

CASE STUDY

Inside Detail: Using BIM for Best Solutions in Monroe Clinic Expansion

Healthcare facilities represent some of the most complex projects on the construction landscape. Required to meet rigorous regulatory standards and designed to stand out in a competitive marketplace, the profile for these facilities magnifies what a healthcare organization justifiably expects from its construction management firm: a high-quality building completed on time and on budget.

The healthcare construction group at CG Schmidt has experience meeting that expectation. And they put it to the test on a major expansion project for the Monroe Clinic that incorporates the use of building information modeling, or BIM. Along with an exceptional group of sub-contractors skilled in applying the three-dimensional, computer-based workflow tool and strong backing from the project owner, CG Schmidt tapped the potential of a technology that gets inside the details to make every decision count.

BIM Sets Project Pace

The RFP for the Monroe Clinic project specified construction using the distinctive coordination capabilities of BIM, and with good reason. BIM uses geometric points, spatial relationships, geographic information, and component information to support essential productivity processes of construction and facility operation. The computer software provides a dynamic, real-time platform for the construction team—in particular the mechanical, electrical and plumbing contractors—to collaborate with each other and communicate important information to the architect, engineer, owner and facility manager at every stage of construction.

Using the original 2-D drawings translated to interactive 3-D BIM, CG Schmidt project managers worked with the MEP team during a compressed pre-construction phase to visualize optimal placement of HVAC equipment, and plumbing and electrical components. The construction team identified both typical and unexpected clashes and resolved the majority of them in the pinpoint model before installation. The clear, concise computer model also gave the design team accurate and immediate feedback on any conflicts they had to address.



Creating Exceptional Facilities that Improve the Lives of Others



PROJECT INFO

- \$61,900,000
- 212,000 SF new construction
- 12,000 SF remodel

Value Impact

MEP requirements, along with drywall installation, account for 40 to 45 percent of costs on a project like the Monroe Clinic expansion. Adding the power of BIM to the process created countless opportunities to tighten scheduling, eliminate waste and maintain quality control.

CASE STUDY



Value Impact

The project team estimates savings of up to 15 % in labor across the trades for fabrication and problem solving in the field.

Pre-fabrication is a case in point. The MEP team used BIM's exact measurements to determine size and quantity of pipe, conduit, ductwork and other materials in advance so each sub-contractor could fabricate most components in their workshops. They also used the information to manage inventory of other components for just-in-time jobsite delivery. The project team estimates savings of up to 15 percent in labor across the trades for fabrication and problem solving in the field as a result. Materials arrived on site ready for precise installation.

With a tight timetable before construction began, the construction team's skill with BIM gave everyone the chance to develop "best-practice" solutions quickly. It set a standard of teamwork that characterized every facet of the Monroe project.



Med Gas Pre-fabrication



Challenge From the Start

The 224,000-square-foot hospital project, located in Monroe, Wisconsin, features a four-story addition that expands and replaces inpatient, diagnostic and support services adjacent to an existing Monroe Clinic building. The facility has 57 acute and critical care beds, a new emergency department, imaging and surgical areas, and rehab services. Support services include a kitchen and cafeteria, central sterile processing, materials management and satellite biomedical and information technology services.

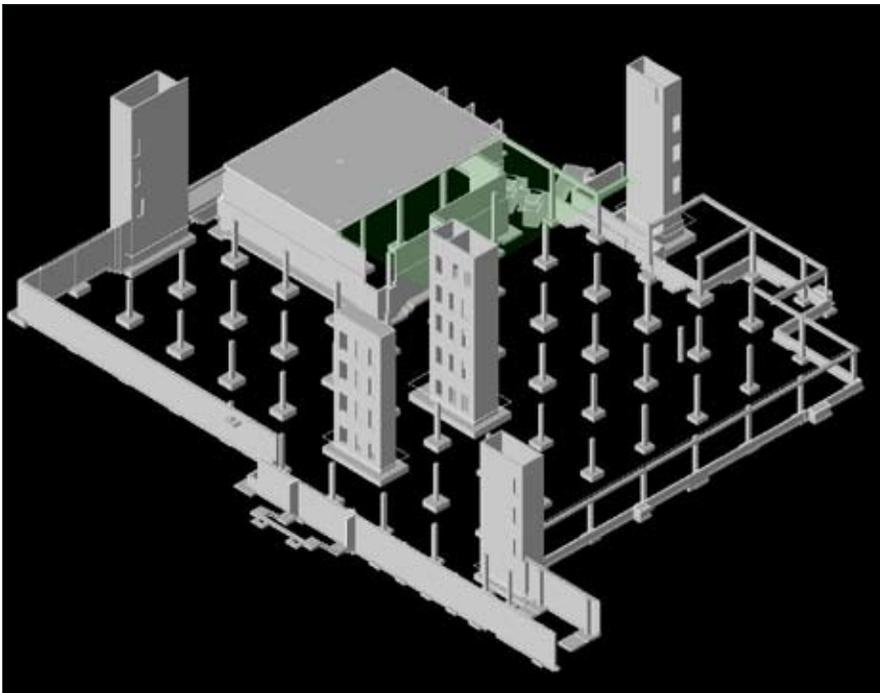
Monroe was a challenging project from the start, says Jim Hans, CG Schmidt Vice President of Operations for Healthcare. “We were in the planning stages just as national economic conditions began to deteriorate, making it hard to finance or control prices on initial estimates,” he recalls. The market correction, when it happened, allowed them to add to the square footage of the building but keeping the project cost efficient remained a central goal.

Brad Fierst, CG Schmidt Project Manager for Monroe, set BIM requirements that encouraged aggressive bids from MEP contractors. **Fierst used a quality assurance exercise to judge how “BIM capable” each firm was so he could create the strongest possible team, ready to move with competence into collaborative overdrive.**



PROJECT INFO

- 4-story addition
- Expansion of inpatient & diagnostic services
- 57 acute and critical care beds
- New ED
- New imaging & surgical areas
- New rehab department



CASE STUDY



To jumpstart the necessary collaboration, CG Schmidt co-located all the BIM coordinators in one office during a short three-month planning process so they could sort out and eliminate 70 to 80 percent of clashes working side-by-side.

Build a Team

The firms CG Schmidt assembled for the MEP team represent some of the top Wisconsin-based contractors. North American Mechanical Inc. (NAMI) of DeForest is handling design and installation of HVAC systems. The electrical contractor is Faith Technologies of Sun Prairie. And Hooper Corporation, head-quartered in Madison, is responsible for all things plumbing.

To jumpstart the necessary collaboration, CG Schmidt co-located all the BIM coordinators in one office during a short three-month planning process so they could sort out and eliminate 70 to 80 percent of clashes working side-by-side. "It really streamlined the information sharing," says NAMI BIM Coordinator Greg Zurbuchen. "Working every day on the most recent updates of each other's files, we could identify and resolve conflicts and model each trade accurately."

They used the exercise to establish base elevations and agree on an efficient, effective order for component installation. Zurbuchen says overlaying the complex files for all three trades helped the MEP team visualize everything that goes into the space, not just their own.

Jesse Stevens, BIM Coordinator for Hooper, says the process evolved into a smooth professional give-and-take. "All of us brought unique knowledge about constructability to the project," he recalls. "We melded together well and got very skilled at finding solutions for each set of equipment."

An example of what emerged from the BIM skull sessions was the idea of running electrical conduits under the floor. Scott Church, BIM Coordinator for Faith Technologies, the electrical contractor, explains that finding room for the essential feeders in the corridor ceiling space was tricky given the size of ductwork for HVAC and the need to position plumbing pipes at a certain pitch.

"There was literally nothing left, so we had to look for another path," Church says. "Considering our options in 3-D, before the slab went in, we had an alternative that didn't force modification of the design or require costly changes."

Chuck Bernhagen, owner's representative on the Monroe project, considers BIM indispensable to a streamlined construction process and quality building, a spur to teamwork. Bernhagen saw the benefits as the construction team—each individual expert in their trade and in 3-D coordination—run multiple scenarios in a short time, finding the ones that work best for the project as a whole. "We're reaping real benefits from BIM here, as I hoped it would."

Good Communication a Must

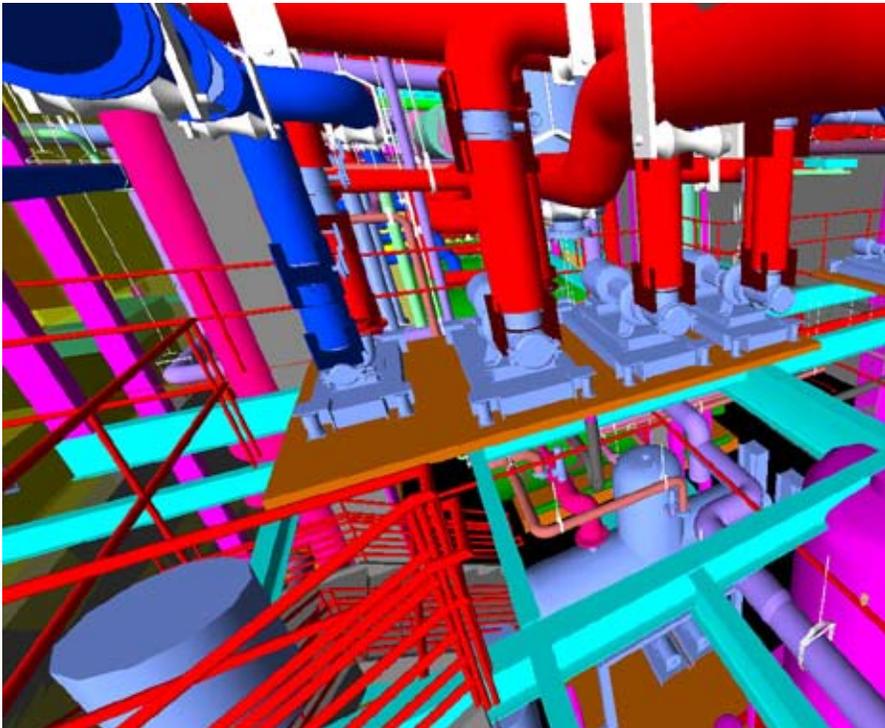
Effective use of BIM also promotes better communication. Hans and Fierst set the expectation of good and frequent communication early on the Monroe project, taking advantage of BIM's data-sharing capabilities. Fierst organized a weekly meeting on site that involved the sub-contractors, the architect and engineer, Bernhagen and Facility Director Steve Borowski. Participants describe it as a valuable forum where they examined conflicts together and resolved them in days not weeks, as is typical. **The 3-D model often served as the centerpiece for these meetings, giving everyone accurate, up-to-date graphical information that helped the entire team see any problems and find solutions.**

Architect Chris Oddo of Madison's Kahler Slater Architect notes how skilled application of 3-D modeling and early coordination measurably reduced change-related costs on the project. He also believes that every hour spent resolving clashes in BIM saved two hours correcting it in the field. The opportunity to address challenging conflicts before work commenced allowed the Kahler Slater team more time to consider solutions that "protect the value in the design." He adds, "Having the whole fact-based picture in front of us meant we could more quickly propose alternatives that satisfied all sides."

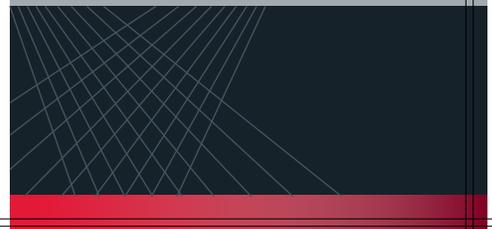
Value Impact

"...every hour spent resolving clashes in BIM saved two hours correcting it in the field."

- Architect, Chris Oddo



CUP Maintenance BIM Model



CASE STUDY



Value Impact

The facilities teams plans to use the final 3-D model to monitor and maintain MEP equipment as part of a preventive maintenance program for the new facility. The maintenance staff can locate it on screen, gather specific model, part number and manufacturer information and initiate repairs without first exploring the physical building.

Model Maintenance

CG Schmidt project teams know every decision they make during construction affects operation of the building they eventually hand over to an owner. **Integrating BIM capabilities on the Monroe project, they saw another important strength of the technology: its interoperability as a post-construction building-maintenance tool.**

As Director of Facilities for Monroe Clinic, Steve Borowski has watched BIM in action during construction and plans to integrate the final, content-rich model into a new facility management system the Clinic is adopting. He and his maintenance staff will use the final 3-D model to monitor and maintain MEP equipment in the new facility. They plan to incorporate BIM in their preventive maintenance program to help record and retrieve a range of timesaving data. In the case of a problem or breakdown, the maintenance staff can locate it on screen, gather specific model, part number and manufacturer information and initiate repairs without first exploring the physical building.

“I can envision the technology will make it easier to operate the new facility,” Borowski says. “And with a primary focus on patient safety and minimizing disruptions to care, we need such tools to help us comply effectively and cost-efficiently.”

Tool With Potential

CG Schmidt healthcare group used the full potential of BIM on the Monroe Clinic project. They led team members in successfully transforming building information modeling from technological marvel to an essential tool. BIM proved itself in multiple applications—from resolving the complicated division of space in a mechanical penthouse layout with no room to spare and making it possible to fabricate many elements off site in well-appointed workshops to supporting productive interaction between members of the construction team.

Hans observes that the integrated project delivery qualities of BIM are coming into their own, providing construction managers with a powerful tool that streamlines every aspect of decision-making and the building process itself. “The Monroe project gave us an invaluable closer look at how to harness that to the benefit of all the professionals involved in construction of a healthcare project, meeting the ultimate goal of producing truly exceptional results for the client.”



Mechanical Maintenance Corridor