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Consultant Dana Gillette and water regulator David Struve with plans for a hurricane-resilient sample-testing lab.
Photo: CJ Walker Photography

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BUILDING & FACILITY MANAGEMENT | By Dana Gillette, PE; and David M. Struve

Model behavior

Water utility managers and consultants use electronic design and project review to hammer out the details of a new, hurricane-resilient sample-testing laboratory.

What: 36,000-square-foot Environmental Services Laboratory

Owner: South Florida Water Management District (SFWMD), West Palm Beach

Contract/delivery method: Design-bid-build

Design: Erdman Anthony

Construction: Suffolk Construction

Project cost: \$8.2 million

Funding: SFWMD Ad Valorem tax revenues

Timeline: Design, March 2009 – June 2010; Construction, October 2010 – February 2012

In Florida's fragile ecosystem and economy, using less water and energy should be a key goal of all public facilities. So when South Florida Water Management District (SFWMD) managers built a new environmental services laboratory to bring all SFWMD scientists under one roof, their mandate to designers was to conceptualize a building that would show their 7.7 million constituents how to conserve energy and water.

Having coped with power outages and other operational havoc wreaked by three hurricanes during a two-year span, they also wanted a building that could survive a Category 4 (140-mph) storm. To satisfy these two equally challenging requirements, it was essential that all project team members meet regularly. But as is often the case, not everyone was using the same building information modeling, design, engineering, and project-management software.

Project participants needed Web-based collaboration tools that would keep everyone informed at all stages. To keep communication lines open and ideas free-flowing while ensuring the information's integrity, design firm Erdman Anthony used two project/in-

formation management tools and one communication tool:

- **Project information management (PIM) software** — Newforma's Project Center (7th edition) to electronically index, search, track, and share computer-aided design files, emails, design reports, PowerPoint presentations to the management team, contractor submittals of shop drawings, and requests for information. This empowered team members to deal with the flood of deliverables, sketches, revisions, and suggestions earlier in the design process than they could have otherwise — which gave them more time for review. All documents were scanned into the program and available digitally.

The software also includes a form that was used to input contract submittals. Design team members reviewed the submittals and sent completed reviews to the district. The program then generated reports of that information, showing open submittals and the time left to respond.

The PIM software suite is priced as an enterprisewide annual subscription license fee, based on the size of the customer.

WEB EXTRA

Read about new approaches architects are using in wastewater treatment facility designs at www.pwmag.com.



SFWMD regulates water use throughout South Florida, so the design team made the water cistern a focal point of the building design to showcase the district's commitment to water savings.



The multifunctional rooftop contains ice storage, chillers, and laboratory exhaust fans.



SFWMD monitors surface water, fish, and sediment in marshes, estuaries, lakes, rivers, and canals. Scientists and technicians complete more than 250,000 water-quality tests each year.

- **Videoconferencing** — Designers were geographically spread out across Florida and New York, so periodic progress meetings were held via Citrix Online LLC's **GoToMeeting.com**, which has an interactive, classroom-style format. Subscribers can access the online tool for \$49/month or \$468/year.

Team members learned how to use all three programs fairly quickly. Within a few weeks everyone was comfortable with Newforma, and within a few days they were using DrChecks reliably. All users mastered **www.gotomeeting.com** in less than a day.

How it worked: design review

At the initial half-day kick-off meeting, stakeholders, users, and district managers contributed their expectations of and vision, needs, and criteria for the project. The group also visited the site

to further define project scope. The information gathered during this initial phase informed the criteria used to create the 30% design documents.

Design review began with a daylong in-person presentation that:

1. Outlined the criteria and where the project was headed
2. Showed sketches and information for each segment of the project.

During the afternoon, each discipline — HVAC, electrical, plumbing, civil, geotechnical, structural, architectural, etc. — broke out into separate sessions to review preliminary designs in that area. These discussions led to specific suggestions like using preferred vendors, revising room sizes, and adding a deck for outdoor experimentation.

When the breakout sessions ended, the design team delivered the Basis for Design Report to SFWMD. Peer reviewers used DrChecks to log

questions, concerns, and suggestions, which could be viewed by all users as soon as they were entered. The design team responded until each item was resolved. In all, this process took about three weeks.

Throughout the design phase, the design team made three one-hour presentations to the district's management team. The first showed how issues from the Basis of Design Report were resolved. The second and third meetings were held after 30% design and when final design submittals were ready, respectively.

When designers and the district employees assigned to the project couldn't resolve an issue, district managers made the final decision. For example, employees were cautious about using pervious pavement. Managers, however, supported this sustainable element

(continued)

The bids of eight of the 10 prequalified construction contractors were within a 7% spread.

because it improves water quality and stormwater runoff — elements that the district regulates — and directed that it be used on a larger portion of the site.

How it worked: quality control

District managers place a high priority on quality control (QC), so they added two weeks to each scheduled submittal phase for the design team to review documents before presenting them.

They also hired peer-review firms representing architects and engineering disciplines and asked some employees to participate using DrChecks. Reviewers entered comments and the project team answered them. The program shows who's commented and whose comments are pending, and tracks the outcome of these back-and-forth discussions on each issue.

Change orders: 3% of project costs

Although there's been some grumbling in the design and engineering community about making peer review so transparent, the process produced better plans that required fewer changes. Another indicator that documents were clear-cut, with few areas open for interpretation: eight of the 10 prequalified construction contractors submitted bids that were well under budget and within a narrow 7% spread.

When the project moved into construction, the team used Newforma software to manage the RFI (request for information) and submittal processes. When RFIs or submittals were received via email, the design firm's project manager logged them into the software program, assigned them to the appropriate team member to review and respond,

and assigned a due date (generally seven days from submittal date).

The response to each RFI also underwent the QC process. Some submittals were reviewed by all team members, others by just one. For example, the electrical team member would review and respond to an electrical question, but a question about enlarging an HVAC duct could involve the mechanical engineer, architect, and structural engineer. All team members had access to all RFIs via the Information Exchange element of the Newforma software.

Obtaining LEED Gold

Although SFWMD's initial goal was to achieve LEED Silver certification for the laboratory building, project architect Acai Associates Inc. encouraged the district to aim higher. Some of the water and energy savings designed into the \$8.2 million facility include:

- A graywater collection system for non-potable uses
- Low-flow fixtures and hand sensors to cut potable water use by 30%
- Pervious concrete in parking areas and sidewalks to reduce pollution from runoff
- High-efficiency mechanical, electrical, and air-conditioning systems to reduce energy use
- Energy-efficient window and lighting systems
- An off-peak ice-storage system to reduce daytime air-conditioning needs
- Roofing and pavement with reflective materials to keep the building and adjacent areas cooler
- Recycled, low-emitting, and regional materials
- Spaces set aside for bicycles and low-polluting transportation to encourage efficient transportation.

In July 2012, the facility received LEED Gold certification, which underscores the district's commitment to the environment. **PW**

— Gillette (gilleted@erdmananthony.com) is a project manager for Erdman Anthony (www.erdmananthony.com). Struve (dstruve@sfwmd.gov) is the Analytical Services section administrator for the South Florida Water Management District (www.sfwmd.gov).

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