

# **FIRE HALL PROGRAM GUIDE**

**GOVERNMENT OF NEWFOUNDLAND AND LABRADOR  
TRANSPORTATION AND INFRASTRUCTURE  
MUNICIPAL INFRASTRUCTURE DIVISION**

REVISION 0  
NOVEMBER 2021

Note that this document is to be used as a guidance document, to inform project teams and support proper provision of required systems and equipment for fire service personnel throughout the province. Design professionals must recognize that they retain full professional responsibility and liability for the design services they provide, and for the completeness of any contract documents which may result.

| <b>Document Revision Table</b> |               |                   |  |
|--------------------------------|---------------|-------------------|--|
| <b>Revision</b>                | <b>Date</b>   | <b>Revised By</b> | <b>Major Revisions and Notes</b>   |
| A                              | May 2017      | WL                | Major Revision - Document Created.   |
| B                              | May 2018      | WL                | Minor Revisions - Climate Change Office and external consultation comments included. |
| C                              | May 2021      | WL                | Addition of Space Attribute Sheets, and housekeeping revisions.                      |
| 0                              | November 2021 | WL                | Issued for use.  |

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| <b>Table of Definitions*</b>       |  |
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| Adaptation                         | Actions by governments, communities, businesses and individuals to understand, plan for, and respond to unavoidable changes in the climate. (CCB)  |
| Authority Having Jurisdiction      | An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure. (NFPA 1500)<br><i>Note: The Fire Commissioner is the Authority Having Jurisdiction per the Fire Protection Services Act.</i>  |
| Combination Fire Department        | A fire department having emergency service personnel comprising less than 85 percent majority of either volunteer or career membership. (NFPA/FES)   |
| Defensive Operations               | Actions that are intended to control a fire by limiting its spread to a defined area, avoiding the commitment of personnel and equipment to dangerous areas. (NFPA 1500)<br><i>Note: Defensive operations are generally performed from the exterior of structures and are based on the determination that the risk to personnel exceeds the potential benefit of offensive actions (NFPA 1500 Annex A)</i> |
| Fire Apparatus                     | A vehicle designed to be used under emergency conditions to transport personnel and equipment, and to support the suppression of fires and mitigation of other hazardous situations. (NFPA 1500)   |
| Fire Hall                          | A fire hall is understood to be a building supporting a volunteer or combination fire department for storage of equipment, along with requisite support space and a varying amount of administrative space depending on department specific program and level of service requirements. (MI)  |
| Fire Station                       | A fire station is understood to be a building (fire hall) supporting the operations and program of a career or combination fire department but that includes dormitory facilities. (MI)  |
| Climate Change Mitigation          | Action taken to reduce GHG emissions in order to minimize and avoid further impacts in the future. (MI)  |
| Offensive Operations               | Actions generally performed in the interior of involved structures that involve a direct attack on a fire to directly control and extinguish the fire. (NFPA 1500)   |
| Owner                              | References to the Owner should be understood to be the municipality, town, local service district, regional service board, or other organization responsible for the fire department. (MI)   |
| Practicable                        | Capable of being put into practice or of being done or accomplished. (Merriam-Webster online dictionary)   |
| Climate Change Resilience          | <i>The defining characteristic of climate-resilient infrastructure is that it is planned, designed, built and operated in a way that anticipates, prepares for, and adapts to changing climate conditions. [1]</i>   |
| Self-Contained Breathing Apparatus | An atmosphere-supplying respirator that supplies a respirable air atmosphere to the user from a breathing air source that is independent of the ambient environment and designed to be carried by the user. (NFPA 1500)  |

|  |   |
|--|---|
| Vehicle Storage Garage   | A vehicle storage garage is understood to be a building supporting only the storage of an operationally ready fire apparatus, and the systems required to maintain it at an operationally ready condition. Vehicle storage garages function as satellite installations for ensuring response times are achieved in a fire department’s area of operations. (MI) |
| Volunteer Fire Department  | A fire department having volunteer emergency service personnel comprising 85 percent or greater of its department membership. (NFPA/FES)  |
| <p><i>*source of definition is indicated in parenthesis after the definition, or indicated below:</i></p> <p>[1] M. Mullan and e. al, "Climate-resilient Infrastructure - OECD Environment Policy Paper No. 14," OECD, 2018.</p> |   |

| <b>List of Acronyms</b> |  |
|-------------------------|--|
| ACGIH                   | American Conference of Governmental Industrial Hygienists  |
| ACH                     | Air Changes per Hour   |
| AHJ                     | Authority Having Jurisdiction  |
| ASHRAE                  | American Society of Heating, Refrigerating and Air-Conditioning Engineers                          |
| BBB                     | Build Better Building policy   |
| BEI                     | Biological Exposure Index  |
| CCB                     | Climate Change Branch (Department of Environment and Climate Change)                               |
| CEC                     | Canadian Electrical Code   |
| CSA                     | Canadian Standards Association   |
| EMP                     | Emergency Management Plan  |
| FES                     | Fire and Emergency Services Division (Department of Justice and Public Safety )                    |
| HVAC                    | Heating, Ventilation, Air Conditioning   |
| IAQ                     | Indoor Air Quality   |
| IDF                     | Intensity-Duration-Frequency   |
| MI                      | Municipal Infrastructure Division (Department of Transportation and Infrastructure)                |
| NBCC                    | National Building Code of Canada   |
| NECB                    | National Energy Code of Canada for Buildings   |
| NEMA                    | National Electrical Manufacturers Association  |
| NFCC                    | National Fire Code of Canada   |
| NFPA                    | National Fire Protection Association   |
| NPCC                    | National Plumbing Code of Canada   |
| OHS                     | Occupational Health and Safety   |
| PPE                     | Personal Protective Equipment  |
| SCBA                    | Self-Contained Breathing Apparatus or<br>Self-Contained Breathing Air System, as context dictates. |
| TLV                     | Threshold Limit Values   |
| VFF                     | Volunteer Firefighter  |

## 1. SCOPE

This document can be generally considered limited in scope to small to medium, volunteer fire departments. While the level of protection outlined in this document is generally analogous to career departments, the differences in the career department operations will require additional resources and infrastructure. Career departments will have room requirements above and beyond what is reasonably needed for volunteer fire departments, and can include such aspects as: dormitory facilities, fitness facilities, and additional office space.

While it may be limited in scope to small to medium, volunteer departments, this document can provide a starting point in terms of required programming for discussion with Owner representatives where combination or career stations are being considered. Should an Owner wish to surpass the design or spatial allowance requirements of this guide, the Owner will be responsible for all incremental costs.

For clarity, this document makes the following distinctions between fire service building infrastructure types, further to their definitions found in the table.

- Vehicle Storage Garage – a vehicle storage garage possesses only the equipment to maintain the apparatus stored within at an operationally ready posture. These types of facilities may be required where response times from the main fire hall or station do not meet the requirements of the department, necessitating assets closer to where Volunteer Fire Fighters live or work to facilitate response. Alternatively, if there is a department who is able to share administrative and support functions with other municipal infrastructure, such as a depot, they may opt for this type of building.
- Fire Hall – the fire hall is for volunteer or combination departments that require apparatus and equipment storage space, support equipment and facilities, as well as potential for administrative space for office duties (e.g. fire chief, fire inspectors, etc.) and training.
- Fire Station – the fire station is for career or combination fire departments. These will have the features of a fire hall, with potential additional space requirements for dormitories, day rooms, fitness rooms, expanded kitchen and dining facilities and others as may be required for department specific programs and operations.

Finally, note that this program is a living document, and as such, there will be additions/changes to the content periodically. Guide users are encouraged to ensure that the most up to date revision is being used. Further, guide users are encouraged to contact MI to discuss potential updates or modifications.

## 2. BACKGROUND

It is of critical importance for consultants and other project personnel to understand the context in which fire service personnel operate; notably volunteer fire fighters. Volunteer fire fighters are technically workers employed by an organization, typically a municipal government (referred to as the “Owner” throughout this document). As such, they are protected by the Occupational Health and Safety legislation of the province. Furthermore, Fire and Emergency Services pays for the requisite insurance coverage required by the Owners for the volunteer fire fighters.

The obvious risks faced by fire service personnel are immediately apparent; the fire and life safety situations to which they respond. The less obvious, but more insidious, risks faced by these individuals

are the potential long-term health impacts related to their service. Fire service personnel can be exposed to hazardous chemicals or pathogens at response situations that adhere to their protective equipment, and contaminate their bodies after the fact. All equipment must be thoroughly cleaned after exposure to any sort of contaminant to ensure that the hazard to personnel is mitigated. Fire service personnel are at an increased risk of certain cancers or other long-term health conditions as a part of their service, so it is imperative that they are provided with equipment and protective measures to reduce the likelihood of disease later in life.

In consideration of the Owner's request for fire service infrastructure, it is important to understand that while the Owner may have received cost-shared capital funding for the acquisition, the Owner will be required to provide the annual operational costs out of their own funds. The important aspect to consider is whether the program that the Owner intends on delivering and the ultimate building design for implementing the program is something that is sustainable from both a financial and environmental point of view.

### **3. OCCUPATIONAL HEALTH AND SAFETY CONSIDERATIONS**

There are some noteworthy sections from the Occupational Health and Safety (OHS) Act and Regulations to consider as they pertain to new fire service infrastructure construction or renovations to existing. Understanding these items up front will provide some insight into assertions made in other sections of this document. Some of these sections are briefly outlined below.

- Hazardous Substances (Section 42)
  - Employers shall monitor the use or presence of substances in the workplace that can be hazardous to health and safety of workers, and provide employ suitable engineering and administrative controls to ensure their safe use.
  - Suitable facilities shall be available to cleanse contaminated body areas.
- Ventilation (Section 45)
  - Employers shall ensure that there is appropriate circulation of clean and wholesome air, adequate ventilation, and impurities are made harmless and inoffensive.
  - Further, the regulation states that, where practicable, local exhaust ventilation is to be installed and maintained near the point of origin of an impurity, and where possible, exhaust from an internal combustion engine operated indoors to be vented outdoors.
- Washing Facilities (Section 62)
  - Employers shall ensure, where reasonably practicable, that there are adequate washing facilities for workers who may be exposed to hazardous, infectious, or offensive substances.
- Emergency Washing Facilities (Section 63)
  - Appropriate washing facilities are to be provided where a worker's eyes or skin may be exposed to harmful chemicals or materials.
  - The selection of the type of washing facilities to be provided is based on an assessment of the hazards that may be present in the workplace.
- Work Clothing and Accommodations (Section 64)
  - Where a worker's clothing or skin is likely to be contaminated by hazardous substances the employer shall provide a suitable changing area, and ensure that clothing is handled or cleaned in a manner that prevents exposure to hazardous substances.



While some general OHS considerations are noted above related to the provision of new infrastructure, project teams should consult with the Owner's fire service personnel regarding any additional operational considerations that would require safety infrastructure.

Any deviance from recommended safety equipment should be supported by a formal risk based assessment of the work place, prepared by a competent party, and discussed with the Owner.

#### **4. CLIMATE CHANGE RESILIENCE, AND ENERGY EFFICIENCY**

It is important to integrate climate change, resilience, and energy efficiency considerations into the construction or renovation of fire halls. This will enable cost savings, through energy efficiency measures, improved resilience to climate impacts (such as flooding), and will also ensure that Owners are best positioned to respond to emergencies by safeguarding these facilities against potential hazards. The design of new fire halls, including site selection, or renovations to existing facilities must consider the following:

##### **Climate Change and Resilience**

There are a number of tools available that design professionals should avail of during infrastructure planning and design. Some of these tools are listed below, with links to these tools in Section 12.

- Climate Change Projections;
- Climate Change Flood Risk Mapping; and
- Coastal Erosion implications for the area.

##### **Energy Efficiency**

- Building must be designed per Government of Newfoundland and Labrador's *Build Better Buildings* (BBB) policy, if applicable. A link to the policy has been provided in **Section 12**.
- The BBB policy applies to all new buildings receiving any capital construction funding from the provincial government, under the following conditions:
  - The area of the new building or extension is equal to or greater than 600 m<sup>2</sup>; or
  - The cost of renovations or extensions to an existing building, with an area equal to or greater than 600 m<sup>2</sup>, exceeds 50% of the cost of a new building of equivalent size and function.
- If BBB policy does not apply, design professionals are to examine cost effective systems and equipment for efficient building operation. Sample areas of interest include:
  - High insulation value in building envelope, windows, and doors;
  - Efficient heating and ventilation equipment and schemes;
  - Efficient lighting equipment and schemes; and
  - Efficient water use.
- Whether or not the BBB policy applies, project teams must have a discussion with the Owner and MI to determine an acceptable energy allowance for new or renovated infrastructure.
- New buildings must be designed to National Energy Code of Canada, latest edition.
- Major systems and design considerations must be backed up with a Net Present Value (NPV) analysis to ensure that lifetime costs are factored in to building.
- Project teams to consider the *Guide to Better Building Envelopes for Large Buildings*, and the *Guide to Building Energy Efficient Homes and Small Buildings* publications, available from the CCB. Links are provided in **Section 12**.

## 5. FIRE DEPARTMENT GEAR

### General

To appreciate the requirements for support and safety equipment in a fire hall, it is important to understand the operations that fire service personnel must undertake to maintain their equipment and respond to calls. Fire service personnel require specific equipment and systems in order to maintain their personal protective and fire response equipment to ensure that they are protected from harmful chemicals that are inherent to their tasks.

### Equipment Cleaning

#### General

A multi-basin commercial stainless steel wash sink, typically a deep three basin commercial model, provides enough space to effectively execute the proper wash procedure for SCBA gear, and rid it of any chemicals/debris it came in contact with during a call. The sink requires sufficient durability to endure regular use by fire personnel.

A commercial washing machine, specifically suitable for fire service use, is necessary for cleaning bunker gear without causing damage, ensuring the expected level of protection and full service life of the equipment. A drying room should be provided, as drying in a conventional drying machine can damage bunker gear and reduce service life. It should be hung and air-dried away from direct light. Ultraviolet light may cause degradation of the specialty fibers used in bunker gear. In lieu of a drying room, specialized drying cabinets are available, where equipment is hung and mechanically ventilated. It is important that fire service personnel have access to a washing machine for washing personal clothing items worn under bunker gear during response, using either the bunker gear washing machine or a separate dedicated machine.

Fire service personnel wash their vehicles often to ensure that any chemical contaminants are removed. A hose reel and interior hose bib should be provided to wash-down equipment.

#### **Equipment Cleaning - Design Implications**

- Multi-basin heavy-duty stainless steel (minimum 304) wash sink to be provided for PPE and other general equipment cleaning.
  - Commercial grade trim, suitable for SCBA/other gear washing.
  - Provided with hot and cold water.
- Fire Service Specific PPE Washing Machine, along with any ancillary plumbing equipment required as per manufacturer's recommendations to ensure a fully functional system.
  - Highly programmable machine, Stainless steel, front loading tub, no agitator, water temperature not to exceed that outlined by bunker gear wash instructions, automatic chemical injection.
  - Plumbing to be provided per manufacturer requirements.
  - Base to be provided if required per manufacturer's recommendation.
- Hose reel(s) and interior hose bib to be provided for equipment wash-down; cold water only.

### **Equipment Drying Room – Design Implications**

- Drying room to be provided, room size as suitable for number of bunker suits in use by the Owner’s fire service.
- Suitable structure to be provided for hanging wet bunker gear.
- Room to be serviced with suitable ventilation/dehumidification for reasonable moisture removal rate.

### **SCBA Tank Fill**

#### **General**

Filling SCBA cylinder tanks to the proper pressurization poses a safety hazard if the proper equipment is not in place. A defragmentation center must be provided if the fire station is to fill SCBA tanks. The use of the defragmentation center, along with proper fill procedures, will help to protect fire service personnel in case of a catastrophic tank malfunction during filling. Not all fire departments need the SCBA fill capability, as there may be filling assets in the region. Fill stations meeting the operational guidelines and safety requirements are quite expensive, and may be cost prohibitive to smaller departments. Cooperation with regional partners for tank filling is often recommended for small departments.

#### **Design Implications**

- If a fill station is to be provided, it must be Class 2, and comply with CSA Z180, latest edition.
- Compressor equipment to be housed in a dedicated room, suitably sized for equipment service and operation.
  - Room to be complete with passive sound attenuation if operational noise generated is expected to exceed OHS exposure limits.

### **Emergency Shower/Eyewash**

#### **General**

- Where a member of the fire service may come in contact with harmful chemicals, as may be the case in the apparatus bay, it is recommended that a combination emergency eyewash/drench shower be provided to ensure compliance with provincial occupational health and safety legislation.

#### **Design Implications**

- Combination Emergency Eyewash/Drench Shower to be provided in or near apparatus bay; complete with automatic tempering fixture, and with suitable drainage. The location and performance of the equipment is to be in accordance with OHS Emergency Eye Wash Facility Policy (see **Appendix A**) and in consideration of the fire/emergency operations undertaken in the facility.

## 6. ARCHITECTURAL

### Building Design

#### General

Owners must be able to afford to maintain the fire departments under their jurisdiction. Infrastructure must be designed for resilience, energy efficiency, and to lessen the operational costs where practical. Buildings are to be designed in accordance with the latest editions of the National codes in force. Projects receiving funding from the Government of Newfoundland and Labrador must also conform to the Build Better Buildings policy. As such, LEED may be a requirement of a fire hall project.

#### Design Implications

- New fire hall construction will meet the requirements of the latest editions of:
  - The National Building Code of Canada;
  - The National Fire Code of Canada;
  - NFPA 101, Life Safety Code (Latest Edition enforced);
  - The National Energy Code for Buildings;
  - The National Plumbing Code of Canada;
  - Canadian Electrical Code; and
  - Other codes or standards required by an Owner.
- Project may require LEED; see Section 4, above.
- Renovations are to achieve high energy efficiency where practicable.

### Occupancy Classification and Building Notes

#### General

Project teams should also recognize that while fire service infrastructure is publically owned, it is not meant for public occupancy.

#### Design Implications

- Apparatus bay and ancillary spaces to be considered F-2 Occupancy.
- The building is **not required** to meet *Post Disaster* requirements, per the NBCC definition.
- Apparatus bay to have fire separations per NBCC requirements, but not less than 45 minutes with adjacent occupancies, and be complete with fire and smoke seals.
- Note that the apparatus bay is not for public occupancy, and is not required to be barrier free.

### Clean Area vs. Dirty Area Separation

Fire service buildings are to be separated into a dirty area (e.g. apparatus bay) and a clean area (e.g. office and support space). This is an important distinction to prevent potential contaminants from being transferred from the dirty area of the building to the clean. The apparatus bay will often be finished with hard surfaces that may cause undesirable acoustic characteristics. Project teams should consider the interior finish, and whether or not sound attenuating features should be provided.

#### Design Implications

The following spaces are subject to potential contamination by harmful substances, based on nature of

fire/emergency response calls, and are to be considered “dirty”. These spaces are to be partitioned from the remainder of the building to the extent possible.

- Apparatus Bay;
- Equipment storage areas; and
- Equipment wash areas.

Facilities to be located on the clean side of the building include, but are not limited to the following:

- Showering facilities;
- Chief’s office, and other office/support space; and
- Meeting/Training/Assembly spaces.

### **Equipment Storage and Maintenance Space**

The equipment storage and maintenance space must be organized and durable. Wire storage racks provide space for quick access to bunker gear and stainless steel workspace countertops are needed to withstand regular operational use by fire service personnel.

### **Design Implications**

- Wire storage racks to be provided for storage of fire service bunker gear.
- Millwork near basin sink to have, as a minimum, a stainless steel countertop of a suitable gauge for moderate to heavy abuse and water/cleaning chemical exposure. All edges to be made smooth.
  - Wash towel dispenser for SCBA mask cleaning to be provided in close proximity to basin sink and millwork.
- Based on the level of service provided, medical oxygen tanks used or stored on the premises must be stored in accordance with NFPA 55, 99 and CSA Z305 as appropriate. See **Appendix B** for non-authoritative, quick reference guides from Digital Government and Service NL.

### **Apparatus Bay Overhead Doors**

#### **Design Implications**

- Each overhead door height and width is to be coordinated with the Owner’s emergency response equipment in service. Overhead doors to be commercial quality, and suitably insulated to prevent unnecessary heat loss from apparatus bay. Vision panels can be included in doors at the Owner’s request, but must be limited to no more than one door segment. Suggested overhead door width is 4267mm to safely accommodate equipment.
- All-glass overhead doors will not be eligible for cost-shared funding. Should the Owner wish to have all-glass overhead doors, the cost differential will be the Owner’s responsibility.

## **7. STRUCTURAL/CIVIL**

### **General**

Structural and civil aspects of the buildings are to conform to the National Building Code of Canada, latest edition.

Site selection and building layout must be discussed with the Owner to ensure that local knowledge and experience may be factored in to decisions.

Design teams must ensure that any relevant flood risk mapping studies for the project area are taken in to consideration. Fire halls are not to be situated in flood risk areas to the extent possible, and in accordance with the Provincial Flood Risk Policy (link to the policy in **Section 12**). Designers to ensure that access to the site will not be cut-off or hampered by flooding events.

Consideration should be given to the different types of response equipment in use by the fire department, and the equipment's specific storage requirements. A separate outbuilding structure may be a suitable choice in instances where specific response equipment is used only seasonally, and is not required to be maintained in a heated building. The resulting size reduction of the main fire hall can result in capital cost savings for the Owner.

An important feature of any fire service building is the clear height of the apparatus bay. Fire and rescue vehicles need to be able to drive in and out of the bay quickly without any obstructions. Overhead door and ceiling heights must be considered along with the placement of building structure, columns and overhead beams. The doors must be coordinated with the height and width of the largest vehicle entering the particular bay, and in consideration of the potential size and height of future vehicles.

### **Design Implications**

- The structure of apparatus bay is to maintain the separation distances outlined in **Appendix E**, including separation from the highest point on the Owner's emergency response vehicles to the building structure. Where an Owner wishes to enlarge the separation distances, the Owner will be responsible for the incremental capital cost increase.
- Bollards, of suitable size, to be provided at overhead door locations on the interior and exterior of apparatus bay doors, and at any other locations as required or recommended to protect building or other infrastructure.
- Columns in apparatus bay should be avoided if practical, depending on specific building structural requirements and the operational requirements of the fire department. Where they must be used, columns in the apparatus bay should be located to minimize interferences with fire service equipment, safety equipment, and operations.

## **8. MECHANICAL**

### **General**

New buildings must meet the requirements of the National Energy Code of Canada, latest edition. All mechanical systems to be designed and installed in accordance with the latest codes and standards in force, and in consideration of safety and environmental impacts, and operational costs. Proper selection of mechanical equipment will have a considerable impact on the operational efficiency of the building, and will ensure that the fire service personnel are provided with the levels of support and safety they expect. Specific fire hall requirements must be discussed with the Owner; however, general expectations for the mechanical systems are outlined in this section.

### **Fire Protection**

Fire protection must conform to appropriate Codes and Standards.

- Fire extinguishers to be provided per NFPA 10 requirements.
- Sprinkler systems to be provided where required by codes in force.
- Flammable storage cabinet to be provided, with the design and installation per requirements of Digital Government and Service NL's *Flammable Storage Cabinet Guidance Document*; see **Appendix C**.

### **Plumbing**

Plumbing services for the building must consider the conditions that are in place in the Owner's locale. Limited or absent access to services are a possibility depending on area of the province. It is imperative that the expectations of the Owner and the solutions provided are clearly laid out in a manner that is acceptable to all parties.

### **Design Implications**

- Systems to comply with NBCC and NPCC (latest editions).
- Low flow and water efficient fixtures to be provided.
- Accessibility type/compliant fixtures to be provided.
- Showering facilities to be provided, appropriately sized for expected personnel load.
- Janitor's room to be provided with mop sink, water supply, and any required storage.
- Apparatus Bay to be provided with floor/trench drains leading to an oil interceptor.
  - Removable sediment bucket to be considered (integral to oil interceptor or stand-alone) given the possibility of silt, sand and other debris resulting from equipment wash-down.
- Consideration to be made, with input from the Owner, for provision of a 40mm service line for apparatus water tank filling, if there is sufficient service capacity to the building.

### **HVAC and Controls**

Ventilation for the apparatus bay is critical for ensuring that fire service personnel are not exposed to hazardous fumes. General exhaust and source capture systems, and gas detection are requisite parts of the overall safe operation for fire department infrastructure. Mitigating the contaminants present, and preventing the migration of any released contaminants to clean spaces is another important aspect; consideration should be given to relative air pressurization of the clean vs. dirty sides of the building.

### **Design Implications**

- All areas to be ventilated per ASHRAE 62.1 requirements. Additionally, Apparatus Bay ventilation is to be designed to requirements set forth in the ACGIH *Industrial Ventilation* manual, latest edition. Consideration must be given to any other project specific circumstances requiring compliance with other ACGIH, ASHRAE, CSA, or NFPA codes or standards, or OHS directives and legislation.
- Apparatus bay is recommended to be at a negative pressure relative to the remainder of the building, and suitable passageway seals to clean spaces to be provided.
- Apparatus Bay to be provided with gas detection and alarm system for monitoring air quality as may relate to presence of products of combustion. Gas detection system is to ensure that exposure to products of combustion do not exceed limits set out in the ACGIH *TLVs and BEIs*, latest edition.



- Exhaust fan to be provided for Apparatus Bay. To be controlled by gas detection system for exhausting airborne contaminants if they should be detected.
- Fire Service Specific source capture (tailpipe) exhaust system for all internal combustion engines (gasoline and diesel) to be provided, with the number of units and capacities to be coordinated with current and projected equipment requirements.
  - Standard of Acceptance will be rail mounted, magnetic detachment Fire and Emergency models from Nederman, Plymovent, or equivalent
  - Service garage type systems are not acceptable.
- Equipment Drying Room to be provided with dedicated drying/dehumidification unit. Room sized as appropriate for drying all required PPE and other equipment,
- Apparatus bay to be maintained at temperature coordinated with Owner's equipment, and seasonal requirements.
- Mechanical cooling not required to be provided to apparatus bay.
- Consider, in consultation with the Owner, in-floor heating for Apparatus Bay. Annual operational costs to be examined if this system is to be considered.
- Destratification fans to be considered where apparatus bay ceiling height warrants.
- Support spaces to building to be provided with heating suitable for occupant comfort.
- Control system to allow for efficient equipment scheduling schemes.

## 9. ELECTRICAL

### **General**

Electrical systems are to be designed and installed per Canadian Electrical Code (CSA 22.1), and any other codes and standards in force. Electrical systems to be used in the building are to consider efficient fixtures, equipment, and control schemes, where practical.

### **Power – Design Implications**

- Power receptacles in apparatus bay to be complete with GFIs as required.
- Equipment to be appropriate NEMA rating for possibility of wet environmental conditions.
- Provide power connections to emergency response equipment per the specific equipment configuration and requirements.
- Provision of emergency power systems to be considered in conjunction with the community Emergency Management Plan (EMP), and discussions with the Owner and MI.

### **Lighting – Design Implications**

- Lighting levels to be provided as per code requirements for interior and exterior.
- High efficiency lighting systems and efficient control schemes to be provided.
- LED lighting systems to be provided.

### **Fire alarms and Emergency lighting – Design Implications**

- To be provided as per governing code requirements, and in discussion with the Owner and AHJ.
- Smoke detectors to be provided.

### **Communications and Multimedia – Design Implications**

- Communication systems to be provided as per **Appendix F** requirements.



## 10. CONSIDERATIONS FOR RENOVATIONS/EXTENSIONS TO FIRE HALLS

Renovations to existing fire service facilities should first consider the minimum fire fighter safety requirements for the building. Equipment and systems listed below are **mandatory**, and must be provided before any further renovations are considered.

- Combination shower/eyewash station
- Personnel shower
- Tailpipe exhaust system
- Gas detection system
- Triple basin wash sink (stainless steel)
- PPE washing machine
- Drying room
- Steel wire equipment rack
- Oil interceptor with sediment bucket
- Flammable storage locker

Project execution should include the stipulation that contractors provide a detailed interruption plan outlining all activities and periods requiring interruptions to normal facility operations. This plan must be coordinated with the Owner to ensure no lapses in fire service coverage.

## 11. ADDITIONAL PROJECT REQUIREMENTS

Project teams to ensure a detailed Operation and Maintenance Manual is provided to the Owner, clearly outlining

- list of routine maintenance requirements for all equipment;
- frequency of maintenance for all equipment;
- estimated cost for replacement consumables; and
- Estimated lifespan for all equipment.

## 12. ADDITIONAL INFORMATION AND USEFUL LINKS

Additional information is provided in the attached Appendices for reference; they are as follows:

- Appendix A - Emergency Eye Wash Facility Policy
- Appendix B - Medical Oxygen Information
- Appendix C - Flammable Storage Cabinet Guidance
- Appendix D - Breathing Air Guidance Document
- Appendix E - Equipment Size and Spatial Allowance Recommendations
- Appendix F - Notional Room / Space Attribute Sheets

The following links provide further information sources for reference.

**Occupational Health and Safety Act**

<http://www.assembly.nl.ca/legislation/sr/statutes/o03.htm>

**Occupational Health and Safety Regulations**

[http://www.assembly.nl.ca/legislation/sr/tableregulations/tableofregulations\\_o03.htm](http://www.assembly.nl.ca/legislation/sr/tableregulations/tableofregulations_o03.htm)

**CCOSH Answers**

<https://www.ccohs.ca/oshanswers/>

**Digital Government and Service NL Safety Guidelines and Information**

<https://www.gov.nl.ca/dgsnl/ohs/safety-info/>

**Climate Change Tools**

<https://www.gov.nl.ca/ecc/occ/climate-data/>

**Other Climate Change Information**

<http://www.turnbackthetide.ca>

**Building Guides**

*Large Buildings*

<https://www.gov.nl.ca/ecc/files/publications-building-envelopes-large-buildings.pdf>

*Small Buildings*

<https://www.gov.nl.ca/ecc/files/publications-efficient-home-building-guide.pdf>

**Build Better Buildings Policy**

<https://www.gov.nl.ca/iet/files/publications-energy-betterbuildingspolicy.pdf>

**Transportation and Infrastructure - NL Master Specification Guide for Public Funded Buildings**

<https://www.gov.nl.ca/ti/works/masterspec/masterspec/>

**Fire and Emergency Services Website**

<https://www.gov.nl.ca/jps/fes/>

**Municipal and Provincial Affairs Flood Risk Policy**

<https://www.gov.nl.ca/mpa/for/flood-policy/policy/>

## **APPENDIX A – EMERGENCY EYE WASH FACILITY POLICY**

*The updated Emergency Eye Wash Facility Policy document to be included when document is available from DGSNL.*

<https://www.gov.nl.ca/dgsnl/files/ohs-safety-info-pdf-emergency-eye-wash-facility-policy.pdf>

*Dated October 2010.*

# **EMERGENCY EYE WASH FACILITY POLICY**

## **Under the Occupational Health and Safety Regulations of the Province of Newfoundland and Labrador**

References to emergency eyewash facilities and emergency washing facilities are found in section 42 (11) and section 63 (a) of the *Occupational Health and Safety Regulations, 2009* under the *Occupational Health and Safety Act*.

This policy meets the intent of both sections as stated below and will be the guideline used by Occupational Health and Safety Division Inspectorate in enforcing these regulations at workplaces throughout this Province.

Section 42. (11) of the *Occupational Health and Safety Regulations* states “Where workers may be exposed to contact with chemicals harmful to the skin, facilities shall be available for the worker to effectively cleanse the contaminated body areas, including, where corrosive chemicals are involved, emergency water baths, showers, jump tanks, eyewash facilities or other effective means of treatment.”

Section 63. (a) of the *Occupational Health and Safety Regulations* stipulates that an employer shall ensure that “appropriate emergency washing facilities are provided in a work area where a worker’s eyes or skin may be exposed to harmful or corrosive materials or other materials which may burn or irritate.”

### **Definitions/ Abbreviations**

ANSI – The American National Standards Association.

Emergency eyewash facility – a facility used, or intended to be used for, the rinsing and/or decontamination of the eyes and surrounding facial area in the event of chemical exposure or particulate in the eyes, such facilities shall meet the design and performance specifications of the ANSI Z358.1-2009 “Emergency Eyewash and Shower Equipment” standard.

Eyewash bottle – a bottle, complete with flushing solution, whose design, construction and manufacture enables the quick flushing of an eye and surrounding facial area

Eyewash station – a station where eyewash bottle(s) and/or a supplemental eye wash facility are located to enable initial and/or supplemental flushing of the eye(s) and surrounding facial area

Supplemental eyewash facility – a plumbed, faucet mounted, and/or self contained device whose design, construction and manufacture enables the quick flushing of both eyes and surrounding facial area, but does not fully meet the design and performance specifications of the ANSI Z358.1-2009 “Emergency Eyewash and Shower Equipment” standard.

### **Requirements**

To determine the need for emergency eyewash facilities, chemical safety information and/or the material safety data sheet (MSDS) shall be reviewed. If such information indicates, in the first aid section that greater than 15 minutes of continuous flushing is required, in the event of worker face/eye exposure, then emergency eyewash facilities are to be provided and maintained in a state of operational readiness. Chemical safety information and/or the MSDS may also stipulate that needed controls include an emergency eyewash station or facility.

**Eyewash bottles, as a stand alone resource, do not satisfy the requirement for an emergency eyewash facility.** Reasoning includes the inability to flush both eyes simultaneously, the inability to provide 60 minutes of continuous flushing and the inability for a person using a portable eyewash bottle to have both hands free to keep their eyelids open while flushing. **Combinations of eyewash bottle(s), safe work procedures and supplemental eyewash facilities, if appropriately designed and implemented, may provide an equivalent level of interim protection to that of an emergency eyewash facility that meets the requirements of this policy.** Should an employer choose such an arrangement and need clarification, the Occupational Health Section of the Occupational Health and Safety Division should be contacted.

### **Location**

Should an emergency eyewash facility be required, it shall be installed within a maximum of 50 feet/15.24 m of linear travel, or within approximately 10 seconds of travel time, from the area where chemicals requiring eyewash facilities are handled, used and/or stored. The unit shall be on the same level as the chemical(s) requiring its use and no obstruction may hinder access to it. Obstructions include doors, moving partitions commonly or frequently found closed, eyewash facilities within closed cabinets, or equipment/items that have to be moved to access and/or operate the emergency eyewash facility.

### **Flushing Fluid**

Should a plumbed emergency eyewash facility be utilized, the water supply shall be potable. To minimize the potential for particulate and/or microorganisms buildup in the flushing water, such devices shall be flushed at least weekly, or more frequently if heeded. Records shall be maintained detailing the flushing dates and initialed by the responsible person.

Should a self contained eyewash facility be utilized the flushing fluid shall be sterile water, preserved buffered saline solution, or a solution commercially formulated and manufactured for use in eyewash facilities. These solutions shall not be used past the manufacturer’s indicated expiry date and shall

remain sealed and/or maintained as per manufacturer's specifications. Potable water may be used as the flushing fluid in self contained units only if the entire volume is changed weekly and records kept documenting the date of change and initialed by the responsible person. If the fluid is found to be visibly contaminated or is reasonably suspected of being contaminated, the flushing fluid shall be changed, and the unit appropriately sanitized.

### **Design/Performance**

Fluids used for flushing shall be protected from possible contamination.

If the emergency eyewash facility is in a publicly accessible area that lacks effective monitoring, the facility and/or fluid shall be protected from possible tampering/misuse or be inspected at intervals to ensure the facility is operationally ready at all times.

Fluid intended for use in flushing of the eyes shall be tempered. Normally the lower temperature limit shall be 15.5°C (60°F) and the upper temperature limit shall be 38°C (100°F). The recommended temperature range under normal circumstances is 20°C to 25°C (68°F to 77°F). Different temperature ranges of flushing fluid(s) may be required for specific chemicals and shall be maintained.

An emergency eyewash facility shall be capable of providing continuous flushing for a minimum of 60 minutes. The rationale being that some chemicals, such as penetrating corrosives, require 60 minutes of continuous flushing. In all cases flushing is to be continued or repeated as long as irritation persists.

The volume and pressure of fluid flow shall be sufficient to wash away any chemical yet not so great to cause discomfort or injury. The required flow rate shall be approximately 1.514 lpm (0.4 gpm) at 206.8 KPa (30 psi).

Emergency eyewash facilities shall be constructed of non corrosive materials.

Nozzles used for dispensing flushing fluid shall be covered to prevent contamination. Once activated the nozzle covers shall be automatically displaced such that they do not hinder flushing.

Emergency eyewash facilities shall be designed and positioned such that accessing or using the device poses no additional risk of harm or injury.

Activation devices shall be easily located and operated. The emergency eye wash facility shall be capable of being activated quickly with one hand in a single motion.

Once activated an emergency eyewash facility shall be capable of continued hands free operation.

Units shall be capable of providing flushing to both eyes simultaneously and designed such that the hands can be used to hold the eye(s) open during flushing.

Units shall be positioned such that the flushing nozzles are not less than 83.8 cm (33 in.), and no greater than 114.3 cm (45 in.), from the surface on which the user stands and 15.3 cm (6 in.) from the wall or nearest obstruction.

Emergency eyewash facilities shall be protected from freezing.

### **Installation**

Emergency eyewash facilities shall be installed as per manufacturer's specifications and this policy. In the event of a conflict the operational parameter that provides the greatest level of safety shall apply.

### **Signage**

Emergency eyewash facilities shall be identified by a high visibility sign which can be seen throughout the entire area to be served by the unit. Additional signs may be required.

### **Maintenance/Inspection**

Emergency eyewash facilities shall be maintained in a clean and serviceable manner at all times. They shall be inspected at appropriate intervals to ensure the unit is in an operationally ready condition. Records shall be maintained detailing the date of unit inspection/maintenance, a brief description of any maintenance, and initialed by the responsible person.

### **Worker Instruction/Information**

All personnel working in, or frequenting, an area where an emergency eyewash facility is required/installed shall be provided with information and instruction as to how the unit is to be operated, inspected and maintained.

October, 2010

## **FAUCET MOUNTED EYE WASH UNITS AS STAND ALONE EMERGENCY EYEWASH FACILITIES**

### **Position Statement**

Faucet mounted eye wash units meet the intent of this policy subject to the following:

1. The manufacturer confirms that the device complies with ANSI Z358.1 “Standard for Emergency Eyewash and Shower Equipment.” This standard outlines the design, construction and performance stipulations for emergency eye wash facilities;
2. The device, upon installation, meets ANSI Z358.1 performance stipulations for emergency eye wash facilities;
3. The device has been installed in strict accordance with its manufacturer's stipulations;
4. The device is being maintained in strict accordance with its manufacturer's stipulations;
5. The area in which the device is installed is free of obstruction and other relevant hazards; and
6. The device is appropriately located and readily accessible given the hazards that necessitate its installation/presence.

### **Permanent Measures:**

To enable time to develop and implement an action plan on emergency eyewash needs, the employer shall:

1. Conduct an assessment to determine Personal Protective Equipment (PPE) needs;
2. Conduct an assessment to determine possible substitution with less hazardous chemicals or the elimination of chemicals;
3. Ensure that the needed PPE (especially chemical splash goggles or safety glasses with face shield) are selected and implemented and workers appropriately trained as to use;
4. Implement strict enforcement and supervision to ensure that the required PPE (especially goggles or safety glasses/face shield) is used; and
5. Implement safe work procedures to minimize the risk of eye/face chemical exposures and emergency procedures to be followed should a splash occur.



### **Interim Measures:**

To meet the intent of this policy in areas where an emergency eyewash facility is required but does not presently exist, the employers shall:

1. Allow the use of one eyewash bottle for first aid flushing coupled with an operational faucet mounted eyewash unit provided in the immediate area.
2. Draft an emergency procedure, post it in the immediate work area and communicate to all applicable workers the process required if any staff contaminates their eyes.
3. Ensure that any worker who may need to access an emergency eyewash facility can rapidly summon help, by yelling, to obtain emergency help with eye/face flushing;
4. Ensure that an emergency eyewash facility as defined is located in a central location that the worker can access with help;
5. Develop and implement a plan to ensure strict compliance with emergency eyewash requirements to ensure emergency eyewash facilities are installed where needed, as soon as practically possible.

#### Example Scenario:

1. The injured worker yells for help and obtains, and begins to use, the eye wash bottle.
2. Another worker responds and immediately activates the supplemental eye wash facility, ensures it is functioning properly in terms of temperature, flow rate and purity and clears the area around it of obstructions or hazards.
3. The injured worker is assisted to the supplemental eye wash facility and continues to flush the eyes/face for the required period of time.
4. If the supplemental eye wash facility does not function properly, or perform adequately, using a minimum of two eye wash bottles the injured worker is assisted to the emergency eye wash facility located elsewhere in the workplace.

October, 2010

## **APPENDIX B – MEDICAL OXYGEN INFORMATION**

**Effective Date: March 12, 2012**

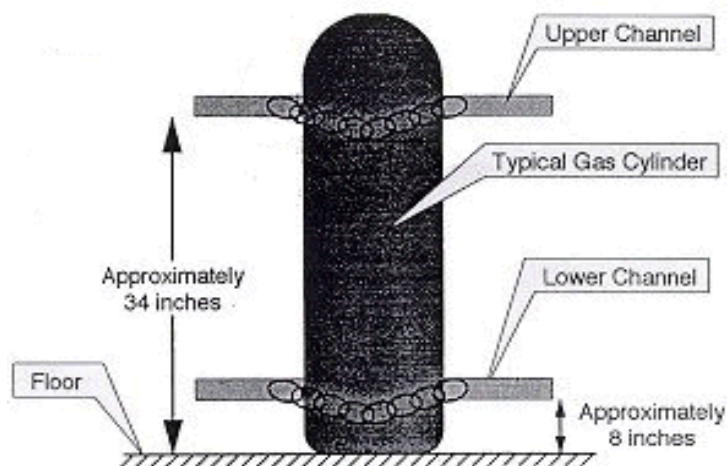
## **Medical Oxygen System/Cylinder Basic Safety Requirements Non-Institutional Health Care Settings**

**Note: The information in this document is not authoritative in nature. It is intended for quick reference only. Authoritative guidance is to be obtained by referencing NFPA 55, NFPA 99, CSA 305.12-06 as well as manufacturer's and supplier instructions and applicable legislation.**

### Basic Requirements:

1. Persons handling/using/storing/filling/transporting medical oxygen cylinders shall be trained and proficient in the applicable safety requirements and Material Safety Data Sheet (MSDS) stipulations.
2. The guidance stipulated on the MSDS for medical oxygen cylinders/containers shall be strictly followed at all times.
3. Medical oxygen cylinders/containers /systems/equipment shall be located such that they are protected from any type of physical damage.
4. No part of any cylinder containing a compressed gas shall be subjected to a temperature above 54°C nor shall any flame be permitted to come into contact with a compressed gas cylinder. Nor shall cylinders/container/tanks be subjected to corrosive chemicals or fumes.
5. Medical oxygen cylinders shall be tightly secured, during storage and use, in an upright position.
6. Cylinders in storage shall be tightly secured with a minimum of one strap or chain per cylinder which is to be positioned at a height of 2/3 the cylinder height. (See attached diagram for best practice.) Cylinder racks of appropriate design and construction are acceptable alternatives.

**Cylinder Securing - Best Practice:** (Measurements shown are approximate and dependent upon cylinder size)



7. When oxygen cylinders are not in use, or available for immediate emergency use, the cylinder valve shall be closed and pressure drained.
8. Cylinders in storage shall have protective valve caps in place if applicable.
9. Medical oxygen equipment including cylinders/containers and their valves, fittings, regulators etc. shall not come into contact with oil or grease and shall not be handled by persons with oily/greasy hands or gloves nor shall they be stored or used in close proximity to such substances. Similar precautions apply to alcohol and petroleum based products including hand cleansers, oil-based hand creams, facial creams, hair sprays and other readily combustible substances.
10. Sources of oxygen shall be stored and used in well ventilated areas at all times.
11. Portable oxygen units and/or oxygen cylinders/containers shall not be placed under clothing or in enclosed spaces such as closets and/or chests.
12. Readily ignitable materials such as wood, waste, paper, textiles, cloths, bedding etc. shall not be placed on, or stored in close proximity to, sources of oxygen.
13. Smoking and other sources of sparks or flame shall not come within a minimum of 1.5 M (5 ft.) of where medical oxygen equipment (which includes oxygen cylinders, containers, concentrators and associated items) is in operation or storage.
14. Medical oxygen equipment shall be kept at least 1.5 M (5 ft.) from electrical equipment or appliances that may produce sparks or open flames.
15. Medical oxygen cylinders/containers/tanks shall not be placed against electrical cables, cords and/or outlets.
16. Medical oxygen equipment shall be kept at least 1.5 M (5 ft.) from heating sources including furnaces, heaters, and stoves.
17. Rooms where medical oxygen equipment is normally used or stored shall be identified by warning signs that clearly identify on one line "OXYGEN" and on a second line "NO SMOKING". Main storage rooms shall also display the applicable WHMIS symbol.
18. Floor plans associated with fire and emergency plans shall be marked to readily identify rooms where oxygen equipment is used or stored.
19. Operational fire or smoke detectors shall be located in rooms/areas where medical oxygen equipment is normally used or stored and a fire extinguisher shall be located in close proximity near the entrance/exit to the room/area in question.
20. Oxygen storage rooms shall not be located below grade if at all possible.
21. Oxygen storage rooms shall be constructed to give a fire separation of at least 1 hour and shall be well ventilated. If a rated fire separation is not provided an area with sprinkler protection may be substituted. Storage rooms shall be kept dry, free of dust, and the temperature in the room shall not exceed 50°C.
22. Unsafe accumulations of oxygen, as specified in CSAZ305.12-06, shall not be permitted.
23. Medical oxygen equipment shall only be serviced and/or repaired as per manufacturer's specifications and by a qualified service technician.
24. The relevant supplier shall be notified if a cylinder, container, or other item of oxygen equipment is used in an unsafe manner or possibly damaged or contaminated. Their guidance shall be followed and the item removed from service until repaired and/or cleared for service by a qualified technician.

25. Tools shall not be used on medical oxygen equipment other than those provided by the supplier for use on a given item.
26. Medical oxygen equipment shall only be used in accordance with its manufacturer's or supplier's specifications and by trained and proficient personnel.
27. Persons transporting medical oxygen cylinders shall only do so in accordance with the supplier's written stipulations, a copy of which is to be readily available for review.
28. Oxygen concentrators:
  - a. Shall be placed in areas with adequate ventilation, with the intake filter positioned for unrestricted airflow, with the concentrator located at least 15 to 30 cm (6 to 12 inches) away from furniture and draperies.
  - b. Shall not be used if the cord is damaged, discolored and/or unusually warm or if its plug fits poorly into the electrical outlet used.
  - c. Extension cords shall not be used with oxygen concentrators.
  - d. If possible cords for oxygen concentrators shall be plugged into a separate electrical circuit.
  - e. Oxygen concentrators shall be regularly checked and maintained in accordance with manufacturer's specifications.
  - f. Persons working with oxygen concentrators shall be trained and proficient in the applicable safety requirements.
29. Portable/Liquid Oxygen:
  - a. Portable/Liquid Oxygen Equipment shall not be filled/refilled/transfilled unless:
    - i. Documented guidelines for the handling/use of the equipment and for the filling/refilling/transfilling process as well as manufacturer's safety instructions and guidelines for user inspection and maintenance are posted in the immediate area.
    - ii. Persons doing the filling/refilling/transfilling are trained, certified and competent in the procedure to be followed, precautions to take and applicable requirements.
  - b. Medical oxygen equipment shall not be filled/refilled/transfilled within 6.1M (20 ft.) of electrical items, electrical equipment or appliances or other source of heat, spark or flame.
30. Liquid oxygen:
  - a. Containers shall not be dropped, tipped, rolled or laid on their side.
  - b. Equipment manufacturer's instructions shall be strictly followed.
  - c. Container's pressure-relief valve(s) shall not be altered, tampered with or replaced other than by a qualified technician.
  - d. Base or portable units shall not be covered with a covering of any kind unless specifically permitted by that item's manufacturer.
  - e. Base units shall be filled/refilled/transfilled outside of the building and only by suppliers.
  - f. Base units shall be fitted with a tip resistant holder at all times.

## **APPENDIX C – FLAMMABLE STORAGE CABINET GUIDANCE**

# **Flammable Storage Cabinet Guidance Document**

Storage cabinets for flammable liquids serve a number of purposes:

- Protection of flammable liquids against flash fires;
- Prevention of excessive internal temperatures in the presence of fire; and
- Containment of spilled flammable liquids to prevent the spread of fire.

NFPA 30, Flammable and Combustible Liquids Code Handbook, provides safeguards to reduce the hazards associated with the storage, handling, and use of flammable and combustible liquids. New flammable liquid storage cabinets must be listed as meeting NFPA 30.

## **Venting Flammable Storage Cabinets**

While cabinet manufacturers may provide the bungs for venting (for users required to vent by local regulations or by insurance carrier policies), ventilation for flammable and combustible storage cabinets is not required or recommended by the NFPA. According to NFPA 30, venting a flammable storage cabinet is not necessary for fire protection purposes. Flammable and combustible liquid storage cabinets are designed to protect the internal contents from a fire outside the cabinet. An improperly vented cabinet could compromise the ability of the cabinet to protect its contents from a fire.

If the cabinet is not ventilated, the ventilation openings must be sealed with the bungs supplied or with materials providing fire protection at least equivalent to that for the construction of the cabinet.

## **When Should a Flammable Storage Cabinet Be Vented**

Exhaust ventilation should only be provided when warranted by the materials in the cabinet, for example for particularly toxic or noxious materials. Determining the classification (i.e. flammable, corrosive, oxidizer), health hazards, storage requirements (i.e. temperature, incompatibilities), and total amounts of the chemicals that will be stored in the cabinet will help in the decision of whether to vent or not. Refer to the Material Safety Data Sheets (MSDS) for this information or contact the manufacturer/supplier for assistance.

If excessive levels of chemical vapors are building up in the cabinet, it doesn't necessarily mean the cabinet must be vented. Before venting a cabinet to lower vapor levels, consider the following options:

- Place cabinets in a cool, dry location out of direct sunlight and away from any possible heat or ignition source to prevent release of vapors.
- Always maintain continuous and adequate room ventilation. Many accidents occur when ventilation is turned off for the weekend or an extended period of time.
- Maintain an accurate inventory of chemicals and their properties to prevent dangerous conditions resulting from incompatible chemical storage.

- Store chemicals only in containers that are made of materials determined to be chemically compatible so that leakage/damage will not occur. Inspect containers/cabinets regularly for signs of leaks, corrosion, spills, or other damage indicative of excessive vapor levels where mechanical ventilation would be needed.

### **If You Decide To Vent**

If the cabinet is to be vented, it must meet the following requirements:

- \*\*Verify that the manufacturer's specifications will support the intended use of the cabinet.
- NFPA 30, 9.5.4.2. states; "If vented for whatever reason, the storage cabinet vent openings shall be ducted **directly to outdoors** in such a manner that will not compromise the specific performance of the cabinet."
- The fan used to ventilate the cabinet must be rated intrinsically safe.
- Both metal bungs must be removed from the sides of the cabinet and replaced with flame arrester screens (normally these come with the cabinets) into the openings. One opening should be used for the vent/exhaust (bottom opening), and the top opening shall serve as the fresh air inlet. The vent piping (both supply and exhaust) must provide fire protection equal to or better than that required for the construction of the cabinet.
- Mechanical exhaust ventilation is preferred and should also comply with NFPA 91 *Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists and Noncombustible Particulate Solids*.
- The total run of the vent piping should not exceed 25 feet.
- **DO NOT** manifold vents of multiple cabinets.

### **Good practices for storage of flammable liquids in cabinets:**

- Do not place cabinets near exits.
- A maximum quantity of 500 litres of flammable and combustible liquids may be stored in an approved cabinet, of which not more than 250 litres may be Class 1 liquids.
- Check your supplier's MSDS for any specific storage precautions, and make sure these are followed.
- Cabinets must be conspicuously labelled, indicating that the cabinet contains flammables and that open flames and sources of ignition must be kept away.





## **APPENDIX D – BREATHING AIR GUIDANCE DOCUMENT**

# **Fire and Emergency Services - NL Self-Contained Breathing Apparatus Guidance Document For Emergency Services Applications**

This guidance document is intended to assist fire departments in the selection, care and maintenance of their Open Circuit Self-Contained Breathing Apparatus (SCBA) and to put a respiratory protection program in place.

Referenced publications are available from the Newfoundland and Labrador Association of Fire Services office in Gander, call 709-651-2361.

There are a number of components to an appropriate SCBA / respiratory protection program:

- Selection and Purchase of New Sets
- Set Care and Maintenance
- SCBA Compliance – Upgrades and Retirement
- Cylinder Hydrostatic Testing and Replacement
- Proper air compressor maintenance - safety equipment and procedures
- Firefighter Training in the Use and Operation

NOTE: This document does not address compressed breathing air combination open-circuit self-contained breathing apparatus and supplied air respirators (SCBA/SAR's) or closed-circuit SCBA.

## **Selection and Purchase of New Sets**

There are a number of items that should be considered prior to starting the selection and purchase process for new SCBA. These include, but are not limited to, expected hazards, frequency of use, size, weight, rated service time, ease of donning and doffing, comfort, and availability of servicing. Chapter 5 of “*NFPA 1852, Standard on Selection, Care, and Maintenance of Open-Circuit Self-Contained Breathing Apparatus*” 2013 Edition, should be referenced prior to purchasing new SCBA sets.

Section 5.1.7.2 of NFPA 1852 states that “For both *NFPA 1981, Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services*, and *NFPA 1982, Standard on Personal Alert Safety Systems (PASS)*, the edition of the respective standard(s) that is the current edition at the time of purchase shall be the edition specified.” The current edition of both is 2013.

NFPA 1981 specifies the minimum requirements for the design, performance, testing and certification of new compressed breathing air open-circuit self-contained breathing apparatus and their replacement parts, components and add-on accessories.

NFPA 1982 specifies the minimum requirements for the design, performance, testing and certification for all new Personal Alert Safety Systems (PASS) for emergency services personnel, including but not limited to stand-alone PASS and integrated PASS. While a

PASS device is still not mandatory it is strongly supported. When ordering you will have to specify this option; units integrated into the airline are recommended.

Fire departments who are considering purchasing used or reconditioned sets shall ensure that the sets have received servicing (rebuild) and functional flow testing (bench testing) by a technician and servicing centre that are authorized by the manufacturer of that particular brand and receive documentation to that effect.

Used or reconditioned sets shall meet the certification conditions as described in the **SCBA Compliance – Upgrades and Retirement** section.

It is strongly recommended that fire departments operate with only one brand name of SCBA within their organization. This will simplify maintenance and training requirements and will prevent the interchanging of air cylinders with different brands. The interchanging of air cylinders with different brand names is not approved and only acceptable as a last resort in emergency situations.

### **Set Care and Maintenance**

The care and maintenance of SCBA is one that is often overlooked by many fire departments but is one of utmost importance.

Follow the manufacturer's recommended procedures for cleaning and disinfecting your sets including the face piece. Excellent information can also be found in Chapter 5, *Essentials of Fire Fighting*, 5<sup>th</sup> Edition and Chapter 6 of NFPA 1852 on the care of SCBA.

All current in-service SCBA sets should be "ready for use", that is a set that has been inspected and is ready to be donned by the firefighter. The interval between inspections should not exceed one week.

Annually, a functional flow test (bench test) is required on SCBA, follow the manufacturer's instructions or your organization's SOP's or GOP's. Each manufacturer also provides a recommended schedule for periodic rebuild (overhaul) of their sets. We strongly recommend that each fire department review these requirements and follow the schedule as closely as possible.

Fire departments must develop a Standard Operating Procedure (SOP) or General Operating Procedure (GOP) to provide a uniform, consistent procedure in the care and maintenance of their SCBA. Fire departments must also ensure that written documentation is kept on all use, maintenance, servicing, and upgrading related to each SCBA unit and cylinder.

Chapter 5, *Essentials of Fire Fighting*, 5<sup>th</sup> Edition and Chapter 7 of NFPA 1852 can be referenced for inspection and maintenance information.

## **SCBA Compliance – Upgrades and Retirement**

The issue of upgrading and/or retiring of SCBA sets have created a lot of confusion within the fire service. Fire and Emergency Services - NL has not formally adopted “*NFPA 1852, Standard on Selection, Care, and Maintenance of Open-Circuit Self-Contained Breathing Apparatus*”, 2013 Edition; however we do recommend that fire departments use it as a guide to manage their SCBA program. It is not our intention to have fire departments throw down their current SCBA sets just because they may not meet the current standard. Rather, we would encourage fire departments to use the standard to evaluate their entire SCBA program.

The following excerpt from NFPA 1852 addresses currently in service sets, upgrades and retirement:

4.4.1 SCBA that are currently in service shall be certified as compliant with at least one of the following standards:

- (1) NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus for the Fire Service*, 1997 edition
- (2) NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire and Emergency Services*, 2002 edition
- (3) NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services*, 2007 edition
- (4) NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services*, 2013 edition

4.4.2\* Where currently-in-service SCBA *do not meet the requirements of 4.4.1* and are covered by any of the following four categories, such SCBA shall be upgraded as specified in 4.4.3 or shall be retired as specified in 4.4.5:

- (1) Currently-in-service SCBA that were *not* certified as compliant with the 1997 edition of NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus for the Fire Service*, when the SCBA was manufactured
- (2) Currently-in-service SCBA that were *not* certified as compliant with the 2002 edition of NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire and Emergency Services*, when the SCBA was manufactured
- (3) Currently-in-service SCBA that were *not* certified as compliant with the 2007 edition of NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus(SCBA) for Emergency Services*, when the SCBA was manufactured
- (4) Currently-in-service SCBA that were *not* certified as compliant with the 2013 edition of NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services*, when the SCBA was manufactured

4.4.2.1 The provisions of 4.4.4 shall apply to SCBA that are not covered by any of the four categories specified in 4.4.2.

4.4.3 SCBA shall be permitted to be upgraded to be compliant with the 2013 edition of NFPA 1981, Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services, in accordance with the SCBA manufacturer's and certification organization's instructions.

Where SCBA do not meet either 4.4.1, 4.4.2 or cannot be upgraded as per 4.4.3 the set should be scheduled for retirement. This is in keeping with Section 4.4.4 as outlined below.

4.4.4\* Where currently-in-service SCBA do not meet the requirements of 4.4.1 and are covered by any of the following categories, such SCBA shall be retired as specified in 4.4.5:

- (1) Currently-in-service SCBA that met only the requirements of the 1971 edition of NFPA 19B, *Standard on Respiratory Protective Equipment for Firefighters*, when the SCBA was manufactured
- (2) Currently-in-service SCBA that met only the requirements of the 1981 edition of NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire Fighters*, when the SCBA was manufactured
- (3) Currently-in-service SCBA that met only the requirements of the 1987 edition of NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire Fighters*, when the SCBA was manufactured
- (4) Currently-in-service SCBA that met only the requirements of the 1992 edition of NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire Fighters*, when the SCBA was manufactured
- (5) Currently-in-service SCBA that were purchased prior to July 29, 1981 that did not meet the requirements of the 1971 edition of NFPA 19B, *Standard on Respiratory Protective Equipment for Firefighters*, when the SCBA was manufactured
- (6) Currently-in-service SCBA that were purchased after July 29, 1981 and prior to June 30, 1987 that did not meet the requirements of the 1981 edition of NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire Fighters*, when the SCBA was manufactured
- (7) Currently-in-service SCBA that were purchased after June 30, 1987 and prior to August 14, 1992 that did not meet the requirements of the 1987 edition of NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire Fighters*, when the SCBA was manufactured
- (8) Currently-in-service SCBA that were purchased after August 14, 1992 and prior to August 15, 1997 that did not meet the requirements of the 1992 edition of NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire Fighters*, when the SCBA was manufactured

In summary, if following the current 2013 edition of NFPA 1852 the only sets that should currently be in service shall be compliant with the 1997, 2002, 2007 or 2013 Editions of NFPA 1981.

If your sets fall within the above year range and were not certified as compliant with NFPA 1981 (ie; Industrial Sets) then the sets shall be upgraded to be compliant with the 2013 Edition of NFPA 1981 or retired.

Any sets prior to the 1997 Edition of NFPA 1981 and that cannot be upgraded to the 2013 Edition of 1981 shall be retired.

#### A NOTE ON THE 2013 EDITION OF NFPA 1852 AND RETIREMENT AGE

The previous edition of the NFPA 1852 standard was in 2007. The 2013 edition has changed the retirement age of the sets by five years. It was 1992; it is now 1997, as stated in the summary above. Fire and Emergency Services realizes that there are a number of sets in use in our Province manufactured between 1992 and 1997 editions that can still be tested and serviced following the manufacturer's instructions. A fire department may decide to keep these sets in service while planning for replacement. If for any reason your service provider can no longer perform the recommended maintenance, testing or repairs for these sets, they should be retired.

### **Cylinder Hydrostatic Testing and Replacement**

Transport Canada (TC) requires that all high pressure SCBA air cylinders be hydrostatically tested by an approved cylinder requalifier (testing agency) as per the following:

|           |                   |                        |
|-----------|-------------------|------------------------|
| Steel     | Every five years  | No end of service life |
| Aluminum  | Every five years  | No end of service life |
| Composite | Every three years | 15 year service life   |

Some manufacturers have now obtained a Permit of Equivalent Safety through Transport Canada for their composite carbon fibre cylinders. One exemption of this permit is the 3 year hydrostatic test interval, thus allowing it to go to 5 years. A search of your carbon fibre cylinder SU number on the Transport Canada web site is available for this information, see <http://www.tc.gc.ca/eng/tdg/safety-menu.htm>

Cylinders may fail a hydrostatic test and inspection for a number of reasons including; out of acceptable limits, dents, gouges, cracks, pitting and rusting.

Note: Composite cylinders refer to fiberglass and Kevlar half-wraps and full wraps, carbon fibre, and all other cylinders that are constructed of two separate materials.

Composite cylinders must be taken out of service and destroyed after 15 years from the date of manufacture.

CAN/CSA-Z94.4-02 (R2008), the Canadian Standard on the Selection, Use and Care of Respirators requires that the air in the cylinder be changed every 12 months which is a change from the previous requirement of 90 days.

Fire departments must keep a written log of hydrostatic testing and filling of each cylinder. This includes the type of cylinder, when it was manufactured, when hydrostatic testing is due, when it was done and the date, location, and person who filled the cylinder. Air cylinders that have gone beyond their hydrostatic test date must not be filled by anyone.

### **Air compressor and Fill Station**

The most important part of a firefighter's respiratory system protection is the quality of the air contained in their SCBA cylinder. And like the old computer adage of "garbage in, garbage out" having cylinders full of quality air is paramount.

For those operating with air compressors, ensure that the required periodic maintenance and purification filter change out is completed. Compressor breathing air is required to be tested/analyzed on a six (6) month basis as per CAN/CSA-Z180, the Canadian Standard on Compressed Breathing Air and Systems. Check with an authorized requalifier on the hydrostatic test intervals for your cascade cylinders.

Air fill stations, for either stationary or mobile SCBA, provide the cylinder refill operator with a greater measure of safety over simply laying a cylinder on the floor or bench during the refilling process. The degree of safety varies between types of fill stations. Class 2, Class 3 and Class 4 are informal classifications. The words "Containment" and "Class 2" refer to the same type. Class 3 refers to a deflecting style of tall fill station that provides a steel blast shield between the operator and the cylinders being refilled. It does not contain the air blast of a ruptured cylinder, nor the cylinder fragments. A Class 4 fill station is sometimes called a "PopCan". It is considered a small fragmentation deflecting unit that does not contain the air blast of a ruptured cylinder, nor the cylinder fragments. Class 4 units offer the operator the least amount of protection of the three types of fill stations. The two types most commonly found in our Province are Class 2 and 4.



CSA Z180 1-13, Compressed Breathing Air and Systems, contains the requirements for fill stations. A Class 2 fill station would meet these requirements. A Class 4 would not. FES-NL and Service NL recommends a Class 2 refill station, however a class 4 fill station would be considered as acceptable subject to meeting specific conditions.



Example of a class 2 refill station.

A Class 4 refill station would be acceptable to FES-NL and Service NL under specific conditions.

- If it is obtained through a manufacturer and installed as per their instructions.
- Written safe work procedures must be developed and implemented. Ensuring appropriate personal protective equipment (eye and hearing protection)
- The fill station at no time can be positioned to operate in an area where there are persons above the system (i.e. second floor of fire hall).
- For added operator safety, the operator should never lean over nor reach over the cylinder during the filling process.
- Units should only be installed vertically.
- Cylinder refilling carries inherent dangers. Proper refill training is required.



Example of a class 4 refill station.

## **Firefighter Training in the Use and Operation**

Firefighter training in the use and operation of SCBA is critical to an effective SCBA program. Firefighters must understand all the operational features of their particular set. New firefighters will require more training to develop confidence in the use of SCBA. Even experienced firefighters should refresh their skills on an annual basis. The fire department should have a SOP/GOP on SCBA training requirements for all firefighters.

Under the 2009 OH&S regulations “Where required, an employer shall establish, implement and maintain, and revise where necessary, a written respiratory protection program in accordance with CAN/CSA-Z94.4-02, the Standard on the Selection, Use and Care of Respirators”.

Section 7.1.4 of CAN/CSA-Z94.4-02 states that under no circumstance shall a person use a tight fitting respirator until a satisfactory qualitative or quantitative fit test has been achieved.

FES-NL fully supports that fire departments implement fit testing into their respiratory protection program.

Chapter 6, of the *Essentials of Fire Fighting*, 6<sup>th</sup> Edition is an excellent source of information on respiratory protection, donning, doffing, and using SCBA. Chapter 8 will take you into building search with Chapter 15 covering fire control.

Under the NFPA 1001 Firefighter I program as delivered by FESNL there are a number of Job Performance Requirements (JPR’s) that can be referenced for skill development in the use of SCBA. The following JPR’s relate to SCBA use: #'s 7, 9, 10, 16, 18, 19, 20, 24, 25, 27, 28, 29, 37 and 44. These are available by calling FESNL or visiting our web site at <http://www.gov.nl.ca/fes/>

There are many other sources of information on SCBA training and each fire department is encouraged to develop a resource file of information.

The Fire Chief or the officer in charge is responsible to ensure that all firefighters using SCBA are qualified to perform the task. All training including SCBA training should be recorded, whether it be by chart, written log or computerized data base.

### **Summary:**

- Evaluate existing SCBA units to ensure compliance with NFPA standards.
- Develop a one to three year plan to replace or upgrade non-compliant sets and seek council funding to meet the requirements of the plan.

- Ensure that existing SCBA units are maintained as per the manufacturer's recommendations.
- Maintain a written log of air cylinder testing and refilling.
- Ensure that air cylinders are hydrostatically tested as per TC requirements and that all composite cylinders are taken out of service at the end of service life, (15 years).
- Ensure that the fire department has a written SOP/GOP on the use, operation, care and maintenance of the SCBA
- Ensure that the firefighters are adequately trained in the use and operation of the SCBA.
- Maintain a written log of all training.

For further information please contact Fire and Emergency Services-NL at:

|            |                        |          |      |          |
|------------|------------------------|----------|------|----------|
| Telephone: | Deer Lake              | 635-4153 | Fax: | 635-4163 |
| Telephone: | St. John's             | 729-1608 | Fax: | 729-2524 |
| Telephone: | Grand Falls-Windsor    | 292-4414 | Fax: | 292-4415 |
| Telephone: | Clarenceville          | 466-4109 | Fax: | 466-1306 |
| Telephone: | Happy Valley Goose Bay | 896-7957 | Fax: | 896-7956 |

## APPENDIX E – ROUGH SPATIAL ALLOWANCE AND EQUIPMENT SIZE FIGURES

The following spatial allowances around equipment in the Apparatus Bay can be used for sizing, but should be discussed with the Owner to ensure they are acceptable.

| Position  | Rough Spacing   |
|---|-----------------|
| Apparatus Clear Space - Front                         | 1200mm – 1500mm |
| Apparatus Clear Space – Rear                          | 1200mm – 1500mm |
| Apparatus Clear Space To Wall                         | 1800mm          |
| Clear Space Between Two Apparatus Parked Side by Side | 1800mm – 2100mm |
| Overhead Clear Space (from all Obstructions)          | 900mm           |

Designers must ensure that they take in to account the equipment that the Owner possesses, or will reasonably be expected to possess, over the life of the building to ensure that sufficient space is provided for. Below are listed some rough sizing figures for various apparatus for reference.

| Apparatus Type            | Rough Length (Approximate) |
|---------------------------|----------------------------|
| Two Door Pumper           | 8500mm                     |
| Two door Tanker (1500GAL) | 8100mm                     |
| Four Door Pumper          | 9500mm                     |
| Walk in Rescue            | 8600mm                     |
| Rural Response            | 7500mm                     |

Designers should allow for the incorporation of overhead doors measuring 4267mm, to ensure sufficient clearance between structure and vehicles (including mirrors).

## APPENDIX F – NOTIONAL ROOM / SPACE ATTRIBUTE SHEETS

Given the considerable financial investment Owners will need to expend in the acquisition of new fire service infrastructure, it is imperative that project teams provide the Owners with the requisite infrastructure at the right size. Buildings are not cheap to build, and Owners must consider the operation and maintenance budget aspects of the buildings early in the project. Proper provision of floor space for the Owner, based on their current and future programmatic needs is an important factor that must be considered up front. There are few benefits and many drawbacks to providing Owners with more floor space that is realistically required in their infrastructure projects.

As a starting point for programming fire service building space, the following floor allowances are being put forward for consideration. Project teams can add additional space in consulting with Owners and MI, but these spatial allowances should be considered minimums, based on measurements of equipment.

| Space                     |
|---------------------------|
| Apparatus Bay             |
| SCBA Wash Area            |
| SCBA Fill Station Room*   |
| PPE Specific Washing Room |
| Drying Room               |
| PPE Storage               |
| Janitor's Room            |
| Fire Chief's Office       |
| Training Room             |
| Kitchenette               |
| Washroom/Shower           |

Rooms marked with "\*" are not required in all projects.

| NOTIONAL ROOM/SPACE ATTRIBUTE SHEET |  |                        |                                 |
|-------------------------------------|--|------------------------|---------------------------------|
| <b>Space Name:</b>                  | Apparatus Bay  | <b>Size Allowance:</b> | Coordinated with vehicle sizes. |
| <b>Space Function:</b>              | Primary Function <ul style="list-style-type: none"> <li>• House Fire Service Vehicles</li> </ul> Secondary or Potential Functions <ul style="list-style-type: none"> <li>• Maintenance Space for Fire Service Vehicles</li> <li>• Location of Bunker Gear lockers</li> <li>• Training space</li> </ul> |                        |                                 |
| <b>Notes:</b>                       | Generally, this space is the main functional area of the building.   |                        |                                 |

| ARCHITECTURAL CONSIDERATIONS |   |
|------------------------------|---|
| <b>Floor:</b>                | Concrete, sealed  |
| <b>Ceiling:</b>              | Exposed, or painted gypsum board.   |
| <b>Wall:</b>                 | Resilient material, depending on building construction.   |
| <b>Equipment:</b>            | Flammable storage cabinet.<br>Other millwork in conjunction with level of service requirements.   |
| <b>Notes:</b>                | Generally, this space must be resilient, and resistant to damage from abuse, exposure to water, and suitable for general fire service equipment maintenance. Apparatus bay door width recommended to be 4267mm. |

| MECHANICAL CONSIDERATIONS |   |
|---------------------------|---|
| <b>HVAC:</b>              | Space to be ventilated per ASHRAE 62.1, ACGIH Industrial Ventilation Manual, and any other pertinent CSA or NFPA codes or standards.<br>Generally, space to be provided with: <ul style="list-style-type: none"> <li>• General Exhaust system</li> <li>• Fire Service Style Tailpipe Exhaust capture system (1 per vehicle)</li> <li>• Gas Monitoring/Detection System</li> <li>• Destratification fans (ceiling height dependent)</li> <li>• Humidity Control</li> </ul> Space temperature to be adjustable, and suitable controls for scheduling. |
| <b>Plumbing:</b>          | Trench drains in Apparatus Bay.<br>Emergency Eyewash/Shower combination unit (meeting CSA specifications)<br>Oil interceptor required, sediment bucket recommended.<br>Internal Hose Bib(s) required.<br>Consideration to be given for provision of 40mm water service line for tank filling.   |
| <b>Notes:</b>             | Space to be negatively pressurized, relative to adjacent spaces, if possible.<br>Mechanical Cooling not necessary.  |

| ELECTRICAL CONSIDERATIONS |   |                  |                                   |
|---------------------------|---|------------------|-----------------------------------|
| <b>Power:</b>             | TBD, per equipment requirements.  | <b>Lighting:</b> | LED, per code/industry standards. |
| <b>Communication:</b>     | TBD.  |                  |                                   |
| <b>Notes:</b>             | Electrical provided to be suitable for service in wet conditions, with GFI's, and suitable NEMA ratings as appropriate. |                  |                                   |

| NOTIONAL ROOM/SPACE ATTRIBUTE SHEET |  |                        |  |
|-------------------------------------|--|------------------------|--|
| <b>Space Name:</b>                  | SCBA Wash Area   | <b>Size Allowance:</b> | Coordinated with space available, 6m <sup>2</sup> minimum. |
| <b>Space Function:</b>              | Primary Function <ul style="list-style-type: none"> <li>Space for washing personal SCBA equipment.</li> </ul>  |                        |  |
| <b>Notes:</b>                       | Generally, this space is for washing and maintaining personal SCBA equipment. This function may be located in a specific room or may be incorporated in to another room (such as the Apparatus Bay). |                        |  |

| ARCHITECTURAL CONSIDERATIONS |  |
|------------------------------|--|
| <b>Floor:</b>                | Concrete, sealed.  |
| <b>Ceiling:</b>              | Exposed, or painted gypsum board, or other depending on code requirements.   |
| <b>Wall:</b>                 | Resilient material, depending on building construction.<br>Back-splash to be provided on adjacent wall space.  |
| <b>Equipment:</b>            | Counter space to be provided, stainless steel.<br>Other millwork, storage, etc. in conjunction with level of service requirements.                           |
| <b>Notes:</b>                | Generally, this space must be resilient, and resistant to damage from abuse, exposure to water, and suitable for use of various chemicals for SCBA cleaning. |

| MECHANICAL CONSIDERATIONS |  |
|---------------------------|--|
| <b>HVAC:</b>              | Space to be ventilated per ASHRAE 62.1.  |
| <b>Plumbing:</b>          | Deep triple basin commercial grade sink required.<br>Domestic Hot and Cold water required.<br>Floor drain. |
| <b>Notes:</b>             | N/A  |

| ELECTRICAL CONSIDERATIONS |   |                  |                                   |
|---------------------------|---|------------------|-----------------------------------|
| <b>Power:</b>             | TBD, per equipment requirements.  | <b>Lighting:</b> | LED, per code/industry standards. |
| <b>Communication:</b>     | N/A   |                  |                                   |
| <b>Notes:</b>             | Electrical provided to be suitable for service in wet conditions, with GFI's, and suitable NEMA ratings as appropriate. |                  |                                   |

| NOTIONAL ROOM/SPACE ATTRIBUTE SHEET |  |                        |  |
|-------------------------------------|--|------------------------|--|
| <b>Space Name:</b>                  | PPE Washing Room   | <b>Size Allowance:</b> | Coordinated with equipment requirements and best practice. |
| <b>Space Function:</b>              | Primary Function <ul style="list-style-type: none"> <li>• Cleaning (Laundering) of Bunker Gear</li> </ul> Secondary or Potential Functions <ul style="list-style-type: none"> <li>• Other gear maintenance or cleaning.</li> <li>• Possible location of Bunker Gear drying cabinets, if used.</li> </ul> |                        |  |
| <b>Notes:</b>                       | This space is used for laundering bunker suits, and washing other PPE aside from SCBA's.   |                        |  |

| ARCHITECTURAL CONSIDERATIONS |  |
|------------------------------|--|
| <b>Floor:</b>                | Concrete, sealed   |
| <b>Ceiling:</b>              | Exposed, or painted gypsum board.  |
| <b>Wall:</b>                 | Painted gypsum board.  |
| <b>Equipment:</b>            | Commercial Washing Machine suitable for washing Fire Service equipment, on housekeeping pad per manufacturer's recommendations.<br>Millwork and storage suitable for storage of cleaning products.<br>Other millwork in conjunction with level of service requirements for space.  |
| <b>Notes:</b>                | Generally, this space must be resilient, and resistant to damage from heavy use, exposure to water, and suitable for equipment maintenance.<br>Extractor (washing machine) minimum spacing distances to be <ul style="list-style-type: none"> <li>• Front/Rear: 600mm minimum</li> <li>• Sides: 300mm minimum</li> </ul> |

| MECHANICAL CONSIDERATIONS |   |
|---------------------------|---|
| <b>HVAC:</b>              | Space to be ventilated per ASHRAE 62.1.   |
| <b>Plumbing:</b>          | Hot/Cold water to be provided to fixtures and equipment provided in room.<br>Floor drains to be provided. |
| <b>Notes:</b>             | N/A   |

| ELECTRICAL CONSIDERATIONS |   |                  |                                   |
|---------------------------|---|------------------|-----------------------------------|
| <b>Power:</b>             | TBD, per equipment requirements.  | <b>Lighting:</b> | LED, per code/industry standards. |
| <b>Communication:</b>     | N/A   |                  |                                   |
| <b>Notes:</b>             | Electrical provided to be suitable for service in wet conditions, with GFI's, and suitable NEMA ratings as appropriate. |                  |                                   |



| NOTIONAL ROOM/SPACE ATTRIBUTE SHEET |  |                        |                            |
|-------------------------------------|--|------------------------|----------------------------|
| <b>Space Name:</b>                  | Drying Room  | <b>Size Allowance:</b> | 7.43m <sup>2</sup> minimum |
| <b>Space Function:</b>              | Primary Function <ul style="list-style-type: none"> <li>• Location for drying washed bunker gear</li> </ul> Secondary or Potential Functions <ul style="list-style-type: none"> <li>• Location for drying other wet equipment</li> </ul> |                        |                            |
| <b>Notes:</b>                       | Typically, gear will be hung to be dried. Room to be suitably sized for drying multiple sets of gear at a time.  |                        |                            |

| ARCHITECTURAL CONSIDERATIONS |   |
|------------------------------|---|
| <b>Floor:</b>                | Concrete, sealed  |
| <b>Ceiling:</b>              | Painted moisture resistant gypsum board.  |
| <b>Wall:</b>                 | Painted moisture resistant gypsum board.  |
| <b>Equipment:</b>            | Robust hanging racks.<br>Other millwork in conjunction with level of service requirements.          |
| <b>Notes:</b>                | Generally, this space must be resilient, and resistant to damage from abuse, and exposure to water. |

| MECHANICAL CONSIDERATIONS |  |
|---------------------------|--|
| <b>HVAC:</b>              | Room should be provided with a dedicated dehumidification system, or other system with a suitably high moisture removal rate.<br>Room to be ventilated per ASHRAE 62.1 at a minimum.<br>Temperature to be adjustable per Owner's equipment requirements. |
| <b>Plumbing:</b>          | Funnel floor drain suggested for dehumidifier drainage line.   |
| <b>Notes:</b>             | N/A  |

| ELECTRICAL CONSIDERATIONS |   |                  |                                   |
|---------------------------|---|------------------|-----------------------------------|
| <b>Power:</b>             | TBD, per equipment requirements.  | <b>Lighting:</b> | LED, per code/industry standards. |
| <b>Communication:</b>     | N/A   |                  |                                   |
| <b>Notes:</b>             | Electrical provided to be suitable for service in wet conditions, with GFI's, and suitable NEMA ratings as appropriate. |                  |                                   |

| NOTIONAL ROOM/SPACE ATTRIBUTE SHEET |  |                        |   |
|-------------------------------------|--|------------------------|---|
| <b>Space Name:</b>                  | Self-Contained Breathing Air Fill Station Room   | <b>Size Allowance:</b> | Coordinated with equipment requirements and best practices. |
| <b>Space Function:</b>              | Primary Function <ul style="list-style-type: none"> <li>Location of the equipment associated with the SCBA Fill Station, compressors, and SCBA tank handling.</li> </ul> |                        |   |
| <b>Notes:</b>                       | Equipment provided in a separate room in order to reduce noise exposure and other risks to Fire Service Personnel.   |                        |   |

| ARCHITECTURAL CONSIDERATIONS |   |
|------------------------------|---|
| <b>Floor:</b>                | Concrete, sealed  |
| <b>Ceiling:</b>              | Exposed, or painted gypsum board.   |
| <b>Wall:</b>                 | Painted gypsum board.   |
| <b>Equipment:</b>            | Robust countertop to be provided.<br>Other millwork in conjunction with level of service requirements.  |
| <b>Notes:</b>                | Generally, this space must be resilient, and resistant to damage from heavy use. Room should be provided with passive noise attenuation where possible. |

| MECHANICAL CONSIDERATIONS |   |
|---------------------------|---|
| <b>HVAC:</b>              | Space to be ventilated per ASHRAE 62.1.   |
| <b>Plumbing:</b>          | N/A.  |
| <b>Notes:</b>             | Mechanical to consider specific equipment requirements for SCBA tank filling systems. |

| ELECTRICAL CONSIDERATIONS |   |                  |                                   |
|---------------------------|---|------------------|-----------------------------------|
| <b>Power:</b>             | TBD, per equipment requirements.  | <b>Lighting:</b> | LED, per code/industry standards. |
| <b>Communication:</b>     | N/A   |                  |                                   |
| <b>Notes:</b>             | Electrical to consider specific equipment requirements for SCBA tank filling systems. |                  |                                   |

| NOTIONAL ROOM/SPACE ATTRIBUTE SHEET |  |                        |                       |
|-------------------------------------|--|------------------------|-----------------------|
| <b>Space Name:</b>                  | PPE Storage  | <b>Size Allowance:</b> | 1 x Gear Rack per VFF |
| <b>Space Function:</b>              | Primary Function <ul style="list-style-type: none"> <li>Storage for Bunker Gear/other Fire Service PPE</li> </ul>  |                        |                       |
| <b>Notes:</b>                       | Bunker Gear can and will generally be stored in/on storage racks systems. This area need not be specifically separated in to a room; can be contained in another space (e.g. Apparatus Bay). |                        |                       |

| ARCHITECTURAL CONSIDERATIONS |  |
|------------------------------|--|
| <b>Floor:</b>                | Concrete, sealed   |
| <b>Ceiling:</b>              | Exposed, or other depending on location.   |
| <b>Wall:</b>                 | Resilient material, depending on building construction.  |
| <b>Equipment:</b>            | Fire Service Equipment Rack system.<br>Other millwork in conjunction with level of service requirements.   |
| <b>Notes:</b>                | Generally, this space must be resilient, and resistant to damage from heavy use, exposure to water, and suitable for storing bunker gear in a high readiness state. Minimum 600mm clear space required in front of gear lockers. |

| MECHANICAL CONSIDERATIONS |   |
|---------------------------|---|
| <b>HVAC:</b>              | Space to be ventilated per ASHRAE 62.1. |
| <b>Plumbing:</b>          | N/A                                     |
| <b>Notes:</b>             | N/A                                     |

| ELECTRICAL CONSIDERATIONS |     |                  |                                   |
|---------------------------|-----|------------------|-----------------------------------|
| <b>Power:</b>             | N/A | <b>Lighting:</b> | LED, per code/industry standards. |
| <b>Communication:</b>     | N/A |                  |                                   |
| <b>Notes:</b>             | N/A |                  |                                   |

| NOTIONAL ROOM/SPACE ATTRIBUTE SHEET |   |                        |                    |
|-------------------------------------|---|------------------------|--------------------|
| <b>Space Name:</b>                  | Janitor's Room  | <b>Size Allowance:</b> | Per best practice. |
| <b>Space Function:</b>              | Primary Function <ul style="list-style-type: none"> <li>Support for cleaning building and storage of cleaning supplies</li> </ul> |                        |                    |
| <b>Notes:</b>                       | Standard janitor's room.  |                        |                    |

| ARCHITECTURAL CONSIDERATIONS |  |
|------------------------------|--|
| <b>Floor:</b>                | Concrete, sealed                             |
| <b>Ceiling:</b>              | Exposed, or painted gypsum board.            |
| <b>Wall:</b>                 | Painted gypsum board.                        |
| <b>Equipment:</b>            | Millwork, and storage for cleaning supplies. |
| <b>Notes:</b>                | N/A  |

| MECHANICAL CONSIDERATIONS |  |
|---------------------------|--|
| <b>HVAC:</b>              | Space to be ventilated per ASHRAE 62.1.  |
| <b>Plumbing:</b>          | Hot/Cold Domestic Water to be provided.<br>Mop Sink to be provided.<br>Floor drain to be provided. |
| <b>Notes:</b>             | N/A  |

| ELECTRICAL CONSIDERATIONS |   |                  |                                   |
|---------------------------|---|------------------|-----------------------------------|
| <b>Power:</b>             | TBD, per equipment requirements.  | <b>Lighting:</b> | LED, per code/industry standards. |
| <b>Communication:</b>     | N/A   |                  |                                   |
| <b>Notes:</b>             | Electrical provided to be suitable for service in wet conditions, with GFI's, and suitable NEMA ratings as appropriate. |                  |                                   |

| NOTIONAL ROOM/SPACE ATTRIBUTE SHEET |  |                        |  |
|-------------------------------------|--|------------------------|--|
| <b>Space Name:</b>                  | Fire Chief's Office  | <b>Size Allowance:</b> | 9.29m <sup>2</sup> – 10.78m <sup>2</sup> |
| <b>Space Function:</b>              | Primary Function <ul style="list-style-type: none"> <li>Office for Fire Chief to Conduct Administrative Matters</li> </ul> Secondary or Potential Functions <ul style="list-style-type: none"> <li>Meeting space for chief to meet with 1 to 2 persons.</li> <li>Storage of sensitive files and resource documents.</li> </ul> |                        |  |
| <b>Notes:</b>                       | The Fire Chief's Office must be suitable for the Chief to conduct administrative matters, store files, and meet with fire personnel individually.  |                        |  |

| ARCHITECTURAL CONSIDERATIONS |   |
|------------------------------|---|
| <b>Floor:</b>                | Resilient sheet flooring.   |
| <b>Ceiling:</b>              | Painted gypsum board, or suspended acoustic tile.   |
| <b>Wall:</b>                 | Painted gypsum board.   |
| <b>Equipment:</b>            | The following is a list of anticipated equipment; this equipment is Owner supplied does not form part of the eligible project funding, nor the construction contract. <ul style="list-style-type: none"> <li>Desk with chair</li> <li>Up to 2 visitor chairs</li> <li>Computer and associated equipment</li> <li>Lockable File cabinet</li> </ul> |
| <b>Notes:</b>                | Typical office requirements.<br>Office must be able to be locked.<br>Window to the exterior to be provided.<br>Interior glazing to apparatus bay may be provided.   |

| MECHANICAL CONSIDERATIONS |  |
|---------------------------|--|
| <b>HVAC:</b>              | Space to be ventilated per ASHRAE 62.1.<br>Temperature to be adjustable, and with programmable thermostat. |
| <b>Plumbing:</b>          | N/A  |
| <b>Notes:</b>             | N/A  |

| ELECTRICAL CONSIDERATIONS |   |                  |                                   |
|---------------------------|---|------------------|-----------------------------------|
| <b>Power:</b>             | TBD, per equipment requirements.  | <b>Lighting:</b> | LED, per code/industry standards. |
| <b>Communication:</b>     | Phone connection.<br>Network/Internet Connection.<br>Other equipment per level of service requirements. |                  |                                   |
| <b>Notes:</b>             | N/A   |                  |                                   |

| NOTIONAL ROOM/SPACE ATTRIBUTE SHEET |  |                        |   |
|-------------------------------------|--|------------------------|---|
| <b>Space Name:</b>                  | Training Room  | <b>Size Allowance:</b> | Sizing is lesser of:<br>0.75 x # VFFs x 1.54m <sup>2</sup><br><b>Or</b><br>30m <sup>2</sup> |
| <b>Space Function:</b>              | Primary Function <ul style="list-style-type: none"> <li>• Space for fire service meetings and training</li> </ul> Secondary or Potential Functions <ul style="list-style-type: none"> <li>• Emergency Operations Centre, if needed.</li> </ul> |                        |   |
| <b>Notes:</b>                       | Generally, this space is not meant to host large/multi-department training events. Could function as the Emergency Operations Centre if detailed in the Owner's Emergency Management Plan requirements.  |                        |   |

| ARCHITECTURAL CONSIDERATIONS |  |
|------------------------------|--|
| <b>Floor:</b>                | Resilient Sheet Flooring   |
| <b>Ceiling:</b>              | Painted gypsum board, or suspended acoustic tile   |
| <b>Wall:</b>                 | Painted gypsum board   |
| <b>Equipment:</b>            | The following is a list of anticipated equipment; this equipment is Owner supplied does not form part of the eligible project funding, nor the construction contract. <ul style="list-style-type: none"> <li>• Smartboard, or Wall Mounted TV</li> <li>• Tables or Desks with chairs</li> </ul> Kitchenette millwork if kitchenette is provided. |
| <b>Notes:</b>                | Generally, this space would be used for weekly/regular training events.<br>Room is to be sized based on realistic attendance numbers.<br>Large training events would be hosted at another municipal or community venue.  |

| MECHANICAL CONSIDERATIONS |   |
|---------------------------|---|
| <b>HVAC:</b>              | Space to be ventilated per ASHRAE 62.1.<br>Adjustable and programmable thermostat provided.<br>May be provided with mechanical cooling/mini-split system. |
| <b>Plumbing:</b>          | Hot and Cold domestic water, and drainage if kitchenette provided.  |
| <b>Notes:</b>             | Consider including the Kitchenette space in this room; adjust the mechanical requirements as needed.  |

| ELECTRICAL CONSIDERATIONS |  |                  |  |
|---------------------------|--|------------------|--|
| <b>Power:</b>             | TBD, per equipment requirements.<br>Rough-in for Owner supplied A/V to be provided.                  | <b>Lighting:</b> | LED, per code/industry standards. Lighting levels to be controllable by wall mounted controller. |
| <b>Communication:</b>     | Phone and Internet.<br>Rough-in for Owner supplied A/V to be provided.                               |                  |  |
| <b>Notes:</b>             | Consider including the Kitchenette space in this room; adjust the electrical requirements as needed. |                  |  |

| NOTIONAL ROOM/SPACE ATTRIBUTE SHEET |   |                        |                              |
|-------------------------------------|---|------------------------|------------------------------|
| <b>Space Name:</b>                  | Kitchenette   | <b>Size Allowance:</b> | As little space as practical |
| <b>Space Function:</b>              | Primary Function <ul style="list-style-type: none"> <li>Support for nutritional breaks during regular training.</li> </ul>                                |                        |                              |
| <b>Notes:</b>                       | Kitchenette space should be as small as practical, as it is meant only to support fire personnel during nutrition breaks (e.g. coffee, tea, water, etc.). |                        |                              |

| ARCHITECTURAL CONSIDERATIONS |   |
|------------------------------|---|
| <b>Floor:</b>                | TBD, based on location.   |
| <b>Ceiling:</b>              | TBD, based on location.   |
| <b>Wall:</b>                 | TBD, based on location.   |
| <b>Equipment:</b>            | Refrigerator (as small as practical, not included in construction contract)<br>Microwave oven (not included in construction contract)<br>Millwork in conjunction with level of service requirements.<br><br>Note that MI will fund rough-in for equipment, but will not pay for kitchen equipment with project funds. |
| <b>Notes:</b>                | Generally, this space would include a fridge, microwave oven, counter space, storage cupboards, and space for plugging in an electric kettle.   |

| MECHANICAL CONSIDERATIONS |  |
|---------------------------|--|
| <b>HVAC:</b>              | Space to be ventilated per ASHRAE 62.1.  |
| <b>Plumbing:</b>          | Single basin sink with hot and cold domestic water.  |
| <b>Notes:</b>             | Should the Owner wish to outfit the building with a commercial kitchen, the Owner will be responsible for paying for the incremental costs of equipment fit-up, including NFPA 96 duct work, and additional Plumbing equipment (e.g. grease trap). |

| ELECTRICAL CONSIDERATIONS |   |                  |                                   |
|---------------------------|---|------------------|-----------------------------------|
| <b>Power:</b>             | TBD, per equipment requirements.                      | <b>Lighting:</b> | LED, per code/industry standards. |
| <b>Communication:</b>     | N/A   |                  |                                   |
| <b>Notes:</b>             | Electrical provided with GFI's per Code requirements. |                  |                                   |

| NOTIONAL ROOM/SPACE ATTRIBUTE SHEET |  |                        |   |
|-------------------------------------|--|------------------------|---|
| <b>Space Name:</b>                  | Washroom/Shower  | <b>Size Allowance:</b> | Washrooms sized per Barrier free sizing requirements. |
| <b>Space Function:</b>              | Primary Functions <ul style="list-style-type: none"> <li>• Washroom</li> <li>• Shower</li> </ul>   |                        |   |
| <b>Notes:</b>                       | Washrooms and shower spaces are not required to be co-located, but can be co-located if it is beneficial.<br>Number of washrooms to be provided in accordance with Code requirements.<br>A minimum of <b>two (2)</b> showers must be provided in the building. |                        |   |

| ARCHITECTURAL CONSIDERATIONS |  |
|------------------------------|--|
| <b>Floor:</b>                | Slip resistant tile.   |
| <b>Ceiling:</b>              | Painted moisture resistant gypsum board.   |
| <b>Wall:</b>                 | Painted moisture resistant gypsum board.   |
| <b>Equipment:</b>            | Typical washroom equipment (e.g. toilet paper dispenser, soap dispenser, paper towel dispenser, sanitary napkin disposal, coat hook, waste receptacle, etc.).<br>Typical shower equipment (e.g. enclosure, towel hook, etc.).<br>Grab bars per barrier free requirements (for washroom and shower components). |
| <b>Notes:</b>                | Washrooms can be universal access.   |

| MECHANICAL CONSIDERATIONS |   |
|---------------------------|---|
| <b>HVAC:</b>              | Space to be ventilated per ASHRAE 62.1 and any other pertinent codes or standards.<br>Temperature to be adjustable.       |
| <b>Plumbing:</b>          | Domestic Hot and Cold Water provided to fixtures per the functions provided.<br>Drainage required per functions provided. |
| <b>Notes:</b>             | N/A   |

| ELECTRICAL CONSIDERATIONS |   |                  |                                   |
|---------------------------|---|------------------|-----------------------------------|
| <b>Power:</b>             | TBD, per equipment requirements.  | <b>Lighting:</b> | LED, per code/industry standards. |
| <b>Communication:</b>     | N/A   |                  |                                   |
| <b>Notes:</b>             | Electrical provided to be suitable for service in wet conditions, with GFI's, and suitable NEMA ratings as appropriate. |                  |                                   |