

Coverage in Minutes

- 0 - 4
- 4 - 6
- 6 - 8
- 8 - 10

N

Woodland Dr
Pioneer Rd
Nassau Mills Rd
Armour Rd
Carnegie Av
University Rd
Cumberland Av
Water St
Hilliard St
Towerhill Rd
Chemong Rd
Lily Lake Rd
Fairbairn St
George St N
Parkhill Rd E
Parkhill Rd W
McDonnel St
Reid St
Hunter St W
Hunter St E
Television Rd
Charlotte St
Rubidge St
Little Lake
Brealey Dr
Sherbrooke St
Park St N
Monaghan Rd
Aylmer St S
George St S
Ashburnham Dr
Lansdowne St E
Clonsilla Av
The Parkway
River Rd S
Park St S
Lansdowne St W
The Queensway
Erskine Av
Kennedy Rd
Bensfort Rd
Crawford Dr
Johnston Dr
Sir Sandford Fleming Dr
Airport Rd
5
115

peterborough

Kilometres
0.50.25 0 0.5 1 1.5 2

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Future Conditions - 4 Stations - 21FF Initial Full Alarm

4 Pumpers = 4 FF each
Additional @ Stn 1: Aerial = 4 FF, Command = 1 FF

16 Firefighters in 8 Minutes of Travel Time	
% Historic Calls Covered	67.6%
% Municipal Area Covered	33.0%
% Road Length Covered	41.9%

Legend

- 1 Existing Fire Station 1
- 2 Relocated Station 2
- 3 Existing Fire Station 3
- 4 Potential Station 4
- City Limit
- Existing Street
- Future Street
- 16 FF Arriving in 8 minutes

N

Woodland Dr
Pioneer Rd
Nassau Mills Rd
Armour Rd
Carnegie Av
University Rd
Cumberland Av
Water St
Hillard St
Towerhill Rd
Chemong Rd
Parkhill Rd E
Lily Lake Rd
Fairbairn St
George St N
Television Rd
McDonnel St
Water St
Reid St
Hunter St W
Hunter St E
Parkhill Rd W
Charlotte St
Rubidge St
Brealey Dr
Sherbrooke St
Park St N
Monaghan Rd
Ashburnham Dr
Lansdowne St E
Clonsilla Av
River Rd S
Park St S
The Parkway
The Queensway
Erskine Av
Lansdowne St W
Kennedy Rd
Bensfort Rd
Crawford Dr
Johnston Dr
Brealey Dr
Sir Sandford Fleming Dr
Airport Rd
Little Lake

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Kilometres
0.50.25 0 0.5 1 1.5 2

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3.3.7 Training

Training staff of the P.F.S. are currently engaged with existing training requirements of the department. This review did not assess whether they are currently meeting legislated requirements and industry best practices, but the addition of 30 firefighters over the next five to six years will add considerably to their work load. Our experience suggests that an additional Training Officer may be required. An assessment of the departments training needs and a training workload analysis should be done to determine if additional training staff resources will be required to meet the department's needs, including the recruit training for additional firefighters.

3.3.8 Implementation Plan

The scenarios described above illustrate the advantages of adding additional staff to enhance the minimum staff on duty at any given time and the resultant increase in response coverage. It requires hiring ten full-time firefighters to add a minimum of two firefighters on a 24/7 basis. The addition of two to the current minimum staffing (15) allows the P.F.S to regularly have on duty sufficient staff to begin to meet the NFPA 1710 standard for the Initial Full Alarm Assignment (16). This is the first step to enhancing the depth of coverage.

By the time we have added a total of 30 staff (Scenarios 5 and 6) or a minimum of six additional staff on duty, depth of response has improved significantly. It still does not meet the N.F.P.A. benchmark of responding with 16 firefighters in eight minutes to 90% of calls, but it has made a significant improvement.

This additional staffing has a number of other advantages as well. When a complement of 16 or more firefighters is required today, firefighters are called in on overtime. The costs of the additional firefighters will be offset to the extent that staff on-duty can respond with sufficient resources or with these additional resources, thereby minimizes overtime. In addition, today, when the P.F.S. responds to an Initial Full Alarm requiring 16 firefighters, all of the on-duty staff are deployed (plus staff on overtime) leaving all of the fire stations in the municipality empty of fire suppression resources. If a simultaneous call occurs with an existing incident where everyone is deployed, there is no one on duty to respond. Having a minimum staffing of 21, still leaves one crew to respond to a simultaneous alarm, which mitigates the fire and emergency risk.

Given the existing risks and increases in forecast population and high density occupancies, the added depth of response helps to meet the needs of the municipality. Even at minimum of 21 on-duty staff, the municipality can't meet the staffing requirements for an apartment building fire (27 firefighters), but it is much better positioned and would require fewer staff to be called in on overtime. The added staff are required to help improve the depth of response and to respond to simultaneous calls, and the best place to add the staff is in the centrally located Station 1. This will serve the municipality well in the short to medium term. Recognizing that adding 30 staff is a major undertaking for the municipality, both financially and logistically, we turned our attention to developing options for a phased implementation plan.

There are many ways hiring could occur over time to achieve this objective. The highest priority is to add a minimum of two additional firefighters to have a minimum of 17 firefighters on duty. This requires hiring ten additional firefighters. Then incrementally adding staff to achieve hiring a total of 30 firefighters in the short to medium term, for a total of six additional firefighters on duty.

The P.F.S. should develop an implementation plan to achieve this objective. Ideally this is accomplished as soon as financially feasible, over the next five to six years. This could be achieved by hiring five fire-fighters a year for the next six years or any other combination that achieves the objective.

In addition to continuously improving the P.F.S. depth of response, an implementation plan aligned to this objective has the added benefit of having sufficient staff and equipment to move a pumper apparatus and staff to the proposed Station 4 (see Scenario 6) when built.

4.0 Peer Comparison

This section provides a comparison of the City of Peterborough and Peterborough Fire Services to a group of peer comparators. The Peer Comparison portion of this study includes the introduction of a selection of peer municipalities and the presentation of results relating to fire suppression performance.

The intent of this exercise is to provide Senior Management and Council with an informed understanding of current service levels related to applicable N.F.P.A. 1710 standard performance benchmarks through the analysis of a representative group of municipalities.

The data collected from the peer communities is based on historic information collected from 2013 to 2019. The 2020 Edition of the N.F.P.A. 1710 standard only recently became publicly available. As such, many municipalities have not yet applied the new standard and revised performance benchmarks to analyze their emergency response capabilities. Therefore this municipal comparator analysis presents the results of the N.F.P.A. 1710 2016 Edition and 2020 Edition for

- The **Initial Arriving Company**; and
- The **Initial Full Alarm Assignment**.

A significant change in these two benchmarks between the N.F.P.A. 1710 2016 Edition and the 2020 Edition is the Initial Full Alarm staffing target. In the 2020 Edition, the staffing target has been revised from 14 firefighters (or 15 firefighters including an aerial) to 16 firefighters (or 17 firefighters including an aerial) arriving on scene within an eight minute travel time to 90% of fire suppression incidents. The 2020 version also provides more guidance on staffing for higher risk occupancies.

4.1 Peer Comparators

The selection of the peer comparators was based on considerations of geographical characteristics, community risk characteristics, and the availability of data regarding suppression services (including the availability of G.I.S.-based emergency response analysis completed by Dillon), and the N.F.P.A. performance benchmarks listed above. By assessing peer municipalities where Dillon has carried out Fire Master Plan ensures that a consistent methodology is applied in collecting and assessing the fire protection capabilities of the municipality and its fire service. In addition to the City of Peterborough (and Peterborough Fire Services), the municipal comparator group selected includes:

- The City of Oshawa (Oshawa Fire Services);
- The City of Brantford (Brantford Fire Department);
- The Towns of Aurora and Newmarket (Central York Fire Services);
- The City of Sault Ste. Marie (Sault Ste. Marie Fire Services); and
- The City of Cornwall (Cornwall Fire Service).

For comparison purposes, the group average is carried through the peer comparator analysis presented in the following sections.

4.2 Peer Group Characteristics

This section presents an overview of the geographical characteristics of the peer comparator group. A summary of the population, land area, and dwelling count is presented in **Table 5** below.

Table 5: Geographical Characteristics of Peer Comparator Group

Municipality	Population	Ranking by Population	Land Area (km^2)	Ranking by Land Area	Total Private Dwellings
Group Average	98,479	-	109.2	-	40,704
Peterborough	**81,032**	**4th**	**64.3**	**5th**	**36,785**
Oshawa	159,458	1st	145.6	2nd	64,883
Brantford	97,496	3rd	72.4	4th	40,732
Central York (Aurora and Newmarket)	133,181	2nd	88.1	3rd	46,069
Sault Ste. Marie	73,368	5th	223.2	1st	34,485
Cornwall*	46,340	6th	61.5	6th	21,272

*Population, private dwelling and land area totals are based on Statistics Canada Census information nearest to the completion year of the reports used throughout this analysis. For example, 2011 Census information was used for Cornwall as the year of study completion for each occurred prior to the release of the 2016 Census.

Many of the municipalities in this comparison share similar characteristics to the City of Peterborough. The City of Peterborough had a 2016 population of 81,032 people, the fourth highest population within the peer comparator group. The peer comparator group average population is 98,479, larger than the population of Peterborough. The peer comparator group populations range from approximately 46,340 to 159,458. In general, the peer group represents mid-sized Ontario municipalities, by population. For additional consideration in comparing municipalities, Peterborough is forecast to increase to 95,385 by 2028 and to 99,354 by 2031 (as documented in the 2019 City-Wide Development Charges Background Study, Hemson Consulting Ltd.).

Peterborough's geographic land area is 64.3 square kilometres, which ranks 5th in the peer comparator group. The group average land area is 109.2 square kilometres, well above the City of Peterborough. Total private dwellings range from 21,272 to 64,883 with a group average of 40,704 dwellings. This group average is close to the number of private dwellings in Peterborough, as of 2016, at 36,785.

4.3 Peer Group Community Risk Comparison

Characteristics such as the demographics of a community are important when determining local fire risks and the level of service provided by emergency services.

4.3.1 Demographic Comparison

Assessing a municipality's demographic profile is required within the legislated Community Risk Assessment process in Ontario (O. Reg. 378/18). **Table 6** provides a summary of two of the key demographic ranges related to an increased fire risk: residents 65 years of age and older and residents aged 14 years and younger.

Table 6: Demographic Profile

Municipality	Percentage (%) of Residents 65 Years of Age and Above	Percentage (%) of Residents 14 Years of Age and Under
Group Average	18.2%	16.3%
Peterborough	**22.3%**	**14.6%**
Oshawa	16.5%	16.7%
Brantford	17.2%	17.7%
Central York (Aurora and Newmarket)	10.9%	19.0%
Sault Ste. Marie	22.4%	14.3%
Cornwall	20.1%	15.5%

Compared to the group average of 18.2%, Peterborough at 22.3% has a slightly higher proportion of residents who are 65 years of age and older. Conversely, compared to the group average of 16.3%, Peterborough at 14.6% has a slightly lower proportion of residents who are 14 years of age and younger.

4.3.2 Building Stock Comparison

Another important consideration of community fire risk relating to fire services is the building stock profile within a community. Assessing a municipality's building stock profile is required within the legislated Community Risk Assessment process in Ontario (O. Reg. 378/18). **Table 7** presents a summary of the percentage of major occupancy classes of the Ontario Building Code for the building stock of each municipal comparator.

Table 7: Building Stock Profile

Group	Occupancy Classification	Peterborough	Oshawa	Brantford	Central York (Aurora and Newmarket)	Sault Ste. Marie	Cornwall
Group A	Assembly	**0.8%**	0.5%	0.8	0.4%	0.8%	0.7%
Group B	Care or Detention	**0.1%**	0.0%	0.1	0.0%	0.1%	0.1%
Group C	Residential	**87.5%**	93.4%	95.4	95.6%	86.0%	92.1%
Group D /Group E	Business and Personal Services / Mercantile	**2.9%**	1.2%	1.8	1.3%	2.0%	6.1%
Group F	Industrial	**1.3%**	1.1%	1.6	2.7%	1.2%	0.8%
Other	Other	**7.4%**	3.7%	0.3	0.0%	9.9%	0.1%

The comparator group municipalities all have one building classification that dominates the building stock profile - Group C Residential Occupancies. For most comparators, Group C Residential Occupancies comprise over 90% of each municipality's total building stock. The City of Sault Ste. Marie has the lowest percentage of Group C Residential Occupancies (86.0%), followed by the City of Peterborough at 87.5%.

4.3.3 Fire Loss Comparison

Another indicator of community fire risk within a municipality is historic fire loss information. Assessing a municipality's past fire loss and event history profile is required within the legislated Community Risk Assessment process in Ontario (O. Reg. 378/18). **Table 8** presents a summary of the percentage of total fire loss associated with each major building code occupancy classification. The fire loss data for the Towns of Newmarket and Aurora have been separated as the Central York Fire Services submits fire loss data separately for each Town to the Office of the Fire Marshal.

Table 8: Fire Loss Profile

Group	Occupancy Classification	Peterborough	Oshawa	Brantford	Aurora	Newmarket	Sault Ste. Marie	Cornwall
Group A	Assembly	**5.4%**	2.1%	4.0	6.0%	6.0%	2.6%	5.0%
Group B	Care or Detention	**2.0%**	0.3%	2.0	1.0%	4.0%	1.5%	1.0%
Group C	Residential	**73.2%**	82.6%	61.0	75.0%	68.0%	80.4%	72.0%
Group D/E	Business and Personal Services/Mercantile	**4.0%**	5.6%	7.0	9.0%	9.0%	3.6%	7.0%
Group F	Industrial	**7.4%**	4.1%	17.0	8.0%	8.0%	5.2%	7.0%
Other	Other	**8.1%**	5.4%	10.0	1.0%	6.0%	6.6%	8.0%

The municipal comparator fire loss data shows the consistency of the trend that the greatest fire loss occurs in Group C-Residential occupancies. The comparator group's range of fire loss occurring in Group C-Residential occupancies, as a percentage of total fire loss, ranges from 61.0% to 82.6%. This analysis supports that the community risk within this group of municipalities is comparable.

4.4 Municipal Group Fire Statistics Comparison

The following sections identify the characteristics, statistics, trends and service levels of the fire services for each of the comparator group municipalities. **Table 9** identifies the suppression staffing resources, minimum staffing levels and fire stations for the municipalities within the comparator group.

Table 9: Fire Staffing and Stations Comparison

Municipality	Ranking by Population	Total # of Fire Suppression Personnel	Minimum On Duty Suppression Staff	Ratio of Total Suppression Staff to Minimum Staff	# of Fire Stations
Group Average	--	101	19	5.5:1	4
Peterborough	**4th**	**80**	**15**	**5.3:1**	**3**
Oshawa	1st	161	33	4.9:1	6
Brantford	3rd	108	19	5.7:1	4
Central York	2nd	136	21	6.5:1	4
Sault Ste. Marie	5th	64	13	4.9:1	4
Cornwall	6th	56	10	5.6:1	2

The group average for total fire suppression personnel within the fire service is 101 total firefighters. The City of Oshawa's total number of fire suppression personnel is significantly higher than the group average at 161 firefighters, followed by Central York with 136 firefighters and the City of Brantford with 108 firefighters. The City of Peterborough's total fire suppression compliment is below the group average.

The highest population within the group translates to the highest number of fire suppression personnel, and the lowest population sizes in the group have the lowest numbers of total suppression staff.

The group average on-duty minimum staffing level is 19 firefighters, which is higher than Peterborough's current minimum staffing level of 15 firefighters on duty at all times. The group range for minimum staffing level is 10 to 33 firefighters.

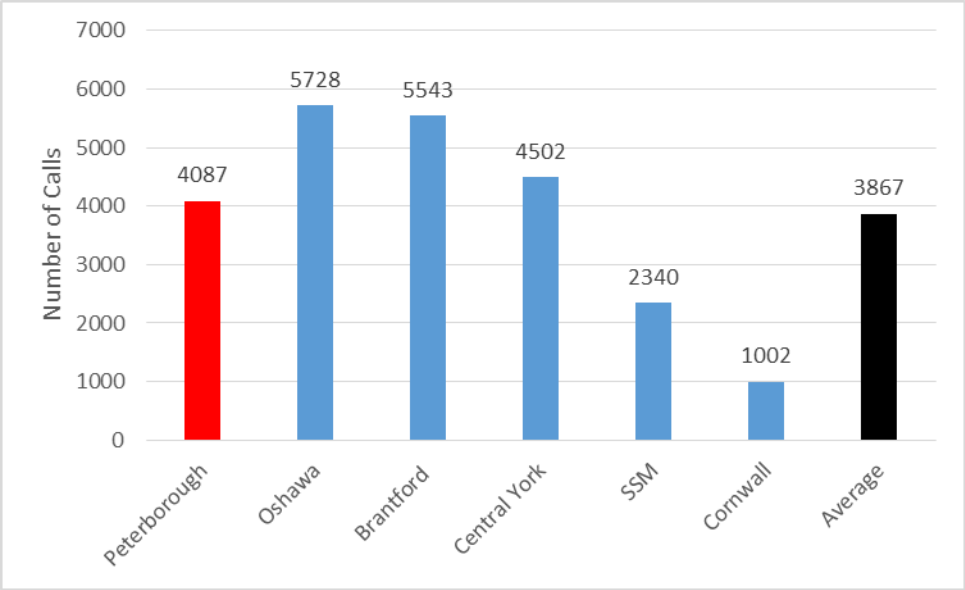
The ratio of total suppression staff to the minimum staffing level indicates the number of full-time firefighters on staff compared to the minimum on-duty staff level. This number can reflect the management of issues such as long-term leaves, sick time, vacation schedules, lieu time, and balancing

overtime costs. The average ratio within the peer group is 5.5 suppression staff to one on-duty firefighter, with a range of three municipalities above and three below this ratio level.

The group average for fire stations is four, and the range of fire stations for the group ranges from two to six fire stations.

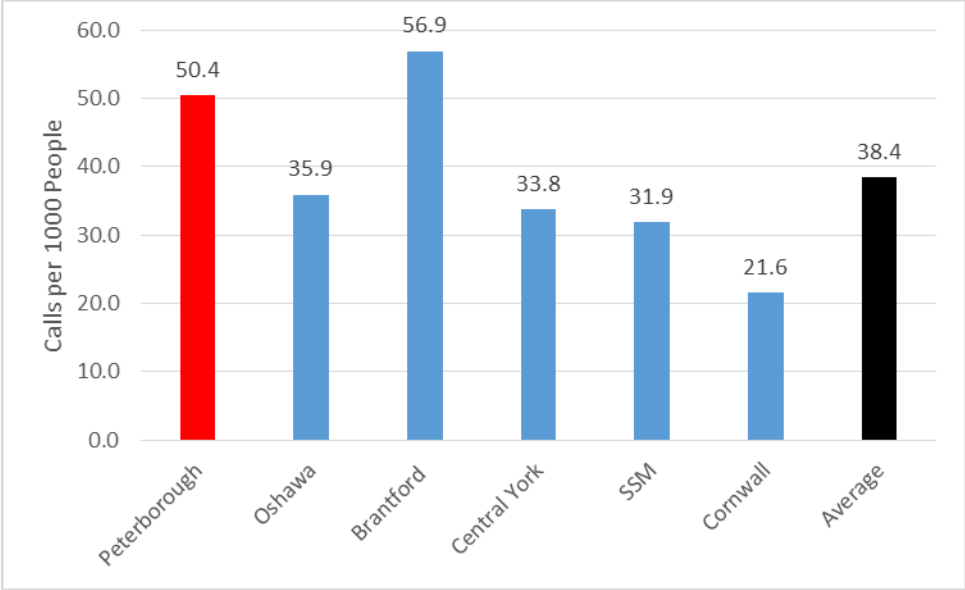
Figure 7 provides a graphical summary of total call volumes for the municipal comparator group using call data for one year closest to the year of study completion for which Dillon Consulting had completed a G.I.S.-based analysis of emergency response performance. Total call volume can be an indicator of workload for the fire services.

Figure 7: Total Call Volume (2013 to 2019)



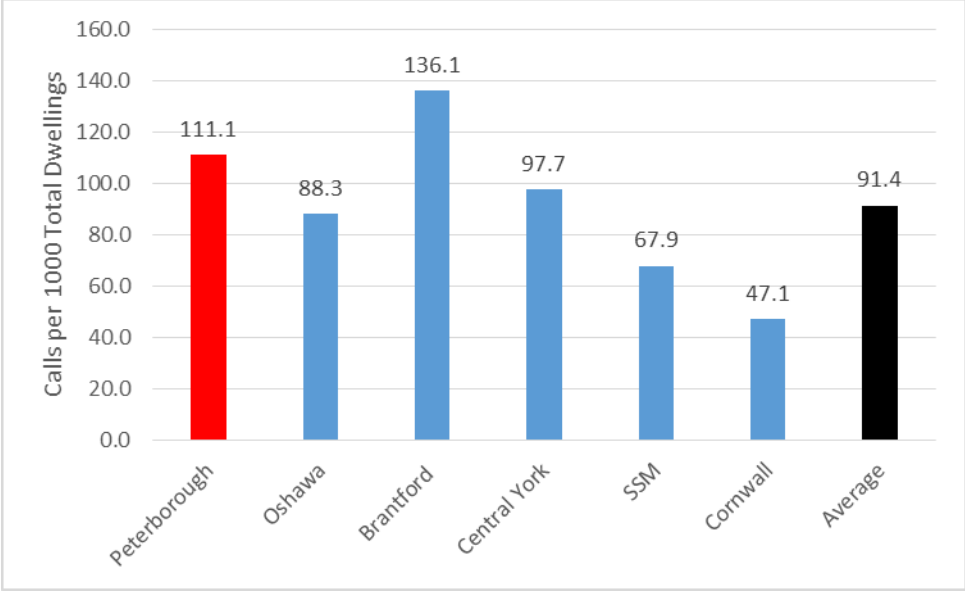
As shown in **Figure 7**, The City of Peterborough has a higher call volume (4,087) than the group average of 3,867 calls. The City of Oshawa experiences the highest call volume. It also has the highest population within the group, which is an important factor in call volume. This is considered in the calls per population analysis shown in **Figure 8** which presents a graph of the total number of calls per 1000 people in the comparator group municipalities.

Figure 8: Total Calls per 1000 People



Comparing calls to population, the Peterborough Fire Services experiences the second highest number of calls per 1000 people, which is higher than the group average. **Figure 9** shows the results of the analysis of total calls per 1000 dwellings within the municipal comparator group.

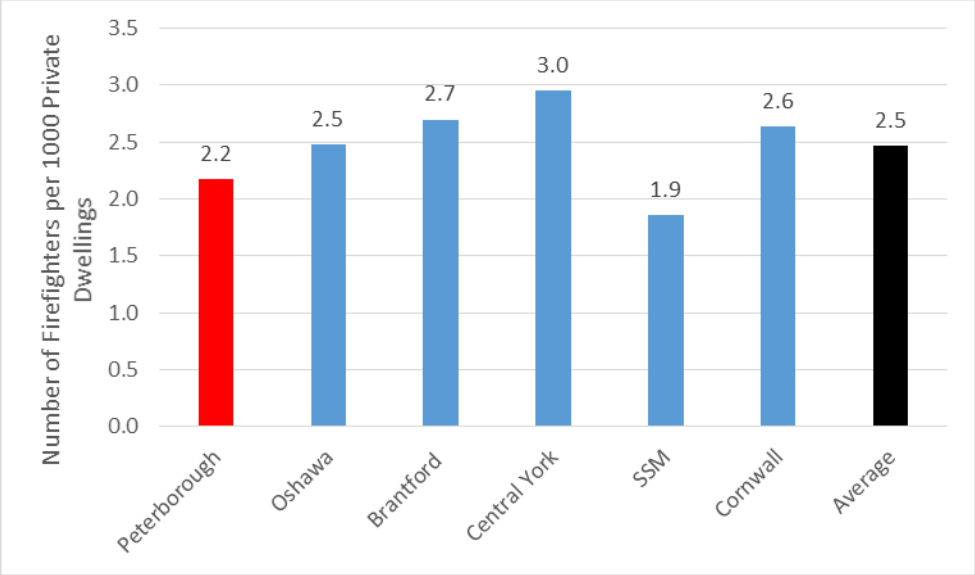
Figure 9: Total Calls per 1000 Dwellings



The calls per 1000 dwellings follows a similar trend to the calls per population. Again, Peterborough is the second highest in the group, higher than the group average by 19.7 calls per 1000 dwellings.

Figure 10 presents a graph indicating the number of firefighters (total suppression staff) per 1000 total dwellings. The group average is 2.5 firefighters per 1000 private dwellings, which is very similar to the 2.2 firefighters per 1000 dwellings present in the City of Peterborough.

Figure 10: Firefighters per 1000 Dwellings



4.5 Municipal Group Response Modelling Comparison

The data collected from the peer communities is based on historic information collected from 2013 to 2019. Again, it is noted that the 2020 Edition of N.F.P.A. 1710 only recently became publicly available, and as such, many municipalities have not yet applied the new standard and revised benchmarks to analyze their emergency response capabilities.

An important consideration is that the only significant change in these two benchmarks between N.F.P.A. 1710 standard 2016 Edition and 2020 Edition is the Initial Full Alarm staffing target. In the 2020 Edition the staffing target is revised to reflect 16 firefighters (or 17 firefighters including an aerial) arriving on scene within an eight minute travel time to 90% of fire suppression incidents.

4.5.1 Modelled Response Data for the Peer Comparator Group

A consideration in the selection of the municipalities within the comparator group was the availability of the data to support the comparison of the fire suppression benchmarks (initial arriving company and initial full alarm assignment). Municipalities and their fire services for which Dillon had completed a G.I.S.-based analysis of emergency response performance, applying the N.F.P.A. benchmarks, were included within the comparator group. **Table 10** provides details on the year within which each emergency response analysis was completed.

Table 10: Year of Emergency Response Analysis Completed

Municipality	Year of Study Completion
Peterborough	**2021 (current report)**
Oshawa	2020
Brantford	2019
Central York	2014
Sault Ste. Marie	2018
Cornwall	2014

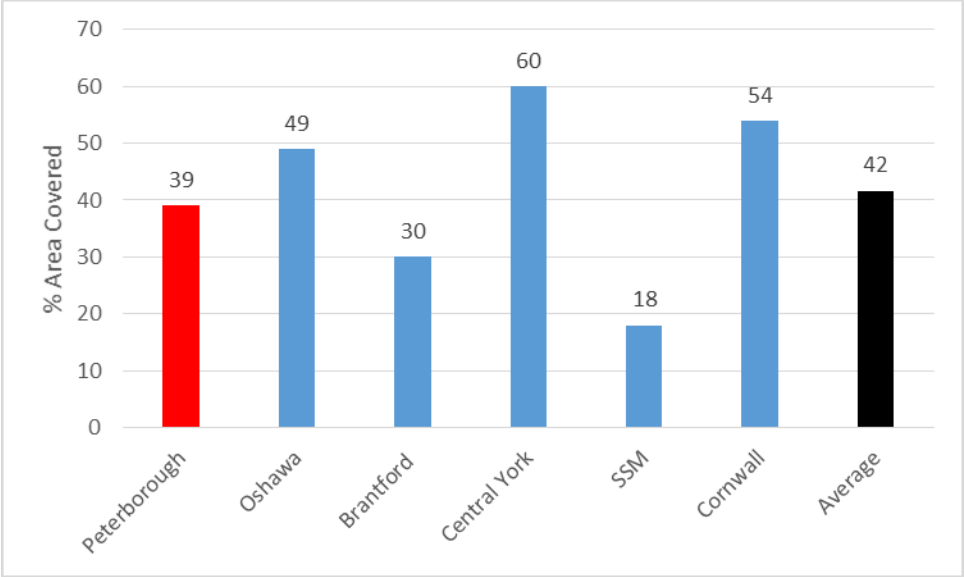
The results of the modelled emergency response analysis of the initial arriving company and initial full alarm assignment for the comparator municipalities are provided below. The results are provided as the measurement of percentage of municipal area covered.

4.5.2 Initial Arriving Company Benchmark

Benchmark: The Initial Arriving Company including four firefighters arriving on scene within four minutes of travel time to 90% of fire suppression incidents (N.F.P.A. 1710, 2016 and 2020 Edition)

Figure 11 provides a graphical summary of the comparator group analysis of the initial arriving company benchmark, measuring the percentage of municipal area coverage. The group average is 42% of municipal area covered with four firefighters responding within four minutes of travel time. The highest result in the group is 60%, achieved by Central York Fire Services. The Peterborough Fire Services have a modelled initial arriving apparatus capability of 39% of municipal area covered with four firefighters responding in four minutes of travel time. The lowest initial arriving apparatus coverage of municipal area is 18% (Sault Ste. Marie Fire Services).

Figure 11: Initial Arriving Apparatus - % of Municipal Area Covered



4.5.3 Initial Full Alarm Assignment Benchmark

Benchmark: The Initial Full Alarm Assignment for a Single-Family Dwelling including 16 firefighters (or 17 firefighters including an aerial) arriving on scene within an eight minute travel time to 90% of fire suppression incidents.

Table 11 provides a summary of the comparator group analysis of the initial full alarm assignment benchmark, measuring the percentage of municipal area coverage. The highest initial full alarm assignment benchmark result in the group is 79%, achieved by Cornwall. However, the initial full alarm assignment benchmark is not an appropriate comparison in this instance, as previous analysis modelled the percentage of municipal area covered with ten firefighters responding in eight minutes of travel time.

Two comparators analyses (Peterborough and Oshawa) modelled to the N.F.P.A. 1710, 2020 Edition standard of 16 firefighters on scene within eight minutes of travel time. As shown in **Table 11**, below, Peterborough cannot achieve the initial full alarm assignment benchmark, with 0% municipal area covered.

The remaining comparator analyses used the benchmark for initial full alarm assignment of 14 firefighters arriving on scene within eight minutes of travel time. Central York Fire Services achieves the highest modelled capability with 30% of municipal area covered with 14 firefighters responding in eight minutes of travel time. The lowest initial full alarm assignment coverage of municipal area is 0%, by Sault Ste. Marie.

Table 11: Initial Full Alarm Assignment - % of Municipal Area Covered

Municipality	% of Municipal Area Covered	Benchmark Used in Analysis
Peterborough	**0**	**Modelled to 16 FFs**
Oshawa	25	Modelled to 16 FFs
Brantford	19	Modelled to 14 FFs
Central York	30	Modelled to 14 FFs
Sault Ste. Marie	0	Modelled to 14 FFs
Cornwall	79	Modelled to 10 FFs

4.6 Summary of Peer Comparison

The peer comparison identified a number of mid-sized Ontario municipalities that are similar to Peterborough. It is clear that all of the peer municipalities are unique, but in aggregate and on average they are useful comparisons that can be made. This is particularly so as we consider the growth that Peterborough will experience as it reaches approximately 100,000 in population by 2031. There are similarities in population and geography, demographics, building stock and fire loss among the peer municipalities.

Comparing fire related statistics shows some interesting findings. Peterborough falls between Brantford Fire Department and that of Sault Ste. Marie (S.S.M.) in population size. Brantford has 19 firefighters on duty while S.S.M. has 13. In comparison to these two municipalities, Peterborough appears on the cusp of transitioning from having fewer than 16 firefighters on duty (the N.F.P.A. Initial Full Alarm standard) to more than 16. Given the projected increase in population for Peterborough as well as the increased risk posed by higher risk occupancies, this is a prudent time to begin to implement this change.

5.0 Staffing Strategy

The analysis in this report has highlighted the need to improve the depth of response for the P.F.S. This is highlighted by the current minimum staffing of 15 when the N.F.P.A 1710 standard for a Single Family Dwelling Initial Full Alarm is 16 firefighters (17 if an aerial is used). This effectively means that the P.F.S. cannot meet the standard anywhere in the municipality. This staffing requirement increases for higher risk occupancies (e.g. apartments, high rise buildings) adding to the concern as higher density development are added to the Peterborough building stock.

The evaluation of the alternative scenarios illustrates the depth of response improvements as staff are added, increasing the minimum staffing initially to 17 and then to 21. This requires the addition of ten additional firefighters initially as a high priority, increasing to a total of 30 firefighters to have a minimum of 21 on duty. This staffing increase can be achieved in a number of ways, but a phased in approach over a number of years may be the most prudent from both a financial perspective for the municipality as well as the logistics of recruiting, onboarding and training for the P.F.S.

The development of a staffing plan that meets this objective over the next five to six years would balance the need for added depth of response while spreading the burden over a number of years. The added benefit of meeting this objective is that when a fourth potential fire station is built on the east side of the Otonabee River, the P.F.S. will have the staff and equipment to relocate a crew to the new station without incurring additional operating costs.

6.0 Recommendations

The following are the recommendations following from this staffing and peer comparison review:

1. That the P.F.S. in conjunction with others in senior management develop a phased in staffing plan for Council approval that has as its objective the addition of 30 firefighters over the next five to six years.
2. That the P.F.S undertake an assessment of the departments training needs and a training workload analysis to determine if additional training staff resources will be required to meet the department's needs, including the recruit training for additional firefighters.