



PLANNING AND  
CONSTRUCTION

# Planning Successful Science Buildings

by David Withee & James Contratto

Embarking on constructing a new science building is the beginning of an adventure in which people imagine the finest state-of-the-art laboratories, new classrooms, and research spaces. Planners often don't consider, however, the downsides: potential cost-overruns, order changes, late deliveries, and conflicts between trades.

Whether the new building ends up being a sweat-inducing nightmare or a fantastic dream depends on preliminary plans. This "secret" to a dream building is pretty simple, but many colleges and universities ignore it and end up with a nightmare.

This article addresses the first step, appropriate for any new building. Assembling and leading the design and construction team is more important than anything else. In the beginning stages is when planners communicate and rank their objectives and decide how involved they will be in the project. The more involved planners are throughout the process, the more likely they are to achieve the dream building.

Planners can definitely hire others who have excellent reputations and let them handle everything. Those professionals, however may not know much about teaching science, the peculiarities of the institution, and actually operating and maintaining buildings. Everyone in the design and construction process has an agenda, and no one knows a campus' needs like campus stakeholders do. To be certain of success, planners must lead in selecting the team.

The 2017 Laboratory of the Year was the Francis Crick Institute in London. Every week, beginning before building a new joint facility was even agreed upon, half a dozen leaders of different institutions met to ensure they not only knew what they wanted but to make certain they would get it. They met every week until the building was done. These were not job site meetings but high-level leadership meetings to ensure the design and build teams stayed focused on what was important for their building. Any challenges along the way were addressed by the steadfast refusal of these leaders—each leading incredibly busy lives—to settle for anything less than their objectives. The design and build teams knew going in the oversight these six would provide and the creative approach to challenges expected of them. Like those six, planners should articulate repeatedly what they and the staff expect for a new building.

This advice does not assume any qualities for a new building, such as "a sustainable building," "state of the art labs," or other marketing jingoism; this approach instead assumes the objective desires a campus may have, such as a net-zero energy building, multi-purpose laboratories suitable for semester-specific topics, room to support anticipated growth of x% over ten years in science majors, etc.

Planners must know what they want and continually remind everyone that they expect it. After deciding on goals, selecting the team can get tough. When interviewing architects, contractors, or

major sub-contractors, the planners should ask tough questions, such as these: Who do they recommend as other team members? Why? Which contractors or sub-contractors do they like working with, and which do they not like working with? Why? Do they have a system in place to evaluate the other key team members from past projects? Describe it. Has a team member ever been blackballed because of poor performance?

Planners should ask if any of their favorite team members do federal construction projects. On many of these projects, only approved vendors can bid, and they are then scored on several key issues, such as on-time performance, meeting specifications, communications, handling jobsite issues, etc. The scores for each project are combined to create cumulative scores. If a contractor has a project with a priority for fast, on-time performance, they typically will not select sub-contractors with low cumulative scores in that area, and risk their own cumulative score. Planners should also ask architects and contractors to provide similar rating programs they use to evaluate vendors.

Any planner, while likely not a construction professional, can trust that no building is ever built as smoothly as desired. The planning team should ask what key issues typically come up and how those issues are handled. For instance, on-time delivery is always a challenge. Planners should ask if past delivery performance is considered in selecting team members, or if they only look at low price. Price is admittedly important, but so is being able to move in with plenty of time to prepare for that semester's classes. In asking these questions of multiple vendors, planners need to make sure that the staff members have that time available.

Planners must continue to explore a variety of angles. For instance, when it comes to on-time delivery, the planning team should ask how vendors handle shortage and breakage issues. Things go wrong on construction sites; approved vendors should understand and be prepared for that reality. The planning team should expect approved vendors to be dependable, based on experience from past projects.

Planners should deeply consider all possibilities and ask for evidence on which to base their

decisions. Let's continue with our example of on-time delivery. Twenty-five years ago, Fisher Hamilton was arguably the largest laboratory casework manufacturer in the world (it is now out of business). They bragged about being over 90% on time, but they allowed themselves to change the ship date as often as they wanted, no matter whether the customer agreed, and then still gave themselves plus or minus one week to be considered on time. Even with these policies in place, they still struggled to reach 90%.

Diversified Woodcrafts, a manufacturer of wood laboratory casework, provides a comparison. Half of their work is project-based; half comes from catalog sales. When customers buy from a catalog, they expect delivery "yesterday." Diversified knows how to ship fast, including five-day quick-ship programs. This practice translates well for construction projects where casework is delivered near the end of the project. Diversified's on-time performance over the last ten years is over 97%. More important is how they measure it against the original agreed upon date. If just one sink or shelf is not on the truck when it leaves the dock,

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the entire load is counted late, even though they air freight a new sink or shelf to the job site to still be installed on time. They include the items sold through their catalog five-day quick ship program, and they include the shortage and breakage items they promise to ship in just a week, if needed, so they arrive while the installers are still on-site.

Diversified Woodcraft offers to show customers their internal documents proving their actual weekly performance. This example is not to promote Diversified, but to show there are different ways companies measure performance; planners should be certain they know the difference. The planning team should expect the design and build leaders to explain who their favorite vendors are and offer examples like those above. The importance of these questions is to ensure that the team shares the college's objectives and philosophies. People who know how to work together and trust each other will be more successful with challenges later.

While capital constraints certainly play a role, the decisions made in the planning process are really about creating a science facility which will meet campus needs for at least fifty years. Planners must consider questions such as these: What true innovations have they used to help past clients reach their impossible goals? What innovative ideas will they bring to this project? Science and how it is taught is constantly changing. Shouldn't science building design also continue to evolve? What new ideas and trends should be considered? Which do they not agree with, and why?

Planners much think beyond capital outlay to consider life-cycle costs, as well. While architect and builder will be finished and gone after construction is completed, the school will still be there using this building. The planning team should think about design decisions that will make the project an easier, more efficient building to operate. Facilities staff leaders should be included in meetings to ensure that they are comfortable with operations

considerations in the new building. If design team references do not include facilities staff from past projects, planners should ask for that information for staff to follow-up.

Campus staff hold a great deal of responsibility, so there's no reason to make their jobs even more difficult in a new building they can't operate and maintain efficiently. If planners get this part right—assembling a team that understands and is committed to the objectives—the odds of achieving the dream building are greatly improved.

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