MURRAY & DOWNS
AIA - ARCHITECTS, INC.

Murray & Downs Newsletter

Volume 3, Issue 2, Summer 2004

Marshall Center for Primary Care - Placerville, CA

Picture This

Medical Imaging - An Overview

Denis J. Stroup
Project Coordinator

Many of us at one time or another in our lives have undergone some kind of medical imaging. Perhaps an X-ray for a broken bone or a DEXA scan to test for osteoporosis. I recently spent some time with Marshall Hospital's Clinical Project's Manager, Dan Weaver, to learn more about the many kinds of medical imaging modalities and their applications.

Radiographic

Imaging devices that emit X-rays are grouped into this category. These include general X-ray, fluoroscopy, and CT (computed tomography).

These devices acquire their images by emitting a quick burst of X-rays which passes through the area being imaged and is captured on the other side by a plate or detector. A general X-ray follows this principle in a pretty straight forward way. An X-ray image is formed by the radiation that is able to pass through an object. Parts of the object that are more dense will absorb a greater fraction of the X-ray beam, appearing "dark" in terms of the amount of X-ray flux detected. Similarly, parts of the object that are less dense will appear "bright." X-ray film typically creates an image of the negative of the X-ray flux, with regions that are highly exposed with X-rays appearing dark, and lightly exposed regions (e.g. bones) appearing bright. "General X-ray is the most often used modality because of its speed and fast turn around" says Dan, "especially for imaging the chest area."

Fluoroscopy is often referred to as a "live X-ray" because it is imaging in real time. The advantages of real-time imaging and the flexibility to freely position the X-ray field during examination makes fluoroscopy a very powerful diagnostic tool. A modern fluoroscopic system can be produced in a large number of varieties and can be used in many fields of radiology, such as photospot imaging, spot film imaging, angiography, digital subtraction angiography (DSA), gastrointestinal imaging, in connection with endoscopy, lithotripsy etc.

A CT scanner acquires images in a radial fashion around the patient "slicing" as their body moves through the gantry. The computer then reconstructs the multiple images into a cross section. The main advantage of CT as compared to projection imaging is the inherent ability of CT to separate objects according to their position in the projection

» *Imaging, page 3*

Sky Bridge

A Ten Ton Work of Art

Mike S. Brumm
Construction Administrator

"The coolest Sky Bridge – and probably the only one – between Rancho Cordova and South Lake Tahoe went up last week in Cameron Park." (*Sacramento Bee* April 11, 2004.)

The 10-ton, 90-foot long bridge was trucked out to Cameron Park, California in one piece from Minnesota..... Can you imagine the looks the truck driver must have received from towns, cities and drivers from across the country?

The bridge was placed to provide connection and additional access for the existing Marshall Medical Center to their new Surgery Center, currently under construction.

The bridge coordination and placement, by General Contractor *Carter/Kelly Inc.*, was executed perfectly by Superintendent Steve Polan and his expert crew.

» *Bridge, page 2*

In This Issue

3025 Sacramento Street
Placerville, CA 95667
Tel. 530.626.1810
md@murraydowns.com
www.murraydowns.com

Tidbit

(Internal Office Communications)

Black Dots

Some thoughts on those little black dots on the site plan - All bollard dots need a note or detail bubble call-out. One way around this would be to note one bollard to say typical of 23. That way, even if they can't find all your dots, they will have priced 23 of them. Add the dot to your symbol list so it is not mistaken for a concrete poché mark. Bollards can be fixed in place or removable, depending on specific requirements of the project. If removable, clarify who supplies the locking device – contractor or owner. Watch specific agency protection and access requirements. We just had a project where a local utility district decided they wanted a swinging gate added to the bollards resulting in a change order. It would be wise to clearly discuss the function of or reason for the bollards. If, for instance, the owner would like to keep people from using the walkway for a driveway, maybe more protection is needed to keep vehicles from simply driving around the bollards.

Bridge

» *Continued from page 1*

It was an awesome event to watch. After placement was completed, Marshall Medical Center's Construction Manager Mark Funston was the first to cross the bridge.

If you are traveling through Cameron Park, east on highway 50 from the Sacramento area towards Placerville and South Lake Tahoe, take a look up on the hill to your left for a for a good view of Marshall Medical Center's newest addition to their fast and successful growth.

The new Surgery Center is scheduled to be completed this September. Also master planned on this site is the expansion of two additional buildings. ❑

Marshall Medical - New Surgery Center, Cameron Park, CA

Did you know ...?

Jeff Stein
Project Architect

Hillary Clinton and HIPAA – Did you know that Hillary Clinton was the pioneer of HIPAA (The Health Insurance Portability and Accountability Act of 1996)? In 1996, the former First Lady was given the task from President Clinton to come up with a plan to provide heath insurance to all Americans. Unfortunately, Hillary got eaten alive by the insurance lobbyists and her quest for universal health coverage was unsuccessful. However, one important element *was* able to survive from her efforts, the concept of "insurance portability" - the right to carry your medical coverage over from one employer to the next without undue restriction, such as having a "pre-existing condition" or a family history of a disease. This feature was protected in a 1996 federal law called the Health Insurance Portability and Accountability Act, or HIPAA. Since then, HIPAA has evolved into the protection of patients rights, enforced by the Department of Heath and Human Services.

HIPAA Compliance Deadline – The deadline for compliance to HIPPA Privacy Rules was April 14, 2003 - ensuring a national floor of privacy protections for patients by limiting the ways that health plans, pharmacies, hospitals and other covered entities can use patients' personal medical information. The regulations protect medical records and other individually identifiable health information, whether it is on paper, in computers or communicated orally. Key provisions of these new standards include:

Access to Medical Records – Method of access to maintain privacy.

Notice of Privacy Practices – Healthcare provider issuing notices to patient on how their medical records will be used.

Limits on Use of Personal Medical Information – Mandating limits to extent of the use of personal medical information.

Prohibition on Marketing – High limits set on what patient information can be used for marketing purposes.

Stronger State Laws – State laws can overrule the federal mandate if the state law provides a more stringent requirement for privacy.

Confidential Communications – Provides patients the ability to instruct their Healthcare provider on how to administer or communicate the confidential information to someone else.

Complaints – The ability for the patient to file a complaint regarding privacy practices of their health care provider.

HIPAA and Litigation - In 2003 alone there were at least 60 lawsuits that were filed in state courts, with patients' lawyers claiming that HIPAA's privacy rules set a "standard of care" that must be adhered to by healthcare providers. In one such case, a jury in Washington, D.C. awarded $25,000 to a patient whose HIV status was inadvertently revealed to the patient's coworkers by a hospital employee. OOPS!

HIPAA Fines - Changes have been added to the final rules, most notably is the change regarding patient information. Originally, HIPAA concentrated on electronic information, the *new rules* include any and all patient information and documentation, including but not limited to paper, paperless, and even voice or transcribed information. Penalties for non-compliance can result in fines ranging from $100 up to $250,000 and /or 10 years in prison. ❑

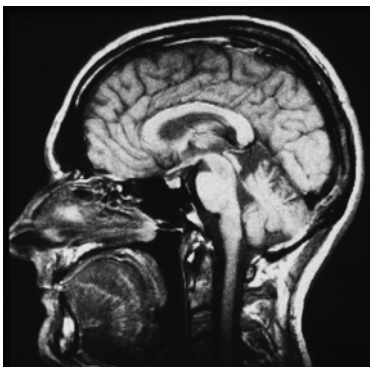
Imaging

» *Continued from page 1*

direction, i.e. to avoid the confusion that arises when the shadows of multiple objects are superimposed. This, combined with high precision measurements and digital displays, gives CT the ability to resolve objects with extremely small contrast. This allows soft tissue structures to be imaged in a manner not possible with projection radiography. "The advances in CT technology have been staggering in recent years," Dan comments, "These machines are now capable of high speed scans and virtual fly -throughs."

Magnetic Resonance Imaging (MRI)

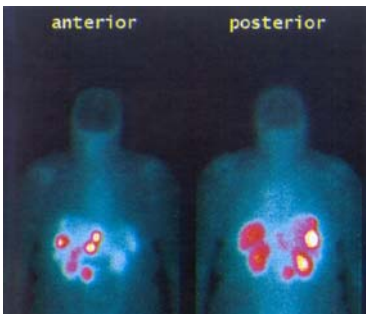
While the other modalities previously discussed looked from the outside-in, MRI's actually look from the inside-out. MR imaging uses a powerful magnet to align hydrogen molecules in the body. A radiofrequency then interrupts this alignment and the energy released from the hydrogen protons is received by the coil positioned around the area of the body that is being imaged. MR imaging



produces high resolution, high contrast two-dimensional image slices of arbitrary orientation which can be used independently, or combined to develop three-dimensional images for review. Applications of MR imaging have steadily expanded over the last decade. Currently, it is the preferred cross-sectional imaging modality in most diseases of the brain and spine and has attained major importance in imaging diseases of the musculoskeletal system. MR imaging in the head, neck and pelvis has attained a substantial level of clinical use, and its applications in the abdomen, kidneys and chest are rapidly increasing with the advent of ultra fast MR imaging techniques.

Nuclear Medicine

Nuclear medicine is used mainly to allow visualization of the skeletal system, organs, and regions within organs that cannot be seen on conventional X-ray images. Bone scanning with nuclear medicine, for example, can be an important step in diagnosing and assessing treatment of various kinds of cancer, including breast cancer, because it can reveal if the cancer has spread beyond its primary site and developed secondary cancer growths in the bones. Nuclear medicine studies require the oral or intravenous introduction of very low-level radioactive chemicals called radiopharmaceuticals into the body. Radiopharmaceuticals are specially formulated to be collected temporarily in the



specific part of the body to be studied. The radionuclides are taken up by the organs in the body and then emit faint gamma ray signals which are measured by a gamma camera. The gamma camera has a large crystal detector called a scintillation crystal. These crystals detect the emitted radiation signal and convert that signal into faint light. The light is then converted to an electric signal, which is then digitized and reconstructed into an image by a computer. The nuclear medicine image can either be in gray scale, such as a bone scan, or they can be color-coded to clearly show functional activity, like in a cardiac study.

Ultrasound

Ultrasound is essentially a sound echo, similar to sonar. The ultrasound process involves placing a small device, called a transducer, against the skin of the patient near the region of interest; for example, against the abdomen to image a fetus. The ultrasound transducer combines functions like a stereo loudspeaker and a microphone in one device: it can transmit *and* receive sound. This transducer produces a stream of inaudible, high frequency sound waves which penetrate into the body and bounce off the organs inside. The transducer detects sound waves as they bounce off or echo back from the internal

structures and contours of the organs. Different tissues reflect these sound waves differently, causing a signature which can be measured and transformed into an image. These waves are received by the ultrasound machine and turned into live pictures with the use of computers and reconstruction software.

The future

When asked what the future holds for medical imaging, Dan replied in a word, "PACS." PACS, or Picture Archiving and Communication System, is

» *Imaging, page 6*

Reconciliation Process

Keeping the End in Mind

John R. Graifemberg
Studio Leader

When space needs are greater than available funding, reconciliation is just what the doctor(s) ordered.

Through facility-wide master planning and operational needs assessment, Marshall Medical Center (MMC) together with Murray & Downs developed a list of needed improvements. Many departments, including acute care nursing, perinatal, emergency and dietary were functioning in outdated, over-crowded spaces; facility-wide traffic flow and parking was inadequate; and significant improvements could not be achieved within the existing facility. It became evident that a New Acute Care Facility (NACF) addition to MMC should be considered.

Marshall Hospital - Placerville, CA

Discussions were held with the departments that exhibited the greatest need for improvements to develop functional space and operational programs. Relationships between various departments that were being considered for relocation to the NACF as well as those that would remain in the existing hospital or be relocated off site were identified.

Murray & Downs, our engineering consultants and MMC facilities staff developed criteria for the NACF architectural, structural, mechanical and electrical systems. Cost estimates for the NACF, site infrastructure and parking concepts were prepared. Soft costs were calculated and added to the construction costs to obtain the total project cost. The proposed scope of work and the related project costs were presented to MMC for review and coordination with identified project funding. Appropriate increases in site parking and owner's contingency costs were added to the project budget.

At this point, it was clear that the cost of the proposed scope of work exceeded the identified project funding. Project status, including the methodology to bring the scope of work and the budget in line, was presented by MMC management and Murray & Downs to the MMC Outcomes Management Council (OMC) Planning and Construction Committee, the MMC board of directors and the MMC Board Planning Subcommittee. It was agreed that the MMC OMC Planning and Construction Committee would take the lead in reconciling the variance between the project scope and identified funding. The MMC finance department and Murray & Downs would provide financial and technical assistance in this effort.

The committee agreed to meet once a week for several weeks to:

- Confirm project goals
- Review the requested scope of work with individual departments
- Identify potential scope revisions, with related costs, and additional funding sources
- Propose selected scope revisions and additional funding sources to be presented to OMC and the Board for approval

A considerable amount of progress was made by the committee during the first all day working session.

Project goals were prioritized in the following order:

- Additional acute care and obstetric beds
- Improve the level of patient care at the emergency department
- Improve dietary department production and service
- Provide additional parking and improve site circulation
- Resolve outstanding code/regulatory issues
- Improve overall hospital efficiency
- Develop a significant main entrance to the hospital
- Improve the typical patient experience
- Improve storage and other support areas

A task specific schedule was developed to establish and track the reconciliation progress. In order to maintain the project schedule, the reconciliation process had to be completed within sixty days.

The magnitude of the difference between the cost of requested project scope, excluding additional parking, and identified project funding was approximately $18 million. Murray & Downs presented several methods that could be used to reconcile the project scope and budget including:

- Removing individual departments from the project equal to 30% of the gross building area
- Removing some individual departments and reducing the size of all remaining

Reconciliation Process

» *Continued from page 4*

building area

- Build out 100% of the building shell and core, but only finish out 40% of the gross building area
- Eliminate or postpone other planned projects
- Select combinations of any or all of the above possibilities

Various options to increase available funding were discussed, including:

- Delaying, downsizing or deleting other budgeted projects
- Use additional funds from favorable bond sales
- Add additional year of income

"It is never easy to take 20% out of a project. We used a collaborative process of employees, managers, administration and Murray Downs to accomplish this reduction. (Their) flexibility and speed in pricing and determining if our ideas would work... was key to us meeting our goal."

James Whipple, Administrator

Through a series of interactive exercises, the committee developed additional ideas to reduce project scope and increase available funding. These started with dividing into groups to list and discuss specific costs and funding options. Each group presented their options with pros and cons considered. Each committee member indicated their preference for each option. The most favored options were brought to the top of the list for further review.

Murray & Downs estimated the costs for each of the scope revision options and presented this information at the next weekly meeting. MMC presented operational cost issues associated with various scope and funding options. The committee was then divided into four groups with the assignment to select a combination of scope and funding revisions that would meet the budget goal. Each group presented their proposals to the committee which suggested minor revisions. The four revised proposals were presented to OMC for approval.

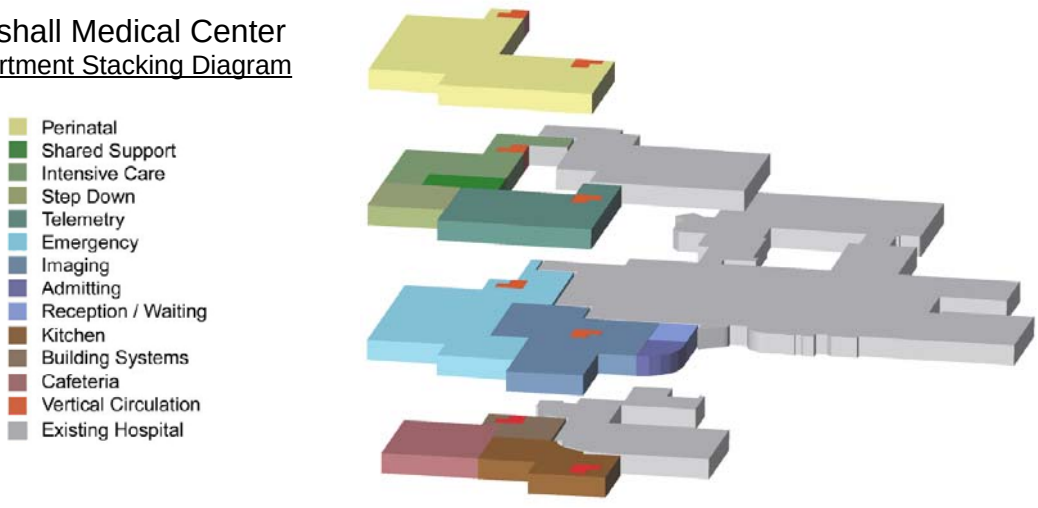
During this time period meetings were held with each department to give them a broad overview of the reconciliation process and to verify departmental specific scope reductions. These proposed reductions were then presented to the committee for review and approval.

OMC approved a combination of the four proposals developed by the committee. Murray & Downs reconfirmed the project costs for each of the scope revisions selected by OMC. The project had been brought back into budget. The final scope revisions and funding increases were presented to and approved by the Board.

Reconciling the scope of work with available funding was a significant accomplishment for MMC staff, but of equal importance were the benefits that the reconciliation process itself created. Hospital staff from many different departments had previously been concentrating their efforts on the needs of their individual departments. The reconciliation process provided the opportunity for each staff member to see how their department fit within the total project. They worked together to meet each other's needs and to create a more unified project. Enthusiasm for the NACF grew during the process and is expected to be maintained through the design and construction phases. ❑

Marshall Medical Center

Department Stacking Diagram



Tidbit

(Internal Office Communications)

Standards

An interesting discussion was held recently at one of our job sites with the electrical sub-contractor. The project is in the SMUD electrical distribution area. Our specs have some specific references to electrical service which differ from SMUD standard specs. The position I presented was that the drawings and specs were bid as issued and amended by addenda. No reference was made to SMUD standards in our documents. The electrical sub indicated that he agreed with this but that in fact he had bid the project using his knowledge of what would be approved by SMUD (as an example our electrical specs call for Schedule 40 conduit. SMUD standards are Schedule 20 minimum-which is what they priced in their bid). His comment, which really hits home on this type of issue, was, "If I don't bid the SMUD standards I will probably not be the low bidder." Understanding the "low bid" nature of public work projects, we need to be cognizant of conditions like this and if we are going to change the Agency standards, we should make it very clear so everyone bids it appropriately, thus removing the statement he made from consideration.

Imaging

» *Continued from page 3*

used to communicate and archive medical imaging data, mostly images and associated text data generated in a radiology department and disseminated throughout the hospital. Dan continues, "Images can be captured, archived and sent to any one of the PACS stations here in our facility or to other physicians around the country or around the world. This translates into a higher level of patient care as diagnostics and diagnosis times are shorter." Marshall Hospital's imaging department is now all digital and PACS capable.

Ever since Wilhelm Conrad Röntgen discovered a new type of radiation he deemed "the X-ray" back in 1895, continuous advances have been made in the field of medical imaging. Today, there is an amazing array of imaging tools for physicians to choose from to more effectively diagnose and treat their patients. ❑

Staff News

Introducing Our New Staff:

Jeff Stein – A graduate of the University of Nebraska, and most recently a project architect in Phoenix, Jeff decided to leave the Arizona sun to join the health care studio here at Murray & Downs. His experience encompasses a wide variety of acute health care projects, one of which was a 50,000 sf Patient Tower that included a medical/surgical nursing unit, telemetry nursing unit, ICU unit, Cath lab, cardiology testing lab, 7 bed PACU, and an endoscopy suite with 3 procedure rooms. His responsibility in the project included assistance with the master planning, and he took the lead in program development, schematic design, design development, construction documents and construction administration. With over 15 years of experience providing architectural services for health care clients, we are pleased that Jeff decided to make El Dorado County his home.

Veronica Cook – A resident of Placerville, Veronica is thrilled about her "non-commute." She is our new Architect's Assistant. She works with all of our Project Architects and Project Managers as they weave their way through the variety of paperwork processing that is required on our public works projects. She comes to us with extensive support experience, most recently from Nationwide Health Plans where she was a Sales & Marketing Technician. Welcome Veronica!

Hideaki Taguchi – Hideaki recently earned his Master of Architecture degree from the University of Illinois Urbana. While at the university, he won the "Earl Design Award" competition as well as several other award nominations. He is a registered architect in California and has been assigned to projects within our K-12 studio. We are very happy to have Hideaki join our team!

Mario Sandri – Mario joins us from Germany. He graduated from the University of Applied Sciences with a degree in architecture. With his highly developed computer skills, he will be assisting our design department in the creation of renderings and presentation materials. Welcome Mario!

Debbie Dayringer – Debbie is a licensed architect and fills the role of Interiors Architect for Murray & Downs. She has a Master of Architecture degree from Texas A&M University. For the past 10 years, Debbie has focused her talents on health care and specializes in health care interiors and specifications. Her recent projects include: Novato Community Hospital, Sutter Medical Plaza in Orangevale, Sutter Amador Hospital in Jackson, and the Santa Cruz Maternity and Surgery Center - just to name a few. We are very excited that Debbie is bringing us her expertise! ❑

Material Matters

Copper and MSRA

June 2004 – University of Southampton

A new study by scientists at the University of Southampton suggests that MRSA contamination can be reduced by using copper alloys for surfaces in healthcare facilities.

Methicillin Resistant Staphylococcus Aureus (MRSA) is a virulent organism, essentially resistant to all beta-lactam antibiotics (for example: penicillins, ampicillins, cephalosporins). It can cause skin, bone and life-threatening blood infections, as well as pneumonia.

In a study co-funded by the International Copper Association and Copper Development Association Inc., New York, Professor Bill Keevil, Head of the Environmental Healthcare Unit in the University of Southampton's School of Biological Sciences, and Dr. Jonathan Noyce examined the survival rates of the organism on stainless steel, the most commonly used metal in healthcare facilities, and on selected copper alloys. Their findings, which were reported recently at a meeting of the American Society for Microbiology in New Orleans, showed that at room temperature, MRSA was able to persist and remain viable in dried deposits on stainless steel for periods up to 72 hours.

For copper alloys containing 55 percent, 80 percent, and 99 percent copper, significant reductions in viability were achieved after four and a half hours, three hours, and one and a half hours, respectively. Yellow brass rendered the bacteria completely inviable after 270 minutes, while the high-copper alloy took only 90 minutes.

"Our results strongly indicate that use of the copper metals in such applications as door knobs, push plates, fittings, fixtures and work surfaces would considerably mitigate MRSA in hospitals and reduce the risk of cross-contamination between staff and patients in critical care areas", said Professor Keevil. "However, despite the significant performance of copper alloys in our study, we also noted that the survivability of MRSA on all metals at lower temperatures is much greater, indicating that hygiene is particularly imperative in those environments."

Professor Keevil added that the antimicrobial effects of copper have been well documented. "Recent studies on E. coli O157 and Listeria monocytogenes on copper alloy surfaces show similar dramatic results, reducing viability of those pathogens from several weeks on stainless steel to only a matter of hours on copper alloys", he said.

Related medical articles can be found at www.innovations-report.com ❑

Customer Service

According to a survey conducted by the authors of *Customer Service for Dummies*, the following are some one-liners which tend to drive clients/friends away. Alternative phrases are in parentheses.

- I don't know. (I'll find out.)
- No. (What I can do is….)
- You're right----this stinks. (I understand your frustration.)
- That's not my fault. (Let's see what we can do about this.)
- You need to talk to my boss. (I can help you.)
- You want it by when? (I'll try my best.)
- Calm down. (I'm sorry.)
- I'm busy right now. (I'll be with you in just a moment.)
- Call me back. (I will call you back.)
- That's not my job. (This is who can help you.)
- I have no idea. (I'll find out.)

From *Customer Service for Dummies*

Tidbit

(Internal Office Communications)

Going Modular

When adaptability and flexibility of design become the key design issues, modular furnishings can usually offer solutions. While flexibility was a key to both of our recent lab and pharmacy projects at Marshall Hospital, it was the pre-designed storage solutions of the modular furnishings company that fit a special need for the pharmacy. These systems were able to accommodate the numerous materials and processes required for a successful pharmacy operation.

The modular casework company and its supplier were also involved in the space planning effort, working collaboratively with both the owner and architect. While built-in custom casework certainly has its place, Marshall Medical's choice of using a modular furnishings company fulfilled many of the complex planning and furnishings requirements for these projects.

Fowler Professional Office Building - Placerville, CA

Tidbit
(Internal Office Communications)

Cut & Paste

With close to 200 individual pieces of equipment going into a recent clinical lab project, equipment planning became the focus in the lab. Once the schematic furnishings layout was developed, an old but proven design tool was used for laying out the equipment. Small paper cut-outs of the major pieces of equipment, tagged and color-coded by department, were scattered onto the schematic plan. Each clinical department was then called in to help put the pieces together in a way that only they knew best. The equipment cut-outs were then taped down to the plan and brought back for CADD input. In this case, the advantage of using paper cut-outs was not only in the quick coordination of equipment layouts, but in also giving the medical staff a "hands on" feel for designing their own environment.

MURRAY & DOWNS
AIA · ARCHITECTS, INC.

3025 Sacramento Street
Placerville, CA 95667
Tel. 530.626.1810
md@murraydowns.com
www.murraydowns.com

Construction Costs Continue to Rise

What goes up, must come down?

Gerry H. Hughes
Estimating Specialist

By now, just about everyone has heard something about the rising cost of construction. International demand for construction materials, weakness in the dollar, a mild strengthening of the U.S. economy, and a boom in California construction, have all combined to create something akin to the "perfect storm" in construction costs.

This "storm" has resulted in a scramble to revise budgets, value-engineer and/or de-scope projects. To make ends meet, some projects have been redesigned, postponed or canceled altogether. But now that the market has digested this very unpalatable wave of cost increases, we should be asking ourselves, "how true is the old adage, *what goes up, must come down*?"

The answer could be, "It depends." In the case of construction materials and labor costs, the old adage may prove less than true. While supply and demand will reach equilibrium and prices will eventually stabilize, they will undoubtedly stabilize at a higher level.

However, the 20%, 40% or 80% premium currently being charged by many contractors and subcontractors seems to be out of line with any "normal" overhead and profit, even after taking into consideration seasonal and geographic adjustments. These premiums seem to be a response to the current shortage of local, available and qualified contractors.

Therefore, our expectation is that while base construction costs (materials and labor) will stabilize at a higher rate, total project costs may actually fall a bit as contractors become less busy and the market becomes a bit more competitive.

The graph below illustrates our projection for the aggregate rise in construction cost normalized for escalation of labor and materials (shown dashed) as well as the projected bid results due to variations in bid climate and the premiums charged by contractors. ❑