

District of Metchosin Fire Hall Building Replacement Needs – Discussion Report Prepared for Mayor & Council



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1) PURPOSE

This report is written to provide Mayor, Council and district staff with the history and pertinent details for planning and discussion as relates to the Municipal Capital Building Replacement Plan and review of the Metchosin fire hall.

2) BACKGROUND

Several in-depth visual inspections of the Metchosin fire hall have been completed, including a Structural Report from Herold Engineering Ltd. dated July 6, 2010 (Appendix 4) and two program service reports from K.R. Neilson & Associates, dated November 2009 (Appendix 5) and Mic Mac Consulting, dated February 2008 (Appendix 6)

The information reviewed and recommended by these experts concludes the District of Metchosin's fire hall is in need of urgent replacement and should be made a priority in the Municipal's capital replacement process.

Throughout the years the District of Metchosin and Metchosin Volunteer Fire Department have not fully addressed many of these concerns. While minimal building maintenance & repairs have been carried out, the building continues to deteriorate and the problems relating to usage, safety and suitability grow exponentially.

The most significant shortcomings of the fire hall are:

- Non-compliance with the BC Building Code as a Post Disaster Facility.
- A highly inefficient building with respect to energy usage.
- Improper ventilation of the apparatus bays of vehicle exhaust.
- Roof loads that exceed structural capacities.
- Various non-compliance with WorkSafe safety codes.
- Increased operating and repair costs due to the building's construction and noncompliance to current standards.

3) INTRODUCTION

a) Overview

When planning for new or renovated fire stations, it is important to conduct a thorough needs assessment. This is a comprehensive information gathering process that looks at existing conditions, current facilities and future needs. The NFPA Fire Protection Handbook, section 12, chapter 14, discusses this process at length. When contemplating future requirements and growth, development planning for this type of critical infrastructure should have a strategic plan extending 20 years into the future. Some guidelines suggest predicting 50 years, but that is neither practical nor reliable due to the many variables, which, change overtime.

The Metchosin Fire Department has occupied this building for over 50 years, far beyond the normal useful life cycle envisioned when the fire hall was originally designed.

b) MVFD History

The Metchosin Volunteer Fire Department (MVFD) was originally established as the Metchosin Mutual Fire Protection Society in October of 1958 and operated out of Bickerdikes Garage, with Harry Bickerdike as Chief and 24 volunteers; in 1961 the Society was disbanded and the Metchosin Fire Protection District was established; and finally in 1988, the Metchosin Volunteer Fire Department (MVFD) was established as a Municipal entity under Bylaw 73.

Currently the MVFD has over 35 members and attends to over 600 calls for service a year, and provides fire and life safety inspections to buildings in the area. The MVFD is a complex fire organization providing services to approximately 5,000 residents, three DND bases, two elementary schools, a First Nations reserve, an International University College, several marinas and many other unique grounds and properties - spread over 71sq/km of land (over 17,000 acres) – encompassing one of the largest geographic areas in the JDF.

Services include:

- Fire Suppression
- Rescue Operations
- First Responder Medical Response
- Fire Inspection
- Public Education
- Response to Hazardous Materials Incidents (HazMat)
- Fund raising and other community service and charitable work.

4) BUILDING FUNCTIONALITY

a) Seismic Design Loads

Seismic provisions for buildings in Canada were first introduced in the National Building Code of Canada in the 1960's and have evolved considerably since that time. The National Building Code of Canada (NBCC) and (British Columbia Building Code (BCBC) recognize that structures are more or less "important" depending on their use and occupancy, with categories for low, normal, high and post-disaster structures. In considering design for earthquake forces, the importance factor for post-disaster building such as fire halls is 1.5% the current Code. The original 1960 fire hall was not designed with any seismic detailing.

Post-disaster buildings have heavily reinforced concrete walls that brace the building in all directions and resist shear forces typical of an earthquake, major windstorm, or other catastrophic events that could occur in the local area. Post-disaster construction means the structure is engineered according to BC Building Code Standards so that it will survive these events and be operational for the community.

The Metchosin fire hall is constructed of unreinforced cinder block walls and, as Herold Engineering Ltd. identified in their report in 2010, would not survive an

earthquake. The fire hall houses, several key Municipal employees, along with trained fire fighters, an emergency kitchen, supplies, and is arguably one of the communities' most important assets. It is one of two buildings fully supported on a back-up generator (and natural gas) in the event of a major power failure throughout the District. In the first few hours and days following an earthquake, these facilities and equipment must be available.

b) MVFD Construction and Seismic suitability

The fire hall was constructed in 1960 with occupancy by MVFD upon completion. Since then, there have been four additions to the original building – not including the new apparatus bay constructed in 1994/95.

The most serious deficiency is in the area of structural seismic rigidity where the original building is grossly non-compliant with current code requirements particularly in the office/kitchen areas. In the event of a small magnitude earthquake or severe wind conditions, the building would not be expected to remain standing, effectively destroying fire-fighting and emergency service to the community at a most critical time.

The new Apparatus Bay built in 1994 – was built to the requirements of the 1990 NBCC or the 1992 BCBC and should be structurally adequate for the current seismic loading. This portion was constructed by volunteers of the day and has not had a formal engineering report completed.

With the original portion of the fire hall not constructed to standards, not only is the service of the fire department in jeopardy, but so are other vital public services and emergency programs.

c) Existing Roof & Snow/Water Loads

The existing roof structure is an additional concern. It has experienced widespread moisture damage, and there is visible mold growth within the attic space.

The flat tar and gravel roof has many areas of pooling and leakage. Upon receiving quotes for repair to the roof – several companies would quote on the project due its being beyond repair. Additionally, many field experts expressed a high concern for water and snow loads, which could potentially cause a catastrophic roof failure (Appendix 3).

d) Other Code Issues / Concerns

A decision to replace the existing fire hall should also take into consideration a number of other, non-structural issues in violation of existing WorkSafe BC regulations:

- Inadequate decontamination facilities for firefighter equipment
- No fire alarms or sprinkler systems in the building
- No mechanical ventilation for vehicle exhaust
- No commercial kitchen extinguishing system installed

This building is Mission Critical to the operation of the fire department and the municipal emergency program and should have these basic life safety and property protection systems installed.

e) Upgrade Requirements

There are currently no Code requirements to upgrade older buildings to meet today's Code for seismic loading. However, when existing structures change use or occupancy, the Authority Having Jurisdiction often stipulates the structure be seismically upgraded. Recognizing it is much more difficult to meet current Code seismic detailing requirements when renovating existing structures, upgrading to 60% or 70% of current loads is often acceptable – this is for “normal” occupancy buildings.

Due to the lack of structural integrity of the existing unreinforced concrete block, the Metchosin fire hall cannot safely be seismically retrofitted.

5) LOCAL EARTHQUAKE DISASTER RISKS

a) Earthquake Statistics

i) Local Recent Events

- (1) December 27, 2012 – 3.3mR
- (2) October 27, 2012 – 4.5mR
- (3) August 19, 2012 – 3.8mR
- (4) September 11, 2011 – 6.4mR
- (5) February 15, 2011 – 2.9mR
- (6) July 19, 2010 – 5.1mR
- (7) November 17, 2009 – 6.9
- (8) August 20, 2008 – 6.1mR
- (9) February 28, 2001 – Nisqually earthquake – 10:54am – 6.8mR: 206 persons injured due to falling masonry & non-structural building elements; major structural damage. Gas line breaks disrupted telephone service and structural damage.

ii) Natural Resources Canada

According to the Natural Resources Canada there have been over 104 earthquakes in the Southwestern BC Region in the last 30 days (May 2014).

Resilient facilities ensure the community volunteers who respond to emergencies can do so - even under the most trying circumstances.

6) CONCLUSIONS

The information gathered during this project indicates there is adequate evidence the current fire hall used by Metchosin Fire Department is in need of urgent replacement. The building is over 50 years old and is substantially below current standards for a post-disaster facility.

The building is likely to be heavily damaged during a significant earthquake making it difficult or impossible for trucks and crew to respond to subsequent emergency situations.

WorkSafeBC Regulation **4.2 Safe buildings and structures:** The employer must ensure that each building and temporary or permanent structure in a workplace is capable of withstanding any stresses likely to be imposed on it.

The above information is supported by the 2010 engineer report by Herold Engineering Ltd, the NFPA Fire Protection Handbook, and the Metchosin Emergency Preparedness report presented to Mayor and Council by K.R. Neilson & Associates in 2009.

7) RECOMMENDATIONS

It is recommended a new fire hall be incorporated into the Municipal Capital Building Replacement Plan as soon as is reasonable.

In the interim it is recommend funding be allocated to mitigate several areas of concern as follow:

- **Roof Repairs - \$30,000**
- **Vehicle Exhaust Extraction System - \$25,000**
- **Kitchen Exhaust System - \$10,000**
- **Safety Renovations - \$25,000**

8) SUMMARY

The District of Metchosin has made a significant investment in equipping and training its fire department to be able to deliver a critical service to the community. Many citizens consider a community fire service to be the most important service their local government provides. Most citizens will never experience the devastating effects of a fire or need the fire department to come to their aid. They do take comfort however, in the knowledge a trained professional service is on standby in their community to respond to fire, rescue persons from a damaged vehicle or to provide first medical response and other services.

***A fire department does not exist for what it does;
it exists for what it may have to do***

This report demonstrates the building deficiencies and safety concerns. Previous reports dating back to 2009 have provided detailed information about the building. It is understood the communities' ability to afford a new fire hall has been a factor in the delay of addressing the building's deficiencies or to build a new facility.

A structurally sound fire hall built to code would be an investment into the future. It would be a community asset that would be environmentally friendly

and energy efficient.

The District of Metchosin, through a policy decision and through an Establishing Bylaw, has decided to operate a fire department. They now are obligated to meet a Standard of Care and a corresponding Duty of Care. The standard of care is measured against what is reasonable in the circumstances based upon standards of training and available resources. This means the firefighters must take reasonable steps when implementing their firefighting duties, and the municipality must take reasonable steps to supply resources for training and to safely equip its fire department.

A new fire hall is required as a community investment in public safety



APPENDICES:

1. **NATURAL RESOURCES CANADA, 2010 National Building Code Seismic Building Code Calculation**
May 2014
2. **NATURAL RESOURCES CANADA, Southwestern British Columbia Listing, Earthquakes in the last 30 days**
May, 2014
3. **ROOF CONDITION REPORT, Metchosin Fire Hall Roof Condition Report**
Eric Meredith, Captain Metchosin Fire Department - January 30, 2013
4. **HERALD ENGINEERING, District of Metchosin, Metchosin Fire Hall Seismic Report,**
Mike Herold, P. Eng. Struct. Eng. - July 2, 2010
5. **METCHOSIN EMERGENCY PREPAREDNESS Report to Mayor and Council of the District of Metchosin, Page 18**
K.R. Neilson & Associates – November 13, 2009
6. **DISTRICT OF METCHOSIN VOLUNTEER FIRE DEPARTMENT REVIEW, Recommendation #58,**
Mic Mac Consulting, Doug MacAulay - February 2008