

Project Summary

Organization:
Burgess & Niple

Solution:
Building BIM

Location:
Columbus, OH

Project Objective:

- Provide various COS Facility types for the US Army corps of Engineers, which includes all necessary object intelligence resulting in an intelligent BIM deliverable.
- Reduce change orders in the field by integrating all disciplines, and producing a more cohesive design through the collective of Bentley BIM applications and solutions.
- Implement ProjectWise across the enterprise allowing multiple offices and contractors to have access to real-time BIM data.
- Work with contractors and client to improve BIM implementation throughout entire Project process

Products used:

Bentley® Architecture
Bentley® Electrical Systems
Bentley® Mechanical Systems
Bentley® Structural
ProjectWise® Navigator
Bentley® Inroads®
ProjectWise®

Fast Facts

- Burgess & Niple fully integrated all disciplines through BIM applications, creating intelligent Building types for the US Army Corps of Engineers.
- A standardized USACE workspace improved design consistency and end product result, providing projects with better lifecycle management capabilities to the US Army Corps of Engineers.
- Integrated conflict detection and resolution employed throughout design and construction processes.

A Bentley BIM Success Story – Burgess & Niple

Designing Facility Projects for The US Army Corps of Engineers,
Utilizing A Comprehensive BIM Solution

Comprehensive Design Approach

On today's complex, multidisciplinary building projects, architects and engineers work in tandem to specify the infinite details that make or break the comfort, efficiency, and aesthetics of a building. Before the first footing is poured, the details of project lifecycle management, materials and systems, energy consumption, operating costs, and maintenance plans all need to be made clear to all project stakeholders—from owners to architects, engineers, and contractors. And a comprehensive design approach requires specialized tools to easily manage this data and support the many decisions that lead to final project specifications.

Among the products in this extensive portfolio are ProjectWise for dynamic collaboration and document control, Bentley Architecture, Bentley Structural, and Bentley Building Mechanical.

For the past four years, Burgess & Niple (B&N), a full-service A/E design firm, has been managing design data and supporting its design and engineering decisions for all of its federal military projects using Bentley System's Building Information Modeling (BIM) software. Among the products in this extensive portfolio are ProjectWise® for dynamic collaboration and document control, Bentley® Architecture, Bentley® Structural, and Bentley® Building Mechanical.

The B&N design team builds the 3D Building Information Model, uploads all graphics and data into it, and then uses the software to analyze the design. This faster, better, and more intelligent architectural design process provides B&N's project teams with a comprehensive understanding of how all of the building systems work together and leads to improved decision making. It also supplies a wealth of information that can be used to support all key project stakeholders throughout the building

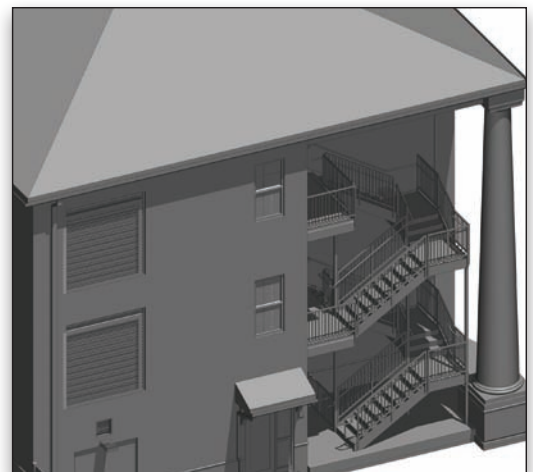
lifecycle – from design, during construction and throughout building operations.

When architects and engineers create 3D BIM models of facilities, all stakeholders gain an accurate perspective of the design. For example, unique conditions where roof elements and walls meet expose possible construction issues to stakeholders that may not have been fully recognized. In 2D, these conditions are not clear, and when there are multiple roof heights and transitions, these potential conflicts can be overlooked, causing rework in the field.

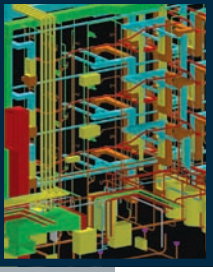
In addition, by using data-rich BIM objects – that is, objects, such as furniture and fixtures, with user-attached nongraphical information that links to a database – designers are able to automate quantity counts. In addition, the system generates customized reports for ordering, tracking inventory, maintenance schedules, repairs, replacements, etc.

BIM on the Job

B&N's first BIM deployment dates back to 2006, when the firm used Bentley software to build mechanical and electrical BIM models for a Fort Knox Barracks project. In this test implementation, the 3D models created by the mechanical design



Fort Stewart 5th Infantry Brigade Combat Team (IBCT) Barracks Complex



“BIM is an essential technology for the Corps. The industry and technology is rapidly evolving and we are seeing more and more of the benefits of BIM coming to fruition. The Corps has a long-term commitment to BIM and firms will increasingly need to demonstrate high quality BIM capabilities and results to remain competitive.”

— Van Woods, USACE

team enabled it to visualize how equipment and systems would fit in the allocated space. BIM also provided critical construction data. For example, with the help of the data-rich wall objects incorporated in the models, designers were able to estimate the number of studs required to construct each wall as well as the quantity of drywall required. This data was then extracted by the contractor in customized reports.

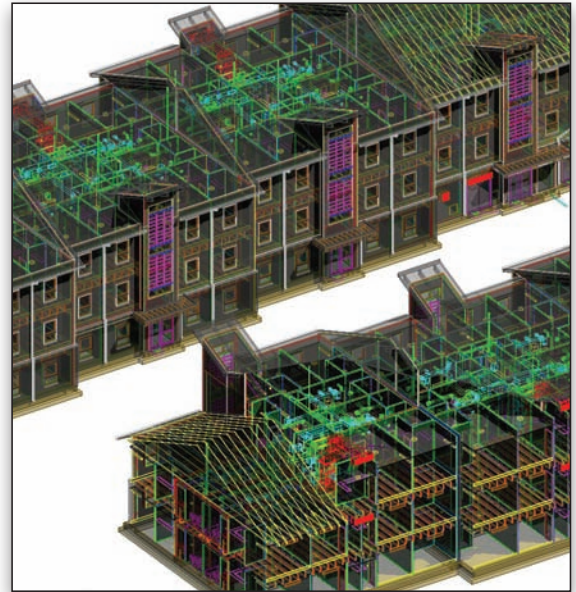
As a result of its use of BIM on the Fort Knox Barracks project, B&N realized immediate advantages in:

- Evaluating alternative approaches,
- Resolving conflicts prior to construction,
- Reducing the risk to the construction team, and
- Managing the construction schedule.

Based on this experience, B&N committed to investing resources and changing its design approach to embrace BIM. Four years later, Bentley BIM is now a standard design practice at B&N. According to B&N Military Program Director Robert A. Draper, Jr., AIA, “BIM is a part of the overall culture and enables a cost-effective approach to discovery and innovative design. We believe it is an essential tool for operating at the forefront of design delivery. Using Bentley BIM, we are able to deliver high-quality design within tight project timelines.”

B&N is currently using Bentley BIM to support the architectural, structural, electrical, mechanical, and sustainable components of multiple design projects. Recognizing that the quality and quantity of data input to a model directly impacts the usefulness of the model, B&N is committed to taking a disciplined approach to gathering, validating, and accurately inputting BIM data.

The following examples demonstrate how B&N has been improving decision making, increasing productivity, enhancing design quality,



Fort Lewis SOF Aviation Battalion Barracks

helping project teams meet project schedules, and increasing owner satisfaction through its use of Bentley BIM. In each case, B&N served as the Designer of Record, working closely with contractor partners in design-build delivery.

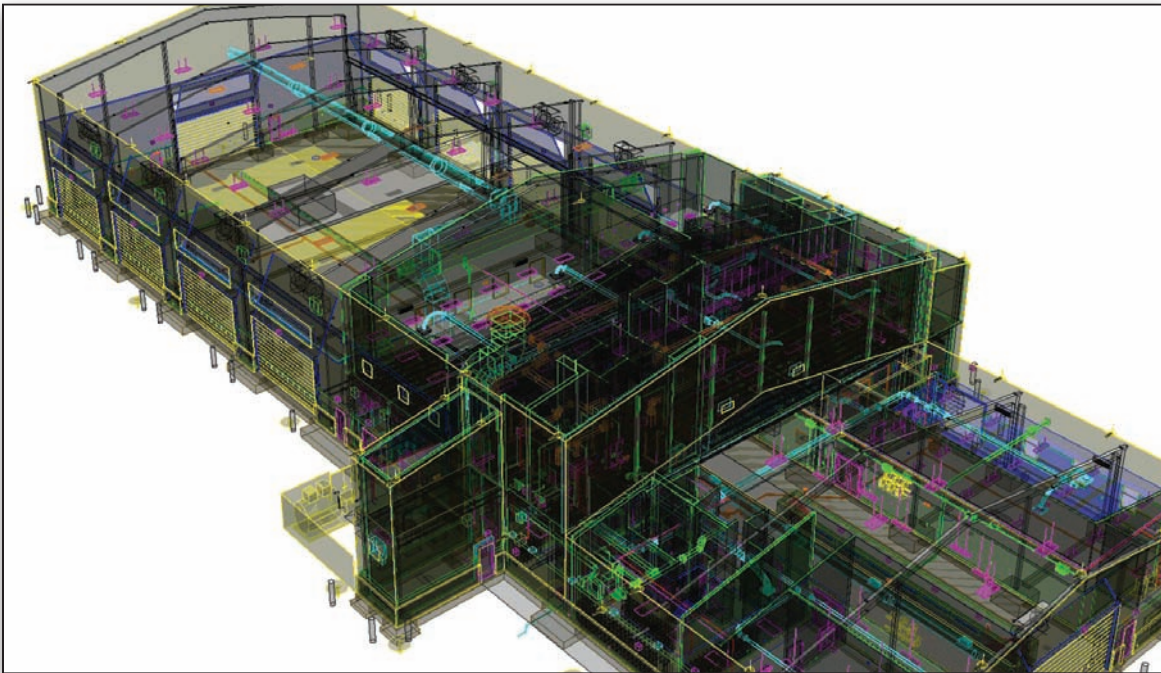
Fort Benning Training Support Brigade Complex Phase 2 – This 150,000 square foot instructional facility includes classrooms, administrative offices, a technical library, and instructional bays. Though not a project requirement, B&N elected to use Bentley BIM to produce plans, building sections, wall sections, elevations, and details.

US ARMY CORPS OF ENGINEERS ADOPTS BIM

In 2008, the USACE adopted BIM as a standard project requirement for new design-build projects. The models provide a wealth of information used to develop best practice design models for the different facility types within the Corps’ Center of Standardization. These models streamline the design and construction process of future facilities while ensuring project requirements are met. This approach follows USACE’s vision of being:

A great engineering force of highly disciplined people working with our partners through disciplined thought and action to deliver innovative and sustainable solutions to the Nation’s engineering challenges.

The Corps’ successful execution of BIM requires expertise from design-build partners. Every USACE project follows a very specific protocol for file structure, naming conventions, and BIM output. This ensures that USACE receives a consistent end product and provides data for costing and facility lifecycle management.



Fort Lee TEMF Facility

Fort Bragg Whole Barracks and Company Operations Facility – This project consisted of two separate complexes, each with four-company operations facilities, two UEPH facilities for 222 personnel, one UEPH facility for 288 personnel, and related civil, and infrastructure improvements. The first BIM model became a tool for streamlining production on the next barracks.

Fort Lewis Whole Barracks Renewal – SOF Aviation Battalion – The Bentley BIM model created for this 31,500-square-foot education center helped identify interdisciplinary utility and structural conflicts within the design before plans were issued to the general contractor.

Fort Lewis SOF AVN BN and 3rd Division Barracks – This project includes two complexes with two, three-story barracks buildings in each. Each barracks houses 200 personnel. Bentley BIM enabled B&N to detect interferences, ensuring a high quality design and reducing changes in the field.

Fort Stewart 5th Infantry Brigade Combat Team (IBCT) Barracks Complex – For these twenty, 3-story 26,065-square-foot, 72-person barracks buildings at Fort Stewart, Georgia, Bentley BIM facilitated the design and confirmed the constructability of mechanical equipment layouts for very small spaces in the structures. In addition, BIM helped the team build a master apartment model that was used to expedite design of multiple barracks.

Fort Bragg Child Development Center (CDC) – The BIM model for this 26,000-square-foot facility helped keep the project on schedule by identifying and resolving conflicts before the construction documents were issued to the general contractor. Currently, B&N is designing seven additional CDCs and using BIM to develop discipline-specific modules of the design. Once the modules are created, they can be used repetitively as standards for each of the seven projects, representing significant savings in time and cost. Any changes required can be made once, and the BIM process automatically updates all occurrences.

About Burgess & Niple, Inc.

For nearly 100 years, B&N has led the development of infrastructure in rural and urban regions. The firm's success is driven by a passion for advancing the built environment with exceptional concern for quality of life, safety and sustainability. B&N works in partnership with private and government entities to lead planning, secure funding, develop designs, and manage implementation. Its 600+ in-house professionals include planners, architects, engineers, environmental scientists, geologists, and other disciplines. The firm's project work spans the world and ranges from complex, urban renewal projects to restoration of historic structures. B&N serves all branches of the U.S. armed forces and has provided design services for the United States Army Corps of Engineers (USACE) since 1980.

B&N is a technology-driven, performance-based firm that utilizes advanced modeling software for alternatives analysis, operations analysis, and design to ensure a project is supported by best-in-class decision tools. B&N is currently ranked 129th in Engineering News-Record's list of the Top 500 Design Firms in the United States.

Said Tim Brower, a B&N project architect, "By knowing the long-term goals of the client, we take advantage of all the 'intelligence' in Bentley BIM to provide a better end product that is much more useful to the client than 2D drawings."

Bentley's Commitment to Support

B&N views Bentley as a partner in maximizing the benefits of BIM software. "Bentley has support professionals on-call to ensure the success of a project," noted Draper. "They assist with training and technical issues and guide us in optimizing the tools on behalf of our clients."

ProjectWise is another Bentley product that offers valuable assistance in BIM project delivery.

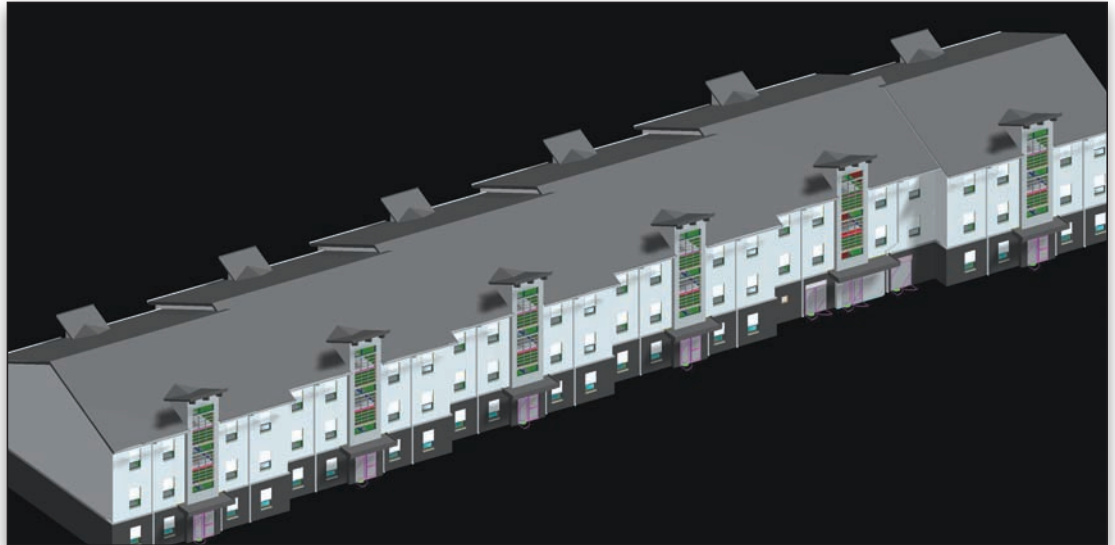
Find out about Bentley at: www.bentley.com

Contact Bentley
1-800-BENTLEY (1-800-236-8539)
Outside the US +1 610-458-5000

Global Office Listings
www.bentley.com/contact

BURGESS & NIPLÉ

614-459-2050
www.burgessniple.com
jkornaker@burnip.com



Fort Lewis 3rd Division Barracks

On a recent large-scale barracks project with 700+ apartment units, each unit contained an electrical panel that required circuiting. Additionally, the United States Army Corps of Engineers (USACE) required the entire BIM model to be data rich. Creating the circuiting for each unit is cumbersome, especially when working under a tight schedule. B&N asked Bentley for help developing a tool to automate the process. The new tool was used to create a complete circuited living unit that could be replicated, with each unit module being data rich.

ProjectWise is another Bentley product that offers valuable assistance in BIM project delivery. This solution allows B&N to efficiently manage multi-office collaboration across its WAN network. With professional staff in 25 offices delivering USACE projects across the country, the sharing and protection of data are essential. ProjectWise allows work to be split among several offices with high-speed transmission and uncompromised security for all BIM data.

ProjectWise also provides contractors with access to real-time data as determined by B&N, with some subcontractors having read-only rights and others having the ability to work directly in a BIM project. This eliminates the need for static FTP sites and the constant need to update files. These capabilities improve efficiency and overall productivity. According to B&N's BIM Director Jason Kornaker, "ProjectWise provides B&N with an invaluable collaboration tool that, combined with our proprietary technology, enables us to have multiple offices across the country work in tandem on any of our USACE BIM projects."

Bentley design tools strengthen communication and understanding from conception through the useful life of a built project. For Burgess & Niple, these applications foster an environment rich with innovative and efficient building design.