

CASE STUDY

**Nez Perce-Clearwater
National Forests
Supervisor's Office**



Mass timber building
showcases work of the
U.S. Forest Service

Countering the concept that mass timber is only suited for expensive urban buildings, the U.S. Forest Service (USFS) chose cross-laminated timber (CLT) and glue-laminated timber (glulam) to build a new supervisor's office for the Nez Perce-Clearwater National Forests. The two-story structure, built in the small town of Kamiah, Idaho, fits seamlessly into its remote, scenic location.

Formerly scattered among five buildings in three communities, the 80 employees who manage the four million acres of the Nez Perce and Clearwater National Forests are now together under one roof. The CLT roof is supported by glulam beams and columns and light-frame walls and floors—illustrating the types of materials that come from Nez Perce-Clearwater and other National Forests. The office was one of the first applications of CLT by the USFS and the first U.S. Department of Agriculture (USDA) project to use BioPreferred® CLT.

“The U.S. Forest Service is inextricably woven into the social and economic fabric of our communities,” said Cheryl Probert, Forest Supervisor of the Nez Perce-Clearwater National Forests. “We play an important role in keeping these rural communities robust and sustainable. That’s why we wanted to use wood, to showcase it as an economic, efficient and sustainable example of the great work the Forest Service does.”

Sustainability was a key goal for the USFS, but they also needed a practical, economical building that fit with the small community in terms of scale, material and aesthetic.

“We wanted to speak loud and proud about utilizing forest products to house the staff who manage this complex landscape,” said Quentin Smith, Recreation, Engineering, Lands & Minerals (RELM) Staff Officer for the USFS. “But we also wanted to keep the building understated while making it welcoming and accessible to the public. In fact, we learned that this building is only the second in Lewis County to have an elevator; the fact that it has an elevator shaft made of CLT makes it even more exciting.”

Of course, they also needed an efficient design that would allow them to meet federal budget requirements. “The building is stunning, and I’m always having to tell people that, when compared with similar buildings in the Forest Service, this one was actually less expensive,” said Probert. “People automatically assume that a beautiful building will cost more, but that was not the case here, even with our remote location.”

Low Profile Exterior, Spacious Interior

The structure is set into a sloping site, fitting with the terrain. “This gave the building a lower profile while still allowing natural light and an open feel,” said Aubrey Yerger, structural project engineer with Morrison-Maierle. “The CLT roof panels reflect that natural light, helping the rooms feel even more spacious.”

PROJECT DETAILS



Nez Perce-Clearwater National Forests Supervisor's Office

LOCATION: Kamiah, Idaho

STORIES: Two stories

SIZE: 16,000 square feet

CONSTRUCTION TYPE: V-B

COMPLETED: 2021

PROJECT TEAM

CLIENT/OWNER: U.S. Forest Service

ARCHITECT: Mosaic Architecture

STRUCTURAL ENGINEER: Morrison-Maierle

CONTRACTOR: Quality Contractors, LLC

CLT SUPPLIER: RedBuilt,
SmartLam North America

GLULAM SUPPLIER: RedBuilt,
QB Corporation

Connect with the
Nez Perce-Clearwater project team at

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The post-and-beam structure features a single gabled roof formed by 8x45-foot CLT panels, a mixture of 4- and 5-ply optimized for best economy. The largest glulam beams were 8-3/4x33 inches; smaller beams were used for shorter spans. To achieve an unbraced column height that reached 20 feet in some areas, they used built-up glulam columns in lieu of larger, solid members. The built-up columns consisted of two 6-3/4x9-inch glulam members with intermediate steel HSS connectors spaced at 5 feet on center, allowing daylight to stream through the gaps.

Because select walls in the vaulted portion of the office area are 25 feet tall, the team used laminated strand lumber (LSL) studs with wood structural panels for shear. The main floor framing was predominantly plated wood floor trusses, although I-joists were used in some areas.



CLT Elevator Shaft Saves Time and Labor

The prefabricated CLT elevator shaft was flown in by crane and installed in one day, providing a significant time savings over a concrete or masonry core. Because of its location in the building, engineers at Morrison-Maierle opted not to use any contribution from the shaft to the lateral system; it was used to support floor and roof gravity loads only.

Joel Little, Project Manager for the USFS, said, “For me, the CLT elevator shaft was an eye opener. When you can use a wood product as a one-hour fire-rated elevator shaft instead of a traditional CMU system, there is tremendous savings in time and labor. It’s beautiful as well.”

He added, “I came here two years ago as part of a value analysis team. Our job is to study a project and find ways to accomplish the same things at lower cost. On this project, we compared traditional elevator shaft and roof designs with that of the CLT system and found the cost difference was negligible, and aesthetic and other advantages far greater. We could find no aspect of the CLT system that didn’t provide a greater value. I’ve been with Forest Service for over 20 years as an architect, and this is the first time I can say that.”

Global Sustainability

Like all new USFS construction projects over 10,000 square feet, the Supervisor’s Office had to qualify for certification under the LEED or Green Globes rating system. “Because RedBuilt provided project management and support at the beginning of the project,

we took extra effort to make sure the glulam and CLT would meet the requirements for Green Globes,” said Kelsey West, mass timber sales specialist with RedBuilt.

The use of BioPreferred CLT furthered their commitment to sustainability. The goal of the BioPreferred program is to increase the use of biobased products, including renewable materials like wood, as an alternative to conventional petroleum-based products. “As architects, engineers and owners, we need to start making different decisions based on the impact that our material choices have on the global climate,” said Smith. “This was one of the things that had me most excited me about this project. This building served as an example of making the right material decisions for the right reasons.”

Wood Construction Opens Local Doors

People might have expected the use of a product like CLT to pose installation challenges in such a remote location, but the team found it to be straightforward.





Nez Perce-Clearwater National Forests Supervisor's Office



Volume of wood products used:
13,379 cubic feet



U.S. and Canadian forests grow this much wood in:
1 minute



Carbon stored in the wood:
331 metric tons of CO₂



Avoided greenhouse gas emissions:
376 metric tons of CO₂



TOTAL POTENTIAL CARBON BENEFIT:
707 metric tons of CO₂

EQUIVALENT TO:



149 cars off the road for a year



Energy to operate 75 homes for a year

Source: US EPA

Estimated by the Wood Carbon Calculator for Buildings, based on research by Sarthre, R. and J. O'Connor, 2010, A Synthesis of Research on Wood Products and Greenhouse Gas Impacts, FPIInnovations. Note: CO₂ on this chart refers to CO₂ equivalent.

Reducing Carbon Footprint

The use of wood lowers a building's carbon footprint in two ways. Wood continues to sequester carbon absorbed by the trees while they were growing, keeping it out of the atmosphere for the lifetime of the building—longer if the wood is reclaimed at the end of the building's service life and re-used. Meanwhile, the regenerating forest continues the cycle of carbon absorption. Wood products also require less energy to produce than other building materials, and most of that comes from renewable biomass (e.g., bark and sawdust) instead of fossil fuels. Substituting wood for fossil fuel-intensive materials is a way to avoid greenhouse gas emissions and reduce embodied carbon.

“Since it was a public project, we got involved at the solicitation stage,” said Gabe French, project manager at Quality Contractors. “It was a best-value contract and initially came in over budget, so we worked through some value engineering options, some of which we were able to accomplish because it was a CLT structure. For example, we were able to eliminate exterior soffits because of the CLT roof panels, which saved time and materials.”

French said it was his crew's first experience with CLT, but once they got rolling, everyone was comfortable with the process. “Our use of CLT shaved a month off construction of the building shell, even on the challenging site,” he said. They broke ground in July 2020 and started framing in late October. The shell was complete by December 1 using a six-person framing crew.

Even though Kamiah is remote, ‘local’ was important to the installation success. Quality Contractors’ framing crews came from just 30 miles away, and the contractor participated in the Nez Perce Tribal Employment Rights Office (TERO) program to include the tribal workforce wherever possible. The remote location was ideal for the prefabricated nature of mass timber since all glulam and CLT panels were precut to fit perfectly at the jobsite.

“People appreciated the fact that their local infrastructure was being improved, and the construction process helped boost the local economy,” said French. “Mass timber—and wood construction as a whole—opens doors to local economies. You still need qualified installers, but mass timber is more flexible than a steel building, and many of the skilled workers we need already exist in smaller communities.”

Natural Efficiencies

The USFS wanted the Nez Perce-Clearwater supervisor's office to showcase forest products and wood technologies, and demonstrate that CLT could be used effectively to create a beautiful building in a remote location with a reasonable budget. “But I also think they took their responsibility seriously in terms of creating a great space for their employees,” said Jeff Downhour, Principal at Mosaic. “These are people who tend to spend a lot of time outside, so they feel more comfortable in spaces that are less institutional. I think the warm feel of the exposed wood, tall ceilings and natural lighting all added value to the project.”

Supervisor Probert added, “We recognize the advantages wood provides in terms of biophilia and how it fosters creativity, positivity and efficiency. I think everybody wants more efficient government employees. It's exciting to think that these people, who've literally been working in basements, can now work from this spacious, beautiful space.”

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