## VIRTUAL COORDINATION IN EXISTING BUILDINGS HOW LEADING-EDGE TECHNOLOGY SIGNIFICANTLY ENHANCED A PROJECT WITH LIMITED FOOTPRINT + SPACE





## Client Purpose + Process

The project's design and design-assist activities resulted in maximum efficiencies for Locus Biosciences' manufacturing process. Locus is a clinical-stage biotechnology company that develops precision antimicrobial medicines for infectious disease, immunology, and oncology. This facility's purpose provides space for clinical trials for precision-engineered antibacterial products and therapies.

Originally a revolutionary life-safer, antibiotics have been found to interfere with the effectiveness of other lifesaving therapies, at times causing additional disease by disrupting the microbiome. The microbiome is the genetic material of all microbes — bacteria, fungi, protozoa, and viruses — that live on and inside the human body. The need to address infections with stronger antibiotics has also contributed to physicians weighing antibiotic toxicities in patients. Locus' products kill target bacteria by irreversibly destroying their DNA, while leaving the many species of good bacteria in the body unharmed. Their product selectively removes bacterial species and strains without disrupting the microbiome or inducing toxic side effects. This technology can be used to address any disease, both infectious and in the microbiome, where pathogenic bacteria play a role.

"Our process of using leading edge coordination and scanning tools allowed us to get in the project space early, capture it, and bring it into a virtual environment. Overlaying the design intent with the constraints of the real world environment, we were able to identify problem areas early and produce effective 3D coordination. In doing so, we identified what would have been a major cost and schedule impact to the project and assisted the design team with adjusting their layout to accommodate."

> – George West Construction Technology Manager BE&K Building Group



## Challenge

Our client had very specific and highly technical requirements for their future manufacturing space. As they are a biopharma start-up, project size, budget, and cash flow were all factors during design, coordination, phasing, budgeting, and scheduling. The client's technical requirements included three suites equally capable of simultaneous production; safe BSL-2 compliant space that would exceed requirements to contain future virulent strains; unidirectional material, waste, and product pathways; rapid construction to accommodate current breakthrough technology, research, and manufacturing; and a complete, fully functioning facility that would be easy to maintain and operate. All of this was required within the client's available 12,000 sf.

## Solution

Through the following opportunities, BE&K was able to deliver a facility that met all of Locus' requirements.

Select modular cleanroom components, ductwork, and piping associated with the facility's equipment were all prefabricated off site. Prefabrication assisted with optimal allocation of space during construction and significantly enhanced the project's overall safety, quality, schedule, and budget.

BE&K's approach not only provided for the most efficient construction schedule, but it also permitted critical trade coordination to begin early. Coordination for the mechanical and electrical systems was significantly enhanced through BE&K's management of the 3D modeling process and our early selection of MEP subcontractors.

In addition to the increased volume of overhead ductwork and specialty piping required in biopharma facilities, there were challenges presented by existing unknown facility conditions discovered during design. In our evaluation of the as-built conditions and the proposed design, we were able to ascertain the steel modifications and slab reinforcements required to support new equipment that included a sizable roof-top mechanical platform. To ensure our calculations were accurate, BE&K laser scanned the existing space. By overlaying the design model with the laser scan, our project team became aware of existing steel kickers in the ceiling. These kickers (i.e., supplemental braces) initially unknown to the design team, produced a significant clash in the proposed design. During coordination, BE&K discovered a significant clash. The original planned ductwork design would be impossible to install due to these existing kickers. Through model coordination and collaborative meetings with the design team, we were able to reposition the extensive ductwork to fit within the available space. BE&K was able to reposition the planned ductwork to fit within the available space, getting it right virtually avoiding costly/timely mistakes in the field.



Floor Plan



Coordination model showing clash



Coordination model with clash resolved by rotation of ducts