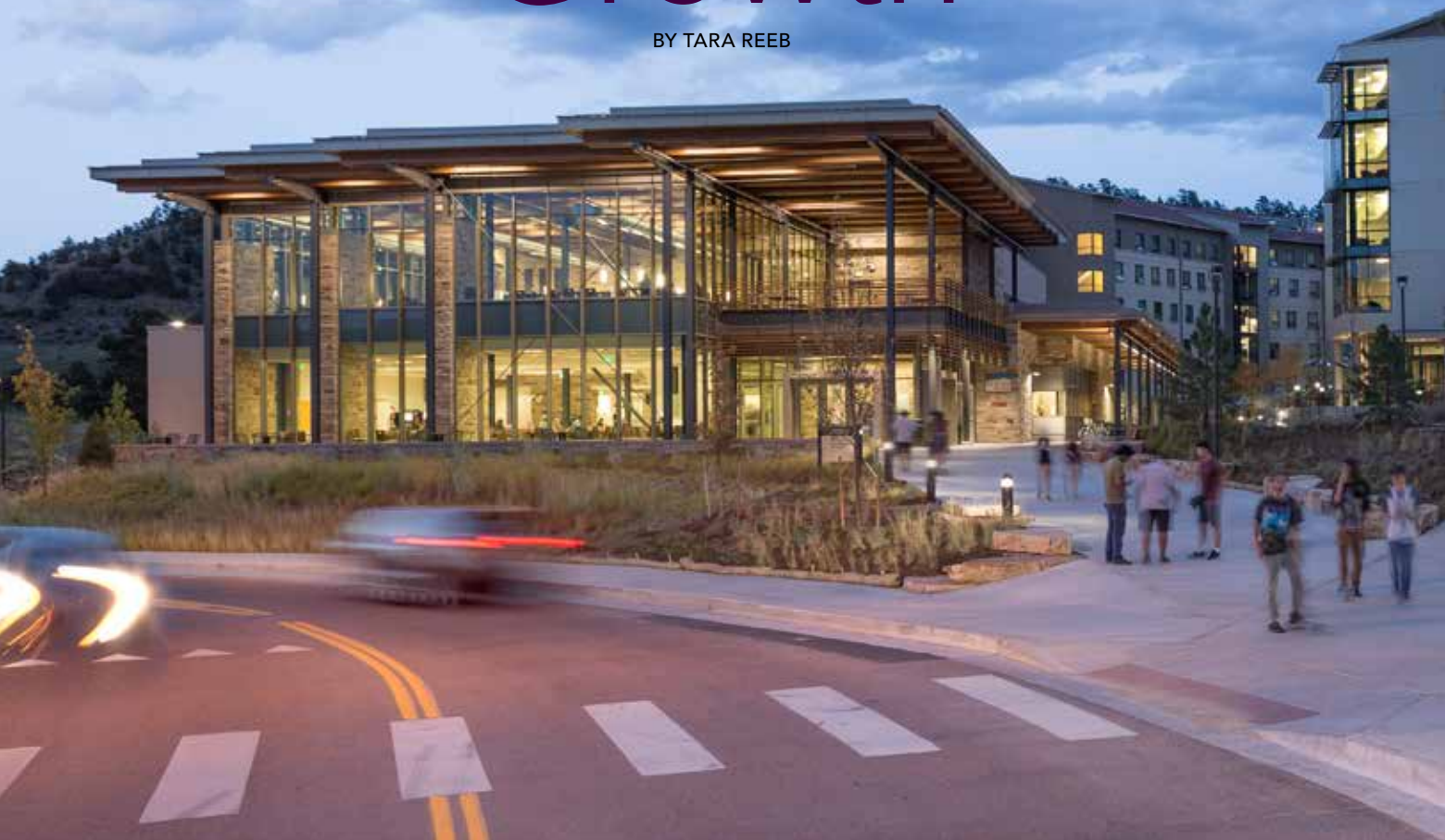


A steel-framed dining facility and surrounding buildings overcome scheduling challenges to open on time on a fast-growing college campus.

FEEDING Growth

BY TARA REEB



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THE UNIVERSITY OF COLORADO Colorado Springs (UCCS) is the state's fastest-growing college.

Located in the shadow of the Rocky Mountains on the north side of Colorado Springs, the rapidly expanding school was in desperate need of additional student housing. And so the Village at Alpine Valley was developed. Built over two phases, each aligned to finish before the 2015 and 2016 fall school semesters began, the 210,000-sq.-ft., \$2.5 million project consists of three new residences halls offering a total of 515 beds.

Anchoring the dorms is the new Roaring Fork Dining Hall, a two-story steel-framed indoor and outdoor dining hall and marketplace with a rooftop garden. The 255-ft-long, 131-ft-wide, 33-ft-tall building includes nearly 23,000 sq. ft on the first floor,

▼ UCCS' Village at Alpine Valley comprises three residence halls and a dining hall.



Frank Ooms Photography

▼ The dining hall stands tall with exposed structural steel framing elements and a steel wraparound patio rail.



Bobbi Jo Greenburg, BCER

12,700 sq. ft on the second floor and 3,600 sq. ft on the rooftop terrace. The facility serves the catering needs not only for the village but also the entire campus and features dining spaces, kitchen areas, retail space and a large multipurpose room. With a current dining capacity of 450, it was designed with future expansion in mind.

Thanks to a résumé full of higher education projects, Kiewit Construction Company was selected as the general contractor for the entire development, and RK Steel was contracted by Kiewit to fabricate and erect all structural steel and miscellaneous metals for Roaring Fork. While the residence halls were primarily concrete-framed, they did contain significant structural steel at the roof levels, and RK also fabricated this steel as well as all stair and miscellaneous steel for these buildings.

Sped Up by Snow

Roaring Fork was part of the project's Phase 1, at the beginning of which the area received 14 in. of snow. While snow is always expected in a Colorado winter, 14 in. in a short period of time is a lot to handle, and construction was stalled by over a month. In response, Kiewit pushed the schedule into a more aggressive mode to ensure the dining hall would be finished before the school year started. The expedited schedule caused a ripple effect, challenging the entire project team.

In order to meet the new time constraints, RK Steel hired additional employees to supplement its in-house CAD department. This added manpower sped up the detailing process and the team was able to submit drawings for not just Roaring Fork but two



◀ Tapered steel beams were designed to provide a signature and sophisticated look to the building.

▼ The wraparound patio allows students to take advantage of the fresh Colorado air.



of the three residence halls as well, all at one time. Fabrication for the dining hall steel was initially bid at a four-week duration, but was reduced to two weeks due to schedule change. As with the detailing, RK boosted its fabrication process as well, setting up a day shift, an overnight shift and overtime on weekends to meet the project demands for just-in-time delivery of prefabricated products. To ensure that the team followed the strict schedule and was prepared with materials on-site, RK used OneNote software to track the status of work orders in the shop using on-site dates for when materials needed to be delivered. The entire project team was able to get real-time updates from OneNote, thus allowing for shipping tickets to be processed immediately.

The ripple effect also made its way down the line to RK Steel's erection crew, whose schedule was reduced from seven to five weeks. In addition to the heavy accumulation, on the first day on-site, RK's erection team was surprised to find that the foundation had not been completed and that the mason's scaffolding was hindering the start of steelwork. This delay pushed the start date out an additional 14 days. In order to accommodate this schedule, the erection team increased its hours to 10- to 12-hour days in the field and overtime on the weekends. Steel was sequenced into small packages to come out to the job site from RK's shop in sections to allow adequate space for construction equipment as well as minimize the lay-down area.

Warp-Free

One of the key structural and architectural features of the dining hall is the series of tapered beams that extrude from the floor. For these W21x55 beams, the web had to be cut at a diagonal, and steel plate of the same thickness and width of the flange was welded back on to make the edge look like the beam was continuous at the diagonal. This presented a challenge when it came to welding the plate. The correct weld lengths had to be determined so as not to warp the plate with too much heat on the plate flange/web members at once. In some instances, part of the welding was completed and then the beam left to cool before additional welding



◀ The village was built in two phases, which opened in time for the 2015 and 2016 academic years, respectively.

- First floor and roof steel for the dining hall, including joists and beams.

was done on the plate flange/web members. Some test samples were performed prior to fabricating the beams to find the correct weld pattern so as to prevent warping during the welding and fabrication process.

Another challenge involving steel beams occurred at the ceiling of the dining hall—specifically, the beams W24×55 carrying the glulam connections. Coordination of various widths and locations of the glulam beams and references to their shop drawings had to be taken into account while laying out the saddles on top of the steel beams. Again, welding procedures and tolerances in the shop had to be checked and monitored to make sure that the right amount of heat was used to as not to warp the saddle plates or cause the opening to be less than what was needed for the glulam beams to fit inside snugly.

Gold Contribution

The project was designed to meet LEED Gold certification, and RK Steel's contribution to the application process was to track the recycling and processing facility records of its suppliers. For its part, RK recorded the receipt and acceptance of recyclable content for the project and submitted material tracking records and invoices to the general contractor to assist with LEED certification.

Phase 1 of the project was completed in time for the beginning of the 2015 fall semester. Phase 2 was also completed on time the following fall. The 515-plus undergraduate students who call the Village home enjoy the easy access to hiking, the recreation center and the rest of the campus. They join the school's enrollment of 14,000 and counting, all of whom can take advantage of a new steel-framed hub that brings the entire UCCS community together. ■

Owner

University of Colorado Colorado Springs


General Contractor

Kiewit Construction Company

Architect and Structural Engineer

Page Southerland Page, Inc., Denver

Steel Fabricator and Detailer

RK Specialties, Inc., dba RK Steel,  Henderson, Colo.

- Exposed steel supports glulam beams and an open floor plan in the dining hall. The diagonal member is part of one of the building's six braced frames.



RK Steel



RK Steel

- ▲ Heavy snowfall impacted Phase 1 but didn't keep the project from being finished on time.



Bobbi Jo Greenburg, DCER