A Case for Precast Concrete Buildings

Shorten Construction Schedules, Harden Security and Lower Costs at Water and Wastewater Facilities

What are Easi-Set Buildings? Solutions - one building to entire complexes.

Easi-Set and Easi-Span Precast Concrete Buildings are ideally suited for a multitude of uses in water and waste water facilities. Our licensed producers have worked all across North America installing single buildings, as well as working on design build teams to complete entire complexes. Our buildings can be customized to exacting specifications and to accommodate large equipment, tanks, and piping, or even installation around existing equipment. These durable precast concrete buildings are resistant to almost any degree of inclement weather, vandals, fires, blasts and UL 725 Level 5 ballistics. We can even design your building to withstand corrosive environments and chemicals, or for placement on piers in flood prone areas. Anything you want to keep out, stays out.

Pre-Engineered - Minimal Site Preparation - Delivered To Site Ready To Use - Maintenance Free - Durable - Sustainable

Pump Stations • Well Houses • Lift Stations • Headworks • Belt Filter Press • Blowers • SCADA Boiler • Solids Processing• Reverse Osmosis Water Treatment • Meter Pit • Methanol & Chemical Storage • HazMat Containment • Generator Buildings • Operations and Control Buildings • Restrooms • Labs • Offices • Maintenance Buildings • Equipment Shelters • Storage & more

Introduction

The quality of life of every American relies in part on a well-maintained municipal or private drinking water infrastructures and wastewater treatment systems which are critical for public health, economic growth, and clean rivers and aquifers. The U.S. faces a growing funding gap as we try to keep up with the rehabilitation, operation and maintenance of aging water and water treatment infrastructures. The directive from water and wastewater treatment owners to consulting engineers, corporate managers, government administrators, operators in the municipal market and industrial system authorities is a simple one, continue to find new ways to build new facilities and operate our outdated, overextended wastewater infrastructure while much-needed maintenance continues to be deferred and systems reach the end of their useful lives. This paper offers solutions that partially offset the lack of available funding.

Financial Challenge

Up to now American households and businesses have never had to contemplate how much they are willing to pay for water if it becomes hard to obtain. The diamond-water paradox was proposed by economists in the 1800s as a means of understanding the role utility plays in the demand price of a good by differentiating between total utility and marginal utility. The paradox is that although water is much more central to life than diamonds, diamonds are more expensive than water.

Water infrastructure is distinct in its commitment to public safety. If the transportation infrastructure breaks down, travel will be slow and the slowdown will mean that businesses and households will incur costs, but will still be able to get to their destinations. Water if it is not available, essential life activities cannot be sustained. Although water may be conserved, it must be obtainable.

Capital spending has not been keeping pace with needs, and if these trends continue, the resulting gap will only continue to widen. With budget cuts, growing operating costs and regulatory pressure rising, municipalities will be pressured to find ways to gain public support to attract water investment. As a result new facilities required to meet stringent environmental goals will be delayed, operations and maintenance are projected to become more expensive and municipalities will continue to test their resilience. Funding to close the gap can come from multiple sources. Federal grants and loans have played crucial roles in building water infrastructure over the decades. Federal funding is not the only answer; since the mid-1970s, money from local and state governments has represented an increasing percentage of public drinking-water and wastewater investment. Whether a system is government owned or private, households and businesses still ultimately foot the bill.

Blueprint for Action

Cost Effective Solutions

There are a variety of solutions to partially offset the lack of available funding, implement systems expansions and prolong the performance life of the decaying assets. One strong measure includes improving construction efficiency and cost-effectiveness with the use of precast concrete products such as Easi-Set® and Easi-Span® Buildings, J-J Hooks® Safety Barriers and SoftSound® absorptive noise technology. Easi-Set® wide range of industrial grade products, are designed to stand up to the rigorous demands found at water and wastewater treatment facilities.

Easi-Set® precast concrete products offer compelling advantages in terms of quality, cost, durability and environmental impact with higher quality and uniformity being the result of production in a controlled casting environment, shorter schedules not affected by weather and faster jobsite installation.

Building Enclosures

Easi-Set® Precast Concrete Buildings can be delivered pre-assembled and fully outfitted at the factory or as separate walls, roof and floor panels and assembled on-site. Applications for water and wastewater treatment plants can be as electrical switching stations, transformer housing, pump stations, control shelters and valve enclosures, chemical storage tanks, reduced pressure zone and water meter enclosures, hazardous materials storage, equipment shelters, offices, maintenance and much more.

Water and wastewater projects especially in urban areas face a number of challenges. Buildings often need to blend into the existing neighborhood architecture, colors and textures and require the use of privacy screen walls and/or noise reducing walls. Easi-Set® Buildings can be tailored to meet endless design possibilities. Easi-Set® Buildings sizes are available and can range from 10 feet by 12 feet to 12 feet by 20 feet. Easi-Span® Buildings are available in clear-span widths of 20', 30', 40' and 50' with lengths up to 250' (in 10' increments). Building heights are available from 9' to 35' (the largest, pre-engineered, transportable precast concrete building in the industry). Both Easi-Set® and Easi-Span® Buildings are available in variety of custom-finished exteriors.

The advantage of efficient customization of the Easi-Set® Buildings offers a cost savings as well. The buildings cost significantly less than comparable built-in-place construction and can be easily relocated as requirements change. The installation of an Easi-Set® Building also saves time, allowing the site to become operational more quickly. With a built-in floor, no foundations or footings are required, unless by local code. A level six-inch layer of sand or crushed stone on an approved sub-grade is all the preparation required. They are produced by local manufacturers throughout North America, and can be transported to the site and installed in as little as a few hours. In addition to the cost and customization advantages, Easi-Set® Buildings are also very durable. A special post-tensioned roof and floor design provides superior water-tight construction. Buildings will not warp, rust, corrode, rot or burn and retain their finish without maintenance. Heavy-duty construction features galvanized insulated doors; vandal-resistant steel reinforced precast concrete construction, tamper-proof hinges, stainless steel window frames and deadbolt locks. Buildings are bullet resistant, fire resistant and earthquake resistant; with a seismic zone 4 rating. They are able to withstand wind loads of up to 165 mph.

Easi-Set® Hazmat Buildings offer customers unparalleled value and the flexibility needed to meet today's stringent requirements. The buildings are well-suited for both wet and dry hazardous chemical storage and more. All buildings also feature non-corrosive, 90-minute fire-resistant doors. Buildings designed for wet storage have galvanized or fiberglass grates raised six inches above the floor's surface to contain liquid spills. They also contain a sump sized to contain 33 percent more liquid than the building's drum storage capacity. Optional features include static grounding systems to prevent sparks which would lead to a fire or explosion hazard, epoxy coatings, interior climate controls to ensure a stable environment, explosion-proof lighting and electrical systems, fire protection systems, custom explosion-relief panels and much more.

Noise Reduction/Privacy

SoftSound® is a fully tested, proprietary, superior sound absorptive technology. Environmentally friendly, 100% recyclable and can be molded and compressed to suit the customer desired technical and aesthetic requirements. SoftSound® combines specialized components and wood-chip aggregates with cement as a binder. SoftSound creates a material that surpasses any other combination of sound absorption, durability, thermal, strength and moldability. It has been subjected to independent testing for Noise Reduction Coefficient (ASTM C423), Freeze Thaw (ASTM C-666), Salt Scaling (ASTM C-672), Flame Spread (ASTM E-84), Sound Transmission Loss (ASTM E-90) and Modulus of Rupture (170 psi minimum).

Among the potential nuisances which arise in connection with wastewater treatment plants are noise and visual impact. Potential noise sources are mechanical equipment such as blowers, compactors, pumps, generators, etc. As a noise wall barrier treatment method, SoftSound® is very adaptable to its surroundings. Originally was introduced as a highway noise barrier. It can be designed to limit a wide range of outdoor noises. Water or wastewater treatment facilities, when placed in urban locations, SoftSound® serves as excellent noise reduction and/or privacy screen walls, while blending into the existing neighborhood architecture, colors and textures. Another use under development for water or wastewater facilities is the application of SoftSound® to the interior of precast industrial grade buildings housing noise generating equipment.

Security

In addition to the scarcity of resources needed to operate a well-maintained municipal or private drinking water plants and wastewater treatment facilities, in the post 9/11 period, utility managers at water and wastewater treatment plants are being challenged by having to also provide resources to assess, secure and protect their facilities in both physical and biological aspects. Easi-Set® products have also value-added benefits.

The Easi-Set® Precast Concrete Buildings as the result of being produced and outfitted off-site, limits both personnel & vehicle vulnerabilities arising from entry/access control at the water and waste water facilities. Construction/installation schedules in most cases require from a few hours to a few days, reducing the need for on-site construction personnel and construction vehicles, thus making significantly easier to manage and control these security issues.

SoftSound® walls not only serve as noise reduction and/or privacy screen walls, they can also be used as effective physical security measure. Walls can be produced to various heights as required and are maintenance free.

The J-J Hooks® Bolt-Down or Pin-Down Safety Barriers provides water treatment facilities with expanded entry control security capabilities. The J-J Hooks® Bolt-Down is a proprietary Bolt Assembly and Adhesive precast barrier anchoring system. It meets FHWA MASH, Test Level 3 (Test vehicle impact angle 25 degrees, impact speed 62.5mi/h and vehicle type designation 2270P – pickup truck 5000 lbs.). The J-J Hooks® actual test result was only 4" Static Deflection. It allows easy installation with only two bolts and easy removal of barriers without flame cutting bolts or damage the deck (bolts are reusable). The J-J Hooks® Pin-Down is a proprietary Pin Assembly precast barrier anchoring system. . It meets FHWA MASH, Test Level 3 (5 ½" Static Deflection). It allows easy installation with only three pins and easy removal of barriers without flame cutting pins or damage the deck (Pins are reusable).

Conclusions

Decaying facilities and the related funding gap remain unresolved. There has been a lacked sense of urgency to revamp funding mechanisms, while regulations continue to impose substantial obligations and cost on facilities. We must unlock the consistent capital flow required to implement the necessary new construction, expansion and rehabilitation of our facilities.

The number of available solutions continue to grow, but to get value for the money to be invested it is crucial to look ahead. Water and wastewater treatment companies, regulators and consumers must

consider re-pricing the value of water, revamp the procurement process and update building codes to enable investment in efficiency focused products and services. Easi-Set® precast concrete products offer compelling advantages. Greater use of Easi-Set® precast concrete prefabrication, preassembly, modularization and off-site fabrication techniques offer the opportunity to lower project costs, shorter schedules, improved quality and more efficient use of labor and materials. There are growing market signs of interest in Easi-Set® precast concrete products solutions proven to be effective.

Easi-Set®and Easi-Span® Buildings also have a significant market advantages in that they are manufactured throughout the USA and Canada by local producers in NPCA certified precasting facilities under license agreements with Easi-Set Worldwide. We are the only brand to offer easy clean-out wall to floor cove details, a patented roof and floor post-tensioning system, stainless steel assembly connector plates, window detail with stainless steel frame and multi-unit monolithic roof and floor designs. Alternative energy sources such as solar are offered as options. Our products are made from locally available materials, recyclable, surprisingly Green and LEED friendly.

Easi-Set Worldwide was created for one purpose – to expand our reach in the precast industry by investing heavily in product development and bringing new innovative products to market.

Easi-Set Worldwide sees itself as a key sector participant in exploring, developing and providing a wide range of innovative opportunities for maximizing the use of its precast concrete products for use in water and wastewater treatment facilities. We are a service-oriented company; please contact us to discuss your needs. 1-800-547-4045. www.easiset.com

www.EasiSetBuildings.com

Case Study One

Pump Station Installation: The Cost and Time Savings of Precast Concrete Buildings

When the timeframe for the project was too short for traditional construction methods to meet, the San Jacinto River Authority (SJRA) turned to a precast concrete building solution for their pump station install in Baytown, Texas.

The new transfer pump station was needed because the Chevron-constructed facility in Baytown required more water for its operations. The new station has to pull 16.5 MGD from the Coastal Water Authority canal and pump it into the SJRA canal.

The original specification was for a large concrete masonry unit (CMU) building. Houston contractor Boyer Inc. was the low bidder on the project, but its bid was still over budget. Through SJRA-initiated value engineering, Boyer offered an Easi-Span Precast Concrete Building as an alternative after determining CMU could not be constructed in time or on budget.

Nathan Davis, a project manager for Boyer, says the building was an easy aspect to quantify. "There were not only savings on the front end for cost of the structure, but there were savings on the backend with the reduced time from pouring the slab to setting the roof panels that allowed Boyer to reduce overall construction time, labor and equipment costs for the project."

Easi-Span Buildings are unique to the industry because they utilize clear-span precast concrete roof sections from 20' to 50' in width. Each 10'-deep roof section is post tensioned to adjoining sections, allowing for buildings of virtually unlimited length to be manufactured.

Two Easi-Span Buildings, 40' x 40' x 16' and 30' x 60' x 20', were needed to house all the pump station equipment. The buildings were manufactured and installed by Lonestar Prestress Manufacturing Inc., Houston. Lonestar, a licensed producer for Easi-Set Worldwide products, works directly with customers to meet individual needs and ensure quality standards are met.

"Boyer was able to propose the use of the precast concrete buildings as a value engineering solution because it has worked with SJRA in the past and knew the building owner's project goals," says Leo Rowe, sales manager for Lonestar. "We were able to add our experience and expertise to Boyer's ingenuity to meet the project schedule and budget."

Easi-Span Buildings allowed Boyer to finish the main slab and begin installing critical electrical gear in less than two weeks. "This included prepping and pouring the slab, installing walls, setting roofs, and caulking the walls and roof panels," Davis notes. "The offsite fabrication of the wall and roof panels was timed so that once the slab was poured and cured we could set the panels."

If the owner had stayed with the original CMU design, Davis believes it most likely would have taken at least three months before the critical work for the pump station could have started.

The interconnected buildings have different functions and customizations. The 30' x 60' area houses two large pumps with an additional section for a future pump. The building was customized with two large roll-up doors and three large roof hatches so the pumps can be removed and replaced as needed in the future. The 40' x 40' building houses two rooms for electrical equipment.

Case Study Two

A Repeat Customer: Finding Value in Precast Concrete Buildings

Among the Civil War history and rolling hills of Culpeper, Va., is an active and growing community. City officials recently set out to accommodate this growth by improving the town's waterlines and expanding its well system. The city repeatedly has turned to Easi-Set Buildings for various projects over the years, and it again found its solution in precast concrete structures. This time, Midland, Va.-based Smith-Midland Corp., an Easi-Set Buildings licensed producer, manufactured and installed two completely customized Easi-Span Buildings for well/water treatment buildings.

Three ground water wells were added to the sites, working at a capacity of about 200 gallons per minute. The new precast concrete buildings that house the well equipment are 20' x 50' x 12' and 20' x 60' x 12', with the second being slightly larger to accommodate a laboratory. The well/water treatment buildings were customized with multiple small rooms that were created by precast partition walls. Rollup doors were added to provide easy equipment access and larger clearances. Each building was installed in less than a week.

This is the first time the contractor has worked with Easi-Set Buildings, and the project manager says: “Everything went great. The buildings look great and everyone was so easy to work with.”

Easi-Span Buildings are the largest clear span all-concrete building system on the market, in addition to being the only expandable concrete building system. The buildings are completely customizable with many finishes and colors. Pre-cast concrete buildings are ideal for water treatment facilities because of their strength and reliability. They are weatherproofed plus fire, windstorm, earthquake and ballistics resistant.

Smith-Midland has a long-standing relationship with Culpeper, completing about 10 building installations with them. “We work hard to exceed our client’s expectations, and customers regularly come back to us,” says *George Sharikas, sales manager for the utility products division with Smith-Midland.* “We’ve worked with the town of Culpeper for years, and we are excited to do even more with them.”

Later this summer, a restroom building and electrical building will be installed by Smith-Midland at one of the water treatment sites to complete the expansion.

Case Study Three

Flood Conditions Impact Pump Station Design

Project Name: Kauffman Ave. Pump Station, Fairborn, Ohio
Owner: City of Fairborn, Ohio
Easi-Set Licensed Producer: Norwalk Concrete Industries
Building Use: Pump Station Equipment & Generator Building

THE CHALLENGE
The Kauffman Ave. Pump Station, in Fairborn, Ohio was two years in the making. What seemed like a straight-forward pump station equipment and generator building became more complex when the City of Fairborn confirmed that, due to its location in a flood-prone area, the building had to be designed to allow only 2 in. of water seepage in any 24-hour period. In addition, they required a 5-year warranty. Norwalk Industries (NCI), an Easi-Set licensed producer, worked with Easi-Set, Concrete Sealants and PS doors to come up with a solution that was within

budget yet still met specifications and building code requirements for anchoring the building and for dry, flood-proof design. “The design itself was a challenge because we had never attempted a building with these characteristics,” says Robb Smithson, the NCI project manager and engineer. “Some products required long lead times so decisions had to be finalized early in order to meet deadlines.”

THE SOLUTION

The 77,300 lbs precast concrete building is 12-ft wide x 20-ft long x 11-ft tall. It is insulated and includes an upgraded electrical package. Not conforming to industry standards, it includes a flood-proof, water-tight door and special anchoring to withstand flood waters. Atop the roof rests a 4,100-lb generator.

“We came up with a detailed plan of action,” says Scott Kinnamon, salesman for NCI. “We collected details and ideas and put everything on paper so everyone involved understood what needed to be done and when.” Criteria changed several times throughout the project. Several components, such as the inclusion of the generator on the roof, forced mid-stream design changes. “We had to design a roof that would meet code criteria for slope and weight loads,” Smithson says. “After the roof was poured we decided to add another slab for the generator. At times we tested the limits of frustration but in the end came through with a great product for the owner.”

Photo captions: The 77,300 lbs. building was designed for flood conditions up to 5 ft 6 in. and includes a flood-proof water tight door. It supports a roof-mounted 4,100-lb generator.

Case Study Four

Building Codes and Budgets Converge

Project Name: North Fork Regional Pump Station
Owner: Albemarle County Service Authority, Virginia
Easi-Set Licensed Producer: Smith-Midland Corporation
Building Use: Pump Station

THE CHALLENGE
To design a pump station that not only met tight budgeting and scheduling requirements, but also adhered to strict building appearance codes to conform to the guidelines of the gateway zone they are located in on the major approach road into historic Albemarle County.

THE SOLUTION
As part of the $10.7 million North Fork Regional Pump Station project, Virginia's Albemarle County Service Authority (ACSA) demolished the existing Camelot Wastewater Treatment Plant and their Research Park pump station. The construction of two remotely located regional pump stations replaced the out-going stations. The two are located across from each other on the

busy Route 29 divided highway and are joined by 1,500 ft of 12-in. force main. Each pump station includes emergency standby generators, instrumentation and SCADA systems.

ACSA met their budget in part by specifying an Easi-Set precast concrete transportable building. The design called for a brick finish with a metal standing seam roof. Cost-savings in materials were achieved by using an Easi-Brick™ grid in the Easi-Set licensed producer Smith-Midland Corporation's precast plant to simulate brick on the 10 wall panels that comprised the 20-ft x 30-ft buildings. This method also produced savings by removing the cost of on-site masons. The design also called for a non-standard height of 13 feet. The use of 13-ft-high precast wall panels simplified construction and eliminated the use of a knee wall. Delivery and assembly of the wall and roof panels was completed in only two days, saving weeks over on-site construction methods.

Photo caption 1: Precast concrete transportable buildings allowed Virginia's Albemarle County Service Authority to meet a tight budget while adhering to strict building code guidelines.

Photo caption 2: The two pump stations provide emergency standby generators, instrumentation and SCADA systems.

Case Study 5

An Easi-Span Building Becomes an Updated Spray Aerator for a Town's Water Supply

Buildings often are looked at for what they contain, not for what they are. This spring, an Easi-Span Building became a spray aerator for the residents of Carpentersville, Ill. This new system replaced one that was constructed in the 1960s and improved over the years but had reached the end of its useful life. The Carpentersville's water treatment system consists of aeration, filtration, ion exchange softening, chlorination and fluoridation.

"The upgraded aerator has two parts—the internal items that distribute the water so it can absorb oxygen from the air and the exterior structure that encloses internal items and protects the sanitary condition of the water inside. So the Easi-Span Building does not enclose or house the aerator; it is an integral part of the aerator," explains Harry D. Harman P.E., senior project manager with Crystal Lake, Ill.-based Baxter & Woodman Inc., the project engineer.

The Easi-Span Building was manufactured by an Easi-Set Worldwide licensed producer—McCann Concrete Products Inc., Dorsey, Ill. McCann Concrete Products is one of 70 licensed producers of Easi-Set products in 10 countries. The producers, who work directly with customers, are trained in their own facilities to manufacture their specific licensed products. McCann Concrete Products worked with Baxter & Woodman and general contractor Boller Construction, Waukegan Ill., to bring Carpentersville this up-to-date technology.

"The existing aerator was installed in the 1960s and could no longer be maintained," Harman says. "Also, the aerator did not have the capacity to meet the needs of the village. Spray aerators for iron removal are a relatively easy design but not commonly thought of first by most engineers. The design criteria of common aerators is complicated. The design criteria for a spray aerator is simple, lower profile and easy to control."

The previous aerator was constructed of redwood with metal siding. Although the siding lasted, the interior redwood structure had begun to deteriorate. The village wanted a replacement structure that was strong and long lasting. A precast concrete building provided the right characteristics—a long lifespan, low maintenance, appealing appearance, cost competitiveness and ease of installation.

A 20' x 20' x 8' Easi-Span Building was selected. Easi-Span Buildings are the largest clear span all-concrete building system on the market, in addition to being the only expandable concrete building system. The aerator building has a simple broom finish texture on the exterior with a white exterior concrete stain to match existing buildings onsite. The roof consists of 2 Easi-Span Building roof panels. Customization is an option for every Easi-Set Building, and this one required specific features. The structure was fitted with 12 24"x12" air exhaust openings, four 24"x24" air inlet openings and one 24" x 36" steel entry hatch. McCann Concrete Products also was able to cast an exterior flashing reglet in the lower wall section, saving the contractor significant time and labor.

The original aerator sat on top of a detention tank, and the new aerator had to be in the same location. The Easi-Span Building was placed on top of the existing concrete foundation, approximately 20’ tall. Mark Melvin, vice president of McCann Concrete Products, notes the contractor's crew installed this building in just one day.

“The project required locating and casting precise openings for existing equipment that

remained in place during installation," says Chris Reese, an engineering manager for Easi-Set Buildings. "The south wall panel had to be walked in and set around an existing 20" aerator inlet."

Now that this upgraded system includes a long-lasting building, the village can continue to supply quality water to its residents for years to come while serving as a modern example to other communities.

To Learn More:

www.EasiSetBuildings.com
1 (866) 252-8210

Link to literature
https://precastbuildings.com/literature