anmore south
OCP Application Tech Addendum
Fire Impact Assessment
July 2023

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FIRE IMPACT ASSESSMENT SUMMARY

ATTACHMENT

Sasamat Volunteer Fire Department: Anmore South Development Impact Assessment
Dave Mitchell & Associates Ltd.
March 2022.

FIRE IMPACT ASSESSMENT

1. INTRODUCTION

The Anmore South OCP Amendment Application submitted to the Village of Anmore on May 5th 2023 seeks to unlock the Metro Vancouver Special Study Area designation for the 151-acre Anmore South lands located at 600, 1605 & 1755 Sunnyside Road. The development of the Anmore South lands offers the potential for a mix of housing and variety of community benefits while retaining the Village's semi-rural character. With the potential growth of Anmore, the community will need upgrades to the existing municipal Fire Service.

This Addendum presents the findings of the Sasamat Volunteer Fire Department: Anmore South Development Impact Assessment report, as supplemental information for the OCP Amendment Application.

2. Fire Impact Assessment Summary

Sasamat Volunteer Fire Department: Anmore South Development Impact Assessment
icona Properties
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The Fire Impact Assessment report provides a high-level review of the fundamental legal, regulatory and operational matters that underpin the operation of fire services. It provides baseline information on Anmore South and the Sasamat Volunteer Fire Department (SVFD), representing the first phase of a detailed study for addressing impacts of community growth.

The report describes the key findings of the Fire Impact Assessment as they relate to the Anmore South OCP Amendment:

- **Location** | the existing SVFD Fire Hall on East Road is within a 5km travel distance all of Anmore South homes, the maximum distance allowed by the Public Fire Protection Classification system;
- **Fire Hall** | based on proximity to the existing Fire Hall, development of Anmore South will not require consideration of adding another Fire Hall;
- **Current Level of Service** | the SVFD's current Level of Service has been declared as "Exterior Operations", restricting control/extinguishment of fire to an external position from the building;

- **Future Level of Service** | as population grows and building density increases, it becomes appropriate to upgrade the Level of Service to "Interior Operations" or "Full-Service", requiring new equipment, training, safety checks, response planning, and operational guidelines;

- **Building Height** | once a community has more than five buildings that exceed three storeys in height, an aerial apparatus (i.e., ladder truck) is required under Fire Underwriters' standards;

- **Apparatus Cost** | a fully-equipped "Type 1" fire engine with aerial apparatus is estimated to cost between $1.5-2 million; and,

- **Staff Recruitment** | as a volunteer fire service, staff recruitment and retention are a challenge for the SVFD. Some communities have experienced success in recruiting and retaining firefighters by providing dedicated housing or assisting with housing affordability challenges.

The full Fire Impact Assessment report is provided as an attachment to the Addendum.

3. Next Steps

The second phase of the Fire Impact Assessment will be prepared as part of the Anmore South rezoning process, following confirmation of neighbourhood density, street alignments and standards, and building forms.

Building on the Phase 1 report, the second phase of the Fire Impact Assessment will involve a detailed review of the operational and administrative capacities of the Sasamat Volunteer Fire Department, including staffing, apparatus, fire halls, administrative structure, mandate and budget. The information will then be used to identify specific development impacts and mitigative steps, as well as opportunities to enhance and improve operational capabilities of the Sasamat Volunteer Fire Department.

The Anmore South OCP Amendment provides a unique opportunity to unlock the Special Study Area designation, enabling development that will help fund needed Fire Service improvements including purchasing new equipment and upgrading of the existing Fire Hall.

attachment:

Sasamat Volunteer Fire Department: Anmore South Development Impact Assessment

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Sasamat Volunteer Fire Department:

Anmore South Development Impact Assessment

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8 March 2022

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Introduction and Background

icona Properties (the “Developer”) is the owner of approximately 152 acres of undeveloped land (“Anmore South”) within the Village of Anmore (“Anmore”). The Developer wishes to have the property re-zoned and the Anmore Official Community Plan amended, to permit a substantial residential and commercial development. The Developer has indicated that Amore South will involve comparable densities to what exists elsewhere in the Village, as well as a substantial investment in the necessary water, sewer, storm drain and related infrastructure.

As a fundamental element of its planning process, the Developer is seeking to identify and mitigate the impacts that the proposed development would have on fire service delivery in the Village. Fire protection is provided by the Sasamat Volunteer Fire Department (the “Department”), which is operated as a regional district service by Metro Vancouver and provides fire protection and emergency response services to both Anmore and Belcarra. The fire service study has been broken into two phases. This first phase provides a high-level review of the fundamental legal, regulatory and operational matters that underpin the operation of fire services generally, viewed in the general context of planning for a major development.

The second phase will build on the first and involves a detailed review of the operational and administrative capabilities of the Department, including staffing, apparatus, fire halls, administrative structure, mandate and budget. That review will be used to identify more particularly what impact the proposed development will have on the Department and the mitigative steps that should be considered.

It should be noted that the issues identified here are discussed at a very high level, and will be analyzed in the specific context of the Department’s operations in Phase 2. The concepts are common for any fire department when addressing growth in its community and are readily addressable. In the process, moreover, there will opportunities for the Department to enhance and improve its operational capabilities and administrative systems.

Fire Service – Operational Drivers

There are a number of factors that drive operational requirements for fire departments, which are relevant to assessing potential development impacts:

- Population – the number of emergency calls is highly correlated with total population;
- Demographics – an older population will tend to drive a higher volume of emergency calls, particularly where the fire department provides first medical responder services ("FMR"). Moreover, if the age demographic of a community is significantly skewed to an older population, this can negatively impact recruitment of new members where the local fire department is dependent on volunteer or paid-on-call members;
- Density – increased density raises the overall fire load and increases both exposure and access issues. This in turn drives the need to pump more water ("fire flows"), increasing the need for more apparatus, equipment and firefighters. Where the basic fire flow for a community is assessed to exceed 3,300 Imperial Gallons per Minute ("IGPM"), the Fire Underwriters require an aerial apparatus;[1]
- Building Height – as structure heights increase (three stories or more), the need for aerial apparatus increases. Aerials are required both to provide an elevated stream and to enable emergency access (for firefighters) and egress (both for occupants and, potentially, for firefighters). Under Fire Underwriters' standards, once a community has more than five buildings that exceed three stories (10.7 metres) in height, an aerial apparatus is required. Higher buildings also require more apparatus and more personnel to provide an effective response, as well as higher level of training and effective pre-incident planning. Under National Fire Protection Association ("NFPA") standards, where the minimum staffing for an ordinary residential fire is 16 – 17 firefighters and officers, staffing requirements for larger structures are significantly higher:[2]

[1] It should be noted that these requirements, if not met, are reflected in a drop in the area's rating for insurance purposes. Fire Underwriters' requirements are not a regulatory or mandatory requirement *per se*.

[2] These numbers are drawn from National Fire Protection Association, *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* (2020 ed.), which is a standard applicable to career departments. The staffing requirements in the equivalent standard for volunteer and composite departments (NFPA 1720), are left to the determination of the authority having jurisdiction. However, in practical terms, the NFPA 1710 standard identifies a role and function for each person in its minimum staffing requirements – as such, it provides guidance even for volunteer, paid-on-call and composite departments.

- three-storey apartment – minimum staffing of 27 – 28;
- open-air strip mall – minimum staffing of 27 – 28; and
- high-rise building (more than 6 stories) – minimum staffing of 42 – 43;

- Access – access issues come in two forms. First, there is the road network itself. If traffic levels are materially increased by development, emergency response times will be increased, which in turn increases the risk of fire spreading beyond the room of origin. Narrow streets, tight turns, obstructive or extensive "traffic calming" measures, and extensive on-street parking, all serve to impede an emergency response. Second, access to each building also is relevant. Geographic features (e.g. steep slopes, setback from curb) may limit access to individual structures and, depending on their design layout, more densely built communities may limit or impede emergency access for responding fire crews;

- Construction type – where structures are primarily constructed of combustible materials, the fire flow rating increases materially (effectively double that of non-combustible construction). Additionally, the presence or absence of NFPA 13-compliant sprinkler systems also materially affects the fire flow ratings;[3]

- Reviews of Development Plans and Fire Safety Plans – the local fire department needs to be included in the review process for the overall development plan as well as its individual phases. This involvement will help identify issues that can impact the delivery of fire and emergency services, or affect the overall fire risks arising from the project. Depending on the nature of the development, the new structures may require the creation of fire safety plans in accordance with the BC Fire Code (including for the development work itself).[4] Local fire departments need to review such fire safety plans. In connection with this work, there will be an increased administrative burden placed on the local fire department both during and following the development period;

- Water Supply – as the overall fire load and risk increases, the need for a reliable and sufficient water supply becomes increasingly critical. Where a hydrant system does not exist, or does not reliably provide the fire flows required, a fire department must make use of water tenders, which increases its apparatus and staffing requirements, and diverts staffing to water shuttle duties from other firefighting operational tasks;

- Purpose or use – while likely not relevant to the Developer's plans for this community, certain industrial uses can materially impact overall fire risk – as evidenced in other communities, where wood processing, chemical plants and oil processing, materially increase the overall risks faced. In addition, certain institutional uses (e.g., hospitals,

[3] National Fire Protection Association, *NFPA 13: Standard for the Installation of Sprinkler Systems* (2022 Ed.).

[4] Fire Code, Division B: Acceptable Solutions, s. 2.8.2, Fire Safety Plan. The issue of fire safety plans is considered further, below.

elder care, etc.), commercial or public assembly uses may also present unique risks that must be addressed in fire department planning, staffing, apparatus availability and training;

- Development period risk – during any major construction project, fire risk is materially heightened. Partially constructed buildings, which lack installed fire safety systems, present a significant fire risk, one recognized by both the NFPA and Fire Underwriters.[5] Some of the largest fire losses in the Province have been experienced in buildings under construction; and

- Need for Mutual or Automatic Aid – Mutual and automatic aid agreements are essential tools that enable fire departments to provide assistance to one another. They permit departments to share resources and specialty services (e.g., specialty rescue, hazardous materials responses, etc.), and enable them to obtain critical support for major incidents or other situations where a department's resources are overwhelmed by events. If the fire and other risks in a community regularly exceed the local department's capabilities, neighbouring jurisdictions may require that any assistance they provide is compensated, which needs to be factored into the overall costs of providing the fire service. The 1995 Metro-wide aid agreement permits (but does not require) responding departments to bill requesting jurisdictions for aid responses. In some cases, where the need for assistance is seen by the responding jurisdiction as overly frequent or onerous, it may be necessary to enter into a formal services agreement, which may include a standby or availability charge and/or a mandatory charge for all responses. As such, where development pushes the local department's response capabilities, it may also be necessary to factor in the costs of assistance from neighbouring jurisdictions.

[5] National Fire Protection Association, *NFPA 241: Standard for Safeguarding Construction, Alteration, and Demolition Operations* (2022 ed.). The Fire Underwriters effectively double the applicable water flow required for the building that is under construction. Letter from M. Currie, Fire Underwriters to Fire Chief, Bowen Island, 26 February 2008, "Construction of 'High Fire Flow' Structures on Bowen Island," at p. 3 of the letter.

Fire Services Legislation

Fire Services Act

The *Fire Services Act* sets certain fundamental requirements relevant to municipalities and to developers. The BC Fire Code, a companion set of regulatory requirements to the BC Building Code,[6] is issued as a regulation to the *Fire Services Act* and specifies certain minimum standards that must be adhered to in new and existing buildings. The Fire Code requires fire safety plans be developed and maintained by property owners in certain specified situations, and those plans are to be developed in consultation with the relevant fire department. Among others, fire safety plans are required for the following:[7]

- every building containing an assembly, care, treatment or detention occupancy;
- every building required by the Building Code to have a fire alarm system;
- demolition and construction sites regulated under section 5.6 of Division B of the Fire Code, with such plans conforming to the requirements specified in section 5.6.1.3.

As such, large development projects necessarily require the creation of an appropriate fire safety plan, which needs to be reviewed by the relevant fire department (thereby adding to a department's workload during the development phase). On an on-going basis, individual fire safety plans for assembly occupancies need to be developed by the property owner and regularly reviewed with the local fire department.

From a municipal perspective, the *Fire Services Act*:

- mandates that the fire chief for the municipality is appointed as a local assistant to the Fire Commissioner, with certain obligations regarding fire investigations, fire reporting and fire inspections on complaint or if deemed advisable;[8] and
- requires that municipalities operate a regular system of inspections of hotels, public buildings and buildings "used as a place of public resort".[9]

The addition of new commercial properties and any condominium, strata or townhouse developments with common areas, or the common areas of low or high rise structures, are required to be subject to a regular fire safety inspection by the local municipal fire department.

[6] The BC Building Code is issued as a regulation to the *Building Act* [SBC 2015], c. 2, s. 3. Hereafter the codes are referred to as the "Fire Code" and "Building Code", respectively.

[7] Fire Code, Division B – Acceptable Solutions, Part 2 – Building and Occupant Fire Safety, s. 2.8.2

[8] *Fire Services Act*, ss. 6(1), 9, 13 and 21.

[9] *Fire Services Act*, ss. 26 and 36.

As the number of inspectable properties increases, the workload for a department will necessarily increase.

The impact of such changes can be material where a department is dependent on volunteer or paid-on-call members to undertake duty crew or fire prevention officer fire safety inspections, follow up inspections and administration of compliance enforcement orders.

Fire Safety Act

In 2016, the Province passed a new *Fire Safety Act*, which is intended to replace the *Fire Services Act*. For a variety of reasons, the new statute still has not been proclaimed in force. However, once proclaimed, it will impact the obligations of local governments regarding, among other things, the conduct of fire safety inspections and fire investigations.

Where the *Fire Services Act* requires a "regular" system of inspections, the new *Fire Safety Act* moves to a "risk based" assessment process. In theory, this will require the local department to undertake a risk assessment of individual buildings and develop an inspection approach based on that assessment. Increased development will expand this task and increase the workload for the fire department. The establishment of a new minimum training standard for fire inspectors will also have a budgetary impact on the Department.

Fire Underwriters Survey

The Fire Underwriters Survey provides a fire risk rating for each community and fire service area in Canada. These ratings are used by insurance underwriters to assess fire risk and factor into insurance costs for both residential and commercial properties. Most residential homeowners and businesses carry fire and general perils insurance, and any person with a mortgage is required to maintain such insurance by the mortgagee bank or financial institution. Entities responsible for strata developments are required by provincial legislation to maintain insurance coverage.

The Fire Underwriters have two separate gradings:

- the Dwelling Protection Grade or "DPG" which is applied to single family and duplex residential properties; and
- the Public Fire Protection Classification or "PFPC" which covers multi-family, commercial, industrial and institutional properties.

It should be noted that the standards set by the Fire Underwriters are voluntary – a local government can choose to ignore the requirements. However, a properly qualified department, one that meets the Fire Underwriters requirements, results in significant insurance savings for residents and local businesses – as much as 60% for residential properties, and 40 – 50% for commercial or multi-family properties.[10] As such, the Fire Underwriters' rating is one element in the cost-benefit analysis of investing tax dollars in the fire service.

Where major developments are being undertaken, and the overall fire risk of an area is changed as a result, the Fire Underwriters' rating may well be negatively impacted unless appropriate mitigative steps are taken. This section sets out at a high level how the two rating systems work and identifies some of the issues which may need to be addressed as development proceeds.

Dwelling Protection Grade Rating

The DPG rating is on a "1-5" scale, where "1" is the best possible rating. There is a split rating at "3", which is broken into two subcategories, where "3A" indicates that there is an approved hydrant or water supply system, and "3B" indicates that the department relies on mobile water supplies. From the insurance industry's perspective, the ratings for residential homeowners are generally treated as follows:[11]

[10] The amount of any savings on insurance is determined by a host of factors, one of which is the Fire Underwriters' rating. However, when compared to properties where there is no recognized, rated fire protection services, the savings are substantial.

[11] The substance of this table is found in most Fire Underwriters' reports.

DPG Rating	Insurance Status	Comment
5	Unprotected	No savings on insurance from having a fire department.
4	Semi-protected	Some savings on insurance likely will be enjoyed; in some regions, this rating and "3B" are often treated as essentially equivalent, though that varies with the underwriter.
3B	Semi-protected	This is usually the rating level at which significant cost savings on insurance are enjoyed. This typically is the highest rating available in areas which are not hydrant-protected.
3A 3B(S) 3B(L) [12]	Protected	Progressively greater savings on insurance. Fully protected status typically means a savings of 50-60+% on insurance costs.
2	Protected	
1	Protected	

There are two principal components that make up the Fire Underwriters' DPG rating: first, there is the assessment of the fire department itself and its emergency response capabilities in the context of its service area; and second, is the location of the property in relation to a qualified fire hall and in relation to the hydrant system (if such system exists).

In assessing the level of fire suppression response, the Fire Underwriters consider the following:[13]

- fire department organization - whether it is authorized by bylaw and supported by taxation;
- the staffing composition of the department – whether it is a career response, a volunteer response[14] or a composite department with a mix of career and volunteers;
- the department's training system – they generally are looking for NFPA 1001 FF-I[15] or better for personnel, proper training records, and an established training program;

[12] A rating of 3B(s) is a Fire Underwriters' accreditation for tanker shuttle capability, where a department is able to demonstrate its ability to maintain a specified water flow for a stipulated period of time, using tanker units. It applies to areas which are not hydrant-protected, and must be periodically renewed. This specialty rating is treated by most insurers as being the equivalent of a "DPG 3A" (hydrant protected) rating. Similarly, a 3B(L) rating indicates the department has been accredited for "large diameter hose lay," which doubles the reach from a fire hydrant from 300 metres to 600 metres.

[13] This summary was largely drawn from a 2015 Fire Underwriters' report.

[14] In general, the fire underwriters do not distinguish between a paid-on-call and "true" volunteer membership. Rather, they are considering whether there is a cohort of responders available in the fire hall or whether the responders first have to travel to the hall to make a response.

[15] National Fire Protection Association, *NFPA 1001 – Standard for Professional Fire Fighter Qualifications* (2019 Ed.) ("NFPA 1001").

- the necessary number of apparatus, each meeting NFPA 1901 or ULC-S515 standards (and within the maximum age requirements – generally between 15 and 20 years, depending on the size of the municipality – set by the Fire Underwriters);
- all of the necessary additional equipment for operational requirements (ranging from hose and small equipment to self-contained breathing apparatus ("SCBA"));
- adequacy of the fire hall (based on location, suitability for purpose, and condition);
- alarm notification system (proper emergency communications); and
- whether there is a water supply meeting Fire Underwriters' requirements (and/or the ability of the fire department to transport water as required).

In relation to property location, the Fire Underwriters have set eight kilometres as the maximum travel distance from a qualified fire hall. Beyond that distance, a property is treated as "unprotected" (i.e., DPG 5). Similarly, they have set 300 metres as the maximum distance from a fire hydrant, beyond which the rating applicable to the property is downgraded to the rating given the particular department for non-hydrant protected areas. This distance from a hydrant can be extended to 600 metres where the relevant fire department is accredited by the Fire Underwriters for "large diameter hose lay."[16]

Public Fire Protection Classification

The PFPC rating is more detailed and more prescriptive than the DPG rating (which, in many cases, is likely drawn from the contemporaneous PFPC assessment). The PFPC rating is on a "1 – 10" scale, where "1" is the best rating and significant insurance cost savings are not experienced until the rating reaches about PFPC 7.

There are three principal elements in the PFPC that need to be understood, each of which may be affected by major developments or changes to a fire service area's building stock and population:

1. Assessment of the fire risk. This determination is undertaken by assessing the "required fire flows" – i.e., the amount of water a department needs to be able to flow to manage a fire in different structures within its service area – from which is derived the "basic fire flow" for a community. As density and/or building heights increase, and as land use changes (e.g., to a high-risk industrial use, or to special risk institutional uses such as hospitals or care homes), individual "RFFs" will increase, and the basic fire flow for the community will also increase. The community's "BFF" is a gating item: it will drive the assessment of the number of apparatus, the quantity of equipment and staffing required for a fire department. In short, the higher the BFF, the more equipment, apparatus and

[16] See: Fire Underwriters, *Accreditation of Alternate Water Supplies for Public Fire Protection* (2012), at: https://fireunderwriters.ca/Resources/FUS-AlternativeWaterSupplyAccreditationProtocol2012.pdf accessed on 12 February 2022.

firefighters that are required to meet Fire Underwriters standards, and get a good PFPC rating.

2. Assessment of the fire department's response capability. The assessment of the response capability is divided into four differently weighted sections:

    - Fire Department: 40% is attributed to the assessment of the fire department (with 19 separate assessment criteria);

    - Water Supply: 30% is attributed to the assessment of the water supply (with 15 separate assessment criteria);

    - Fire Prevention: 20% is attributed to the assessment of the fire safety control (covering fire prevention bylaws, inspection regimes, enforcement, fire education, and similar matters) (with four assessment criteria), and

    - Emergency Communications: 10% is attributed to the assessment of fire service communications and dispatch (with seven assessment criteria).

3. Property location. To be treated as protected, a property that is rated under the PFPC system must be within five kilometres of a qualified fire hall and within 150 metres of a recognized water supply (i.e., a fire hydrant).[17]

Major development projects potentially impact a service area's PFPC rating in several ways:

- by increasing the calculated BFF for the community, which in turn increases the number of required apparatus, with concomitant impacts on staffing levels and equipment needs;

- by changing the character of the fire risk – through densification, building height increases or land use changes – in a way that requires different apparatus (e.g., aerial units) and increased water supplies; and

- by increasing the need for fire inspections and fire prevention activities.

It should be noted that the proposed Anmore South project is well within the five- and eight-kilometre zones set by the Fire Underwriters. As such, the project will not impact fire hall location or, as has occurred in other municipalities, require consideration of adding a further fire hall.

[17] As with the DPG rating, large diameter hose lay accreditation can double the allowable distance from the hydrant – in the case of PFPC ratings, to 300 metres.

Level of Service

In 2014, the Fire Commissioner established new training standards for firefighters pursuant to the *Fire Services Act*.[18] The impetus for these new standards was a line of duty death of a volunteer firefighter in Clearwater, which led to both a detailed WorkSafe investigation and a series of recommendations from the coroner's investigation that followed. As a fundamental element of those new standards, the authority having jurisdiction (the "AHJ") over the fire department – which typically, though not always, is the local government – is required to establish the service level at which the fire department is expected to operate. That service level determines the nature and extent of the fire suppression response that the department is authorized to provide, which, in turn, impacts its training requirements and staffing levels.

Under the Playbook (which is in the process of being updated and revised), there are three possible service levels:

> **Exterior Operations** – includes fire fighting activities restricted to the control and/or extinguishment of fire from an external position to the building or object; where a fire department does not undertake interior attack or rescue operations on a fire-involved structure or object, or operate in an environment that is "immediately dangerous to life and health".
>
> **Interior Operations** – where a fire department, in appropriate circumstances, will enter a fire-involved structure or object to undertake fire suppression activities or conduct rescue operations. Interior operations by these departments are generally to be limited to smaller structures, single family dwellings and vehicles, except where specific hazard assessments and planning have been undertaken in respect of more complex risks.
>
> **Full-Service** – a full-service department is equipped, staffed and trained to provide a full spectrum of fire services by firefighters and fire officers who are trained to the competencies outlined in the NFPA 1001 FF-II and relevant NFPA 1021 Fire Officer[19] standards.

The Department's service level has been declared as Exterior Operations.

New developments potentially will drive the need to change the service level designation. As the population grows, and in more densely constructed settings, an "Exterior Operations" service level becomes less sustainable. Similarly, if the development involves high-rise

[18] The standard was updated, and a second edition released in 2015. A third edition is expected to be released sometime over the next 12 months or so. Office of the Fire Commissioner, *British Columbia Fire Service Minimum Training Standards: Structure Firefighters – Competency and Training Playbook* (September 2014; second edition – May 2015) (the "Playbook").

[19] National Fire Protection Association, *NFPA 1021: Standard for Fire Officer Professional Qualification* (2020 edition).

construction, significant industrial development or large institutional buildings, it may be appropriate to move a department to a full-service footing.

Where a department is operating at the Interior Operations level, the addition of multi-family, medium-rise and commercial properties will require a department to expand its pre-incident planning, update its operational guidelines and enhance its training to address the new risks. If new apparatus is required – such as an aerial – it also will require new training, updated safety checks (to meet WorkSafe BC requirements), updated response planning and additional operational guidelines.

Training

Effective fire department training programs are designed to ensure safe and efficient operations and must be aligned with the approved services provided to the community. Fire suppression training must conform with Provincial training standards and WorkSafe BC requirements for all functional or operational roles. Where no clear standard has been set, best practice requires adherence to the relevant NFPA standard. As noted above, the AHJ must declare the approved service level, based on a consideration of a number of conditions, including:

- the availability of resources;
- staffing model and the availability of those resources to respond;[20]
- the nature of the service area's risks;
- travel distances;
- apparatus and equipment requirements and availability; and
- the ability of the AHJ to sustain its fire department financially to enable it to meet all applicable training, safety and operational requirements for the chosen service level.

These regulatory requirements and approved services are key factors in determining the specific training required for each position within a department. As development occurs and service area risks increase, the AHJ may need to raise the service level and increase the training of its firefighters and officers. It may also need to revisit its overall staffing model. In each case, there may be an increased financial impact.

It is important to understand the extent of the training required to meet the minimum standards for fire departments based on that department's service level. The BC Firefighter Competency Matrix outlines the requirements of the AHJ with respect to minimum training qualifications and job performance requirements based on the relevant NFPA standards.[21]

> Minimum training qualifications for **Exterior Operations Level** firefighter includes the following:
>
> - Emergency Scene Traffic
> - Safety & Communications
> - Personal Protective Equipment ("PPE")
> - Ropes and Knots
> - Fire Streams, Hose and Appliances
> - Ventilation

[20] A factor which is particularly relevant to departments which are primarily dependent on volunteer or paid-on-call responders.

[21] Playbook, pp. 13ff. Bold face in the original.

- Water Supply
- Ladders
- Rehabilitation Area (Rehab)
- Introduction to Basic Fire Behaviour and Building Construction
- Dangerous Goods or Hazmat Awareness
- Gas & Electrical Safety for Firefighters
- Incident Command System 100

Minimum training qualifications for **Interior Operations Level** firefighter includes all of Exterior Operations Firefighter plus the following:

- Organization, Safety and Communication
- Rapid Intervention Team (RIT)
- Self-Contained Breathing Apparatus (SCBA)
- Search and Rescue
- Fire Behavior
- Fire Extinguishers
- Building Construction
- Forcible Entry
- Ventilation
- Loss Control
- Live Fire Exterior

Minimum training qualifications for **Full Service Operations** Level Firefighter includes all of NFPA 1001 – FF2 competencies (except Hazmat and Medical response) plus the following:

- Live Fire – Exterior & Interior
- Hazmat Operations

Instructor competencies include the following;

- Exterior Operations Level: Fire Service Instructor I (NFPA 1041) or Train the Trainer course
- Interior Operations Level: Fire Service Instructor I or higher (NFPA 1041)
- Full-Service Operations Level: NFPA 1001-FF2 and Fire Service Instructor I or higher under NFPA 1041. In addition, individual instructors for a particular competency must meet the requirements for that competency and be considered by the department to be capable of providing instruction to other department members.

Evaluator competencies include the following;

- The Training Officer is responsible for providing oversight for the delivery of training and the evaluation process. Individuals conducting the evaluations must be considered by the department to be capable of conducting such evaluation.

It also should be noted that the Playbook is not a complete system. It does not define the training for all emergency scene functional roles and responsibilities. As suggested above, where the Playbook is silent on such matters, best practice requires adoption of the relevant NFPA standard.[22]

Planning the delivery of training programs in volunteer departments is complex and must also consider the time commitment of the members required to complete the initial and ongoing maintenance training. The training requirements for fire departments have increased significantly over the past several years and we anticipate that the revisions to the Provincial training standards in 2022 will include additional obligations, especially for officers and incident commanders where changes in the service area are increasing potential risks.

Fire departments are also required to maintain detailed individual training records for each member of the department that must include the specific training subjects covered by each training session. We find that many fire departments are struggling to meet this administrative obligation (which is considered in greater detail in the Records Management section, below).

There are limitations with regard to the commitment that volunteers and paid-on-call members can make. As such, any increase in the time required from these individuals to meet regulatory requirements for skills training and maintenance, must be considered and may necessitate changes to the current volunteer staffing model.

[22] This issue is specifically recognized in the Playbook itself: Playbook, at p. 13.

Training Site and Props

To operate its required training programs, a department requires access to proper training facilities. The nature of those facilities is driven, in part, by the service level and extent of the services being provided by the department. An exterior operations department, which provides few or no specialty services (e.g., no medical or no rescue services), will need less complex training facilities than one that undertakes interior operations or a broader range of emergency responses.

Fire service training facilities include buildings, structures, practice areas and various props, along with related storage space. Some examples of props include medical equipment and mannequins, rope rescue equipment, tabletops and models for incident command training, and fire alarm/sprinkler systems. Other items, such as vehicles used for auto-extrication training, require a secured outdoor area.

For smaller departments, there may be room in the main fire hall and outside on the adjacent grounds that are used for classroom instruction and some training evolutions. Most of these departments need to send their members out of jurisdiction for other critical training activities (e.g., live fire training, vehicle extrication training, etc.), which can be both costly and time-consuming. As such, most departments try to develop some level of self-sufficiency so that fundamental training needs can be met locally.

Some fire departments and various specialized training centres are fully equipped with drill towers, drafting pits, live fire training structures, emergency vehicle operations courses, driver training areas, areas for practising flammable liquid and gas fire suppression, hazardous materials training capabilities, and other equipment and areas for specialized training. The capital and maintenance costs of such training grounds are significant (even if some operational revenue can be derived from renting the facilities to other departments).

As a department's training needs increase – driven by changes to its service level, call volumes, services provided, and the nature of the risks being faced – there will be a need to improve and expand its training facilities.

Records Management System

Records keeping by fire departments has become increasingly complex. In addition to their general administrative needs, fire departments are required by both the Playbook and WorkSafe BC to maintain various types of records. As such, fire departments need to keep records on a wide variety of matters, including the following:

- training and qualifications of members and officers (on an individualized basis);
- incident responses;
- pre-incident plans;
- inspections;
- apparatus and equipment repairs, testing, and related maintenance;
- post-incident analysis;
- infectious disease and other exposures tracking;
- a series of occupational health and safety matters (ranging from joint committee records and inspection reports to workplace accident investigations); and
- general administration (e.g., tracking of hours, compensation, benefit entitlements, etc.).

As the size of a department increases, and its role and responsibilities are broadened, the time, effort and technologies involved in creating and maintaining a proper and comprehensive set of records will necessarily increase. Individualized training records, covering qualifications, and initial and maintenance training, are required by the Playbook and WorkSafe BC. These records need to include the subject matter of the lesson plan, and the name of each firefighter trained, the instructor and information as to the evaluation and assessment processes. As the level of service provided increases, and as a department undertakes a broader range of emergency responses (e.g., specialty rescue, emergency medical responses, etc.), the quantity of training and the number of records will increase materially.

Records of all fire inspections and fire cause investigations are a requirement of the current *Fire Service Act* and its successor, the *Fire Safety Act*. Accurate record keeping of all inspection and investigation activities undertaken by a department are also needed to manage legal risk for the local government and fire cause investigations are required to be reported to the Office of the Fire Commissioner. Increases in the number of inspectable properties as well as their growing complexity will require a larger and more sophisticated records management system; it will also increase the level of training required for those maintaining the records system. The growing administrative burden often drives the need for more staffing – and in a volunteer or paid-on-call department, increases the pressure to move to career positions for various roles (e.g., a career Fire Prevention Officer; adding administrative staff, etc.).

It is essential that departments have ready access to their incident response data, in a usable format. These data will inform workload assessments and fire prevention initiatives, and are critical in protecting the local government should a claim arise in relation to an emergency response. They also are necessary to manage the local government's obligations under the *Freedom of Information and Protection of Privacy Act.*

Records of incident responses will include the date and time the incident was reported, as well as the time at which the department was notified, the time each unit responded to the incident from the fire hall, unit on-scene times, any additional resource call-outs (e.g., mutual aid, or a further alarm), and each unit's return to service at quarters. These details are typically recorded by the dispatch provider in its Computer Aided Dispatch system ("CAD"). The CAD data often will include contemporaneous comments from the responders, such as time stamps for requests for ambulance, police and electrical support, as well as information regarding the fire's status, such as loss stopped and other details. Almost without exception, fire services in BC no longer have their own dispatch provider and instead rely on the service of another agency (in the case of the Department, it is dispatched by E-Comm).

The dispatch service provider typically provides an electronic copy of all incident details to the responding department, which a department then needs to manage (or have managed on its behalf) a records management software system. A department will then add further information to complete its fire response record. The additional data will include details of all actions by the responders, an estimate of the fire loss, details as to any injuries to persons at the scene, any lost or damaged equipment, and a description of any damage to adjacent properties. The records kept will also detail any firefighter exposures to infectious diseases, carcinogens and traumatic events, along with the measures taken to reduce or mitigate any such exposures.

Accurate records of all actions of a fire department are a requirement of the Playbook as well as WorkSafe BC, and are part of a legal record against which a department will be measured. Fire department records management systems have become increasingly complex: more information needs to be stored, across a greater number of information fields, and reportable out for varying purposes. As a department grows, as its responsibilities expand and incident responses increase, more data and information will need to be collected, stored, protected and used. As such, to the extent that major development projects drive concomitant expansion of a fire department, it is necessary to ensure that onward impact on the department's records keeping processes and systems are included in the impact assessment.

Fire Halls

The suitability of a department's fire hall(s) depends on the nature and level of service it is providing, the overall size of the department, the size of its fire service area and each hall's location. As development occurs, and a fire department expands to meet its larger service obligations, fire halls may require expansion or replacement. In some cases, where there is a large service area and the development is occurring outside one or more of the Fire Underwriters' prescribed maximum distances (i.e., eight kilometres for residential or five kilometres for commercial and multi-family properties), an additional fire hall may be required.

At a high level, a fire hall must:

- be capable of safely storing all of a department's apparatus (the number and configuration of which may be affected by changed response requirements driven by development);
- have sufficient storage space for spare hose, SCBA cylinders and other small equipment;
- have a hose tower (or drying racks);
- provide sufficient room properly to store members' personal protective equipment;[23]
- enable separation of contaminated equipment from office/living quarters;
- provide sufficient interior space for administration, training and any in-house equipment repair and maintenance;
- provide facilities for post-response decontamination by firefighters;
- provide some level of amenities for firefighters – which will depend on the staffing model and use of the fire hall. These facilities may include sleeping accommodation, kitchen space and fitness equipment.

Fire halls may also need to serve as a primary or secondary emergency operations centre (and be designed and equipped with that aim in mind) and/or a place of refuge during area-wide event.

In addition, fire halls need to be resilient. Ideally, such facilities will meet the most recent Building Code requirements for emergency response facilities, including seismic and weather resistance. They also should be properly equipped with back up power systems, to enable continuing operation during power outages.

[23] Ideally, this storage space will be isolated from the apparatus parking area, to avoid contamination of the PPE by vehicle exhaust.

Fire hall location can also be a critical factor. Where significant, unsprinklered development is occurring, it is important to ensure that the new construction is within a 10-minute response of the fire hall. If it is not, then certain additional requirements will need to be met under the Building Code with respect to spatial separation and unprotected openings. Under the Building Code, this 10-minute period is calculated as the

> "time from receipt of notification of a fire by the fire department until the arrival of the first fire department vehicle at the building exceeds 10 min[utes] in 10% or more of all fire department calls to the building".[24]

The Province's interpretation of this requirement can be found in presentations and interpretation bulletins that were issued contemporaneously with the amendments that were made in 2012. In a presentation to the Fire Protection Officers' Association of BC on 13 May 2013, an Office of Housing and Construction Standards ("OHCS") official noted that:[25]

> "'Response time' is measured from the fire department's receipt of the emergency call until a properly manned fire truck arrives at the building. The response time should be the 'turn out' time plus travel time to the site of the proposed building."

The OHCS subsequently issued Information Bulletin B13-04, dated 8 July 2013, entitled "Fire Department Response Times" (the "Information Bulletin"), in which it noted that a department's response time is to be calculated as the

> "time from the receipt of notification of a fire by the fire department, to the arrival, at the building or building site, of the first firefighting vehicle that is staffed and equipped to fight a fire for the purpose of limiting the exposure."[26]

The vehicle arriving on scene must be a "firefighting vehicle", which is defined as one that has integral firefighting equipment and does not include support or auxiliary vehicles.[27]

In both cases, it was noted that the vehicle has to have sufficient staff to undertake response operations:[28] for external operations, an initial attack can safely and effectively begin (though not be properly sustained) with three trained firefighters.

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[24] This language is found in the Building Code, Part B, ss. 3.2.1.3.(8)(a), 9.10.14.3.(1)(a), and 9.10.15.3.(1)(a).

[25] Zachary May, Building and Safety Standards Branch, OHCS, "Fire Safety in the 2012 BC Building Code," presentation to the Fire Protection Officers Association of BC, Kelowna (May 2013) at p. 74 (the "OHCS Presentation").

[26] Information Bulletin, p. 1.

[27] Information Bulletin, p. 2.

[28] As defined, the relevant fire suppression response type under the *Building Code* is an exterior attack that protects the exposures of neighbouring structures.

Apparatus

One of the principal capital costs of operating a fire department is related to the fire apparatus itself. There have been significant inflationary pressures in this area in recent years. A fully equipped "Type 1" engine – which is the standard pumper unit designed to respond to structure fires – now can cost in the range of $1.0 million, while aerial apparatus can easily cost between $1.5 – $2.0 million.

Fire Underwriters' standards significantly impact apparatus requirements – and the application and effect of those standards, in turn, can be affected by major development and growth in a community. As noted in the section on the Fire Underwriters Survey, as a community's fire risks increase (through growth, densification and building height changes), more apparatus will be required, and the type of apparatus needed may change.

Equally significantly, under the rating system used by Fire Underwriters, the maximum frontline lifespan of apparatus in an urban environment is about 15 years and apparatus are treated as "unrated" after 20 years.[29] The application of these standards is also affected by community size: while Fire Underwriters may permit small communities can extend the frontline lifespan of their fire apparatus to 25 years (and occasionally beyond), they are less willing to make allowances for larger communities. As such, one of the impacts of development and growth is that it creates a need to build a capital plan for apparatus based on 15 years of frontline (first out the door) service, followed by five years of reserve status, and replacement at the 20-year mark.

The appropriate specification of fire apparatus, and the total number required, are dependent on a number of factors including:

- building heights and construction types within the community;
- the presence of specialized risks (including large institutional occupancies, high risk industrial properties, interface risks, etc.);
- the quantity of water that a department needs to be able to flow;
- sprinklering;
- access issues both to the structures themselves and based on the terrain and road network;[30]
- the nature of the water supply and hydrant system;
- the available fire force (personnel); and
- the types of services provided by the department.

[29] The Fire Underwriters' requirements are based, in part, on the guidance provided in Schedule D to *NFPA 1901: Standard for Automotive Fire Apparatus* (2016 ed.) ("NFPA 1901"). NFPA 1901 is in the process of being updated and rolled into a new, more comprehensive standard – NFPA 1900.

[30] Where streets are narrow or where there are tight turns, larger apparatus may well prove unsuitable.

Training requirements and maintenance costs are also impacted as a department grows and its number of apparatus increase, and its apparatus mix changes.

The principal types and description of fire apparatus are set out below.

Aerial Ladder Truck

An aerial ladder truck is a fire apparatus fitted with an elevating device that provides access to roofs and above-ground access points for firefighters, enables egress (sometimes emergency egress) from heights for firefighters and members of the public, and enables firefighters to deliver water as needed to elevated areas not accessible from the ground.

Aerial ladder trucks are most often fitted with a water tank, hose and a fire pump, enabling the apparatus to function in multi purposes and to contribute to the community's fire flow requirements.

Where in the past aerial ladder devices may have been considered specialty devices used only in areas with unique fire risks, they are now considered to be integral components of any modern firefighting fleet. The assigned roles for Ladder Companies include forcible entry, utility shut-off, ladder placement, ventilation, salvage and overhaul and lighting.

As noted above, the Fire Underwriters' rating is negatively impacted if a department lacks an aerial unit, and its response area has at least five buildings that are 10 metres or more in height or districts that have a basic fire flow greater than 3,300 IGPM or any combination of these criteria. The height of the ladder needs to at least equal the height of the tallest building (to a maximum of 100 feet.)

Engines

Engines are the most common type of fire apparatus used in structure firefighting. Equipped with hose, ladders, a water tank and fire pump, and staffed with three to six firefighters, engines are often the first fire apparatus on scene to support fire suppression efforts. Sometimes also referred to as pumpers, engines can be categorized by four basic types:

Type 1 Engine

A Type 1 Engine is required to have a pump rating of at least 1,000 GPM and a minimum water tank size of 300 gallons. Most such apparatus significantly exceed these minimum requirements.

Type 2 Engine

A Type 2 Engine has many of the same features as a Type 1, but typically has a shorter wheel-base and is equipped with a smaller pump and water tank. A Type 2 Engine is designed to be a more versatile option as a first out unit that is capable of managing smaller fires or providing initial attack on structure fires.

Type 3 Engine

The Type 3 Engine is often used as a wildland fire truck and is well adapted to areas with steep hills, narrow roadways and driveways, and similar terrain constraints. These trucks have a minimum of a 500-gallon water tank and 150 GPM pump, which often is of a power take off ("PTO") design (i.e., the pump takes its power from the transmission). A Type 3 Engine using a PTO pump can pump water while driving, a useful ability when involved in suppressing interface fires and wildfires.

Rescue Truck

Rescue Trucks carry specialized equipment for a range of incident types, including motor vehicle extrication, hazmat incidents, medical responses and firefighter rehabilitation. These vehicles are highly customized to meet the specific needs of the department.

Rescue Trucks are sometimes equipped with water tanks, fire pumps and hoses to enable those units to support firefighting efforts. In those cases, the pumping capacity can contribute to the calculation of a department's fire flow capability.

Response capability requirements are included in the NFPA *Fire Protection Handbook* (20th edition) and include the following response requirements for ladder trucks and pumpers:

High-Hazard Occupancies (schools, hospitals, nursing homes explosive plants, refineries, high-rise buildings, and other high-risk or large fire potential occupancies):

At least four engines and two ladder trucks (or combination apparatus with equivalent capabilities).

Medium-Hazard Occupancies (apartments, offices, mercantile and industrial occupancies not normally requiring extensive rescue or firefighting forces):

At least three engines, one ladder truck (or a combination apparatus with equivalent capabilities).

Low-Hazard Occupancies (one, two or three family dwellings and scattered small business and industrial occupancies):

At least two engines, one ladder truck (or combination apparatus with equivalent capabilities).

Equipment

Fire service equipment, whether for the fire halls, apparatus or personnel, is regulated by both general and specific requirements established by WorkSafe BC.[31] Where specific requirements have not been set, NFPA standards form best practice and typically are applied by a fire department's AHJ. Equipment use, management, servicing and repair will be set out in a fire department's operational guidelines and overseen as part of its occupational health and safety program. Changes to equipment will have an impact on a department's training program as well as its maintenance and servicing requirements.

A fire department must provide an adequate range of tools and equipment to enable effective response and mitigation of a range of potential emergency situations, and must also provide an adequate quantity of each type of tool and equipment based on the numbers of fire apparatus and firefighters in the department.

The equipment listed below is not exhaustive but provides examples of the major items that must be purchased and maintained by a department, and factored into its capital asset replacement program:

- firefighter PPE: Boots, pants, jacket, spanner belt, helmet, gloves, flash hood, survivor light;
- SCBA: complete packs, harness, masks, spare air bottles, PASS alarms,[32] and SCBA compressor for refilling cylinders. Many fire departments are moving away from metal cylinders to composite materials that are lighter in weight and capable of carrying larger volumes of air by operating at higher pressure'
- fire hose and fittings: various hose sizes (typically from 1.5 inches to 2.5 inches in diameter; though larger diameter hoses may also be used); water supply hose, hose clamps, attack hose of various sizes, nozzles, ground monitors, fittings, compressed air foam supplies, foam eductors, high-rise hose packs;[33]
- portable fire extinguishers;
- ladders: ground ladders, roof ladders, attic ladders (each in varying length);
- fans and related portable generators: to provide positive pressure ventilation - specialty high flow fans to exhaust smoke and hot air;

[31] Specific requirements for the fire service are found in Part 31 of the *Occupational Health and Safety Regulation*, made under the *Workers Compensation Act*. All of the other general and many of the specific requirements of WorkSafe BC also apply to fire department operations and related equipment.

[32] "Personal Alert Safety System" – a PASS can be activated manually by a firefighter to call for assistance, and will sound an alarm automatically in certain circumstances.

[33] High-rise hose packs are packs designed to enable a one person to carry up to 150 feet of 2-inch hose with nozzle and adapters.

- portable radios and related charging equipment;
- medical equipment: oxygen filling system, oxygen bottles, Automatic External Defibrillators, first responder medical equipment;
- extrication equipment: hydraulic or battery-operated tools including spreaders, cutters, rams, stabilizers, blocking;
- hazardous materials responses: equipment for containment and mitigation during hazmat events, including gas monitors;
- station wear: pants, belt, socks, shirts, boots, jackets;
- miscellaneous hand and power tools for emergency operations: chain saws, solo saws, pike poles, fire axes, forced entry tools, water vacuums;
- high/low angle and confined space rescue equipment: ropes, harnesses, gloves, helmets, basket stretcher; and
- overhaul equipment; tarps, tools.

The range, quantity and types of equipment and tools will change as a department grows, or as it is required to address increased risks within its service area. Much of this equipment is highly specialized and expensive. Fully outfitting a single firefighter with PPE and station wear can easily cost in the range of $4,000, while the cost of a complete SCBA pack is in the range of $8,000 – $9,000. Much of this equipment also has a fixed replacement schedule – for example, a firefighter's bunker gear (jacket, pants) needs to be replaced about every 10 years, to meet manufacturer's specifications, NFPA standards and WorkSafe BC requirements.

Pre-Incident Planning

Pre-incident planning is a necessary fire department tool that contributes to the control and reduction of fire damage and enhances firefighter safety. A pre-incident plan collates and displays key information about a set of premises that can directly influence the strategy and tactics employed by an incident commander, and helps facilitate an effective and safe response to emergency incidents.

Such planning is an industry best practice. In addition, departments operating at the Interior Operations service level are limited to undertaking interior fire suppression activities within simple structures or objects such as a single-family dwelling, vehicle, or other small structure. The departments may also undertake interior operations in larger or more complex structures only where the AHJ has assessed and pre-planned for such a response, and has determined the structure to be safe for such operations by qualified firefighters. Firefighters must be trained specifically to the risks associated with these structures.[34] The employer's obligations to mitigate and manage risks under the *Workers Compensation Act* and associated regulations, also make such pre-incident planning essential for all fire departments undertaking interior operations.

The need to create and maintain pre-incident plans can materially affect a department's workload. This workload can also be impacted by the technology used for the storage and access of pre-incident plans (e.g. CAD system / tablets / paper based). The creation and maintenance of pre-incident plans can overlap with a department's fire inspection program, and should be contemplated by the department's operational and establishment bylaw. Much of the information required to create a pre-incident plan, or to validate and update existing plans, can be gathered during the fire safety inspection process.

Pre-incident planning is also a factor in the Fire Underwriters' rating of a department, factoring into both the Fire Department and the Fire Control scoring. The Fire Underwriters review of a department's pre-incident planning program specifically looks at the plan preparation, the quality of data and the use of pre-incident plans in training and responses.

[34] Playbook, at p. 17.

Recruitment and Retention

There are more than 400 fire departments in British Columbia. Of that number, approximately three-quarters of them rely on volunteer or paid-on-call members for some or all of their fundamental fire suppression activities (as well as for administration and oversight). The Department is among that number: it pays some pre-set stipends to its officers and pays some small remuneration to its members for practice attendance and responses.

Recruitment and retention pose a perennial challenge to the volunteer fire service. They can become significant issues where a department becomes busier – requiring more responses by members – or where training obligations are increased to meet a higher level of service. While new residential development can assist by providing a larger body of potential recruits from which a department can draw, there are significant time lags to training up new members. In general, in a volunteer context, it generally takes upwards of 12 to 18 months to properly train new members (particularly if the department is operating at the Interior Operations level or higher).

It is perhaps helpful to understand how fire departments evolve over time, as their communities grow, and the departments' responsibilities expand. In smaller communities, fire departments often start out as purely volunteer affairs. Faced with the increasing administrative burden from WorkSafe BC, Office of the Fire Commissioner and other provincial standards, many then move to a stipend system for their officers, and eventually to a paid-on-call system for members. From there, as operational and administrative requirements increase, it is typical to see career officers recruited – Fire Chief, Deputy Fire Chief, Training Officer and Fire Prevention Officer (or some combination of these roles, depending on the department's needs). In the fullness of time, and with continued community growth, departments then begin to recruit career firefighters – particularly to address the fact that weekday, daytime turn outs by volunteer or paid-on-call members is often insufficient, as the members are at their regular jobs and either unable to leave or to respond in a timely fashion.

In some cases, communities have taken a slightly different approach, and implemented a work experience program ("WEP"). Those programs bring in a cohort of fully trained, but inexperienced firefighters (i.e., they will have their full NFPA 1001, FF-II qualifications). The department pays the WEP members a stipend, arranges housing, ensures that they receive both training and experience during their tenure (which is typically about a year in length), and then assists the WEP members with their job search following completion of the program. While conceptually attractive in many ways, it needs to be recognized that there is a significant and on-going administrative burden associated with such programs.

Some communities have also experienced success in recruiting and retaining firefighters by either providing housing for those individuals or assisting them with housing affordability challenges. These methods are most commonly found in resort communities where it is difficult to access housing.

In this context of fire department evolution, it needs to be recognized that major development and growth in a community can severely tax the abilities and resources of a volunteer or paid-on-call department. Such growth can exacerbate retention issues, and create recruitment needs that a department will be challenged to meet.

Various steps can be taken to improve recruitment and enhance retention. Those steps include ensuring that members feel sufficiently rewarded – whether in the form of recognition, some level of compensation and/or benefits, or the combination thereof – to be attracted to the opportunity to join the Department and to remain with the service. It also means that the recruitment processes need to be designed to reach the appropriate audience. Finally, it is important that a balance can be struck between too many and too few calls. Where volunteer and paid-on-call members have too great a workload, a department can suffer attrition; conversely, if they seldom if ever get to exercise their training, attrition occurs. The former is more readily addressable – whether in the form of moving towards a composite structure, or creating a duty-crew system that works with members' schedules. The specifics relating to the Department's recruitment and retention issues will be explored during the second phase review.

Appendix 1: Defined Terms and Acronyms

Term/Acronym	Definition
AHJ	Authority Having Jurisdiction
Anmore	Village of Anmore
BFF	Basic Fire Flow
CAD	Computer Aided Dispatch
Department	Sasamat Volunteer Fire Department
Developer	Icona Properties
DMA	Dave Mitchell & Associates Ltd.
DPG	Dwelling Protection Grade
Fire Flow	The quantity of water a department needs to be able to flow to address risks within its service area
FF-I and FF-II	Firefighter I, Firefighter II under NFPA 1001
FMR	First Medical Responder
IGPM	Imperial Gallons per Minute
LGMA	Local Government Management Association
NFPA	National Fire Protection Association
OHCS	Office of Housing and Construction Standards
PASS	Personal Alert Safety System
PFPC	Public Fire Protection Classification
Playbook	*British Columbia Fire Service Minimum Training Standards: Structure Firefighters – Competency and Training Playbook* (September 2014; second edition – May 2015)
PTO	Power Take Off
RFF	Required Fire Flows
PPE	Personal Protective Equipment
RIT	Rapid Intervention Team
SCBA	Self-Contained Breathing Apparatus
WEP	Work Experience Program

Appendix 2: Consultants' Biographies

The following section describes the background, experience and qualifications of the consultants contributing to this report.

Dave Mitchell

Dave Mitchell retired as Division Chief, Communications in 1998 from Vancouver Fire & Rescue Services following a career spanning 32 years. During this time, he was responsible for managing the emergency call taking and dispatch for the Vancouver and Whistler Fire Departments. In 1997 he managed the transition of dispatch service for the five fire departments on the Sunshine Coast from an independent contractor to Vancouver Fire & Rescue Services.

In 1998, Dave was hired by E-Comm 9-1-1, Emergency Communications for BC (E-Comm) as its first Director of Operations. In this role he was a member of the founding senior management team and was responsible for the transition of the Regional 9-1-1 Control Centre staff from the Vancouver Police Department to E-Comm in June 1999. By June 2000 this included the management of approximately 200 call takers, dispatchers and team managers in addition to a ULC listed alarm monitoring service.

He left E-Comm in June 2000 to work as a consultant, and since that time has managed the development of corporate, strategic and operational plans for a number of clients. As principal of DMA, Dave participates on all projects undertaken by the company either as the lead consultant or by providing his expertise at an advisory or support level.

Dave holds a Bachelor of Arts Degree (Geography) from Simon Fraser University in addition to a diploma from their Executive Management Development Program. He is past Chair of the Board of Directors of the Vancouver General Hospital and University of British Columbia Hospital Foundation, and currently a Director and Board Chair of the Justice Institute of British Columbia Foundation, a member of the National Fire Protection Association, the Association of Public-Safety Communications Officials, the Fire Chiefs' Association of British Columbia, the BC 911 User Group, and the Canadian Association of Management Consultants.

Gordon Anderson

Gordon Anderson retired in 2019 with 29 years in the fire service, serving for the last five as the British Columbia Fire Commissioner. In this role, he was the senior fire authority for the Province providing advice to government and supporting local government fire services, as well as dealing with fire service issues at the national level. While in government, he also periodically fulfilled the role of (Acting) Assistant Deputy Minister for Emergency Management BC (including during the record 2017 flood season).

During this time he implemented a new Structure Firefighter Training Standard (the Playbook), modernized and expanded the wildland interface Structure Protection Program in partnership

with the BC Wildfire Service and the Fire Chiefs' Association of BC and, with extensive stakeholder input, successfully developed and passed new provincial legislation to repeal and replace the current Fire Services Act (implementation pending).

Prior to joining the Office of the Fire Commissioner, he had many years of experience in volunteer fire departments and 22 years in a career department (Esquimalt Fire Rescue) where he rose through the ranks to finish his last six years as Deputy Fire Chief. His extensive experience as a department Chief Training Officer and 12 years as a contract instructor for the Justice Institute of BC included instructing firefighters and all four levels of the NFPA Fire Officer Certificate Program.

In addition to a Bachelor of Arts degree from the University of Victoria and NFPA Fire Officer Level 4 certification; in 2018 he earned a Bachelor of Public Safety Administration degree. Gordon holds certification as an Executive Chief Fire Officer and is a Fellow at the Institution of Fire Engineers (United Kingdom). He is past-President of the Council of Canadian Fire Marshals and Fire Commissioners and served on the governance board of the Canadian Public Safety Operations Organization (CANOPS). Combining this with many years of experience as a front-line police officer, he has moved into a consulting role for a wide range of fire service, public safety and emergency management issues.

Jim Cook

Jim Cook is an experienced professional with over 38 years of experience in the fire service. He has extensive knowledge and experience with budgets, labour relations, fire operations, strategic planning, executive leadership, project management, community engagement, and organizational change.

Jim began his career in the New Westminster Fire Department. He was promoted to the position of Deputy Chief in 2001. His roles and responsibilities included administration, operating and capital budgets, communications, human resources, emergency operations, training and facility maintenance including the planning and oversight of the transfer of personnel and equipment to the new main fire hall.

In 2008, Jim was appointed to the position of Fire Chief in West Vancouver where he worked to improve the mutual and automatic aid agreements in the region. This included transitioning the department to the E-Comm Wide Area Radio System. He also served as a member of the senior management committee responsible for leading the analysis, planning and design of an emergency services building.

During his career, Jim has worked on several committees and boards including the BC Municipal Pension Plan, BC Investment Management Corporation, Vancouver Hospital Foundation, BC Fire & Life Safety Education Program, First Responder Program and the BC Fire Chiefs' Association. He is also a past-President of the Greater Vancouver Fire Chiefs' Association. He has also been an instructor in the fire officer leadership program at the Justice Institute of BC. Jim retired in 2015 and is now working as a consultant specializing in organizational structure and change management in the fire service.

Ian MacDonald

Ian MacDonald is a former lawyer who practiced international corporate law in Canada and the United Kingdom. Ian started as a lawyer with Davies Ward & Beck in Toronto in 1990 and worked on large corporate transactions in Canada, including corporate financings, shareholder agreements and corporate restructurings and corporate acquisitions. Ian became a partner in Davies Ward & Beck in 1994 and an equity partner in 1996.

After moving to England in 1998, Ian became managing partner of Arnander, Irvine & Zietman, an intellectual property/litigation firm, and had a varied practice advising clients in respect of company formation, shareholder and members' agreements, corporate financing, governance issues, and privacy matters. He also did extensive work on litigation files related to corporate fraud.

Ian retired as a lawyer in January 2004 and returned to Canada, since which time he has acted as a volunteer director on two boards, acting as the chair of the governance committee for both, and assisted various community groups in developing long term strategic and business plans. Ian has previously worked with Planetworks Consulting Corporation on the Capital Region Emergency Service Telecommunications project, conducting a full governance review of that organization.

Since 2007 Ian has worked with DMA and been involved on almost all the major fire and emergency service project. In addition, he is providing advice to several fire departments as they rewrite their bylaws to reflect the changes required by the Playbook and the Fire Safety Act.

Tim Pley

Tim Pley is a retired local government chief administrative officer (CAO) with extensive experience leading on local, regional and provincial fire department matters. Tim's public service career began in 1990 as a firefighter. He was a member of the IAFF local executive for ten years, a deputy fire chief/chief training officer for eight years and fire chief for eight years. In 2016 he was appointed CAO for the City of Port Alberni, a position he held for six years.

During his career with the fire department Tim was an executive board member of the Fire Chiefs' Association of BC (FCABC) for eight years, including three years as president. In that capacity Tim forged new relationships with the provincial government and the LGMA. He was a co-creator of the BC Fire Service Minimum Training Standards: Structure Firefighters – Competency and Training Playbook, supported the Province in implementing that new minimum training standard, and in 2015 led a team that advised the Fire Commissioner on changes that were incorporated into the second edition. Tim was a member of the curriculum design team and a presenter for the LGMA's Effective Fire Service Administration training program for CAOs and Fire Chiefs. Tim also provided input to the Province in connection with the drafting of BC's new Fire Safety Act.

As the City of Port Alberni's most senior staff member, Tim supported his Mayor and Council in developing and implementing a corporate strategic plan, led in effecting positive organizational changes including recruiting and retaining talented staff, and played a key role in the development of trusting relationships with two First Nations and the City's First Nation citizens. In 2017 he was seconded by the Province to act for the Fire Commissioner during the prolonged wildfire response. Tim has represented LGMA in engaging with the Office of the Fire Commissioner on drafting the third edition of the Playbook.

Tim's education includes a Bachelor of Physical Education (UBC,) a Diploma in Public Sector Management (UVic), a Leadership and Conflict Resolution Certificate (JIBC), Competent Toastmaster designation, as well as Fire Officer 4 and Fire Inspector 1 certifications. Tim has tutored and mentored many fire officers through JIBC and VIERA fire officer programs.

Tim has a demonstrated ability to recommend and communicate resolutions to local government challenges that meet the needs of communities, elected officials, CAOs and fire departments, to support the development of respectful and effective relationships, and to help stakeholders understand and support solutions that address the broader needs of communities.

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