# THE Advisor™

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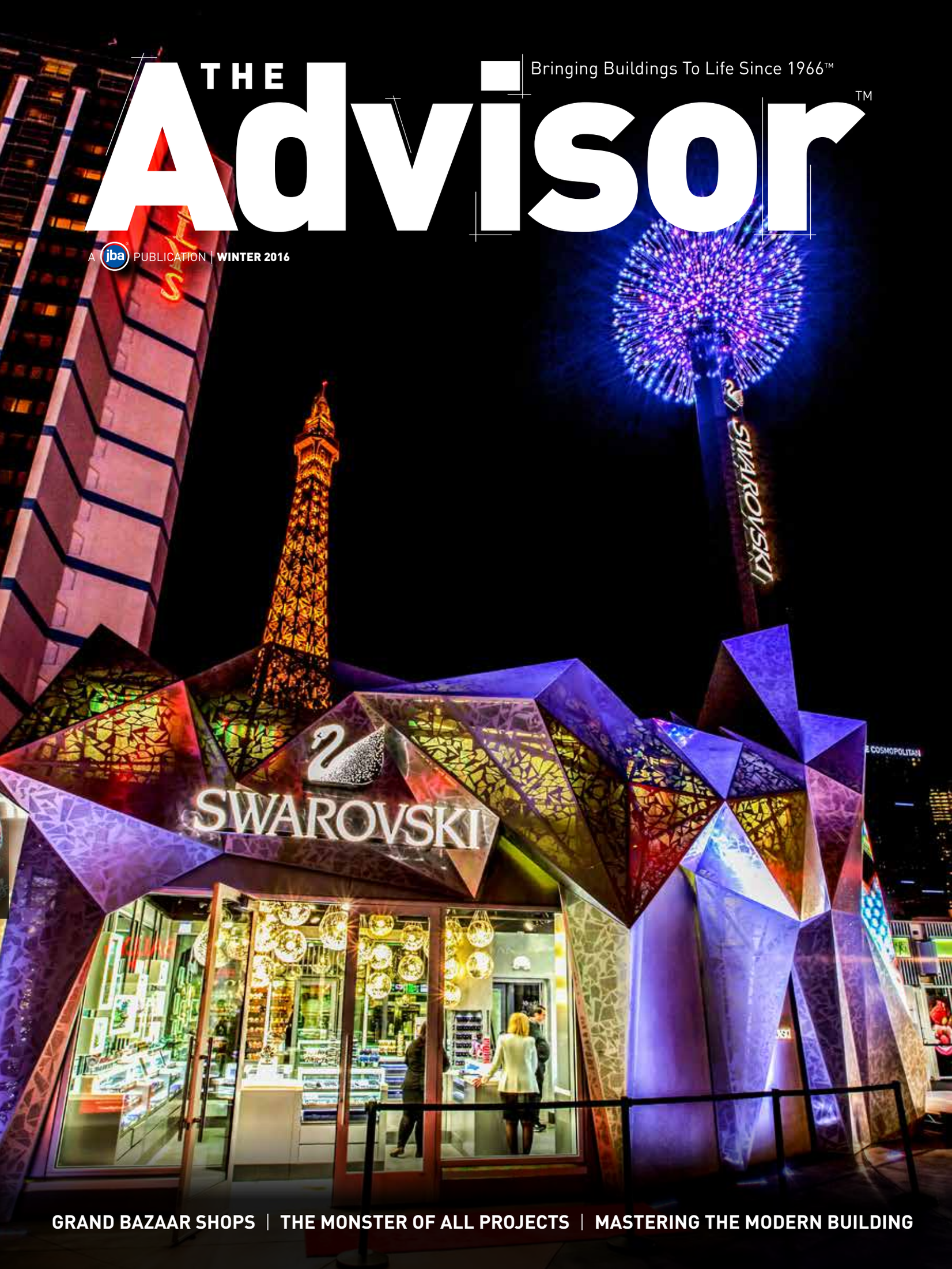
A jba PUBLICATION | **WINTER 2016**




**GRAND BAZAAR SHOPS | THE MONSTER OF ALL PROJECTS | MASTERING THE MODERN BUILDING**

# WELCOME



**Dear JBA Clients, Fellow Colleagues and Industry Associates,**

As I prepare for 2016 and think back on this past year, it is rewarding to reflect on all that JBA has accomplished. We welcomed 30 new team members, opened offices in Atlanta and Los Angeles, celebrated our eighth anniversary in Asia and secured project opportunities with new clients in new markets. None of these achievements would've been possible without you; our Clients, Vendors, Subcontractors and Strategic Partners. Thank you!

JBA celebrated several successes this past year. We landed our largest U.S. project since 2010, increased our contracted work by 45% and increased profitability by 20%. JBA moved up 95 spots on the Engineering New Record's (ENR) Top 500 Design Firms list, landed on ENR's Top International Design Firms list and was ranked for the 2nd year in a row on Inc. 5000's fastest-growing private U.S. companies list. Congratulations to the talent and expertise of the JBA teams, who work tirelessly to design and engineer systems for projects around the world. Highlighted projects for the year include renovations to the Arizona State University Psych Building, new technology services at the Yavapai College in Arizona and College of the Desert Applied Sciences building in California, as well as technology services on the new Studio City integrated resort in Macau, China. JBA also completed full service MEP engineering services for phase one at Graton Resort & Casino and Searsucker Restaurant, both in California, as well as the LINQ Hotel & Casino in Las Vegas.

Inside this issue of the Advisor, you will read about the sound and lighting show our Artistic Engineers designed for the Grand Bazaar Shops on Las Vegas Boulevard. We also share with you part two of designing ASU's Law School and the role of master planning and programming in the beginning stages of a project. Brian Patrick, our new Director of Consulting in Atlanta, addresses the importance of technology integration into the master planning process as well.

As we prepare for the new year and the celebration of JBA's 50th Anniversary, we are excited about the future and we look forward to a continued partnership as your Trusted Advisor™!

Cheers!

Jennie Bowman

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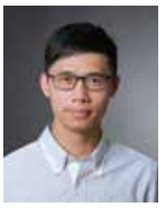

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# BEAUTY & THE BAZAAR


## JBA's Artistic Engineering™ creates mystery and excitement in Las Vegas.

Chatuchak Market in Bangkok...Temple Street, Hong Kong...London's Portobello Road... The world's great open air markets have always had an air of mystery and excitement that's tough to find here in the United States.

Or is it? Now that Grand Bazaar Shops has opened in Las Vegas, Americans can get a taste of these exotic markets, together with the comforts and convenience of a more traditional retail development.

"Grand Bazaar Shops - is unlike anything else you will see," explains Allen R. Bowman, General Manager. "We have worked hard to create a more authentic and engaging experience than typical brick and mortar stores provide."

One big difference is the intimacy of these shops. Most are just 350 square feet, about the size of a nice hotel room. You can always find their very best merchandise right at your fingertips – there just isn't space for the second-rate.

Then too, there's an international flavor to the shops, with English dry goods in one, hand-made cosmetics in another, wearable art, jewelry, gifts, even a shop devoted to Turkish ice cream.

A great deal of the atmosphere is created by colorful, wave-shaped roofs that top each section of shops. These serve as a huge electronic canvas that displays an immersive sound and lighting show visible from above and below.

Towering above the market is the Swarovski Crystal Starburst, lit up twice each night with a special sound and lighting show. It's directly in front of Bally's and across from the Fountains of Bellagio, on the busiest pedestrian intersection in the city—a site that more than 20 million people walk by each year.

"There's only one other crystal ball comparable to this in the United States, the one in Times Square," Bowman says. The Starburst and the lighting/music shows help to blend a shopping and party experience that separates Grand Bazaar Shops from any other retail establishment.

## LAS VEGAS' NEWEST OUTDOOR RETAIL SHOPPING ATTRACTION

In creating this unique marketplace, Bowman explains that the design team faced a number of unique challenges. "Keep in mind that when developers build a regional mall of 130 to 150 tenants, they put them on a site of 90 acres or more. Here we have over 120 tenants on a two-acre site, the density of which has never been seen before in the United States."

Management also spent an extraordinary amount of time choosing and attracting those tenants. "Our chairman has visited over 86 countries," Bowman notes. "His experience shaped the development to a huge degree."

The choice of the design and construction team was crucial. Bergman Walls & Associates (BWA) and DCC Architects shared roles as the designers and Architects of Record and The Penta Building Group was the General Contractor. Management also charged DCC Architects to create the site plan and Elkus Manfredi the roof design, with Grand Canyon Development serving as the owner's rep. JBA's Artistic Engineering Group, headed by Senior Design Consultant Rob Pourciau, designed the sound and lighting shows and, with the help of JBA's technology and electrical teams, the network and electrical infrastructure that delivers them. BWA designed the Swarovski building, signage specialist YESCO created the Swarovski Crystal Starburst, and integrator PSX handled the AV installations.

"Without these companies, the light show would either not exist or would not come close to the appeal it has today," Bowman says. "Rob and the JBA team, we believe, are the best in the world, and they work all over the world. Their creations are absolutely spectacular."

"It was a happy chain of events that brought us together with the developer," Pourciau recalls. "I was able to help them understand how the Grand Bazaar theme could be extended to create a more immersive environment that would attract shoppers and keep them there—that would prompt them to say, 'Wow, this is great. I need to come back with my friends.'"


> **There's only one crystal ball comparable to this in the United States, the one in Times Square.**
>
> - Allen R. Bowman, General Manager Grand Bazaar Shops

"Rob and his team designed the audio and lighting aspects of the project plus a kind of a jukebox of songs and light shows, from classic Las Vegas to modern fun," Bowman adds. The programming changes constantly throughout the night, arranged into three to four-minute segments that start every 15 minutes. At 9:00 p.m. and midnight, the Swarovski Midnight Celebration, created by YESCO and designed by BWA, takes over, and music from the Grand Bazaar multimedia system plays throughout the shops, accompanied by appropriate lighting effects.

A Medialon media server and show control system synchronizes all of the special effects and makes it easy to upload new shows digitally. JBA's Artistic Engineering team designed the system so that the shows could be tailored for the time of day, the season, holidays and special events.


**Swarovski Starburst**

*The crystal ball has 911 Swarovski crystals and weighs 4,000 lbs.*

## CREATING THE INFRASTRUCTURE

Clint Gordon, Senior Project Manager, Electrical, for JBA, says that in many ways the infrastructure for Grand Bazaar Shops is more straightforward than for other retail developments.

Because the multimedia system is based on intelligent color-changing LEDs, it uses only 10% of the power that more traditional theatrical lighting would require. Aside from the food vendors, the power requirement for most shops is small as well. "We created a basic electrical infrastructure, but then provided separate distribution panels for the larger units and a few of the smaller shops that have higher demands for power," Gordon explains.

Gordon says JBA kept the mechanical designs simple and cost effective as well. "There's no central plant. We used packaged heating and cooling units in individual structures." In a similar way, JBA's telecom group created a conduit infrastructure design which Cox Communications used in providing wired and wireless Internet to the shops.

"We used an existing tunnel system that had been installed back when the area was used for special events by Bally's," explains David Wells, JBA Director of Technology. "We created an MDF, essentially a small data center, in a utility room beneath Grand Bazaar Shops, then ran conduit to nine smaller utility rooms serving all of the shops." The biggest challenge, he adds, was providing Wi-Fi throughout the property, given the interference expected from the metal in the colored roofs. "We worked with Cox to make sure everyone has good coverage."

The fire protection planning was challenging, mainly because the fire codes were written with larger retail structures in mind. Executive Director of Fire Protection, Nick Moriarty, worked with the Las Vegas building department to designate each group of shops as a single building for the purposes of planning. "Nick created an egress plan that made sense for the unusual layout, while, in electrical, we helped with exit signs and emergency lighting," Gordon says.

"Here in Las Vegas, we set out to create a destination, an outdoor shopping and dining experience with rich colors, sounds and smells that delight all the senses," Bowman adds. "We hope you can come here and experience how we have reimagined retail." ❖

# MONSTER CITY STUDIOS and the TEMPLE OF VROOM

## ARTISTIC ENGINEERING™ HELPS MONSTER CITY STUDIOS CREATE MORE IMMERSIVE, TECHNOLOGY-RICH ENVIRONMENTS

Imagine you're planning to open a themed restaurant and retail store based on an ancient temple. You've got an Asian Pacific menu, a line of Polynesian drinks, and a very cool experiential marketing idea where your guests will design their own souvenirs...but where are you going to get the jungle, the temple, and the animatronics goddesses, not to mention the touch screens and programming for your build-a-gift experience?

Enter Monster City Studios, which creates custom environments, characters and a variety of props for themed entertainment venues, working in partnership with JBA's Artistic Engineering Group. Together they can provide everything you need for a themed environment, whether in a restaurant, retail store, casino, museum, or theme park.


"We like to say we bring stories to life," explains Richard Deaver, President of Monster City. "Everything we do tells some kind of story in a memorable, literally larger-than-life way."

## VISIONARIES

Monster City consists of a visionary team of artists, sculptors, fabricators and technicians who take clients' ideas and turn them into fun, innovative environments, characters and props. They've performed work for companies such as Nike, Target, Sanrio, and many others, including vendors inside Disney's California Adventure, as well as a number of hotels, resorts, restaurants, museums, retail chains, parks and attractions, and individuals.

JBA's Artistic Engineering™ is composed of a visionary team of consultants and engineers who work in audio, video, IT, acoustical, mechanical, fire protection and security systems. Their clients include Caesars Entertainment, Wynn, MGM Resorts International, Cirque du Soleil, and the National World War II Museum.

"We work primarily with theming consultants," explains Rob Pourciau, Director of Artistic Engineering for JBA. "Depending on the project, we may help create the concept or work with the creative team to implement their ideas. But for us, the question always remains, 'How can we take this cool idea and make it practical?'"

## A MONSTER PROJECT

In explaining how a company like Monster City does its work, Deaver says he was approached by a local businessman last year who wanted to create a private entertainment space in a large warehouse. "It's kind of a man cave where he keeps his car collection, and where he wanted to invite clients and friends over for a drink and to watch football. He had seen our shop from the freeway and stopped in to ask if we'd ever done anything on an Indiana Jones® theme."

Before long Deaver and his new client were brainstorming ideas, and when he left Deaver began researching the Indiana Jones movies and rides. "We captured images and mounted them on foam board; he came back and we started talking through scenarios."

Next Deaver had one of his artists create color renderings and, after more discussions, a 3D computer model they could look at from different perspectives and with different types of lighting.

The concept they created is the Temple of Vroom – a tongue-in-cheek nod to Indiana Jones and the client's car collection. "As you enter the building, you'll walk into a cave with undulating rock walls, floors and ceilings hanging with moss and vines. You turn right, then left, cross a bridge over a lava flow and then past an ancient stone temple with cobras on either side of its entrance."

Past the temple is a Moroccan village with houses, storefronts and a huge stone head with another cobra. There's a hidden DJ stage and a 30' full commercial bar flanked by 90" 4K TVs. "We use forced perspective on everything," Deaver says. "That creates the illusion that you're in a much larger place than you actually are."

The coolest area is the bar, fabricated from packing crates reminiscent of the last scene from Raiders of the Lost Ark™. Here the Ark is easy to spot, as it glows and pulsates within its crate. And centered above the bar? A real 2 ½ ton army truck from World War II, welded in place yet seeming to crash through the planks of a rope bridge.

## FABRICATING THE FANTASY

Unlike most theming consultants, Deaver and his staff do their own fabrication of the environments they create. They use a variety of materials to create their props and whimsical sculptures.

Here the temple, village and bar have structures of wood and steel tubing, covered with plaster, high-density urethane foam, sealant, paint, fabric and dried plant material. Depending on the project,

Monster City will use a lot of reclaimed wood, various types and densities of foam, even cast concrete. Almost everything they do is supported with a welded steel structure.

The company has its own CNC/computerized milling machines, which help the staff fabricate their complex creations. Typically they'll build, sculpt, assemble and paint their characters and sets at their own shop, then take them to the client site for final assembly and finishing.

At the Temple of Vroom, the installation includes more than 160 DMX-controlled LED lights, smoke machines, over 1,000 feet of artificial vines hung from the ceilings, and several real palm trees, freeze-dried to keep them looking fresh in the indoor environment.

Typically Deaver and his team will work with the client's architect, general contractor and subs, such as electrical and lighting contractors, to make sure their installations are safe and follow local codes. The partnership with JBA gives them access to special expertise in MEP, and life safety design plus the Artistic Engineering Group's ability to bring together the latest computer, audio and video technologies, including software design and show programming.

"At heart we're storytellers," Deaver says. "We're very good at creating or developing themes and ideas and bringing them to life in sculptures and environments – but we're not engineers."

"There's a lot that goes into a themed environment beyond the characters and props," Pourciau notes. "We have to make sure the guests are comfortable, providing proper ventilation and cooling. Our acoustics team will minimize mechanical noise, while at the same time optimizing the show audio within the space. Electrical will provide power for lighting, mechanicals, AV and animatronic characters."

"Many of the materials that Richard uses are combustible and can present a challenge when introduced to a space that doesn't typically have that type of fuel loading," adds Nick Moriarty, Executive Director of Fire Protection for JBA. "These environments are unique and careful consideration should be placed on the sprinkler system design, egress plan and other life safety features."

"There may be special needs for audio, video and animatronics," Pourciau adds. "Most likely we'll need to design a show control system to tie the entire environment together, creating a timeline and sequence of events. We use the full breadth of JBA's expertise on these projects."

"We're excited about the relationship with JBA," Deaver says. "It brings us a new ability to create far more immersive, technology-rich environments." ❖

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*Raiders of the Lost Ark is a trademark of, and Indiana Jones is a registered trademark of Lucasfilm Ltd. LLC."*

# MASTERING THE MODERN BUILDING

## THE CASE FOR INCLUDING ACTIVE INFRASTRUCTURE IN MASTER PLANNING AND PROGRAMMING

"Active building infrastructure in all its forms comprises 35 to 45% of a commercial building's construction cost, about 40 – 50% of its long-term operating costs, and over half of a building's value to its owners. Yet, as often as not, it's not part of the early planning."

That's Dwayne Miller, CEO of JBA Consulting Engineers, talking about a building's internal systems and the master planning/project programming process.

"Think, for example, about what technology does for a building today and the consequences if it fails. If a hotel loses its data center, guests can't check in and the restaurants can't bill their customers. If it's a corporate office, employees can't do their work. If it's a casino, play comes to a halt. Yet many planners relegate infrastructure planning to a secondary role, and in so doing, perform a huge disservice for their clients."

Miller defines the active infrastructure as those parts of a building that move, flow and transport. "You can think of a building as a body, with a structure of bone and ligament and a beautiful skin, but also a brain, organs and arteries made up of lighting, electrical, HVAC, plumbing and technology, all of which today are becoming dependant on the network and the data center."

Often the architects in charge of the project planning process do not involve engineering firms early enough to make sure these active systems are designed correctly. Or if they do, they sometimes hire a low bidder who is not fully qualified for the type or complexity of the project.

"The best architects get it and assemble a team that consults, listens, analyzes and seeks to understand the owners' needs, then design suitable active building systems based on clear requirements," Miller says. The master planning process works well in many projects, but the consequences are high when it doesn't.

### THE PROBLEM OF OVERBUILDING

Edward Butera, mechanical engineer and Chairman of the Board for JBA, explains that engineers are conservative by nature. "To be safe, they will make a system bigger than it needs to be, just to make sure it does not fail when demand is at its peak. Of course, if they're not used to working on really large buildings, they may not understand seasonal differences, diversities or realize that the peaks do not all take place at the same time. That's a very common error."

For example, in a large resort, there will be guest rooms, restaurants, a theater, retail shops and perhaps a casino. "The peak period of demand for power in the guest rooms is not the same as in the restaurants, nor for casinos, nor for retail," Miller adds. "If someone isn't regularly working on this type of project, they'll just add up all the peaks, and then, of course, add a safety factor as well, because they're not really sure they have it right. This results in grossly oversized infrastructure."

This type of error, Miller says, can happen in all of a building's systems—mechanical, electrical, plumbing, telecomm, life safety—and it's more pronounced when the project is not the norm in a given market. "We may see it in integrated resorts in small cities or rural areas – certainly in Asia and in remote areas in the US. The architect may hire a firm they trust for residential buildings or shopping malls, but they'll struggle though a learning curve

when they engineer a resort. In these cases, extensive oversizing can result in a physical plant that is twice what is required."

One large project Miller cites literally cost the owner several million dollars in unnecessary construction costs, with annual operations costing perhaps 30% more than what they should have been. "Very often in this kind of situation no one is really aware how much extra they are spending," he explains. "They may actually have the latest technology and great equipment; it simply is not sized appropriately for the owner's needs resulting in higher than necessary upfront costs and long term operational penalty costs."

"Today, as building designers, so much of our focus is on sustainability and carbon footprint," he adds. "When we overbuild, we not only waste the owner's money but waste resources that future generations will need. The sad truth is that even the most intelligent buildings are not always intelligently designed."

## RIGHT SIZING AND RIGHT PROVISIONING

Miller says a great engineering firm will think holistically, constantly questioning the way things are 'always done' to create a solution that leverages technological advancements and properly fits the owner's needs.

One strategy is beginning with the end in mind and designing building systems that are scalable – that start out relatively small but can be added on to as the facility grows. "The key thing is to create an infrastructure plan that looks five to ten years out," Miller explains. "Some of its steps can be very simple. If, for example, the owners may expand to the north of the original building, you don't put anything below grade on the north side. In addition, you avoid major equipment at the likely expansion interface area. You may also build equipment rooms in the vicinity a little larger so they can expand to accommodate additional equipment in support of the future phases of the building. These are obvious things but the consequences of not planning for them may not be so obvious."

Nick Moriarty, JBA Executive Director of Fire Protection, explains. "We're working on a project now where the existing fire command center is absolutely packed. We're going to be short about 40 to 50 square feet that we'll need for new alarm panels, and for that reason will have to expand the room into space already in use and interrupt operations for the entire property while that's being done." Space can be an issue in any expansion. Moriarty says he often sees issues in planning enough exits and stairwells, particularly for high-occupancy spaces or high-rises taller than 420 feet.

A second strategy is districtization, the process of combining systems across a building or campus, or even across multiple properties with separate ownership. "For example," Miller explains, "you might install a bank of emergency generators in a casino to power the data center, security, lighting and slot machines, or in a mixed use development to power a hotel, convention center, retail mall and movie theater." With centralized systems you most often have less wasted capacity than you would with individual units for each area. Then too, if one generator fails during an outage, you might have enough extra capacity to keep everything running, or at least the option to decide what to shut down.

Another example, Miller says, is a central cooling plant JBA helped design in downtown Las Vegas. It serves multiple properties, ranging from brand new to 40 years old. The central plant was less expensive to install than individual cooling plants, runs more efficiently and is managed by a third-party provider at a lower cost than individual maintenance teams. "Districtization can save a great deal of money up front, reduce operating expense, and provide better managed systems that are less likely to fail." The district energy plant concepts, primarily for heating, cooling and power have been in practice for several years. Miller suggests that technology (data center, Network Operations Center, etc.) and fire services could all layer into the same model.

## STRATEGIC OPPORTUNITIES

So far we've discussed only the cost benefits of early infrastructure planning, but Michael Shafer, Director of Consulting for JBA, suggests that there are strategic benefits as well.

"Many architects," he explains, "use a visioning process to help owners decide how big their building will be and the kinds of spaces it will include. Yet the internal systems are crucial as well. They are what will determine how the owners will be able to serve their clients."

For example, last year Shafer led a series of visioning sessions at Arizona State University, which was in the process of designing a new home for its law school. "The dean of ASU Law is very interested in innovative instruction, but he wasn't necessarily in tune with how classroom design and technology can affect how students learn." The sessions helped administrators understand the faculty's interest in more collaborative teaching methods and led to changes in both the architecture and the technical infrastructure of the new classrooms, meeting rooms and study spaces.

In a different kind of project, Ron Edwards, Executive Director of Mechanical for JBA, designed a cutting-edge air handling system for the Twin Arrows Navajo Casino Resort in Flagstaff. "Smoking has become a very big concern in the casino industry, because while one group of loyal customers wants to smoke while they play, others insist on a nonsmoking environment." The system supplies 100% outside air from underfloor vents, then exhausts it from the ceiling, carrying tobacco fumes up and away from guests. A system like this would not be possible had it not been in the plans from the very beginning, nor could the owners have gained the business benefits.

A very visible example are the single-show theaters built for Cirque du Soleil such as O, KÀ and The Beatles Love. "These were all team efforts, with the architect, the owner, producers and engineers working closely together from the beginning of the planning process," Miller says. "Bringing life to these experiences just would not have been possible in the absence of this approach."

"Visioning is all about deciding what's most important to your organization and what your new building should be," Shafer says.

"The planning process should be about what you hope to accomplish, how much space each task will require, and the technology you need to make it possible."

## THE DOLLARS AND SENSE

"One reason projects go astray," Miller says, "is that the focus at the critical phase of project development is so often around fees." If the owner or architect is not knowledgeable about the differences between engineering firms, they may choose one based mainly on price.

Brian Patrick, Director of Consulting for JBA Atlanta, suggests that the problem was exacerbated by the recession. "A lot of engineering firms have learned to work for smaller fees, cutting quality and detail as they trim the amount of time they spend on each project. As a result, there's a whole generation of buildings that are underperforming."

Let's take a moment to look at engineering fees and how they fit into the overall budget.

On a large project –one, say, with a $100 million construction budget– the fees from the best engineering firms will generally run between three and four percent. The active building systems, on the other hand, will cost 35 – 45%. If the owner can save 10% of the engineering fees, that will be $300,000 - $400,000, a substantial amount of money. But if the low-bidder overbuilds the active infrastructure by just 10%, that's $3 - $4 million in construction costs.

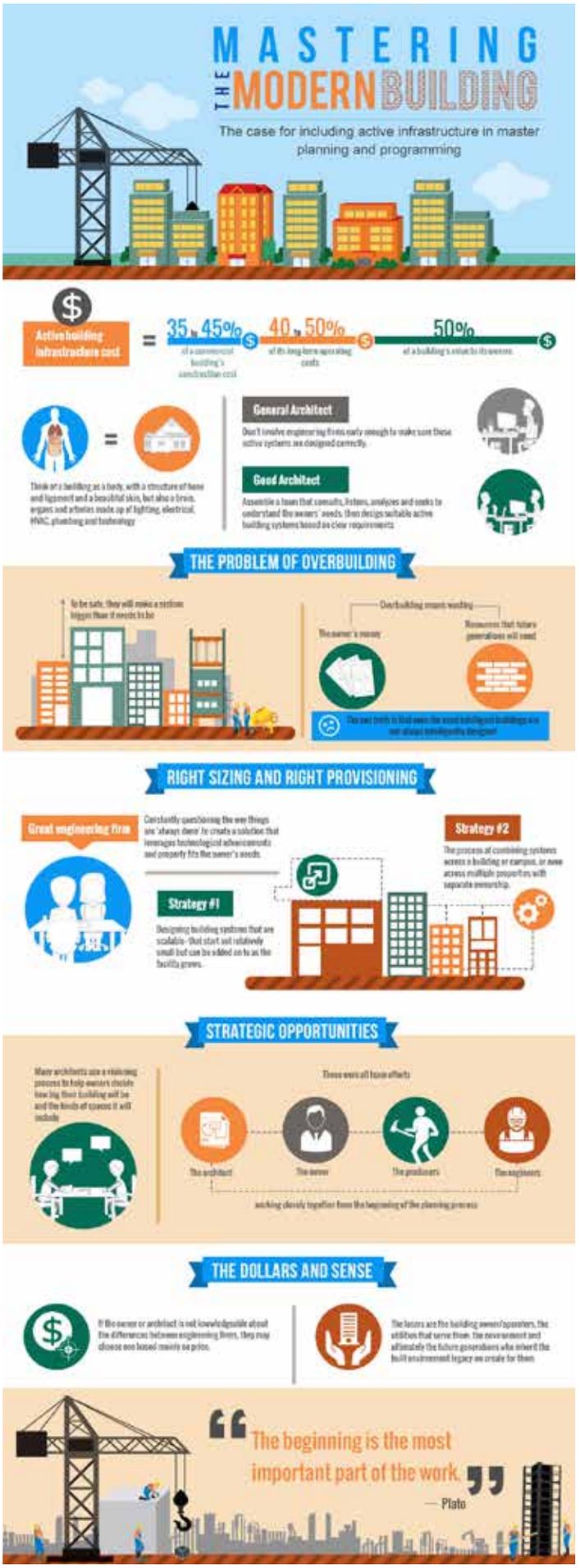
Worse, energy, maintenance and other operating expenses will run substantially more than necessary every year for the 30 – 50 year life of the building. So in this example, a $400,000 savings upfront can easily end up costing the owner $5 - $10 million or more.

In our experience, this estimate is conservative. And the owners may miss out on strategic opportunities if they never consider how new technologies and new building systems might help them better serve their clients or stakeholders.

"The losers are the building owner/operators, the utilities that serve them, the environment and ultimately the future generations who inherit the built environment legacy we create for them," Miller explains. "Ironically, no one may even be aware that the patient has a really bad disease….which by the way could have been avoided if treated at the appropriate time in the planning process."

Michael Schwob, a Senior Acoustical Engineering Consultant for JBA, points out that "If you plot the impact of a building and its internal systems against design and construction costs, you'll see the impact drop and the cost rise, both exponentially, as time constraints grow."

"Another way of saying that," he adds, "is to quote Plato: 'The beginning is the most important part of the work.'" ❖



**BRIAN PATRICK**
Director of Consulting - Technology
Atlanta

# Q&A

## TECHNOLOGY ACROSS THE ORGANIZATION

## Are your systems planned, or "also-ran"?

**Why would a corporation, university, large resort, hospital, or other institution engage technology experts in a master planning assignment?**

In short, because technology today is crucial to growth strategy, resource management, return on investment, reflection of core values, sustainability, and competitive advantage. Technology helps us tell our stories, communicate meaningfully, secure our assets, and elevate the user experience.

Even in 2015, technology systems are often notably absent from the facility programming and campus master planning process. When an organization needs to plan for growth and change over the next 5-10 years, specialty technology systems such as telecommunications, physical security, and audiovisual are key to how business gets done. Much like HVAC, power, and water utilities, extending technology bandwidth is essential for comfort, productivity, and the overall user experience.

How often are building technologies labeled "cutting edge" or "state-of-the-art"? And let's be honest… how often are the ideas and plans presented as such really that forward-thinking? Too often, I see a vision for technology branded as leading-edge when the reality is borne from a desire to mimic one's competition or worse, when spending capital is equated with showmanship. Even technology needs context for purpose and impact, and a strong vision and mission statement will set the tone.

*Brian Patrick is the Director of Consulting - Technology on the East Coast. In his role, he provides technical leadership to clients through the visioning and planning process, assembles teams to deliver design services and ensures that project outcomes are realized. He has 20 years of experience in the technology design industry, specializing in Audiovisual Systems, IT, Physical Security Systems, and Acoustics and Noise Control.*

Change is inevitable. In our world of AV, telecomm, and security design, it is guaranteed, and this change offers constant opportunity for an organization to innovate and advance. An effective master plan will use many tools to build an actionable, living document that encompasses all working parts of the organization, striving to implement strategic initiatives, corporate vision, and building-specific program requirements.

This ensures scalability and efficiency across the organization, and it plants the seeds for intangibles like "wow factor." It does not infer jumping on the bandwagon, however. Often, a missed opportunity such as the late adoption of a mainstream solution or prolonged difficulty in maintaining a competitive edge motivates and leads the master planning effort into overlooked solutions. New technologies emerge that influence – and disrupt – an organization's way of doing things, and this is especially true of the technology systems that empower how we interact and communicate.

*(continued on page 21)*

# blaze of glory

## JBA Fire sets the stage for the hottest party of the year

As destructive as fire can be, people have always found it fascinating.

Maybe that's why, when the SLS Las Vegas opened last year, the climax of its preview party was a beautiful rooftop fireworks display. And why the DJ booth in the nightclub featured jaw-dropping flame and fog effects.

It was the job of JBA Fire to make sure the opening night celebration –and every part of the building itself– are safe.

"We were and continue to be involved in every phase of this project, from the conceptual designs through testing and commissioning, and now in consulting and permitting for the shows in the night club," says JBA President Allyn Vaughn.

It's been an unusually long and complex project that few fire protection consultants could have handled. It began back in 2007, when SBE Entertainment purchased the old Sahara Resort and began considering how they could best update the property.

### SERVICE, LUXURY AND STYLE

The Sahara, of course, was the iconic home to the Rat Pack, Buddy Hackett, Duke Ellington, Don Rickles and many other legendary performers. It was only the sixth resort to open on the Strip and it was the site of the first high rise tower to be built there. Vaughn had done fire protection consulting for the property's 1999/2000 expansion, which saw the construction of the Sahara Theater and the NASCAR Cafe.

As a Trusted Advisor, Vaughn was retained again in 2007 to write a fire protection report for the remodeling effort, but the crash of 2008 put those plans on hold. JBA was brought aboard again in 2009, but SBE deemed the economy too fragile to pull the trigger. Finally a new architect, Gensler, took over in 2010 and they hired JBA once more.

"Part of the complexity of the SLS project came from the fact that so much was built over so many years," Vaughn

explains. The Sahara, first opened in 1952, saw seven major expansions—in 1958, 1959, 1961, 1968, 1988, 1998 and 2000. By the time it closed in 2011, it had grown to 1720 guest rooms and suites plus the casino, restaurants and convention center.

Another major challenge was that the owner required all of the consultants to retain as much of the original structure as possible. That was crucial because SLS properties target a younger demographic than other resort casinos, and so they needed to hold the cost of construction down while, at the same time, keeping the building's quality and style high.

"In a remodeling project, the law requires that we show that any structure or components we retain meet, at minimum, the building codes that were in effect when they were originally installed," Vaughn explains. "We were careful to negotiate with the county up front, explaining what we would retain, what we would replace, and which code we felt should apply to which parts of the project."

The fire protection reports JBA Fire wrote outlined the types of construction used in the original building and to be retained in the remodeling, the ratings of the walls, ceilings, floors, columns, and roofs, the exit requirements, and criteria for the sprinkler, smoke control and emergency power systems. "There were a number of areas where it would have been difficult or impossible to meet the strict letter of the fire code, in particular with some of the interior finishes and draperies," Vaughn explains. "We submitted alternative material and method reports detailing how we would deal with these issues and make sure they were safe."

In the end, the newest of the hotel towers was kept almost completely intact, while two others and major portions of the main floor casino, restaurants and meeting center were gutted down to the structure. "The original, central portion of the casino was wood framed, surrounded by concrete and steel," Vaughn says, "That area had to be completely demolished and replaced." Still, even in the areas that were gutted, stair halls, pipes, generators, and some components of the fire alarm system were retained, so the codes to be applied and necessary variances all had to be agreed upon before final drawings could be made.

"In essence, we brought a building created over six decades ago into compliance with the 2006, 2009 and 2012 fire codes," Vaughn says. "Yet plans always change, in small ways and large during a project of this size. That's especially true in a remodeling project, where you're never completely sure what you're going to find. It was a moving target throughout the entire course of the construction."

## MULTIPLE TEAMS

Vaughn says JBA worked under several separate contracts, sometimes for the architect, sometimes for the contractors, at other times directly for the owner.

Most of the work for the remodeling effort was done by a code consulting team headed by Vaughn. Among other things, this group created the design parameters that Southland Industries, the mechanical contractor, followed in creating the construction drawings and installing the fire systems. "For example, we created the design criteria for the sprinklers, but they did the detailed engineering based on our work. During the design-build process, JBA engineers worked with their team to make sure their designs met our criteria. As the opening grew closer, we were on site to verify that their work met all the requirements."

A separate JBA team, approved by Clark County, worked as special inspectors with the owner and the county to test and commission the smoke control and related systems for the building. That process included a review of all of the design documents, primarily the fire protection report prepared by Vaughn and the smoke control diagrams


**In essence, we brought a building created over six decades ago into compliance with the 2006, 2009 and 2012 fire codes.**

- Allyn Vaughn, JBA President


prepared by Southland Industries. It also included inspection of system components, fire-resistance rated construction, and the testing of smoke management systems, including the closure of doors and dampers, the activation or de-activation of fans, and the activation of fire alarms.

Still another JBA team, headed by Director of Electrical Engineering Rick Reyburn, worked on electrical system designs as a subcontractor to Bombard Electric.

One of the more interesting parts of the project came after construction was finished. "SBE retained Fireworks by Grucci out of New York, a company that does high end fireworks displays around the world," notes Nick Moriarty, JBA's Executive Director of Fire Protection. Moriarty headed the team that did a third-party risk assessment for the opening night display, starting with a site inspection to review the fireworks discharge areas on the roof.

"We looked for potential combustibles, openings into the building including fans and vent pipes, means of egress for the Grucci crew, and resources for fire suppression in the immediate area, including stand pipes and hose bibs," Moriarty explains. He says the team reviewed the risk assessment report that Grucci prepared, then prepared their own report for Clark County. "We made sure that they installed non-combustible pads over the areas where the fireworks would be launched, removed any loose debris and wet down the adjoining areas before they began."

## THE OPENING NIGHT PARTY

Moriarty's team was also involved with the initial concept and permitting for a number of show effects in the nightclub. "They are trying to tweak their shows to create more excitement," he says. "They started out with liquid nitrogen fog technology, but they recently upgraded that system as well as adding flame effects over the DJ booth. We worked with them on the fire protection designs, code consulting and the permitting process."

JBA's ability to touch so many aspects of a project is what won them the contracts in the Sahara rebuild. "Traditionally an engineering firm works with the architect, and when the building opens, their role is done," Vaughn notes. "But we're able to work with the architect, owners, regulating agencies and various contractors to get the building up and functioning, and then continue to work with operations managers when they need to modify it to make it an ongoing, viable business."

That's a powerful combination and explains why JBA Fire continues to be the consultant of choice for the majority of major resorts in Las Vegas. "Casino resorts are unlike anything else anywhere in the world," Vaughn says. "It takes an unusual fire protection firm to meet the needs of their owners and the demands of their guests, yet still keep everyone safe." ❖

**PART 2**: ARIZONA STATE UNIVERSITY

# Designing A Better Law School


## INSIDE THE DESIGN PROCESS FOR ARIZONA STATE'S NEW CENTER FOR LAW AND SOCIETY

"When we started looking at the idea of replacing our law school building, we examined who we wanted to be. Law schools tend to have big, monolithic facilities, with lots of wood, marble and stone, but we thought, no, that's not who we are. We're about innovation and service — service to our students, our local community, the legal profession and through it the nation and the world."

That's Doug Sylvester, Dean of the Sandra Day O'Connor College of Law at Arizona State University (ASU Law), talking about the school's new academic building in downtown Phoenix.

The new building, the Arizona Center for Law and Society, will be modern and transparent – composed largely of glass and steel to feel accessible and open. A team of Trusted Advisors at JBA Consulting Engineers has been working hard to make sure ASU Law's education, meeting, and public spaces help the school do a better job of teaching its students, engaging the local community and presenting itself to society as a whole.

### GETTING BACK ON TRACK

The technology designs for the new building began only after a yearlong process of planning and goal setting. That process included a large number of meetings with faculty and administration, plus visits to other law, medical and business schools.

"We began our construction documents just five months before groundbreaking," says JBA Director Michael Shafer. He had led a planning process back in 2013 when employed by a different consulting firm, but he had left before the design documents were created. Unhappy with the direction the process had taken since Shafer left, ASU Law and Thomas Williams, Assistant Dean of Academic Affairs and the Institution at ASU Law, asked him to come back to the project in March 2014, together with Trusted Advisors Nathaniel Holland, Timothy Johnson and Michael Schwob. "Our first task was to review the documents the other firm had prepared, anticipating that they would need quite a few revisions."

Normally in a project of this size, there are several stages in the design process. Schematic Design, or SD, is the first visual glimpse of the building that the architect prepares, using input from the technology consultant on the physical space needed by the various systems. Design Development (or DD) is where the actual structure is finalized, taking the completed technology requirements into consideration. By March, the consultant should have been well under way on the Construction Documents (or CD) that document all of the interior systems for the builder and the technology subcontractors, but the JBA team found it necessary to go back to decisions made in DD and even SD, working with the architect and client to resolve a number of deficiencies in the plans.

Holland says that although the timeframe was extremely compressed, "Our saving grace was our sheer familiarity with all types of technology, especially used in higher education."

## AN EXECUTIVE MEETING SPACE

The most extensive changes took place in a sixth-floor space currently called the Executive Conference Room, intended to be made available for leaders of the state and federal judiciary, chairmen of large corporations and even world leaders. "The design goal was to provide a place

**More Effective Communication**

*A detailed rendering of the Executive Conference room show the ring-shaped table that will function as a video screen.*

where up to 50 people could meet as equals at a round table and be able to communicate face-to-face, as well as share computer and video information," Holland explains. "There was an initial design with two projection screens on one side of the table, but the planning committee did not feel it would function adequately." The team looked at one option after another until it developed an idea it felt could work exceptionally well.

"It would not have been possible if Brian Farling (Jones Studio), Greg Clawson (Ennead Architects) and Brian Masuda (Ennead Architects) were not totally on board with our goal of creating an exceptional meeting space," Holland says. "They actually agreed, at this late stage, to redesign the concrete structure of the building to accommodate our ideas."

"Dean Sylvester wanted a room for very high-level meetings," Farling adds. "We had the idea of making the table itself the screen, but one of our key questions was whether we could project on a screen that curves and leans back in the vertical dimension. Nathaniel was instrumental in figuring out how that could be possible."

The final design uses an elongated ring-shaped table with a projection screen set all the way around its inside face. The top of the screen is well below eye level, so that meeting participants have an unobstructed view of each other. Yet, as they look down they will also have a clear view of the presentation images.

To make that work, Holland and the architects created a room where the finish floor is at the same level as the rest of the sixth floor yet a 4-inch underfloor cavity provides wiring flexibility. The center of the room is lifted an additional 11 inches to conceal 16 ultra-short throw projectors that illuminate the curved screen. These projectors can create one very wide edge-blended image for each side of the room or multiple side-by-side images around the screens.

## AN INDOOR/OUTDOOR MEETING SPACE

The JBA team also contributed extensively to the design of a large multipurpose space to be built on the first floor.

"We regularly bring outside speakers in to address our students and the community," Williams explains. "For example, we've recently had Sen. John McCain on campus, former Arizona Governor Jan Brewer, and former Senate Minority Whip Jon Kyl, and we felt we needed a better venue for them to speak." In addition, three appellate-level courts hold session periodically at ASU Law, including the Arizona and Navajo Nation Supreme courts, and the school has a need for a large lecture hall.

"We also discussed the idea of 'public steps,' where students and faculty could sit, take a break or meet informally, and anyone could address a group," Farling recalls. Now the planning committee had four ideas, each requiring a large space, so it only made sense to combine them. But how?

Ennead Architects, with a design team led by design partner Tomas Rossant and managing partner Timothy Hartung, developed a plan where the entire front wall of the lecture hall would be on a motorized lift, so it could be combined with an outdoor courtyard to form one very large indoor/outdoor auditorium. The seating inside the hall is retractable, and furniture at the front of the room — for example a podium and appellate court benches — will be portable so it can be rolled out of the way.

As an indoor space, this "Great Hall" will seat 150. As an indoor/outdoor combination, it will seat 800. "The principal design problem we had, and the one we did not feel the previous consultant had prepared for adequately, was acoustical," Holland explains.

Michael Schwob, an Acoustical Consultant for JBA, says speech intelligibility was a very high priority in this room. One strategy he used was to take the background noise down to an unusually low level so that speech would be more audible. "The primary noise generator in most rooms is the HVAC system, so we worked with the mechanical engineer on equipment selection, air flow velocities and a number of other issues."

Schwob says he was worried that the roll-up door that forms the movable wall would allow outside noise into the room, so he worked closely with the architect on its choice. "In a room of this size, we also have to look at the reverberation rate, so we introduced sound absorbing materials into the walls and on the ceiling around the audience area." The ceiling directly above the audience, however, will be reflective, in order to help transmit sound from the presenter to the audience and from audience members to the presenter.

In addition, Schwob and his team looked at the materials used in the interior partitions, the doors and the windows, and the ways each of these are sealed to make sure sound would not be transmitted from one room to the next or from the outside into the interior. This was something they did for the entire building, not just the Great Hall.

"When the room is open," Holland adds, "we have to adjust the sound system, tying in outdoor speakers, changing the settings on the audio processor and the volume levels to accommodate the noise of the outdoors." In addition, Holland has specified the installation of two edge-blended projectors in a projection room at the back of the auditorium, which will be able to create a single presentation image, or two side-by-side images, on a large motorized screen in the interior portion of the room. When presentation images are needed for an indoor/outdoor meeting, support staff will set up a portable screen outdoors and use it with a portable projector.

## LOOKING AHEAD

In addition to the technology designs for these key spaces, Holland worked up plans for an additional 17 classrooms and lecture halls; Schwob worked on sound mitigation; and Tim Johnson focused on telecommunications, including an advanced gigabit Wi-Fi network, which will serve the entire building.

"I can think of any number of times where we've had an idea for the building and asked the team from JBA, 'How can we do that?'" Williams says. "They've done a great job in taking our vision and making it work in the real world, sometimes expanding our ideas in ways in which we never would have thought."

Holland says that this kind of challenge is what he lives for. "It was very difficult at times, but that's what makes my job exciting. The Executive Classroom in particular was a complicated design task that forced me to brush up on my knowledge of physics. But when I have an interesting problem like this, I don't mind working the extra hours."

"Dean Sylvester and the leadership of ASU Law are working to reinvent the law school experience, but it's more than that," says Rossant. "This retooling of legal education will better integrate ASU Law into the social and political life of Phoenix and reengage citizens in the fundamental importance of the law in our daily lives. The new building will reposition the law school as a conduit for connecting the school's progressive legal scholarship with the public. This is where the law hits the street."

"Preparing students for a career in the law is not an easy task, at least if you want to do it really well," Williams adds. "We looked for opportunities to leverage technology that we had not seen before in order to achieve a level of communication that we're not finding at our peer schools."

Things are a little quieter now for the JBA team, with the construction documents finished and the building starting to take shape. They will step in again soon, helping to send out bids and supervising the awarding of contracts to the technology integrators. ❖

ASK AN ADVISOR *(continued from page 13)*

I was recently on the campus of a university that employs 1,500 staff and serves 10,000 students. Feeling the aftershocks of the recession, the entire organization was under an indefinite hiring freeze. Nevertheless, the IT department had endured a steady rise of new facilities and endpoints to support since the financial slowdown began. The future technology landscape was unsustainable.

A master technology planning process revealed several unique solutions to solve strategic problems that went far beyond "should we use PC's or thin clients in the new Library," or "which fiber optic strategy serves us best?" The IT Director expressed interest in outsourcing a few key IT services and the cloud-based options we developed became an important part of the final plan. Together we challenged traditional means and methods. By moving email services to an outside provider, the department freed up two full-time staff, shifting man-hours and brainpower to more important initiatives and projects. Technical systems spending began to swing from end-of-the-year patchwork solutions toward a planning framework.

In the end, the IT department reemerged as a campus partner, championing academic goals and ambitions. Instead of rushing into one-size-fits-all remedies, they rolled out several customized solutions and piloted new learning environments along the way. Master planning changed the way the organization not only worked, but how it thought about problems and solutions.

In terms of technology, simply emulating what your competition is doing ensures a path to obsolescence or banality, as your organization is one step behind. At JBA, our thought leaders are actively engaged in professional organizations and advisory councils where we seek to identify and shape future solutions, revealing what might emerge on the technology horizon. Applying this industry-leading knowledge to an organization's Technology Master Plan can lead to a very powerful process or document; tying your strategic initiatives to the design of systems, facilities, and infrastructure. Don't make the mistake of waiting until building design is well underway to start planning technology systems. Think of engaging our experts in a master planning assignment before the forces of project schedule and budget set you down the cow path of the road most traveled. ❖

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