

Host to the America's Cup in 2013, Pier 27 now serves as a berth for cruise ships and a venue for events.

# Green at Its Best

Sailing race venue integrates rainwater treatment and reuse

In the world of aquatic sporting and adventure, there are few places on Earth as well recognized as San Francisco's waterfront along the Embarcadero. Located in the heart of the city's bustling Fisherman's Wharf area, Pier 27, once visited daily by hordes of residents and tourists alike, had gradually deteriorated under withering traffic over the past decade.

The eastern waterfront area along the Embarcadero is now in the midst of a renaissance that is transforming it from a dilapidated warehouse district into one of the city's most festive focal points.

The restored piers include famous tourist destinations such as Fishermen's Wharf and have proven productive long beyond their original purposes.

## A Race for the Ages

Piers 27 and 29 are uniquely joined at the end to form a 10-acre triangular area. For decades, each pier was covered by a bleak patchwork of sheet metal structures. The old buildings were removed to create space to view the 34<sup>th</sup> America's Cup races. The focal point of the construction there—and for the tourists who came to see the races—was the new ship terminal.

In September 2012, trial runs of the sleek catamaran America's Cup candidates began, drawing crowds from around the world. Construction of the steel and glass terminal building was well ahead of schedule for the event's official opening.

In July and August 2013, four countries competed in the Louis Vuitton Cup for the right to challenge Larry Ellison's Oracle Team USA, the defending 2010 America's Cup champion.

Once again, the Oracle team won

the cup in a winner-take-all 19<sup>th</sup> race, defeating challenger Emirates Team New Zealand by 44 seconds. Led by 35-year-old skipper Jimmy Spithill, Oracle won by a score of 9 to 8; Spithill became the youngest person ever to skipper a cup-winning team.

The 2013 races featured 72-ft-long sailboats for the first time. Another unique feature to note was that world-class races are rarely held so close to shore, making Pier 27 one of the best venues yet.

Although the races are now over, the new terminal remains as a monument to the sport and a cruise ship port.

"New construction on Pier 27 was focused on the new James R. Herman cruise ship terminal. There's no question that it is now a landmark building for San Francisco's waterfront," said Kavinder Singh, vice president and general manager for Turner Construction Co.

The 1,360-ft berth can accommodate groups coming to and from the largest cruise ships. It is designed to handle 2,600 passengers routinely, and up to 4,000 in a pinch. Forty to 80 cruise ships visit the port each year, and when ships are not in port, the terminal is available for other events.

## Green Focus

With California at the leading edge of the sustainability movement, it is natural that green technology was a key expectation for the new terminal early on. The building earned a LEED Silver rating from the U.S. Green Building Council.

"The green movement has so many good angles to it," Singh said. "For the cruise terminal, one of the really

unique facets of the project is the BRAE rainwater harvesting system with several large tanks, there to do two very important things: It puts rainwater to use, water that would otherwise be lost, and it greatly reduces runoff from the property, water that would spill into the ocean. To build this way—especially in a city and state at the cutting edge of environmental responsibility—points to our stewardship of natural resources. It's a win-win for everyone."

Singh explained that the new terminal is an 88,000-sq-ft, two-level building. The size of the terminal was defined as optimal to serve current and future ship berthing.

Passengers departing from and arriving in San Francisco now pass through the terminal, which houses ticketing, baggage, customs and security operations. It opened as the venue for the 2013 America's Cup Village and is designed to accommodate vessels up to 1,200 ft long, in addition to being an elegant gateway to the city.

Unnoticed by the throngs of people pouring into the city or enjoying box office seats for the best views of the America's Cup, however, was the network of drains, pipe, valves and controls installed to harvest and put to use the world's most precious natural resource: freshwater.

## Integrating the System

The terminal is equipped with a five-tank, 42,000-gal rainwater harvesting system.

"Rainwater is used for toilet flushing in the main terminal, and also for outdoor irrigation of the facility's gardens," said Eddie Van

Giesen, ARCSA, MLA, national sales manager for BRAE Rainwater Harvesting Systems. BRAE supplied all components of the rainwater harvesting system, which consists of three 12,800-gal tanks, two 1,650-gal tanks, and a rainwater control station that houses all of the filters, treatment equipment and controls.

The larger tanks are used for toilet flushing; the smaller tanks provide water for irrigation.

According to Van Giesen, water from the terminal's roof is sent to a prefiltration system, which removes larger debris before the collected rainwater enters the storage tanks. When there is a call for water, fluids are pumped through the filtration and treatment (rainset) system before entering dedicated lines to the toilets. Ozone is used for disinfection.

"As a Port Authority project, designers knew the importance of this groundbreaking system. It's one of the finest projects of this scale. California Assembly Bill 1750, also known as the Rainwater Capture Act of 2012, was signed into law by California Gov. Jerry Brown," Van Giesen said. "In addition, the California Building Standards Commission approved Chapter 17 of the California Plumbing Code—a chapter devoted to rainwater harvesting in the state—so sweeping changes to California plumbing coincided with passage of the rainwater bill.

"With a project of this caliber, and with its high profile, designers wanted to exceed expectations, and they accomplished it marvelously," Van Giesen added. "The terminal is now one of the highest-profile buildings

in the city to use rainwater for indoor non-potable use. Toilet flushing consumes vast amounts of water, so this is a big step. And it just stands to reason that it's not the most prudent use of clean, potable water."

Combined with water for irrigation, the facility will conserve thousands of gallons of freshwater each year. Another key advantage is that potentially contaminated runoff will not flow freely into San Francisco Bay.

### A Sustainable Example

Turner Construction tapped Oakland, Calif.-based Broadway Mechanical to do all of the plumbing work at the Pier 27 terminal. According to Michael Hohl, project manager for Broadway Mechanical's work at Pier 27, the job involved 12 plumbers, a detailer, an engineering project manager and an assistant manager. They were on the job for about nine months.

According to Hohl, the cruise terminal building is among the first in the city with such a large volume of stored rainwater, and it is the first in San Francisco with a skid-mounted ozone system for water treatment.

"Technically, this qualifies the water as having potable quality, but that's not the intent at all," Hohl said. "Being the first at something like this does have its challenges. Local code and water board officials and other authorities can all take divergent views about water quality and what constitutes water of sufficient quality to drink."

He explained that all of the city's water authorities reviewed the water catchment plan and have studied the storage, filtration and treatment of water there.

The water, though treated to a high quality, is still labeled non-potable and is used only for landscape irrigation and the flushing of toilets and urinals within the terminal building.

"One of the goals for this project was to set a precedent: to raise the sustainability bar voluntarily," Hohl said.

The plan to install a rainwater harvesting system at the terminal gave Port Authority an opportunity to lead by example. Hohl explained that the city's infrastructure for stormwater drainage is near capacity. That is why the terminal's ability to harvest so much rainfall on site is a real advantage.

The large terminal structure, with more than an acre of roof surface, will certainly shed a lot of water during periods of heavy rain. If the storage tanks are full, the overflow water will nonetheless be filtered and treated, rendering it pollutant-free before it enters San Francisco Bay.

Sales representatives Ron Monk and Dave Johnson of the Rancho Cordova, Calif.-based manufacturer's representative firm, Repcor, presented BRAE's rainwater catchment capabilities to managers of the city—Pier 27's owner—and Broadway Mechanical.

"We assured them that the BRAE systems would meet and exceed their expectations," Monk said. "We remained in close contact with them throughout the entire timeline, involving specification, sales and installation."

Hohl added that there was also an advantage in the BRAE system's

single-source supply: "The original system was pieced together from various suppliers. From tanks to treatment, BRAE could provide it all."


"The systems there work just as they were designed to," Van Giesen said. "Through the years, the use of rainwater at Pier 27 will only play a greater role. It all ties to the city of San Francisco's and the Port Authority's admirable commitment to sustainability." *wqp*

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