

# WOOD USE IN BRITISH COLUMBIA SCHOOLS

## BENEFITS OF WOOD

Wood is versatile, resilient and renewable, making it an excellent choice to build or renovate schools. It can be less expensive than other major building materials, and studies show it creates safe, healthy and inspiring learning environments. Find out how wood can be integrated into current practices across British Columbia to deliver a wide range of benefits while addressing unique factors involved in school construction and renovation.



Southern Okanagan Secondary, Oliver, B.C. | Architect: HDR | CEI, KMBR Architects Planners Inc. | Photo: Courtesy of CEI Architecture, Ed White Photographics

*In 2018, Forestry Innovation Investment commissioned a report to increase awareness of how school facilities can use and are using wood to support B.C.'s climate and education priorities. "Wood Use in British Columbia Schools", conducted by Stantec and Fast + Epp, highlights opportunities and innovative solutions to use wood in schools.*

# Fast, cost-effective construction

School districts, which are responsible for building designs and material selection, are finding that wood is a versatile and resilient choice for structural applications and non-structural uses such as exterior cladding and interior features. Wood construction, from light wood framing to heavy or mass timber, is generally faster than steel or concrete, and the project costs are often lower, important considerations for school projects with tight schedules and budgets.

## Construction benefits

Faster construction time can be better for infrastructure and capital project planning, as well as reduces site disruptions and avoids issues in regions where weather is a challenge. Many wood elements can be prefabricated off site in a controlled environment, reducing time and waste.

Wood buildings are easy to renovate, expand and adapt to changing uses while meeting code and safety requirements.

## Performance benefits

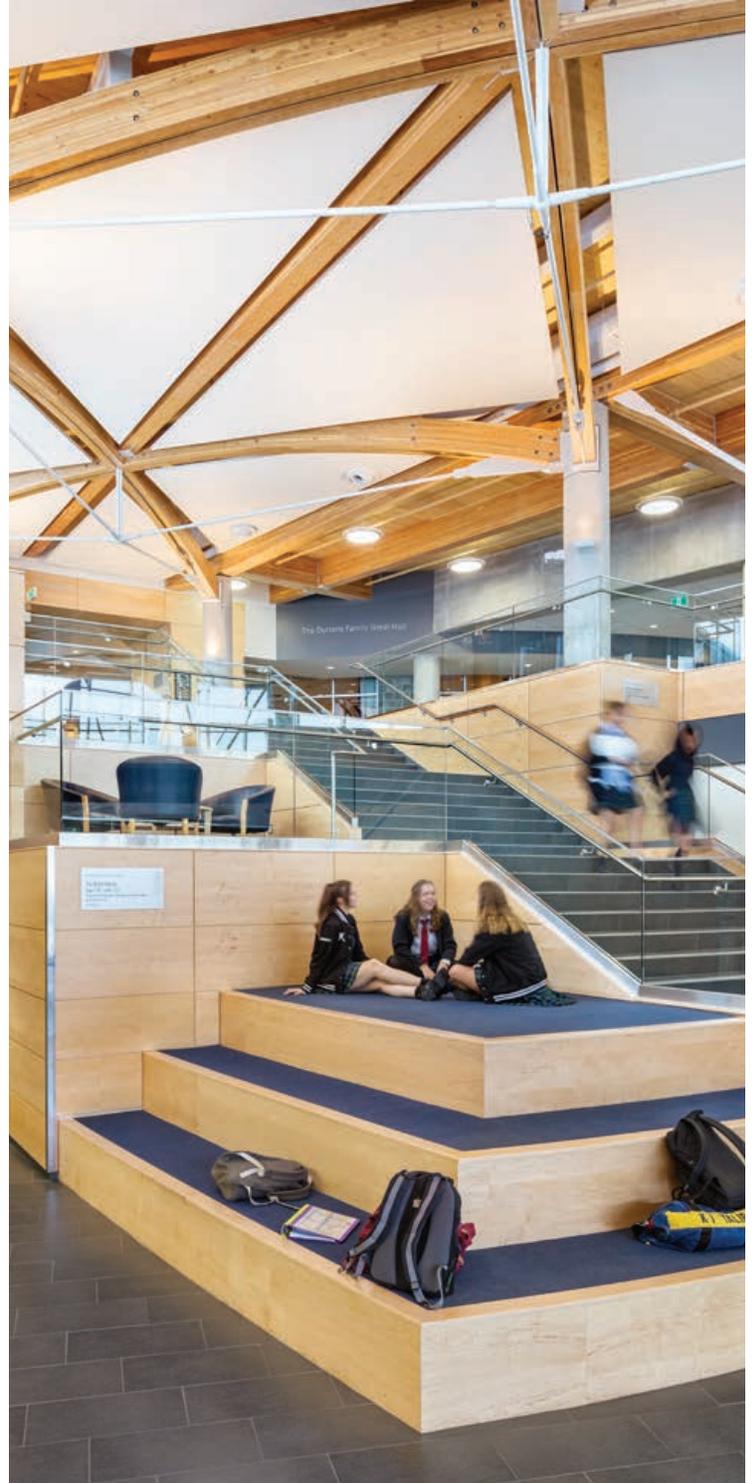
With smart design and proper maintenance, wood in buildings is durable and long lasting, resisting damage and decay that may result from heavy use, water and insects.



Cordova Bay Elementary, Victoria, B.C. | Architect: Iredale Architecture  
Photo: krista jahnke photography + design

## B.C.'s sustainable forests

*B.C. is recognized as a global leader in sustainable forest management, with stringent laws and regulations, skilled professionals and comprehensive monitoring and enforcement. The forest sector is an important part of the provincial economy, supporting healthy communities; providing thousands of secure, well-paying jobs; and contributing taxes for important services such as education and health care.*



Mulgrave School, West Vancouver, B.C. | Photo: Ed White Photographics

## Innovative B.C. wood products

*Wood offers designers many options—from traditional dimensional lumber framing to engineered products such as glue-laminated timber and cross-laminated timber. The B.C. government is working with industry and communities to develop innovative uses of wood to build better performing and more sustainable buildings.*

# Comfortable, safe learning environment

Wood is durable, strong, flexible and lightweight. As well as improving building performance, studies show it supports the safety, well-being and productivity of occupants. It complements the new curriculum recently introduced by the B.C. government, and meets the expectations of students, parents and teachers, by helping provide a calm and welcoming space where collaboration and creativity can be encouraged.

## Safety and resilience

Schools need to meet some of the highest safety standards under the BC Building Code and the BC Fire Code. They are often designated as shelters in the event of a major disaster such as an earthquake.

Wood schools are common in high population areas along British Columbia's coast where major earthquakes are a concern. Wood structures have features that meet or exceed the most demanding earthquake design requirements such as numerous nail connections that provide inherent flexibility so there is less chance the structure will collapse.

### Earthquake protection

*The B.C. Ministry of Education is funding projects to make schools safer in the event of earthquakes, and has established budgets for school expansion and replacement programs. Schools that have used wood in seismic upgrades include Victoria's Cordova Bay Elementary, Westview Elementary in Powell River and Surrey Christian.*

## Fire safety

Building codes require that all building systems perform to the same level of safety, regardless of the material used. Wood construction is resilient with a proven safety and performance record for a full range of conditions, including fire. Nearly all wood products meet maximum surface flame-spread ratings without the need for fire retardant treatments or coatings.

Wood often exceeds prescriptive fire safety and protection codes. When exposed to fire, the outer layers of thick mass timber char to provide natural protection. This insulates the wood, slowing combustion and retaining strength so there is time to evacuate the building.

## Health and wellness

Wood is hypo-allergenic and easy to clean. Solid wood products, particularly flooring, are often specified in environments where the occupants are known to have allergies to dust or other particulates. The use of wood products can improve indoor air quality by acting like a sponge to moderate humidity—raising it when the air is dry and lowering it when the air is moist.

*Wood and Human Health*, a study carried out at the University of British Columbia and FPInnovations, found that the visual presence of wood in the interior of buildings helps reduce stress levels in occupants.

## Learning outcomes

B.C.'s new curriculum for K-12 includes new competencies and principles such as creative thinking, critical thinking, positive personal and cultural identity, and social responsibility.

The use of wood in schools provides a tangible connection to the natural world, and encourages students to think about sustainability. It offers a calming and welcoming learning environment—softening noise in open learning spaces where students are much more active than in the past, encouraging collaboration and creativity, and providing health and well-being for all occupants.

## Acoustics

Wood assemblies can be adapted to meet specific acoustic requirements for any setting, from libraries to gymnasiums. They deliver sound attenuation and absorption in a comfortable setting. Performance theatres typically use wood as a surface material because it can diffuse sound or spread it evenly through the space.



Seven Oaks School of Performing Arts Centre | Architect: dRMM (de Rijke Marsh Morgan Architects)  
Photo: David Merewether

*Acoustic considerations underlie the design of each part of the Sevenoaks School of Performing Arts Centre in Kent, England—including a large open timber roof that provides the volume and detail needed for quality acoustics.*

## Cultural significance

The B.C. curriculum has greater emphasis on Aboriginal perspectives and knowledge. Wood construction and detail can create a strong architectural expression symbolic of First Nations culture. It is also a key symbolic element where schools are used as community gathering places.



Kwakiul Wagalus K-7 Elementary, Port Hardy, B.C. | Architect: Lubor Trubka Associates  
Photo: : Courtesy of Lubor Trubka Associates Architects

### Learning from others

*Jurisdictions such as Japan, New Zealand and California that face seismic risks similar to B.C. are turning to wood for schools. An assessment of school damage after the 1994 Northridge earthquake in California found wood structures performed well—more than 40% of schools in the state are made with wood.*

## Support for B.C.'s climate action

By choosing wood construction, B.C. school districts can demonstrate a commitment to climate action and the environmental future of their students.

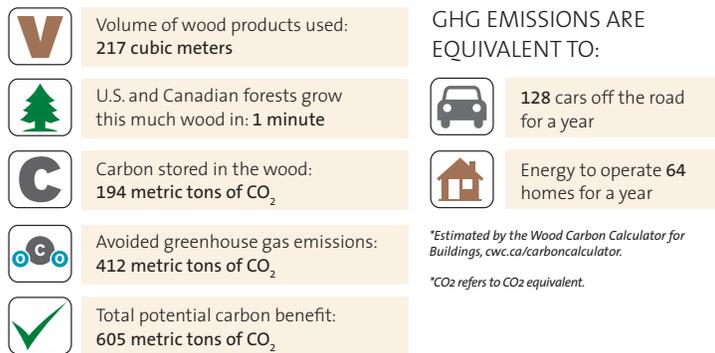
### Energy efficiency

Highly energy-efficient school buildings lower the cost of carbon neutrality to school districts and can lead to long-term operational cost savings. Wood schools can be easily designed to meet or exceed demanding energy-efficiency requirements, including the new BC Energy Step Code. Wood has low conductivity, and wood structures are easier to insulate.



Westview Elementary, Powell River, B.C. | Architect: KMBR Architects Planners Inc.  
Photo: Ed White Photographics

### ESTIMATED ENVIRONMENTAL IMPACT OF WOOD USE FOR WESTVIEW ELEMENTARY



Westview Elementary was designed and constructed after a seismic assessment of the original school (then known as Grief Point) determined that upgrading the existing structure to current code requirements would be uneconomical. It was designed as a 'Neighbourhood of Learning', making it not only a place for learning, but also a facility for a wide range of community activities.

The environmental impact of using wood as opposed to steel or concrete in the 4,300 square metre school and can be seen in the chart above.

The wood grain featured in this factsheet is Douglas fir.

### Embodied energy

Forests are critical in addressing climate change and reducing greenhouse gases. As they grow, trees filter air, absorb carbon dioxide, release oxygen and store carbon.

#### B.C. climate change strategy

B.C.'s is working to build a clean growth future for its economy. Its climate strategy priorities include a commitment to reduce greenhouse gas emissions to 80% below 2007 levels by 2050. Reducing carbon at every stage of construction—including production, transportation and disposal of building materials as well as the operation of the building is essential to meeting these targets.

#### BC Energy Step Code

The BC Energy Step Code is a voluntary program that encourages buildings to go beyond the energy requirements of the BC Building Code to make buildings net-zero energy ready by 2032. It takes a performance-based approach, identifying energy-efficiency targets so designers/builders can decide how to meet them. This opens the door to innovative, cost-effective solutions using leading-edge technology.

Through the BC Energy Step Code, government is recognizing the role of high-performance standards such as Passive House in reducing greenhouse gas emissions. Passive House buildings consume up to 90% less heating and cooling energy than conventional buildings. Passive House certification will gain more traction as the building industry adapts to the BC Energy Step Code and more sustainable practices.

### FOR MORE INFORMATION

For more information and resources visit:

- [naturallywood.com/WiS](http://naturallywood.com/WiS) for the Wood Use In British Columbia Schools report, case studies, project profiles CEUs, virtual tours;
- [wood-works.ca/bc/](http://wood-works.ca/bc/) for case studies, resources and technical support.

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