



US Army Corps  
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AUGUST-SEPTEMBER'S THEME:

## *Sustainable Design and Development*

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### DWIGHT'S NOTES

Although we have past the first anniversary of the 11 September 2001 terrorist attacks on our country, none of us in HQUSACE is letting our guard down. If anything, this past year has crystallized the resolve of the U.S Army Corps of Engineers to become a vital protagonist in America's War on Terrorism. USACE has civilian and soldiers deployed in many of the theatres of this war. We are also providing critical professional services to the Department of Defense and other federal agencies in the form of antiterrorism design standards, security assessments, and research and development projects. Within our Civil Works mission we completed over 300 security assessments and are in the process of upgrading security at many of the locks, dams, reservoirs, hydropower facilities and recreation site around the country. On the national level, the Corps led the establishment of The Infrastructure Security Partnership (TISP), which includes over 110 organizations composed of over 1.4 million firms and individuals. Many of you and contributed to this important National Security imperative, and for that, we in the Corps leadership are very grateful. Please stay the course. It's very important.

Another area that the Corps is providing outstanding leadership is in Sustainable Design and Development, the theme of this issue of E&C News. We are again served well by our world-class laboratories and professional practitioners in this growing field. Sustainable design and development is a very important initiative consistent with the Chief Environmental Operating Principles (EOP). As the Corps becomes more adept at planning, designing, constructing, and operating projects that we good for the environment and save energy, we will find that those projects will be ever more valuable throughout time. Please embrace sustainable practices in all you do until it becomes the second nature.

We start a new fiscal year shortly and with that new and old challenges will present themselves to us. I look forward to such challenges because each one is an opportunity to learn something new and to make a contribution to our mission and our customers. I wish all of you the best for you succeeding in meeting your challenges as well. The nation will never need you more.

Essayons!

Dwight

(Editors' note: If you want to share your thoughts with our readers regarding Dwight's Notes send an email to the E&C News editor ([charles.pearre@usace.army.mil](mailto:charles.pearre@usace.army.mil)). A synopsis of your comments will be published in the next issue.)

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# *Sustainable Design and Development*

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## SUSTAINABLE DESIGN AND DEVELOPMENT

Thanks to members of our PDT's for making this program a huge success. We have successfully adopted SPiRiT in all our military facility designs. We have selected 6 FY02 projects as showcase projects to benchmark our design. These 6 projects will try to achieve better than Bronze level of SPiRiT. When completed these projects will provide us a good indication of sustainability of our design process without additional funding. Additionally we have selected 6 FY03 projects with requirement to achieve Gold or higher level of SPiRiT. These projects when completed will give us a good indication of what we can achieve, if we adopt some of the strategies recommended by SPiRiT. We are working on selecting FY04 showcase projects. We developed SPiRiT because commercially available tools were not suitable for military facilities. U.S. Green Building Council (USGBC) developer of Leadership in Energy and Environment Design (LEED), most commonly used commercial rating tool has reviewed SPiRiT and will most probably adopt some aspects of it in LEED version 3, scheduled to be released around April 2005. At that time, we intend to adopt it as our rating

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tool. ERDC-CERL has created a very useful web page for SDD. I encourage everyone to visit it at [www.cecer.army.mil/sustdesign](http://www.cecer.army.mil/sustdesign).

POC: HARRY GORADIA, CECW-ET, 202-761-7170

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### SPIRiT REFERENCES AND RESOURCES

'Sustainable Project Rating Tool (SPiRiT) Version 1.4.1 References and Resources' has been posted to the CERL Sustainable Design Website.

This *SPiRiT 1.4.1 References and Resources* was developed to be an easy to use tool to access information supporting project teams using SPiRiT in sustainable design processes. It is simply a Microsoft Excel spreadsheet containing hot links to both direct and indirect references and resources keyed where possible to numbered SPiRiT (1.4.1 June 2002) paragraphs.

It can be found on the CERL Sustainable Design Website directly at:

[http://www.cecer.army.mil/SustDesign/SpiritReferencesV1\\_4.xls](http://www.cecer.army.mil/SustDesign/SpiritReferencesV1_4.xls). Alternatively, from the main CERL Sustainable Design web page [<http://www.cecer.army.mil/SustDesign/>], click on [What Is the Corps Doing?](#), [Sustainable Project Rating Tool \(SPiRiT\)](#), and then [Best SPiRiT References](#).

We will be periodically updating the spreadsheet references, so suggest users get in the habit of referring to it on the website rather than downloading it for local use.

If anyone cares to comment, please do so. More complete POC information for comment is contained in the document on the 'Notes' page.

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### SAVANNAH DISTRICT AWARDS ITS FIRST SUSTAINABLE DESIGN SHOWCASE PROJECT

The installation communications facility at Fort Gordon was originally scheduled for construction in the 2004 MCA (Military Construction – Army) Program but in July 2001 Congress bumped it up to the 2002 program, giving the district only until July 31, 2002, to execute the project and award a construction contract.

“We knew we probably couldn’t meet the schedule using the normal design-bid-build procedure,” said Efrain Rosario, the district’s senior project manager for Fort Gordon. “Normally, that takes two years. We met with the Project Development Team (PDT) in July 2001 and decided that a design-build request for proposal (RFP) was the best acquisition strategy. To further expedite the project, we decided to do 10 percent design in-house.”

A month before Congress put the project on a fast track, the Army had mandated that sustainable design be incorporated into all military construction projects to the extent possible, effective immediately. This meant designing environmentally friendly buildings that are constructed with an eye toward depleting less of the nation’s natural resources. Using the Army’s Sustainable Project Rating Tool (SPiRiT), project teams were to strive to achieve at least 25 out of a possible 100 SPiRiT\* points on all projects.

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About the same time, the communications facility at Fort Gordon was selected as a district showcase project on sustainable design, which meant that the team had to strive to achieve a higher SPiRiT rating.

“This was the first project where we had to incorporate the sustainable design into the RFP, so we really sort of invented the template on this project,” said Judy Milton, architect and district point of contact on SPiRiT. “Our goal was to achieve 50 points.”

In the end, the district awarded the project ahead of schedule, under budget (87 percent of the programmed amount), with a gold SPiRiT rating of 64 points for sustainable design (50 points is required for a gold rating), and with a shorter construction period than estimated. The contract was awarded June 17 to Teng Construction, a Chicago-based firm whose customers include AT&T, Verizon and SBC.

	<b>RFP</b>	<b>Teng</b>
Construction Cost Limit:	\$8,870,000	\$7,681,600
Construction Period (Calendar Days)	810	488
SPiRiT Points	50 points	64 points

“You always want to come in under the budget, but to do it as well as we did and end up with the quality of work that we’re expecting to see out of this is very gratifying,” said Carlton Shuford, installation master planner for Fort Gordon. “From the installation’s point of view, you really feel we’re going to get our money’s worth.”

**THE PROJECT** – The project\*\* is a communications facility that will house in one building all of the communications activities currently performed in five buildings around the fort.

“The old arrangement was not efficient,” said Rosario, “so the installation master planner developed a project to combine the different offices so that anyone having business with the DOIM (Directorate of Information Management) can go to one place on the installation.”

“Trying to get the building programmed early on was a challenge,” said Shuford, noting that the Directorate of Public Works had been looking at the need to replace the old building for about five years. “I’ve been working on this a little at a time until we got the project elevated to get enough attention. On the surface, this building’s mission might be viewed more as administrative, which is harder to raise in the priority of things for funding. But this building is vital to every mission on the fort, because this is the place where the telephone exchange, all the computers for the network system— all the wiring takes place.”

In order to make the importance of the facility to the installation obvious, Shuford interviewed employees about their jobs. The actual process of fine-tuning the programming document took about 18 months.

**Acquisition strategy** – In past years, Savannah District has typically solicited low-price bids/proposals on its projects, using design-bid-build invitation for bids and low-price technically acceptable RFP’s.

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“This year we have been going outside the box, and almost all of the solicitations are ‘Best Value’ requests for proposals,” said Rosario. “We are looking for the best value for the government, and on this project, it happened that the best firm submitted the best proposal and was also the low bidder.” The team used a two-phase selection process to award the contract and included language in the RFP emphasizing the importance of sustainable design in the project. More than 15 firms competed in Phase I, and the Source Selection Board chose the five most highly qualified offerors (those who had shown that they could build environmentally friendly projects) to submit proposals for Phase II. “The proposal that won gave us back practically what we put out,” said Milton. “Teng didn’t spend a lot of energy and time reinventing the building layout: they focused their effort on ways to make the building really energy efficient.”

It took 11 months from start of design to award of the construction contract. “This was possible, in part, by the use of the two-step design-build procurement,” noted Rosario.

**Sustainable design** – A growing trend for at least the last five years, sustainable design (or green building) is becoming more and more mainstream. It focuses on doing things in a way that does not use up the nation’s non-renewable resources— does not pollute the water or air, does not eliminate all of the green space (undeveloped areas)— in essence, does not jeopardize future generations’ ability to live on the planet.

The United States Green Building Council (USGBC), a non-profit organization, developed a scoring system that the private sector uses to set goals and measure achievement in sustainable design. The system is called LEED (Leadership in Energy and Environmental Design).

“The beauty of LEED is that it puts sustainable design in some kind of manageable form,” explained Milton. “It says, here’s a goal; if you meet this goal, you earn a point. But you don’t have to meet this goal— *you choose which points you go after*, based on the nature of your project and what its opportunities are.”

SPiRiT is the Army’s adaptation of LEED. It is a point system covering several broad categories such as sustainable sites (site selection and how you develop the site), water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, facility delivery process, and a few others categories that deal with the future life of the facility. In each category there are points to be earned for accomplishing certain goals.

The Fort Gordon project was well suited to showcase sustainable design: There was no standard design to follow, no preconceived notion of the building, no pre-existing floor plan.

“Basically,” said Milton, “we looked at the existing facilities, talked to the user and employees, and put pencil to blank paper. So right from the beginning, as I started to develop the floor plan and work with the site engineer on how we were going to site the building, I already had certain points I was going to try to earn.”

Shuford and the user (DOIM) became, in effect, part of the design team. Led by Milton, the team went through all of the different SPiRiT categories and decided which of the SPiRiT points they would require the contractors to include in their proposals.

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“Basically,” said Milton, “we looked at what we thought would have the least impact on the initial cost to the project, because no funding was provided for sustainable design, and we still had to meet our budget.

“Sustainable design,” she explained “is not more important than meeting the customer’s functional needs or more important than meeting the budget. It’s something we have to put into the pot when we’re making our decisions and trying to do as well as we can within the constraints that we have.” Features mandated by the RFP included operable windows and perimeter light controls, day lighting throughout the occupied area, a light-colored roof, low VOC paints and sealants, bike racks, showers, and a site layout that provides shading on paved areas.

“We were fortunate that the site, which had already been selected, earned five points,” said Milton. “Site selection is outside the scope of our activities, so we started out kind of lucky.”

But the RFP requirements totaled only 25 of the 50 required points. The offerors had to come up with at least another 25 points.

Using the district’s suggested floor plan, which also included sustainable design features that were not mandatory, Teng came up with another 39 SPiRiT points, including restoration of destroyed habitat through landscaping, no increase in storm water runoff, use of a high-efficiency landscaping/irrigation system to minimize the amount of potable water used for landscaping/irrigation, 20 percent reduction in water usage through high-efficiency fixtures, reduction in annual energy consumption through high efficiency mechanical and electrical systems, and recycling construction waste rather than taking it to a landfill.

“When we finish the construction,” explained Rosario, “we have to verify that everything the contractor said he was going to do was done, then we can get certified as a SPiRiT gold project. Beyond that, we will have the satisfaction that this is a project that will not put a burden on the resources in Georgia.”

\*SPiRiT Milestones: Bronze (25 points); Silver (35 points); Gold (50 points); Platinum (75 points)

\*\*Major features: Uninterrupted power supply protection, controlled humidity part storage and repair areas, 24-hour operator/information operations, intrusion detection system (IDS), central monitoring and control capability, anti-terrorism and Force Protection measures.

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## *Update*

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### **ENGINEERING & CONSTRUCTION EMBRACES USACE ENVIRONMENTAL OPERATING PRINCIPLES**

LTG Robert B. Flowers, Chief of Engineers, set a new tone and direction for USACE when he issued the Environmental Operating Principles this spring. The principles are:

1. Strive to achieve environmental sustainability. An environment maintained in a healthy, diverse and sustainable condition is necessary to support life.

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2. Recognize the interdependence of life and the physical environment. Proactively consider environmental consequences of Corps programs and act accordingly in all appropriate circumstances.
  3. Seek balance and synergy among human development activities and natural systems by designing economic and environmental solutions that support and reinforce one another.
  4. Continue to accept corporate responsibility and accountability under the law for activities and decisions under our control that impact human health and welfare and the continued viability of natural systems.
  5. Seek ways and means to assess and mitigate cumulative impacts to the environment; bring systems approaches to the full life cycle of our processes and work.
  6. Build and share an integrated scientific, economic, and social knowledge base that supports a greater understanding of the environment and impacts of our work.
  7. Respect the views of individuals and groups interested in Corps activities, listen to them actively, and learn from their perspective in the search to find innovative win-win solutions to the nation's problems that also protect and enhance the environment.

Notice the strong focus on sustainability, which we define as "a synergistic process whereby environmental and economic considerations are effectively balanced through the life cycle of project planning, design, construction, operation and maintenance, to improve the quality of life for present and future generations."

These principles don't promote "business as usual" but instead serve as motivators, encouraging us to be creative and proactive in carrying out our military and civil works missions. It's not that we aren't already doing good things; we just need to continue our culture change and press forward.

Two examples reflecting the Environmental Operating Principles way of thinking are; building sustainable facilities by applying the Sustainable Project Rating Tool (SPiRiT), and Louisville District's partnering with the Kentucky Chapter of The Nature Conservancy to restore the Green River Bioreserve ecosystem.

SPiRiT is an easy-to-use tool, allowing project delivery teams to design facilities to achieve defined levels of sustainability. SPiRiT has four achievement levels: Bronze, Silver, Gold and Platinum. Army and USACE policies require all Army military facilities to be scored against SPiRiT and to achieve at least Bronze in FY 02. The bar may be raised after that. For more information on using SPiRiT for military or civil construction, contact Mr. Harry Goradia, CECW-ETV or visit the Sustainable Development and Design web site, <http://www.cecer.army.mil/sustdesign>.

Louisville District is partnering with the Kentucky Chapter of The Nature Conservancy to help protect rare plants, animals, and restore the ecosystem functions and natural communities indigenous to the Green River Bioreserve influenced by releases from the USACE operated Green River Lake. A very important facet of this effort is restoring natural hydrologic flow and temperature variability in the bioreserve area. The District and The Nature Conservancy are collaborating to refine the operation of Green River Lake to improve both the downstream environment and recreational opportunities without

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compromising established project-operating requirements. Bill Byron, CELRL-ED-T-W can provide more information on this innovative project.

The Chief introduced the Environmental Operating Principles by personally training his subordinate commanders. By now we in the Engineering and Construction community throughout the Corps have been trained, too. Now it's up to us to integrate sustainability into our day-to-day business processes and produce more, and better, projects showcasing the Environmental Operating Principles.

*POC: DALE OTTERNESS, CECW-ET, 202-761-7697*

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## **NEW YORK DISTRICT ENGINEER RECEIVES HEARTLAND AWARD**

Mark Kucera of the New York District received the Heartland Award for his outstanding leadership on the Reynolds Metals Superfund Project in Massena, New York.

**Reynolds Metals Superfund Site** – If you take a drive 410 miles north from New York City, go west from Plattsburg, you will reach the “elbow” on the Canadian border, where the beautiful St. Lawrence River runs and where sits one of the EPA’s critical environmental clean up projects – the Reynolds Metals Superfund Site in Massena, New York.

The site is located at the Reynolds Facility that used to be owned by the well-known Reynolds Aluminum Wrap Company and is now operated by the Alcoa Aluminum Plant, but still referred to as “Reynolds.” The facility has been an active aluminum fabricating plant since 1958. During the 1980’s the EPA discovered that as a result of the facility’s production activities, various types of industrial waste, including primarily Polychlorinated Biphenyls (PCBs), were being discharged into the St. Lawrence River.

The EPA said that the river needed to be dredged and capped otherwise this would pose an environmental and public health risk to surrounding businesses and communities, including the St. Regis Mohawk Tribe Reservation, located just one mile down the St. Lawrence River.

The Mohawk community, which is politically influential in the area, is extremely involved in this project and it is working closely with the project team that includes EPA Region II; the State of New York, Alcoa (Reynolds); several US Army Corps of Engineer Districts including New York, Kansas City, Buffalo and Detroit; and TAMS Consultants, said Josephine Newton-Lund, Project Manager, Kansas City District.

**Kucera Leads Project** – The project is a Kansas City District mission because the District supports all of the EPA Region II’s environmental cleanup efforts. They were in charge of staffing the project and called upon several districts and area offices to provide suitable candidates.

To lead this project, Mark Kucera, a 20-year Civil Engineer with the New York District, was selected from the list of candidates. "Since this was a Superfund project done under EPA's authority and involved dredging of hazardous material, I was looking for someone with both Hazardous, Toxic and Radioactive Waste (HTRW) and dredging experience. I had a couple of engineers who fit the bill but since Mark had extensive Superfund experience and was familiar with and well respected by the EPA as well as Kansas City District, I chose him," said Donald Braun, Project Engineer, New York District and Kucera's supervisor.

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The Corps' responsibility for the superfund project was to provide 24-hour oversight of the clean-up operation that was performed by contractors hired by the Reynolds Metals Corporation. "The EPA wanted a full-time presence on the federal level. I was the senior full-time federal government representative on site. With the Corps' experience involving dredging, environmental work and construction management, we were an easy choice. My role was to verify the remediation work was being performed in compliance with the approved work plans and keep coordination with all the various agencies under control," said Kucera.

**Project Challenges** – Kucera said the project had its challenges but nothing their team couldn't handle, "Environmental work frequently yields challenges in that you're not always sure what is there until you literally dig into it. The short construction season in northern New York complicated things considering the extensive scope of the project. Any problems we had to overcome became a group effort," said Kucera.

Public health concerns were another challenge for the project team. They held frequent Public Availability Sessions to answer community questions. The St. Regis Mohawk Tribe Reservation's Environmental Staff attended the meetings and were always present on the site. Their main concern was with contamination being transported down river into their property, the release of water borne and airborne contamination and the safe removal of the dredged material.

Anne Kelly, Project Manager, Superfund Division, U.S. EPA worked with Kucera on a daily basis. She said, "When I met Mark the first thing that came to my mind was "military". He is disciplined and very intelligent, but a huge part of the job was dealing with people. Removing highly contaminated sediments from an international border, upstream of Mohawk Territory and several drinking water supplies is not just a technical job- it's about people. The best, most highly disciplined engineers in the world cannot always negotiate solutions when emotions and conflicting agendas are involved. Mark and the other Corps representatives could. I could not have hoped for a better oversight team. Mark is also exceedingly generous; generous with his time, with what he knows, his sense of humor and an ever-present bag of potato chips at lunchtime!"



**Heartland Award** – Kucera's work as lead on the project was considered outstanding and his extremely long hours away from home were appreciated. It was because of his dedication that he was honored with the Heartland Award. "He was given this award due to his exemplary performance in the field, including outstanding teamwork skills, and his endurance away from home," said Newton-Lund.

The Heartland Award honors outstanding accomplishments by personnel outside of the Kansas City District. A former Kansas City District Engineer, COL

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Robert Morris, conceived the award. Before his tenure in 1997, there was no formal means of recognizing outstanding achievements by individuals outside of their district, such as work performed by other Corps districts, military, and contractual personnel.

Kucera was “surprised” and honored to be selected for this award, but what’s been most enjoyable for him has been the project itself, “ I enjoyed the complexity of the project. We had what was reported as the largest dredging fleet on the Great Lakes/St. Lawrence Seaway (three dredges within ¾ miles of each other). All of the dredge spoil had to be transferred to land for stabilization and disposal. Add in all the environmental aspects and the various governments involved, it became more interesting than a typical dredging project. On the lighter side – it’s a beautiful part of New York State,” said Kucera.

**Future Work** – Reynolds (Alcoa) has spent approximately \$47 million to clean up the site, the first phase of which was completed in early November 2001. According to Kucera, the construction is ongoing.

EPA Region II is very pleased with the project, “Twenty-four hour oversight was achieved successfully. The EPA Region II was extremely happy with our field oversight crew that was lead by Kucera and consisted of personnel from the New York, Buffalo, Detroit and Kansas City Districts and TAMS Consultants, Inc. The Corps oversight crew provided the EPA remedial project manager with on-site information on a daily basis. The oversight crew performed this in an exemplary manner. EPA also depended on the oversight crew’s outstanding technical skills,” said Newton-Lund.

Kucera is modest about his award and stresses the fact that this project was a team effort, “We had a great team of players. I’d like to think I made at least a significant contribution to the team effort. We did in the overall balance of things, solve more problems than we caused.”

Kelly who managed the project mostly from her New York City office said, “I had the misfortune of walking down the street, a few blocks away from the World Trade Center when the planes hit. In the days and weeks that followed, like everyone else I was stunned, but I was also responsible for managing this multi-million dollar river cleanup with rattled nerves, my office closed and limited phone service at home. I feel very fortunate that I had Mark and the rest of the Corps team on the job-not just any job but one that, if not done correctly, could have serious impacts to public health and the environment. I had every confidence that they would make the decisions that had to be made and do my job, in addition to theirs, if they had to. I worried about a lot of things that week, but I did not worry about the job getting done and getting done safely. There is not an award big enough for that.”

To learn more about the Reynolds Metals Superfund Project see <http://www.slrrp.com>.

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## PROFESSIONAL CERTIFICATION OF CONSTRUCTION MANAGERS

The Construction Management Association of America (CMAA), an organization dedicated exclusively to the interests of professional program/construction managers, offers a Professional Development Program for Federal Employees. The program’s aim is to bestow the Certified Construction Manager, or CCM, designation on those individuals that can demonstrate, through education and field experience, an understanding of the principles of construction management.

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To date, nine staff members from Baltimore District Construction Division have earned their CCM designation under the pilot Professional Development Program for Federal Employees. The primary goal of the initial nine participants was to better display their knowledge and commitment to construction excellence via certification from a recognized professional body. Their feedback has been very positive on this training.

The process begins with an individual self-determining their eligibility by completing CMAA's qualifications matrix. The matrix shows functional areas of construction management from pre-design to post-construction. Those able to document project experience in a minimum of 15 designated areas can submit an application and, pending satisfactory review from CMAA's Board of Governors, take the Standards of Practice review course and the actual CCM exam.

For those interested, the next CMAA Standards of Practice training class will be held **18-22 November 2002 in Washington, DC** on a first come basis until filled. To be eligible, a completed application must be submitted no later than 15 October 2002 to CMAA at the POC listed below. The cost of this training class is \$795, which includes the review of the application, the Standards of Practice training course and materials, and the exam. Specifics regarding CCM and the application process can be found via CMAA's website, [www.cmaanet.org](http://www.cmaanet.org) (click on the CM certification link). Points of contact for further information on this program at CMAA are Ms. Amanda Wolfe at [awolfe@cmaanet.org](mailto:awolfe@cmaanet.org) or (703) 356-2622.

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### **BULL SHOALS DAM TAIL WATER HABITAT RESTORATION**

In November 2000, the Arkansas Game and Fish Commission (AGFC) approached the Little Rock District to create better trout habitat downstream from the Bull Shoals dam on the White River. The habitat for trout had been degraded due to high flows of the river. The river had also started to erode the stream banks causing even more problems with the trout habitat.

Working together the Little Rock District and the AGFC came up with a plan consisting of in-stream habitat structures and bank stabilization techniques. The final plan uses bioengineering principles to create and improve the natural habitat for the trout. The plan was modeled after a project that had been successfully completed and implemented on the tail water of Beaver Dam.

The plan consists of both boulder complexes and root wads in the streambed. The boulder complexes consist of 2 to 4 boulders alternated in series. The minimum spacing between the boulders is 30 feet to ensure boating safety. Root wads are trees with the roots still attached and are used to create habitat. They are anchored into the streambed with the root wad side upstream. The idea is to create protective structure for fish habitat. In general, turbulence around the structures tends to scour a pool into the streambed to produce spawning areas for trout. The trout also use the pools created by the scour for rest and protection.

The project also consists of bank stabilization techniques. Four techniques are to be utilized: bank log crib, log/rock crib, cedar tree revetment and riprap point bar. The bank log crib consists of logs driven horizontally into the bank 4-feet with at least 2 feet protruding from the bank. Cover logs or crib logs are pinned perpendicular to the logs protruding from the bank. The crib logs will be notched in place with a chainsaw to approximately half of the diameter of the abutment logs to reduce the gap between them. Rebar is driven through the crib and abutment logs to keep the crib logs from sliding off.

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Dozers will backfill between the wall and the riverbank. The final product will look like a privacy fence turned sideways with the ends of logs protruding outward.

A log/rock crib is similar to the bank log crib. A base log is placed and a large slab of rock is placed on top of it. Then another log is placed. This continues until the eroded area is protected. Cedar revetments consist of one to three rows of cedar trees that are tied together and anchored using twelve-inch duckbill anchors and .5-inch steel cable. The anchors are driven a minimum of 6 to 12 inches below grade.

“It isn’t your standard design that the corps does. The materials are inconsistent, and the structures you are building do not have defined dimensions. It really is an art to make it blend in with the environment while creating a sustainable fish habitat,” said Bobby Van Cleave, Design Coordinator. The natural techniques will help to protect the bank from the river and create natural habitat while blending into the natural surroundings.

“(The Arkansas) Game and Fish (Commission) is really excited,” says Jonathon Long, the project manager. “We have enjoyed the cooperative effort to make fishing even better on the White River.”

*POC: BOBBY E. VAN CLEAVE, CESWL-EC-DG, 501-324-5840*

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## *Dam Safety*

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### **WORLD WATER & ENVIRONMENTAL RESOURCES CONGRESS 2003**

The American Society of Civil Engineers will hold the World Water & Environmental Resources Congress, 2003, in Philadelphia, Pennsylvania, 23-26 June 2003. One of the tracks for the conference will be Dam Safety – Addressing the Infrastructure Report Card. More information on the conference is available at <http://www.asce.org/conferences/ewri2003/>. The inclusion of Dam Safety in this event has come about through the partnering agreement between EWRI and ASDSO as a means of initiating discussion of activities that could be initiated jointly to begin having a positive impact on the grade. An offer has also been extended to USSD to co-sponsor the conference track. The overall goal is to be able to begin formulating what actions EWRI and ASDSO can pursue to have a positive impact on the grade. Having had some brief conversations with some of you already, the committee has begun a list of target topic areas that could like to address with the sessions and papers.

While there is a general call for papers out, the committee is asking for your help in identifying people who would make a valuable contribution to these dam safety topics. Please let me know of anyone you think would make a valuable contribution on the subject.

*POC: CHARLES PEARRE, CECW-EIS, 202-761-4645*

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## *Information*

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### **HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC) REPORT ON EXISTING MILITARY CONSTRUCTION (MILCON) FACILITIES**

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The HVAC report is a result of feedback over the past several years regarding HVAC systems. The US Army Corps of Engineers and Office of the Assistant Chief of Staff for Installation Management (OACSIM) formed a team to look at issues across the Army that concerned HVAC systems. The team was assembled by HQUSACE and included representatives from the ACSIM, the Corps of Engineers districts and laboratories, and installations Departments of Public Works. The team evaluated existing HVAC systems from a complete life cycle perspective (i.e., planning, design, construction, and operation and maintenance (O&M)).

Over several months the team visited three barrack complexes and four general-purpose type facilities located on three separate Army installations. Each facility visited had been in operation from one to four years. In addition to performing a site visit of each existing facility, the task force performed interviews with key personnel involved with each project. To perform the interviews the task force broke up into four separate technical groups (planning, design, construction, and O&M) each of which included members specifically knowledgeable in that field. Interviews were performed primarily with master planners, designers, construction representatives, and on-site O&M personnel.

The web addresses for the completed cover memorandum, summary of recommendations and HVAC report respectively are listed below.

- a. <http://www.hnd.usace.army.mil/techinfo/ecb/bauer.pdf>
- b. <http://www.hnd.usace.army.mil/techinfo/ECB/SUMMARY%20OF%20RECOMMENDATIONS-Final.doc>
- c. <http://www.hnd.usace.army.mil/techinfo/ECB/HVAC%20Study.doc>

*POC'S: GARY BAUER, CECW-ETC, 202-761-1228,  
AND JACK OSBORNE, CESWF-EC-DM, 817-886-1932*

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### **APPROVAL OF THE HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC) DIRECTORY OF EXPERTISE (DX)**

Reference ER1110-1-8158, Corps-Wide Centers of Expertise Program, 16 January 1998. In accordance with ER-1110-1-8158, the Huntsville Center HVAC DX is approved and authorized to perform the primary mission of providing HVAC support to the Corps and its customers throughout the lifecycle of a HVAC related project (i.e., planning, design, construction, and O&M).

The HVAC DX will maintain state-of-the-art technical expertise regarding all-types of HVAC systems for use on Army, Air Force, and Corps facilities. This expert knowledge includes, but is not limited to: equipment, instrumentation, strategies and concepts for design and testing of HVAC systems; inspection techniques; specification development; failure analysis; formal training; operations and maintenance assistance, consulting and expert witness; as well as environmental and safety issues relating to HVAC systems.

*POC'S: JOE MCCARTY, CECW-ETE, 202-761-5533  
AND GARY BAUER, CECW-ETC, 202-761-1228*

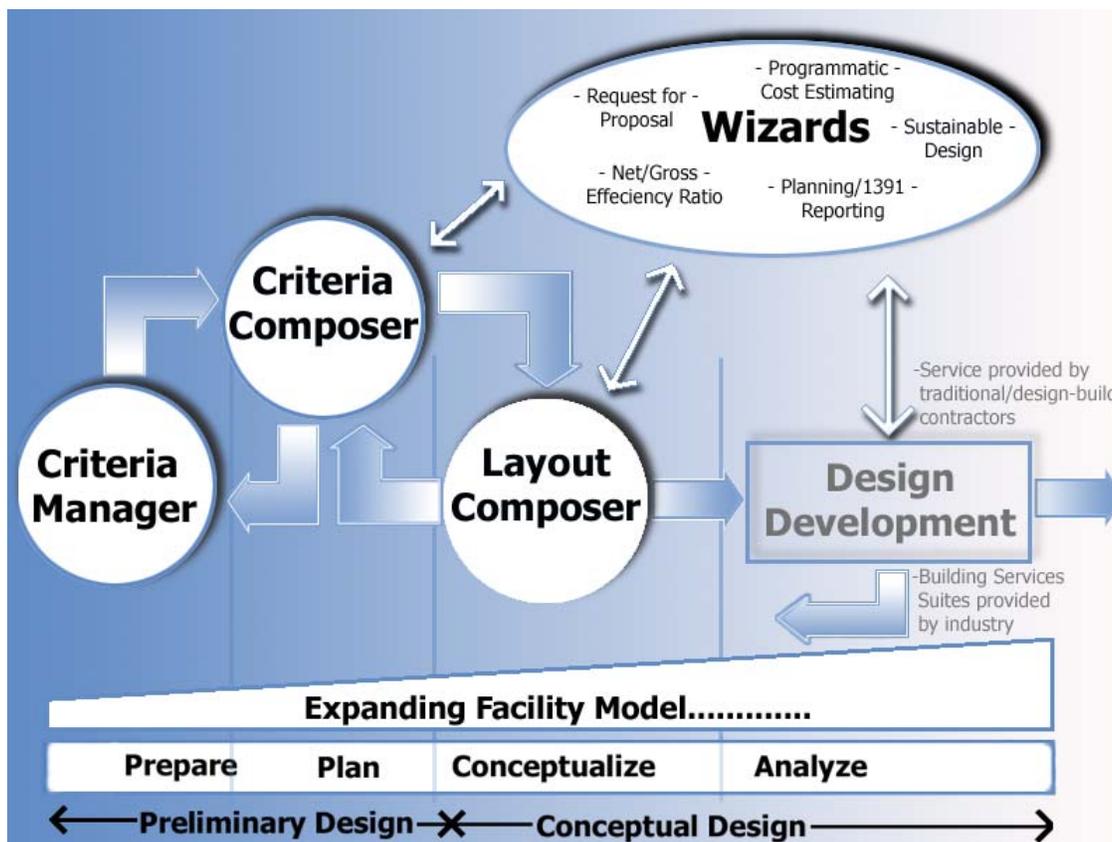
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**BUILDING COMPOSER**  
**CRITERIA/REQUIREMENTS-BASE FACILITY DESIGN**

*Building Composer* is a suite of tools for use by facility planners, designers, and engineers during the initial phases of facility planning and design. While originally developed to support the design of government facilities, *Building Composer* is based on the general concepts of: (1) providing a method to effectively and creatively create and use criteria libraries, (2) providing support for architectural programming and project specific criteria specification during interactive design charrettes or at the designer's desktop, and (3) supporting the creative and analytical aspects of architectural conceptual design involving the creation of one or many solutions from the specified criteria in an intuitive design environment.

While not enforcing any particular design process, *Building Composer* is designed to be able to support the iterative process shown in *Figure 1*.



**FIGURE 1. PROCESS FLOW OF *BUILDING COMPOSER* TOOLS.**

The most important concept of *Building Composer* is that **customer-specific and computable criteria are associated with a growing facility model** that continues throughout the life cycle of the facility. While many volumes of government design criteria exist in the form of design guides, regulations, technical manuals, and web pages, few, if any, of these are expressed in a computable format. In addition, current design systems do not provide a way to directly interact with these criteria, nor do they provide an efficient way to extend the functionality of an application to directly support criteria

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usage. With the evolution of facility modeling standards, these restrictions will be overcome by emerging design systems.

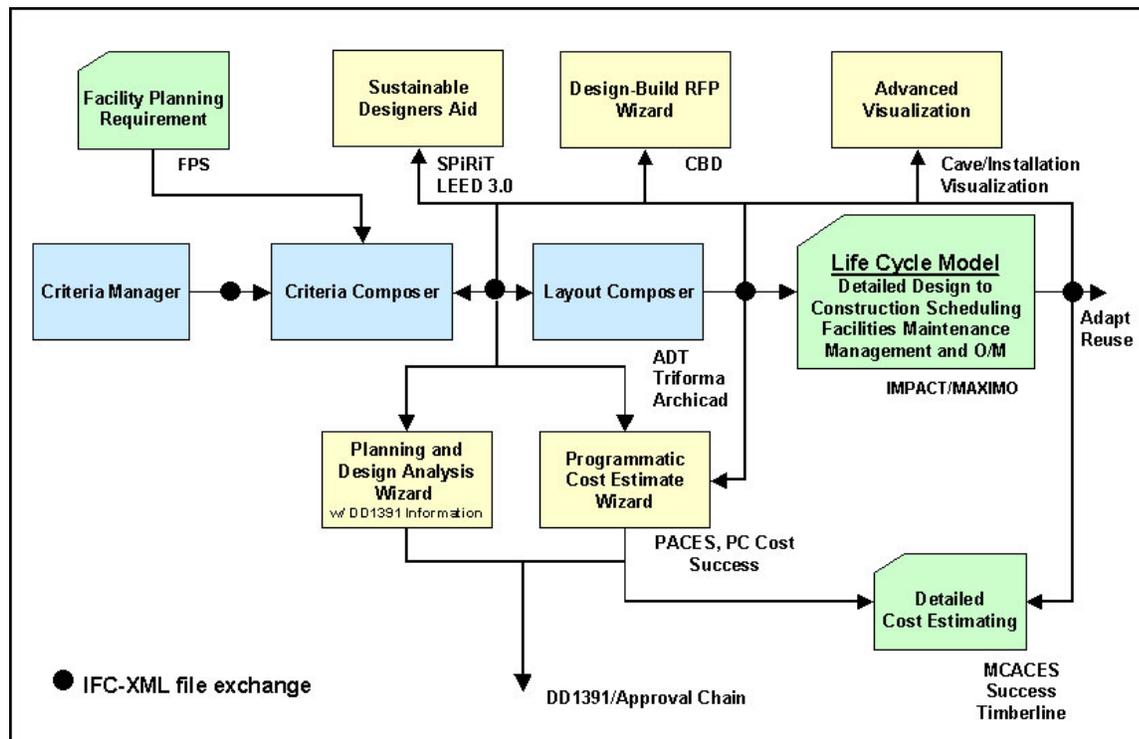
In *Building Composer*, criteria can be associated to different project elements based on the appropriate level of detail, from the **project** to the **site**, the **building**, **story**, **function**, down to the individual **space**. For example, *Building Composer* allows one to specify that a target schedule and cost be associated to a project, that masonry exterior walls and a steel structure be used on a building, that 32-Watt T-8 fluorescent lights be used in corridors and 50 foot-candles be maintained in the offices, and that a particular room will have VCT flooring. *Building Composer's* ability to maintain a linkage between criteria and project elements (site, building, story, etc.) provides many benefits:

- It helps ensure that critical criteria are followed, and that desired characteristics are recorded and addressed.
- It helps organize criteria and makes it available at its point of use. It helps in defining criteria and can help in recording its rationale.
- It simplifies creation, maintenance, and distribution of new criteria. For example, as requirements that better implement sustainable design principles are developed, these are added to an organization's standard library for use in subsequent projects. These libraries are typically organized around facility type, but are not required to be.
- It helps support rapid conceptual and detailed design & analysis (cost, structural, HVAC, energy, electrical, O&M, etc.) either directly or through standards, such as the [International Alliance for Interoperability's Industry Foundation Classes \(IAI-IFC\)](#) and [Building Lifecycle Interoperable Software \(BLIS\)](#).

Owners with numerous facility holdings, in particular, reap benefits from this approach as it helps ensure the initial design satisfies their corporate criteria, shortening the review process and avoiding "design by review." All of these benefits result in cost and timesavings by reducing user changes late in the design process or during construction. Design quality is also enhanced, as many alternatives can be explored rapidly.

**Tools** -- The primary tools in the *Building Composer* application suite include:

- **Criteria Manager**, a web-based application that helps in the development of corporate and building specific criteria libraries
- **Criteria Composer**, which helps users create an architectural program and to set values for project specific criteria
- **Layout Composer**, provides an environment for the designer/user to rapidly create 2D and 3D conceptual facility design solutions
- **Wizards** that provide support for various discipline specific issues and assist in the completion of individual design tasks and calculations. *Figure 2* shows how the *Building Composer* tools interact and how *Building Composer* and commercial-off-the-shelf (COTS) tools feed into the expanding facility model. These tools are described in more detail below.



**FIGURE 2. BUILDING COMPOSER DATA FLOW.**

**Criteria Manager** -- Building Composer relies on a customizable customer-specific library of architectural functions and criteria from which the architectural program is developed. Each customer will be able to create and customize these libraries using this web-enabled Criteria Manager application. Those authorized to use this tool can add new architectural functions, update their criteria, and notify interested parties. Criteria Manager will then export the criteria library in an XML-based format for use by the Criteria Composer.

**Criteria Composer** -- Criteria Composer (*Figure 3*) is used to develop a facility “architectural” program and to add and set project specific criteria. This includes traditional information such as the total project area and allocation of area to specific architectural functions such as circulation and offices. It also contains discipline-specific criteria such as requirements for structural, electrical, HVAC, lighting, and plumbing. The level of detail in the architectural program varies from project to project, and can be specified as such in the system.

With just a few parameters set, the information in Criteria Composer is sufficient to prepare a preliminary cost estimate and schedule. For example, it is acceptable to create a project that contains a list of architectural functions and their allocated areas without deciding how many buildings will be required. On the other hand, the planner may create a project with detailed information such as the number of buildings and the number of stories in each building. Obviously, the latter cost estimate will be more accurate. Typically, the planner will not create such a detailed program from scratch, but will copy it from a similar project and tailor it to suit the current customer’s needs. Users benefit from Criteria Composer not only because it provides a method to capture, use, and reuse this explicit criteria, but also because it can often assist designers by providing a deeper understanding of the rationale behind certain decisions, from which other, better, solutions could be considered.

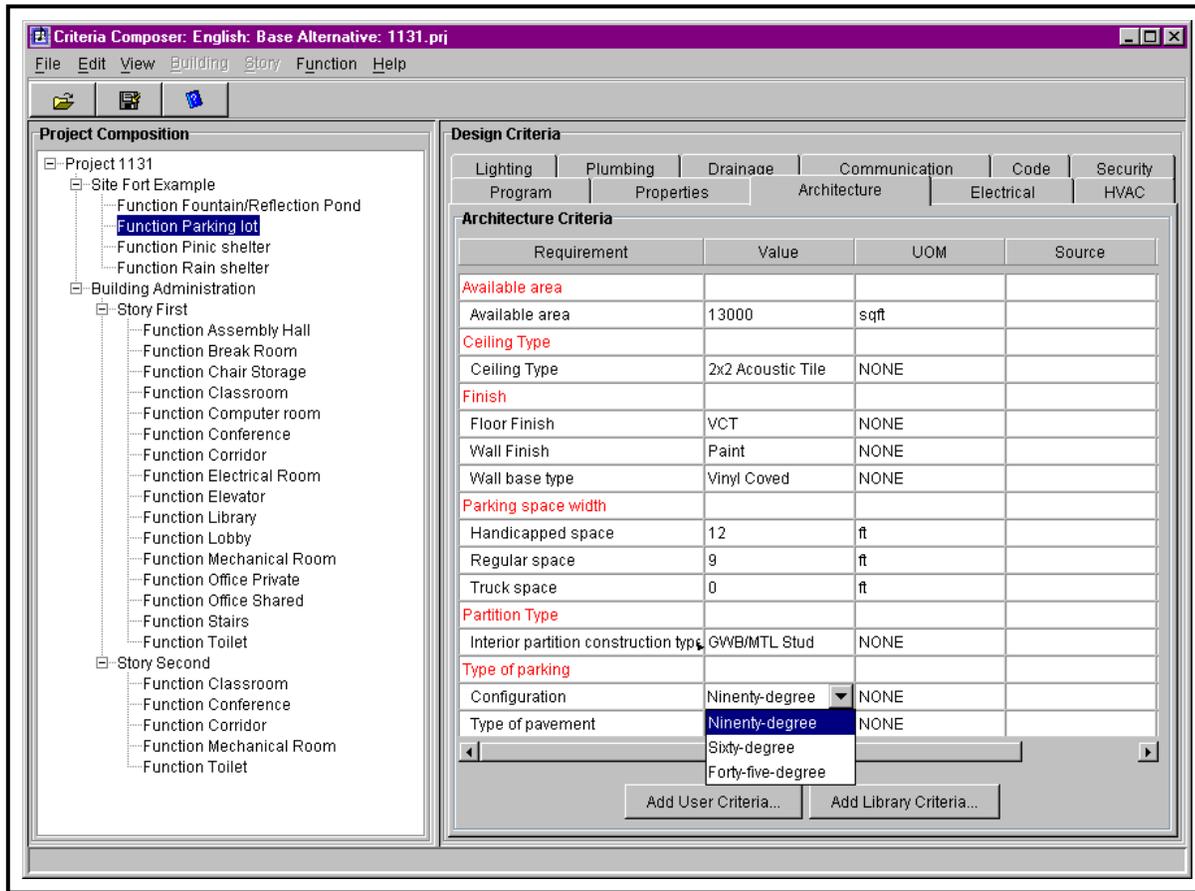


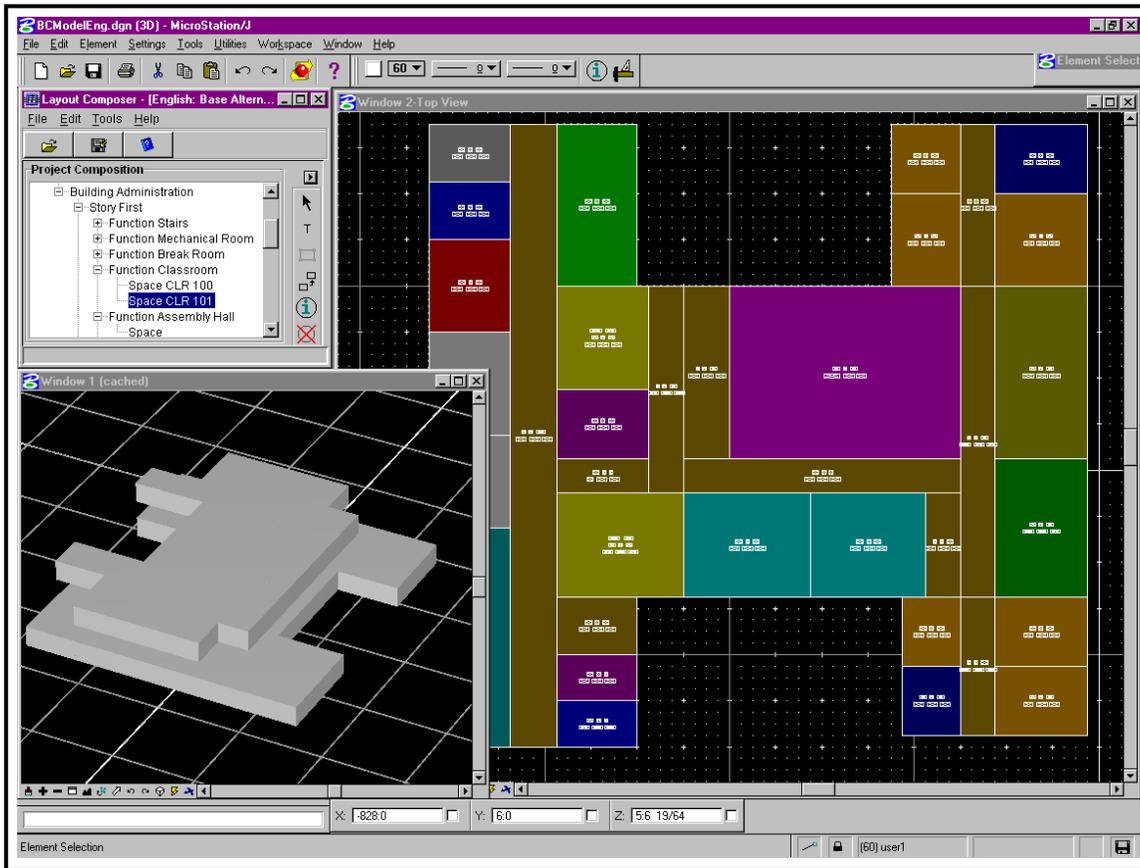
FIGURE 3. CRITERIA COMPOSER.

Once the architectural program has been completed, *Building Composer* will support a programming level cost estimate with preliminary cost estimating tools such as the Parametric Construction Cost Estimating System ([PACES™](#)) via an XML-based exchange file. In addition, other applications that comply with the IAI or BLIS standard can also be used.

**Layout Composer** -- Layout Composer (*Figure 4*) supports the creation of conceptual facility designs. Layout Composer works in conjunction with MicroStation TriForma™ or AutoCAD Architectural Desktop™ and uses the programmed area and criteria established in Criteria Composer as a point of reference and comparison during design. In this phase, the architect would then determine how many stories are needed and what functions would work on which stories (blocking and stacking). Given chosen requirements such as building footprint, street appeal, adjacency, structure, building systems, form, and massing, the designer can explore conceptual alternatives to determine the best overall solution.

The spatial configurations that are created are not simply abstract geometry. The underlying model recognizes these spaces as offices, corridors, restrooms, or any other function in the customizable library, and therefore understands and provides reference to all of the criteria that applies for that particular function. For example, restrooms require an exhaust air system while offices do not. The default criteria associated with each space is sufficient to use Wizards to create a preliminary design

and programming level cost estimate, along with other types of analysis. System selections can be made at this stage, but are not required.



**FIGURE 4. LAYOUT COMPOSER IN MICROSTATION/J.™**

Layout Composer assists in the design process by providing an environment that explicitly (and parametrically) supports the concepts of multiple stories, functions, and spaces. This simplifies the interface by allowing operations to occur on these elements rather than requiring an understanding of the native CAD platform commands. For example, to change the floor-to-floor height of all of the spaces on a particular story, one just needs to change the criteria value on the story tab and all of the spaces comply, rather than selecting walls and stretching them as in a typical CAD environment. Also, deleting a story is as simple as deleting the item in the tree hierarchy interface as is commonly done on files on today's operating systems, rather than requiring an understanding of file referencing to other story drawings.

Another important concept and feature in Layout Composer is the ability to present the design differently based on the user's task and objective. For example, during design, a view named "Above / Current / Below" could be used to quickly see the spaces on the current story with the regular symbology, and all of the spaces on the stories below with a grayed line, and the spaces on the story above with a dotted line, as is a current convention in practice. This allows a quick assessment of the relation of forms on particular stories to other stories in a building. Other representations include a "Bubble Diagramming" view, which is useful for presenting conceptual relationships, and a "Color by Function" view, which provides visual feedback on functional groupings.

In addition, Layout Composer assists the designer by supporting the use of pre-designed solutions of configurations of one or more spaces. For example, if a particular building type has a unique requirement for a function layout (i.e. arms vault, communications equipment rooms), these can be stored and reused preventing the need to “reinvent the wheel” in subsequent designs.

Once a design proceeds past the Conceptual Design phase to the Design Development phase where system and component selections are no longer optional, *Building Composer* continues to provide value in several ways:

- Engineers can use Criteria Composer to reference and target the requirements associated with their discipline.
- Wizards are available to expedite the system selection process as well as other design tasks.
- The completed architectural program can be exported to a detailed cost-estimating tool as well as customizable reports.

**Wizards** -- Wizards are software components that operate on a discrete design task by taking criteria and user input in order to create or manipulate a building and criteria model rapidly, all according to generally recognized or organization specific practices. A Wizard extends *Building Composer* functionality and knows how to use the criteria data expressed in Criteria Composer to create or analyze something in a useful way. An example of a simple wizard might be one that determines the number of parking stalls required for a building with a particular building occupancy level, based on an individual organizations standard design criteria tables and algorithms (*Figure 5*).

Criteria	%	Value
Staff	100	22
Number of Children	25	99

**Figure 5. Example Wizard.**

Wizards assist the designer in ensuring that the design solution meets the design guide requirements, in ensuring that the customer’s requirements are being satisfied, and in providing additional accuracy and speed over manual calculations. Wizards do not encode only one particular method and set of data, but

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rather provide flexibility for adapting to different design practices, commonly by building type. There are three different categories of Wizards that can help users in different ways:

1. **Criteria Wizards** are wizards that assist a user primarily in Criteria Composer by providing one or more worksheets consisting of questions and answers, selection options, and structured data entry (to name a few) from which an algorithm or calculation is performed to arrive at a value for a particular criteria. The parking allowance Wizard in the example above is a perfect example of a Criteria Wizard.
2. **Model Generation Wizards** are wizards that interact with commercial off the shelf software to generate model components and objects through parametric modeling formulas or manual specification. Examples of these would be a Duct Layout Wizard based on supply and exhaust airflow, a Lighting / Ceiling Grid Layout based on grid spacing, diffuser layouts, lighting algorithms and requirements (foot-candle, lumens).

Of particular interest are model generation wizards that take an initial space layout of a building and then automate the generation of a building model consisting of walls, floors, ceilings, and roof objects. The building model here is based on the criteria established for each of the associated elements. For example, a particular function may specify a particular wall type and a building may specify a particular exterior wall type, from which the appropriate elements would be generated. At this point, Architectural Desktop or Triforma will be used to facilitate detailed design and construction document generation.

3. **Analysis Wizards** interact with third-party GOTS/COTS analysis tools in addition to custom analysis tools written within *Building Composer*. Examples of third-party tools might include: SPiRiT sustainable designers aid, energy analysis, security analysis, and force protection analysis. Analysis Wizards currently being considered for *Building Composer* are net to gross area calculation and preliminary egress analysis.

In summary, *Building Composer* is a suite of facility design tools that integrate **client-specific criteria** with a life-cycle facility model and commercial tools. Designers benefit from having criteria at hand and from having an a la carte toolbox of design and analysis wizards that automate tedious tasks, freeing designers, to a degree, to concentrate on higher-level design and use issues. Clients benefit from a **centrally managed set of criteria** that is explicitly addressed in the design process, therefore **improving quality**, supporting design **flexibility**, and **reducing the time and cost** of facility acquisition.

*POC: BETH BRUCKER, CEERD-CF-N, 217-352-6511*

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## ENVIRONMENTAL OPERATING PRINCIPLES (EOP)

This is an update on EOP activities within HQUSACE and across the Corps.

A Corps-Wide web based E&C EOP survey was conducted by the ERDC-CERL-IL between 16-31 July 2002. The purpose of the survey was to obtain input essential in developing a sound and practical action plan that fully integrate the EOP into our culture, policy and guidance, business processes, and products. Almost 400 responses were received. The ERDC-CERL-IL is currently assessing the results.

A Corps-Wide E&C EOP network of environmental professionals has been established and is attached. This network will provide an information transfer conduit in the E&C community on environmental matters. A copy of this listing can be obtained from Bruce Wallace.

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## NEW PUBLICATIONS

All new publications issued by HQUSACE are now issued electronically. This results in some offices not knowing about new publications for some months after the official issue date of the publication. Corporate Information (CECI-IV) maintains a list of new publications issued in the last 180 days on the Internet at <http://www.usace.army.mil/inet/usace-docs/new-pubs/>.

In order to assist Engineering and Construction offices in obtaining the latest publications, we will include a listing of the newest publications in each issue of the E&C News. The lists in this issue include all publications issue from 31 May 2002 through 1 September 2002.

### New Engineer Circulars

PUB.NUMBER	PGS	PROPONENT	TITLE	PUB.DATE	EXP.DATE
<a href="#">EC 25-1-303</a>	019	CECI	Information Management - Information Technology Investment Management (ITIM)	01 Aug 02	31 Aug 04
<a href="#">EC 1110-2-6054</a>	009	CECW-E	Engineering and Design: Properties of Low-Density Concrete	28 Jun 02	30 Jun 04

### New Engineer Manuals

PUB.NUMBER	PGS	PROPONENT	TITLE	PUB.DATE
<a href="#">EM 1110-1-1000</a>	371	CECW-EE	Engineering and Design: Photogrammetric Mapping	01 Jul 02
<a href="#">EM 1110-1-1004</a>	102	CECW-EE	Engineering and Design: Geodetic and Control Surveying	01 Jun 02
<a href="#">EM 1110-1-4001</a>	424	CEMP-ET	Engineering and Design: Soil Vapor Extraction and Bioventing	03 Jun 02
<a href="#">EM 1110-2-1009</a>	292	CECW-EE	Engineering and Design - Structural Deformation Surveying	01 Jun 02

### New Engineer Pamphlets

PUB.NUMBER	PGS	PROPONENT	TITLE	PUB.DATE
<a href="#">EP 715-1-7</a>	175	CECW-ET/ CEPR-P	Architect-Engineer Contracting	31 Jul 02

### New Engineer Regulations

PUB.NUMBER	PGS	PROPONENT	TITLE	PUB.DATE
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<a href="#">ER 37-1-31</a>	012	CERM-B	Financial Administration - Planning, Programming, Budgeting and Executing Operations	01 Aug 02
<a href="#">ER 690-1-500</a>	018	CEHR	Civilian Personnel - Position Management and Classification	31 Jul 02
<a href="#">ER 1110-2-111</a>	034	CECW-EI/ CECW-OD	Periodic Safety Inspection and Continuing Evaluation of USACE Bridges	31 Aug 02

### New Engineer Technical Letters

PUB.NUMBER	PAGES	PROPONENT	TITLE	PUB.DATE
<a href="#">TL 1110-1-188</a>	033	CECW-EWS	Use of Geogrids in Pavement Construction	31 Jul 02

### New HQUSACE/OCE Army Technical Manuals

PUB.NUMBER	PGS	PROPONENT	TITLE	PUB.DATE
<a href="#">TM 5-693</a>	0139	CEMP	Uninterruptible Power Supply System Selection, Installation, and Maintenance for Command, Control Communications, Intelligence, Surveillance, and Reconnaissance (C4ISR) Facilities	31 May 02

*POC: LIZ PANNELL, CECI-IV, 202-761-5974*

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## *Upcoming Regional and National Meetings and Conferences*

### 2003 INFRASTRUCTURE SYSTEMS CONFERENCE

The following information on the 2003 Infrastructure Conference will be published in Civil Engineer, the American Society of Civil Engineers magazine.

The U.S. Army Corps of Engineers is conducting its 2003 Infrastructure Systems Conference at Bally's in Las Vegas, 5-8 May 2003. The Corps expects over 1,200 attendees and over 200 exhibitors. Interested vendors should contact Jim Truesdale at (916) 557-5346 or email him at [James.J.Truesdale@usace.army.mil](mailto:James.J.Truesdale@usace.army.mil) for more information. The security of our nations infrastructure will be a major item of discussion at the conference. Individuals interested in attending the conference and not wanting to have a display booth should contact Bill Zeigler at (213) 452-3747 or email him at [William.J.Zeigler@usace.army.mil](mailto:William.J.Zeigler@usace.army.mil).

*POC: ROBERT DIANGELO, CECW-ETE, 202-761-5543*

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## *Training*

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## FY2003 PROSPECT COURSES

A wide variety of technical and professional development courses are available through the USACE Proponent Sponsored Engineer Corps Training (PROSPECT) Program. Information about the FY03 program can be found online at: <http://pdsc.usace.army.mil> under *Class Schedules*.

To enroll, first discuss this with your supervisor and then contact your local training coordinator. Your training coordinator can guide you through the registration process and inform you of any deadlines applicable in your organization as well as all local procedures that you must follow to register.

If a course is full, you may request to be put on a waiting list and you will be informed when a space becomes available.

*POC: JOHN P. BUCKLEY, CEHR-P-T, 256-895-7431*

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## *Open Discussion and Comments*

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No items for discussion were received this month.

(Editors' note: If you want to share your thoughts with our readers regarding a subject of general interest, send an email to the E&C News editor at [charles.pearre@usace.army.mil](mailto:charles.pearre@usace.army.mil). A synopsis of your comments will be published next time).

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## *Editors' Notes*

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### FUTURE THEMES

Future regular issues of the Engineering and Construction News will be issued every two months; with special issues published as needed. The theme for the next issue of the News is listed below for your information and use in preparing articles for submission to the News.

October-November 2002      E&C Technical Capability Assessments

*POC: CHARLES PEARRE, CECW-EIS, 202-761-4645*

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### SUBSCRIBE TO ECNEWS

Engineering and Construction News uses a subscription list on the Corps List Server. The name of the list is LS-ECNEWS. The purpose of the list is to distribute the Engineering and Construction community newsletter, *Engineering and Construction News*.

You can subscribe or unsubscribe to LS-ECNEWS by sending an e-mail message to [majordomo@ls.usace.army.mil](mailto:majordomo@ls.usace.army.mil) with no subject line and only a single line of text in the message body. That single line of text should have the following format: **subscribe ls-ecnews** or **unsubscribe ls-ecnews**. The List Server system will automatically pick up your originating e-mail address from the message and add it to or delete it from the distribution list.

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If you have any questions about the list server, see the List Server E-Mail Delivery System web page at <http://eml01.usace.army.mil/other/listserv.html>. Or you may contact Charles Pearre if you have additional questions on the subscription list.

*POC: CHARLES PEARRE, CECW-EIS, 202-761-4645*

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