Maurice J. Gallagher Hall

Customer Success Story

Project Team

Sundt Construction

Sasaki Associates

Rutherford & Chekene

Client

UC Davis Office of Design and Construction Management

Autodesk® Revit® Architecture
Autodesk® Revit® Structure
Autodesk® Revit® MEP
Autodesk® Navisworks® Simulate

The Graduate School of Management occupied the building in September 2009, a month ahead of schedule. Working from Revit models helped keep the entire design and construction team focused on meeting the schedule and realizing the intent of the design.

—Strachan Forgan
Director of Digital Design
Sasaki Associates

Sustainable. Cost-effective. Ahead of schedule.

UC Davis achieves its cost and sustainability goals with a BIM-powered design/build process.

Main entrance to Gallagher Hall. Photo © Bruce Damonte.

Project Summary

Officially opened in October of 2009 and built to LEED Gold™ standards, Maurice J. Gallagher, Jr. Hall (Gallagher Hall) serves as the new home of the UC Davis Graduate School of Management. UC Davis is part of the University of California, a system of highly regarded public universities within California. The 82,000-square-foot, three-story building includes an innovative—and environmentally friendly— heating and cooling system, technologically advanced classrooms, a conference center, and a landscaped garden and courtyard.

Gallagher Hall was delivered with remarkable speed, agility, and cost-effectiveness by a multidisciplinary design/build team using building information modeling (BIM) software from Autodesk. BIM helped the winning design/build team to stand out during the highly competitive proposal phase and to meet an aggressive schedule as the project advanced. "BIM provided deep insights into the project's characteristics from the very beginning, completely transforming traditional expectations about how quickly and cost-effectively we could deliver a noteworthy project," says Strachan Forgan, director of digital design and an architect with Sasaki Associates, the architectural firm on the project. "We never lost sight of time, budget, and client needs, thanks in no small part to BIM."

The Team

The UC Davis Office of Design and Construction Management served as the client on the Gallagher Hall project. As UC Davis's administrative hub for building projects, the office initiated the request for proposal (RFP), evaluated submissions, and coordinated input from university stakeholders with the design team.

Sundt Construction, the 55th largest construction company in the United States, teamed with Sasaki Associates, a leading architectural and planning firm, to develop the winning proposal. Sundt invited Sasaki to drive the design portion of the project because of its long history of working with public sector clients and its experience designing with Autodesk® Revit® Architecture software. "Our firms employ BIM on every project," says Scott Woody, design manager for Sundt. "It's not just about using 3D instead of 2D. We wanted partners that could take full advantage of BIM to design and engineer for constructability."

For structural engineering expertise, Sasaki chose Rutherford & Chekene, one of California's foremost structural and geotechnical engineering firms. Founded in 1960, Rutherford & Chekene has been using Autodesk® Revit® Structure software since 2004.

Autodesk®

Design/build project team saves time on documentation, clash detection, and cost analysis with BIM.

The Challenge

Before Gallagher Hall opened, the UC Davis Graduate School of Management was housed in a 25,000-square-foot building that had become cramped as the top-rated school grew. In 2007, the university's plans for a new building were ready to move forward, and it decided to award the building as a unified design/build project. Susan Rainier, a project manager in the UC Davis Office of Design and Construction Management, explains: "In terms of space and basic design, we had a good idea of the kind of building we needed. We chose to leverage our ideas about the building to facilitate a competitive bidding process that would save time and keep costs under control."

The Office of Design and Construction Management wanted to take a big picture approach to awarding the project, and it developed a detailed scoring system that would help it select the best proposal, not simply the lowest bid. Evaluation criteria included innovation, construction schedule, value, and adherence to the university's sustainability goals, leading UC Davis to specify that Gallagher Hall needed to be built to LEED Silver™ standards.

The Solution

Throughout the proposal phase of the Gallagher Hall project, Sundt and Sasaki used BIM solutions from Autodesk, and both firms credit BIM with helping them to submit the winning proposal. Autodesk Revit Architecture software helped the design team to dive into the specifics of the design more quickly—and deeply. Using Autodesk® Revit® MEP and Autodesk Revit Structure software, the project MEP and structural engineers were able to contribute cost, sustainability, and materials insights as the proposal took shape. Vetting their design ideas along the way, the team reviewed the proposal model with the client in Autodesk® Navisworks® Simulate software.

"We didn't have much time to develop the proposal, but being able to work from a rich, detailed model helped to accelerate everything we did," notes Forgan. "In just a few days, we created a preliminary Revit model of Gallagher Hall based on the program outlined in the client's RFP. Continually enhancing and analyzing the model, we were able to more quickly explore the cost, sustainability, and visual implications of features."

More Time for Innovation

According to Forgan, the additional insight afforded by BIM inspired an innovative solution to meet UC Davis' sustainability goals—geothermal heating and cooling. On examining the soil report provided in the RFP, the team discovered that the building's foundation would require excavation to 16 feet, adding an unavoidable cost to the construction process. Wanting to turn a challenge into an advantage, the team decided to explore placing a geothermal heat exchange under the building. The analysis made possible by the BIM process supported this value-add, which is not ordinarily seen in time and budget constrained design/build projects.

> No two construction projects are ever alike, but with BIM, we visualized each task necessary to complete Gallagher Hall so that when it came time to build, it was like we had done it before.
>
> —Scott Woody
> Design Manager
> Sundt Construction

Using Revit MEP and Revit Architecture software, the MEP engineers, the architects, and Sundt examined the impact of a geothermal array on the design as a whole. Most notable, it could help reduce the size of the heating and cooling system by about 100 tons, with a commensurate reduction in the cost of the equipment. They also determined that they could scale back the amount of duct work throughout the building by using exposed structural slabs as the radiating surface for the geothermal array. Because duct work is traditionally one of the most clash-prone aspects of construction, this cut construction risk along with costs.

"As we brainstormed, we captured input in Revit Architecture software, and the model reflected ideas from the engineers and the contractor as we worked," explains Forgan. "It enabled us to be simultaneously innovative and practical. The geothermal array helped push our proposal high into the LEED Gold realm. The design was also 34 percent more efficient than required by Title 24, which is California's strict energy efficiency standard."

More Efficient, Accurate Cost Analysis

Sasaki needed to balance the design aesthetic with the knowledge that cost was likely to be a major factor in winning the project. To help the team not have to compromise on appealing features, Sasaki and Sundt conducted real-time costing exercises using the material take off features in Revit Architecture software.

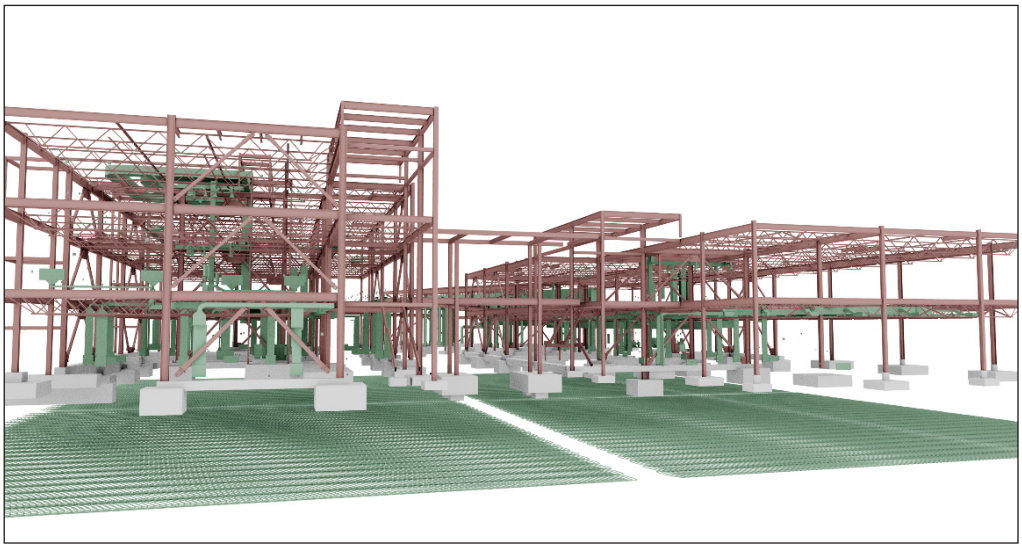
Rendering of the west façade of Gallagher Hall.

Marie Crist, project manager for Sundt, describes the process: “The architects modified the façade materials and the amount of glass in the design, and gave us the take offs from Revit Architecture. We then provided them with precise cost information for their choices, helping them to stay within our desired budget.”

“There can be a temptation to be too conservative when developing a design/build proposal,” adds Woody. “You don’t want to drive up the bid with extravagant features or put the firm at risk by over-promising. We used BIM to give the team an accurate view of how their design choices impacted costs. For example, they didn’t have to cut back on windows just to be on the safe side. Instead, they were able to optimize the use of appealing features and add value to the proposal.”

Detailed Designs in Only Eight Weeks

The design team met with stakeholders from UC Davis early in the design process to test their initial thoughts against client expectations. At the meeting, the team used Autodesk Navisworks Simulate software to conduct a 3D fly-through of an early iteration of the building model. The client stakeholders discussed the aspects of the model that they liked and areas that did not fully address their needs. “Following the meeting, the design team applied the information gathered at the meeting to our Revit-based models of Gallagher Hall,” reports Forgan. “Prior to using Revit Architecture software, we had to stop designing to develop a presentation for the client. Now, we can keep enhancing the design almost up to a deadline, and in many regards, the documentation takes care of itself.”



Structural rendering of Gallagher Hall.

Only eight weeks after receiving the RFP, Sundt and Sasaki delivered a proposal for Gallagher Hall that incorporated detailed renderings, plans to meet LEED Gold standards, precise costing, and feedback received from the client.

The UC Davis team used both cost and their scoring systems as a guide during the selection process. “Sundt and Sasaki’s proposal included renderings that were very rich in detail, which was surprising given the short amount of time they had to develop the proposal,” says Rainier. “The design was visually appealing, and we liked the LEED aspects. They were definitely the point leader in the evaluation process. Just as impressive, they were also the lowest bidder, so awarding them the project was an easy choice.”

Racing to the Finish

The team did not have time to celebrate winning the Gallagher Hall project; they continued with detailed design and began planning construction immediately. The structural engineers at Rutherford and Chekene developed a preliminary model in Autodesk Revit Structure software early in the project, which the architects were able to use as a background in Autodesk Revit Architecture software while designing architectural details.

Tanjeet Juneja, senior project engineer with Rutherford & Chekene, explains how using BIM across the team facilitated quality and collaboration on the project. “We had a fairly complete model of the building almost from the beginning, and we all coordinated our work against it, correcting issues as we went. If a beam was off by even an inch, it was easier to spot. BIM allowed us to avoid many potential issues and clashes in advance—even before we had won the project.”

Moving into construction well before the building documentation was complete, Sundt turned to Autodesk Navisworks software to aggregate the Revit-based models from the architecture and engineering teams. As the initial site work was underway, they began construction planning and fabrication on the elements that were locked down, including the geothermal array and the steel support structure.

“Reviewing the building model as a whole with our subcontractors allowed us to communicate exactly what we needed them to do,” says Woody. “Sequencing features within Navisworks software gave us the ability to break down tasks, making it easier for crews to execute efficiently. No two construction projects are ever alike, but with BIM, we visualized each task necessary to complete Gallagher Hall so that when it came time to build, it was like we had done it before.”

Courtyard view of Gallagher Hall at night.
Photo © Bruce Damonte.

Thanks to improved productivity, design team devotes more time to developing innovative, sustainable design ideas.

The Result

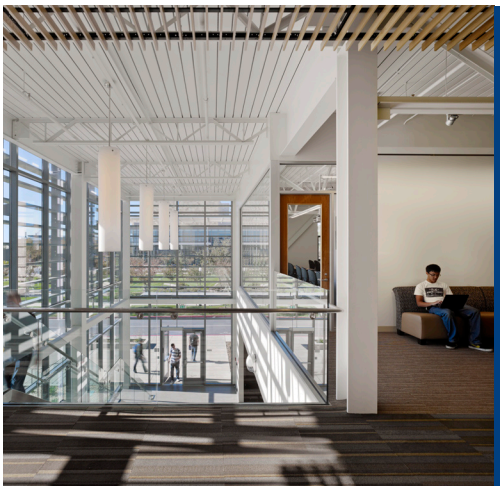
The impact of BIM was evident throughout the project, especially in meeting the schedule, notes Forgan: "We were awarded the Gallagher Hall project in October of 2007, began grading work in January, and started the foundation in March. The Graduate School of Management occupied the building in September 2009, a month ahead of schedule. Working from Revit models helped keep the entire design and construction team focused on meeting the schedule and realizing the intent of the design."

Woody reports that, from the design and construction team's perspective, the project has been highly successful. "From proposal development to building to LEED Gold standards, we are pleased with what we achieved on the project," he says. "BIM solutions from Autodesk enhanced the project—start to finish. BIM helps to enable the close collaboration and insight that can make all the difference on design/build projects."

For More Information

Keep your public sector design/build projects on a path to success with BIM. Visit **www.autodesk.com/government** to learn how.

A class taking place in one of Gallagher Hall's classrooms. Photo © Bruce Damonte.



Inside Gallagher Hall. Photo © Bruce Damonte.

As we brainstormed, we captured input in Revit Architecture software, and the model reflected ideas from the engineers and the contractor as we worked. It enabled us to be simultaneously innovative and practical.

—Strachan Forgan
Director of Digital Design
Sasaki Associates

Images courtesy of Sasaki Associates & Bruce Damonte

Autodesk®