

2016 AGC ACE Awards

**Woodward Lincoln Avenue Campus
Headquarters Building**

Fort Collins, Colorado

Entry Category: Best Building Project GC \$10-\$40 Million



MANUFACTURING IS BACK IN THE U.S.

Woodward is a Fort Collins-based manufacturing company that integrates leading edge technologies into fuel, combustion, fluid, actuation, and electronic control systems for the aerospace and industrial markets.

Mortenson was the design/builder on the new headquarters building for Woodward, which encompassed the construction of 60,000 square feet of office space supporting Woodward's expansion of its manufacturing operations at its new Lincoln Avenue Campus. The new facility had to support Woodward's operations on the campus. It also needed to reflect the culture of the "workplace of the future" by providing a healthy, efficient and inspiring place to attract skilled manufacturing workers.

The \$20 million, three-story building exemplifies the concept of flexibility, with almost every space and element in the building providing ease of reconfiguration as business demands require. Originally envisioned as a need that could be served by a typical speculative office project, the design and construction team worked together with Woodward to explore options to enable them to see the return on investment that they could realize with a build-to-suit. By integrating a design with real-time cost models, the team was able to deliver a spectacular world headquarters building that exemplifies Woodward's brand within their budget. The entire project has transformed the former 100-acre site of the abandoned Link-N-Greens golf course.

The new facility allows Woodward to:

- Maintain and enhance its ability to serve its customers in aerospace engineering
- Exemplify the "workplace of the future"
- Provide a sustainable and healthy environment for its employees.

400 Tons of Structural Steel

40 acres of Woodward property turned over to The Poudre River Trail Open Space.

635 days without a Mortenson injury

"They [Mortenson] were a partner with us in this. When things weren't going right, they told us. When we were not getting them the information that they needed, they told us. Having people be open and honest about exactly what is happening on your project was so critical to us."

Jennifer Ray, Program Manager,
Woodward, Inc.



Woodward's Lincoln Avenue Campus includes the 60,000 sf headquarters building (left) in addition to the 300,000 sf Industrial Turbomachinery Systems building.

ENSURING DELIVERY OF THE RIGHT PRODUCT FOR THE RIGHT COST & SCHEDULE

The Lincoln Avenue Campus allows Woodward to make decisions that are best for their operations in the long term, as they are planning to own and occupy the Lincoln Campus for the foreseeable future. The result is a facility that will truly meet the company's needs for the next fifty years.

The project team used Target Value Design to manage costs. In November 2013, a baseline budget for the overall project was created and agreed upon by the entire project team. Then the budget was deconstructed into major building elements. The deconstructed elements were then broken into individual systems such as structure, enclosure, MEP, and finishes. The headquarters building delivery also had to be coordinated with the simultaneous work the same contractor team had underway at the adjacent 300,000 square foot Industrial Turbomachinery Systems building.

This deconstruction broke the project into pieces managed by cross disciplinary teams best suited to control the design and cost of that element. These teams had the specific skill sets required to allow that project element to meet all project performance, programmatic, constructability, budget and safety goals.

Woodward Lincoln Campus Project Charter

- Integrated Project Delivery to Provide On Time, On Budget with Great Quality and Zero Injuries
- Seamless Transition for Woodward and Their Customers
- Transparent, Collaborative Team Committed to Timely Decision Making and Having Fun
- Apply Lean Principles to Design and Construction Process
- Highest Possible Woodward Satisfaction with Design and Construction Teams
- High Performing, Flexible Facility Using LEED Principles
- Integrated, Cost Effective, Best Value Solution Driven Process
- Respectful of Community and Our Environmental Stewardship



Building elements were tracked on a continual basis by Mortenson's Design Phase Management team. Cost trends were provided to Woodward on a regular basis providing Woodward absolute confidence that, at any given point in time, the project remained on schedule and within budget.

Within the manufacturing world, Woodward has trademarked the name "Collaborate to Cost" for this process. Their process allows the implementation of design changes that bring the best value for Woodward's Customers while allowing Woodward to innovate and maintain its position as a leader in the aerospace and energy markets.



QUALITY

The Woodward Headquarters building was a component to the overall Lincoln Avenue Campus development, which was a complicated project that had to support various uses. Woodward's project management team integrated into the quality management process and were proactively engaged in the execution of the plan. The Project Quality Control Program used Integrated Work Planning and a Three Phase Inspection Process to manage quality control on the ITS project.

The Integrated Work Planning (IWP) processes ensured that the entire team, including trade partners and individual craft workers, collaborated during the construction process to simplify and consolidate all information into one delivery source, creating a task-specific document that contains all information necessary to perform a particular task of a defined scope of work.

The Three Phase Inspection process verified the work installed met all project requirements.

- Preparatory meetings ensured that construction team members were fully prepared to start work and fulfill the commitments forged during the design phase and submittal processes. These meetings were used to indoctrinate trade partners into job site and safety procedures, and to further address material inspections, testing requirements, and review repetitive deficiencies associated with the feature of the work.

- Initial inspections on each feature of work reinforced items discussed and ensured our quality control procedures remained effective.
- Follow-up inspections were performed on a daily basis and were focused on specific aspects of a feature of work that assure the quality of the end product.

Extensive use of Building Information Modeling and Virtual Design and Construction was implemented to ensure constructability before crews began installing in the field. Integrated work plans were used to evaluate each phase to identify high risk activities. The team's trained crews were required to demonstrate their ability to execute the plans prior to, and during installation. Resources were assigned to execute the quality system including quality leaders, quality leadership teams, and a person responsible for quality and transition to sustainable operations.

CHALLENGES

Delivering more than 360,000 square feet of flexible, innovative corporate campus space within three years was not without its challenges and complexities. Among the complexities were:

City Approval Process: One of the initial challenges on the project was the fact that Woodward had to obtain approval from the city of Fort Collins

for the exterior elevations prior to closing on the former Link-n-Greens golf course site. Once the concept design and the exterior elevations were approved by the city, the entire team began work on preconstruction. The preliminary approval process essentially locked Woodward into an exterior appearance that could be modified only slightly and forced production areas to fit into the established and approved constraints, versus designing the ideal process layout and building the enclosure around that process.

Difficult Site Conditions: Converting a 100-acre golf course along the Cache la Poudre River into a world-class production facility proved to be another challenge. A beautiful location, just east of downtown Fort Collins, over half of the existing golf course was in the flood plain of the

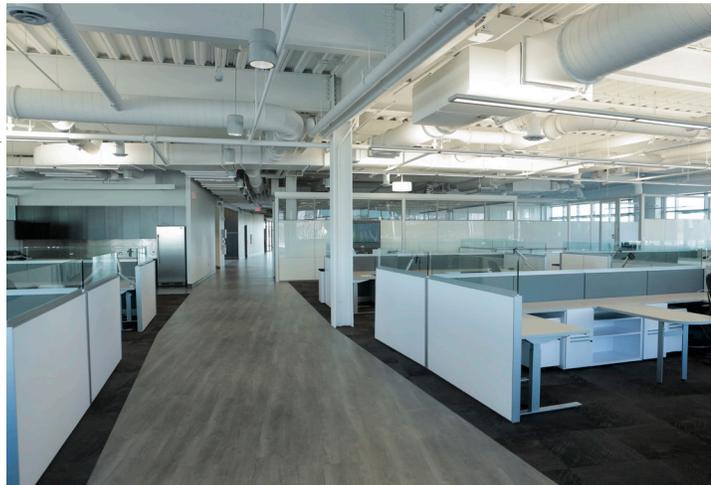


Poudre River, which required the building pad to be raised over five feet in certain areas. This was accomplished by the import of over 250,000 cubic yards of structural fill. This work started nine months before the building structure commenced.

Flexibility – Woodward’s business is driven by a low volume, high mix product line, which requires the business to ramp up or down product lines based on current market conditions. One driving philosophy behind the design was a “No Monuments” credo. The facility needed to be flexible to meet this requirement now and for the next fifty years.

Culture through Design – Woodward wanted to drive a cultural shift through the design of the building, integrating engineering and production into one cohesive entity. The Ghafari-led design team created spaces that push members together throughout the day in collaboration spaces and transparent production area boundaries. Members love the new space, with generous natural light and views.

Schedule: Though there were some delays to the initial schedule, the result was a higher quality project that better supported Woodward’s business needs. Also of note, the spring of 2015 in Colorado was one of the wettest in recent memory, with a challenge of the project losing the entire month of May on critical path activities. The project team was fortunate to have some flexibility with move-in and completion dates as the entire team came together to discuss options. It was decided that some more time could be added to the schedule to ensure the quality, flexibility and budget pressures were not compromised.



Seamless Transition of World Class Production: – Woodward manufactures the highest quality products for the energy and aerospace industries, many of these products are machined and tested to tolerances that ensure zero failure rates. Seamlessly moving this production from the existing facility while meeting the quality and certification standards of Woodward’s Customers was a primary project goal. This goal was met throughout all phases of the project from design through construction.

INNOVATION AND PARTNERING RESULTS IN PROJECT SUCCESS

The key elements that led to the success of the Woodward Headquarters Building at the Lincoln Avenue Campus include the following:

True Partnering: Partnering sessions that included the entire team, including the owner, the owner’s representative, the design team and the contractor and its major trade partners, helped the owner communicate priority needs to help resolve the budget while still accommodating the installation of complicated systems required to support Woodward’s manufacturing operations.

“Jennifer Ray [at Woodward] was a fantastic person to work with. Very few people in her position have the time to develop a personal relationship with the people that are putting the work in place to get the project done. Jennifer made it a point to walk the job and get to know my crew members by name. That level of personal involvement with the labor force on the job has a great influence on morale and motivation. Thanks, Jennifer for taking the time to make it personal, you’re awesome!”

Chris Bradford, Superintendent, Mortenson

Establishing Project Team Goals: Understanding Woodward’s overall mission and vision along with being accountable to shareholders in this publicly-traded company was key to success. This was accomplished by the owner’s willingness to work hand-in-hand with the team through the process.



Use of Target Value Design Process: This process proactively managed the budget again ensuring the project met all safety, performance and schedule goals while keeping the overall project budget true.

Early Onboarding of Mechanical, Electrical and Steel Trade Partners: Early trade partner engagement supported the target value design process with real time feedback on the complex structural, mechanical and electrical systems the project required.

Integration of Woodward Production Members into the Design and Construction Team: End users of the facility provided input early in the design and this was invaluable to making the project a success.

Sustainability: Sustainable features include the re-use of Silver Maple and Ash trees that were harvested from the site and incorporated into various finishes within the building. Restrooms include energy saving fixtures such as lavatories that are hydro powered, regenerating power with each flush, and hand dryers which produce 4.0 g of CO2 per dry, up to 74% less than other hand dryers and 71% less than paper towels. Highly energy efficient LED light fixtures are incorporated throughout the facility.

Co-Location of All Stakeholders: During the construction of the campus project all stakeholders were collocated at the project site in the “Caddy Shack” (the former golf course club house renovated into the project office). This drove a “one team” culture and philosophy that permeated the entire project team.

Clear, honest and frank communications between Woodward, Mortenson and Ghafari: The deep, personal relationships we built on the project allowed the team to have honest, frank and sometimes difficult, conversations while keeping a keen eye on the end result prize.



PARTNERING & PROJECT SUCCESS AT WOODWARD

For a video of the project and its results please visit <http://www.mortenson.com/Home/Company/News/Video%20Library/Project%20Videos/Partnering%20Woodward>