

PBK K-12

NEXT -IN- CLASS

BUILDING DESIGN SOLUTIONS



POWER OVER ETHERNET (PoE)

PoE is a technology that enables fully integrated electrical power to devices installed in buildings and other locations without requiring a separate power and data connection.



OUTDOOR LEARNING

Contact with nature assists the development of critical thinkers who understand how the world works via contact with environmental elements surrounding a school.



INTERACTIVE, PLAY-BASED LEARNING

Open-ended, play-based learning has shown to improve social skills, as well as promote initiative, focused attention, and curiosity about the world.



HARDENING

Hardening improves the durability of infrastructure, making it better able to withstand the impacts of catastrophic events from a natural disaster.



PHOTOVOLTAIC

Selection of photovoltaic solar energy systems on a school campus should be made in consideration of other building systems, local climate, and financial objectives.



INDOOR AIR QUALITY (IAQ)

Good IAQ contributes to a favorable environment for students, performance of teachers and staff, and a sense of comfort, health and well-being.



BUILDING AS A LEARNING TOOL

Learning tools can be incorporated into the very fabric of the design of a school environment to permit active and passive learning opportunities for students.



SAFETY AND SECURITY

Safety and security strengthens the district's ability to mitigate vulnerabilities and respond quickly to a crisis situation.



FURNITURE DESIGN/PROCUREMENT

Mobile, agile furniture can create an enriched, autonomous learning experience while simultaneously encouraging engagement and collaboration.

POWER OVER ETHERNET

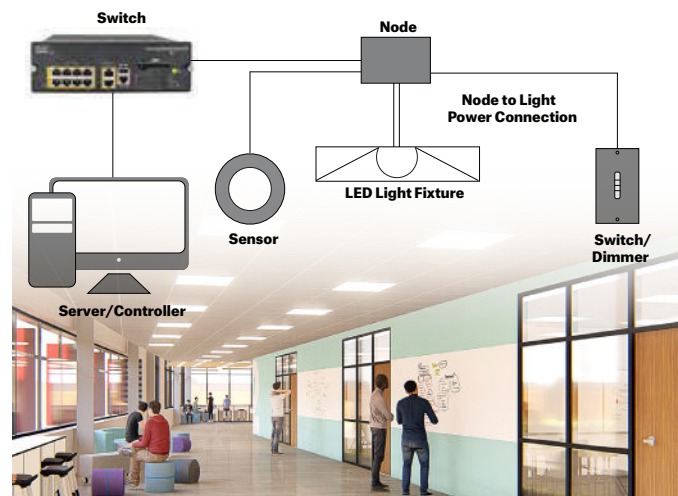


Power Over Ethernet (PoE) provides low-voltage power to LED lighting systems and is controlled over a standard ethernet data cable. It's a new and innovative way of delivering lighting systems in the Internet age.

COMPLETE FLEXIBILITY IN LIGHTING CONTROL!

PoE easily adapts to NextGen learning environments where furniture and spaces may change rapidly with evolving teaching methods, especially great for flex spaces, reprogramming done with software or plug-and-play data connections as opposed to physically rewiring light fixture. PoE provides building occupants complete flexibility in control of dimming, switching, and reconfiguration of zones with simple low voltage computer cable connections that don't require any hard wired 120v or 277v circuits out to the fixtures. The solution is simple to integrate into other IP based systems including:

- LED Color Tuning Controllers
- Gunshot Detection
- Access Control and Intrusion Detection (lockdown scenarios)
- Surveillance Cameras
- Paging
- Fire Alarm
- HVAC/Energy Management Controls
- Wayfinding



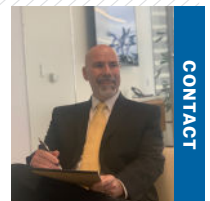
LITTLE-TO-NO UP-FRONT COST DIFFERENCE!

Typically, fluorescent lighting accounts for approximately 30% of your building's electrical load. PoE lighting with LED fixtures can reduce this draw by 50%, providing CAPEX and OPEX cost savings and promoting environmental sustainability. If planned and packaged properly, PoE does not cost more than traditional hard wired 120v or 277v systems and can be easily configured by building operators. However, there will be increased overlap. More electrical and emergency power circuits will be run to IDF/MDF closets and lighting systems in the building may be managed by IT staff.

INDUSTRY PLAYERS WHO SUPPORT POE



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OUTDOOR LEARNING



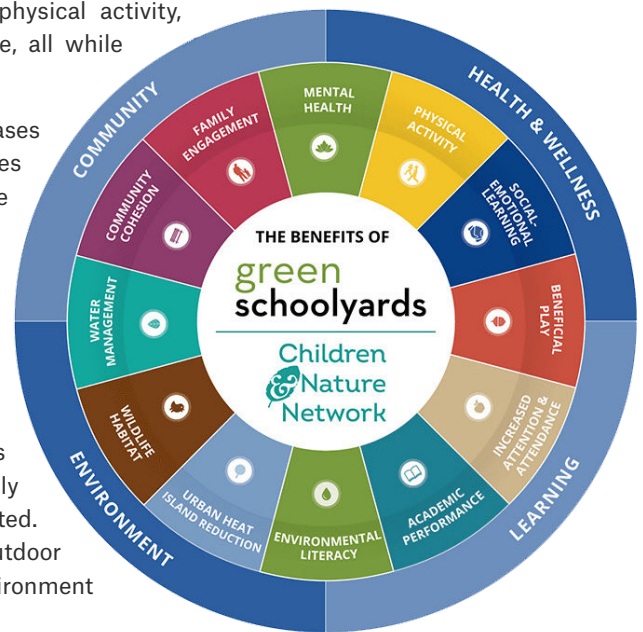
Utilizing outdoor spaces to promote hands-on experiential learning, improve physical and mental health, and create opportunities for entire communities to benefit from exposure to nature.

HEALTH, EQUITY, AND IMPROVED ACADEMIC OUTCOMES!

Getting students outdoors stimulates the senses, encourages physical activity, promotes mental wellness, and instills an appreciation of nature, all while effectively providing developmentally appropriate learning.

Research has shown that nature enhances positive and decreases negative emotions, improves feelings of competence and increases supportive social relationships that help build resilience. The positive impact on students' health in turn, contributes to improved academic outcomes. Spending time in nature has been proven to help children focus their attention and in one study, 94% of teachers report that students are more engaged in educational experiences utilizing outdoor learning labs than in traditional classrooms.

When open to entire communities, outdoor learning environments help create equity in populations that have been traditionally underserved in terms of exposure to nature and the benefits associated. By creating a sense of place and positive relationship with nature, outdoor learning can help students develop a lifelong awareness of the environment and the importance of preserving it.



OPERATIONAL BENEFITS

From an operational perspective, intentionally designed outdoor learning environments provide numerous benefits. Cultivating the natural ecology of a space reduces the frequency at which the area must be mowed and maintained, which can in turn improve the surrounding air quality. Additionally, natural outdoor environments are more resilient to the impacts of weather events such as flooding. These green spaces can also provide an alternative to large paved spaces, reducing the urban heat island effect and in turn, minimizing costs of cooling the school building. Finally, allowing nature to propagate on a schoolyard increases the biodiversity of the area, allowing students to witness the return of native species and wildlife to the area.

— INDUSTRY PLAYERS IN OUTDOOR LEARNING —

The Nature Conservancy

children & nature NETWORK

McMac Cx

Healthy Tweaks



PBK

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INTERACTIVE, PLAY-BASED LEARNING



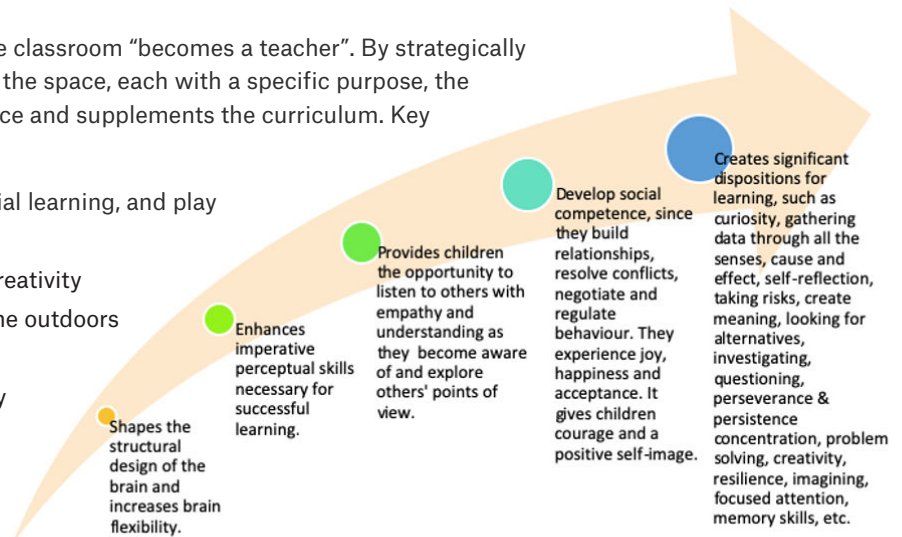
Play-based learning allows children to use play as a context for learning. The motivation to play supports learning through exploration, imagination and inquiry. Learning environments can support this model of education.

ENVIRONMENTAL DESIGN & PLAY-BASED LEARNING

Play-based curriculums support cognitive development and problem solving strategies as well as social and emotional competencies and skills. Research shows that play-based curriculums, in addition to improving play skills and narrative language ability, also have positive influence on the acquisition of grammar.

When play-based learning is done well, the classroom “becomes a teacher”. By strategically incorporating objects and activities within the space, each with a specific purpose, the environment adds to the learning experience and supplements the curriculum. Key components include:

- Opportunities for movement, experiential learning, and play
- Open, collaborative spaces
- Adaptable equipment and promoting creativity
- Incorporate nature and connection to the outdoors
- Bring natural light into all spaces
- Incorporate age-appropriate technology
- Utilize flexible furniture



INDUSTRY PLAYERS IN PLAY-BASED LEARNING



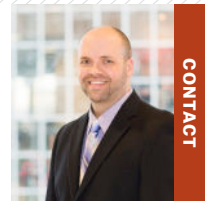
IACE
INSTITUTE FOR THE ADVANCEMENT
OF COGNITIVE EDUCATION



**EXHIBIT
CONCEPTS**

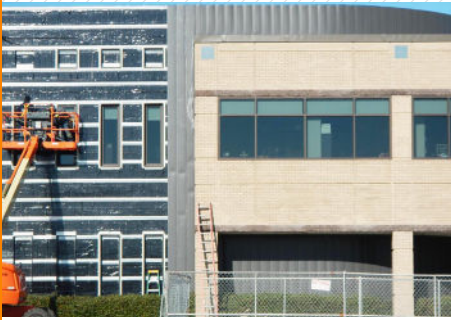


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HARDENING

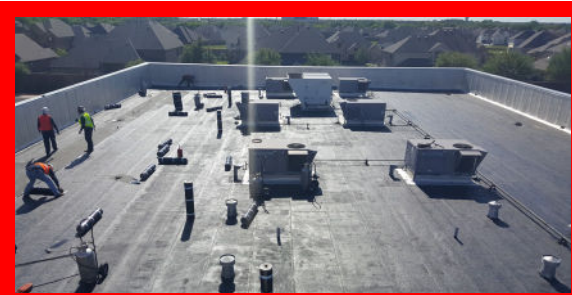


Hardening of a building is part of an entire Building Envelope process that includes the roof system, air and water barriers, attachments of window frames and door frames, and window glazing that reduces impact and weather damage.

PREPARING BUILDINGS NOW TO PREVENT DAMAGE LATER

Depending on the geographical location and wind zones (or seismic zones) codes will dictate enhanced roof attachment to prevent damage from high winds, flying debris or hail. In areas of that are prone to forest fires UL fire rated systems help reduce spread of fire from burning embers. Roof top equipment, gas, electrical and water pipes may require additional securement

from high winds or in seismic zones the attachment to the structure to prevent damage from structural movement.



The water proofing on the exterior walls dictate the use of an air barrier for above ground applications and water barriers for below grade. Current codes require a complete system that seals out air and water vapor that includes flexible flashings around all window and door frames, at changes in floors and at the roof wall connections and base of wall connections. Proper detailing of these penetrations as well as all other penetrations such as electrical/communication conduits, water pipes and louvers for mechanical systems are critical to provide the control of water and water vapor into the building. The exterior walls systems also include the requirement to have a continuous exterior insulation from base of wall extended to the roof edge.

Proper detailing and specifications of securing window and door frames to the structure provides additional security from impact damage from high winds and high-speed projectiles.

HARDENING TODAY REDUCES FUTURE EXPENSES

Proper attachment of roofs, windows and doors protect the building interiors from further storm damage from wind, fire, earthquakes and flooding thus reducing from costly repairs and lack of use from uninhabitable buildings. Impact resistant glass can add additional cost, but can be minimized to harden entry exit points or to just exterior glass, or films adhered to the interior of the glass can further reduce cost over more expensive glazing.

Proper application of air and water barriers prevent everyday infiltration of air and water vapor eliminating growth of mold and enhancing the ability of HVAC systems to better control humidity and temperature at reduced cost from reducing size of units and better control of outside air in balancing the HVAC systems.



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PHOTOVOLTAIC



Selection of photovoltaic solar energy systems on a school campus should be made in consideration of other building systems, local climate, and financial objectives.

A BRIGHT IDEA: REDUCING EMISSIONS, LOWERING COSTS

LEAF Engineers is an industry leader in incorporating photovoltaic energy systems in educational facilities. Our team has been on the cutting edge of delivering systems that minimize carbon emissions and result in cost savings for districts.

CASE STUDY: STOCKTON JUNIOR HIGH SCHOOL

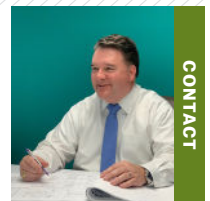


Stockton Junior High School, located in Conroe, Texas opened in September 2020 and features an on-site 1-megawatt solar array, which has proven to have a short term and long-term effect on the local environment. The on-site solar array supplements the current building electrical consumption and vastly reduces the campuses carbon emissions as well as improves the regional air quality and reduces local pollution. The adoption of on-site power generation thereby has an effect on the local utility grid and the local power companies need to utilize fossil fuels at their generation plants which in turn reduces their local carbon footprint and provides fossil fuel reductions that would have been needed had the array not been installed. Any reduction of coal or natural gas resources consumed by the local utility plant provides less regional air pollutants and ultimately improves the air that we breathe. Over a 25-year period, utilizing the triple bottom line cost benefit analysis, its projected that this array will have long term impact on the local utility grid and generation plant of **more than \$4 million** in air pollution and carbon emissions that would have been required for a standard building this size over that same timeline. In addition, the renewable energy provided by the array will **offset district utility expenses by almost \$8 million** over that same timeline. Ultimately, the long term economic and environmental impact will have **significant savings in the short term but extend for many years in the future.**

INDUSTRY PLAYERS IN PHOTOVOLTAIC

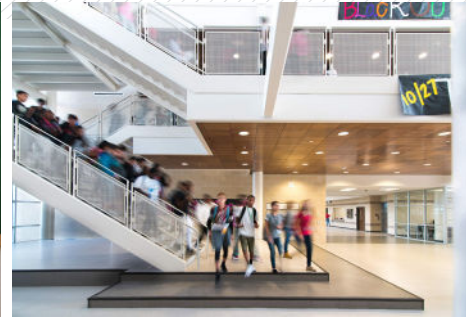


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INDOOR AIR QUALITY



Controlling the interior air condition of a building so that it protects human health, enhances mental wellbeing and productivity, and promotes and sustains high building value is a high priority in a post-covid world.

PROPER BUILDING INDOOR AIR QUALITY

The indoor air quality (IAQ) for students and staff is more important than the outdoor air quality because the indoor spaces are where the majority of the students' learning, activities, and engagement take place. There are several studies that show the benefits of proper IAQ and the harmful effects for the lack of. Student productivity, attention ability, and physical and mental wellbeing are all social benefits that add tremendous value to the school system.

There are many sources that adversely affect the IAQ essential for students and staff. These sources include people's respiration, [building paints, adhesives, sealants, and furniture off-gassing], combustion processes, cleaning supplies, mold, and pollutants from labs. The harmful molecules and microorganisms from these sources need to be addressed by the building ventilation system.



Monitors like the one shown here are being utilized to measure particulate matter, volatile compounds, carbon monoxide and dioxide, and more, informing the building system to act accordingly to maintain proper IAQ.

PROPER BUILDING SYSTEM AND CONTROLLABILITY

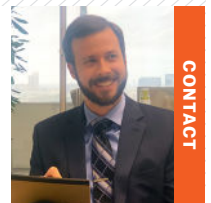
In order to deliver IAQ to the building, the building ventilation system must supply proper ventilation air to the building and proper filtration of the indoor air and outdoor air. Treating the indoor air provides an additional measure to promote IAQ.

Controllability is key for a system to maintain proper IAQ and is enhanced when paired with measurement devices. Measurement devices are capable of reading particulate matter, volatile organic compounds (VOCs), carbon monoxide (CO), carbon dioxide (CO₂), temperature, and humidity and informs the building system to act accordingly to measured levels. Measuring the indoor air also provides a means for the school system to show all school occupants have the IAQ they need.

INDUSTRY PLAYERS IN INDOOR AIR QUALITY



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BUILDING AS A LEARNING TOOL



Today's school buildings are landscapes that support, enhance, and contribute to education by influencing the way students interact with the environment, their teachers, and their peers.

MAXIMIZING THE POTENTIAL OF LEARNING ENVIRONMENTS

21st-Century learning environments should not only house education - they should become part of the fabric of the learning experience. By incorporating components such as technology, sustainability, outdoor learning, career and technical education, transparency, and multipurpose space, school facilities become tools that incidentally expose students to a wider knowledge base and spark inquiry and discovery in new ways. Key features include:

- **Technology Integration:** Wiring the entire school promotes collaboration and peer-to-peer learning by allowing students to access the network anywhere on campus and reducing dependence on teachers.
- **Transparency:** The principle of visual interconnectedness makes learning communal and creates a public forum for celebrating and observing student work across grade levels.
- **Multipurpose Space:** Multipurpose spaces allow for flexibility in an age of rapidly evolving trends in education. They support various learning and teaching styles. Examples include stairs that double as seating areas, walls that double as writing surfaces, and corridors that become extensions of the classroom.
- **Outdoor Learning:** Outdoor learning provide opportunities to observe and interact directly with nature in ways that enhance understanding of curriculum. Research shows that outdoor learning positively impacts health and academic outcomes.



Students at Stockton Jr. High observe how the photovoltaic field that powers the campus is improving the environmental quality in the area. Technology across the campus supports experiential learning.



Multipurpose space at Alief ISD's CTE center supports various learning styles and incorporates the principle of transparency, allowing students to see and celebrate what is happening campus-wide.



Students at Neill Elementary utilize outdoor learning spaces, which have been shown to improve mental and physical health, as well as support academic achievement and environmental literacy.

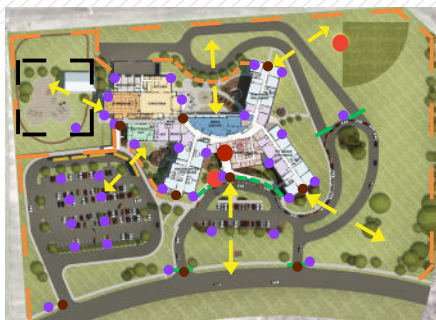
INDUSTRY PLAYERS IN UTILIZING BUILDINGS AS LEARNING TOOLS



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SAFETY AND SECURITY



The threat of school violence has permeated the 21st-century educational experience. Our consortium of over 130 experts has developed best practices to enhance safety and security for a future without fear.

A CONSORTIUM OF EXPERTS

In 2018, PBK founded the Texas School Safety and Security Council (TSSSC), a consortium that has grown to include over 130 law enforcement officers, design experts and school administrators with a vision of bringing a holistic approach to school safety. Over two years, this group developed a list of 32 best practices (right) that has been utilized by dozens of school districts to enhance school safety. While based in Texas, the insight of TSSSC has been implemented nationally to assist districts in developing board policy and administrative practices, as well as on-site training to reinforce emergency readiness and keep students and staff safe.



SAFETY & SECURITY BEST PRACTICES

- | | | |
|--|--------------------------------------|--|
| 1. OFFICER PRESENCE | 13. HARDENED GLAZING | 24. TRAINING AND DRILLS |
| 2. SITE EMERGENCY CALL STATIONS | 14. ACCESS CONTROL | 25. CLEAR BACKPACKS |
| 3. SITE FENCING | 15. LOCK-DOWN / PANIC BUTTONS | 26. SOCIAL MEDIA MONITORING SOFTWARE |
| 4. NATURAL SURVEILLANCE | 16. SAFE ROOMS | 27. TOURNIQUETS/STB KITS |
| 5. NATURAL ACCESS CONTROL | 17. INDICATOR LOCKS | 28. GUNSHOT DETECTION TECHNOLOGY |
| 6. TERRITORIAL REINFORCEMENT | 18. SENSING TECHNOLOGY | 29. FACIAL RECOGNITION SOFTWARE |
| 7. MAINTENANCE AND MANAGEMENT | 19. ACCESS CONTROLLED EGRESS DOORS | 30. STUDENT REUNIFICATION METHOD (SRM) |
| 8. SECURITY CAMERAS | 20. COMMUNITY/CONFERENCE ROOM | 31. CYBER SECURITY |
| 9. ENTRY VIDEO CAMERA / INTERCOM SYSTEMS | 21. SECURE COMMAND/CONTROL ROOM | 32. CYBER BULLYING PREVENTION |
| 10. DRIVE AND DOOR IDENTIFICATION | 22. INTEGRATED COMMUNICATION SYSTEMS | |
| 11. PORTABLE / MODULAR CLASSROOMS | 23. EMERGENCY OPERATIONS PLAN | |
| 12. SECURE VESTIBULES | | |

Best Practices Developed by PBK & the Texas School Safety & Security Council

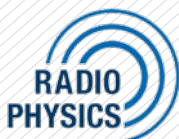
INDUSTRY PLAYERS IN SAFETY & SECURITY



RAPTOR
TECHNOLOGIES



PatriotOne
TECHNOLOGIES



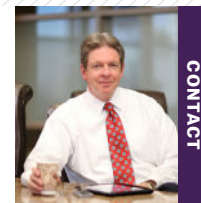
i love u guys
FOUNDATION



JEFFCO/DEANGELIS
FOUNDATION

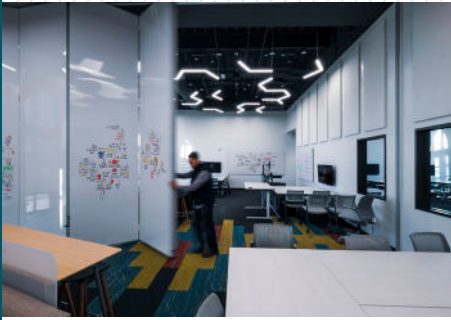
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FURNITURE DESIGN & PROCUREMENT

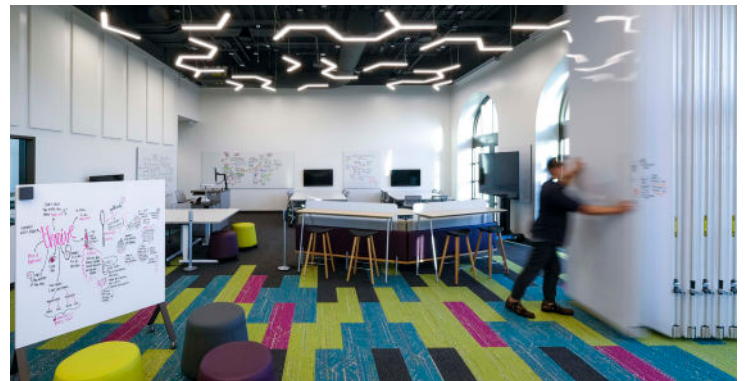


Space is designed holistically at design development to include furniture. Effective furniture design enhances learning by promoting well-being, collaboration, flexibility, retention, identification, and comfort.

Designing and selecting FF&E through the project's architect benefits the overall design of the project in several ways. First, it helps reduce the number of change orders that occur due to poorly coordinated power and data in relation to the furniture. Designers have access to the revit model and can see changes to plans and make updates to furniture in real time. Using this PBK service reduces the client's stress and time in reviewing specific model numbers and quantities in multiple page quotes or bids and reduces the client's need to vet out numerous vendors and a multitude of manufacturers. Having PBK designers involved in the process from the start will ensure a cohesive and holistic building.

OUR SERVICES INCLUDE:

- Preliminary furniture test fits into floor plans.
- Inventory / documentation of existing furniture.
- Detailed furniture plans: showing power & data in relation to the furniture.
- Selection of interior and exterior furniture, storage, and ancillary items.
- Presentations of sample boards, finishes, renderings, and budget.
- Tracking and development of installation timeline, installation fees, contingencies, mockups and user surveys.
- Development of a detailed furniture spec. book, cut sheets, and warranties.
- Act as a consultant to the client and coordinate with dealers, installers, and owners regarding quotes, warranties, delivery, and installation.
- Weekly onsite visits during the furniture installation process and tracking of punch items.
- Preparation of multiple bid packages review, document, and evaluation of all bid proposals.



NEXT IN CLASS

Furniture design supports various other Next in Class principles. Flexible furniture plays a large role in utilizing the building as a learning tool and can enhance play-based learning as well. Designing and selecting furniture, fixtures, and equipment through the project's architect provides a holistic approach allowing successful integration the various components of the learning environment.

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