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Uxbridge Fire Department Fire Master Plan

Township of Uxbridge

Final Report
August 2012

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Fire Master Plan Final Report

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Our Project: 11-5428

Prepared By:

Dillon Consulting Limited

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1.0 INTRODUCTION

The Township of Uxbridge initiated this Fire Master Plan (FMP) study as part of its comprehensive community planning process to guide the delivery of fire protection services over the next ten years. Completion of the FMP recognises the continued commitment of Council and senior staff to providing the highest level of services and programs to the community in the most cost-effective and efficient manner.

This FMP provides a complete review of the current operations of the Uxbridge Fire Department to assist Council in establishing key objectives for the department. The plan includes recommendations to address both short-term and long-term strategies for the municipality, consistent with the fire master planning process outlined within the Office of the Fire Marshal, Ontario, *Shaping Fire-Safe Communities Initiative.*

The overarching goal of this report is to present a clear understanding of the existing and future requirements of the Uxbridge Fire Department. Referencing best practices, including relevant standards and legislation, this report was prepared by completing an assessment of the following department components and operations:

- Governance;
- Administration;
- Emergency response;
- Training;
- Fire prevention;
- Firefighter staffing & service agreements;
- Station location;
- Apparatus and equipment / maintenance program;
- Dispatch and radio systems;
- Finances; and
- Emergency preparedness planning.

As a composite fire service the Uxbridge Fire Department utilizes both full-time and volunteer (part-time) staff to deliver fire protection services. Sustaining this composite model and the high level of dedication and commitment of the volunteer firefighters has been a strategic consideration in developing this Fire Master Plan.

1.1 Community Background

The Township of Uxbridge is located along the western boundary of the Regional Municipality of Durham, in south-central Ontario. It is bordered by the Region of York to the north and to the west, by the City of Pickering to the south and by the Townships of Brock and Scugog to the east.

With a population of approximately 20,600[1] people and an area of approximately 421 square kilometres, the Township of Uxbridge is the second smallest municipality in the Regional Municipality of Durham by population, but the third largest by land area. It is a predominantly rural community, consisting of many small hamlets, such as Coppins Corners, Goodwood, Leaskdale, Sandford, Siloam, Udora and Zephyr. The Township of Uxbridge has a strong agricultural base and also hosts a number of industrial businesses. The main urban area is the original Town of Uxbridge, located in the centre of the township.

The balance between urban amenities and rural living that the Township of Uxbridge provides has made it a desirable community to live in and a popular bedroom community for people working in nearby larger centres such as the City of Oshawa, Town of Whitby and the Greater Toronto Area. The following excerpt from the Township's Official Plan highlights the community's vision to sustain rural character and protect its natural environment features:

> *"Uxbridge Township - A Rural Ontario Treasure*
>
> *Uxbridge Township is a vibrant, caring community that will protect and enhance:*
> *i) the beauty and tranquility of its rural setting through managed growth;*
> *ii) the local natural environment;*
> *iii) the close-knit lifestyle of a small historic town and hamlets;*
> *iv) the local economy, both urban and rural; and,*
> *v) the social, cultural, recreational and health programs."*

[1] Statistics Canada, 2011 Census of Population (Township of Uxbridge Population was 20,623)

2.0 LEGISLATION

Within the Province of Ontario the relevant legislation for the operation of a fire department is contained within the *Fire Protection and Prevention Act*, 1997 (FPPA). The FPPA states that, *"every municipality shall, establish a program in the municipality which must include public education with respect to fire safety and certain components of fire prevention; and provide such other fire protection services as it determines may be necessary in accordance with its needs and circumstances."*

Developing a FMP is recognised as an appropriate strategy in assessing the needs and circumstances within a specific community to assist local Council's in developing an overall fire protection model for their community.

To further assist communities the Office of the Fire Marshal, Ontario (OFM) has developed the Comprehensive Fire Safety Effectiveness Model. The model identifies "*three lines of defence"* that can be utilized in responding to local community needs. The three lines of defence include:

- ✓ **Public education and prevention;**
- ✓ **Fire safety standards and enforcement; and**
- ✓ **Emergency response.**

The ultimate goal of any fire and emergency service is to prevent a fire. In applying these three lines of defence the Comprehensive Fire Safety Effectiveness Model emphasises the importance and value of preventing a fire. This is important from both an economic and life safety perspective. The model also recognises that developing programs and providing resources to effectively implement the first line of defence (a proactive public education and prevention program) can be an effective strategy to reduce and potentially minimize the need for the other lines of defence.

The following are applicable sections of the FPPA for reference purposes:

PART I: DEFINITIONS	1.(1) In this Act, "Fire protection services" includes fire suppression, fire prevention, fire safety education, communication, training of persons involved in the provisions of fire protection services, rescue and emergency services and the delivery of all those services
PART II: RESPONSIBILITY FOR FIRE PROTECTION SERVICES **Municipal responsibilities**	2.(1) Every 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.
Services to be provided	(3) In determining the form and content of the program that it must offer under clause (1)(a) and the other fire protection services that it may offer under clause (1)(b), a municipality may seek the advice of the Fire Marshal
Review of municipal fire services	(7) The Fire Marshal may monitor and review the fire protection services provided by municipalities to ensure that municipalities have met their responsibilities under this section, and if the Fire Marshal is of the opinion that, as a result of a municipality failing to comply with its responsibilities under subsection (1), a serious threat to public safety exists in the municipality, he or she may make recommendations to the council of the municipality with respect to possible measures the municipality may take to remedy or reduce the threat to public safety.
Fire chief, municipalities Responsibility to council	6.(3) A fire chief is the person who is the person ultimately responsible to the council of a municipality that appointed him or her for the delivery of fire protection services

PART III: FIRE MARSHAL **Powers of Fire Marshal**	9.(1) the Fire Marshal has the power, **(**a) to monitor, review and advise municipalities respecting the provision of fire protection services and to make recommendations to municipal councils for improving the efficiency and effectiveness of those services (d) to issue guidelines to municipalities respecting fire protection services and related matters
Duties of Fire Marshal	9.(2) It is the duty of the Fire Marshal, (b) to advise municipalities in the interpretation and enforcement of this Act and the regulations (d) to develop training programs and evaluation systems for persons involved in the provision of fire protection services and to provide programs to improve practices relating to fire protection services

2.1 Office of the Fire Marshal Ontario (OFM)

As indicated above, the OFM has a role to monitor municipal compliance with the FPPA. This role includes the review of compliance with the minimum requirements of a Community Fire Safety Program, which must include:

- a smoke alarm program with home escape planning;
- the distribution of fire safety education material to residents/occupants;
- inspections upon complaint or when requested to assist with code compliance (including any necessary code enforcement); and
- a simplified risk assessment.

The development of training programs and evaluation systems to improve community fire protection is another core function of the OFM. Public Fire Safety Guidelines (PFSG) are one of the tools used by the OFM to facilitate these functions.

For example *"Public Fire Safety Guideline 00-00-01" "Framework for Setting Guidelines within a Provincial-Municipal Relationship"* states the following purpose:

> "*To assist municipalities in making informed choices for providing public fire protection through objective and innovative approaches. Guidelines will be developed for municipal councillors and senior officials as well as municipal fire departments"*.

PFSG 00-00-01 also provides the following background information that is important in consideration of developing a Fire Master Plan:

> *"The Fire Protection and Prevention Act places new responsibilities on municipalities. The Office of the Fire Marshal has a mandate to assist municipalities to fulfill these responsibilities by providing information which will enable municipalities to make informed choices based on an objective analysis. Municipalities are compelled to establish a program in the municipality which must include public education with respect to fire safety and certain components of fire prevention. The act also states that municipalities are responsible for arranging such other fire protection services as they determine may be necessary according to their own needs and circumstances. The relationship between the province and municipalities is based on the principle that municipalities are responsible for arranging fire protection services according to their own needs and circumstances. The primary roles of the province are to provide leadership and support to*

> *municipalities in the exercise of this responsibility, and to ensure public safety is not compromised. Guidelines, developed by the Office of the Fire Marshal in consultation with municipalities, the fire service and others, will be a key vehicle for fulfilling the provincial role to support municipalities. This consultation process will continue on an ongoing basis to ensure the guidelines change and evolve to reflect trends, changing circumstances and new technology. To be useful, the guidelines must remain current, and must have the support and acceptance of municipalities. The province will retain an interest in the development of guidelines and monitoring of their application. However, day-to-day management and delivery will be municipal responsibilities".*

PFSG 00-00-01 highlights the following key principles to be used to develop the guidelines:

- *Municipal councils are directly accountable to their constituents and municipalities are also accountable to the province.*
- *There will be opportunities for appropriate stakeholder involvement and consultation during the development stages.*
- *Local needs and circumstances vary widely across the province. Therefore, the measures required to address these needs and conditions will also vary.*
- *There are many ways in which individual needs and circumstances can be addressed. Therefore, municipalities require flexibility to employ different strategies to achieve similar objectives.*
- *Local council, in consultation with the fire chief, will determine the extent to which their needs and circumstances will be addressed. Some may choose to address specific risks more comprehensively than others. Provided serious threats to public safety are addressed, this is a reasonable and legitimate exercise of municipal responsibility.*

2.2 Occupational Health and Safety Act

The *Occupational Health and Safety Act*, R.S.O. 1990 (OHSA) requires every employer to, *"take every precaution reasonable in the circumstances for the protection of the worker"*. The OHSA 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 firefighters-specific safety issues within Ontario.

Where 20 or more workers are regularly employed at a workplace, the OHSA requires the establishment of a Joint Health and Safety Committee (JHSC). The committee must hold regular meetings including the provision of agendas and minutes.

Firefighter safety must be a high priority in considering all of the activities and services to be provided by a fire department. This must include the provision of department policies and procedures, or SOPs that are consistent with the direction of the OHSA Section 21 Guidance Notes for the fire service.

3.0 COMMUNITY RISK PROFILE

The Office of the Fire Marshal, Ontario's (OFM) *Fire Risk Sub-model*[2] introduces the importance of community risk in the following paragraph:

> "*Assessing the fire risk within a community is one of the seven components that comprise the Comprehensive Fire Safety Effectiveness Model. It is the process of examining and analyzing the relevant factors that characterize the community and applying this information to identify potential fire risk scenarios that may be encountered. The assessment includes an analysis of the likelihood of these scenarios occurring and their subsequent consequences.*"

Community fire risks are further explained in detail within the OFM's *Fire Risk Sub-model* as follows:

> *"The types of fire risks that a community may be expected to encounter are influenced by its defining characteristics. For example, a "bedroom community" presents a different set of circumstances over one that is characterized as an "industrial town". Communities that are distinguished by older buildings will pose a different set of concerns over those that are comprised of newer buildings constructed to modern building codes. Communities populated by a high percentage of senior citizens present a different challenge over ones with a younger population base.*
>
> *Assessing fire risk should begin with a review of all available and relevant information that defines and characterizes your community. Eight key factors have been identified that contribute to the community's inherent characteristics and circumstances. These factors influence events that shape potential fire scenarios along with the severity of their outcomes:*
>
> - *Property Stock*
> - *Building Height and Area*
> - *Building Age and Construction*
> - *Building Exposures*
> - *Demographic Profile*
> - *Geography/Topography/Road Infrastructure*
> - *Past Fire Loss Statistics*
> - *Fuel Load*

Utilizing the framework provided within the OFM's Fire Risk Sub-model provides the opportunity to assess the potential fire risk scenarios that may be present by creating a Community Risk Profile. The profile can then be used to assess the current level of fire protection services provided, and identify where if any potential gaps exist, or areas that a municipal Council may want to consider in determining its own needs and circumstances as defined by the FPPA.

This section contains a summary of the observations from each of the categories contained within the community risk profile and assessment. The detailed Community Risk Assessment is contained within ***Appendix A.***

[2] Source: *Comprehensive Fire Safety Effectiveness Model, Fire Risk Sub-Model*, June 2009 Office of the Fire Marshal, Ontario

3.1 Summary of Community Risk Profile

As a community the Township of Uxbridge reflects a suburban community surrounded by large areas of open space and agriculture uses. The population centres within the Township, include the historic downtown area, hamlets and neighbourhoods all served by a well connected road network. The road network layout is primarily a grid pattern of arterial rural roads and local roads serving a large geographic area. In the event of a fire the emergency response times can be longer due to the extended travel distances that are reflective of such a large municipal boundary.

Within the ten year horizon of this plan significant growth is not expected. Based on current projections the community is anticipated to grow at a modest rate of 13% during this period.

Residential occupancies dominate the community at 84.0% of the building stock. The second largest percentage, 11.8% of the building stock is related to the agricultural activity within the community. The historic downtown core represents some of the larger building mass and height. The inherent multi-use traditional downtown buildings include commercial on the ground floor with residential above. Combined these result in both life safety and fire risks that need to be considered in terms of regular inspections cycles and sustaining compliance with the Ontario Fire Code (OFC). The community has very few buildings that are higher than five stories.

Many of the original settlement area homes remain in the community. Of the 6,655 residential units, 83.47% of these are single-detached dwellings of which 48.76% were built prior to the adoption of the Ontario Fire Code in 1981. This means a large parentage of the residential homes were not built to current construction standards with regard to fire protection including the absence of mandatory smoke alarms on all levels.

The demographic profile is very consistent with that of the Province of Ontario. As a primarily English speaking community the population has a generally higher level of income and home ownership level than that of other communities within the province. The percentage of senior population is also consistent with that of the province and should be considered a high priority in terms of their vulnerability in the event of a fire.

The analysis of fires during the period 2006 to 2010 indicates a similar profile to that of the experience across the province. There are no indicators that the Township has any specific hazards or risks that would require further detailed analysis. The highest number of fires have occurred within the residential occupancies which is consistent with provincial statistics and their representation as the largest proportion of buildings within the community.

Based on Geographic Information Systems (GIS) modeling the actual emergency calls that occurred during the period 2009 to 2010 the Existing Conditions Risk Profile Model indicates that the department has been able to respond from the existing fire station location to 71% of the calls (all call types, excluding medical calls) located in moderate risk zones in four minutes or less travel time. In a travel time of ten minutes or less the department has been able to respond to 98% of the calls located in moderate risk zones.

The GIS model was also used to approximate existing and future geographic coverage of the existing risk zone areas. Under existing conditions, 19% of the moderate risk geography and 2% of the low risk geography is covered within four minutes of predicted travel time. This scenario also results in 52% of the moderate risk zones and 85% of the low risk zones being covered within the ten minute predicted travel time.

The future model incorporated the relocated fire station location, which was selected by the Township prior to the initiation of the fire master planning study. Under future conditions, with the relocated fire station, 20% of the moderate risk geography and 3% of the low risk geography is covered within four minutes of predicted travel time. This scenario also reaches 60% of the moderate risk zones and 92% of the low risk zones within the ten minute predicted travel time. This shows a modest improvement in risk zone coverage from the future fire station location as compared to the existing fire station location. The detailed methodology and results (including figures) from the GIS modeling of the Risk Profile are contained within ***Appendix A***.

In summary, the department has been achieving a level of emergency response travel time representing arriving at the scene of 98% of the fire related calls involving moderate risk occupancies in 10 minutes or less travel time of which 84% of the building stock is Group C – Residential Occupancies.

Within the fire suppression division section this report assesses the level of initial response and depth of response in relation to the risk levels identified by the Existing Conditions Risk Profile Model. In terms of the initial assessment of emergency response capability in relation to community risk, the Community Risk Profile confirms that the Uxbridge Fire Department is achieving a very high quality of service in comparison to best practices of comparable size municipalities.

4.0 ADMINISTRATION DIVISION

As a composite fire service the Uxbridge Fire Department is comprised of both full-time and volunteer (part-time) staff. Under the leadership of a full-time Fire Chief the department has a long history of providing fire protection services primarily through the use of volunteer firefighters. The current complement of volunteer firefighters has continued this tradition of dedication and commitment to attaining a high level of efficiency and effectiveness in the services they provide.

Evidence of the commitment within the department is contained within the Uxbridge Fire Department's Mission Statement as follows:

> *"The Township of Uxbridge Fire Department is committed to reducing death, injury and property loss due to fire and other related emergencies. We are dedicated to serving and protecting residents and visitors of the Township in a professional manner through providing high-quality services such as public education, fire prevention, fire suppression and training. In order to fulfill our mandate, we will continue to be persistent in acquiring the most up-to-date technical skills and knowledge in the realm of fire protection. As a leader in fire safety, we will use all of our available resources to best service our diverse communities in the most efficient and effective manner possible."*

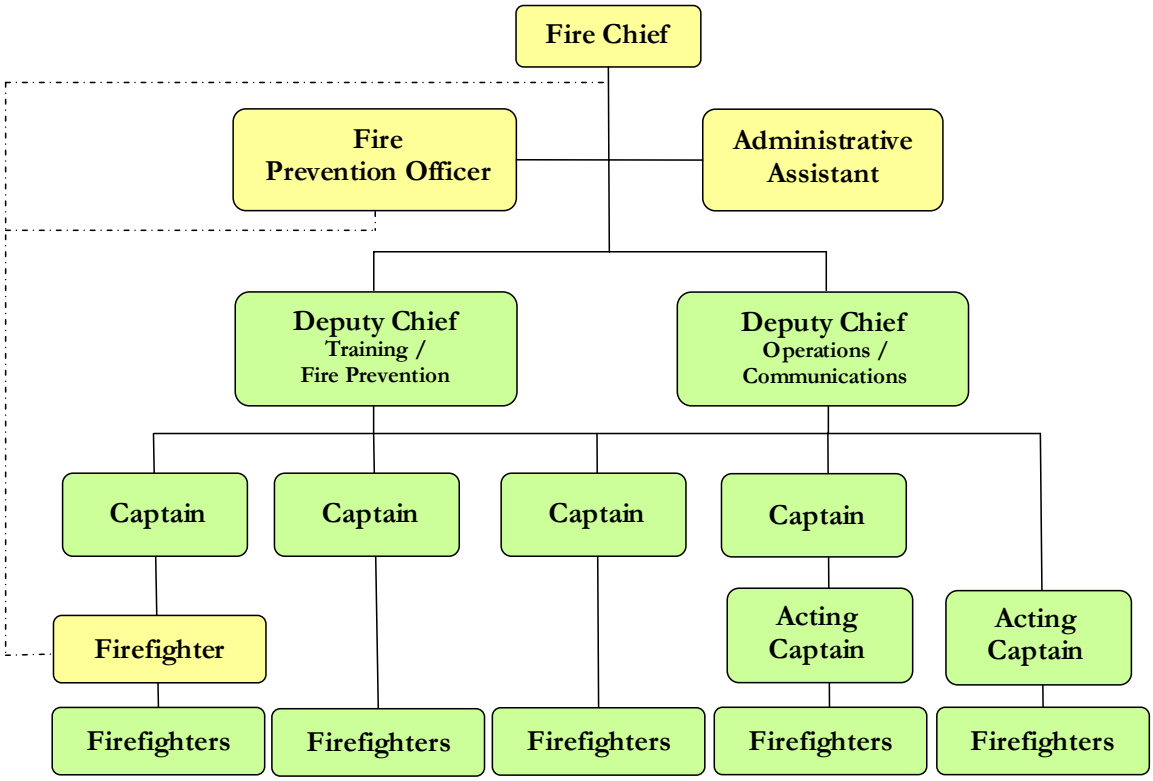
4.1 Department Organization

In addition to the full-time Fire Chief the current Council approved staff complement includes a full-time Fire Prevention Officer (Captain), one full-time firefighter position, two part-time administration assistants and 35 volunteer (part-time) firefighters.

The Fire Chief is supported by two volunteer Deputy Fire Chiefs responsible for overseeing the operations/communications divisions and training/fire prevention divisions respectfully. The fire suppression division is divided into five platoons with seven volunteers assigned to each platoon. Three platoons are managed by a Captain, one platoon is managed by the Deputy Chief with an Acting Captain in training and one platoon is managed by a Captain with an Acting Captain in training.

The current Council approved complement is identified within **Figure 4.1**, Department Organizational Chart (study outset).

Figure 4.1: Department Organizational Chart (Study Outset)



Note: (yellow = full-time, green = volunteer)

During the course of developing this FMP one of the volunteer Deputy Fire Chiefs retired from the department. The full-time firefighter's position has also become vacant as a result of this employee accepting another position within a larger fire department. Including an assessment of these vacant positions within the overall framework of developing a FMP provides a unique opportunity to provide recommendations for the future of these positions.

Recommendations to revise the current organizational chart are included within the fire suppression and fire prevention/public education division sections of this report.

4.2 Department Services

The fire department provides a variety of services to the Township of Uxbridge, including, but not limited to:

- Fire prevention;
- Public education;
- Fire suppression;
- Auto extrication;
- Medical responses (including defibrillation);
- Hazardous material response (awareness level); and
- Cold water rescue (land based).

4.3 Department Management Team

4.3.1 Fire Chief

The Fire Chief is responsible for administration and operations of the Uxbridge Fire Department, including all functions and programs. The Fire Chief reports to Council through the Township's Chief Administrative Officer (CAO). Within the Uxbridge Fire Department job description document prepared by the Township in September 2005, the purpose of the Fire Chief's position is described as follows:

> *"Provides direction and leadership to the operations and administration of the Fire Department including planning, developing, recommending and implementing fire and emergency services, fire prevention, public education, and fire investigation. Establishes and coordinates the Township's Emergency Plan. Prepares report and recommendations to Council and other Senior Management Staff, attends necessary meetings and public functions and recommends/reviews and implements the department's operating and capital budgets. Assumes the role and statutory requirements of the Chief Fire Official under the Fire Prevention and Protection Act."*

The primary duties of the Fire Chief include the following:

- Participate as a member of Township's senior management team, including preparation and interpretation of policies, programs, services, by-laws, reports, etc.;
- Provide leadership to the Fire Department, develop a management team, meet performance expectations of the community and demonstrate economical and efficient use of resources;
- Ensure the development of personnel, including performance measurement, training, career path planning, communication networks and reward / recognition programs;
- Establish departmental planning processes by assessing community needs, establish goals and objectives, and reviewing and implementing action plans;
- Conduct financial planning for the department and submits budget proposals for Council's approval;
- Establish and implement financial management system to implement budgets in accordance with Council's direction;
- Applies legislation, codes and by-laws by establishing, enforcing and maintaining current policies;
- Oversees the development and implementation of fire prevention and public education programs to meet community needs;
- Discharge the duties and responsibilities of the Incident Commander at major emergency scenes when assuming command and oversees/facilitates required OFM investigation and associated report preparation;
- Respond to enquiries (from staff, public, etc.) regarding community fire matters;
- Recommends to Council the hiring, promotion and dismissal of fire department personnel;
- Assist and participate in labour relations matters including negotiations and grievance resolutions;
- Ensure prosecution and follow-up of Fire Code violations;
- Ensures expert witness testimony of criminal court fire investigations and coroners inquests on behalf of the Township;

- Liaises with Federal, Provincial, Regional and Municipal agencies and other authorities on natter related to the Fire Department;
- Prepares Township's emergency management plan; and
- Performs other duties as assigned.

4.3.2 Volunteer Deputy Chiefs

There are two volunteer Deputy Chief positions within the current organizational structure of the department. One of these positions is responsible for the Operations and Communications Divisions, the second is responsible for the Training and Fire Prevention Divisions. These positions also currently share the responsibility of backfilling the position of Fire Chief in his absence.

As members of the department management team the volunteer Deputy Chiefs provide an important function to the overall leadership and management of the department. As a result of a retirement there is currently a vacancy in the position of volunteer Deputy Chief responsible for the Operations and Communications Divisions. This is discussed further in the suppression section of the report.

4.3.3 Administrative Support

The Fire Chief, volunteer Deputy Chiefs and Fire Prevention Officer are supported by an Administrative Assistant position. This is currently filled by two part-time persons. The role of the full-time assistant position (currently filled by two part-time personnel) is to:

- Provide confidential assistance on personnel issues;
- Produce internal / external correspondence;
- Submits payroll information;
- Administer accounts payable & accounts receivable;
- Maintain department statistics / provides basic computer technical and Fire Pro support to fire department staff;
- Liaise with general public / professional contacts of the department;
- Deliver / collect main from Township Offices daily;
- Reviews local media for articles of the fire department for archive purposes;
- Manage departments' attendance management records;
- Prepares and maintains recruitment documents, testing, records, etc., throughout the recruitment process; and
- Other administrative tasks as assigned by the Department Management Team.

4.4 Administrative Workspace

The Township of Uxbridge has initiated the process to design and build a new Fire Department Headquarters station. The Fire Chief has indicated that the design process will assess workspace needs of this department including the recommendations contained within the FMP. The current scheduled is for construction of the new fire station in 2013, ready for occupancy in 2014.

4.5 Annual Report

The Fire Chief prepares an annual report on behalf of the Uxbridge Fire Department to summarize the activities, operations and successes completed over the course of the year. These reports are organized by division, providing details on staff, programs, changes and accomplishments during the year.

Our review of previous Annual Reports completed by the Fire Chief indicates a high degree of professionalism, both in the format and content of the documents reviewed. The annual reports provide a valuable communications tool to inform the community and council on the performance of the fire and emergency services.

Preparation of an annual report provides a high degree of accountability and transparency on behalf of staff and council in reporting to the community on the level of services provided. Maintaining the information within the Community Risk Profile as part of the annual report to Council would enhance the level of information provided. This practice would ensure that the profile stays current and is available for regular review and monitoring of evolving trends within the community.

We recommend that the Community Risk Profile be maintained on a regular basis and included within the fire department annual report to Council.

4.6 By-laws & Agreements

4.6.1 By-laws

The *Municipal Act*, R.S.O. 1990 requires a municipality to enact a number of by-laws to operate a municipality and specifically their fire department. In addition to meeting this legislative responsibility by-laws provide the community with important information with regard to the level of service that a municipality intends to provide. By-laws also provide municipal staff with the authorization to provide these services as well as the responsibility to achieve the prescribed service level.

Our review of the existing by-laws approved by the Township of Uxbridge indicates that all required by-laws are in place. Ensuring these documents are regularly reviewed and updated to reflect any changes in service level or changes in authority are important functions.

The Establishing and Regulating By-law of the Fire Department is currently under review by the Fire Chief. Our review of the proposed revisions indicates that they provide additional clarity and detail as well as updating the by-law to reflect the current conditions of the department. Further revisions may be required as a result of the recommendations within this report.

We recommend that subject to consideration of the recommendations within this report the revised Establishing and Regulating By-law be presented to Council for consideration and approval.

4.6.2 Mutual Aid Agreements

Mutual aid agreements are predetermined plans that allow a participating fire department to request assistance from a neighbouring fire department. Public Fire Safety Guideline (PFSG 04-05-12) provided by the OFM identifies the information required to develop and approve these agreements.

There are two main scenarios when mutual aid agreements are enacted:

1. When a fire department is on-scene at an emergency, has received information that immediate assistance is required, it may ask for mutual aid assistance from a neighbouring fire department.

2. Where distance and/or conditions are such that a neighbouring fire department could provide a more timely response, fire departments may immediately request a simultaneous response from a participating fire department.

The Uxbridge Fire Department is an active participant in the "*Regional Municipality of Durham Mutual Aid Plan"*. This includes the regular review and update of the plan, and participation in providing assistance to a neighbouring municipality should it be requested.

4.6.3 Automatic Aid Agreements (Fire Protection Agreements)

In contrast to mutual aid agreements, automatic aid agreements are programs designed to provide and/or receive assistance from the closest available resource, irrespective of municipal boundaries, on a day-to-day basis.

The obvious advantage of implementing an automatic aid program is the person experiencing the emergency receives fire services from the closest available provider by supplying seamless service through the elimination of artificial service boundaries. Some of the additional benefits that an automatic aid agreement provides include:

- an enhancement of the level of public safety;
- a reduction of the critical element of time between the commencement of a fire and the application of an extinguishing agent to the fire by dispatching the closest available assistance;
- the reduction of life, property and environmental losses; and
- the improvement of public and fire-fighter safety.

The Township participates in a number of automatic aid agreements (*fire protection service agreements*) with neighbouring municipalities. These include agreements to provide services to areas of the Township of Scugog and agreements to purchase services from the Town of Whitchurch-Stouffville and the Town of East Gwillimbury. Our review of these agreements indicates that they are functioning as intended.

We recommend that a process be implemented to review all Fire Protection Agreements on an annual basis to ensure they continue to meet the needs of the involved municipalities.

4.6.4 Tiered Response Agreement

The Uxbridge Fire Department provides emergency response to medical related emergencies as identified within the current Tiered Response Agreement with the Region of Durham. The current letter of agreement states the following:

> *"This letter of agreement between Durham Region EMS and the Township of Uxbridge Fire Department authorizes the Ministry of Health and Long-Term Care (MOHLTC) Central Ambulance Communications Centre (CACC) activation of a tiered response, to provide first response resources and skills to out of hospital medical emergencies that have a high probability of clinical benefit from a clear response time advantage in scene arrival over the primary responding EMS resource(s), in accordance with the following criteria: Level B Tiered Response…"*

Our analysis of the emergency call volume of the department for the period from January 1, 2009 to October 31, 2011 indicates that a large percentage of the emergency calls are tiered response calls. A detailed review of the tiered response medical calls has identified strategies that should be considered in revising the department's medical response procedures.

Recommendations to address the current Tiered Response Agreement are included within the suppression division section of this report.

4.6.5 Dispatch Services Agreement

The Township of Uxbridge has an agreement in place with the City of Oshawa for the provision of dispatch services. This agreement currently addresses the emergency call taking and dispatching functions related to paging the volunteer firefighters to respond to the fire station in the event of an emergency. Once receipt of the call is confirmed by a member of the Uxbridge Fire Department by radio the remaining dispatching functions of the emergency call are assumed by the member of the Uxbridge Fire Department. This current practice reduces the number of firefighters available to respond to an emergency and requires all volunteer firefighters to be trained in the dispatch function.

The opportunity to contract all of the dispatch functions is currently inhibited by the radio technology utilized by the department. Our review indicates that plans are currently underway to replace the existing radio system in 2014. As this initiative is planned and implemented consideration should be given to contracting all of the dispatch functions to an external agency in order to improve the efficiency and effectiveness of the dispatch function, and increase the availability of firefighters to respond.

Recommendations related to the current Dispatch Services Agreement are included within the communications section of this report.

4.6.6 Specialized Rescue Services Agreement

Specialized rescues include activities such as high/low angle rescue, confined space rescue, trench rescue, land-based water rescue, and hazardous materials response. For most fire departments these are typically very low frequency types of emergency calls. Each of these requires a very high level of training and certification in order to ensure the safety of firefighters. They also require specific equipment in order to conduct the rescue.

In a volunteer fire department such as the Township of Uxbridge providing these types of services can be a significant challenge in terms of the training and equipment requirements needed. Identifying opportunities to develop strategic partnerships with neighbouring fire departments, or retaining private sector service providers can be effective solutions to providing these services.

We recommend the Fire Chief be directed to investigate alternative resources for all or some of the specialized rescue services.

4.7 Departmental Policies and Procedures

Standard operating procedures (SOPs) are used within the fire service to establish a written statement to guide the performance or behaviour of departmental staff, whether functioning alone or in groups. Standard operating procedures are intended to:

- enhance safety;
- increase individual and team effectiveness;
- improve training efficiency;
- improve orientation for entry-level staff;
- improve risk management practices;
- prevent / avoid litigation;
- create objective post-incident evaluations; and
- permit flexibility in decision making.

Best practices and the OFM indicate that creating and empowering a committee of fire service staff to research, develop, and draft standard operating procedures can be a successful model for administering these core documents. Activities that impact on firefighter safety, the most common emergency operations, or high risk operations should be the top priority for a fire and emergency service to have in place.

Standard operating procedures are required to be finalized and approved by the Fire Chief. Procedures should then be in place within the fire and emergency service to ensure that these procedures are distributed to all staff affected, understood by all staff and followed as directed. Applicable procedures to record this process of development, approval and distribution must be in place to ensure due diligence on behalf of the fire and emergency service and the municipality, as the employer.

Health and safety is an essential consideration for fire and emergency services. In addition to the relevant sections of Ontario's *Occupational Health and Safety Act* (OHSA) the fire service is also required to comply with the OHSA Section 21 Guidance Notes. Ensuring that standard operating procedures are developed, approved and distributed for all Section 21 Guidance Notes should be considered a priority.

The Uxbridge Fire Department currently has a basic framework of SOPs in place. Some functions within the department such as fire prevention and public education would benefit from implementation of further SOPs. Currently there is only one SOP which applies to Fire Prevention. There are no existing SOPs relating to Public Education. SOPs should be developed and approved to encompass all of the functions provided by the Fire Prevention and Public Education Division.

The department currently has four SOPs which relate to training. The SOPs do not fully reflect the breadth of the training provided by the department. It is recommended that additional procedures for the Training Division be developed and implemented. This will be particularly important as the department continues to grow and evolve.

Sections 400 and 500 of Uxbridge Fire Department SOGs relate to apparatus and equipment and emergency vehicle operations. Currently no written procedures address all aspects of apparatus maintenance. A policy for apparatus maintenance procedures should be developed and implemented.

An agreement for services provided by Oshawa Fire Services Communications Division is in place. Oshawa has provided Uxbridge Fire Department with a copy of the SOP associated with providing these services. The Oshawa SOP is attached to the Uxbridge Fire Department's SOPs.

There is currently an informal process in place to develop, approve and distribute these documents utilizing staff expertise and input on an individual basis. Our review also identified that the department has used the committee structure in the past, but this practice is not currently formalized.

The department has a formal Standard Operating Procedure Review Committee consisting of one Captain, one Acting Captain and three Firefighters. We recommend ensuring this committee continues developing and maintaining a comprehensive set of standard operating procedures for the department. Priority should be given to procedures required to address Section 21 Guidance Notes.

4.8 Departmental Records Management

The department implemented FirePro2 computer software as the digital records management platform in 2010. The department is using the program for all record keeping from 2010 to present and working to input historic data. The Administrative Assistants are supporting the records management process and updates.

Fire prevention and public education records are now being maintained using the FirePro records management software. Based on our review, the RMS system appears to be working well for the division's needs. For activities prior to implementation of FirePro hard copy records are still available on file. There have been some efforts extended to input the historical files into the RMS. Although there is some value in these efforts this should not be considered a priority. As files are reviewed for new inspections consideration should be given on a case by case basis as to the merits of inputting historical data.

Emergency response call data summaries are provided by Oshawa Central Ambulance Call Centre (CACC). The department has good depth in its emergency response statistical tracking. One area noted for improvement is related to personnel arriving on scene (depth of response). We recommend that the department implement a process to track the on-scene time of all arriving firefighters in order to monitor the depth of resources on scene.

The current records management practices for department training are very good and complete. Prior to the implementation of the FirePro RMS all training records were kept manually on hard-copy. Training reports were completed for each training session held. These reports were then maintained in yearly files.

Currently, the Training Division uses FirePro for records management. Now, following each training session the manual training report is forwarded to the Administrative Assistant to enter the records into FirePro. As a transitional phase to the new records management system, hard copies of the training reports are maintained on file.

Individual training files are maintained for each member of the department. This file includes copies of courses taken or certificates received. These hard copy files will eventually be transferred into the electronic system (FirePro).

In addition to the current training records, it is recommended that a practice be established to ensure each individual personally signs-off on the completed training sessions. This practice also requires the trainer to sign the record. This is considered a best practice with regards due diligence to provide training evidence to authorities, such as the Ministry of Labour Ontario.

As for fleet records management, log books associated with each vehicle are filled out by the Emergency Vehicle Operator (EVO) upon returning to the station. Information such as the date, mileage and any defects or issues are recorded and signed-off by the EVO. Log books are kept as a record for three years. The Mechanical Officer reviews each entry as soon as possible following a call and initials the reviewed record. If repair or maintenance is required for a noted defect, the Mechanical Officer takes action to conduct or schedule the repair. If the defect requires the vehicle to be removed from service the Mechanical Officer notifies the Fire Chief.

Any significant mechanical issues or major repair items noted in the log books or apparatus check-lists (completed by suppression staff during basic and comprehensive apparatus checks) are entered into the department's computer system and logged as a defect. Paper files are maintained for each unit as a record of major issues and invoices.

The FirePro2 inventory module is used to record testing and certification of all units and equipment. Each unit has a dedicated section to track defects, repairs and maintenance. This information is organized, up to date and accessible.

The Public Works Department enters information into the works department records management system, and provides a hard copy to the fire department. The Mechanical Officer enters the information into FirePro2.

Uxbridge does not maintain dispatch data in a records management system. Oshawa maintains records of the portions of the call handled by Oshawa's Communication Division. Call information gathered by the firefighter staffing the radio room is recorded by hand as well as by an audio recorder. The audio recorder (DIR911t) also logs all pages on the alerting system, and all radio traffic through the base station radio and all telephone conversations on the dispatcher's handset. Incident reports are tracked in the RMS and the hard copy radio room report is attached to the hard copy of the incident report. Attendance on-scene is also entered into the RMS incident report.

The current records management practices result in duplication of efforts and information. This would be improved if Oshawa Communications Division was to perform the call dispatching in addition to the call handling.

Audio recordings are downloaded on a regular basis and organized for filing. They are burned annually onto a DVD to save as a permanent record.

Network connection to the Township's server is limited and not well supported by the department's existing technology. Improvements to connecting and sharing resources with the Township's network, computers and technology should be further investigated.

4.9 Community Emergency Management (CEM)

Under the *Emergency Management and Civil Protection Act*, the Solicitor General has authority to make regulations setting standards for the development, implementation and maintenance of emergency management programs required by communities. It is the responsibility of every municipality, minister of the Crown and designated agency, board, commission and other branches of government to ensure that their respective emergency management plans conform to the standards set within the Act. The Act also requires every municipality to adopt the emergency management program by by-law.

Emergency Management Ontario (EMO) has developed a core emergency program, with elements focused on supporting emergency preparedness and response activities. The program requires designating an Emergency Management Coordinator (EMC), having a written emergency response plan and forming a program committee. Part II of the *Ontario Regulation 380/04* lays out the Municipal Standards for emergency management. There are six main standards, relating to:

- Emergency Management Program Coordinator;
- Emergency Management Program Committee;
- Municipal Emergency Control Group;
- Emergency Operations Centre;
- Emergency Information Officer; and
- Emergency Response Plan.

The emergency plan is designed in a generic fashion which allows it to respond to situations that are unexpected and require a coordinated response and recovery. The plan is based on a hazard identification and risk assessment (HIRA), which is a required component under the *Emergency Management and Civil Protection Act*.

The plan also includes a primary Emergency Control Group and Emergency Support Group, which consists of all of the significant stakeholders responsible for managing the community and adjacent areas. This group would be assembled, if the emergency plan is activated, to approve the decisions required to control situations that arise during an emergency.

With the introduction of the *Emergency Management and Civil Protection Act*, the Fire Chief has been assigned the role of Emergency Management Coordinator, which requires on-going leadership in maintaining, testing and training of the emergency response plan. The Emergency Management Coordinator is responsible for the overall implementation the emergency management program, and is required to report to the ministry's emergency management program committee on his work.

The Township of Uxbridge's Emergency Management Plan is currently under review by the Fire Chief. Completing this review and maintaining the responsibilities outlined in the *Act* will ensure the Township is able to mitigate; respond to and recover from an emergency in the most effective and efficient manner.

4.10 Key Findings

- The current administrative functions of the department are working well in supporting a "composite" fire department model.
- Two current vacancies within the department including a volunteer Deputy Chief and a full-time firefighter position provide a unique opportunity to assess the organizational structure.
- The roles and responsibilities of the Fire Chief, department management team and the administration staff are clearly defined by the Township.
- The Township has the necessary by-laws in place. Ensuring these documents are regularly reviewed and updated to reflect any changes in service level or changes in authority should be considered a priority.
- The Township actively participates in agreements for purchasing and providing services in a number of areas. Regular review of these agreements and options for additional agreements should also be considered a priority.
- The department has a framework of standard operating procedures in place to represent many of the services provided by the department, however there are still gaps in the SOPs which require infilling and updating.
- The Township's Community Emergency Management Plan is currently under review by the Fire Chief, who assumes the role of CEMC.

5.0 FIRE PREVENTION & PUBLIC EDUCATION

The Township of Uxbridge carries out fire prevention enforcement and public fire safety education programs, within the guidelines of the *Fire Protection and Prevention Act*, 1997 (FPPA). Under the FPPA, *"every municipality shall, establish a program in the municipality which must include public education with respect to fire safety and certain components of fire prevention; and provide such other fire protection services as it determines may be necessary in accordance with its needs and circumstances."*

The Office of the Fire Marshal, Ontario (OFM) describes the minimum requirement for a community fire safety program as including:

- a smoke alarm program with home escape planning;
- the distribution of fire safety education material to residents/occupants;
- inspections upon complaint or when requested to assist with code compliance (including any necessary code enforcement); and
- a simplified risk assessment.

5.1 Comprehensive Fire Safety Effectiveness Model

This Division is responsible for coordinating the initiatives of the Uxbridge Fire Department to optimize the impact of applying the first two lines of defence identified within the Ontario Fire Protection Model including:

- ✓ ***Public Education and Prevention***
- ✓ ***Fire Safety Standards and Enforcement***
- ✓ ***Emergency Response***

Best practices of other municipalities within the province have shown that optimizing the efforts dedicated to these lines of defence can have a positive impact on reducing emergency call volume, and increasing the overall level of fire protection within the community.

Utilizing these lines of defence across the community and prioritizing the programs to address areas of the community identified by the Community Risk Profile should be considered a strategic priority of this plan. For example, high priority should be given to optimizing the first two lines of defence in areas of the community where vulnerable occupants reside and where emergency response times may be longer as a result of extended travel times by fire suppression staff.

5.2 Staffing

Within this division the Uxbridge Fire Department currently employs a Fire Prevention Officer (FPO) responsible for coordinating all activities within the division. The FPO reports directly to the Fire Chief and is also responsible to enforce the Fire Prevention Regulations of the Municipality and Province. The FPO is currently supported by the full-time firefighter and volunteer firefighters for some aspects of the division's services.

As the staff resources for this division are limited, it is essential that the priority of the Fire Prevention Officer be directed at the first two lines of defence. The FPO is also a volunteer fire suppression Captain who provides first response to daytime calls (including burn complaints and CO calls). This is a reasonable practice, considering the challenges associated with daytime response in a volunteer department; however it reduces the amount of time available to complete other public education and fire prevention tasks. This practice could be improved by ensuring that the FPO returns to his prevention duties once sufficient staff is assembled on scene. Ensuring the FPO returns to prevention duties in a timely manner as soon as possible will improve the resources focused on public education and fire prevention.

This divisional review identifies the broad range of services provided by this division and highlights a number of areas noted for consideration in order to optimize programs directed at the first two lines of defence. In addition, this plan identifies a direction to consider revising the current organizational structure of the department by deleting the position of full-time firefighter and creating a new position dedicated to public education and training programs.

5.3 Key Functions

The main goal for fire prevention is to minimize the impact of fire risks and to decrease the threat of fire incidents. As identified in the Township's 2005 Simplified Risk Assessment, the main objectives of fire prevention programs put in place are to:

- Reduce the likelihood of a fire which may cause death or injury to any person;
- Reduce the impacts and incidences of all fires; and
- Achieve compliance with the fire prevention and public education requirements detailed in the FPPA.

5.4 Fire Prevention and Public Education Activities

The current fire prevention and public education efforts of the department are focused on the first two lines of defence of the Comprehensive Fire Safety Effectiveness Model. These include the delivery of public education and fire prevention programming and activities related to fire safety standards and enforcement. An overview of these programs and activities are included below.

5.4.1 Public Education Programs

The Uxbridge Fire Department acknowledges the benefits and importance of providing fire and life safety public education programming to Township's residents.

Currently, it is the responsibility of the FPO to prepare and evaluate the public education program of the department. Volunteer firefighters support the FPO by delivering programs and presentations to schools, community groups and residents as required.

The department delivers a broad range of programs to the Township schools. These school programs have largely been designed and delivered by one of the volunteer firefighters who has served the department for 37 years. This individual held the role of Fire Prevention Officer when it was a part-time position.

Table 5.1 lists the public education programs provided by the fire department and the approximate time commitments associated.

Table 5.1: Public Education Activities

Activity / Program Name	Time Commitments (hours)
Learn Not to Burn	228
Older Wiser	13
Tapp-C (The Arson Prevention Program for Children)	6
Canadian Tire	10
Uxbridge Fall Fair	100
Station Tours	14
Uxbridge Bruins Hockey	12
YMCA	2
Uxbridge Summer Camps	4
Fire Department Open House (bi-annual)	100
Jennifer Ashleigh Foundation	6
Duck Derby	12
Huck Finn Day	9
Miscellaneous Events (i.e. M&M BBQ, etc.)	24

Best practices of other municipalities has proven that expanding and enhancing public education efforts can be an effective strategy to reduce emergency call volume and increase the overall level of fire protection within a community. Within a fire department utilizing volunteer firefighters, managing and where possible reducing emergency call volume can have a positive impact on the sustainability of the volunteer model.

Prior to leaving the department the full-time firefighter provided assistance to the FPO in delivering public education programs. As a strategy to enhance the public education programming of the department and further prioritize the efforts directed at the first line of defence we are recommending that the full-time firefighter's position not be filled as it was previously.

Creating a new position using the approved complement position vacated by the firefighter with a focus on public education and firefighter training would be an effective strategy to address two major priorities within the department, education and training. The similarity of the skill sets required for these two functions make combining these roles an effective strategy for organizing resources.

At the direction of the Fire Chief and in coordination with the FPO this new position of Public Education/Training Officer would be required to divide the workload between developing and delivering public education programs to the community, and developing and delivering training programs to the volunteer firefighters. This would require a flexible work schedule to accommodate both the communities and volunteers needs.

From a public education perspective priority should be given to implementing and expanding programs that address the vulnerable population identified within the Community Risk Profile as well as areas of the community where emergency response times are extended due to factors such as travel time for emergency response.

Based on our review we recommend that the vacant position of full-time firefighter be reassigned as a new position of a full-time Public Education/Training Officer. Further support for this recommendation is included within the training section of this report. This staff member would also be available to respond to emergency calls, adding to daytime personnel available.

5.4.2 Fire Prevention Inspections

The FPO's job description identifies that he is responsible for organizing a fire inspection program for all classes of buildings and occupancies within the municipality. The fire prevention inspections work load is driven by the following:

- Requests or complaints;
- Municipal and provincial licensing requirements;
- Contraventions of the FPPA;
- Ontario Fire Code; and
- Municipal By-laws.

Formalized performance measures for fire inspection cycles should be developed based on the identified risks within the Community Risk Profile. Once developed these performance measures should be presented to Council for consideration and approval. For example, seniors' residences and care facilities are currently inspected annually. This inspection cycle would be considered consistent with the findings of the Community Risk Profile.

Historically, the FPO has informally prioritized fire inspections based on known risks, such as an annual inspection program for the downtown core. Formalizing these practices and relating them to the Community Risk Profile will provide the department with a core set of performance measures to manage workload and set priorities for the public education and fire prevention activities of the department.

During the preparation of the final draft of this report the OFM released Technical Guideline OFM-TG-01-2012 "*Fire Safety Inspections and Enforcement*". An excerpt from this new guideline states that the scope is "*to assist municipalities and their fire services in meeting their fire safety inspection and enforcement responsibilities in the most effective and efficient way possible, as provided by the FPPA*".

Our initial review of this guideline indicates that it supports the direction of the first two lines of defense and provides municipalities with strategies particularly related to enforcement of the OFC in situations where achieving compliance has been difficult to achieve. We recommend that this new guideline be reviewed by the Fire Chief and FPO and where required included within the development of new Standard Operating Procedures for the department.

5.4.3 Fire Investigations

It is identified within the job description of the FPO to attend emergencies, interview witnesses, photograph scenes and gather evidence for the purpose of determining the origin and cause of fires. This practice is consistent with other comparable size fire departments.

Investigations of the cause of fire are a requirement within the FPPA. The FPO conducts these investigations and assists the OFM with their investigations as required.

The workload associated with these services is dependant on the number of fires and required investigations each year. In 2010, six investigations were conducted. Ideally, with an increased focus on public education and fire prevention, the Township will experience a reduction in annual fires and therefore reduce the number of investigations required.

5.4.4 Fire Safety Plans

The FPO is responsible for reviewing fire safety plans required by the Ontario Fire Code. As well, the FPO attends pre-construction meetings, inspects the building while under construction and conducts a final inspection prior to occupancy. As there is not a large amount of growth and development occurring, new construction plans are not a large area of workload for the FPO.

5.4.5 Smoke Alarm Program

One of the legislated requirements of the FPPA is the delivery of a Smoke Alarm Program. It is an important element in the department's "first line of defence" as part of optimizing the fire protection services provided. The Uxbridge Fire Department is currently meeting the minimum requirements of the FPPA; however the existing program is reactive rather than proactive. As part of the initiative to enhance the "first line of defence" consideration should be given to developing and delivering a new and enhanced Smoke Alarm Program to Township residents.

Utilizing the Community Risk Profile the department should particularly emphasize a Home Smoke Alarm Program as the "first line of defence" in areas of the community (such as rural residential areas) where extended emergency response times are present due to factors such as travel time for emergency response. As well, it is recommended to prioritize delivery of the new program to areas of known risks such as older building stock or historic fire loss areas. The department could then target a three or four year delivery to all residences within the Township based on priority.

The new program should consider the goals and objectives established by the OFM and the needs of the Township, in order to provide the most effective solution to ensuring the safety of the Town residents.

Strategies to incorporate the volunteer suppression staff to deliver the home smoke alarm program should be investigated and applied.

Thorough tracking and monitoring of department statistics over the coming years will likely provide evidence of the effectiveness of the enhanced programs. This information is essential to relay the importance of added public education resources as a first line of defence in order to reduce the workload on the third line of defence (suppression staff).

Table 5.2: Fire Prevention and Public Education Priority Setting Worksheet

Priority	Status		Effectiveness, Goals/Objectives		
Fire Safety Priority (List in order of Priority)	**Current fire prevention / public education programmes that address the fire safety priority**		**Existing programmes adequately address the fire safety priority & ensure compliance with minimum FPPA requirements?**		
				If No, how should this change?	
	Fire Prevention (Inspection) Activities	**Public Education Activities**	**Y/N**	**Fire Prevention Activities**	**Public Education Activities**
1) Residential Fire Loss	Upon request.	Distribute public education materials during holidays, public events and on a seasonal basis. Bi-weekly fire safety material published in local newspaper.	Y	Enhance existing smoke alarm program by delivering a home smoke alarm program. Aim to reach all residences in Township on three or four year cycle, prioritizing higher risk areas first.	Enhance public education prioritized according to risk areas within the Township.
2) Multi-Unit Residential	All multi-unit dwellings brought up to retrofit standards. Annual inspection frequency (target not currently being met). Inspections upon request / complaint (being completed).	Distribute public education materials during holidays, public events and on a seasonal basis. Bi-weekly fire safety material published in local newspaper.	N	Formalize inspection targets and align resources to meet inspection schedule. Enhance existing smoke alarm program by delivering a home smoke alarm program. Aim to reach all residences in Township on three or four year cycle, prioritizing higher risk areas first.	Enhance public education prioritized according to risk areas within the Township.
3) Smoke Alarm Program	Check for working smoke alarms during emergency responses to residential occupancies. Batteries / smoke alarms are replaced if required.	Distribute public education materials during holidays, public events and on a seasonal basis. Bi-weekly fire safety material published in local newspaper.	Y	Enhance existing smoke alarm program by delivering a home smoke alarm program. Aim to reach all residences in Township on three or four year cycle, prioritizing higher risk areas first.	
4) Commercial and Industrial Properties	Plans reviews and inspections of new buildings / change of use of existing buildings.	Distribute available information.	Y	Formalize annual inspection targets.	

Priority	Status		Effectiveness, Goals/Objectives		
Fire Safety Priority (List in order of Priority)	**Current fire prevention / public education programmes that address the fire safety priority**		**Existing programmes adequately address the fire safety priority & ensure compliance with minimum FPPA requirements?**		
				If No, how should this change?	
	Fire Prevention (Inspection) Activities	**Public Education Activities**	**Y/N**	**Fire Prevention Activities**	**Public Education Activities**
5) Seniors	Annually.	Older and Wiser	Y	Formalize annual inspection targets.	Expand number of programs and depth of material.
6) Children	Annually.	Lean not to Burn Tapp-C Fire Station Tours	Y	Formalize annual inspection targets.	Expand number of programs and depth of material.

5.5 Fees for Service

The Township has an existing by-law which identifies fees for certain services provided by the division. This includes inspection and re-inspection. As part of developing performance measures for this division consideration should be given to completing a full review of all current fees charged. It is recommended that all fees for service be reviewed and revised on an on-going basis to ensure that they accurately represent the fiscal realities of the services.

5.6 Workspace

The existing work space within the present fire station is meeting the needs of the division. Subject to approval of the revised organizational structure consideration will need to be given to workspace for the proposed public education/training officer. Based on our review of the proposed new fire station there should be no difficulty in addressing this need within the new station.

5.7 Key Findings

- The Township of Uxbridge currently carries out fire prevention enforcement and public fire safety education programs, within the guidelines of the *Fire Protection and Prevention Act*, 1997 (FPPA), and is meeting the legislated responsibilities of the FPPA.
- Full-time staff resources for the division are limited to one Fire Prevention Officer who also has responsibilities as a Captain within the fire suppression division. This is creating a challenge of priorities between fire prevention and fire suppression.
- The fire prevention and public education efforts of the department target the first two lines of defence of the Comprehensive Fire Safety Effectiveness Model but are limited by available resources.
- Currently the FPO targets a three year inspection cycle, however no formal inspection schedule or performance measures currently exist.
- The FPO conducts fire investigations and assists the OFM with their investigations as required. Ideally, with an increased focus on public education and fire prevention, the Township will experience a reduction in annual fires and therefore reduce the number of investigations required.
- The records management software and system is working well for the division's needs.

6.0 FIRE SUPPRESSION

The Township of Uxbridge has successfully sustained a composite model fire department. This type of model includes the use of both full-time and volunteer (part-time) firefighters utilizing an integrated approach to providing services requiring a firefighting emergency response. The existing department complement of firefighters currently consists of one full-time firefighter assigned to a day shift Monday through Friday and 35 volunteers divided into a five platoon system. In addition to responding to fires the services provided include medical aid until paramedics arrive, responding to motor vehicle fires and accidents including patient extrication when required, alarm investigations, and specialized services such as hazardous materials incidents.

The Township of Uxbridge shares the characteristics of many large primarily rural in nature communities in Ontario that include smaller urban centres surrounded by vast tracks of rural geography. The ability for the Township or any other community that shares these characteristics to provide emergency response in the form of firefighting resources that could effectively mitigate a fire in a timely manner can be difficult and challenging. Travel distances and water supply are only two factors that can impact the ability to provide this type of mitigation within an established time frame.

Utilizing the composite model the Uxbridge Fire Department currently provides an effective level of services based on a comparison of other similar municipalities and best practices within Ontario. The working relationship between the volunteer firefighters and the full-time firefighter appears to be very positive.

During the course of developing this report the full-time firefighter accepted a position with a lager fire department creating a vacancy in this position. A second vacancy has occurred at the rank of volunteer Deputy Chief as a result of a recent retirement. As part of this review these vacancies were assessed in terms of the overall effectiveness of the department and where possible consider opportunities to improve the efficiency and effectiveness of the department in the most cost effective manner. The result is a proposed new organizational structure included within this report.

For all emergency calls other than medical responses all five platoons are paged simultaneously to respond. This protocol is consistent with the best practices of volunteer fire department. Due to availability of the volunteer firefighters for a wide variety of reasons including vacation, sickness and other personal commitments a 50% turnout of the total complement of volunteers would be considered a good average.

Daytime response from Monday to Friday during normal business hours can be a further challenge as it can be difficult for volunteer firefighters to leave their full-time employment during this period. Targeting volunteer recruitment programs to create a blend of volunteer firefighters that work regular weekday jobs with those that work shift work can be an effective strategy in sustaining a balance of available volunteers. The added challenge is that shift work itself is becoming less common within the overall workforce in Ontario.

6.1 Fire Station, Apparatus and Staffing

The Uxbridge Fire Department operates from one existing fire station. This station is planned to be replaced by a new fire station. A Fire Station Location Study was prepared for the Township in 2008. The new station will be located at the site recommended by the 2008 study, which is located east of the intersection of 6th Concession Road at Regional Road 8. Construction of the new station is scheduled for 2013, with occupancy planned for 2014.

The apparatus fleet is consistent with other communities of similar size and community risk profile. One of the current apparatus, the pumper/rescue is able to provide the basic functions required for this type of apparatus; however, its design and high level of maintenance costs are not consistent with the preferred optimal efficiency of this type of apparatus. A detailed evaluation of this apparatus is contained within the apparatus and equipment review section of this report.

The department does not have an aerial apparatus or the ability to operate an elevated master fire stream in the event of a large structure fire. This has been identified in previous planning documents and in particular as a component of establishing insurance underwriting. Further analysis of the need for this type of apparatus is also contained within the apparatus and equipment review section of this report.

Table 6.1 provides an overview of the fire station, apparatus and fire suppression staffing within the Uxbridge Fire Department.

Table 6.1: Current Stations, Apparatus & Minimum Staffing

Station	Station Address	Apparatus	Available Fire Suppression Staffing
1	17 Bascom Street	2 Pumpers 1 Pumper/Rescue 1 Light Rescue 1 Tanker 1 Pick-up	1 Full-time Fire Chief 2 Volunteer Deputy Chiefs 1 Full-time firefighter 35 Volunteer firefighters

6.2 Fundamentals of Fire Suppression

A core component of evaluating the overall effectiveness of providing fire suppression services includes considering a measurement-supported set of performance targets (i.e. service standards) and setting clear goals and objectives. ***Appendix B*** contains an overview of guidelines and standards that represent the current information and best practises within the fire service industry in Ontario and North America.

Within Ontario there is no specific legislated standard that a community must achieve with regard to the type of firefighter (career/part-time/volunteer) or the number of firefighters that would be required to respond to any given incident. The FPPA does require that a municipal Council assess this level of resources based on determining its local needs and circumstance.

To complete this study we have identified the different guidelines and standards that are currently in effect and through comparison of each with a typical fire scenario provide insight into the industry best practices through completion of a risk-based analysis.

6.3 Fire Suppression Performance Targets Summary

Based on the analysis provided in ***Appendix B***, an initial response of four firefighters arriving on the same apparatus, or alternatively arriving on the fire scene simultaneously within four minutes of travel time can be considered a best practice in the Ontario fire service.

The assembly of four firefighters on the fire scene provides sufficient resources to safely initiate some limited fire suppression operations. This first crew of four firefighters is also able to conduct the strategic operational priority of "size-up" whereby the Officer in-charge can evaluate the incident and where necessary request an additional depth of resources that may not have been dispatched as part of the initial response.

In regard to depth of response the analysis indicates fourteen firefighters arriving on scene within eight minutes of travel time as the current best practices within Ontario. A critical variable to the depth of response target is turnout time. This time component varies significantly between full-time fire departments where firefighters (a crew) are available within a fire station and available to respond immediately, in comparison to a volunteer fire department where firefighters must first respond to the station and assemble a crew able to respond.

For the purposes of this analysis this report recognises the variable turn out times of full-time and volunteer firefighters. The depth of response target references the components of travel time and assembly of an appropriate number of firefighters to effectively mitigate the prescribed emergency.

Each of these performance targets should be considered minimum staffing levels, based on the example fire risk scenario presented as a typical single family detached dwelling assessed as having a moderate risk level. Incidents involving an extension of the original fire, or higher risk occupancies will require additional resources.

The strategy to dispatch a higher number of firefighters as part of the initial response to a high or extreme level of risk occupancy can be achieved in a number of ways. These include:

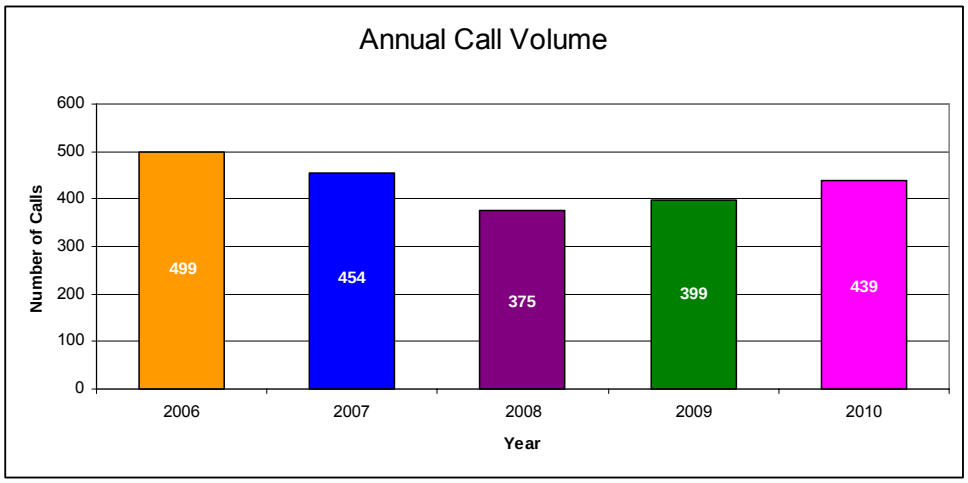
- Dispatching of additional staff and apparatus from the same fire department
- Call back of firefighters (full-time or volunteers) to staff additional apparatus
- Fire Protection Agreements (Automatic Aid Agreements) with other fire departments to provide additional firefighters and apparatus.

Utilizing the Community Risk Profile we recommend that emergency response protocols for occupancies identified as having high or extreme risk be developed to automatically dispatch additional fire suppression resources by implementing Fire Protection Agreements with neighbouring communities.

6.3.1 Call Volume

A summary of the volume of emergency calls in the Township of Uxbridge for the period 2006 to 2010 is presented in **Figure 6.1** below. Over this period the department has experienced variances as high as 25% in terms of the number of emergency calls. The average experience for the five-year period represents a volume of approximately 433 calls per year. This is very consistent with the 2010 emergency call volume of 439 calls.

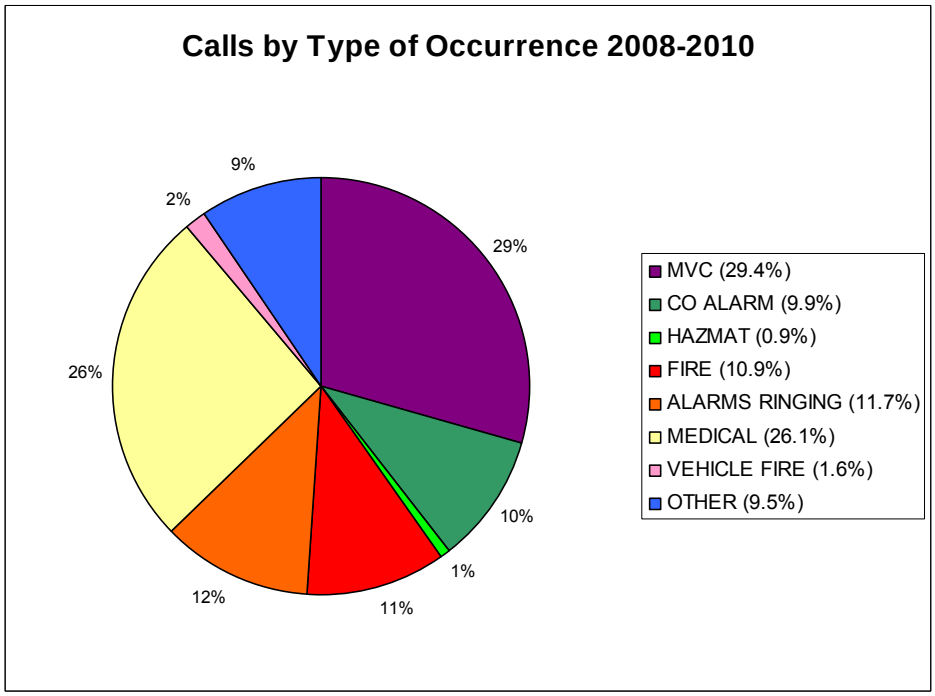
Figure 6.1: Historical Annual Call Volumes (2006-2010)



6.3.2 Incident Types

A more detailed analysis of the period 2008 – 2010 indicates that motor vehicle accidents represented an average of 29% of the total emergency call volume over this three year period. Response to medical calls is the second highest average of call volume at 26% for this period. Response to fires represented an average of 11%.

Figure 6.2: Call Breakdown by Type (2008-2010)



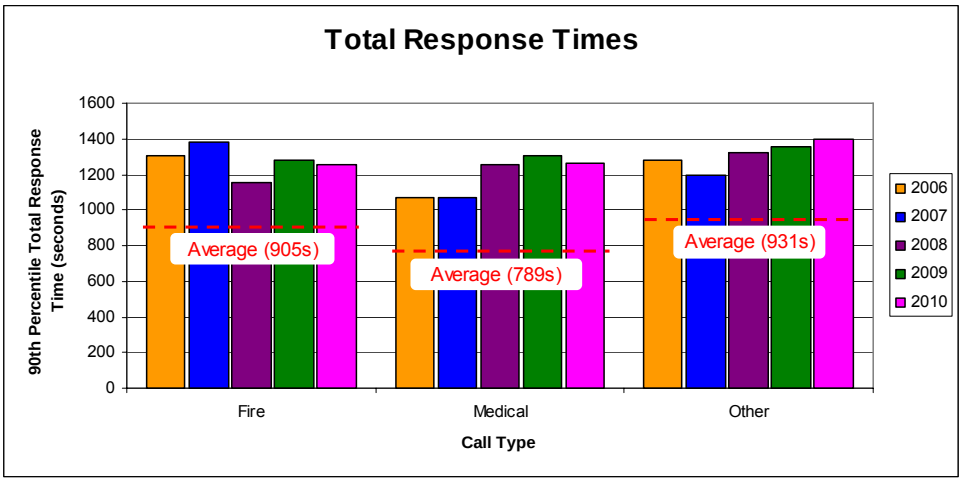
6.3.3 Total Response Times

Total Response Time is defined by the NFPA within NFPA 1710 as follows:

> *"The time interval from the receipt of the alarm at the public safety answering point (PSAP) to when the first emergency response unit is initiating action or intervening to control the incident."*

Figure 6.3 presents the total response performance measure including the components of dispatch time, turnout time and travel time. The Township of Uxbridge currently has an agreement with the City of Oshawa for the supply of Dispatch Services. However responsibility for the dispatch functions as it relates to measuring the overall total response time remains with the Township of Uxbridge.

Figure 6.3: 90th Percentile Total Response Times (2006-2010)



The total response times has remained relatively consistent for fire and medical calls over the past three years, and have increased over the past four years for other calls. The average total response time for fire calls for the period 2006 to 2010 was 15 minutes and eight seconds. In part this length of time can be attributed to extended travel times given the large geographic area covered by the department. All of the components are analysed individual below.

6.3.4 Dispatch Times

Dispatch Time has been defined above to include "*The time that it takes for the person responsible for "alarm answering", and "alarm processing" to be able to receive the call, and dispatch the appropriate apparatus and staff to respond to the emergency".*

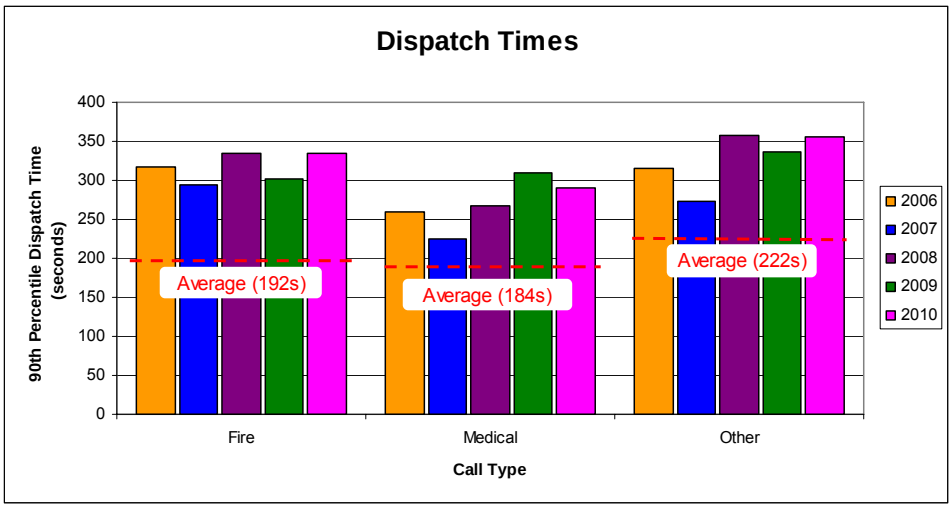
In comparison the NFPA 1221 – Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems, defines Dispatch Time as:

> "*Emergency Alarm Processing / Dispatching*: *A process by which an alarm answered at the communications centre is transmitted to emergency response facilities (ERFs) or the emergency response units (ERUs) in the field.*"

The NFPA 1221 standard is an industry best practice for dispatch time requirements and it is utilized by many fire departments in Ontario. It requires the processing of the alarm call (dispatching) to be completed within 60 seconds, for 90% of all calls (90th percentile), and within 90 seconds for 99% of calls. This means that 90 out of every 100 calls are required to be dispatched within 60 seconds and 99 out of every 100 calls must be dispatched within 90 seconds.

The 90th percentile dispatch times for the Uxbridge Fire Department are displayed in **Figure 6.4**.

Figure 6.4: 90th Percentile Dispatch Times (2006-2010)



From the statistics above, the department's historic (2006-2010) 90th percentile dispatch times for all call types are well above the standard of 80 seconds for medical and 90 seconds for all other calls. Currently Oshawa Fire Services Communications Division receives 9-1-1 calls for Uxbridge and activates the volunteer alerting system. Current practice has been for the full-time firefighter while on duty or alternatively the first arriving volunteer firefighter to get to the station assumes responsibility for staffing the radio communications room. The firefighter calls Oshawa, to confirm the location of the call and the information available. This firefighter then assumes the role of dispatcher for the remainder of the call which is an important overall function of managing the call and municipal liability. This current practice of having the first available firefighter conduct the dispatch is uncommon in comparable municipalities.

In addition to depleting the number of available firefighters particularly during normal business hours Monday thru Friday this practice places significant responsibilities on an individual with regard to the functions of a dispatcher and management of the overall response. As part of the planned replacement of the radio platform scheduled for 2014 the Township should consider extended the dispatch agreement for services to include all components of dispatching. This strategy would increase the number of firefighters available by removing the dispatch function, it would also provide the basis for improving the total response time by having specifically trained staff handling the call taking and dispatch functions.

Within our review of the current Dispatch Agreement with the Oshawa Fire Services there is no specific performance measure requirement such as identified within the NFPA 1221 standard for call taking and dispatching functions. We recommend that consideration be given to revising the current Dispatch Agreement to include a performance measure such as NFPA 1221.

6.3.5 Turnout Times

Turnout Time is defined above as "*the time interval that begins from when the emergency response staff receive the required dispatch notification, and ends at the beginning point of travel time'.*

In comparison turnout time as defined by the NFPA, within the Standard for Organization and Deployment of Fire Suppression Operations by Career Fire Departments (NFPA 1710), as:

> "*the time interval that begins when the emergency response facilities (ERFs) and emergency response unit (ERUs) notification process beings by either an audible alarm or visual annunciation of both and ends at the beginning point of travel time.*"

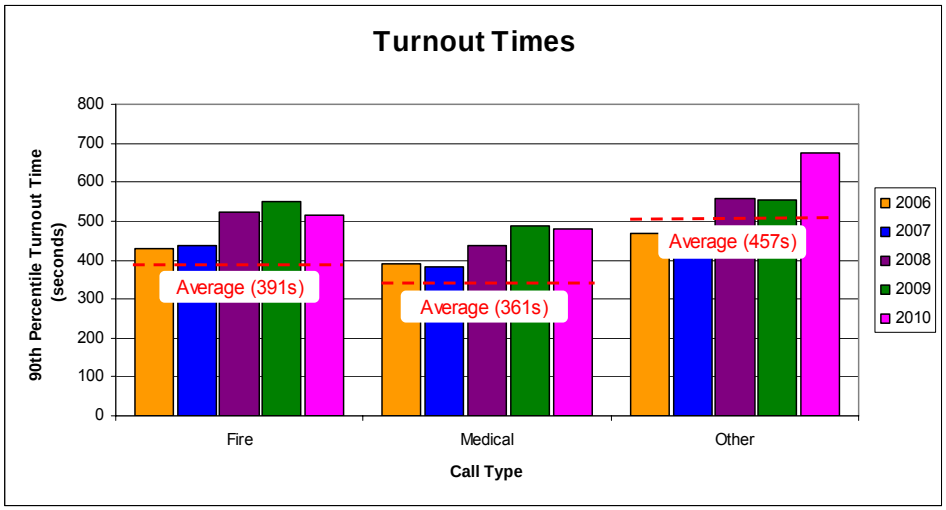
This NFPA standard is specifically targeted at fire departments utilizing full-time firefighters available to respond directly from the fire station. It is recognised within the industry that volunteer firefighters must respond from home or work and therefore have extended turnout times as they must first travel to the fire station.

Within this review understanding and monitoring turnout times is an important component of understanding the overall total response time. This is particularly important in identifying if there are and changes and to monitor trends.

Figure 6.5 presents a summary of Uxbridge Fire Department's historical turnout times from 2006 to 2010 that does indicate a trend of gradually increasing turnout times. The department has gone from seven minutes or greater in 2006 to eight minutes or greater in 2010. The turnout time component of the overall total response time is one function that the department should consider implementing specific performance measures for. In comparison to improving travel time which is associated to driving conditions and length of travel, turnout time is one area that can be positively impacted by implementing alternative strategies.

The department currently attempts to staff the first responding vehicle with a minimum of five to six firefighters. This current procedure has a positive benefit in assembling more firefighters on scene; however, in terms of best practices this procedure has a much larger negative impact on getting the first vehicle to the scene as the crew must wait for this number of firefighters to respond to the fire station. Best practices would be to staff the first responding vehicle with a minimum of four firefighters. We recommend that the procedure of having the first responding vehicle be amended to include a minimum response of four firefighters. Tracking turnout times also should be considered a priority for the department to monitor the trend of increasing time.

Figure 6.5: 90th Percentile Turnout Times (2006-2010)



6.3.6 Travel Times

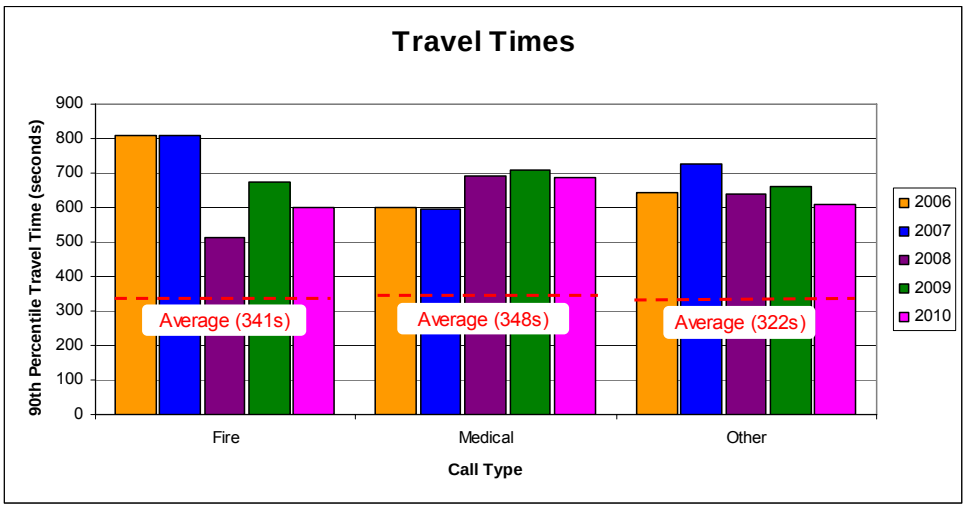
Travel Time has been defined above as "*The travel time interval begins when the assigned emergency response apparatus begins the en-route travel to the emergency, and ends when the apparatus arrives at the scene*".

In comparison the NFPA 1710 standard defines travel time as:

> *"The time interval that begins when a unit is en route to the emergency incident and ends when the unit arrives at the scene."*

Historical (2006-2010) 90th percentile travel times for the department are summarized in **Figure 6.6.**

Figure 6.6: 90th Percentile Travel Times (2006-2010)



Travel times for fire calls and other calls have been on a decreasing trend from 2006 to 2010. Medical call travel times have increased between 2007 and 2008, and have remained relatively consistent since then. In 2010 the 90th percentile travel time to fire calls was 10 minutes which is slightly high compared to the best practices identified within the performance targets of 8 minutes. These longer travel times are primarily a result of the travel times required to reach the outlying rural areas within the Township. Travel times within the urban area of the Township are considerably lower.

6.4 Existing Fire Suppression Services

6.4.1 Current Staffing

There are currently two vacancies within the department including the full-time firefighter's position and one of the volunteer Deputy Chiefs. In addition to assessing these vacancies; this review has assessed the overall complement of available volunteer firefighters, volunteer officers and the organizational structure of the department.

The department currently utilizes a five platoon system as shown in **Figure 4.1**. The primary purpose of the platoon system is to assign staff for first response to medical calls, training activities, and station/vehicle and equipment maintenance This system has served the department well, however there are times when the Captain or Acting Captain is not available when a particular platoon is on call for medical responses, there is also no back up or depth of officers assigned to each platoon to provide supervision for the platoon.

Another aspect of the current platoon system is the absence of a clear succession path for firefighters who may have an interest in a more senior supervisory position. Having sufficient officer positions either as Captains or Acting Captains is a core component of providing the appropriate supervision both at emergencies and all other activities of the department.

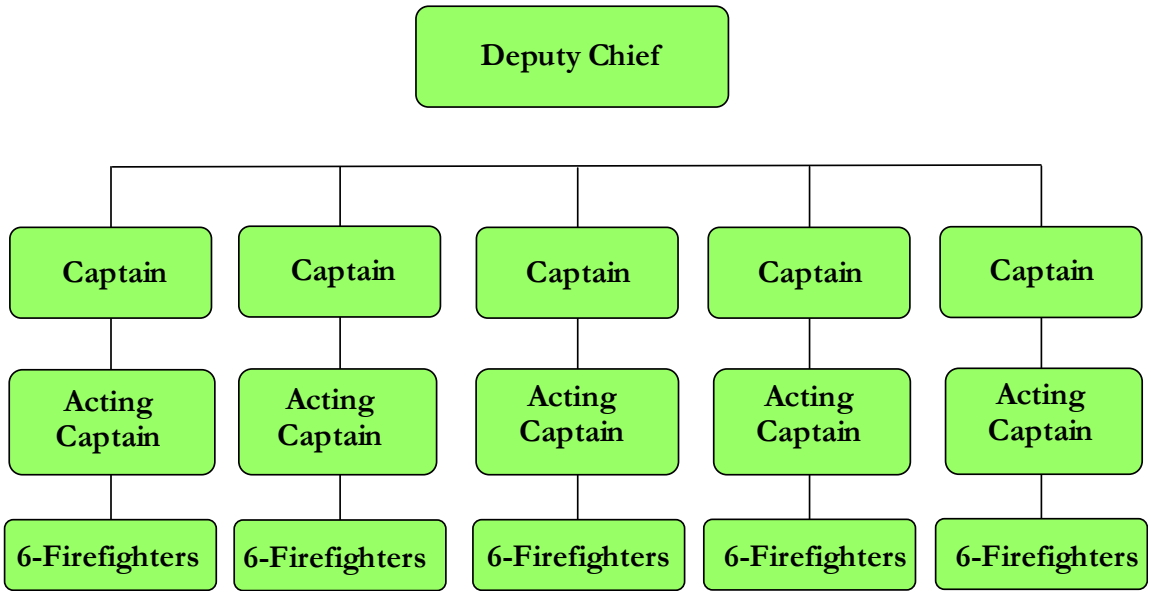
The department currently has 38 staff available for responding to emergencies. This includes the Chief, Deputy Chiefs, Fire Prevention Officer, full-time firefighter and the volunteer firefighters. Although the department has been achieving a consistent level of volunteers able to respond to each call, there are times particular Monday thru Friday daytime when the department is challenged to assemble an appropriate number of firefighters.

Revising the organizational structure by reducing the number of platoons as well as increasing the number of officer positions and firefighters that are available is recommended as a proactive strategy in sustaining the level of effectiveness the department has achieved. Implementing a five platoon system consisting of a Captain, Acting Captains and six firefighters on each platoon will require the addition of four additional Acting Captain positions, and the hiring of six additional volunteer firefighters.

In comparison to the current platoon system this strategy will provide more diverse platoons of two officers and six firefighters on each platoon. In the absence of the Captain the Acting Captains will be available to fulfill the role of supervisor under the OHSA as well as the operational role of incident commander. An increase in the number of officers (Acting Captains) also provides opportunity for succession planning for the future of the department. The increase in firefighters (six) will increase the depth of resources within the department and should be focused on firefighters available during the daytime Monday through Friday. This level of increased staffing will also prepare the department for staffing of new apparatus such as the larger tanker being considered, and staffing of all emergency response vehicles to increase the depth of response of the department.

The revised organizational structure recommended for the division is included in **Figure 6.7**.

Figure 6.7: Revised Organization Chart for Suppression Division



Implementation of the revised organizational structure should be planned to coincide with the opening of the new fire station in 2014. Opportunities to phase in the hiring and promotion of officers prior to 2014 should be considered.

6.4.2 Fire Calls

Initial Response:

On the receipt of an alarm by the Oshawa Fire Dispatch all of the volunteers are paged to respond. The department currently strives to achieve a staffing complement of five firefighters on the initial responding apparatus and all other apparatus where the apparatus has the capacity for this level of staffing. As indicated previously within this report an initial response of four firefighters is considered to be best practice within Ontario. In some instances waiting for the fifth firefighter to arrive can cause a delay in the response of the apparatus. The result can be an extended response time to an emergency.

The Uxbridge Fire Department has utilized this initial response staffing complement for many years. This practice does provide a means to assemble a larger number of firefighters (depth of response) on a scene by utilizing fewer vehicles. However, in our view the ability to provide an initial response of four firefighters as quickly as possible in order to reduce the initial response time is considered best practice within Ontario for a municipality such as the Township of Uxbridge.

As indicated within the Turnout Time analysis to achieve the optimal level of initial response the Uxbridge Fire Department should revise the complement of volunteer firefighters responding on the initial apparatus to include four firefighters. To initiate performance objectives for the Uxbridge Fire Department, Council should consider adopting a "performance target" for Turnout Times as follows:

"Utilizing volunteer firefighters the Township of Uxbridge Fire Department will strive to achieve a Turnout Time of five minutes for the initial firefighting apparatus to all structure fires".

Approving the "performance target" above would provide the opportunity for Council to begin implementing performance measurement within the fire department. As data is collected with regard to this "performance target" Council will be able to evaluate the level of service being provided and consider revisions to the target to include other measurements such as travel time and percentage of response.

Depth of Response:

Figure 6.8 presents a summary of the 90th percentile number of the depth of response to each type of incident for the period from 2006 to 2010. This represents all personnel that arrived on-scene to the emergency calls. For fire calls, the department has achieved 15 firefighters or more on-scene 90% of the time for the time period. For medical calls, the department has consistently been achieving five or more total personnel 90% of the time. Staffing at other calls has been consistently just over 10 personnel responding 90% of the time for the period from 2006 to 2010.

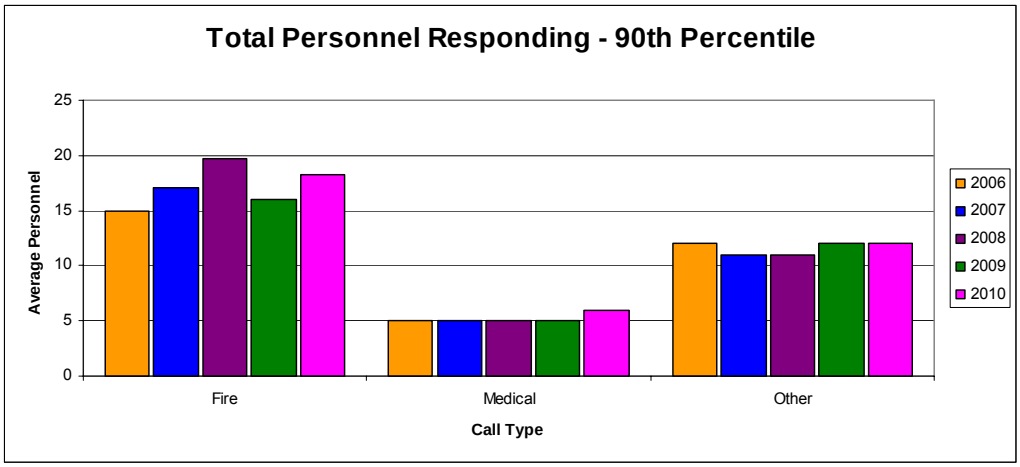
In comparison to best practices the department is doing very well in assembling a depth of response on scene. The challenge the department faces is the overall total response time it takes to assemble this depth of response.

Based on data collected as part of this review the Uxbridge Fire Department is consistently achieving a 90th percentile depth of response of 15 or more firefighters for fire calls and 10 or more firefighters for other calls outside of normal business hours Monday thru Friday. Achieving this level of response by volunteer firefighters during normal business hours is a challenge for most volunteer fire departments including Uxbridge.

The department does not currently collect information with regard to the time it takes to assemble the depth of resources on the scene. This is a function that normally would be completed by dispatch, and would benefit from an expanded dispatch agreement. The department should consider implementing procedures to collect this information as soon as possible. This would confirm the assembly time component of achieving the depth of response on scene.

Achieving this consistent level of depth of response is a credit to the dedication and commitment of the Uxbridge volunteer freighters.

Figure 6.8: 90th Percentile Total Personnel Responding (2006-2010)



6.4.3 Medical Calls

The department strives to achieve a staffing complement of four to five volunteer firefighters responding to all medical related calls. During daytime Monday through Friday hours the volunteers have up until recently been supported by the availability of the one full-time firefighter, as indicated this position is currently vacant. To achieve this level of staffing the department currently pages all of the volunteers to respond in the event of a medical call.

The department responds to carbon monoxide calls that do not identify any symptoms present with one officer and one firefighter. This response protocol should continue.

Medical calls represent the second highest percentage (26%) of the departments overall emergency call volume. A detailed review of the medical calls for the period January 1, 2009 to October 31, 2011 presented in **Table 6.2** indicates that of the 346 medical related calls during this period the department staff provided actual medical assistance to a patient only 19.1% of the time.

Table 6.2: Medical Incidents Attended by Uxbridge Fire Department

Year	Medical Assistance Provided		On Scene, No Medical Assistance Provided*		No Assistance Provided upon Arrival		Cancelled		Lift Assist		Total Incidents
2009	21	19.8%	27	25.5%	48	45.3%	6	5.7%	4	3.8%	106
2010	18	15.1%	18	15.1%	55	46.2%	20	16.8%	8	6.7%	119
2011	27	22.3%	27	22.3%	50	41.3%	13	10.7%	4	3.3%	121

(Jan-Oct)											
Overall	66	19.1%	72	20.8%	153	44.2%	39	11.3%	16	4.6%	346
2011 (East Gwillimbury)	0	0.0%	6	60.0%	4	40.0%	-	-	-	-	10
2011 (Whitchurch-Stouffville)	3	27.3%	4	36.4%	3	27.3%	1	9.1%	-	-	11

In our discussions with the volunteer firefighters they expressed a level of frustration and fatigue in the volume of medical calls and the corresponding number of times they are cancelled while responding, cancelled on arrival and the low percentage of time they are achieving a positive impact through direct patient contact.

Our review of the current Tiered Response Agreement with the Region of Durham indicates that the Uxbridge Fire Department currently participates in a "Level B Tiered Response" program. This includes response based on the following protocols:

A tiered response will be requested within one (1) minute of EMS dispatch, and in conjunction with the response reference chart, for the following emergency requests for service:

1. *Respiratory Arrest (Absence of Breathing)*
2. *Cardiac Arrest (Absence of Pulse)*
3. *Unconsciousness*
4. *Motor Vehicle Collision with EMS attending*

A tiered response will be requested within one (1) minute of EMS dispatch, and in conjunction with the response reference chart, when the EMS response time is anticipated to be greater than twelve (12) minutes for the following emergency requests for service:

1. *Acute Chest Pain and/or Shortness of Breath/Difficulty Breathing (not on calls originating from LTC, medical facility and/or other location with an available on-site EFR program or higher level of care)*
2. *Profuse and Uncontrolled Bleeding (not including nose, vaginal, rectal or catheter site bleeds and no on calls originating from LTC, medical facility and/or other location with an available EFR program or higher level of care).*

In our view the Township of Uxbridge should consider implementing a strategy to optimize the fire department's response to medical calls to mitigate the current level of frustration and fatigue experienced by the volunteer firefighters while sustaining the level of medical response to the community.

The recommended strategy is to direct the Fire Chief to negotiate revisions to the current Tiered Response Agreement to address the current response protocols to calls including response to care facilities such as nursing homes where medical staff is present, and where possible other components of the agreement to recognise the current impact on the volunteer firefighters.

6.5 Key Findings

- The Township of Uxbridge has successfully sustained a composite model fire department.
- The Township of Uxbridge shares the characteristics of many large primarily rural in nature communities in Ontario that include smaller urban centres surrounded by vast tracks of rural geography. The ability for the Township or any other community that shares these characteristics to provide emergency response to mitigate a fire in a timely manner can be difficult and challenging.
- The existing department complement of firefighters currently consists of one full-time firefighter assigned to a dayshift Monday through Friday and thirty five volunteers divided into a five platoon system.
- In addition to responding to fires the services provided include medical aid until paramedics arrive, responding to motor vehicle fires and accidents including patient extrication when required, alarm investigations, and specialized services such as hazardous materials incidents.
- The working relationship between the volunteer firefighters and the full-time firefighter appears to be very positive. During the course of developing this report the full-time firefighter accepted a position with a lager fire department creating a vacancy in this position.
- A vacancy has occurred at the rank of volunteer Deputy Chief as a result of a recent retirement.
- Outsourcing all dispatch procedures once the radio platform is upgraded is expected to improve dispatch times.
- Travel times for fire calls and other calls have been on a decreasing trend from 2006 to 2010. Medical call travel times have increased between 2007 and 2008, and have remained relatively consistent since then.
- The department currently utilizes a five platoon system consisting of seven volunteers. For all emergency calls other than medical responses all five platoons are paged simultaneously to respond.
- Due to availability of the volunteer firefighters for a wide variety of reasons including vacation, sickness and other personal commitments a 50% turnout of the total complement of volunteers would be considered a good average.
- In our discussions with the volunteer firefighters they expressed a level of frustration and fatigue in the volume of medical calls and the corresponding number of times they are cancelled while responding, cancelled on arrival and the low percentage of time they are achieving a positive impact through direct patient contact.
- To achieve a staffing complement of three to four volunteer firefighters responding to all medical related calls the department currently pages all of the volunteers to respond in the event of a medical call.
- For carbon monoxide calls that do not identify any symptoms present should continue to receive a response of one officer and one firefighter.
- For all reported emergency calls the department pages all of the volunteers to respond.

- Based on data collected as part of this review the Uxbridge Fire Department is consistently achieving a depth of response of 10 to 14 firefighters outside of normal business hours Monday thru Friday. Achieving this level of response by volunteer firefighters during normal business hours is a challenge for most volunteer fire departments including Uxbridge.

7.0 TRAINING

7.1 Key Functions

Uxbridge Fire Department provides a broad and comprehensive training program to its personnel. The Training Division is specifically dedicated to provide the fire department with the following key functions:

- Development and implementation of training programs
    - Curriculum training
    - Recruit training
    - Promotional processes
- Coordination / scheduling of training program delivery;
- Delivery of training programs;
- Assessment of staff performance;
- Evaluation of and revisions to programs to meet legislative requirements;
- Supervision of assigned staff; and
- Records management for the division.

7.2 Staffing

The Training Division is currently managed by the part-time Deputy Chief of Training and Fire Prevention. The Deputy Chief is responsible for the development and implementation of training programs. Training sessions are assigned and delivered by various staff in the department, including seven Officers (Captains), eight Trainer Facilitators and one "Train the Trainer" pump operator. Firefighters with special subject knowledge are also used for training sessions where possible.

The newly proposed department organizational structure recommends a full-time staff position to divide duties equally between training and public education. These two areas are closely related as they both require an emphasis on education and require strong teaching skills and techniques to effectively implement. There are many areas of the division which could be improved upon through the support of this role. It would also help to relieve some of the burden from the volunteer staff who currently provide both training and suppression services.

7.3 Training Sessions

Training sessions are held every Tuesday evening, with the exception of during the months of August and December. The first Tuesday of the month consists of operational meetings and Firefighter Association meetings. The second and third Tuesdays of each month consist of two hour general training sessions. The fourth Tuesday of the month is a one hour pre-plan session. Minimum training is five hours per month for 10 months of the year. It is required within a standard operating procedure (SOP 1405) that staff attend 75% of the regularly scheduled training sessions. Additional training programs are occasionally added to the schedule on alternative evenings or weekends.

7.4 Training Programs

Training programs and evolutions (simulated emergency scenarios, including live fires) are designed to meet the requirements outlined within the Ontario Firefighter Standards in the Ontario Firefighter Curriculum, the basis for the training program within the department. Training is also developed and delivered to meet legislative requirements of the Ontario *Fire Protection and Prevention Act, Occupational Health and Safety Act* and the Section 21 Guidance Notes.

7.4.1 External Training

Uxbridge Fire Department uses external training resources in order to enhance training resources available to staff. All fire college courses, any regional schools, and Eastern Ontario Fire Academy courses are available to all department staff, subject to approval from the Fire Chief. These include the following external training programs:

- Ontario Fire College Course Calendar (available to all personnel, Fire Chief's approval to register);
- Eastern Ontario Fire Academy Component 1 Training (new recruits without pre-fire certificate);
- Eastern Ontario Fire Academy Company Officer Courses, Introduction to Incident Management Systems (IMS), etc.
- Oshawa Base Hospital medical training (EMR/CPR/Defib/CME);
- DRIVEWISE Defensive Driving Course (repeated every three years);
- Enbridge Natural Gas Awareness Training (every three to five years);
- Code 4 Auto-Extrication Training (annually); and
- Subject specific by other sources (e.g. Township staff, OFM, etc.).

7.5 Specialty Training Programs

Uxbridge Fire Department provides a range of specialized training to support specialized emergency calls. The following specialized training programs are currently being delivered by the department:

- Pump Operation (certification by Train-the-trainer);
- Hazmat (to awareness level)
- Ice/Water Rescue (entry level training);
- Rope / high-angle / trench rescue (to awareness level);
- Firefighter Survival; and
- Rural Water Supply.

Responding to emergency calls requiring speciality training is low frequency requiring a significant amount of training and certification. Consideration should be given to assessing partnership or service agreements with other fire departments or the private sector for the provision of some or all of these services.

7.5.1 Live Fire Training

One area identified for improvement is additional access to live fire training for all suppression staff.

The purpose of live fire training provides realistic fire training simulations under safe and controlled conditions. With relatively low volumes of fire calls it is important that the department provides access to suppression staff to simulate safe and effective fire suppression operations in an appropriate training facility. Live fire training facilities can provide simulated heat, humidity, restricted vision and smoke conditions.

The department does have access to live fire training through the Eastern Ontario Fire Academy in Norwood, Ontario. This location, however, is not an option for the department as a whole to attend for training sessions. It is recommended that the Uxbridge Fire Department and the Township investigate opportunities for live fire training. This could include partnerships with other local fire departments in neighbouring municipalities.

It is recommend that live fire training be included in the department's training schedule and be completed at minimum on an annual basis for all fire suppression staff.

7.6 Succession Planning

There is currently no formal process in place for succession planning within the department. Adding more Acting Captain positions to the department organizational structure, as discussed above, would enhance the opportunities for succession and career path development within the department.

Promotional processes are in place to achieve firefighter classifications and Captains rank. The following describes the existing processes.

7.6.1 Promotional Process

There is currently a formalized promotional process in place for recruits, firefighter classification and Acting Captain promotions.

7.6.1.1 Recruit Promotion

The recruitment process begins with an application and aptitude test. Successful candidates are then interviewed prior to completing a physical fitness test and medical before joining the department as new recruits.

Since 2009 all new recruits complete the entire curriculum process. This includes attending the Eastern Ontario Fire College in Norwood for 16 weeks to complete Component 1 of the curriculum (those without a pre-fire certificate). Components 2 and 3 are completed through in-house department training.

7.6.1.2 Firefighter Classification Promotion

Recruits attain 4th Class Firefighter following the completion of the recruit process, with one year probation. Following the one year probation the firefighter can then progress through Parts 1, 2 and 3 of the department's promotional process. There is an SOP to describe the department's promotional process. This process is then repeated annually until 1st Class Firefighter is achieved.

7.6.1.3 Acting Captain Promotion

There is an SOP to identify the process for promotion to Captain within Uxbridge Fire Department. The promotional process is comprised of Parts 1, 2 and 3. Following successful completion of the three parts of the promotional process results in achieving Acting Captain status.

7.6.1.4 Company Officer Training

Since 2008 precedence within the department is that Acting Captains must complete company officer courses (CO101, CO400 and CO500) in order to be appointed the position of Captain. This is a very large time commitment for volunteer members.

7.7 Facilities & Workspace

The main training facility within the existing fire station is the lecture room. This room accommodates a fairly large group and has served the department and Training Division well over the last number of years, though the fire station was designed to accommodate a group of 20 to 24 firefighters and it currently houses 35.

Space on the apparatus floor and around the property of the existing fire station is limited. Therefore there are limitations as to what training evolutions can be performed. This requires the use of off-site training locations, such as other municipally owned properties, to conduct practical evolutions. As there is not enough capacity with the existing department vehicles to carry all 35 staff simultaneously, these off-site events require shuttling staff and equipment. The shuttling process decreases the amount of time available to conduct the actual training ground.

The existing facilities are also somewhat limited with regards to storage for training. This results in some training props being stored at off-site locations.

It is anticipated that many of the facility limitations facing the division presently will be resolved with the opening of the new fire station in 2014.

7.8 Training Challenges

At times, it is difficult to keep all members current with training if sessions are missed. Shift workers tend to have a specific disadvantage surrounding the evening and weekend training schedules.

Working with the full complement of the department together for training sessions results in a large groups. Getting individual hands-on experience in the limited training time for everyone within the large group is a challenge.

Conducting training at off-site locations is a challenge to coordinate, both with regards to staff and equipment transportation.

As well, it is a constant challenge to maintain an up-to-date training program and procedures to meet all of the legislated requirements, including health and safety requirements.

Completing regular live fire training on a regular basis is a challenge for the department as a whole. Finding a location in close proximity to the Township and coordinating training with suppression coverage would be an important step to manage the risk of temporarily relocating manpower and apparatus for training purposes.

As indicated within the Fire Prevention and Public Education section of this report we are recommending creating a new position using the approved complement position vacated by the firefighter with a focus on public education and firefighter training as an effective strategy to address two major priorities within the department, education and training. The similarity of the skill sets required for these two functions make combining these roles an effective strategy for organizing resources.

Under the direction of the Fire Chief this new position would be available to address the training challenges identified and further increase the training practices within the department.

7.9 Key Findings

- Uxbridge Fire Department strives to provide a broad and comprehensive training program to its personnel.
- Training sessions are assigned and delivered by various staff in the department, including seven Officers (Captains), eight Trainer Facilitators and one "Train the Trainer" pump operator. Firefighters with special subject knowledge are also used for training sessions where possible.
- The basis for the training program within the department is the Ontario Firefighter Standards in the Ontario Firefighter Curriculum. Training is also developed and delivered to meet legislative requirements of the Ontario *Fire Protection and Prevention Act, Occupational Health and Safety Act* and the Section 21 Guidance Notes.
- It is anticipated that many of the facility limitations facing the division presently will be resolved with the opening of the new fire station in 2014.
- There is currently no formal process in place for succession planning within the department. Adding more Acting Captain positions to the department organizational structure, as discussed above, would enhance the opportunities for succession and career path development within the department.
- At times, it is difficult to keep all members current with training if sessions are missed. Shift workers tend to have a specific disadvantage surrounding the evening and weekend training schedules.
- Working with the full complement of the department together for training sessions results in a large groups. Getting individual hands-on experience in the limited training time for everyone within the large group is a challenge.
- Conducting training at off-site locations is a challenge to coordinate, both with regards to staff and equipment transportation.
- It is a constant challenge to maintain an up-to-date training program and procedures to meet all of the legislated requirements, including health and safety requirements.
- Completing regular live fire training on a regular basis is a challenge for the department as a whole. Finding a location in close proximity to the Township and coordinating training with suppression coverage would be an important step to manage the risk of temporarily relocating manpower and apparatus for training purposes.
- The current records management practices of the division are very good and complete.

8.0 APPARATUS & EQUIPMENT / FLEET REVIEW

Overall, the apparatus and equipment within the department are in excellent condition. The fleet is relatively young, with the oldest apparatus at 13 years old.

8.1 Division Staffing and Responsibilities

Uxbridge Fire Department's apparatus and equipment are maintained by the Mechanical Division with support from the Suppression Division. The Mechanical Division consists of a Mechanical Officer and an Assistant Mechanical Officer. Currently, one of the department's volunteer firefighters fills the role of Mechanical Officer. He holds a heavy equipment (industrial diesel) mechanic's license. The Mechanical Officer is responsible for records management relating to department apparatus, including service information, defects, work orders and repairs. The mechanical officer attempts to complete repairs in-house when possible. Larger or more complex repairs / maintenance needs are outsourced. The Mechanical Officer is currently assisted by another volunteer firefighter who holds a vehicle mechanic's license. These positions are in addition to the suppression positions held, and are appointed by the Fire Chief through a hiring process specifically for the Mechanical Officer and Assistant Mechanical Officer.

The Township's Public Works Department has a truck mechanic on staff who assists the fire department with routine service of fire apparatus that cannot be completed by the Mechanical Officer / assistant. The first priority of the Town's Mechanic, however, is works department vehicles. This means short term notice issues (e.g. breakdowns or unexpected service) often cannot be incorporated into the schedule. For immediate service needs, apparatus are sent to outside contractors or manufacturers (i.e. Dependable Emergency Vehicles) for repair work. When possible, service technicians come to the fire station to perform repairs.

Suppression Division staff (volunteer firefighters) perform weekly basic checks on the apparatus, including a check of equipment, pump and emergency light. Every four weeks ach truck receives a more comprehensive check. This includes the following:

- Operation check of small engines;
- Pump draft check;
- Ladders checked;
- Appliances washed;
- Completing any minor repairs; and
- Recording noted defects into records management system (for Mechanical Division staff to process).

These checks follow a written check-list. The hard copies of the completed checklists are provided to the mechanical staff.

8.2 Existing Fleet

Table 8.1 below summarizes the existing department apparatus.

Table 8.1: Apparatus and Model Year

Vehicle	Description	Year
Pumper Rescue 1	Rosenbauer Spartan Advantage VA41M chassis custom Rosenbauer body 2000 gallon (U.S.)/min pump 500 gallon (U.S.) poly tank Rosenbauer max compressed air foam system Foam-Pro 2002 foam proportioning system diesel powered seats 6	2005
Tanker 2	Freightliner FL-80 Village Tanker body by Fort Garry 1900 L/min pump 1400 gallon (imperial) water tank seats 3 diesel powered	2001
Rescue 4	GMC Sierra SLE, 1 tonne 4x4 chassis Rescue Utility Box by Fort Garry seats 5	2001
Pumper 8	Freightliner FL-80 Village Pumper body by Fort Garry seats 5 5000 L/min pump 900 gallon (imperial) water tank Foam-Pro 2001 system diesel powered	1999
Pumper 9	2009 Seagrave Spartan Gladiator chassis Custom Seagrave Canada fire body 1250 gallon (U.S.)/min pump 600 gallon (U.S.) poly tank Foam-Pro 2002 foam proportioning system diesel powered seats 6 (plus 2 jump seats)	2009
Car 1	GMC Acadia FWD 4 door	2011
Car 5	Dodge Ram Pick up truck	2007

Apparatus purchased within the past 12 years has been specified with up to date equipment needs. This includes equipment such as air primers, compressed air foam systems (CAFS), stadium lights, improved SCBA seating, multiplexed electrical systems, LES emergency scene lighting, hydraulic generators and more. Purchasing equipment needs at the time of apparatus replacement is a good practice for capital replacement.

The existing fleet includes only a single 1400 gallon tanker. This is small for the majority of rural fires. More modern tankers tend to have twice the capacity. The Township receives tanker support through mutual aid agreements, however, response can be delayed up to 20 minutes depending on the location of the call and mutual aid provider.

8.3 Reserve Fleet

Uxbridge Fire Department does not currently have spare or reserve vehicles in its fleet. If a vehicle is out of service the department accommodates with the remaining apparatus. Maintenance and non-urgent repairs are schedule to only have one apparatus out of service at a time. As Uxbridge continues to replace existing vehicles, it is recommended that a reserve vehicle be built into the fleet. This will add redundancy for situations where maintenance is required or unexpected defects / breakdowns occur. It would also provide a depth of resources to transport staff to the scene and provide additional rescue capacity for calls requiring more resources, such as structural fire calls.

8.4 Aerial Ladder

The department does not currently have an aerial ladder within the fleet. This was a recommendation of the previous Insurance Underwriters Survey that the department purchase a 100’ ladder truck. Improvements in technology within the fire service industry have improved the overall operation of these apparatus into providing more multi-functioning capacity. In addition to providing a ladder for access to upper stories of a building (typically 8 to 10 stories) these apparatus include all of the equipment typically found on a pump/rescue apparatus.

Our review of the Community Risk Profile indicates very few high-rise type buildings within the community. There are however many instances where an elevated master stream (large volume of water elevated to an extended height) would be a beneficial resource in fighting a fire in a large building or to contain a fire from extended to buildings exposed to fire.

Our review as identified that a number of the neighbouring communities do have aerial ladders within their fleet. Consideration should be given to developing an automatic aid agreement (fire protection agreement) with one or more of these municipalities to provide an aerial ladder as part of the initial response to occupancies designated with a high risk within the Community Risk Profile. This strategy would be an effective response to providing this type of resource.

In addition to the above consideration should be given to including an elevated master stream capability when replacing current vehicles within the fleet. As an example, this report recommends replacing Pumper-Rescue 1 in the short term (rationale provided) as part of replacing this apparatus consideration should be given to including a 55’ or 75’ ladder as part of the specifications. This strategy would address the need of an elevated master stream in addition to providing some ladder capability within the department.

8.5 Maintenance

8.5.1 Apparatus Maintenance

Apparatus requiring Ministry of Transportation, Ontario (MTO) certificates have scheduled maintenance throughout the year. This is incorporated into the schedule and work load of the Township's public works mechanic. Preventative maintenance occurs at the time of certification and six months after. The department strives to complete the final service by November to ensure vehicles are ready for winter operating conditions. All units receive annual rust-proofing.

All vehicles which do not require MTO certification follow a 5,000 kilometre preventative maintenance program. This maintenance is generally completed by the Township's public works mechanic. Specialized repairs are completed by local dealerships specializing in specific equipment.

Apparatus break-downs are sent immediately for repair by the Mechanical Division, Township's Public Works Mechanic or an applicable private repair facility, as dictated by availability and type of repair.

Table 8.2: Apparatus Maintenance Costs Summary

Vehicle	Maintenance Costs			Total
	2009	2010	2011	2009 - 2011
Pump 8	$7,434.56	$9,617.66	$3,926.48	$20,978.70
Pump 9	$5,949.57	$8,651.31	$5,812.03	$20,412.91
Pumper-Rescue 1	$20,303.58	$19,268.72	$15,785.57	$55,357.87

As shown in **Table 8.2** above, apparatus maintenance costs from 2009 to 2011 for the department's Pumper-Rescue 1 apparatus have more than doubled the combined cost of maintaining both Pumps 8 and 9. As the apparatus ages, as with any vehicle, maintenance costs would be expected to further increase.

As well, **Table 8.3** summarizes the number of in-service (minor) repairs and number of days out-of-service for more significant repairs or maintenance. Again, Pumper-Rescue 1 had twice as many in-service repairs as Pump 8 and Pump 9 combined. It also was out of service for approximately 72 days. This is significant as it represents approximately 20% of a calendar year.

Due to the high maintenance costs and significant reliability issues shown through the repairs and days out-of-service, the Township should consider replacing the Pumper-Rescue 1. The front-end costs of a new apparatus will likely be recovered by the savings in expected maintenance if Pumper-Rescue 1 continued to be used as a front-line apparatus.

Table 8.3: Apparatus Repairs and Days Out-of-Service Summary

Vehicle	# of In-Service Repairs			Total	Days Out-of-service Repairs			Total
	2009	2010	2011	2009-2011	2009	2010	2011	2009-2011
Pump 8	6	5	2	13	0	6	3	9
Pump 9	2	8	2	12	0	3	4	7
Pumper-Rescue 1	4	13	7	24	0	20	52	72

8.5.2 Equipment Maintenance

Pump testing is completed every two years. NFPA recommends annual pump testing, however Uxbridge Fire Department pumps receive low hours. The decision for bi-annual pump testing procedures is reviewed annually. Foam pump testing and calibration will be incorporated into future pump tests.

Hose testing is completed in-house on an annual basis by suppression staff. Damaged hose is either repaired or replaced.

Ground ladders receive yearly inspection and testing from an independent company, compliant with NFPA standards.

Auto-extrication equipment is checked and maintained regularly, and tested and serviced semi-annually by the supplier. The supplier has complimented the department on the good condition of the equipment as a result of the maintenance program.

Equipment is routinely upgraded if it can improve on-scene performance. As an example, auto-extrication equipment is considered to be among the best available. It was recently upgraded to Hurst with streamline coupling. This equipment upgrade frees up one firefighter on-scene.

The department's bunker gear is in excellent condition. It is sent out annually for cleaning and any repairs or patching that may be required. After three years in service the gear undergoes annual moisture barrier testing to ensure proper performance. The life cycle of bunker gear for the department is 10-years as per NFPA standards.

The department's SCBA and air cylinders are well-maintained. Scott Air-Paks are flow tested annually and cleaned following each use. Minor repairs are completed in-house and other repair needs are outsourced. Suppression personnel have all been issued personal facemasks. The current life-cycle of the department's SCBA units is approximately 10 to 15 years. Cylinders are hydrostatically tested every five years. Air is exchanged every three months. Uxbridge Fire Department operates their own compressor and fill station (located in the workshop).

8.6 Training and Succession Planning

The Mechanical Officer receives annual training at the Ontario Fire College. He attends a week long session organized by the Emergency Vehicle Technicians of Ontario. Information and training is provided relating to a number of areas, including maintenance procedures, new equipment, NFPA requirements, MTO updates and occupational health & safety. This training session also provides an opportunity to network with other fire department's mechanical staff and fire related manufacturers.

The current maintenance program relies heavily on the mechanic licences held by the Mechanical Officer and the volunteer firefighters. Currently there is no formal succession plan in place to replace the Mechanical Officer position. If this position was to become vacant, additional outsourcing of repairs and maintenance would be required.

8.7 Fleet Replacement Plan

Historically, the department has followed a 25 to 20 year replacement cycle. The department aims to reduce this replacement cycle. With the annual call volume, we recommend a 15 year replacement cycle, with five additional years as a reserve vehicle.

Uxbridge does not currently have a capital replacement plan for fire apparatus or equipment. The Mechanical Division budget is calculated by the Fire Chief, with information provided by mechanical and suppression staff. It is recommended that life cycle replacement plans be developed and incorporated into the capital budget planning process for apparatus and equipment costs. It is also recommended that considerations for reserve apparatus be built into the capital budget and fleet replacement plan.

8.8 Future Fleet Considerations

As a result of high maintenance costs and increased time out of service, as summarized above, it is recommended that the department replace Pumper-Rescue 1. It is recommended that the Township consider a 55 foot or 75 foot quint for the replacement apparatus. This would give the department the ability to provide an elevated master stream, which they cannot currently provide. Another benefit to this type of apparatus is an improvement on access and rescue capacity for higher buildings within the Township.

The Township has currently arranged for financing to purchase a new tanker. The delivery schedule is expected to coincide with the opening of the new fire station. It is recommended that this apparatus be a 2500 gallon tanker. It will be an asset to the fleet and department by providing additional water carrying capacity for fires in the non-hydranted areas.

As the department adds suppression staff to meet the proposed organizational model, considerations may be required to ensure all responding staff can be transported to the emergency scene. Staffing levels responding to calls should continue to be monitored and reviewed for staff transport constraints.

8.9 Facilities and Work Space

The workshop facility in the existing station is small for the needs of department. The area contains a large toolbox and SCBA maintenance equipment. Only one person can work in the workshop area at a time, due to the limited size. Storage for parts is also an issue. Current storage for the Mechanical Division is spread throughout the station due to limited availability. Within the design of the new fire station consideration should be given to an appropriate are for equipment maintenance.

8.10 Key Findings

- Overall the apparatus and equipment within the department are in excellent condition.
- The fleet is relatively young, with the oldest apparatus at 13 years old.
- Currently, one of the department's volunteer firefighters fills the role of Mechanical Officer.
- For immediate service needs, apparatus are sent to outside contractors or manufacturers (i.e. Dependable Emergency Vehicles) for repair work. When possible, service technicians come to the fire station to perform repairs.
- Auto-extrication equipment is checked and maintained regularly, and tested and serviced semi-annually by the supplier. The supplier has complimented the department on the good condition of the equipment as a result of the maintenance program.
- The department's SCBA and air cylinders are well-maintained.
- The department's bunker gear is in excellent condition.
- Equipment is routinely upgraded if it can improve on-scene performance.
- The division has very good records management practices and procedures in place.
- The workshop facility in the existing station is small for the needs of department.

9.0 COMMUNICATION & TECHNOLOGY

The communications system used by Uxbridge Fire Department is currently under review. A number of changes and improvements are anticipated as a result of the review.

9.1 Next Generation Common Communications Platform Project (NextGen)

Uxbridge Fire Department is a participating member in the Next Generation Common Communications Platform (NextGen) Regional Communications Interoperability Project. The project, conceived in early 2012, and involves collaboration from Durham Regional Fire Services Joint Management Team, Durham Regional Police Services (DRPS), Ontario Power Generation (OPG) and the Region of Durham. The project aims is to identify, acquire and deploy a region-wide common and seamless voice and data communications platform. Current project horizon aims to have the platform in place by 2014. This will allow emergency responders and public service organizations in the Region of Durham too communicate in real-time without boundaries such as disciplines or jurisdictions.

As a result of participating in this project, the communications equipment and technology used by the Uxbridge Fire Department will need to be upgraded and revised.

9.2 Radios and Communications Equipment

The existing radio system is a digital VHF trunked system operated by Bell Mobility Radio, called FleetNet. It is currently shared, and therefore interoperable with, Brock and Scugog Fire Departments. East Gwillimbury Fire Services and Whitchurch-Stouffville Fire and Emergency Services have companion portable radios to allow for communications with Uxbridge Fire Department during interagency operations. Currently, Uxbridge Fire Department does not have the equipment or technology to communicate with the South Durham Fire Department, Durham EMS or DPRS.

The department uses companion portables for mobile radio communications. They are analog UHF radios which connect to repeaters in the apparatus, which convert the signals to or from digital VHF. This provides the range of service (VHF) with in-building coverage (UHF). This system is providing excellent in-building coverage and range for the suppression staff.

Three system portable radios are used by the department when repeaters are unavailable (e.g. at tanker fill sites). These radios can connect to the existing platform radio system without going through a repeater, so they can operate remotely and independently, however they experience range limitations and therefore cannot be used in all areas of the Township.

The radio system has three folders for talk groups, one for each Uxbridge, Brock and Scugog Fire Departments. There is an inter-folder talk group available to allow the three departments to communicate. In addition, Uxbridge has one analog, two digital and one conventional legacy talk groups available for use.

Primary pager activation is transmitted through radio activation. Oshawa's communications personnel activate the paging repeater and paging system and broadcast the message. Uxbridge Fire Department pagers use a two tone activation method. One tone is "all calls" and activates all department pagers, used for all emergency response calls. The second tone is "duty officers" to report non-emergency administration calls to duty officer pagers. Through a paging consol in the radio room, Uxbridge is able to page staff directly from the station if the call is received by telephone to the station or through a walk-in report.

9.3 Dispatch

The Township of Uxbridge has an agreement in place with the City of Oshawa for the provision of dispatch services. This agreement currently addresses the emergency call taking and dispatching functions related to paging the volunteer firefighters to respond to the fire station in the event of an emergency. Once receipt of the call is confirmed by a member of the Uxbridge Fire Department by radio the remaining dispatching functions of the emergency call are assumed by the member of the Uxbridge Fire Department. This current practice reduces the number of firefighters available to respond to an emergence and requires all volunteer firefighters to be trained in the dispatch function.

The opportunity to contract all of the dispatch functions is currently inhibited by the radio technology utilized by the department. Our review indicates that plans are currently underway to replace the existing radio system in 2014. As this imitative is planned and implemented consideration should be given to contracting all of the dispatch functions to an external agency in order to improve the efficiency and effectiveness of the dispatch function, and increase the availability of firefighters to respond.

9.4 Communications Technology

Currently Uxbridge does not have or use CAD or AVL technology. The department does not have a console in the station or in any apparatus to replay information, though this could be accommodated on the existing digital radio system. A console would also provide information, either in real-time or as printed run sheets, to responding apparatus to assist with incident location. The costs associated with these improvements should be considered within the communications platform upgrades.

Technology provisions, such as computer and internet availability for firefighters (access on-line training programs, etc.) should also be considered. Additional technology equipment planning should be discussed and considered between all departments to compare needs and provide suitable resources to implement efficiencies and improvements where possible.

9.5 Facilities / Workspace

All communications are routed through the radio room in the existing station. The room houses all dispatching and radio communications equipment. The room is also used by the department's officers, for such things as completing incident reports. This requires sharing the one available computer, as required.

No communications facility is planned for the new station. Communications equipment will be accommodated within the storage and operational areas of the station.

9.6 Key Findings

- The communications system used by Uxbridge Fire Department is currently under review. A number of changes and improvements are anticipated as a result of the review.
- Currently Oshawa Fire Services Communications Division receives 9-1-1 calls for Uxbridge and activates the volunteer alerting system. The first arriving volunteer firefighter to get to the station assumes responsibility for staffing the radio communications room.
- The 'NextGen' Regional Communications Interoperability Project to identify, acquire and deploy a region-wide common and seamless voice and data communications platform is expected to be competed by 2014.

- As a result of NextGen Regional Communications Interoperability Project communications equipment and technology used by the Uxbridge Fire Department will need to be upgraded and revised.
- The existing radio system is a digital system called FleetNet. It is interoperable / shared with Brock and Scugog Fire Departments.
- East Gwillimbury Fire Services and Whitchurch-Stouffville Fire and Emergency Services have companion portable radios to allow for communications with Uxbridge Fire Department during interagency operations.
- Currently, Uxbridge Fire Department does not have the equipment or technology to communicate with the South Durham Fire Department, Durham EMS or DPRS.

10.0 STUDY CONSULTATION

The Township of Uxbridge Fire Master Plan study started with a project initiation meeting, held on September 28, 2011. As the study progressed, various forms of consultation activities were employed to engage the public and gather feedback from stakeholders and members of the community. Effective communication and consultation with stakeholders and the community is essential to ensure that those responsible for implementing this Fire Master Plan, and those with a vested interest, understand the basis on which certain decisions are made and why particular actions are required.

10.1 Steering Committee

Information and feedback was collected from members of the Project Steering Committee and key stakeholders via informal interviews held following the Project Initiation Meeting. This was an opportunity to gather background information for the environmental scan and input on strengths, opportunities, challenges and threats from the point of view of these key stakeholders. This was an essential stage in developing strategic goals and objectives for the fire master planning process.

The Steering Committee was comprised of the following members:

- Fire Chief Scott Richardson
- Chief Administrative Officer Ingrid Svelnis
- Mayor Gerri Lynn O'Connor
- Councillor Pat Molloy
- Councillor Gordon Highet

10.2 Project Meetings

Throughout this study, the Dillon team met with the Steering Committee to keep them abreast of study progress. The following meetings took place:

- Project Meeting #1 Project Initiation – September 28, 2011
- Project Meeting #2 Preliminary Findings & Recommendations – February 9, 2012
- Project Meeting#3 Present Draft Report – July 17, 2012
- Project Meeting#4 Present Final Report to Council – Planned for September 2012

10.3 Stakeholders

Stakeholders can provide valuable input at each step of the process, providing information about context and background from different perspectives. This helps to identify issues and needs associated with the fire and emergency service. As well it provides information that is used for study analysis and recommendation phases. Engaging stakeholders and the community helps ensure that multiple perspectives can be brought to the fire master planning process.

10.4 Public and Stakeholder Consultation

The consultation approach was designed to gain as much feedback from study stakeholders as possible in the time available. Information was collected from key stakeholder during interviews with department personnel as well as through a tour of the existing fire station held on September 28, 2011.

Notice that the study was on-going was listed on the Township's website, with the Fire Chief's contact details provided for information requests or questions.

10.4.1 Key Stakeholder Interviews

One-on-one interviews were held with department staff. This is a component of the data collection process and is also essential to gaining feedback regarding the strengths, weaknesses, opportunities and challenges with the Uxbridge Fire Department. Interviews were held with the following persons:

- Fire Chief Scott Richardson;
- Deputy Chief of Operations & Communications Tony Peck (retired December 31, 2011);
- Deputy Chief of Training & Fire Prevention Bill Graham; and
- Fire Prevention Officer Ken Maynard.

10.4.2 Stakeholder Session with the Volunteer Firefighters

A stakeholder session was held on November 1, 2011 with the fire department's volunteer firefighters. A presentation was delivered to stakeholder group to introduce the master fire planning process. This was followed by open discussion to gather feedback from these key stakeholders regarding the strengths, weaknesses, opportunities and challenges of the fire department for consideration in the Fire Master Plan.

10.4.3 Community Information Open House

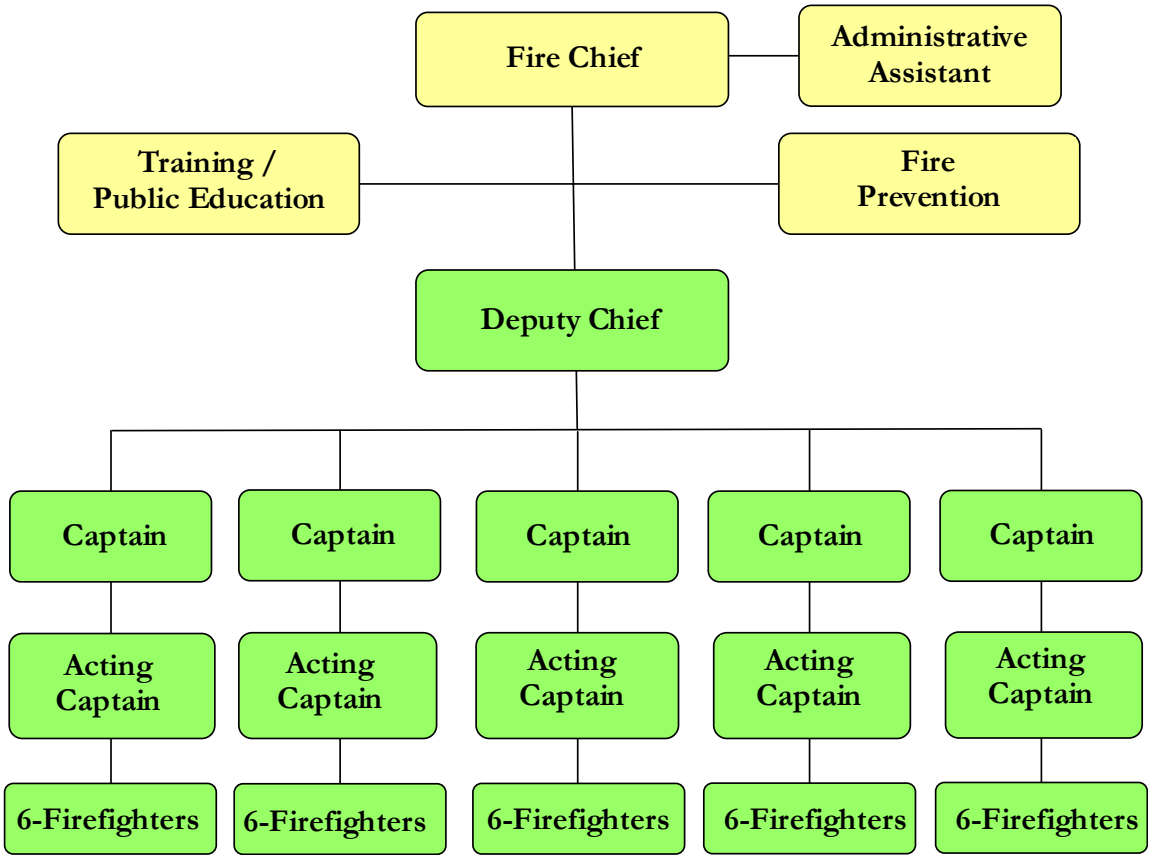
A Community Information Open House was held on April 12, 2012 to present the study to the broader public. Information was provided regarding the study purpose, background, scope, municipal responsibilities, key issues and preliminary findings. The format of the community open house included a presentation followed by a question and answer period. The public were provided with comments sheets and contact information to provide additional feedback to the study. Copies of the presentation are contained in ***Appendix C***.

11.0 SUMMARY OF RECOMMENDATIONS

11.1 Organization of the Department

Figure 11.1 summarizes the revised organizational structure and staffing levels recommended by the Fire Master Plan study.

Figure 11.1: Revised (Recommended) Department Organizational Chart



(Note: Yellow=full-time, Green=volunteer)

11.1.1 Administration Division Recommendations

- We recommend that the Community Risk Profile be maintained on a regular basis and included within the fire department annual report to Council.
- We recommend that subject to consideration of the recommendations within this report the revised Establishing and Regulating By-law be presented to Council for consideration and approval.
- We recommend that a process be implemented to review all Fire Protection Agreements on an annual basis to ensure they continue to meet the needs of the involved municipalities.
- We recommend the Fire Chief be directed to investigate alternative resources for all or some of the specialized rescue services.

- We recommend that the department formalize a Standard Operating Procedure Review Committee for the purpose of developing and maintaining a comprehensive set of standard operating procedures for the department. Priority should be given to procedures required to address Section 21 Guidance Notes.
- We recommend that the department implement a process to track the on-scene time of all arriving firefighters in order to monitor the depth of resources on scene.
- In addition to the current training records, it is recommended that a practice be established to ensure each individual personally signs-off on the completed training sessions.
- We recommend that improvements to connecting and sharing resources with the Township's network, computers and technology should be further investigated.

11.1.2 Fire Prevention and Public Education Recommendations

- Based on our review we recommend that the vacant position of full-time firefighter be reassigned as a new position of a full-time Public Education/Training Officer
- Utilizing the Community Risk Profile develop a comprehensive inspection cycle of performance measures for consideration and approval by Council. Consideration should be given to prioritizing the two lines of defence as strategic priorities of the department.
- Give consideration to enhancing the current Smoke Alarm Program to include pro-active strategies such as door-to-door campaigns, and where possible incorporate the volunteer firefighters in the delivery of this program. Where possible the Community Risk Profile should be considered in prioritizing implementation of the enhanced Smoke Alarm Program including areas of older building construction and extended emergency response travel times.
- Subject to approval of the proposed organizational structure include workspace and equipment such as a computer within the design of the new fire station.

11.1.3 Suppression Division Recommendations

- Utilizing the Community Risk Profile we recommend that emergency response protocols for occupancies identified as having high or extreme risk be developed to automatically dispatch additional fire suppression resources by implementing Fire Protection Agreements with neighbouring communities.
- We recommend that consideration be given to revising the current Dispatch Agreement to include a performance measure such as NFPA 1221.
- We recommend that the procedure of having the first responding vehicle be amended to include a minimum response of four firefighters. Tracking turnout times also should be considered a priority for the department to monitor the trend of increasing time.
- Revising the organizational structure by increasing the number of officer positions and firefighters that are available is recommended as a proactive strategy in sustaining the level of effectiveness the department has achieved. Implementing a five platoon system consisting of a Captain, Acting Captains and six firefighters on each platoon will require the addition of six additional Acting Captain positions, and the hiring of six additional volunteer firefighters.
- To initiate performance objectives for the Uxbridge Fire Department, Council should consider adopting a "performance target" for turnout times as follows:
  "Utilizing volunteer firefighters the Township of Uxbridge Fire Department will strive to achieve a Turnout Time of five minutes for the initial firefighting apparatus to all structure fires".

- In our view the Township of Uxbridge should consider implementation of a strategy to optimize the fire department response to medical calls to mitigate the current level of frustration and fatigue experienced by the volunteer firefighters while sustaining the level of medical response to the community. The recommended strategy is to direct the Fire Chief to negotiate revisions to the current Tiered Response Agreement to address the current response protocols to calls including response to care facilities such as nursing homes where medical staff is present, and where possible other components of the agreement to recognise the current impact on the volunteer firefighters.
- Recognizing the challenges with volunteer retention and daytime availability, increasing the complement of volunteer firefighters by six people is recommended to achieve a higher response overall and ultimately during normal business hours.

11.1.4 Training Division Recommendations

- A full-time staff position is recommended to be added to the department to divide duties equally between training and public education. Training support would improve the existing training programs and help to relieve some of the burden off of the volunteer staff who currently provide both training and suppression services.
- It is recommend that live fire training be included in the department's training schedule and be completed at minimum on an annual basis for all fire suppression staff.
- It is recommended that the Uxbridge Fire Department and the Township investigate opportunities for live fire training. This could include partnerships with other local fire departments in neighbouring municipalities.
- In addition to the current training records, it is recommended that a practice be established to ensure each individual personally signs-off on the completed training sessions. This practice also requires the trainer to sign the record. This is considered a best practice / due diligence to provide training evidence to authorities, such as the Ministry of Labour Ontario.

11.1.5 Apparatus and Equipment Recommendations

- A policy for apparatus maintenance procedures should be developed and implemented.
- As the department adds suppression staff to meet the proposed organizational model, considerations may be required to ensure all responding staff can be transported to the emergency scene. Staffing levels responding to calls should continue to be monitored and reviewed for staff transport constraints.
- As a result of high maintenance costs and increased time out of service, it is recommended that the department replace Pumper-Rescue 1. It is recommended that the Township consider a 55 foot or 75 foot quint for the replacement apparatus.
- It is recommended that the Township purchase a larger tanker apparatus (2500 gallons) and attain tanker-shuttle accreditation following delivery of the vehicle.
- Staffing levels responding to calls should continue to be monitored and reviewed for staff transport constraints, especially as the number of suppression staff increases to meet the new organizational model proposed.
- Recommend targeting an apparatus replacement cycle of 15 years as a front-line apparatus with an additional five years as a reserve vehicle.

- It is recommended that life cycle replacement plans be developed and incorporated into the capital budget planning process for apparatus and equipment costs.
- It is recommended that considerations for reserve apparatus be built into the capital budget and fleet replacement plan.

11.1.6 Communications Division Recommendations

- In coordination with the planning for implementation of the NextGen Regional Communications Interoperability Project consideration should be given to expanding the current Dispatch Agreement to include all functions of call taking, dispatching, and call handling.
- In coordination with the planning for implementation of the NextGen Regional Communications Interoperability Project consideration should be given to expanding the current Dispatch Agreement including the use of Computer Aided Dispatch (CAD) capabilities and Automatic Vehicle Locators (AVL) as part of the dispatch technology.
- In conjunction with Township staff a complete review of the existing information technology utilized by the fire department should be completed to assess opportunities to increase the use of technology within the department. This should include a review of existing connections to the Township network, hardware use including computers, and where possible further use of technology may provide efficiencies within the department.

12.0 IMPLEMENTATION PLAN

Recommendations resulting from this analysis were derived to form an action plan for implementation, shown in **Table 12.1.**

Table 12.1: Implementation Plan

Item	Plan Year	Description	Proposed Costs	
			Operating	Capital
1	2012-2015	NextGen Radio Upgrades		$150,000
2	2012-2015	Purchase 2500 gallon Tanker		$400,000
3	2012-2015	Hire six additional volunteer firefighters	$90,000	
4	2012-2015	Bunker gear / clothing for six additional volunteer firefighters		$15,000
5	2016-2021	Purchase Quint to replace Pumper-Rescue 1		$750,000
6	2016-2021	Update Fire Master Plan.		$25,000

APPENDIX A

Detailed Community Risk Assessment

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1.0 DETAILED COMMUNITY RISK ASSESSMENT

1.1 Property Stock

The Ontario Building Code (OBC) categorizes buildings as defined by their major occupancy classifications. Each classification has inherent definitions that distinguish it from other occupancy classifications. Utilizing the OBC as the source for defining the occupancy classifications provides a recognized definition and baseline for developing the Community Risk Profile.

The OBC major occupancy classifications are divided into six major building occupancy classifications (Groups), within each group the occupancies are furthered defined by (Division). The OBC major classification groups and divisions are presented in **Table A-1.**

Table A1: OBC Major Occupancy Classification

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	---	*Residential occupancies*
Group D	---	*Business and personal services occupancies*
Group E	---	*Mercantile occupancies*
Group F	1	*High hazard industrial occupancies*
Group F	2	*Medium hazard industrial occupancies*
Group F	3	*Low hazard industrial occupancies*

1.1.1 Community Risk Profile – Major Occupancy Classifications

The Fire Risk Sub-model developed by the Office of the Fire Marshal utilizes the major group classifications only (Group A, B, C, D, E, F). The Fire Risk Sub-model does not use the detailed "Division" classifications provided for the respective occupancy groups.

This strategy provides the ability to assess property stock within a community comparatively by major occupancy groups thus providing a consistent and recognised definition for each major occupancy type. Where necessary this strategy provides the opportunity for further analysis of a specific occupancy group for example a *Group F Industrial, that is a Division 1 - High hazard industrial occupancy.* Subject to any site specific hazards or concerns individual occupancies within this group can be assessed individually and then included where required within the scope of the broader community risk profile.

The Fire Risk Sub-model utilizes the following major occupancy classifications.

1.1.2 Assembly Occupancies (Group A)

Assembly occupancies are defined by the OBC as the "*occupancy* or the use of a *building* or part of a *building* by a gathering of persons for civic, political, travel, religious, social, educational, recreational or similar purposes or for the consumption of food or drink".

Risks within these occupancies can include:

- *overcrowding by patrons*
- *lack of patron familiarity with emergency exit locations and procedures*
- *staff training in emergency procedures*
- *large quantities of combustible furnishings and decorations*

Proactive measures for reducing risks can include:

- *regular fire prevention inspection cycles*
- *automatic fire detection and monitoring systems*
- *approved Fire Safety Plan and staff training*
- *pre-planning by fire suppression staff*

1.1.3 Care and Detention Occupancies (Group B)

A care or detention occupancy means the occupancy or use of a building or part thereof by persons who;

(a) are dependent on others to release security devices to permit exit,
(b) receive special care and treatment, or
(c) receive supervisory care.

Risks within these occupancies can include:

- *ability to evacuate or relocate patients*
- *presence of flammable/combustible gases*
- *vulnerable occupants*
- *combustible furnishings*

Proactive measures for reducing risks can include:

- *regular fire prevention inspection cycles*
- *automatic fire detection and monitoring systems*
- *approved Fire Safety Plan and staff training*
- *pre-planning by fire suppression staff*

1.1.4 Residential Occupancies (Group C)

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 there to receive medical care or treatment or who are not involuntarily detained there.

Within this occupancy classification both the Ontario Fire Code and the Ontario Building Code classify residential low-rise buildings as up to and including six stories in building height. Buildings in excess of six stories are considered as high-rise buildings. Comparatively Statistics Canada defines low-rise buildings as being less than five stories in building height and high-rise as five stories and greater.

Another example of a use within this occupancy group would be mobile homes or travel trailers. The common factor is overnight accommodation (sleeping) when an occupant can be at the highest risk.

As the primary source for data regarding community risk factors is provided by Statistics Canada this analysis utilizes the Statistics Canada definitions for residential occupancies.

Risks within these occupancies can include:

- *overnight accommodation (sleeping)*
- *combustible furnishings*
- *secondary units (basement apartments)*
- *high density*

Proactive measures for reducing risks can include:

- *Smoke Alarm Program*
- *Public Education Programming including Home Escape Planning*
- *retro-fit and compliance inspection cycles for OBC and OFC compliance*
- *pre-planning by fire suppression staff*

1.1.5 Business and Personal Services Occupancies (Group D)

Business and personal services occupancies are defined as those that are used for the transaction of business or the provision of professional or personal services.

These occupancies can be located within remodelled single family dwellings, low-rise and high-rise buildings. Each of these building types can present different risks including egress for firefighting operations and evacuation by occupants.

Risks within these occupancies can include:

- *high volume of occupants*
- *high combustible loading*
- *specialized equipment utilizing high risk substances such as radiation*
- *consumers unfamiliar with emergency exits and procedures*

Proactive measures for reducing risks can include:

- *regular fire prevention inspection cycles*
- *staff training in fire prevention and evacuation*
- *public education*

- *pre-planning by fire suppression staff*

1.1.6 Mercantile Occupancies (Group E)

This occupancy is defined as one that is used for the displaying or selling of retail goods, wares, and merchandise.

These occupancies range in size and potential risk from smaller neighbourhood corner stores to the large "big box" industrial style buildings that survive on the sale of large volume. Large volumes of combustibles are typically present in all applications.

Risks within these occupancies can include:

- *high volume of occupants/staff*
- *high volume of combustible loading/high rack storage*
- *lack of occupant familiarity with emergency exit locations and procedures*
- *size of building*

Proactive measures for reducing risks can include:

- *regular fire prevention inspection cycles*
- *automatic fire detection and monitoring systems*
- *approved Fire Safety Plan and staff training*
- *pre-planning by fire suppression staff*

1.1.7 High/Medium/Low Hazard Industrial Occupancies (Group F)

Industrial occupancies are defines as those used for the assembly, fabrication, 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 potential for rapid fire growth.

The potential for major fires within this occupancy type is related to the high levels of combustibles that are present in storage and utilized in the manufacturing process. This can include highly flammable and corrosive products.

Risks within these occupancies can include:

- *large dollar loss as a result of a major fire*
- *economic loss in the event of plant shut downs and job loss*
- *environmental impacts*
- *presence of ignition sources related to processing activities*

Proactive measures for reducing risks can include:

- *regular fire prevention inspection cycles*
- *staff training in fire prevention and evacuation*
- *public education*
- *pre-planning by fire suppression staff*

1.1.8 Other Occupancies/Uses not listed within the OBC (Not Classified)

There are other occupancies and uses not included within the OBC major building occupancy classifications that should be considered as part of developing the Community Risk Profile. These include occupancies that may be regulated under other legislation such as Federal owned facilities.

Examples of these include;

- *major railway lines*
- *major highways and transportation corridors*
- *outdoor tire storage facilities*
- *farm buildings*

1.1.9 Property Stock Analysis

Utilizing the property stock classifications contained within the Fire Risk Sub-model **Table A2** provides a summary of the property stock within the Town of Uxbridge.

Table A2: Property Stock Profile Town of Uxbridge

Occupancy Classification (OBC)	Occupancy Definition Fire Risk Sub-model (OFM)	Number of Occupancies	Percentage of Occupancies
Group A – Assembly	*Assembly occupancies*	79	1.0%
Group B - Institutional	*Care or Detention occupancies*	7	0.1%
Group C - Residential	*Residential occupancies*	6,655	84.0%
Group D - Business	*Business and Personal Services Occupancies*	74	0.9%
Group E - Mercantile	*Mercantile occupancies*	75	0.9%
Group F - Industrial	*Industrial occupancies*	87	1.3%
Other occupancies	*Not classified within the Ontario Building Code (i.e. farm buildings)*	946	11.8%
Totals		7,923	100%

The majority (84.0%) of the Township of Uxbridge property stock is Group C residential. The second largest percentage of property stock (11.8%) consists of other occupancies not classified within the Ontario Building Code.

This particular analysis confirms that as a community the Township of Uxbridge is primarily a "bedroom community" for many of the large urban centres in the Greater Toronto Area (GTA). Agriculture is also very prevalent throughout the Township, including dairy, beef, hog, sheep, poultry and cash crop operations. Farm buildings (not classified within the OBC) vary in size and use from small utility sheds to large livestock barns.

The Township's other major occupancies include industries such as metal fabricating, plastic automobile parts, concrete manufacturing and agricultural related products. Commercial occupancies are located within the downtown core, however most new commercial development is occurring outside of this area.

Residential occupancies include both commercial/residential mixed used buildings located within the downtown core, a small number of low-rise and high-rise apartment buildings, several seniors' orientated complexes and extended care facilities, a 320 site trailer park and a mix of typical single family dwellings.

1.1.10 Property Stock Profile Observations

The analysis of the Property Stock Profile for the Town of Uxbridge confirms that the largest percentage of major occupancies 84.0% is "Group C" residential. The "Group C" residential occupancies, which also include the life safety risk, of overnight accommodation (sleeping) represent a total of 6,655 potential occupancy locations.

The second largest percentage of 11.8% consists of occupancies that are not classified within the Ontario Building Code. This is consistent with the large rural area of the Township that contains many original farms and related buildings such as barns and implements storage buildings.

The Property Stock Profile confirms that the Town consists of primarily residential occupancies a historic town core of commercial/residential occupancies. There are a limited number of industrial occupancies; three within the defined urban area, the remaining number are located outside of the urban core.

1.2 Building Height and Area

Buildings that are taller in height, or contain a large amount of square footage (footprint) can have a greater fire loss risk and life safety concern.

1.2.1 Building Height

One of the unique characteristics and risks of taller buildings (multiple stories) is defined as the "stack effect". Air movement that occurs vertically throughout the building caused by air into and out of the building due to buoyancy caused by indoor/outdoor temperature and elevation differences can have a dramatic effect on smoke permeation throughout 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 is also the presence of higher occupant loads and fuel loads due to the quantity of furnishings. Evacuation can be a challenging process due to a lack of direction and knowledge of the occupants resulting in overcrowding of stairways and exit routes.

There are a limited number of residential high-rise buildings within the Town. A total of five (5) buildings of this profile exist. These buildings are primarily occupied by senior residents that are a vulnerable demographic.

Ensuring all required life safety systems are in place and functioning is a priority for these occupancies. Taller buildings can cause extended response times for firefighters to ascend to the upper levels. Options such as "shelter-in-place" where by occupants are directed by the Fire Department to stay within their unit can be an effective strategy. Ensuring internal building communications systems are in place and functioning is critical to the success of this strategy.

1.2.2 Building Area

In contrast to building height, building area can cause similar 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 the new "big box" stores can 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 cause additional risk to firefighter safety due to collapse.

The Town has a small number of large industrial/commercial/mixed-use buildings. For example, the Herman Laue Spices facility located at 119 Franklin Street, is a very large building in terms of square footage, however, the contents of the building are considered a low hazard in terms of a combustible load. Other examples of buildings with large areas and potential fire loss risk include:

- L.B. Moore Trailers, large combustible building, welding and cutting of metal
- Kott Lumber, large volume of wood product storage
- Win-Rock Insulation, storage and distribution of drywall and construction products
- Ram Forest Products, milling of rough lumber, indoor lumber storage

The Town also has a historic downtown core consisting of multi-unit buildings containing mixed-use occupancies as defined by the OBC. Many of these include residential units above commercial stores located on the ground floor. In terms of building height these buildings would not be considered high in terms of risk, however, in terms of area these buildings cover large portions of the core area of the Town.

1.2.3 Building Height and Area Observations

The analysis of the buildings within the Town in regards to height and area represent a minimal number of buildings in excess of five stories. This includes all occupancy classifications. There are also a limited number of large (square footage) buildings with the exception of the historic downtown core. The multi-use occupancies of these downtown core buildings in addition to their large coverage area represent a potentially significant fire loss risk and life safety risk do to the presence of residential occupancies above many of the commercial occupancies.

1.3 Building Age and Construction

As a community the Town of Uxbridge began to develop during the late 1800's. Many of the older buildings within the downtown core have historic ties to this era. As the community has grown the large majority of new construction has occurred outside of the downtown core. This includes both commercial and residential growth.

1.3.1 Building/Fire Code Application

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

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

- *occupancy*
- *exits/means of egress including signs and lighting*
- *fire alarm and detection equipment*
- *fire department access*
- *inspection, testing, and maintenance*

In 1983 the OFC was further expanded to include retrofit requirements for many of the building constructed prior to adoption of the code. Retrofit requirements were established to ensure a minimum acceptable level of life safety is present. A number of occupancy types are included within the retrofit requirements including assembly, boarding, lodging and rooming houses, health care facilities, multi-unit residential, two-unit residential, and hotels.

1.3.2 Residential Buildings

Ontario residential buildings have historically accounted for approximately 70% of all structural fires and 90% of the total fire deaths. Together single family dwellings including detached, semi-detached and attached homes and low-rise/high-rise buildings have accounted for 85% of the total residential fires and deaths.

These facts make understanding the age and construction of a community's residential building stock an important component of developing a Community Risk Profile.

The Town of Uxbridge's residential building structural dwelling type are summarized in ***Table A3.***

Table A3: Residential Structural Dwelling Type

Structural Dwelling Type	Town of Uxbridge	% of Units	Ontario	% of Units
Single-Detached House	5,555	83.47	2,551,760	56.03
Semi-Detached House	105	1.57	260,170	5.71
Row House	270	4.05	358,495	7.87
Apartment-Duplex	105	1.57	158,755	3.48
Apartment-more than 5 Stories	10	0.15	710,785	15.60
Apartment-less than 5 Stories	610	9.16	490,355	10.77
Other single-attached House	10	0.15	11,725	0.25
Movable Dwelling	5	0.08	12,200	0.26
Total	6,655	100	4,554,255	100

In comparison to the provincial data the Town of Uxbridge percentage of single-detached housing of 83.47% represents a significantly larger component of the residential dwelling types that that of the province at 56.03%. Apartments with less than five stories are the second highest percentage of residential dwellings at 9.16% which is relatively comparable to the provincial data of 10.77%.

This analysis of residential dwelling types also indicates that the Town of Uxbridge percentage of apartments with more than five stories of 0.15% is significantly lower than the provincial data of 15.60%.

Historical data provided by the Office of the Fire Marshal indicates that fires in single-detached dwellings are responsible for nearly two thirds of all residential fires. The data further indicates that detached homes generally account for 80% of all single-family dwelling fires, with semi-detached and attached homes evenly contributing the remaining 20%.

The Town of Uxbridge's residential buildings age are summarized in ***Table A4.***

Table A4: Age of Construction

Period of Construction	Town of Uxbridge	% of Units	Ontario	% of Units
Prior to 1946	1,155	17.36	677,875	14.88
1946 to 1960	510	7.66	690,155	15.15
1961 to 1970	715	10.74	640,660	14.06
1971 to 1980	865	13.00	776,745	17.05
1981 to 1985	505	7.59	338,575	7.43
1986 to 1990	720	10.82	410,160	9.01
1991 to 1995	540	8.11	291,480	6.40
1996 to 2000	655	9.84	312,215	6.86
2001 to 2006	995	14.95	417,165	9.16
Total	6,655	100	4,554,255	100

An important component of this analysis is the percentage of residential buildings built prior to the adoption of the Ontario Fire Code in 1981. Table 1.3 indicates that 48.76% of the Town of Uxbridge's residential buildings were built prior to 1981 in comparison to 61.44% of those in Ontario.

In relation to the OFC the Town of Uxbridge has a relatively newer percentage of residential dwelling buildings than that of the province12.68% more have been built since 1981.

During the late 19th century and early 20the century's balloon frame construction was a common framing technique used in both residential and small commercial construction. This technique permitted the spread of fire and smoke to move rapidly from the lower floors to upper floors and the roof level. Understanding the age of construction of dwellings can assist in determining if balloon framing may have been utilised.

Modern construction techniques have introduced the use of platform construction whereby each level is built as a component of the overall structure. This technique in addition to the use of fire stops has reduced the extension of fire and smoke by creating horizontal barriers.

1.3.3 Building Age and Construction Observations

As a community the current building stock of the Town is representative of a small urban settlement area that has grown over the past century to the current mixed use urban/rural community.

Residential single-detached housing units represent 83.47% of the 6,655 residential dwelling structures. 48.76% of the residential building stock was built prior to adoption of the Ontario Fire Code in 1981.

The majority of the residential building stock is of newer construction technology including flame retardant materials and construction techniques. Buildings within the downtown core represent the highest fire loss risk due to age and construction.

1.4 Building Exposures

Closely spaced buildings, typical of historic downtown core areas, and newer infill construction, have a higher risk of a fire propagating (fire spreading to an adjacent exposed building). A fire originating in one building could easily be transferred to neighbouring structures due to the close proximity. The close proximity of buildings can also impede firefighting operations due to the limited access for firefighters and equipment.

Adoption of the OBC and the OFC has required spatial separations and the use of fire retardant materials and constructions methods to reduce the fire risks. In addition to the construction and planning requirements within the respective codes, basic firefighting practices consider the protection of exposures as a primary function and consideration in the event of a response by the fire department.

1.4.1 Building Exposures Observations

The risk of exposures as a result of a fire can occur in incidents involving buildings that are in compliance with current OBC and OFC requirements as well as those that may have been constructed prior to these public safety initiatives.

As the majority of the building stock within the Town of Uxbridge has been constructed utilizing the applicable code requirements the probability of a fire spreading to involve other exposures is limited.

The age and construction of the buildings within the downtown core present the most significant risk for fire spread both internally and to adjacent buildings due to the close proximity and combustible construction of many of these buildings.

1.5 Demographic Profile

In terms of demographic profile with regard to developing a community risk profile it is important to understand a number of key factors related to residents of the community. Assessing these factors in relation to provincial statistics is an effective tool in understanding where there may be vulnerable groups in terms of fire or life risk, or barriers such as language that could affect communication of public education programs. The key factors within the demographic profile include:

- Population Distribution by Age Group
- Population Shifts
- Vulnerable Individuals or Occupancies
- Language Barriers to Public Education
- Income level

1.5.1 Population Distribution by Age Group

Within Canada our aging population has been recognised as one of the most significant demographic trends. Based on current data it is predicted that by the year 2026, one in every five Canadians will have reached the age 65. Seniors, those 65 and above represent one of the highest fire risk target groups in Ontario.

Information provided by the Office of the Fire Marshal indicates that "*between 2000 and 2004 the leading cause of senior (aged 65 and over) fire deaths were attributed to "open flame tools/smoker's articles" and "cooking equipment". These ignition sources were responsible for 35% and 10% respectfully of fire deaths for this age category during this period. It is believed that the decline in cognitive and physical abilities contributes to the frequency of fire incidents relating to careless use of these ignition sources".*

Identifying a community's population by age category is a core component of developing the Community Risk Profile and identifying specific measures that may be required to mitigate risks associated with a specific age group such as seniors.

Table A5 provides a comparison of the Township's population by age group to that of the provincial statistics according to the 2011 census from Statistics Canada.

Table A5: Age Group

Age Characteristics of the Population	Uxbridge[1]		Ontario[2]	
	Total	% Total	Total	% Total
Total population	20,623	-	12,851,820	-
0 to 4 years	900	4.4%	704,260	5.5%
5 to 9 years	1,160	5.6%	712,755	5.5%
10 to 14 years	1,480	7.2%	763,755	5.9%
15 to 19 years	1,700	8.2%	863,635	6.7%
20 to 24 years	1,270	6.2%	852,910	6.6%
25 to 44 years	4,065	19.7%	3,383,895	26.3%
45 to 54 years	4,060	19.7%	2,062,020	16.0%
55 to 64 years	2,830	13.7%	1,630,275	12.7%
65 to 74 years	1,670	8.1%	1,004,265	7.8%
75 to 84 years	1,090	5.3%	627,660	4.9%
85 years and over	395	1.9%	246,400	1.9%
Median age of the population	44.0	-	40.0	-
Population aged 14 and under	3,540	17.2%	2,180,770	17.0%
Population aged 65 and over	3,155	15.3%	1,878,325	14.6%
Statistics Canada, Census Data (2011)				

[1] Source: *Statistics Canada - 2011 Census Data*

[2] Source: *Statistics Canada - 2011 Census Data*

This comparison indicates that the age characteristics of the population within the Town are relatively consistent with that of the province. This is particularly important when comparing the number of deaths as a result of a fire. As indicated in **Table A6** below, prepared utilizing information from the Office of the Fire Marshal's review of Ontario Fatal Fire during the ten year period from 2001 to 2010 (*revised October 2011*) although no particular age group stands out as more at risk, when the number of fatalities per million population is calculated, the seniors age group (65 and above) are at the greatest risk of fire death compared to other age groups.

Table A6: Provincial % of Fire Fatalities by Age Group

Age Characteristics of the Population	% of Age Group
0 to 10 years	8%
10 to 19 years	6%
20 to 29 years	6%
30 to 39 years	10%
40 to 49 years	19%
50 to 59 years	14%
60 to 69 years	12%
70 to 79 years	13%
80+ years	12%

As indicated by the Provincial data, seniors tend to be more at risk. In comparison, the senior's population of the Town of Uxbridge as a percentage of the overall population is similar to that of the provincial data. The property stock profile also identifies that a large portion of the seniors population reside within the high-rise apartment buildings, several seniors' orientated complexes and extended care facilities.

1.5.2 Population Shifts

The population within a community can shift at various times during the day or week and throughout the year. This can be as a result of residents that are required to leave the community to seek employment vs. having employment opportunities within the community. Other examples can include tourist and vacation destinations within a community. Large population shifts can occur during summer months as a direct result of these activities being available within a community.

Communities that are home to educational institutions such as colleges and universities can have a different population shift during the fall and winter months when students are attending school and living with residence.

In both instances the increased risk due to overnight accommodation (sleeping) either in a trailer/hotel/or school residence can be a major factor which can impact the demand for fire protection services.

1.5.3 Vulnerable Individuals or Occupancies

Identifying the location and number of vulnerable individuals, or occupancies within the community will provide insight into the magnitude of this particular demographic within a community. This demographic is typically defined as requiring some type of assistance due to physical/cognitive limitations, disabilities, drug or alcohol use and others that may require assistance to evacuate in the event of a fire.

Occupancies that should be considered when assessing this demographic include hospitals, senior's apartments, group homes, rooming houses, residential care facilities, daycare centres and long-term care facilities.

Table A7: Occupancies where Individuals 65 Years of Age and Over Reside

Occupancy	# of Residents
Aberdeen Place Condominiums	29 residents
Brookside Apartments	44 residents
Group Homes (3)	5 residents in each residence
Mossbank Condominiums	73 residents
Shobrook Gardens Condominiums	80 residents
Testa Apartments	168 residents
Trinity Manor Apartments	44 residents
Uxbridge Cottage Hospital	30 beds
Reach View Nursing Home	100 residents

1.5.4 Language Barriers to Public Education

Cultural diversity and ethnic background can be factor that fire departments must 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 can have an impact of the success of these programs. **Table A8** provides a breakdown of the ethnic background of residents within the Township based on the 2006 Statistics Canada census information.

Table A8: Ethnic Background

Language	Uxbridge		Ontario[3]	
	Total	% Total	Total	% Total
Total population	**19,155**	-	**12,028,895**	-
English	17,795	92.9%	8,230,705	68.4%
French	155	0.8%	488,815	4.1%
Italian	170	0.9%	282,750	2.4%
German	245	1.3%	158,000	1.3%
Polish	50	0.3%	140,890	1.2%
Spanish	40	0.2%	160,275	1.3%
Portuguese	30	0.2%	155,310	1.3%
Arabic	20	0.1%	114,730	1.0%
Dutch	150	0.8%	68,180	0.6%
Tagalog (Pilipino)	10	0.1%	117,365	1.0%

[3] Source: *Statistics Canada - 2006 Census Data*

Language	Uxbridge		Ontario[3]	
	Total	% Total	Total	% Total
Other non-official languages	415	2.2%	1,936,545	16.1%
Multiple responses	80	0.4%	175,335	1.5%

English is the largest majority of the population (93%) indicating that although there may be occasions where a language barrier may be present, the probability of a problem is quite minor in comparison to otter more diverse communities.

1.5.5 Income Levels

Table A9 summarizes household data from the 2006 Census from Statistics Canada. Uxbridge, as a Township, has a higher population density than the province. Uxbridge also has a higher median income and a higher average value of owned dwellings than the provincial average. A higher percentage of Uxbridge is owned dwellings, rather than rented dwellings, compared to the provincial statistics.

Table A9: 2006 Household Data

Census Characteristic	Uxbridge	Ontario
Population Density	45.6	13.4
Median Income (all private households)	$80,455	$60,455
Average Value of Owned Dwelling	$400,647	$297,479
Total # of Dwellings Owned	6,660	4,547,785
% Owned Dwellings	86%	71%
% Rented Dwellings	14%	28%

1.5.6 Demographic Profile Observations

The demographic analysis of Uxbridge indicates that by age category the Town is very representative of the provincial statistics. Seniors as a component of the population are also reflective of the provincial statistics and as such should be consider a vulnerable component of the population. There are a number of buildings identified where the vulnerable demographic of the community reside, these buildings should be considered on an individual basis with regard to the level of risk assigned do to the vulnerability of the residents.

As a community Uxbridge has some shift in population during the summer months as people vacation and enjoy the wide range of community events and attractions. The ethnic background of the population is largely English and as such should present minimal challenges in providing fire prevention and public education programming.

In general income levels and the percentage of home ownership are higher than that of the provincial averages, this would be considered consistent given the nature of the community.

1.6 Geography / Topography / Road Infrastructure

Located approximately 65km northeast of Toronto and within the Regional Municipality of Durham, the Township of Uxbridge has the third largest geographic area of the eight municipalities within the Region (421 square miles). The Township also has the smallest population.

A large portion of the Township's population is centered in the community of Uxbridge downtown core (suburban area). The remainder of the Township's population is interwoven into the rural areas and surrounding natural heritage system, including streams, wetlands, forested areas, trail systems, open space, parkland and areas of significant wildlife habitat. Approximately forty-five (45) percent of the Township geography is located within the Oak Ridges Moraine which extends over 160 kilometers across the most populated area of Ontario. As a remnant of the last ice age the moraine continues to provide clean, safe drinking water to private and municipal wells. The Township has committed its support to the protection of the moraine through both regional and local planning documents.

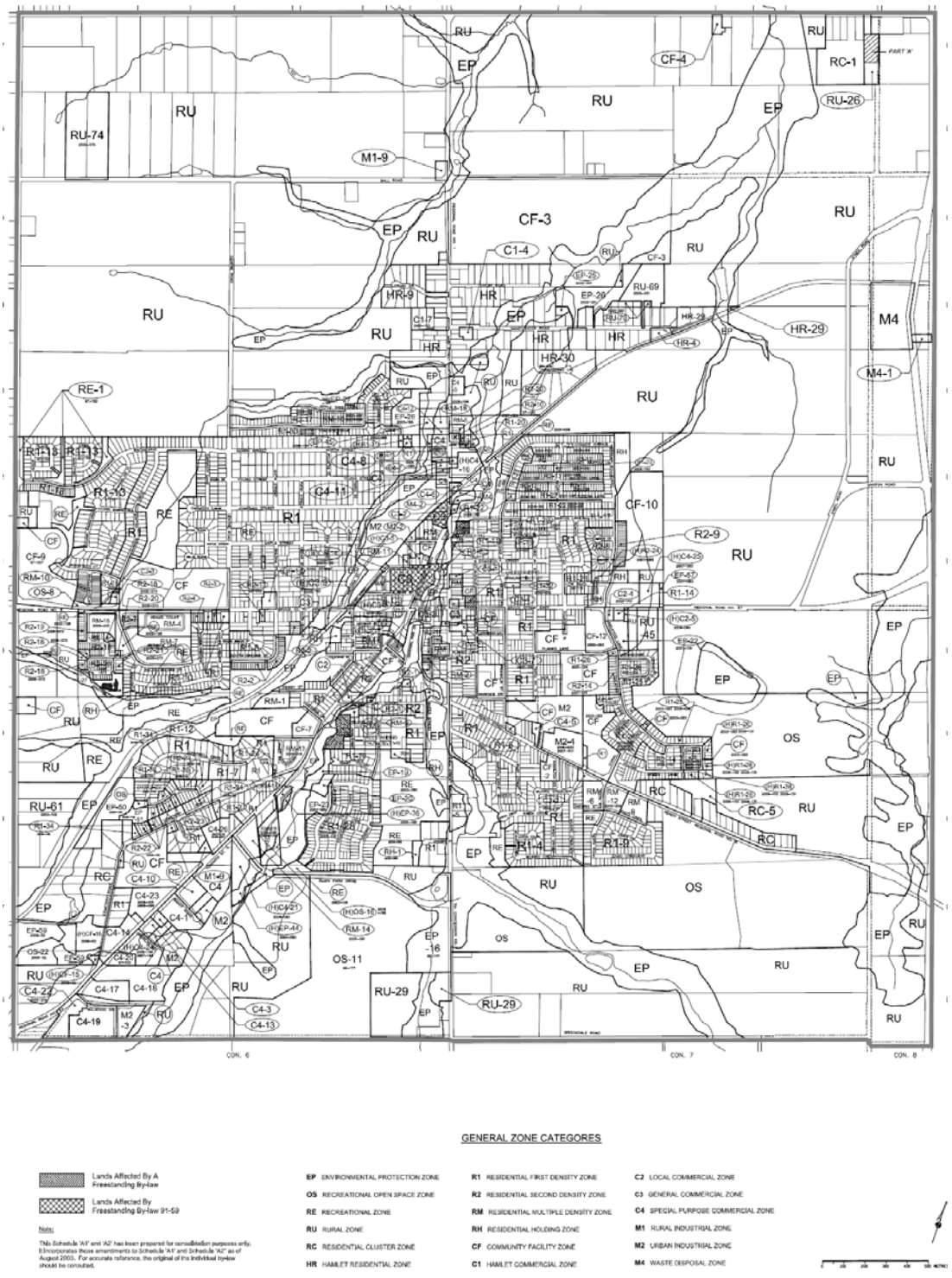
The Township has also identified Environmental Constraint Areas. There are lands which are considered to be unsafe for development due to natural risk or susceptibility, such as flooding or erosion and those lands being protected for specific wildlife habitat. Future development is restricted in these areas.

The core developable area, existing suburban community and the environmentally restricted areas are shown in the Township's zoning map included below in **Figure A1**.

Public transportation is available from the provincially operated GO Transit System (buses currently, with plans for rail service in the future) as well as the Durham Regional Transit (DRT) System via hourly bus service.

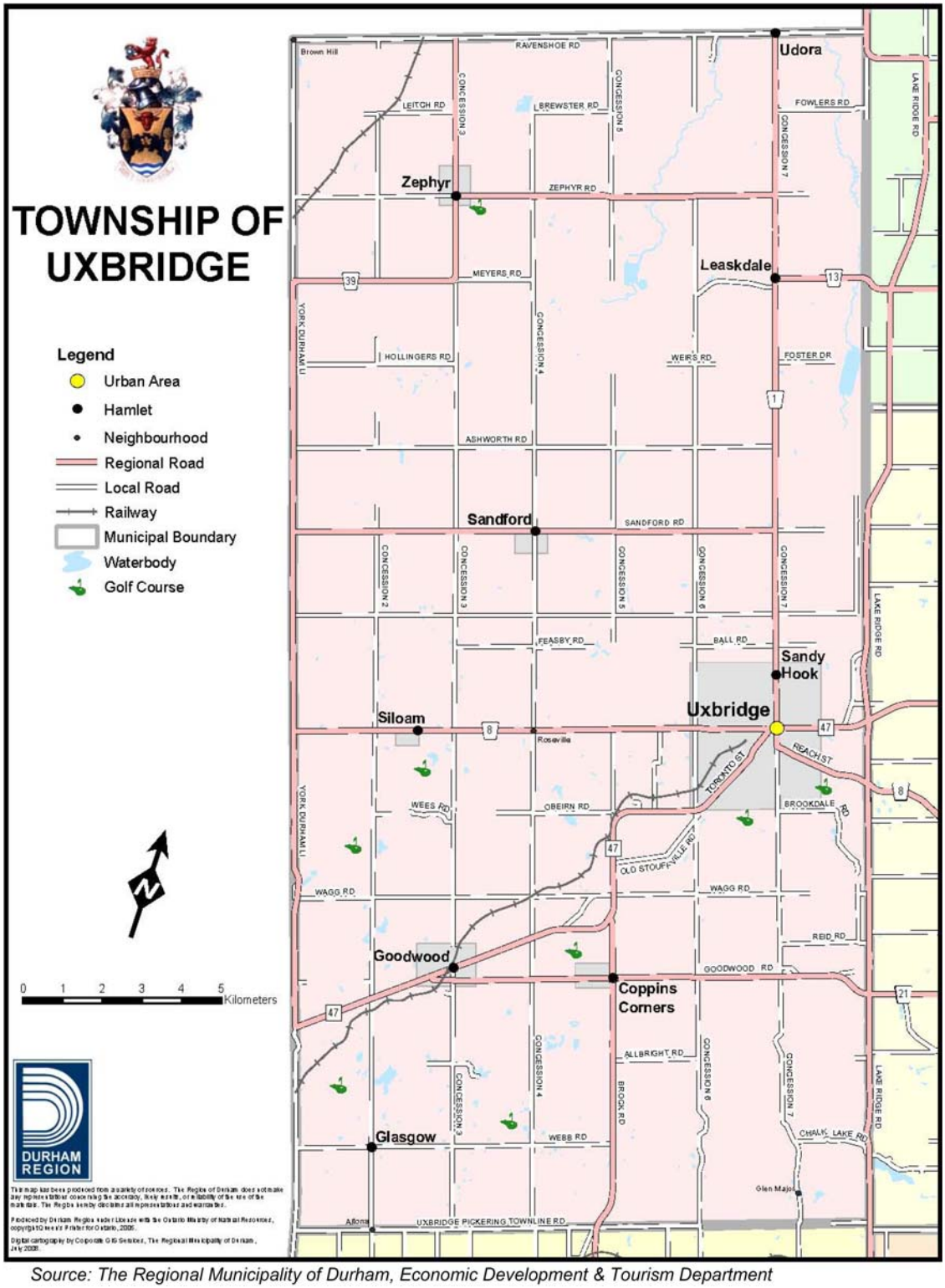
The road network within the community consists of primarily two lane rural profile infrastructure. Areas within the downtown core and the newer commercial growth districts have a more modern two and four lane profile including storm sewers and sidewalks. The Township and its population centres are well-served by a number of north-south and east-west Regional (arterial) roadways. The existing road network and the population centres (urban areas, hamlets and neighbourhoods) are depicted below in **Figure A2.**

Figure A1: Existing Township Zoning Map



(Source: Township of Uxbridge Consolidated Zoning Bylaw)

Figure A2: Township of Uxbridge Road Network and Population Centres



Source: The Regional Municipality of Durham, Economic Development & Tourism Department

No significant changes to the road infrastructure are identified at the time of this study by the Township. Any new development areas are required to provide a modified grid pattern or other designs which facilitate continuity and connectivity to the existing community. This is supportive of effective emergency response as well.

1.6.1 Geography/Topography/Road Infrastructure Profile Observations

The risks associated with the geography, topography and road infrastructure within the Township are predominantly those associated with the large overall size of the municipality and the rural residential areas located outside of the built-up communities. This typically means longer response times from the fire station, centred in the urban centre of the community, out to the rural homes in the surrounding areas. The road network layout is primarily a grid pattern of arterial rural roads and local roads which provide access to these rural residential locations. The population centres within the Township, including the main urban area, hamlets and neighbourhoods are well served and connected by the road network.

1.7 Past Fire Loss Statistics

Identifying and understanding trends through the analysis of historical data provides valuable insight into community's specific trends. 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.

1.7.1 Fire Loss by Occupancy Classification

For the period from 2006 to 2010 there were 67,028 fires within Ontario with a loss reported to the OFM. During this period 62.2% or 41,700 of these involved a structure and 37.8% or 25,328 of these fires involved a vehicle.

Table A10 indicates the provincial fire loss by property classification for the period 2006 to 2010.

Table A10: Provincial Fire Loss by Occupancy Classification
Period 2006 to 2010

Occupancy Classification (OBC)	Occupancy Definition Fire Risk Sub-model (OFM)	Ontario Fire Loss by Occupancy Classification
Group A – Assembly	*Assembly occupancies*	5%
Group B - Institutional	*Care or Detention occupancies*	1%
Group C - Residential	*Residential occupancies*	72%
Group D - Business	*Business and Personal Services Occupancies*	3%
Group E - Mercantile	*Mercantile occupancies*	4%
Group F - Industrial	*Industrial occupancies*	8%
Other occupancies	*Not classified within the Ontario Building Code (i.e. farm buildings)*	7%
Reported fires	*Reported structure fires*	41,700

For this period 72% of the fires with a loss occurred within a Group C residential occupancy.

In comparison to the provincial analysis the Township of Uxbridge property loss as a result of fires is presented in **Table A11** below. For the same period the analysis indicates that 75.5% of the fires reporting a loss occurred in Group C residential occupancies.

In comparison to the provincial statistics the Township of Uxbridge had a slightly higher percentage of fires within the Group F Industrial occupancy classification.

Table A11: Township of Uxbridge Fire Loss by Property Classification
Period 2006 to 2010

Occupancy Classification (OBC)	Occupancy Definition Fire Risk Sub-model (OFM)	Township of Uxbridge Fire Loss by Occupancy Classification
Group A – Assembly	*Assembly occupancies*	1.9%
Group B - Institutional	*Care or Detention occupancies*	3. 8%
Group C - Residential	*Residential occupancies*	75. 5%
Group D - Business	*Business and Personal Services Occupancies*	3. 8%
Group E - Mercantile	*Mercantile occupancies*	1.9%
Group F - Industrial	*Industrial occupancies*	11.3%
Other occupancies	*Not classified within the Ontario Building Code (i.e. farm buildings)*	1.9%
Reported fires	*excluding buildings under National Farm Building code (7 fires)*	53

1.7.2 Reported Fire Cause

Assessing the possible cause of the fires reported is an important factor in identifying any potential trends, or areas that may be considered for introducing additional public education of fire prevention initiatives as part of the community fire protection plan.

Table A12 provides a summary of the reported possible cause of the 53 fires reported during the period 2006 to 2010 for the Township of Uxbridge. (OFM data for Uxbridge)

Table A12: Township of Uxbridge 2006 to 2010 Reported Fire Cause

		Number of Fires	% of Cause
Intentional	Vandalism	0	0.0%
Unintentional	Children Playing	1	1.7%
Unintentional	Design/Construction maintenance deficiency	19	31.7%
Unintentional	Mechanical /Electrical failure	9	15.0%
Unintentional	Misuse of ignition source	12	20.00%
Unintentional	Other unintentional	4	6.6%
Unintentional	Undetermined	3	5.0%
Other	Other	3	5.0%
Undetermined	Undetermined	9	15.0%
Total number of fires and percentage		60	100%

There are four categories of cause utilized to classify the cause of a fire. These include intentional, unintentional, other, and undetermined.

The "intentional" category recognises the cause of a fire to be started for a specific reason. These are typically classified as arson fires, and for example can be related to acts of vandalism, or to achieve personal gain through insurance payment. As the analysis shows there were no fires reported with this cause for this period.

The "unintentional" category recognises a number of the common causes of a fire that represent both human behavioural causes such as playing with matches, and equipment failures such as a mechanical failure. Unintentional design/construction deficiencies represent 31.7% of the cause for the 60 fires during this period.

The cumulative percentage of "*unintentional–other intentional (6.6%), unintentional-undetermined (5.0%), other-other (5.0%) and undetermined-undetermined (15.0%)"* represent a total of 31.6% of all fire causes. This indicates that there was no specific cause identified for approximately one-third of all fires during this period.

1.7.3 Reported Ignition Source

Table A13 similarly provides the reported ignition source for the 60 fires that occurred during the period 2006 to 2010. (OFM data for Uxbridge).

Table A13: Township of Uxbridge

2006 to 2010 Ignition Source Class

Reported Ignition Source	Number of Fires	% of Cause
Appliances	6	10.0%
Cooking equipment	3	5.0%
Electrical distribution	8	13.3%
Heating equipment chimney etc.	14	23.3%
Lighting equipment	1	1.6%
Open flame tools/smokers articles	10	16.6%
Other electrical/mechanical	2	3.3%
Processing equipment	1	1.6%
Miscellaneous	5	8.3%
Exposure	2	3.3%
Undetermined	8	13.3
Total number of fires and percentage	60	100%

Heating equipment, including chimneys, woodstoves, fireplaces represent the largest percentage 23.3% of ignition sources for fires during this period. Open flames typically related to the improper disposal of cigarettes or misuse of candles represented 16.6% the second largest percentage of ignition sources.

1.7.4 Reported Injuries and Fatalities

Table A14 indicates the number of fire related injuries and fatalities that occurred within the Township of Uxbridge during the period 2008 to 2010.

Table A14: Township of Uxbridge
2006 to 2010 Reported Injuries and Fire Deaths

Occupancy Classification (OBC)	Occupancy Definition Fire Risk Sub-model (OFM)	Injuries	Fatalities
Group A – Assembly	*Assembly occupancies*	0	0
Group B - Institutional	*Care or Detention occupancies*	0	0
Group C - Residential	*Residential occupancies*	0	1
Group D - Business	*Business and Personal Services Occupancies*	0	0
Group E - Mercantile	*Mercantile occupancies*	0	0
Group F - Industrial	*Industrial occupancies*	0	0
Other occupancies	*Not classified within the Ontario Building Code (i.e. farm buildings)*	0	0

During this period there was only one reported fatality as a result of a fire in a Group C residential occupancy that occurred in 2010. There were no reported injuries to firefighters or civilians during this period.

1.7.5 Past Fire Loss Profile Observations

Based on the historical data for the period 2006 to 2010 the Township of Uxbridge experienced the highest rate of fires within the Group C residential occupancies. This result is consistent with that of the provincial profile.

Unintentional design/construction deficiencies representing 31.7% and unintentional misuse of ignition source 20.0% were the leading causes for fires during this period. The cumulative percentage of fire causes that could not be determined represented 31.6% of the 60 fires reported during this period.

Heating equipment 23.3% and open flames 16.6% represented the two leading ignition sources of the 60 fires reported during this period.

The only fatality as a result of a fire during this period occurred within a Group C residential occupancy.

1.8 Fuel Load Profile

Fuel load typically refers to the amount and nature of combustible content and materials within a building. This can include combustible contents, interior finishes as well as structural materials. Combustible content tends to create the greatest potential fire loss risk. This can include industrial materials, commercial materials or typical office furnishings. Higher fuel loads results in increased fire loss risk due to increased opportunity for ignition and increased fire severity.

Fuel load is site specific to an individual building or structure. The following list of buildings has been identified by the Fire Department as having either a large volume of fuel load, or alternatively a higher risk of fuel load that could impact the result of a fire.

Table A15: Fuel Load Site Specific Buildings/Structures

Building/Structure	Fuel Load Identified
Pine Valley Packaging	Large volume combustible plastic storage
Kott Lumber	Large volume wood product storage
Reesor Seed & Grain	Large volume agricultural products
Ram Forest Products	Large volume wood products
Trudel Roofing	Large volume combustible roofing materials
Butler & Baird	Large volume wood storage
H.H. Good Feeds	Large volume of fertilizer storage
Choko Motorsports	Large volume combustible clothing storage
St. Lawrence Farm Supplies	Large volume chemical storage

1.8.1 Fuel Load Profile Observations

In comparison to the number of buildings within the Township of Uxbridge there are a small number of buildings identified as having a site specific fuel load concern. In addition to ensuring compliance to the requirements of the OBC and the OFC there are operational strategies that a fire department can implement to address fuel load concerns. For example pre-planning a building of this nature can provide an operational advantage in the event of fire.

1.9 Community Growth & Development

1.9.1 Historic Growth

Table A16: Historic Growth in Population and Households

Year	Uxbridge Population	% Change in Population	Uxbridge Population by Household	% Change in Households
1976	10,977	-	3,175	-
1981	11,207	2.1%	3,505	10.4%
1986	11,895	6.1%	3,875	10.6%
1991	14,092	18.5%	4,730	22.1%
1996	15,882	12.7%	5,380	13.7%
2001	17,377	9.4%	5,900	9.7%
2006	19,169	10.3%	6,655	12.8%
2011	20,623	7.6%	7,345	10.3%

1.9.2 Growth Projections

Table A17 summarizes the growth projections for the Township from 2006 to 2031.

Table A17: Population and Employment Growth Projections

Year	2006	2011	2016	2021	2026	2031
Population	19,165	20,940	22,545	23,740	25,570	26,965
Households	6,660	7,610	8,095	8,940	9,850	10,650
Employment	5,610	6,060	6,950	7,995	8,565	8,970

Source: Durham Region Official Plan Amendment No. 128, Adopted by Regional Council June 3, 2009

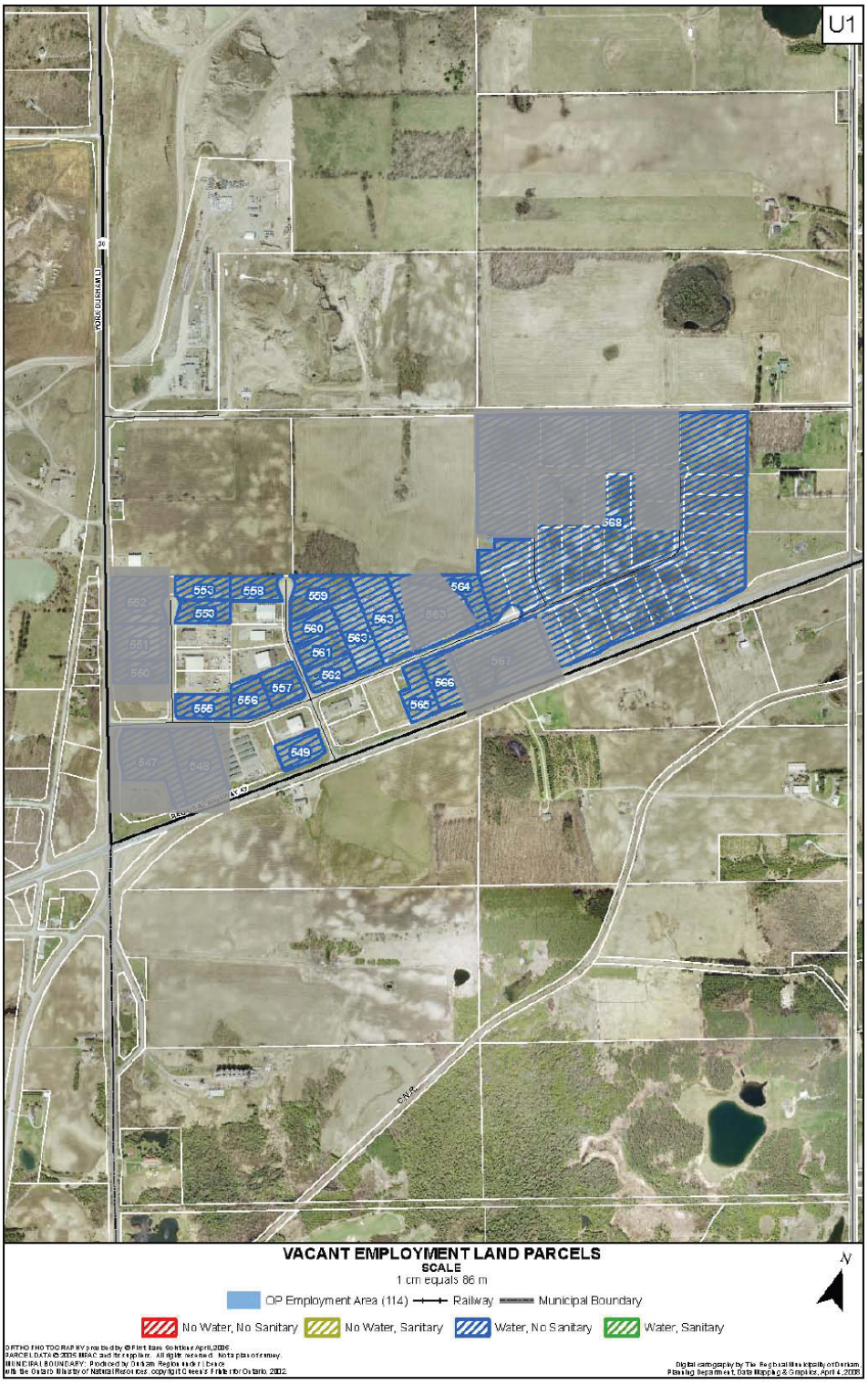
From 2006 to 2011 the population of Uxbridge grew by 7.6%, approximately 1.5% per year. This is slightly less than the population growth of the province over the same time period, which was 8.4%, closer to 1.7% per year. The population and employment estimates shown below predict that over the next 10 years the Township will experience moderate population growth of a 13% increase, representing approximately 1.3% annual growth. The Region of Durham completed a *Rural Residential Development Potential Review* in May 2011. This document identifies the potential for the development of an additional 188 units in hamlets, five approved residential subdivisions and 44 rural lots within the Township of Uxbridge.

Employment, however, is predicted to increase by approximately 32% over the next 10 years, or 3% per year. This represents a modest increase in employment for the Township. The bulk of the employment development is predicted to occur in the Uxville Industrial Park. This park is located along the north side of Durham Highway 47, east of the York-Durham Line (Regional Road 30). The industrial park is shown below in **Figure A3**. Lots in the figure which are grey were no longer available for development as of February 2009.

1.9.3 Growth Projections Profile Observations

The population of Township of Uxbridge is anticipated to grow at a modest rate of 13% over the coming 10 year period. This represents just slightly over 1% of population growth per year. No signification intensification or new suburban development areas are currently planned. This growth is expected to be supported by ongoing rural residential development. Therefore the future geographic locations of population are not expected to vary significantly within the 10 year study horizon.

Figure A3: Uxville Industrial Park



Source: The Regional Municipality of Durham, Planning Department - 2006

(Source: Township of Uxbridge Site Selector Information Package, February 2009)

1.10 Risk Profile Model

The OFM Fire Risk Sub-model defines risk *"as a measure of the probability and consequence of an adverse effect to health, property, organization, environment, or community as a result of an event, activity or operation. For the purposes of the Fire Risk Sub-model, such an event refers to a fire incident along with the effects of heat, smoke and toxicity threats generated from an incident".*

The OFM model develops an overall risk assessment *"by assigning probability and consequence levels to potential adverse events or scenarios due to fire and combining the two to arrive at an overall risk level"*. The OFM Fire Risk Sub-model provides a matrix as one option in arriving at the level of risk for a range of scenarios.

Alternatively the model provides the opportunity *"for analysis purposes, the community being assessed can be defined as the municipality in its entirety or as a particular segment of it that distinguishes it from other parts"*. The model further provides that *"it may be convenient to subdivide a municipality based on residential subdivision, downtown sections, industrial park, and a rural area"*.

For analytical purposes, the methodology within this study uses the OFM Fire Risk Sub-model major occupancy classifications as the basis for segmenting the community by primary building use. Each major occupancy classification is assigned a probability level based on the OFM Fire Risk Sub-model definitions. A consequence level also using the OFM Fire Risk Sub-model definition is then assigned for each major occupancy classification.

The methodology within this report includes a further process of assigning 'weighting factor' to each of the eight risk factor categories identified by the OFM Fire Risk Sub-model. Utilizing a range from 1 (lowest) to 3 (highest) each of the factors is assigned a weight factor, to calculated a weighted average. The weight factor assigns more or less priority to each of the given factors. For example, the demographic profile that identifies the number of vulnerable residents has been assigned the highest factor weight of 3. This process results in the most relevant categories having more impact on the risk priority level calculated.

The level of risk (Priority Level) for each major occupancy classification is determined by multiplying ***"probability x consequence = risk level (priority)".*** This provides the ability to determine an overall risk level for each major occupancy classification within the community.

This methodology then coordinates the assigned risk level for each major occupancy classification with the Council approved zoning by-law information and mapping. This process provides the opportunity to create a visual model (map) of the Community Risk Profile. This provides the opportunity to view both the current and projected level of risk within the community based on the Council approved Official Plan.

Creating the Community Risk Profile Model provides the opportunity to evaluate the current level of fire protection services provided. The model can further identify where risk levels may increase or change based on growth and long-term planning of the community.

1.10.1 Probability Levels

The probability of a fire occurring can in part be estimated based on historical experience of the community. The experience of other similar communities and that of the province as a whole can also provide valuable insight into the probability of a fire occurring. The experience of the evaluator and the local fire service staff in collaborating on determining probability is also a key factor.

The OFM Fire Risk Sub-model categorizes the probability of an event occurring into five levels of likelihood. **Table A18** identifies the OFM Fire Risk Sub-model categories.

Table A18: OFM Fire Risk Sub-model Likelihood Levels (Probability)
Likelihood Levels (Probability)

Description	Level	Specifics
Rare	1	- may occur in exceptional circumstances - no incidents in the past 15 years
Unlikely	2	- could occur at some time, especially if circumstances change - 5 to 15 years since last incident
Possible	3	- might occur under current circumstances - 1 incident in the past 5 years
Likely	4	- will probably occur at some time under current circumstances - multiple or reoccurring incidents in the past 5 years
Almost Certain	5	- expected to occur in most circumstances unless circumstances change - multiple or reoccurring incidents in the past year

1.10.2 Consequence Levels

The consequences as a result of a fire relate to the potential losses or negative outcomes associated should an incident occur. The Fire Risk Sub-model identifies four components that should be evaluated in terms of assessing consequence. These include:

- ***Life Safety:*** Injuries or loss of life due to occupant and firefighter exposure to life threatening fire or other situations.
- ***Property Loss:*** Monetary losses relating to private and public buildings, property content, irreplaceable assets, significant historic/symbolic landmarks and critical infrastructure due to fire.
- ***Economic Impact:*** Monetary losses associated with property income, business closures, downturn in tourism, tax assessment value, employment layoffs due to fire.
- ***Environmental Impact:*** Harm to human and non-human (i.e. 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.

The OFM Fire Risk Sub-model evaluates the consequences of an event based on five levels of severity. **Table A19** identifies the OFM Fire Risk Sub-model categories.

Table A19: OFM Fire Risk Sub-model Consequence Levels

Description	Level	Specifics
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	2	- potential risk to life safety of occupants - minor property loss - minimal disruption to business activity and/or - minimal impact on general living conditions
Moderate	3	- 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	4	- potential for a large loss of life - would result in significant property damage - significant threat to businesses, local economy and tourism and/or - impact to the environment would result in a short term, partial evacuation of local residents and businesses
Catastrophic	5	- 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

1.10.3 Risk Levels

Once probability and consequence are determined for each major occupancy classification the level of risk is calculated by multiplying ***"probability x consequence = risk level (priority)".*** **Table A20** identifies the four levels of risk identified within the OFM Fire Risk Sub-model including the lower and upper range of each risk classification and the relative definition of each.

Table A20: OFM Fire Risk Sub-model Risk Levels

Risk Level	Priority Level	Lower – Upper Range	Definition
Low Risk	L1	0 to 6.3	- manage by routine programs and procedures, maintain risk monitoring
Moderate Risk	L2	6.4 to 12.5	- requires specific allocation of management responsibility including monitoring and response procedures
High Risk	L3	12.6 to 18.7	- community threat, senior management attention needed
Extreme Risk	L4	18.8 to 25.0	- serious threat, detailed research and management planning required at senior levels

1.10.4 Ontario Fire Code Compliance

A major determinate in assessing risk within a community and the major building classifications is compliance with the Ontario Fire Code. The Ontario Fire Code which was adopted in 1981 and the Ontario Building Code were developed to ensure uniform building construction and maintenance standards are applied for all new building construction. The codes also provide for specific fire safety measures depending on the use of the building. Examples of the fire safety issues that are addressed include:

- *occupancy*
- *exits/means of egress including signs and lighting*
- *fire alarm and detection equipment*
- *fire department access*
- *inspection, testing, and maintenance*

In 1983 the OFC was further expanded to include retrofit requirements for many of the building constructed prior to 1981. Retrofit requirements were established to ensure a minimum acceptable level of life safety is present. A number of occupancy types are included within the retrofit requirements including assembly, boarding, lodging and rooming houses, health care facilities, multi-unit residential, two-unit residential, and hotels.

Determining the status of compliance or non-compliance including the status of retrofit requirements particularly for major building occupancies is an important component of developing the Community Risk Profile. This is particularly important within the major occupancies classifications where there is a documented history of property loss as a result of fire, and/or injuries and fatalities as a result of fire. Group A – Assembly and Group B – Institutional occupancies are the two primary occupancies types where more detailed analysis of compliance and non-compliance should be considered.

Where compliance has been achieved and documented these occupancy classifications can be considered as part of the standard risk identification methodology within this report. Where compliance has not been achieved including retrofit requirements these occupancies should be evaluated independently adding a further assessment of OFC compliance.

Completing the independent evaluation provides the opportunity to assess these buildings on a case by case basis and as such does not impact the overall risk level for the occupancy classification. In the event an individual property is assigned a higher level of risk as a result of non-compliance this methodology provides the opportunity for re-evaluating the risk level for that specific property once compliance is achieved.

Group A – Assembly Occupancies – Non-Compliant OFC

Information provided by the Township of Uxbridge Fire Department indicates that there are four buildings of this occupancy type in non-compliance with the OFC at the time of writing this report. Non-compliance for all of these buildings is related to the updating of existing Fire Safety Plans. All other Group A - Assembly occupancies are currently in compliance with the OFC.

Work is currently underway to address the updating of the Fire Safety Plans for each of these buildings. As such, and as they each have existing Fire Safety Plans there would be no increased risk that should be considered as part of the Community Risk Profile.

Group B – Institutional Occupancies – Non-Compliant OFC

Information provided by the Township of Uxbridge Fire Department indicates that all Group B – Institutional Occupancies are currently in compliance with the OFC. The care and detention centers classified within this occupancy classification can present unique challenges in the event of a fire. Utilizing the "first line of defense" including pro-active fire prevention and public education programming in addition to a regular fire inspection program to sustain compliance with the OFC is an effective strategy in managing this risk.

Group C – Residential Occupancies – Vulnerable Demographics

Section 3.5.3 Vulnerable Individuals or Occupancies, has identified nine current properties where vulnerable occupants reside either in residential or institutional occupancies. Although these buildings are currently compliant with the OFC the profile recognizes that this demographic of the population is by experience at higher risk in the event of a fire. For this reason these nine properties should be considered high risk (RL-3). As high risk properties site specific emergency response protocols should be considered. These will be described further within the fire suppression division section of this report.

Group D – Commercial Occupancies – Fuel Load High Risk

Section 3.8 Fuel Load, has identified nine properties that may be classified as either mercantile or industrial that have either a large volume of fuel load, or alternatively a higher risk of fuel load that could impact the result of a fire. For this reason these nine properties should also be considered high risk (RL-3). As high risk properties site specific emergency response protocols should be considered. These will be described further within the fire suppression division section of this report.

Group E – Mercantile Occupancies – Non-Compliant OFC

Information provided by the Township of Uxbridge Fire Department indicates that all Group E - Mercantile Occupancies are currently in compliance with the OFC.

Group F – Industrial Occupancies – Non-Compliant OFC

Information provided by the Township of Uxbridge Fire Department indicates that all Group F - Industrial Occupancies are currently in compliance with the OFC.

1.11 Township of Uxbridge Risk Evaluation

Table A21 presents the completed risk evaluation for the Township of Uxbridge. The evaluation utilizes the methodology described above following the framework of the OFM Fire Risk Sub-model.

The risk evaluation summary incorporates all community risk factors within the Township of Uxbridge for each major occupancy classification. The summary identifies that the Township has no extreme risk occupancies. Institutional occupancies were assigned high risk. This should be reflected in the department's fire prevention and public education program planning. Assembly and residential occupancies are identified as moderate level risks. If, however, any buildings under this occupancy are non-compliant, they may be considered high risk. This would apply specifically to higher density residential units or assembly occupancies. Another consideration would be residential buildings which specifically house higher risk age-groups (e.g. seniors or vulnerable persons), which should be given a higher priority for programming based on increased risk. Business and mercantile occupancies in Uxbridge represent a low risk.

Table A21: Risk Evaluation Summary

Community Risk Profile Factors		Property Stock	Building Height	Building Age	Building Exposures	Demographic Profile	Geography Topography	Past Fire Loss	Fuel Load	Prob. Level	Cons. Level	Priority Level	Risk Level
Weight Factor		***1***	***2***	***3***	***1***	***3***	***1***	***3***	***2***	***Weighted Average***			
OBC Major Occupancy Classification		**Risk Level Assessment**											
Group A	**Assembly**	3	2	3	2	4	2	1	2	2.4	3	7.2	RL-2
Group B	**Institutional**	4	3	4	3	5	3	1	3	3.2	4	12.8	RL-3
Group C	**Residential**	4	2	3	3	5	2	3	2	3.1	3	9.3	RL-2
Group D	**Business**	3	2	3	4	2	2	1	3	2.3	2	4.6	RL-1
Group E	**Mercantile**	3	2	3	4	2	2	1	3	2.3	2	4.6	RL-1
Group F	**Industrial**	3	2	2	2	2	2	2	4	2.3	2	4.6	RL-1
Mobile Homes & Trailers		2	1	1	1	2	2	1	1	1.3	2	2.6	RL-1

Probability:		**Consequence Level:**		**Priority Level**		**Risk Level**
1 – Rare		1 – Insignificant		0 to 6.2 = Low	=	RL-1 – Low Risk
2 – Unlikely		2 – Minor		6.3 to 12.5 = Moderate	=	RL-2 – Moderate Risk
3 – Possible	**X**	3 – Moderate	**=**	12.6 to 18.7 = High	=	RL-3 – High Risk
4 – Likely		4 – Major		18.8 to 25.0 = Extreme	=	RL-4 – Extreme Risk
5 – Almost Certain		5 - Catastrophic				

1.11.1 TOWNSHIP OF UXBRIDGE RISK MODEL

1.11.2 Methodology

This section provides a brief outline of the scope and methodology used in order to provide insight into the modeling procedures adopted to assess Township risk. A Geographic Information Systems (GIS) model was developed to assess risk based on historic call locations, risk geography, land use and the department's existing and predicted emergency response travel times relate to these risks.

The basis of the GIS risk model is the development geographical risk zones. These zones represent areas of low, moderate, high and extreme risk categories based on land use. The Township's existing zoning by-law and map was used to determine the boundaries and building occupancies associated with each zone. The associated building occupancies were used to determine the base risk category, which assumes that the buildings in the risk zone are in compliance. The base risk zones associated with each occupancy category are listed in **Table A22**.

Table A22: Base Risk Zone Category by Occupancy

Occupancy Classification (OBC)	Occupancy Definition Fire Risk Sub-model (OFM)	Base Risk Zone Category Assigned
Group A – Assembly Assembly	*Assembly occupancies*	*moderate*
Group B - Institutional Institutional	*Care or Detention occupancies*	*high*
Group C - Residential Residential	*Residential occupancies*	*moderate*
Group D - Business	*Business and Personal Services Occupancies*	*moderate*
Group E - Mercantile	*Mercantile occupancies*	*moderate*
Group F1 - Industrial	*Industrial occupancies*	*low*
Group F2 - Industrial		*moderate*
Group F3 - Industrial		*high*
Other occupancies	*Not classified within the Ontario Building Code (i.e. farm buildings)*	*low*

Existing Risk and Response (Call Locations)

The existing risk zones and existing emergency response are presented in **Figure A4**. This figure depicts historic call data from 2009 and 2010 (all call types, excluding medical calls) overlaid onto the existing risk zones represented in the model. These calls are colour coded according to travel time. Calculations were carried out to estimate the number of calls within each risk zone category and the travel time associated. From the calculations table, 71% of the moderate risk calls are responded to in four minutes or less of travel time. Ninety-one percent of moderate risk calls are responded to in eight minutes travel time or less and 98% of moderate risk calls are responded to in ten minutes of travel time or less. This also shows that 21% of the low risk calls are responded to in four minutes or less of travel time, 59% in eight minutes of travel time or less and 76% in ten minutes of travel time or less. This indicates that based on where the majority of the calls occur, the department is able to respond in a timely manner.

Existing Risk and Response (Township Geography)

The GIS model was used to approximate existing geographic coverage of the existing risk zone areas. The existing station location was represented in this scenario, shown in **Figure A5**. Travel time was estimated according to distance from the station, with an assumed average travel speed of 60 kilometres per hour. Therefore, a distance of four kilometres has an assumed travel time of four minutes. These assumed travel distances (in kilometers) and travel speeds (in minutes) are represented by the circle buffers surrounding the fire station. The calculations indicate the percentage of the various risk zone categories that fall within the estimated travel time / distance buffer. In this figure, 19% of the moderate risk geography and 2% of the low risk geography is covered within four minutes of predicted travel time (four kilometre buffer). This scenario also results in 52% of the moderate risk zones and 85% of the low risk zones being covered within the ten minute predicted travel time (ten kilometre buffer).

Future Risk and Response (Township Geography)

The model was used to approximate future geographic coverage of the existing risk zone areas. The existing risk areas roughly represent the future risk zones, as little development is anticipated. The future fire station location was represented in this scenario, shown in **Figure A6**. The methodology for this scenario was the same as for the Existing Risk and Response discussed above. In this figure, 20% of the moderate risk geography and 3% of the low risk geography is covered within four minutes of predicted travel time (four kilometre buffer). This scenario also reaches 60% of the moderate risk zones and 92% of the low risk zones within the ten minute predicted travel time (ten kilometre buffer). This shows a modest improvement in risk zone coverage from the future fire station location as compared to the existing fire station location assessed above.

Existing Station

Travel Time	% of Low Risk Calls	% of Moderate Risk Calls
<= 4 min	21%	71%
<= 5 min	32%	80%
<= 6 min	36%	84%
<= 7 min	55%	86%
<= 8 min	59%	91%
<= 9 min	72%	94%
<=10 min	76%	98%
>10 min	100%	100%

Low Risk
Moderate Risk
High Risk
Extreme Risk
<= 4 minutes
4-5 minutes
5-6 minutes
6-7 minutes
7-8 minutes
8-9 minutes
9-10 minutes
> 10 minutes
Existing Fire Station

TOWNSHIP OF UXBRIDGE
FIRE MASTER PLAN
11-5428

RISK ANALYSIS
FIGURE # A4
Existing Risk and Response Call Locations

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY REGION OF DURHAM

MAP CREATED BY: SLS
MAP CHECKED BY: SLC
MAP PROJECTION: NAD 1983 UTM Zone 17N

0 0.5 1 2 km

N W E S

FILE LOCATION: G:\CAD\2011\115428 20\Design_GIS\MXDs

PROJECT: 11-5428 STATUS: FINAL DATE: 29/05/12

Existing Station

Time/ Distance	% Covered Low Risk	Moderate Risk
4 min/4km	2%	19%
5 min/5km	12%	20%
6 min/6km	14%	21%
7 min/7km	33%	24%
8 min/8km	49%	33%
9 min/9km	63%	40%
10min/10km	85%	52%

Low Risk
Moderate Risk
High Risk
Extreme Risk
4 min (4 km @ 60km/hr)
5 min (5 km @ 60km/hr)
6 min (6 km @ 60km/hr)
7 min (7 km @ 60km/hr)
8 min (8 km @ 60km/hr)
9 min (9 km @ 60km/hr)
10 min (10 km @ 60km/hr)
Existing Fire Station

TOWNSHIP OF UXBRIDGE
FIRE MASTER PLAN
11-5428

RISK ANALYSIS
FIGURE #A5
Existing Risk and Response (Geography)

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY REGION OF DURHAM

MAP CREATED BY: SLS
MAP CHECKED BY: SLC
MAP PROJECTION: NAD 1983 UTM Zone 17N

0 0.5 1 2 km

N W E S

FILE LOCATION: G:\CAD\2011\115428 20\Design_GIS\MXDs

PROJECT: 11-5428 STATUS: FINAL DATE: 29/05/12

Future Station

Time/ Distance	% Covered Low Risk	Moderate Risk
4 min/4km	3%	20%
5 min/5km	4%	23%
6 min/6km	27%	26%
7 min/7km	43%	35%
8 min/8km	69%	44%
9 min/9km	84%	48%
10min/10km	92%	60%

Low Risk
Moderate Risk
High Risk
Extreme Risk
4 min (4 km @ 60km/hr)
5 min (5 km @ 60km/hr)
6 min (6 km @ 60km/hr)
7 min (7 km @ 60km/hr)
8 minm (8 km @ 60km/hr)
9 min (9 km @ 60km/hr)
10 min (10 km @ 60km/hr)
Future Fire Station

TOWNSHIP OF UXBRIDGE
FIRE MASTER PLAN
11-5428

RISK ANALYSIS
FIGURE # A6
Future Risk and Response (Geography)

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY REGION OF DURHAM

MAP CREATED BY: SLS
MAP CHECKED BY: SLC
MAP PROJECTION: NAD 1983 UTM Zone 17N

0 0.5 1 2 km

N W E S

FILE LOCATION: G:\CAD\2011\115428 20\Design_GIS\MXDs

PROJECT: 11-5428 STATUS: FINAL DATE: 29/05/12

APPENDIX B

Fire Suppression Performance Targets

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1.0 FIRE SUPPRESSION PERFORMANCE FACTORS

There are a number of variables to be considered by a municipal Council in understanding and determining an appropriate service level for fire suppression. The variables include the type of risk (Community Risk Profile) the total response time (dispatch time, activation time, and travel time) the number of firefighters required (initial response and depth of response) and the measurement objective (the percentage of incidents that would meet an assigned objective).

The Community Risk Profile included within this study presents a comprehensive analysis for determining fire risk, and then assigning fire risk based the Ontario Building Code Major Occupancy Classifications.

For comparison purposes this study utilizes the example of a fire in a 2000 square foot, two-story single-family dwelling without a basement and with no exposures present. This represents a typical home of wood frame construction located in a suburban neighbourhood having access to a municipal water supply including fire hydrants. Within this study this occupancy would be classified as a Group C - Residential Occupancy (moderate risk).

To determine a recommended fire suppression performance target this study will assess the current guidelines and standards that are being utilized by the Ontario fire service in comparison to this typical fire risk scenario.

1.1 Importance of Time with Respect to Fire Growth

Time is a critical component with respect to the growth of a fire and the success of intervention by firefighters. Research conducted by the OFM and National Research Council of Canada indicates that a fire in a non-sprinklered residential occupancy (typical fire risk scenario) can spread from the room where the fire originates in ten minutes or less. Tests have shown that the fire can extend from this room of origin in as little as three minutes, under fast fire growth conditions.

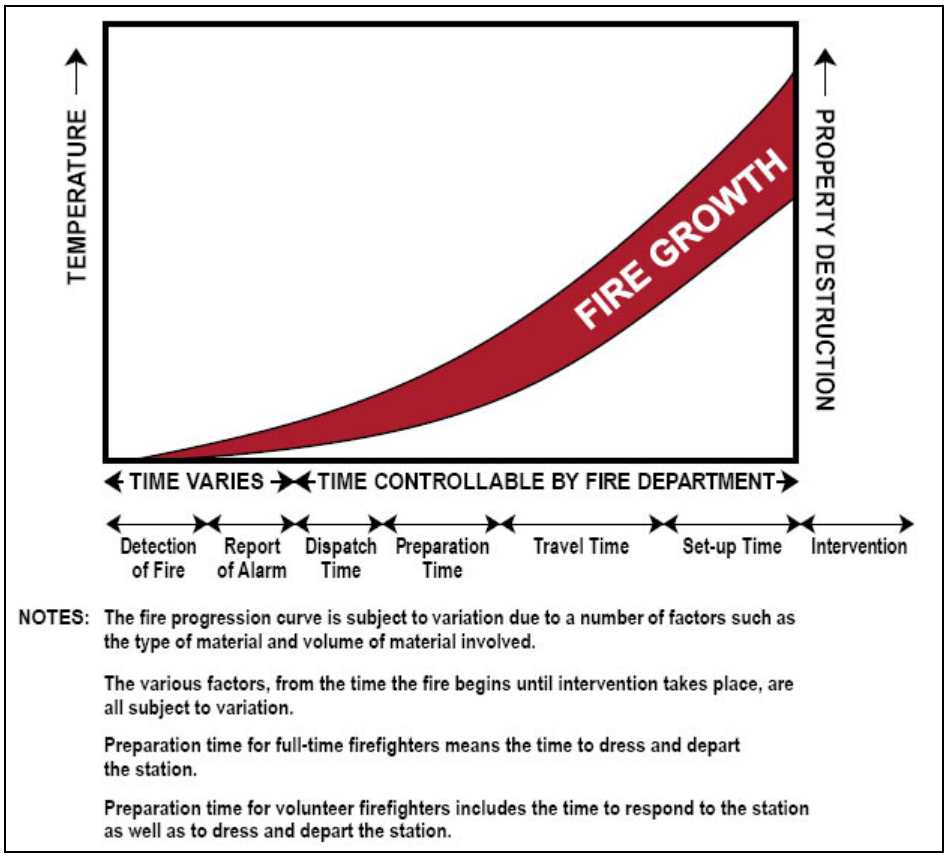
Fire growth rates, defined by the Society of Fire Protection Engineers, as slow, medium and fast are listed in **Error! Reference source not found.**. The fire growth rates are measured by the time it takes for a fire to reach a 1 megawatt (MW) fire. This is roughly equivalent to an upholstered chair burning at its peak. A 2 MW fire is approximately equal to a large upholstered sofa burning at its peak.

Table B1: Fire Growth Rates as Defined by Society of Fire Protection Engineers

Time to Reach 1 MW and 2 MW Fire Growth Rates in the Absence of Fire Suppression		
Fire Growth Rate	*Time in Seconds to Reach 1MW*	*Time in Seconds to Reach 2 MW*
Slow	600 seconds	848 seconds
Medium	300 seconds	424 seconds
Fast	150 seconds	212 seconds
Source: Office of the Fire Marshal, Ontario, 'Operational Planning: An Official Guide to Matching Resource Deployment and Risk', January 7, 2011 (www.ofm.gov.on.ca)		

Within this ten minute time period flashover conditions can occur. Flashover occurs when the combustible items within a given space reach a temperature that is sufficiently high for them to auto-ignite. The graph in **Figure B1** highlights the importance of fire fighting intervention, given the exponential increase in fire temperature, and the potential for loss of property/loss of life with the progression of time (*Courtesy of the Office of the Fire Marshal, Ontario).*

Figure B1: OFM Fire Progression Curve



The fire progression curve reflects the importance of time during the "*detection – report*" stage. This is the time period not impacted by any actions by the fire department. The time period controlled by the fire department begins when the call is initially received by "*dispatch"* and includes several other components leading up to the initiation of "*intervention*" by fire suppression staff.

Understanding factors such as "growth rate" and "time' in terms of how quickly a fire can reach a critical stage such as "flashover" are important considerations in assessing fire suppression performance targets. For example, where areas of the community may have extended response times due to long travel distances, in excess of 10 minutes, the potential for the fire to have spread from the room of origin, and or already reached a "flashover" state, will be significantly higher.

In these situations consideration should be given to the first two *"lines of defence"* including the provision of more public education and fire prevention activities as a means to inform the public on how to be prepared.

1.2 Total Response Time

Measuring the total response time to an emergency call can be defined by three primary components: *dispatch time, turnout time, travel time*. Together these components make up the total response time it takes for a fire and emergency service to receive a call either from someone at the scene of with knowledge of the fire, identify the location of the emergency and dispatch appropriate vehicles and staff, travel to the scene of the incident, and set up to begin fire suppression activities. The common definitions of these four components are:

1. Dispatch Time: The time that it takes for the person responsible for "*alarm answering*", and "*alarm processing*" to be able to receive the call, and dispatch the appropriate apparatus and staff to respond to the emergency.
2. Turnout Time: The time interval that begins from when the emergency response staff receives the required dispatch notification, and ends at the beginning point of travel time.
3. Travel Time: The travel time interval begins when the assigned emergency response apparatus begins the en-route travel to the emergency, and ends when the apparatus arrives at the scene.

One of the important factors to recognize with regard to these times is when the responding fire department begins to take *"care and control"* of the incident. Within PFSG 04-08-12 the OFM describes this as *"Once notified of an emergency, your department accepts its "care and control". If your department handles its own call-taking and dispatching, you can see that you have care and control right from the earliest moment, when the emergency was reported. But if you hire a call-taking or dispatching or both, you do not accept care and control until sometime later. Nevertheless, the fire department has responsibility for ensuring that hired agencies manage call-taking and dispatching effectively, and in accordance with establishes protocols"*.

1.3 Initial Response

Initial response can be defined as the number of firefighters initially responding to an incident. Identifying the number of firefighters required on the initial response has been the focus of much debate within the fire service industry for many years. More recently there has been a significant shift by fire service leaders and professional standard setting bodies to recommending that an initial response of four firefighters should be considered the minimum.

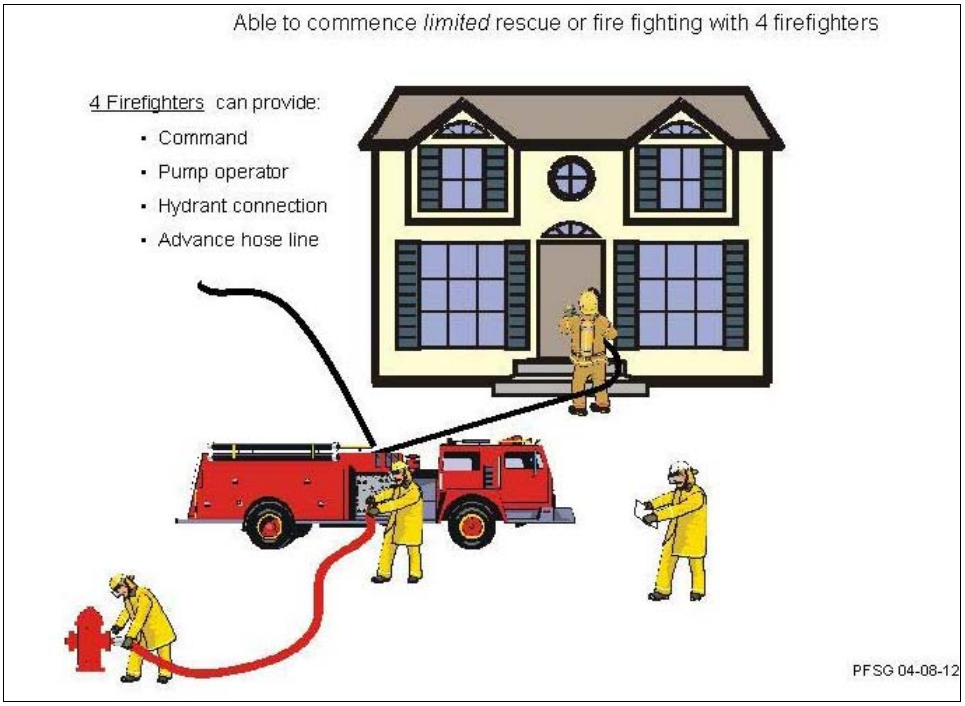
It has been acknowledged by fire service leaders and professional standard setting bodies that until a minimum of four firefighters have assembled at a fire scene, there are not sufficient firefighters on scene to safely initiate or make entry into the building to commence the rescue of occupants, or initiate interior fire suppression operations. If fewer than four firefighters arrive on scene, they must wait until a second vehicle, or additional firefighters arrive to have sufficient staff to commence these activities.

An initial response of four firefighters once assembled on the scene is typically assigned the following operational functions. The Officer in charge shall assume the role of Incident Command; one firefighter shall be designated as the pump operator; one firefighter shall complete the task of making the fire hydrant connection; and the fourth firefighter shall prepare an initial fire attack line for operation.

Under the direction of the Incident Commander the initial response crew then has the option of initiating limited search and rescue (i.e. looking for trapped persons immediately inside doorways or windows) or beginning limited firefighting using two firefighters for either task.

Fire scene responsibilities are highlighted in **Figure B2** below.

Figure B2: First Response Fire Scene Responsibilities



(Office of the Fire Marshal, Ontario, Prior to November 2010).

1.4 Depth of Response

In comparison to the Initial Response the depth of response relates to the "total" number of firefighters initially assigned to an incident. Depth of response is also commonly referred to as "First Alarm" or "Full Response". For example NFPA 1710 defines "*Initial Full Alarm Assignment"* as "*Those personnel, equipment, and resources ordinarily dispatched upon notification of a structure fire"*.

It is very important to recognise that depth of response is referring to the "total" number of firefighters **initially** assigned to an incident. The total number of firefighters assigned to an incident can vary based on the type of occupancy and the level of risk present. Fires involving occupancies that have been assigned a higher level of risk such as high, or extreme may require a higher number of firefighters as part of the initial depth of response. This can be achieved in many ways such as dispatching of additional resources or the use of Fire Protection Agreements (Automatic Aid Agreements).

In comparison to best practices within the industry that recognise four firefighters as the appropriate level of resources for the initial response, determining best practices for depth of response has a number of variables to be considered.

Depth of response is assessed below for the OFM guidelines and the NFPA standards in comparison to the typical fire risk scenario presented.

1.5 OFM Public Fire Safety Guidelines

As identified in the *Fire Protection and Prevention Act, 1997*, the Office of the Fire Marshal, Ontario (OFM) has the power to issue guidelines to municipalities with respect to fire protection services and related matters. These *Public Fire Service Guidelines* (PFSG) are to be used by local municipalities to determine the level of fire protection services they determine may be necessary, in accordance with their particular needs and circumstances.

PFSG 04-08-10 *Operational Planning: An Official Guide to Matching Resource Deployment and Risk* was released by the OFM in January 2011. Utilizing the risk evaluation and determination process identified with the Fire Risk Sub-model this PFSG contains a "Critical Task Matrix". The matrix is defined by the OFM as "*The critical Task Matrix is based on the Incident Management System (IMS). It will assist in identifying fireground staffing capabilities based upon low, moderate, high and extreme risk levels within your community. The Office of the Fire Marshal (OFM) has identified the critical tasks from the Incident Management System that are used during fireground operations. These tasks are consistent with applicable legislation, industry best practices and the Ontario Fire College Curriculum".*

The Critical Task Matrix provides a lower and upper range of the number of firefighters required to respond for each of the four risk levels. The actual number of firefighters within each range is based upon analysis of actual fires, the Occupational Health and Safety Act Section 21 Guidance Notes affecting firefighters, and industry best practices.

The Critical Task Matrix identifies a range of 16 to 43 firefighters that would be required to respond to a moderate level risk that is comparable to the typical fire risk scenario presented above. The matrix recognises that the actual number of firefighters required may vary depending on the fire risk that exists and the tasks that are assigned by the Incident Commander on the scene. The matrix does not specify the number of firefighters recommended for an initial response, it only looks at the suggested depth of response resources.

The matrix for the fire risk scenario presented (moderate risk) suggests a firefighter is required for both "Water Supply – pressurized" as well as "Water Supply – non –pressurized". As the fire risk scenario identifies a municipal water supply with fire hydrants is available only one of these firefighters would be required based on the lower range level of sixteen.

The matrix also identifies that "Utilities" would require a firefighter for this fire risk scenario. In our experience this is a function that can be coordinated by the Incident Commander either by the multi-tasking of other firefighters on scene, or alternatively by utilizing staff from the agencies directly responsible for the utilities to mitigate any issues.

Modifying the lower level of the moderate risk range by reducing the number of firefighters by two; and revising these two tasks would suggest that a minimum response of fourteen firefighters responding to the fire risk scenario presented within this study would be an acceptable minimum performance target.

1.6 National Fire Protection Association (NFPA) 1710 Standard

The National Fire Protection Association (NFPA) is an international non-profit organization that was established in 1896. The company'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 NFPA is recognised as one of the world's leading advocates of fire prevention and an authoritative source on public safety.

NFPA 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. Its more than 200 technical code and standard development committees are comprised of over 6,000 volunteer seats. Volunteers vote on proposals and revisions in a process that is accredited by the American National Standards Institute (ANSI).

NFPA 1710 "*Standard for the Organization and Deployment of Fire suppression Operations, Emergency medical Operations, and Special Operations to the Public by Career Fire Departments"* provides a resource for determining and evaluating the number of career firefighters required based upon recognised industry best practices.

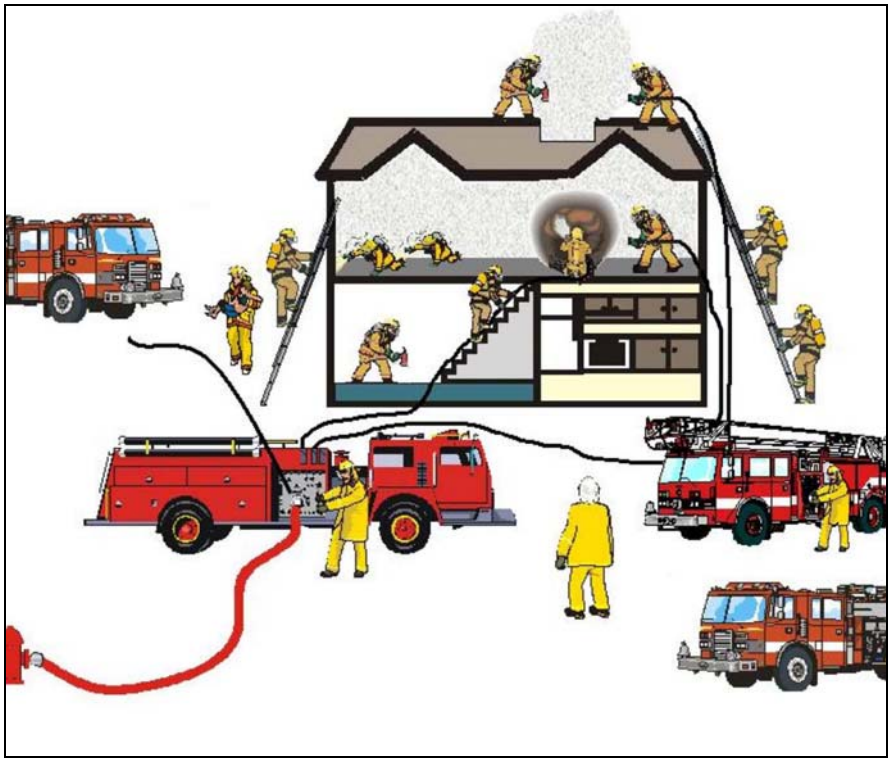
NFPA 1710 is a standard that is designed for larger municipalities that as a result of many factors are operating their fire department utilizing substantially career firefighters. Relevant references from NFPA 1710 include the following:

- This standard applies to the deployment of resources by a fire department to emergency situations when operations can be implemented to save lives and property.
- The standard is a benchmark for most common responses and a platform for developing the appropriate plan for deployment of resources for fires in higher hazard occupancies or more complex incidents.

The NFPA references support the strategic priority of saving lives and property, as well as recognising the standard as a "*benchmark"* for determining the appropriate level of resources based on the complexity and level of risk present.

The NFPA 1710 standard for the initial response of four firefighters is widely accepted as the minimum initial response and best practice within the industry. The NFPA 1710 standard for depth of response to the same typical fire risk scenario is fourteen firefighters, fifteen if an aerial device is to be used. The NFPA 1710 fire scene responsibilities for depth of response including an aerial are highlighted in **Figure B3**.

Figure B3: Depth of Response Fire Scene Responsibilities



1.7 National Fire Protection Association (NFPA) 1720 Standard

NFPA 1720 "*Standard for the Organization and Deployment of Fire suppression Operations, Emergency medical Operations, and Special Operations to the Public by Volunteer Fire Departments"* provides a resource for determining and evaluating the number of volunteer firefighters required based upon recognised industry best practices.

The NFPA 1720 standard further supports the minimum initial response staffing to include four firefighters including "*Initial firefighting operations shall be organized to ensure that at least four fire fighters are assembled before interior fire suppression operations are initiated in a hazardous area"*. This particular standard further recognises that the four firefighters may not arrive on the same vehicle, but that there must be four on the scene prior to initiating any type of interior firefighting operations.

Within this standard the NFPA identifies five different categories described as "Demand Zones" that relate to the type of risk that may be found within a typical community; either by population density, travel distance, or special circumstances. The standard then identifies a minimum level of firefighters that would be recommended for each of these categories. **Table B2** presents the NFPA minimum staffing levels by category.

Table B2: NFPA 1720

Demand Zones	Demographics	Minimum # of Firefighters Responding	Response Time (Turnout + Travel) in Minutes
Urban Area	>1000 people per square mile	15	9
Suburban Area	500-1000 people per square mile	10	10
Rural Area	<500 people per square mile	6	14
Remote Area	Travel Distance + or – 8 miles	4	Dependant upon travel distance
Special Risks	To be determined by Fire Department	To be determined by Fire Department	Determined by Authority Having Jurisdiction

The NFPA 1720 standard utilizes population density as a factor in evaluating the minimum number of firefighters recommended for depth of response. As a standard primarily for use by volunteer fire departments it recognises lower population densities are typically found in smaller communities in comparison to much higher population densities found in large urban centres.

1.8 Comparison of Emergency Response Performance Measures

In addition to the minimum staffing levels for the initial response and the depth of response, identifying options for performance targets (service levels) must also consider criteria for the overall response time and in terms of evaluation, the targeted percentage of achievement.

Table B3 provides the summary of the OFM PFSG 04-08-10 and NFPA 1710 & 1720 standards for initial response and depth of response to the typical fire risk scenario presented within this report. For this comparison travel time represents *"The travel time interval begins when the assigned emergency response apparatus begins the en-route travel to the emergency, and ends when the apparatus arrives at the scene"*. The objective represents the percentage of the total number of calls responded to by a fire department.

Table B3: Comparison to the Typical Fire Risk Scenario

Source	Initial Response	Travel Time	Depth of Response	Travel Time	Objective
OFM PFSG 04-08-10	---	---	**14 firefighters	---	---
NFPA 1710	4 firefighters	4 minutes	14 firefighters	8 minutes	90%
*NFPA 1720	4 firefighters	---	10 firefighters	10 minutes	80%

*NFPA 1720, suburban area, 500-1000 people per square mile

** This includes adjustments for water supply and external agencies

Within the Province of Ontario it is recognized that the largest number of fire fatalities occur in residential dwellings. Residential dwellings also represent the highest dollar loss as a result of fire. More recently there has been a downward trend in these statistics; reducing fires and fire fatalities in residential dwellings remains a fire service priority.

APPENDIX C

Community Information Open House Presentation

Uxbridge Fire Department Fire Master Plan

Community Information Open House

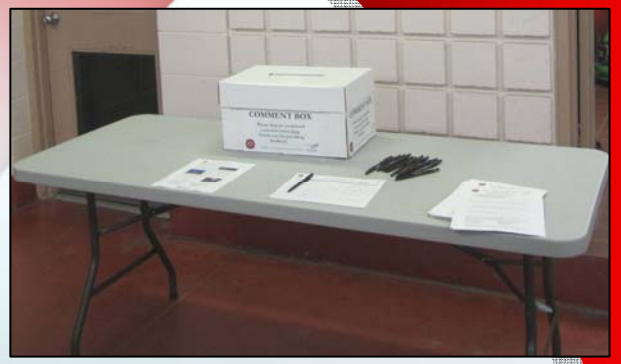
April 12, 2012

Presented by Steve Thurlow and Suzanne Charbonneau

Dillon Consulting

Presentation Outline

- ✓ Introduction to Fire Master Plans
- ✓ Current Study Background
- ✓ Municipal Responsibilities
- ✓ Department Background
- ✓ Key Issues
- ✓ Study Progress
- ✓ Next Steps
- ✓ Questions & Discussion



What is a Fire Master Plan?

- ✓ **Comprehensive evaluation of Uxbridge Fire Department's current service delivery.**
- ✓ **An assessment of the current services in relation to legislated standards and best practices.**
- ✓ **Creation of a multi-year plan to deliver service based on the "needs and circumstances" of the community.**

Benefits of a Fire Master Plan

- ✓ **Provide Council and staff with a strategic template for delivering fire & emergency services in response to community risks and needs over the next 10 year period.**
- ✓ **Ensure Township is addressing legislated responsibilities / requirements.**
- ✓ **Opportunity for stakeholders to participate in developing service level performance targets and measures.**

Methodology

- ✓ **Strategic fire master plan to guide fire department through next 10 years**
- ✓ **Conduct high-level review of overall department:**
  - *industry best practices*
  - *Office of the Fire Marshal, Ontario (OFM) public fire safety guidelines*
  - *National Fire Protection Association (NFPA) standards*
- ✓ **Short term (1-5 year) & long term (5-10 year) recommendations**
- ✓ **Tailor study to meet local needs and circumstances**

Photo credits: Uxbridge Fire Department

Study Scope

Divisional Reviews of:

- ✓ *Administration;*
- ✓ *Emergency response;*
- ✓ *Training;*
- ✓ *Fire prevention;*
- ✓ *Firefighter staffing & service agreements;*
- ✓ *Station location;*
- ✓ *Apparatus & equipment / maintenance program;*
- ✓ *Dispatch & radio systems;*
- ✓ *Finances;*
- ✓ *Emergency preparedness planning; and*
- ✓ *Legislated requirements.*

Photo credits: Celia Klemenz / Metroland

Informational Review

- ✓ ***Data collection process***
  - ✓ *Department statistics*
  - ✓ *Township growth & demographics*
  - ✓ *Risk profile*
- ✓ ***Interviews with key stakeholders***
- ✓ ***Site Visit***
- ✓ ***Previous Studies:***
  - Fire Station Location Study (2008)
  - Previous Fire Master Plan (2006)

Photo credits: Celia Klemenz / Metroland

Municipal Responsibilities

Fire Protection and Prevention Act 1997 (FPPA) states that every municipality shall:

(a) Establish a program for public education with respect to fire safety and certain components of fire prevention; and

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

(a) Establish a program for pubic education

At a minimum this should include:

- ✓ ***Simplified Risk Assessment – to identify the extent of other fire protection services.***
- ✓ ***A smoke alarm program.***
- ✓ ***Fire safety education activities distributed to residents/occupants.***
- ✓ ***Inspections upon complaint or when requested to assist with code compliance.***

(b) Provide other fire protection services

Services should include:

- ✓ ***Identifying the level of fire protection (suppression) services the municipality deems necessary based on its own "needs and circumstances".***
- ✓ ***Determining this through evaluating factors such as: fire risk, liability, financial capabilities, resources, and community and council expectations.***

Ontario Fire Safety & Protection Model

Three Lines of Defence:

1. **Public Education and Prevention**
   - *i. Smoke Alarm Program, school and seniors education, risk management, etc.*
2. **Fire Safety Standards and Enforcement**
   - *i. Inspections, Occupancy Inspections, Licensing Approval, Violation Enforcement, Fire Investigations, etc.*
3. **Emergency Response**
   - *i. Ontario Fire Marshal's Office Guidance Notes*
   - *ii. National Fire Protection Association Standards (NFPA)*
   - *iii. Ministry of Labour (Section 21 Guidance Notes)*
   - *iv. Industry Best Practices*

Emergency Response – Performance Measures

Performance Measures	
Measure	**NFPA 1720 (Volunteer Departments)**
Urban Area (>1000 people / sq. mile)	Minimum Staff: 15 Response Time (minutes): 9 Meets Objective (%): 90%
Suburban Area (500-1000 people / sq. mile)	Minimum Staff: 10 Response Time (minutes): 10 Meets Objective (%): 80%
Rural Area (<500 people / sq. mile)	Minimum Staff: 6 Response Time (minutes): 14 Meets Objective (%): 80%
Remote Area (Travel Distance 8 miles or greater)	Minimum Staff: 4 Response Time (minutes): Depends on travel distance Meets Objective (%): 90%
Special Risks	Minimum Staff: Determined based on risk / Council Response Time (minutes): Determined by Council Meets Objective (%): 90%

Department Background

- **Volunteer department**
- **One fire station**
  - *Current location at 17 Bascom Street*
  - *Proposed new station at museum site*
- **Fire service agreements include:**
  - *Scugog, Pickering Brock, Whitby, Oshawa, Ajax;*
  - *Whitchurch-Stouffville; and*
  - *East Gwillimbury.*

Photo credits: Michael Jurysta

Department Background

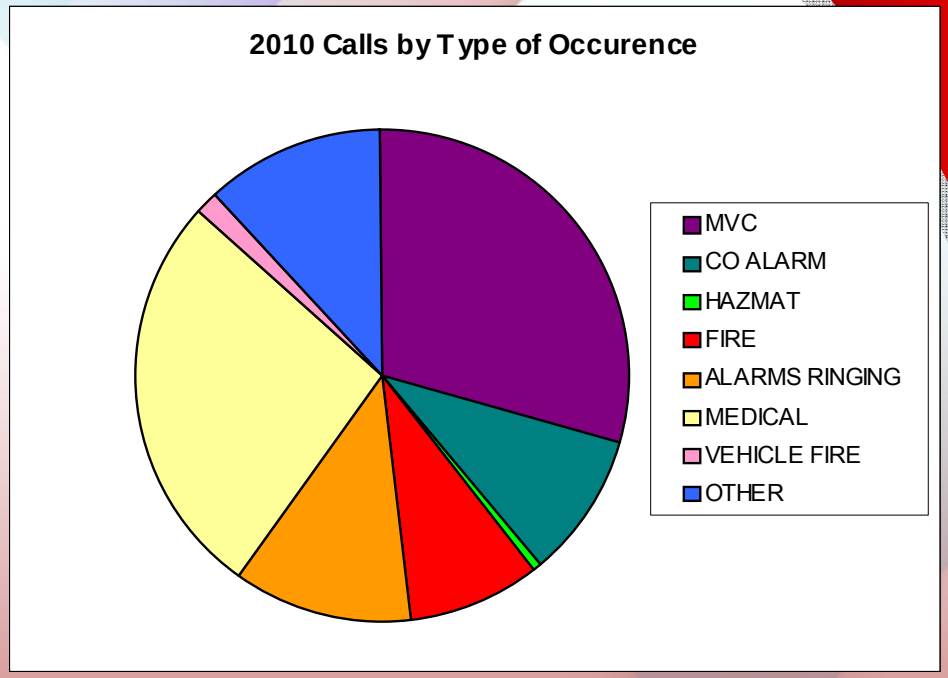
Staffing Complement:

- ✓ *1 full-time Fire Chief*
- ✓ *1 full-time Fire Prevention Office (Captain)*
- ✓ *1 full-time Suppression / Operations (firefighter)*
- ✓ *2 part-time administrative assistants*
- ✓ *2 volunteer Deputy Chief positions*
- ✓ *34 volunteer firefighters*
- ✓ *Currently vacancies*
  - *Deputy Chief*
  - *Full-time Operations Firefighter*

Photo credits:Celia Klemenz/Metroland

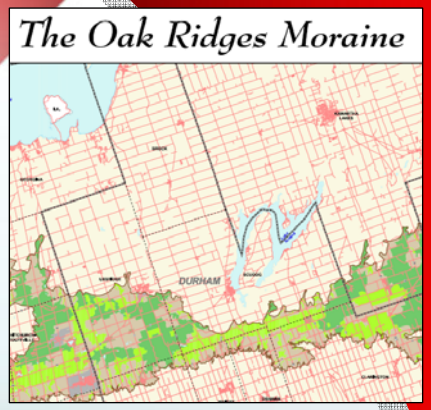
Department Workload

Year	Annual Call Volume
2010	439
2009	399
2008	375
2007	454
2006	499



Key Issues / Opportunities

- ✓ ***Township growth limited:***
  - Ontario Greenbelt Plan
  - Oak Ridges Moraine Conservation Plan
  - Lake Simcoe Protection Plan
    - *–Phosphorus Reduction Strategy*
- ✓ ***Plan match financial resources***
- ✓ ***New fire station***
- ✓ ***Maintain volunteer department***
  - Organization of resources



Key Issues / Opportunities

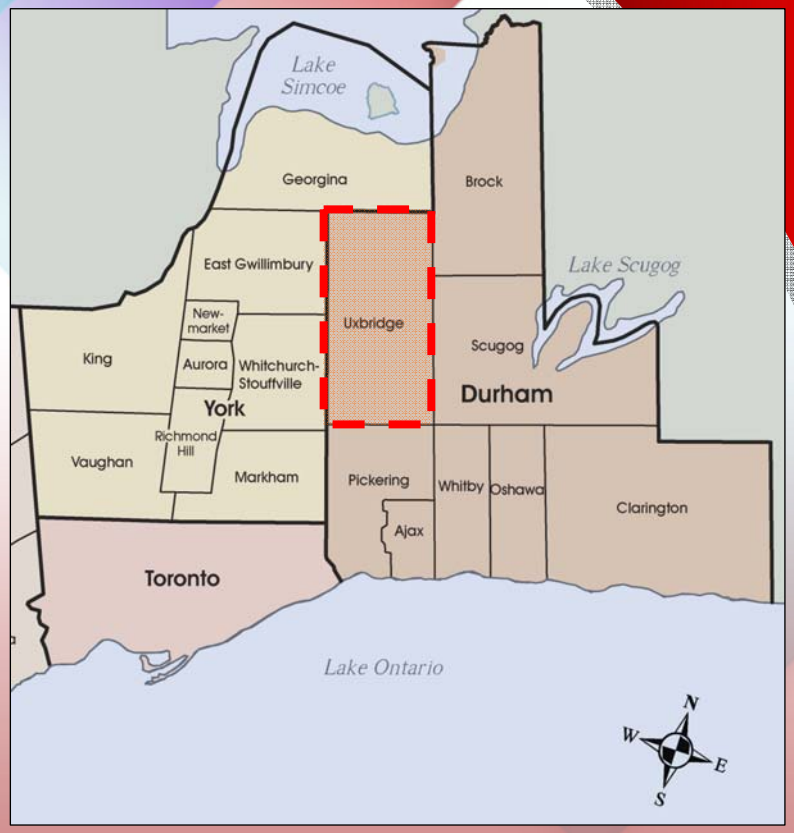
- ✓ *Medical calls / tiered response agreement*
- ✓ *Staffing vacancies*
- ✓ *Staffing vehicles (medical calls, fire / emergency calls)*
- ✓ *Council establish performance targets*
- ✓ *Live fire training*
- ✓ *Dispatch procedures / technology*
- ✓ *Fleet replacement*

Schedule and Progress

- ✓ **Project Initiation and Data Collection**
  - August – September 2011
- ✓ **Key Stakeholder Interviews & Site Visit**
  - September 28, 2011
- ✓ **Background Review**
  - September – October 2011
- ✓ **Volunteer Firefighter Roundtable Session**
  - November 1, 2011
- ✓ **Non-Suppression & Suppression Analysis**
  - November –January 2011
- ✓ **Project Update (Steering Committee) & Council Workshop**
  - February 9, 2012

Next Steps

- ✓ Finalize Analysis
- ✓ Present Draft Report to Steering Committee
- ✓ Present Final Report to Council



Questions?