CASE STUDY

The Village at Mines Park

University combines light-frame wood and mass timber for affordable student housing

When this premier engineering and applied science university combined mass timber with light-frame wood to build affordable student housing, they overcame many of the challenges common to this type of project, including budget constraints, strict timelines, and high student expectations. And they did so while meeting their own goals for sustainable design.

Like many universities, the Colorado School of Mines needed more beds. The housing near campus was well-situated but dated and inefficient. To maximize the prime location, Mines demolished six of the most underutilized structures, which housed less than 100 students, and replaced them with five new multi-story buildings. Today, the redevelopment known as The Village at Mines Park provides attractive, convenient, affordable housing for more than 650 students.

The University had ambitious sustainability goals, budget constraints, and a strict schedule, but the land itself was problematic. “The site has about a 50-foot grade change from top to bottom,” said Matthew Breen, Architect and Project Manager at SAR+ Architects. “So, we were truly designing these buildings to fit on the side of a mountain. And the result is a much better use of the land from a density standpoint.”

The new structures were built using a mix of light-frame wood and mass timber. The hybrid configuration took advantage of many of the positive aspects of wood construction, overcoming cost, schedule, and structural challenges while giving students a beautiful place to live.

Making it Pencil

The Village at Mines Park was developed through a public-private partnership (P3) led by Capstone Development Partners. “They gave us key requirements in terms of how many units were needed to make the project pencil,” said Breen. “Our budget was set from day one.”

The initial plan was for five light-frame wood structures, using engineered wood trusses for the floors and roofs. But shortly after beginning design, SAR+ discovered that the City of Golden had a 50-foot height limit along the north edge of the property, where four of the five buildings would be located. This meant they had to re-examine the structural system, since the planned five-story buildings exceeded the height requirements.

The team considered all-concrete options as well as one that combines a composite floor system with pre-panelized load-bearing metal stud walls. But both Mines and Capstone Development Partners required a certain baseline of sustainability, so the design team continued to pursue a wood system. SAR+ and Milender White Construction were both familiar with cross-laminated timber (CLT) and together determined that the shallow floor and roof assemblies allowed by the mass timber panels would enable them to keep the buildings under 50 feet.

PROJECT DETAILS

The Village at Mines Park

LOCATION:	Golden, Colorado
STORIES:	Four and Five
SIZE:	285,743 square feet
CONSTRUCTION TYPE:	III-B – 5-story mass timber/ light-frame wood (three buildings)
	V-A – 4-story mass timber/ light-frame wood
	V-A over I-A – 4-story light-frame wood over a concrete podium
COMPLETED:	2025

PROJECT TEAM

OWNER:	Colorado School of Mines
DEVELOPER:	Capstone Development Partners
ARCHITECT:	SAR+ Architects
STRUCTURAL ENGINEER:	Fortis Structural
GENERAL CONTRACTOR/ MASS TIMBER INSTALLER:	Milender White Construction
MASS TIMBER:	Element5 | HASSLACHER Group
ACOUSTIC MATERIALS:	Pliteq, Inc.
MASS TIMBER FINISHES:	Sansin
FASTENERS/CONNECTORS:	Rothoblaas

Connect with The Village at Mines Park project team at *www.woodworksinnovationnetwork.org/projects/mines-park-housing*

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Four of the student residences were designed using the mass timber/light-frame hybrid system. Three are five stories and the fourth, built into a slope, is four stories to better match the massing and scale of the others. The fifth building has four stories of light-frame wood over a concrete podium, as it is outside the height-restricted area.

Student-Friendly Spaces

Each of the four wood hybrid structures features a large open entry, designed to celebrate the exposed glue-laminated timber (glulam) beams and columns inside. Windows in the airy volume allow natural light to stream in, highlighting the beautiful exposed CLT ceilings.

Mass timber was also left exposed wherever possible in the living spaces. Overall, Breen estimates that about 50 percent of the CLT was left visible.

“The University wanted well-designed, multi-use spaces built with good materials and daylighting,” says Breen. “In addition to the residential rooms, each of the buildings features a variety of community spaces, ranging from small study rooms to larger shared areas where students can hang out with friends. The size and location of these areas vary from floor to floor, so students can find a variety of places to relax, study with a group, or study alone in any of the buildings.”

Because the four hybrid buildings follow the site’s topography, they were built with what Breen calls “interesting bends and kinks, almost draped along the contours of the mountain. This is what allowed us to break open the floorplan and find room for all those community spaces. The overall width of the larger areas was defined by the bearing walls, which were stacked from floor to floor. We then used non-structural bearing walls to create smaller spaces where desired.”

While the fifth building wasn’t subject to the height limit, SAR+ wanted the light-frame wood structure to fit within the architecture of the Village. Its main level contains a small student union area with a multipurpose lounge and café; adjacent are a large fitness center and university offices. Four stories of residences sit above.

Height Restriction Required Tight Coordination

Because of the height limit, SAR+ maintained tight control over the floor-to-floor heights of the four hybrid buildings and worked closely with their mechanical contractors to ensure coordination.

They chose a heat pump split system and focused on ductwork placement to minimize the need for soffits and keep as much of the CLT exposed as possible. Most mechanical systems run through the corridors, which have strategically-placed dropped ceilings, and fan coil units were placed in the covered soffits of support spaces like laundry rooms and in residential bathrooms. They used sidewall distribution for the airflow intake and exhaust systems in the amenity spaces. Ductwork ran into bedrooms and living rooms from the dropped bathroom ceilings, leaving many of the bedrooms with a fully-exposed CLT ceiling. Electrical for lighting was routed from above when possible, but the buildings also have exposed conduit.

“We knew there was no wiggle room within the ceiling heights,” said Breen. “So, everyone worked together to meet both the height restriction and our goal of leaving the CLT exposed.”

The height limit also meant SAR+ needed to manage the thickness of their acoustical floor assembly. They began by searching for an option that would work with a 2-inch-thick gypcrete topping slab and found a 3/8-inch-thick acoustical mat that could be installed directly on the CLT. They also added a recycled rubber acoustic underlayment when needed under the laminate flooring. The efficient assembly gave them an STC rating of 52 and an IIC rating of 51.

Move to CLT Saved Money

The move to a hybrid light-frame structure with CLT floor panels allowed the project team to find savings in several areas.

As with most universities that want new construction to match their campus identity, the Colorado School of Mines had specific expectations regarding façade design. So even though these buildings were designed as affordable student housing, they needed brick and metal panel cladding. By using CLT to reduce the height of the four buildings (a reduction of about 4 to 5 feet each), the team was able to save money on these more expensive façade materials.

Speed of construction also resulted in project savings. Milender White panelized the light-frame wood walls at their nearby prefabrication facility. The wall panels were then shipped to the jobsite and lifted into place, allowing the CLT panels to be efficiently dropped in.

Construction began in November 2023, and the contractor began installing CLT panels in late April 2024; the four hybrid buildings were topped out just four and a half months later. Breen credits a "very well-executed logistical plan by the entire design-build team. We knew the project needed to be completed in time for fall semester. So even with the need to pivot to a new structural system, we were able to meet that August 2025 deadline."

Taking Advantage of a Beautiful Location

Natural materials, sweeping views, and ample lighting all add to the appeal of The Village at Mines Park. Stairs are conveniently located to encourage use; they are surrounded by large windows that allow students to take advantage of the views. Outdoor spaces flank each of the buildings, and meandering paths provide easy access. Mass timber is left exposed wherever possible.

Supporting Sustainable Forests

The Village at Mines Park includes 132,123 cubic feet of wood products. It takes North American forests 10 minutes to grow this volume of wood.

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, FPInnovations.

It was all designed to support student health, said Breen. "You can see the excitement when people experience these buildings for the first time. Most people don't expect to see beautiful wood like this in student housing, and it's a pleasant surprise for them. We also know how natural materials like wood promote better learning, so that was also a key driver in our design."

The project even created interest among Mines students, particularly those studying structural engineering. During construction, the job site became a popular place for these students to tour.

"The Colorado School of Mines promotes student wellbeing, and they were very supportive of our decision to use mass timber," Breen added. "It's a material that's both beautiful and sustainable; a nice way to give students what they want—quality buildings, quality spaces, and healthy materials. The university is celebrating this project and even using it to attract new students. It's become a nice part of the Mines story."

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Photos: Kyla Chambers
