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*Construction
Management
Comes Full Circle:
Looking Back
to the Future*





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Commitment to Our Clients

Commitment to Our Culture and People

Commitment to Our Company

Commitment to Our Communities and Surroundings



Economic Stimulus Program: Are you ready?

We've all heard a lot about the American Reinvestment and Recovery Act (ARRA) of 2009 Stimulus Funds. But what does it mean to you and are you ready to take advantage of these economic stimulus funds?

PBS&J is actively helping clients apply for and make the most of ARRA funds. While there is a wealth of valuable information readily available on a variety of websites, PBS&J has compiled links to all of these resources in one convenient place: http://www.pbsj.com/Economic_Stimulus

These links include government agency recovery websites as well as professional associations and private websites that examine different aspects related to the interpretation and implementation of the ARRA of 2009. Whether you need help with immediate accountability, transparency, and project

performance requirements of the ARRA or enhancing your day-to-day and long-term operations, you can find the information you need here.

For more information about the types and range of services that PBS&J can provide, contact Mike Pavlides at mpavlides@pbsj.com.



PBS&J FYI

When it comes to construction management, a Peter Allen song title best sums it up "Everything Old is New Again." Twenty-first century construction projects are seeing a return to the master builder concept that made the pyramids and the Great Wall of China possible. Construction management at-risk and other innovations in construction management and delivery are accelerating project schedules and reducing project costs.

Take a look at some noteworthy projects where effective construction management techniques and modern day technology are combining to achieve results our ancestors could never have imagined.

As always, we would love to know what you think. Drop us an email at 22895@pbsj.com.

China | The master builder concept made the Great Wall of China possible.

Greece | Master builders organized unskilled labor into specific disciplines resulting in the advent of trades.



Egypt | Master builders were the early architects who designed, engineered, and coordinated construction on the pyramids.



Roman Empire | Master builders built monuments like the Coliseum and the Pantheon working as designers and supervisors of construction.



Middle Ages | Churches and cathedrals throughout Europe were built for the Roman Catholic Church. Construction guilds and trades were established.



Construction Management Comes Full Circle:

Looking Back to the Future

As the construction industry continually evolves, it is constantly evaluating, re-evaluating, and refining the methods and processes used to manage construction and successfully deliver completed projects on time and within budget. Ironically, the more we look ahead to the future of the industry, the more we find ourselves looking to the past for answers. Construction management has come full circle from the master builder concept in ancient times, a one-stop shop for design, engineering, and coordinating construction, through the turbulent centuries in between, to arrive, essentially, back where it started with the twenty-first century master builder—the construction manager.

Looking in the Rearview Mirror

Regardless of the title—master builder, construction manager—the role has been around since the advent of construction projects and the responsibilities are much the same now as they were then. Master builders built the pyramids, the Coliseum, and other ancient wonders while serving as both designers and supervisors of construction. The modern construction manager is still the go-to person for most of the parties involved with major construction endeavors—a single point of contact who can manage the complexities of a large-scale construction project from concept to concrete.

The construction manager is also the person responsible for handling complaints and resolving problems along the way. Although the questions and problems that arose centuries ago may have differed, they were all addressed and resolved by the master builder. While the industry may have strayed from the master builder concept for a while and explored some more diversified approaches to construction management, that desire for a single point of contact and the inherent benefits it offers in terms of efficiency and cost effectiveness has forced us to look to the past for solutions that will work in the future.

The Modern Master Builder

Although the construction manager role has been around for centuries, the professional discipline of construction management has only truly been recognized since the 1960s. Around this time construction contractors began serving as consultants to owners of large-scale construction projects—helping them navigate the potential pitfalls in getting a project successfully completed on time and within budget. Project owners immediately recognized the benefits of having one point of contact serve as a trusted advisor on projects. With a construction manager sharing a sense of ownership and protecting the project's best interests, project owners now had a professional experienced in all areas of construction

guiding the process from pre-design through commissioning. This helped to eliminate crossover between the various construction disciplines, and resulted in significant cost savings and accelerated construction times.

Bruce D'Agostino, president and chief executive officer of the Construction Management Association of America (CMAA), an industry organization committed to advancing construction and program management worldwide, sees the 1960s as a bellwether in the evolution of construction management and industry recognition of the importance of the construction manager role.

"Madison Square Garden and the Twin Towers (World Trade Center buildings) were complex projects in the 1960s on which the owners needed a trusted advisor to protect their interests and reduce their risks," explains D'Agostino. "The complexity of design had advanced so far with the

advent of computers and hi-tech construction scheduling and delivery methods such as the critical path method (CPM) of scheduling, value engineering, and constructability reviews, that the need for a construction manager again became vital."

In 1970 the General Services Administration (GSA) began to question its method of procuring and contracting construction projects when studies showed similar projects in the private sector were being built for half the cost. The result was a recommendation to move towards "phased construction in conjunction with construction management." And in 1975 the GSA completed the National Air and Space Museum—its first project using construction management. Around the same time period the Department of Health, Education, and Welfare started using guaranteed maximum price (GMP) contracts (also known as management

at-risk [CMAR]) to complete hospital, school, and laboratory construction projects.

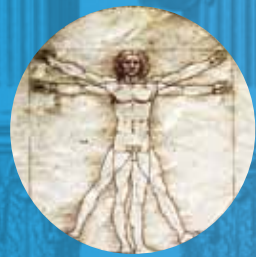
Initially, the concept of the modern construction manager was not well received by the three guiding disciplines in the construction industry: architecture, engineering, and contracting. As with most forms of oversight, the preliminary reaction was to question the necessity. But in 1975 the industry took the first step in recognizing construction management as its own professional discipline when the American Institute of Architects (AIA), the Associated General Contractors of America (AGC), and the American Council of Engineering Companies (ACEC) issued a joint press release acknowledging construction management as a "multidisciplinary approach that utilizes architecture, engineering, and construction contracting."



Bruce D'Agostino, president and chief executive officer of the Construction Management Association of America (CMAA), an organization committed to "Advancing Construction and Program Management Worldwide."



Renaissance | With design concepts far more complex, architects took a hands-off approach to construction. The separation of the design and construction disciplines began.



1960s | The bellwether in the evolution of construction management and the construction manager, with projects including Madison Square Garden.

Construction Management Comes Full Circle: Looking Back to the Future

When asked if it is possible for a large-scale construction project to be completed on time and within budget without using a construction manager, D'Agostino responded candidly, "Absolutely, but I wouldn't risk it when the cost for being uninformed might exceed a construction management fee."

He went on to add, "CMAA does not promote the use of a specific project delivery method, but we do advocate the use of certified construction managers, as owner sophistication is the key to any successful project."

Since its establishment in 1982, CMAA has been supporting the construction management industry with its mission to promote and enhance leadership, professionalism, and excellence in managing the development and construction of projects and programs. As part of this mission, CMAA developed

a certification program for construction managers. CMAA members have the opportunity to become certified construction managers (CCM) through the association's Construction Manager Certification Institute (CMCI). A CMCI certification is not required to enter the construction management field, but, according to D'Agostino, "The CCM designation is highly regarded by peers, clients, and other industry professionals as the international designation for professional PMs and CMs."

The View Ahead

So with this return to the master builder concept of the past, what does the future of the construction management industry hold? For modern, large-scale construction project owners, one of the key goals is always to keep finding new and improved value-added procurement and delivery methods.

In a tough economy this goal is more critical than ever. Facing the pressure of completing projects on time and within budget while demonstrating added value for stakeholders, traditional project delivery methods are starting to give way to more innovative alternative delivery methods. Methods such as these offer owners more financial protection and less risk while teaming them with a construction management partner who also has a financial stake in getting a project done on time and within budget.

Randy Larson, The PBSJ Corporation's executive officer for construction, recognizes the cyclical nature of the construction industry and the impact of tough financial times, but he is optimistic about the future of construction management's role in rebuilding our infrastructure.



"Construction will and still continues. The diversity of the industry seems to keep it alive. Tough economic times generally bring out the best in process."

Listen to Randy Larson's insights about the current state of construction management.

<http://www.pbsjbuzz.tv/asce2008.aspx>

1982 | The CMAA began supporting the Construction Management industry with CMCI certifications.

CONSTRUCTION MANAGEMENT



1975 | GSA completed the National Air and Space Museum, its first project using construction management, and the AIA, AGC, and ACE acknowledged construction management as a multidisciplinary approach that utilizes architecture, engineering, and construction contracting.

TODAY | The evolution of construction management has come full circle, embracing the concept of the master builder once again.

In his recent podcast about the current state of the construction management industry Larson commented, "Construction will and still continues. The diversity of the industry seems to keep it alive. Tough economic times generally bring out the best in process."

"Smart people take closer looks at their processes and ways of doing business," Larson continued. "They will experiment and explore with all sorts of procurement methods to find the best value. And professional construction management seems to fit that need."

With the current state of the economy and the resulting federal stimulus monies being offered through the American Recovery and Reinvestment Act (ARRA), it is imperative that federal funds are utilized with delivery methods that offer the most value to both the owner and taxpayer.

The ARRA funding for "shovel ready" projects (projects ready to start the construction phase) is intended to put the United States back to work while rebuilding the nation's infrastructure.

According to www.recovery.gov, the \$150 billion ARRA investment in new infrastructure includes the largest increase in funding of our nation's roads, bridges, and mass transit systems since the creation of the national highway system in the 1950s. This is a massive undertaking, much like the Works Projects Administration (WPA) program that existed from 1935 to 1943, but if the results are similar, the successes might be seen for decades to come. During its time in operation, the WPA built 651,087 miles of highways, roads, and streets. It also constructed,

repaired, or improved 124,031 bridges; 125,110 public buildings; 8,192 parks; and 853 airport landing fields.

"There must be value added," Larson reiterates. "Procurement has come full circle. The day of the master builder is once again upon us: a single entity that can design and build and be a trusted confidant and advisor. This integrated approach helps the owners achieve the project they envisioned, at the best price."

The construction industry continues to evolve with alternative procurement and delivery methods driving the move forward. As the industry evolves, so too do the qualifications and expertise of the well-rounded construction

"Smart people take closer looks at their process and ways of doing business. They will experiment and explore with all sorts of procurement methods to find the best value. And professional construction management seems to fit that need."

—Randy Larson, The PBSJ Corporation's executive officer for construction

management professional. The right combination of education, field experience, and financial savvy, teamed with innovative technology such as building information modeling (BIM), CPM scheduling, and mapping software, make the goal of achieving added value for large-scale construction client owners more attainable than ever before.

2009 | \$150 billion ARRA investment in new infrastructure implemented. This is a massive undertaking, much like the Works Projects Administration (WPA) program that existed from 1935 to 1943.



Construction Management Comes Full Circle: Looking Back to the Future

Demonstrating Value in Cobb County

Construction management projects vary in size, cost, and detail, but they all share a common goal: to achieve the best value for the dollar.

Cobb County, Georgia recently took an innovative approach to achieving this goal when the county initiated a transportation program management/construction management contract to provide transportation and public safety projects throughout Cobb County, as well as a new courthouse and jail expansion. Financed through a special purpose local option sales tax (SPLOST) that was approved by residents in 2005, the project was fast-tracked to show residents demonstrated results and completed projects resulting from their one-cent sales tax increase, or \$800 million investment through 2012.

Larry Terry, PBS&J's program manager for the Cobb County project, was excited when talking about the project's results to date.

"The challenge was to accelerate projects to show the residents of Cobb County value for their investment," Terry says. "And we have been able to do so by working as an extension of the Cobb County Transportation team."

Since 2006 construction of 120 projects has been completed. From road widening to intersection improvements and new roads to bridges, these projects have already added value in the form of improved traffic flow and decreased congestion. And ultimately, when the projects approach completion in 2012, construction and program management staff can move on to new assignments, eliminating the county's need to maintain permanent staff as well as the costs involved in doing so.

PBS&J is helping to improve traffic congestion in Cobb County by providing program and construction management services for the 3.1-mile (above) Post Oak Tritt road and bridge expansion and the (below) Hiram Lithia Springs Road bridge replacement projects.



More than Monetary Value in New Orleans

The damage to New Orleans and the gulf coast region caused by Hurricane Katrina in 2005 has been well documented. Fast forward to 2009 and the current status and shape of the region. Extensive work has taken place in the years since Katrina under the direction of the U.S. Army Corps of Engineers (USACE) to rebuild and fortify the region to a 100-year level protection by 2011. With a \$7.3 billion price tag, this is the largest civil works project in USACE history.

PBS&J is partnering with Louisiana-based Evans-Graves Engineering to help meet that goal through program management of the planning, design, and construction of the Hurricane and Storm Damage Risk Reduction System (HSDRRS).

Under the six-year contract, a four-pronged approach is being used to protect the Greater New Orleans area against a storm surge:


1. Fix and upgrade levees and flood walls.
2. Construct new permanent pump stations.
3. Prevent a storm surge from entering the inner harbor navigation canal.
4. Repair and storm-proof pump stations in Jefferson and Orleans parishes.



New Orleans, LA, August 31, 2005— A local pumping station remains deep in flood-water after Hurricane Katrina. -Photo by Celyn Augustino/FEMA

The sheer magnitude of the project, both in dollars and size, coupled with the ramifications if the project is not completed on time, makes this a critical program and construction management assignment.

"Providing well-trained and professional staff to help manage a multibillion dollar program of this magnitude is imperative," says PBS&J program manager Gasper Chifici. "And with the bulk of work scheduled to occur in 2009 and 2010, we will be helping to manage over \$4 billion of construction projects in a relatively short amount of time."

Measuring the value of providing program and construction management to USACE and their partners can be quantified in dollars and cents, but to the residents of New Orleans and the gulf coast region, the peace of mind this project will provide is invaluable. 



Arizona's METRO Makes History

What do the NBA All Stars, a United States President, and Kid Rock have in common? They have all made an appearance in central Arizona since the December 2008 opening of METRO light rail, helping to earn this new system a place in history with record crowds.

The public is familiar with Vice President Joe Biden's well-documented 30 years of round-trip train commutes, but now President Barack Obama has taken his place in rail history as well, when his May 13, 2009, Arizona State University commencement speech inspired a surge of 30,000 riders on the state's new transportation asset, the METRO. In mid-February throngs of basketball fans also put the system through its paces, relying on the METRO to deliver them to the highly attended NBA All Star games, and in April music lovers came out in force to be shuttled to a concert event headlined by Kid Rock. "For each of these events, thousands chose to use light rail and METRO delivered," says Hillary Foose, METRO light rail public information officer.

In fact, since its two-day grand opening, during which more than 200,000 people rode the system, it took only four months to hit the millionth-rider mark—proving that light rail is playing a significant role in the transportation system linking Phoenix, Tempe, and Mesa, Arizona. But there is more to the system than its ability to safely deliver masses of people to multiple destinations. The METRO is a multi-award-winning, technologically advanced, "polite" rail system. METRO has won multiple awards for its innovations, earning its place in the state's transit system history.

Clang, Clang, Clang Went the Trolley



Arizona is no stranger to rail transportation; it's just been a while since it was part of the state's regular commuter

transit offerings. The state's first rail service, the Phoenix Street Railway, ran from 1887 to 1948, evolving from horse-drawn carts to electric streetcars. On February 17, 1948, four months after fire destroyed most of the fleet of streetcars, the remaining Phoenix Street Railway trolley cars made their final runs. Eighty years later, car #116 helped to celebrate the rebirth of rail transit in the region, sitting proudly on display during the METRO grand opening.

Of course there are great differences between today's rail and that of car #116's day, not the least of which is METRO's use of embedded track. Embedded girder rail, while prevalent in Europe, is a relatively new method of light rail transit construction in the United States. Built without conventional ties, the rail is separated from the concrete street pavement structure by a rubber boot to isolate stray current from the traction power system.

Another remarkable difference is METRO's predictive priority signal system. Most modern light rail systems use preemptive traffic control systems that give trains absolute priority in intersections; however, METRO is much more "polite." It was implemented using a predictive system that continuously adjusts the timing of the lights in intersections where trains pass through so that motorists are not impeded.

This is accomplished with the use of embedded light rail transit detectors in the track, which signal the arrival and departure of trains at



intersections via a peer-to-peer communication network. Information from the train's location at a particular intersection is sent up the line a short distance to intersections along the route, so that the timing of the lights can be adjusted for the train's arrival.

But a reliable transit system that also uses the latest in transportation technology takes more than a wish and prayer to implement. It takes a skilled construction team and a closely monitored project schedule.

Smart Construction Management

METRO has been the recipient of no small amount of industry recognition and accolades. Including a 2007 Grand Award in Engineering Excellence from the American Council of Engineering Companies (ACEC) Arizona Chapter, presented to PBS&J/PGH Wong Engineering, Inc. Joint Venture, and subconsultant, Structural Grace, Inc. in recognition of smart construction management on the Tempe Town Lake Light Rail Bridge.

So how does a company implement smart construction management? According to Bill Bugge, construction project manager for the PBS&J/Wong Engineering, Inc. Joint Venture, it takes an experienced team and a reliable project tracking system. He says, "Our approach to the METRO project was to assemble the finest team for construction administration that we could. We were successful in bringing together a team of experienced light rail professionals from all over the country. We also used


PGH Wong Engineering, Inc.'s Construction Management System for the electronic tracking of our projects, which allowed instant update access for all current project information to all of the stakeholders."

The Construction Management Association of America (CMAA) defines construction management as applying effective management techniques for the purpose of controlling time, cost, and quality (www.cmaanet.org). Bugge reports that because of his team's approach the project was not only completed on time and within budget, but also exceeded the quality specified in the contract, and the safety record was unparalleled for its size and complexity.



Bugge cites one example where resident engineers and senior construction management looked beyond their limited constructability review area and saved the agency about \$30 million by implementing creative solutions to a water main replacement. He points out that partnering with contractors who are highly technical, dedicated to safety, and display excellent project management skills contributed to a successful build.

All Aboard!

METRO will span 57 miles and take 20 more years to build. But if the 19.6-mile starter line is any indication, Arizona's newest rail line is well on the way to achieving its mission of providing a premier regional rail system that enhances mobility and strengthens the viability of the community. 



METRO PROJECT AWARDS

The METRO project has received some of the industry's most prominent awards, including:

- Line Section 5 – The 2008 Best of the Best for Transportation projects by McGraw-Hill Construction, *Southwest Contractor* Best of 2008 Award for Transportation, and The Associated General Contracts of America (AGC) 2009 Aon Build American Merit Award for new highways.
- Line Section 4 – American Public Works Association (APWA) Arizona Chapter Project of the Year Award for 2008.
- Light Rail Operations and Maintenance Center – *Southwest Contractor (Arizona)* Best of 2007 for Best Project Management, Large Project; APWA, Arizona Project of the Year 2008; and the AGC, Arizona Build Arizona Award 2007.
- Tempe Town Lake Light Rail Bridge – *Southwest Contractor (Arizona)* Best of 2008 Award for bridges, and ACEC Arizona Engineering Excellence Awards 2008 Honor Award.



Photograph of Trolley Car #116 courtesy of The Phoenix Trolley Museum.



Delivering Project Success

With stimulus monies being distributed nationwide for construction of “shovel ready” projects as a result of the American Recovery and Reinvestment Act (ARRA), transparency, spending accountability, and project value are at the forefront of everyone’s thinking. Choosing the best project delivery method is key to getting projects successfully constructed while maximizing project value. Fortunately for owners and builders, many project delivery options are available.

The most commonly used project delivery method is design-bid-build, often referred to as the “traditional” method of project delivery. When owners select this delivery option, they are committing to extensive involvement from concept to concrete. They select and work closely with the project designer to develop plans that are then sent out to builders for bid. Builders will then bid the job based on the design, and once selected, will start construction.

“Consequently, if an owner’s knowledge is limited in any aspect of the project, mistakes can arise,” says Randy Larson, The PBSJ Corporation’s executive officer for construction. Misinterpretations, changing conditions, plan errors, and general constructability issues almost always result in elevated costs for the owner, with the possibility for claims and litigation.”

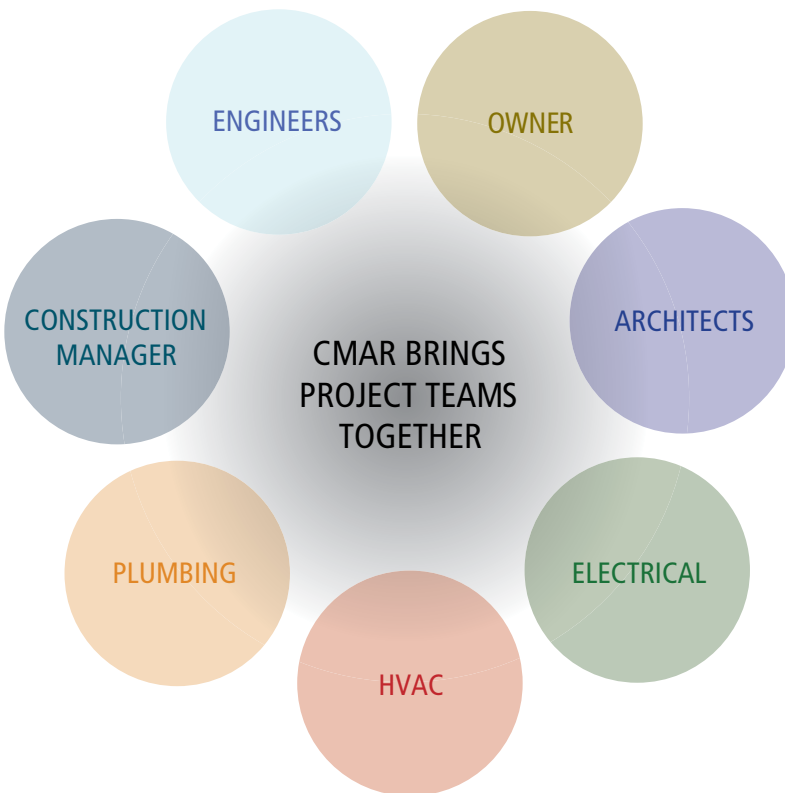
Design-bid-build is commonly used with public sector projects because it is more readily adaptable to current statutes and procurement policies.

Design-build is a procurement method where a single point of contact handles both design and construction. While owners can rely on an overlap of the design and construction phases to help reduce costs and meet deadlines, they must provide a clear understanding of what the project entails up front. More importantly they must be able to define their expectations in a scope of work—to mitigate misunderstandings that can lead to scope creep and additional costs.

Regardless of whether an owner chooses the traditional design-bid-build delivery method or the design-build

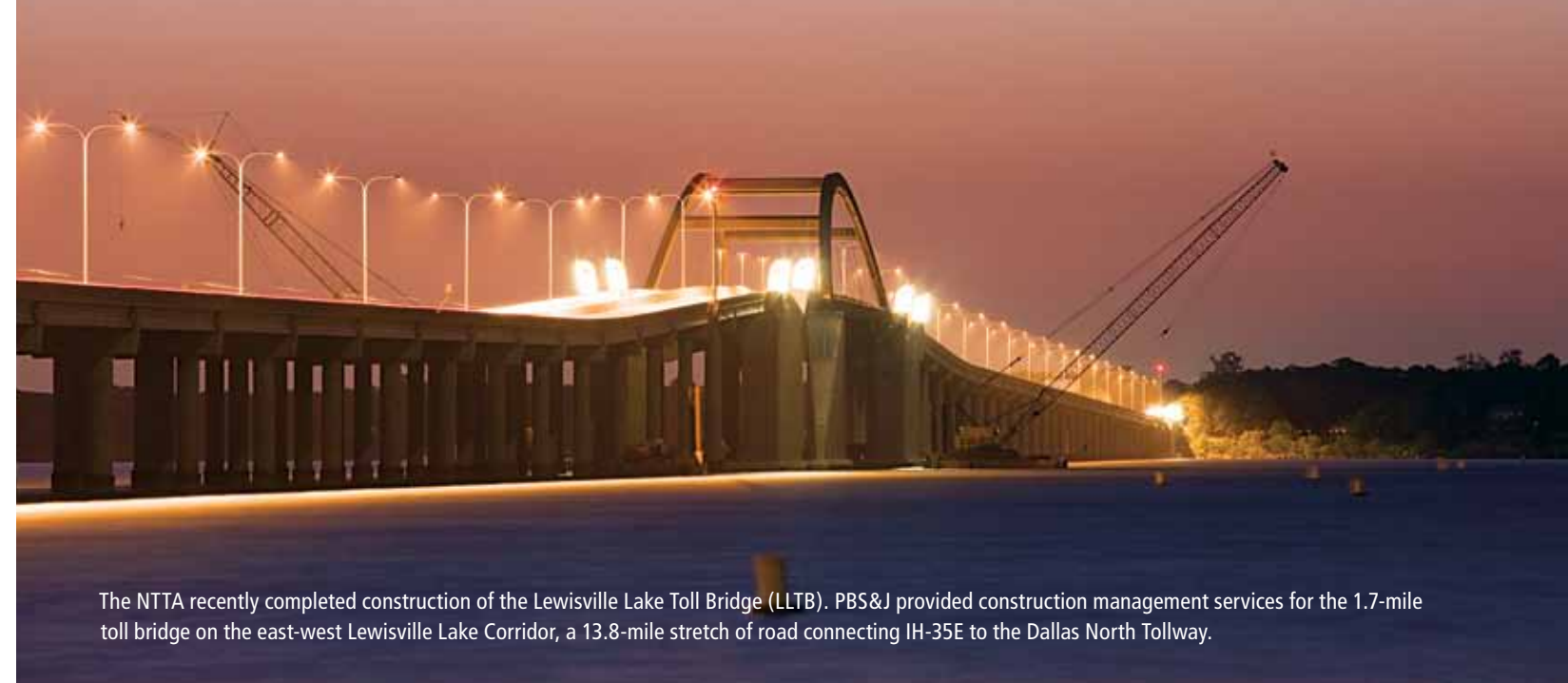
delivery option, the use of a professional construction manager, either from an in-house source or from an outside construction management firm, can help to improve project efficiency and cost effectiveness. A knowledgeable, certified construction manager (CCM) can play a key role in coordinating proper communication and defining project scope requirements.

An alternative delivery method that is widely accepted in the private sector and that is gaining acceptance in the public sector is construction management at-risk (CMAR). A CMAR firm works with the designer in the early stages of the project to determine project feasibility. Towards the end of the design process, the CMAR firm establishes and commits to a guaranteed



Some Project Delivery Options:

- **Design-Bid-Build**
- **Design-Build**
- **Construction Management At-Risk (CMAR)**
- **Integrated Project Delivery (IPD)**




The NTTA recently completed construction of the Lewisville Lake Toll Bridge (LLTB). PBS&J provided construction management services for the 1.7-mile toll bridge on the east-west Lewisville Lake Corridor, a 13.8-mile stretch of road connecting IH-35E to the Dallas North Tollway.

maximum price (GMP) for constructing the project, thereby, transferring the risk from the owner to the CMAR firm. If a project’s costs exceed the GMP through no fault of the owner, then the CMAR firm is on the hook for the additional expenses. If project management is inefficient, the CMAR firm’s bottom line takes a hit. And, throughout the project, a CMAR firm’s books must always be open, translating to complete transparency and a more efficient and cost-effective project for the owner.

Building on the CMAR method of procurement, integrated project delivery (IPD) can take construction to the next level when it comes to limiting risk and improving efficiency. This relatively new method of construction project delivery brings the owner, architects, engineers, construction manager, and principal trades (such as electrical, HVAC, and plumbing) to the table together on Day One—with each committed to the best interests of the project and assuming a certain level of risk up front. As with CMAR, IPD projects require open books, transparency, and information sharing with all project participants. This, coupled with a commitment by all parties to cooperation and accountability at the outset of the project results in better designs and cost efficiency. Larson speaks highly of the enormous success in using the IPD procurement method and the very real possibilities of extending it to future projects.

“With the principal trades teaming up to provide the best input on design, cost estimating, construction, and maintenance through the project’s life cycle, the costs and schedules for completing a project are established, resulting in virtually no change orders and the best value,” Larson explains.

With project teams established at the outset, IPD is well suited for projects in the private sector. Public sector projects are currently limited by certain bid requirements for distributing work, but amendments are in the works to make IPD accessible to the public entities at the federal, state, and local levels.

Regardless of the project delivery method chosen, the goal for every successful project is the same: to maximize project value and maintain cost accountability. With the wide variety of delivery options available to owners and builders, achieving these goals has never been easier. 



PBS&J provided design and CM services in support of the TxDOT Customer Service Center, a design-bid-build project.

Managing Construction on Texas Toll Roads

The Texas Department of Transportation (TxDOT) manages a significant number of projects as part of its plan to reduce traffic congestion, enhance safety, improve air quality, and expand economic opportunity. A key element in the success of all of these projects is the use of successful construction management techniques.

One recent project involved playing a fundamental role in the design and construction of the Central Texas Turnpike Project (CTTP) in Austin, Texas. A vast undertaking, the CTTP was a \$3.6-billion project that established the first toll facility and toll operations center for TxDOT and involved extensive coordination with TxDOT and its contractors to design the 65-mile toll system.

The three-pronged goal of the project was to improve overall traffic mobility, facilitate access to regional services, and increase travel safety for Central Texas residents, workers, and visitors. Recognizing the importance of toll roads as a safe transportation solution, TxDOT used private sector partners and financing options to accelerate project delivery. This alternative approach to project financing and construction was just one of the factors that contributed to the success of this project. Another factor that played a key role in the project's success was the use of effective construction management techniques to ensure that the project stayed on track and make certain that communication lines stayed open so that schedules and milestones were successfully met. Working closely with the Texas Turnpike Authority (TTA) on project management, project scheduling, performing construction inspections, and overseeing the work of a team of contractors to ensure quality construction with an emphasis on safety all contributed to the CTTP being completed under budget and more than a year ahead of schedule.

"We continuously strive to identify improvements to make both the construction and operation of toll facilities more efficient and cost-effective. Effective construction management provides our clients with better project controls, a smooth ride, good traffic management, and accurate tolling systems, while ensuring that quality projects are completed on time and on budget," says Rick Hurst, PBS&J senior program manager.




Construction management plays a key role on TxDOT projects throughout the state, including the construction of new toll roads, as well as conversions of older toll facilities to new technologies. The process is employed to manage the development of project segment supplements to address project-specific needs, including coordination with legal counsel on contract modifications, and coordination with TTA and the system integrator regarding any revisions or additions to the contract.

Inspections of tolling facilities and roadways are conducted annually and recommendations for improvements are made. For the CTTP alone this includes more than 50 buildings. TxDOT also relies heavily on its construction management to develop and review construction plans and provide oversight for projects in the close-out phase, ensuring that projects are not fully closed out until each and every punch list item is completed. In addition to overseeing construction inspections, daily reports are prepared and submitted to the clients for all significant activities during the construction period.

PBS&J designed and provided construction oversight for the CTTP. The firm also provided the same services for the TxTag Customer Service Center (CSC), a multimillion-dollar facility constructed to be the hub of toll operations for TxDOT and its tolling programs throughout Texas. As part of this effort, PBS&J oversaw the civil construction, equipment installation, and integration of the toll system on the project and ensured that the equipment installation requirements were met by the contractor in each

toll lane, at the host location, and at the CSC prior to formal acceptance of the system. Oversight included full integration with the CSC pursuant to interface control documents and system design documents.

Statewide, PBS&J also provides oversight on construction and construction management on other Texas toll projects, including North Texas Tollway Authority's (NTTA) conversion of the President George Bush Turnpike (PGBT) to all-electronic tolling in Dallas, and TxDOT's Loop 49 in Tyler and SH 255 (Camino Columbia Toll Road) near Laredo. Construction management in support of NTTA's conversion to cashless tolling included developing the tolling concept, the budget and schedule, oversight of the construction plans, toll system modifications, and conducting rolling roadblocks during installation of the final traffic controls and construction aspects.

As Hurst sums it up, "We are continually looking to enhance our methods and practices to help build toll facilities and operate them in the most efficient and cost-effective manner. By encouraging the use of innovative technologies and management techniques, we are helping TxDOT transform the way roads are planned, financed, constructed, and operated throughout the state." 

"...Effective construction management provides our clients with better project controls, a smooth ride, good traffic management, and accurate tolling systems, while ensuring that quality projects are completed on time and on budget."

—Rick Hurst, PBS&J senior program manager



As part of TxDOT's \$3.6-billion CTTP, PBS&J managed construction of the SH 45 & US 183 direct connector.

Gulf Boulevard: At-Risk, All Reward



Winding through a chain of barrier islands from Clearwater to St. Pete Beach on Florida's Gulf Coast, Gulf Boulevard (SR 699) is the only north-south roadway serving the seaside towns of Indian Shores and Indian Rocks Beach. In October 2007 the Florida Department of Transportation (FDOT), Pinellas County, and the City of Indian Rocks Beach joined forces to make a three-mile section of this scenic beachside thoroughfare safer. What resulted—the \$23.6-million Gulf Boulevard Roadway and Utilities Improvement Project—was not your typical roadway reconstruction effort.

In effect, the effort combined three projects into one: Pinellas County Utilities' reclaimed water project, the City of Indian Rocks Beach's sewer line project, and FDOT's Gulf Boulevard roadway improvement project. The challenges were great. Multiple stakeholders used three different design engineers, owners had different priorities, and the project faced funding constraints. Further complicating matters, reconstruction had to take place within a fraction of the usual right-of-way and involved several complex and interconnected phases.

Yet the Gulf Boulevard renovations were completed \$1.4 million under budget and a remarkable 63 days ahead of schedule. How was this possible? Perhaps this road story is less about concrete and asphalt, and more about management—construction management, that is.

Challenges on the Road Ahead

Gulf Boulevard was the first roadway project in the nation to be partially funded by the Federal Highway Administration (FHWA) and built using a construction management at-risk (CMAR) delivery method. CMAR involves a firm assuming financial responsibilities and risk similar to those of a general contractor. Although CMAR is a common delivery method for building construction, it is rarely used in the roadway industry, where the design-bid-build process prevails, and had never been used on a federally funded roadway project.

As the construction manager at-risk for the Gulf Boulevard improvements, PBS&J Constructors managed the entire construction process, including subcontractor selection, project schedule, and safety program. The project's various elements included roadway paving, new shoulders with bike and walking paths, utility upgrades, a new storm drainage system, and seawall reconstruction.

Both sides of Gulf Boulevard are lined with single-family homes, apartments, condominiums, and businesses—to the tune of 243 private and commercial driveway connections. Construction had to be completed within a very limited 40-foot-wide right-of-way, while maintaining safe and efficient traffic conditions for motorists and thousands of beachgoers on foot and bicycle.

From a user standpoint, the single most important consideration was schedule. "During any road construction project, noise, dust, and traffic delays can be a constant headache to residents, and since Gulf Boulevard bisects a popular beach resort, traffic delays and detours could mean fewer customers for business owners," explains Ray Simpson, PE, CCM, CGC, one of the project managers for PBS&J Constructors. "The project team recognized early on that any reduction in construction duration would translate into major success for the project."

Seeking Solutions

To help save both time and money, PBS&J Constructors' CMAR process relied heavily on innovation at nearly every turn.

For example, much of the sanitary sewer system in the city of Indian Rocks Beach needed to be repaired, but open-cut installation of underground utilities is expensive and time-consuming. Since the city did not have funds available to replace the entire system, PBS&J Constructors opted for an alternative solution based on cured-in-place pipe lining. This allowed the leaking pipe systems to be restored without the expense and disruption of constructing a new system.

In another instance, an expensive and complicated soil stabilization process that had initially been incorporated into the design of a seawall along the "Narrows" was abandoned in favor of an alternate tie-back anchor system.

The result: easier installation and \$1 million in savings for FDOT.

Value engineering (VE) was also used as a catalyst for cost savings and efficiency. The original design called for a closed drainage system with retention ponds; the VE team called for a complete redesign of the drainage system to eliminate the traditional use of concrete curbs and gutters.



The new design incorporated the use of permeable asphalt, which allows runoff to drain through to the subsurface where it is trapped and piped to sewer drainage systems. This process also provides for better filtration, and thus, increased removal of pollutants from runoff.


It wasn't all about technology, however. The original plans called for the roadway to be completely reopened to traffic each night. PBS&J Constructors introduced an innovative traffic control plan that included the use of onsite flaggers to direct traffic to one lane on a 24-hour basis. This method slashed 540 days from the construction schedule and saved hundreds of thousands of dollars.

And to better meet the community's needs, the construction management team worked with the city and agency leaders to create a designated fishing area, providing safe access to local anglers who used the seawall area as a fishing hole. If the project had used a design-bid-build delivery system, this process would not have been possible, and adding access during construction would have resulted in a change order.

The Case for CMAR

The original project schedule, as presented by the engineer-of-record, called for a construction duration of 1,200 calendar days. Had the project been implemented as design-bid-build, the timeline would have remained unchanged, and the project may not have gone forward due to funding issues.

"The CMAR method allowed us to solve issues more efficiently, as well as offer more innovative solutions to meet this project's unique challenges," says Gene Tharpe, PE, CCM, superintendent for PBS&J Constructors. As a result of these measures, construction was trimmed to just 660 days, cutting one valuable tourist season from the schedule. "And faster project delivery meant happier residents, business owners, tourists, and government officials all around," says Tharpe.

Its unconventional CMAR delivery method may have made Gulf Boulevard a project of firsts, but its success reflects CMAR's potential as a construction management strategy in the roadway industry. Stakeholders may find CMAR the key to enhancing the construction process, encouraging innovation, and speeding up project delivery without compromising safety or quality. 

The CMAR project delivery method helped keep traffic moving on Gulf Boulevard during heavy construction.





Larry Boatman



John Classe Jr.



Steven Davis



Edie Lohmann



Michael Marso



Kameran Onley



Yong Song



Eugene Wright



PBS&J PEOPLE NEWS

LARRY BOATMAN | Orlando, Florida | Transportation

Boatman has been appointed transportation deputy national service director responsible for the company's transit, aviation, tolls, intelligent transportation systems, and structures national business sectors. A PBS&J employee for more than 20 years, Boatman is a senior vice president and member of PBS&J's Transportation Executive Committee. He has a master's degree in urban planning from Florida State University and a bachelor's degree in business administration from Georgia State University.

JOHN CLASSE JR., PE | Orlando, Florida | Facilities

Classe has rejoined PBS&J as regional business sector manager for southeast engineering. He will direct the activities of our civil engineering groups in Florida, Alabama, and Mississippi, and he will also share leadership of PBS&J's private and urban development market initiatives. Classe has 25 years of experience in civil engineering and real estate development, and he holds a bachelor's degree in civil engineering from Auburn University.

STEVEN DAVIS | Marietta, Georgia | Peter Brown Construction

Davis will serve as a senior project manager for Peter Brown Construction's federal construction division. His 16 years of experience include managing the design, permitting, and construction of large military, education, hospitality, residential, and mixed-use developments throughout the United States. Davis holds a bachelor's degree in architectural engineering from the Southern College of Technology.

EDIE LOHMANN, CFM | Roseville, California | Water

PBS&J's water service has added Lohmann as a senior project manager. With more than 23 years of experience in project management, government relations, and insurance policy operations, Lohmann also specializes in marketing, outreach, public relations, and education for FEMA's National Flood Insurance Program. She earned an M.B.A. from Saint Mary's College and a bachelor's degree in management and international business from Arizona State University.

MICHAEL MARSO | Harrisburg, Pennsylvania | Transportation

As transportation division manager, Marso brings more than 29 years of experience in construction management and inspection, design, and environmental services, which he has applied to various projects located throughout Pennsylvania, West Virginia, and Ohio. He comes to PBS&J after 19 years with another large engineering firm, where he most recently served as vice president of the company's northeast division and principal-in-charge of major transportation projects.

KAMERAN ONLEY | Alexandria, Virginia | Federal

PBS&J's federal services division welcomes Onley as a principal project director. Her 16 years of experience include significant contributions to the environmental industry and federal government. Her impressive public service record includes, most recently, serving as the Acting Assistant Secretary for Water and Science at the U.S. Department of the Interior. Onley holds a master's degree from Clemson University in economics and a bachelor's degree in economics and minor in biology from Seattle University.

YONG SONG, PE, CFM | Denver, Colorado | Water

Song has been named PBS&J's group manager for Colorado water resources. He has 18 years of professional engineering and project management experience in water resources, storm drainage, flood control, and other related water practice fields, with a focus on the western United States. Song earned his bachelor's degree in civil engineering from the University of Nevada, Reno, and is a registered professional engineer in California, Colorado, and Nevada.

EUGENE WRIGHT, PE | Henderson, Nevada | Facilities

Wright brings more than 30 years of engineering experience to his new role as senior facilities group manager, including extensive management experience in the Las Vegas area. Prior to joining PBS&J, he was executive vice president of another major engineering company, where he served as the master plan engineer for a number of high-profile developments. He earned his bachelor's degree in civil engineering from the University of Utah.



STARR Consortium to Support FEMA's National Flood Program

The Federal Emergency Management Agency (FEMA) has awarded a five-year, \$600-million contract to a consortium of four engineering firms—PBS&J, Greenhorne & O'Mara, CDM, and Stantec—to support the agency's massive risk program. The goal of FEMA Risk MAP is to provide reliable, easy-to-access digital flood risk data that can be used by communities to better assess and plan for flood damage throughout the United States.

The four firms are working together in a joint venture called the Strategic Alliance for Risk Reduction (STARR). As part of the Risk MAP team, STARR will collaborate with FEMA, states, communities, and other organizations to better define and communicate flood risks in critical areas throughout the nation.

Don McEvoy, vice president at PBS&J, states, "We are proud to be a part of this important next step in FEMA's efforts to minimize losses caused by floods across the country."

PBS&J Helps Explorer Elementary Science Program

PBS&J recently presented a \$5,000 check to the Explorer Charter Elementary School in San Diego, California. The funds will be used to assist the Explorer Elementary Science Program, including the purchase of seven FOSS science kits for use in kindergarten through fourth grade. The skills learned through the science program will help plant the seeds for future engineers and scientists.



The FOSS science curriculum is inquiry-based and hands-on. Some of the content areas included in the kits for younger children are air and weather, balance and motion, solids and liquids, and insects and plants. For older children, topics include magnetism and electricity, the human body, and the physics of sound.

"I am delighted to have this opportunity to support my community and help promote science to children at such a young age," said PBS&J division manager Joseph Smith. Funding for the donation was provided through The PBSJ Foundation, Inc.

CURRENT NEWS

PBSJ Welcomes Poll as EHS Director



Bob Poll, CIH, CSP, has joined The PBSJ Corporation to direct and further enhance our Corporate Environment, Health, and Safety (EHS) program. He will draw from more than 23 years of global EHS management experience to oversee the corporate-wide programs that help protect the health and safety of our employees.

Poll joins PBSJ after serving nearly 19 years in various EHS management positions with Earth Tech, Inc. (AECOM), where he most recently was the northeast region EHS director. He is certified in the Comprehensive Practice of Industrial Hygiene by the American Board of Industrial Hygiene and the Comprehensive Practice of Safety by the Board of Certified Safety Professionals. He is located in the company's Tampa headquarters.

New Sustainable Design Group Launched



To further grow the company's "green" building services, PBS&J recently established a new sustainable building design group focused on meeting our clients' sustainability goals.

This national practice offers a dedicated project management team to guide clients through the process of building

for U.S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED®) certification, energy modeling and simulation, and building commissioning.

The new team is made up of individuals carefully selected for their experience, skills, and passion for sustainable urban development and energy-efficient building practices. Leading the initiative is **Vince Briones, PE, LEED AP**, senior group manager. Briones has

more than 13 years of experience as a professional engineer and has an expert understanding of the design and construction process. He has diverse experience on over 30 LEED projects including two of Florida's first LEED-certified buildings.

Additional engineering staff members include Rachel Cook, PE, LEED AP; Kellie Watson, EI, LEED AP; and Kimberly Walton, EI, LEED AP. The group is based in PBS&J's Orlando, Florida, office.



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Hays County YMCA

Client: YMCA of Austin, Texas



This \$5.6-million YMCA of Austin recreational facility involved a full range of architectural services. The 28,000-square-foot facility is the centerpiece of a 78-acre sports park that includes soccer and baseball fields.

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