



# NANOOSE BAY FIRE HALL RENEWAL PROJECT

**Why are we re-building the Nanoose Bay Fire hall?**

The BC Building Code was amended in 2006 to require that emergency services buildings, if undergoing major repairs or being newly constructed, be built to a post-disaster standard. In 2007 the Nanoose Bay Fire Protection Society commissioned a seismic upgrade review which indicated that the cost of basic reinforcement was approximately \$500,000. The RDN Board asked for an additional review which revealed that the existing building had a long list of structural, mechanical, electrical and operational deficiencies. The Board approved a recommendation to design a new building to a post disaster standard. A design team made up of Society members, RDN staff and consultants worked together to design a new fire hall.

**What is the difference in cost between upgrading and rebuilding?**

The costs to upgrade versus re-constructing are outlined as follows in a report prepared by Johnston, Davidson Architecture and Planning (2008) for six rural RDN fire halls.

	Cost per Square Foot Upgrade	Cost per Square Foot New
Structural	\$100	
Architectural	\$60	
Mechanical	\$57	
Electrical	\$42	
Overheads & profit	27.5%	
Construction Cost	\$331*	
Overall for new construction		\$300*

\* Detailed design fees, building permits, civil engineering, geotechnical, landscaping, project management and project contingencies are additional non-construction costs.

**A significant earthquake will likely make it impossible for fire trucks to move around – so why worry about the building damage from an earthquake?**

The Nanoose Bay fire department is trained to provide a high level of first aid. A post disaster standard building will protect the equipment and supplies that have been paid for by Nanoose taxpayers and maintain the ability of the fire department to offer assistance in such a disaster.

## **What are the major operational weaknesses of the current building?**

Decontamination–Firefighter personal protective gear is stored within vehicle bays and becomes contaminated with smoke from fires, and from the general contamination that comes from a vehicle storage area.

First responder equipment and supplies – There is no dedicated storage or cleaning area for first aid supplies. The fire department responds to about 300 calls annually and 50 per cent of those are for medical aid, so storage and separation are critical for these supplies.

Vehicle access – Vehicle bays are constructed of cement block, and each bay is separated from the others. This makes addressing vehicle exhaust more difficult, limits storage and working spaces and makes access to vehicles awkward.

Training space – The department needs to provide training to more than one group of personnel at a time. The open upper storey of the fire hall cannot be easily divided for training. The old hose tower is unsafe for confined space training and is the weakest structural element of the building.

Fire sprinkler system – There is no fire sprinkler system in the vehicle bays.

Washroom facilities – There is inadequate washroom facilities for female fire fighters. The proposed fire hall will have one female washroom/shower room, one handicap washroom and a two-person male washroom/shower facility.

Access to water for filling vehicles and training – The department has no onsite fire hydrant or uncontaminated water storage for vehicle washing, training or maintaining landscaping.

Dispatching – The radio room is located at the rear of the vehicle bays, which makes it difficult for whoever is managing dispatch to see which members and vehicles have left the station.

General administration space – There is a single room in the fire hall that serves for all records storage and as a Society Board meeting room. The department has outgrown the space.

Building entry –The current entrances are not well suited for public or personnel access. Both entrances require climbing a high set of stairs to reach the administrative and training spaces in the fire hall.

Heating systems – Space heating to the upper floors is provided by fuel oil fired hot water baseboards. The equipment has reached then end of its useful life. There is no cooling in the building. Vehicle bays are heated by overhead heaters which do not provide good coverage for drying the underside of wet vehicles when they return from a fire.

Electrical power – The building has reached the capacity of the current electrical service and has very limited, manually activated back up power. A larger generator with automatic switching will be installed as part of the project.

**Why not combine fire and ambulance services in one building?**

The provincial ambulance service is not able to provide dedicated services in the Nanoose area at this time, and there is no timeframe for the Province to consider such a change.

**Is the Department of National Defense contributing to the building?**

The Department of National Defense pays a grant in lieu of property taxes of about \$5,000 annually for fire protection. It is not contributing any other special funding to the project.

**What does the RDN’s Green Building Policy mean for this project?**

The primary objectives of the Green Building Policy are energy efficiency and a reduction in greenhouse gas emissions. Heating, cooling and electrical systems are the focus for reducing energy use and greenhouse gas emissions. The proposed building uses cost-effective, energy efficient electrical and lighting systems. Water based heat pumps will reduce the cost of energy for heating and will also reduce the carbon footprint of the building by about 95 per cent from current equipment. This project has been evaluated as achieving a LEED Silver standard.

**How much have the proposed green features increased the cost of the building?**

*In-floor heating:* Estimated at \$30,000 to \$36,000. Overhead fan based heaters in the vehicle bays are less expensive than in-floor heating - the capital cost would be in the order of \$5,000 to \$8,000. Other alternatives include installing large overhead fans to force air down (similar to grocery and building supply stores). The department reports overhead heating does a poor job of drying the damp, open spaces of the vehicle bays and the underside of wet vehicles returning from a fire.

*Water based heat pumps:* Estimated at \$45,000 compared to the cost of a high efficiency boiler system at \$35,000 to \$37,500. Water based heat pumps have very high performance ratings – for every 1 unit of energy used to run the heat pump; it generates 4 times the energy for heating and cooling.

*Onsite water storage:* Estimated at \$16,000. This is an environmentally sound approach to managing runoff from the site and does offer operational benefits to the fire department.

In summary the estimated net cost of these three items on the project are:

	Capital Cost	Alternative capital cost	Net capital cost
In floor heating	\$36,000	\$8,000	\$28,000
Water based heat pump	\$45,000	\$37,500	\$12,500
Onsite water storage	\$16,000		\$16,000
	\$97,000	\$45,500	\$45,500

An energy model of the building with updated lighting fixtures and the water based heat pump system indicate annual energy savings in the range of \$1,700 per year on a typical annual cost of \$10,000 to \$15,000 ( depending on fuel oil prices).

Based on the relatively modest cost of these three features compared to the construction cost as a whole and the significant improvement in the environmental impact of the proposed design, these three features have been recommended as part of the proposed design.

**Why not use air based heat pumps, overhead fans in the vehicle bays and standard HVAC equipment to provide heating and cooling – aren't they less expensive?**

The capital costs of air based equipment will be approximately equal to the water based heat pumps. The mechanical engineer on the project advised the design team that air based heat pumps are not as efficient as water based heat pumps in colder weather. In the remainder of the building, standard air coil fans supply heat (and cooling) through typical duct work. Given the capital costs as shown in the table above and the positive results of the energy model study for this particular system, it was recommended that these systems be incorporated in the proposed design.

**Wouldn't a pre-engineered building be less expensive?**

Pre-engineered buildings are often used in warehouse style configurations, have some advantages in that they can be erected relatively quickly once delivered and can be less expensive – but not always. The difference in cost between designs in wood versus steel will depend on the design itself as well as the price of either commodity. Recently steel prices have increased considerably and they continue to be volatile. From a broad environmental perspective, wood which is produced and available locally is preferred to steel which must be manufactured and shipped from considerable distances.

The proposed design is based on standard wood frame construction which is very familiar to the local building trades. Structural steel is used in the roof assembly where required, but the walls of the structure use wood as the primary material. The proposed design uses large wood beams (glulam) as the roof structure. This allows the material to be seen structurally as well as decoratively. A steel roof structure requires more finishing of the ceiling to achieve the equivalent fire rating. Wood framed walls do require more extensive detailing than structural steel walls – more nailing of materials to studs for example – but wood is acknowledged as very good from a seismic standpoint.

The exterior of the building is clad in low maintenance materials. Cedar shiplap will cover the administrative sides of the building and standard metal siding will cover the vehicle bay portions of the building. The roof will be metal standing seam with galvanized gutters.

As mentioned above, local construction trades are very familiar with wood construction and should be very efficient at the detailing.

**Can we get a grant to help with the cost of the building?**

At this time there are no grant programs available to offset some of the costs of this building.