VOICE DATA VIDEO
SOUND AND COMMUNICATIONS
of Northern California

THE VOICE

2005
VOLUME ONE

LATEST SOUND & COMMUNICATIONS TECHNOLOGY NEWS

ALAMEDA • CONTRA COSTA • FRESNO • MARIN • MONTEREY • NAPA • SACRAMENTO • SAN FRANCISCO • SAN MATEO • SANTA CLARA • SANTA CRUZ • SOLANO • SONOMA

A publication of the National Electrical Contractors Association and the International Brotherhood of Electrical Workers of Northern California.

Saint Agnes Medical Center–

The Complexity of Wiring a New Hospital Calls for the Skills of a Union Contractor

COURTESY OF SAINT AGNES MEDICAL CENTER

Contra Costa Electric, Inc. wired the voice, data, and fiber for Saint Agnes Medical Center's new wing.

Modern medicine is driven by technology. VDV contractors must multi-task their way through complex hospital projects, planning and installing state-of-the-art information networks. Everything is digital, from radiology to telemetry to patient charting. Regulations are stringent, and contractors endure countless federal, state, and local inspections, along with grueling timelines.

That's why Saint Agnes Medical Center in Fresno chose an experienced union contractor, Contra Costa Electric, Inc., to wire the voice, data and fiber for its new 230,000 square foot North Wing. The six-story North Wing, which opened in April, almost doubles the size of the existing hospital. Over 100 beds were added for a total of 436. Saint Agnes worked directly with Contra Costa Electric, Inc.'s Fresno office to complete the expansion.

The first floor of the new addition houses an expanded Emergency Department, almost three times the original size. Additional floors include space for cardiac rehabilitation and cardiovascular diagnostic services, heart and vascular surgery, interventional radiology rooms, a coronary intensive care unit, and heart and vascular private patient rooms.

"When a hospital is thinking about installing new communications systems, you want to make sure that you bring on a company that can actually handle the job. If we had just a few wires to run, it would be a different story. But we are talking about thousands of wires, and needing trained and experienced technicians to do the job."

–Dick Phillips, Senior Telecommunications Engineer, Saint Agnes Medical Center, Fresno

Scope of Work

Contra Costa Electric, Inc. began work on the new facility in late 2003, assisted by technicians from the International Brotherhood of Electrical Workers (IBEW) Local 100. Contra Costa Electric, Inc. wired one million feet of data and voice cabling to over 4,000 stations throughout the hospital–rooms, labs, nursing stations, etc. They have installed over 5,000 feet of low voltage cable tray into the ceilings of the main corridors on each of the hospital floors.

They installed eight telecommunications closets throughout the building, including the main closet on the first floor. There are 500 cable terminations in each 10 x 10 closet. Contra Costa Electric, Inc. also used fiber to connect the new infrastructure to the hospital's main data center a mile away.

"Contra Costa Electric, Inc. has done an excellent job," said Dick Phillips, senior telecommunica-

continued on back page

To find a NECA/IBEW Union Contractor go to www.norcalvdv.org

NECA/IBEW VDV Contractors in High-Profile Buildings thro

Gladstone's new auditorium has state-of-the-art lighting and sound.

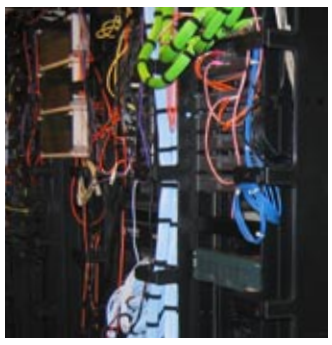
Metropolitan Wires J. David Gladstone Institute

Metropolitan Electrical Construction of San Francisco has installed over one million feet of telecommunications cable at Mission Bay's first private biotech research laboratory, the J. David Gladstone Institute.

The $74 million Institute is located adjacent to UCSF's Mission Bay campus, which promises to become the premier biomedical research hub on the West Coast. The Gladstone Institute is an independent, not-for-profit biomedical research institution affiliated with UCSF. It is devoted to research into cardiovascular disease, AIDS, Alzheimer's disease, and other neurological disorders.

For the project, Metropolitan installed the fiber infrastructure as well as the complete copper cable throughout the 200,000 square foot facility. The job was done with Category 6 wiring, in part to accommodate future desktop video teleconferencing using Voice over IP. Category 6 wiring is a new standard in copper that has recently been implemented by telecommunications contractors. The Cat 6 wiring is gigabit Ethernet, and the fiber backbone is a 10 gig fiber backbone.

The Cat 6 wiring goes throughout the building. Jack colors are changed according to whether the installation is phone or data. Data jacks are blue and phone jacks are green; everything is labeled and color coded.



The server room links to each floor with Cat 6 cable, fiber and copper.

The server room is located on the first floor of the six story facility. The server room is linked to each floor into the IDFs with fiber and copper. The first floor contains offices and lecture halls; floors 2-6 are lab floors. The lab floors have about 100 bench spaces each, arranged in 22 rows.

All the cables in the telecommunications closet are terminated on an Avaya Visipatch panel to save rack space. The panel is then linked into the UCSF campus with a fiber backbone. Metropolitan also installed a large wireless network.

Senior Project Manager Jeff Holland of Metropolitan Electrical said the project took ten months to install. Metropolitan worked with technicians from Local 6 to complete the installation.

Metropolitan recently completed a large telecommunications installation at Juniper Networks, as well as nVidia and Veritas.

For more information, contact Jeff Holland at jholland@metroelectric.com

COURTESY OF JOHN DURANT

The J. David Gladstone Institutes, wired by Metropolitan Electric, is the cornerstone of a planned biotech district.

Ceitronics Completes Communication Systems For Upscale Continuing Care Community

Ceitronics is completing communications wiring for the Classic Residence by Hyatt, a continuing care retirement community in Palo Alto. Located on Sand Hill Road near Stanford Shopping Center, the community features 388 independent living residences, as well as private accommodations for assisted living, memory support, and skilled nursing. The facility opened in June, and is built on the site of the former Stanford Mansion.

The Independent Living Facility is comprised of seven buildings, each four stories high. The assisted living facility is a two-story single structure. The facility features a number of amenities, including an auditorium, art studio, various dining venues, pool, spa, fitness center, library, general store, computer and business center, and gardens.

In addition to wiring the facility for voice and data, Ceitronics installed the security access control system, the life safety system, and the AV system. The AV system includes speakers throughout the dining rooms, and an overhead projector, screen, and sound system for the activity room.

The project has taken 18 months to complete, and was done in conjunction with IBEW Locals 332 in San Jose; 595 of Dublin and 617 of San Mateo.

Larry Collins, Senior Technician for the project, said the structured cabling for the voice and data was completed with Cat 5 wiring. The backbone is a copper and fiber solution. The security access control system includes perimeter detection, controlled access to the entry points, and card access.

Collins said the main challenges for the project included

Install Cutting-Edge Wiring ughout Northern California

COURTESY OF CEITRONICS

Ceitronics wired hundreds of units in the new Classic Residence by Hyatt.

scheduling and coordination with other trades. First and second year apprentices from the Joint Apprenticeship Training Program were given a rare opportunity to gain in-depth field time by working on the facility.

For more information, contact Joe Gann at joe_gann@ceitronics.com

Decker Electric Connects 29 Buildings At USF

Decker Electric, one of San Francisco's oldest electrical contractors, recently upgraded the network infrastructure at University of San Francisco by connecting 29 campus buildings with fiber optic cable. Thirty technicians from Local 6 assisted Decker Electric on the job.

Project Manager Jeff Bloom said the fiber optic backbone was installed on both the upper and lower USF campuses, linking the 29 buildings. All the fiber on campus runs back to two main hub rooms, one for the lower campus and one for the upper campus. The new fiber connection, which replaced an older fiber network, will enable faster transmission of data throughout campus, as well as a more robust infrastructure with a redundant pathway. One of the hub rooms was pre-existing; Decker installed a second new hub room on the upper campus. Infinicore 300, 50 Micron multi-mode fiber and single-mode fiber were used for the job. The fiber was terminated on LC connectors on both ends.

Decker and Local 6 technicians worked on an aggressive schedule to install the cabling, so that the fiber backbone could be completed while students were off-campus.

Decker installed new riser cables in most of the 29 buildings, and linked 132 IDF closets back to main building closets with fiber as well. Decker also assisted NEC Unified Solutions in the installation of a large 5000 port PBX system.

Decker Electric's Telecommunications Division installs VDV projects for various commercial and institutional clients throughout Northern California.

For more information, contact Jeff Bloom at jbloom@deckerelectric.com

COURTESY OF LAURA WINDISCH

Decker Electric connected 29 buildings at USF with fiber optic cable, benefiting students with a faster transmission of data throughout the campus.

Young Electric, Young Communications Re-Connect San Francisco's Cliff House

Young Communications, working with parent company Young Electric and technicians from Local 6, recently completed the voice and data cabling, security, audio, and fire alarm systems for San Francisco's landmark restaurant, the Cliff House. Because of its scenic views, the Cliff House has been a a favorite for locals and tourists alike for more than 140 years.

Young Electric began the job in June 2002, and Young Communications finished the project in early 2005. According to Project Manager Len Beatie, the restaurant was able to remain open for about 90% of that time.

Located on the edge of the Pacific Ocean, the original Cliff House was built in 1863. The current establishment, a restored version of the third design, involved a demolition of the existing north wing and the construction of the Sutro Wing (including a gift shop and two-story dining room).

Young Communications installed Cat 5E voice and data cable throughout the building, replacing existing cable that was 40 to 50 years old. The company also installed speakers and microphones for the audio system, cabling for a new point-of-sale system, and pulled the cable for a security system involving 36 video cameras. Footage from these cameras, each running 24 hours a day, can be saved on the hard drive for an entire year.

COURTESY OF LAURA WINDISCH

A San Francisco landmark, The Cliff House was recently rewired by Young Electric.

New fire alarm systems were installed by Young Electric. Don Woods, General Foreman on the job, said connecting the new building to the old structure posed a challenge. "It was a unique situation. They put a new wing on the building, and going from the new wing to the old building, which was built in 1909 of very different construction, required some planning."

Young Communications, a division of Young Electric, has also completed projects for the Delta Hotel, Millbrae Bart Headquarters, and Nordstrom. Young Electric has offices in both San Francisco and Oakland.

For more information, contact Len Beatie, lenb@youngelec.com, or Don Woods, donwoods@youngelec.com

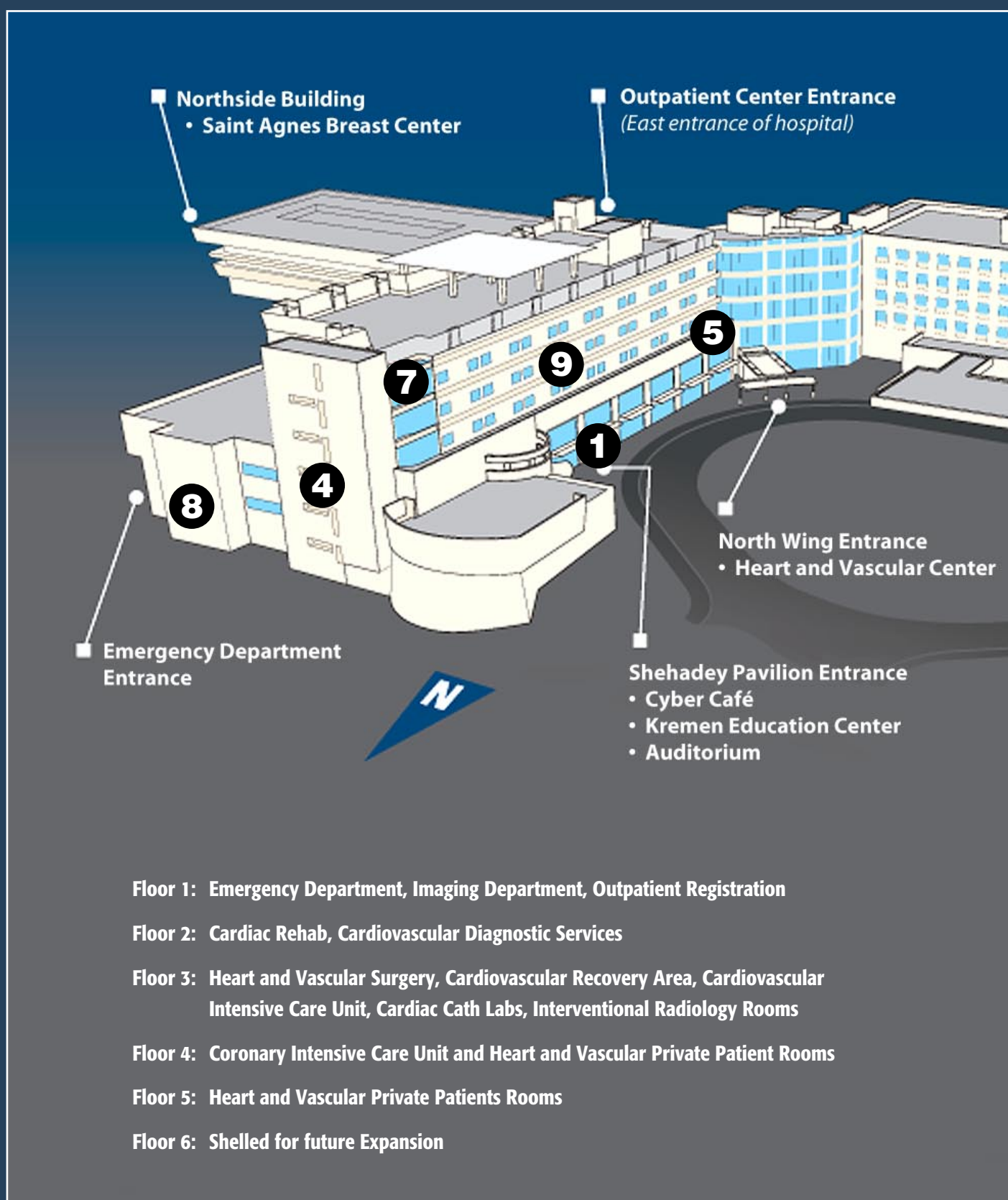
How can I find a contractor?

Visit the Northern California Voice-Data-Video website at www.norcalvdv.org to view over 125 qualified contractors in the Sound and Communications industry. The large number of companies can be narrowed down to fit your specific needs by utilizing the search options, which are available alphabetically, by county, by specialty, and by zip code.

An inside look at Saint Agnes Medical Cent

Elements of Voice Data Video Wiring by Contra Costa Electric, Inc.

1. The Main Distribution Frame (MDF) of the expansion is a 10′ x 10′ room located on the first floor. There are about 500 cables that come into this closet, along with backbone feeder from the seven other closets. There is also a feeder out to the existing hospital.
2. The Main MDF routes information from the expansion MDF to data center via single mode fiber. The use of single mode fiber is to address a large bandwidth.
3. The Plaza Building, located one mile away from the hospital, houses the Data Center for the hospital.
4. Contra Costa Electric, Inc. installed a wireless network throughout the expansion, one of the ways the hospital was "future proofed." Saint Agnes uses wireless cards and access points throughout the network with PDAs, laptops, and pen tablets. Saint Agnes uses Wavelink Mobile Manager and Avalanche to manage the wireless devices.
5. Low voltage cable tray was run down every major hallway. The job was completed floor by floor, comprising about 5,000 feet of cable tray.
6. Basic voice and data wiring and fiber optics tied the existing hospital infrastructure into the new expansion and involved 2,100 pairs of copper and 96 strands single mode fiber, with about 1,000,000 feet of cable for voice and data Cat 6 and Cat 5E.
7. There are 8 closets on the expansion side. Floors one, two, and three have two closets each (including the MDF on Floor 1). Four and five have one closet each.
8. When Contra Costa Electric, Inc. started the expansion, they planned on future proofing the hospital by over building everything they had (four strands of fiber going to a closet ended up 16; one computer outlet became three, etc.)
9. Over four thousand station locations had to be coordinated with the electrical contractor and with all the other trades during the expansion.



Floor 1: Emergency Department, Imaging Department, Outpatient Registration

Floor 2: Cardiac Rehab, Cardiovascular Diagnostic Services

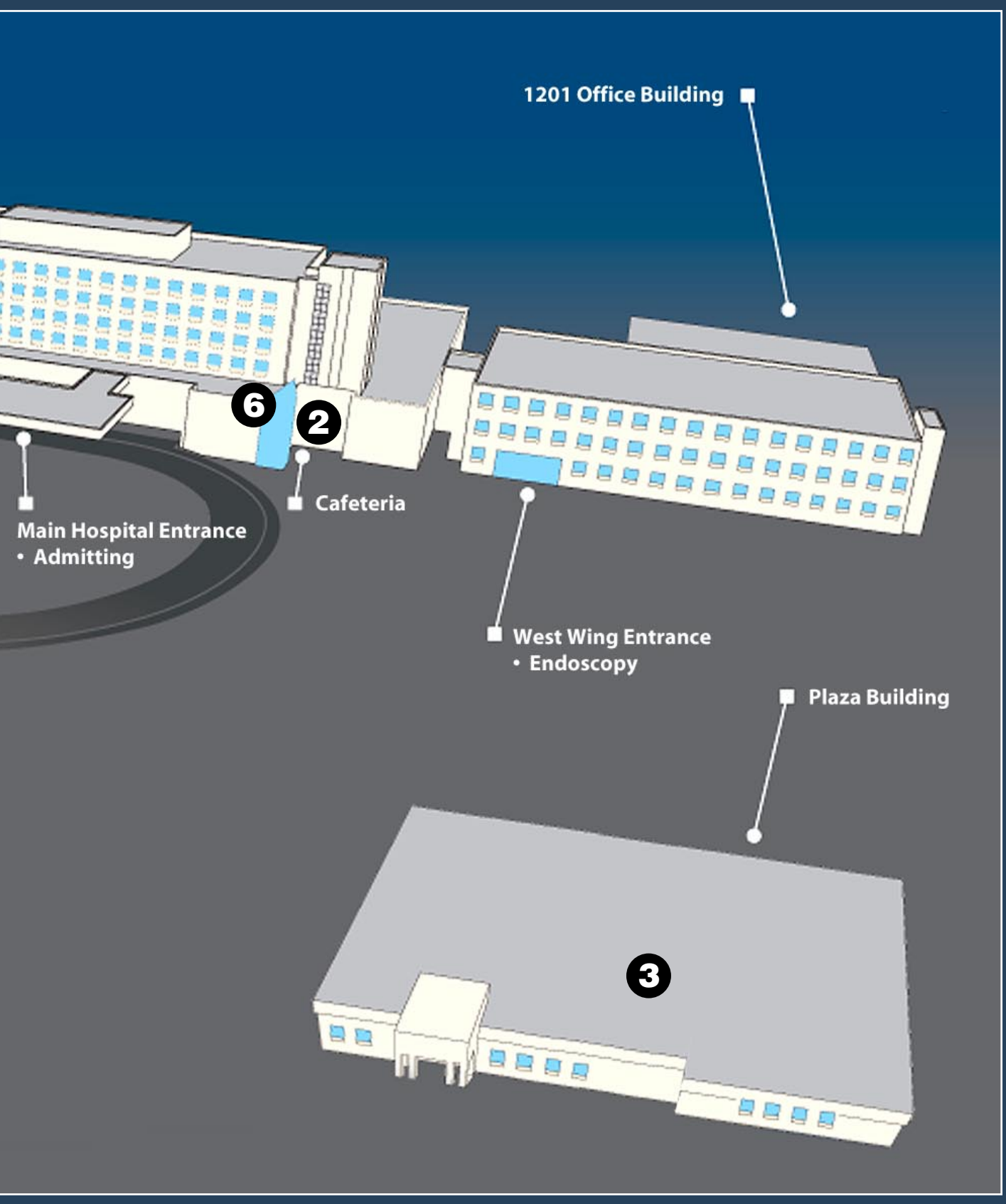
Floor 3: Heart and Vascular Surgery, Cardiovascular Recovery Area, Cardiovascular Intensive Care Unit, Cardiac Cath Labs, Interventional Radiology Rooms

Floor 4: Coronary Intensive Care Unit and Heart and Vascular Private Patient Rooms

Floor 5: Heart and Vascular Private Patients Rooms

Floor 6: Shelled for future Expansion

ter expansion by Contra Costa Electric, Inc.



Saint Agnes Medical Center North Wing Expansion, Fresno

Telecommunications Contractor: Contra Costa Electric, Inc.

Technicians: IBEW Local 100, Fresno

Project completion time: 2+ years

Size: 230,000 Square Feet, basically doubling the size of the hospital

Number of Floors: Six

Type of Work: Voice, Data, Fiber Infrastructure

Voice/Data Wiring: 1,000,000 feet of Cat6 (data) and Cat5V (voice) copper wiring

Number of Stations: 4,000

Low Voltage Cable Tray: 5,000 feet of cable tray, seismically braced into the ceilings of the main corridors

Number of Closets: 10 x 10 closets, including the main closet on the first floor and 4 additional closets in the outpatient center

Number of Terminations per closet: 500

Connecting the New Infrastructure to Existing Infrastructure: 2,100 pairs of copper and 96 strands of single mode fiber from the main closet to the Main Hospital MDF

PHOTOS COURTESY OF SAINT AGNES HOSPITAL

ECOM Engineering CEO Advocates Flexibility for Hospital Technology Planning

COURTESY OF ECOM ENGINEERING

ECOM Engineering is currently a consultant for Kaiser in Roseville.

Eric Johnson, President of ECOM Engineering, Sacramento, has planned the electrical engineering/telecommunications infrastructure for many hospitals built by Kaiser Permanente and Sutter Health. His firm of electrical engineers is currently consulting on Kaiser Hospital, Roseville, and Sutter Hospital in Roseville. ECOM provides complete electrical engineering support for both new and remodeled projects. Here Johnson discusses the telecommunications needs of today's hospital, advising long term planning and flexibility.

Q. What are some of the technology trends in hospitals?

A. Modern medicine is driven by technology. Everything is digital, from radiology to telemetry to patient charting. Hospitals have become a very dense package of communications and information systems. It gives them the ability to process and utilize more information with a smaller staff. Various information systems are merged together, and the nursing staff oversees patients' charts electronically. Charts are often just a flat monitor computer hanging on the wall next to a patient's bed and no longer a physical chart hanging over the bed. Patients are tracked from facility to facility electronically, as opposed to the days of charts and files.

Q. Any specific health technologies that have been impacted?

A. All imaging in radiology and x-ray is now digital. There is no film processing anymore. Hospitals must move significantly large digital information files between facilities and between doctor's offices so that doctors can pull the images up on their office computers to examine them.

Q. What does this change mean in terms of requirements for the VDV infrastructure?

A. It puts a lot of emphasis on planning capacities for the present, as well as the future. These technologies change very quickly

COURTESY OF ECOM ENGINEERING

Eric Johnson, CEO, ECOM Engineering

and what we see today as a solution probably will be outdated in three to four years. We have to build in the ability to easily re-cable, reconnect, and add and change equipment without tearing up the hospital. Upgrading has to be very flexible. We also have to plan for the telecom rooms to support all of these devices, and build in an easy way to get equipment in and out of the room and connect it. There is a lot of emphasis on the flexibility of these spaces and pathways.

Q. What materials are you using for the infrastructure?

A. We are using a fiber optic backbone system, with copper Cat 6 cabling for the horizontal solution. Cat 6 has more bandwidth, than the various versions of Cat 5 and the systems that hospitals are using are extremely dependent on bandwidth capacities. This is especially true on the imaging side, with all those very large files to move around.

Q. What about the use of converging technologies for fire detection systems or enterprise security systems?

A. We've heard the discussions about converging technologies, but we've yet to see any of the manufacturers step up to the plate and put some ground work down to implement it. We do see that there will be convergence in the near future, and our network system will end up incorporating several of the systems, so we don't have independent cabling for each and every system.

Q. What would you like to tell hospital facility directors to keep in mind about telecommunications wiring in the next few years?

A. In most of the facilities, we find that they get caught up in the idea that what they are putting in today is the solution for the next 20 years, and that's not the case. What we try to emphasize is flexibility. What we are putting in today will be outdated in a matter of years. That's why the pathways and spaces and power infrastructure is so important. We need to have the ability to take what we put in today and remove it or change it in short order without a significant cost of rebuilding.

Q. What are some of the tricks to planning so that you don't have a lot of cost down the line when you have to change?

A. We try to defend our need for space for telecom rooms early on. We have to defend these rooms because they are usually the first target for hospital planners who say, "We need more rooms for office or reception space, and that telecom room looks so big and empty, why don't you give up half of it?" We would also like to see planners give more thought to implementing access control and surveillance systems upfront.

Q. How do you like working with IBEW technicians?

A. They are better at holding their certifications and having more qualified people on the project. They have better training and workmanship than their non-union counterparts.

For more information, contact Eric Johnson at ecj@ecomeng.com or call 916.641.5600. ECOM Engineering is located at 2100 Northrop Avenue, Suite 400, Sacramento 95825.

ECOM

Finding The Right Sound and Communications Contractor

The best place to begin in hiring a qualified sound and communications contractor is to hire union. You can find a list of qualified union (IBEW-NECA) contractors online at www.norcalvdv.org.

IBEW-NECA sound and communications contractors put large resources into training and educating their workforce. There is a higher bar set for union technicians in terms of training, education, and expectation out in the field.

IBEW-NECA technicians complete a three-year formal training program. By contrast, most non-union workers never participate in a formal industry-based program, and some non-union workers receive as little as 40 hours of training.

COURTESY OF WALKER COMMUNICATIONS

Gary Walker, President and CEO of Walker Communications, is an IBEW-NECA contractor based in Fairfield who performs sound and communications work for private and public clients in Northern California and Nevada.

Here are some of his tips for evaluating the qualifications of a prospective contractor, in order to find one that fits your needs.

Industry Tips

• Hire an **IBEW-NECA contractor.** Union contractors offer better training and benefits to employees. Hiring a non-union contractor may seem more economical in the short run, but it usually causes a lot of headaches in the long run.

• Make sure the contractor has a **C-10 or C-7 license**

• Check to see that the contractor has all necessary **insurance,** including workers comp and liability

• Select a company with a **good reputation** and check multiple references

• Check the contractor's certifications–look for a contractor that is **BICSI trained** (Building Industry Consulting Service International) and affiliated

• Ask if someone on staff has an **RCDD certification**–a registered communication distribution designer

• Double check the company's **manufacturer certifications,** especially in the areas of specialty interest to you. If you have an AV project, are they certified by AV manufacturers, for instance?

COURTESY OF WALKER COMMUNICATIONS

• Stipulate that the contractor perform **neat, clean work,** so that the project site is kept as pristine is possible. Neatness is essential on every job, large or small.

• Review the testing procedures that will be instituted after the work is completed. Will the contractor run the **proper tests** to make sure the work meets specifications?

• Check to see if any complaints have been filed with the **California State License Board.**

Walker Communications recent sound and communication projects include The Solano County Government Center and the Monterey County Government Center. In addition to the Fairfield office, Walker Communications has offices in Rocklin and San Leandro.

For more information contact Gary Walker at gary@walkercomm.com. For more on Walker Communications, see the web site at www.walkercomm.com.

How can I find a Voice/Data/Fiber Optics contractor?

Atlas/ Pellizzari Electric Inc
Contact: Steve Pellizzari
SteveP@atlas-pellizzari.com
450 Howland Saint
Redwood City, CA 94063
Tel: (650) 364-1204
Fax: (650) 364-6193
www.atlas-pellizzari.com

Briggs Electric Inc.
Contact: Greg Dye
Gregdye@briggselectric.com
5138 Metric Way
Carson City , NV 89706
Tel: (775) 887-9901
Fax: (775) 887-9454

CAL Communication Service Co.
Contact: Randall J. Weber
randy@calcsc.com
525 Second Saint
Rodeo, CA 94572
Tel: (510) 799-0300
Fax: (510) 799-0966
www.calcsc.com

Ceitronics
Contact: Ignacio del Rio
Ignacio_delRio@cei.com
550 Parrott St
San Jose , CA 95112
Tel: (408) 452-5000
Fax: (408) 452-8953
www.ceitronics.com

Contra Costa Electric Inc
Contact: Chris Payne
chris_payne@emcorgroup.com
825 Howe Road
Martinez, CA 94553
Tel: (925) 229-4250
Fax: (925) 229-1672
www.ccelectric.com

Contra Costa Electric Inc
Contact: Matt Furrer
matt_furrer@emcorgroup.com
4277 W Richert #108
Fresno, CA 93277
Tel: (559) 271-3264
Fax: (559) 271-1905
www.ccelectric.com

Cupertino Electric Inc
Contact: Gene Ryley
1132 N Seventh St
San Jose, CA 95112
Tel: (408) 808-8000
Fax: (408) 275-6967
www.cei.com

Dynaelectric Company
Contact: Diane Piper
Diane_Piper@emcorgroup.com
414 Brannan Saint
San Francisco, CA 94107
Tel: (415) 597-4700
Fax: (415) 543-1301
www.design42.com/dynalectric

Eilbacher Electric
Contact: William Eilbacher
Lectrospec@aol.com
41794 Vargas Rd
Fremont, CA 94539
Tel: (510) 490-5530
Fax: (510) 651-7885

Facilities Group, The
Contact: Thomas Ward
Tward@facilitiesgroup-sf.com
400 Brannan St, Ste. 7
San Francisco, CA 94107
Tel: (415) 284-1500
Fax: (415) 284-0984
www.facilitiesgroup-sf.com

Groseclose Electric Company Inc.
Contact: George Yeager
Gyeager@redshift.com
231 Commission St
Salinas, CA 93901
Tel: (831) 424-2791
Fax: (831) 424-6132

Integrated Communication Systems (ICS)
Contact: Aaron Colton
aaron.colton@ics-integration.com
1550 Parrott Street, Suite 40
San Jose, CA 95112
Tel: (408) 491-6000
Fax: (408) 998-0100

Martinez Electric
Contact: John Martinez
Johnmtz@martinezelectric.com
3000 Wilbur Ave
Antioch, CA 94509
Tel: (925) 757-4645
Fax: (925) 757-3826
www.martinezelectric.com

MCM & Associates, Inc.
Contact: Rudy Biscaino
Rudy.Biscaino@mcm-assoc.com
110 Pioneer Way
Mountain View, CA 94041
Tel: (650) 940-7560
Fax: (650) 940-6065
www.mcm-assoc.com

MDE Electric Company
Contact: Marshall Goldman
Admin@mde-electric.com
152 Commercial St
Sunnyvale, CA 94086
Tel: (408) 736-8600
Fax: (408) 728-0385
www.mde-electric.com

Metropolitan Electric
Contact: Jeff Holland
jholland@metroelectric.com
2400 Third St.
San Francisco, CA 94107
Tel: (415) 642-3000
www.metroelectric.com

Steiny and Company Inc.
Ssteiny@steinyco.com
27 Sheridan Saint
Vallejo, CA 94590
www.steinyco.com

TDN Electric Inc.
Contact: Ross Noguchi
Rnoguchi@tdhelectric.com
544 E Weddell Dr. # 5
Sunnyvale, CA 94089
Tel: (408) 541-9000
Fax: (408) 541-9001
www.tdnelectric.com

Walker Comm Inc
Contact: Gary and Donald Walker
donaldw@walkercomm.com
521 Railroad Ave.
Fairfield, CA 94533
Tel: (707) 421-1300
Fax: (707) 421-1359
www.walkercomm.com

Young Electric Co Inc
Contact: James Young
Jpy@youngelec.com
3317 26th Saint
San Francisco, CA 94110
Tel: (415) 649-3355
Fax: (415) 648-8259
www.youngelec.com

For a complete listing of over 125 qualified Sound and Communications contractors, please visit www.norcalvdv.org.

Saint Agnes Hospital *(continued from page 1)*

tions engineer for Saint Agnes Medical Center. "We went with them because they had an extremely good reputation locally. I visited some sites that they had worked on and was impressed with their work."

Matt Furrer, project manager for Contra Costa Electric, Inc., said that 20 to 25 technicians from Local 100 worked on the installation each day for over two years. Furrer said that Contra Costa Electric, Inc. built future-proofing into its work so that as technologies change, solutions will not become outdated as quickly.

"We over-built everything that was specified so that the hospital had enough cable for their voice and data needs in the next few years," said Furrer. "If we needed four strands of fiber going to a closet, it probably got quadrupled. For a lot of the station cabling, if they needed one computer outlet, they got three."

Furrer said that Contra Costa Electric, Inc. also wanted to make sure there was room for expansion within the small telecommunication closets, which measure 10 feet by 10 feet.

"We were somewhat limited on the physical space that we were provided, but the way everything was laid out, there is still room to grow. It should carry them until they replace this cabling plan."

Phillips concurs that looking toward the future to make sure everything was adequate was a major concern. "In the wiring closets, we wanted to make sure there is enough space to handle our needs now and for the future," he said. "We wanted to make sure the backbone was large enough to handle what we are doing now, and what may come up in the future. I think we succeeded in that."

Contra Costa Electric, Inc. installed redundant fiber that takes different paths to the data center to carry imaging and other large bandwidth files.

One of the most challenging parts of the jobs came early in the project-- installing the low voltage cable trays in the ceiling down every major hallway. "Physically putting the cable tray in was a big challenge because the space was so limited," said Furrer. "We covered any major cable pathway with the cable tray.

"Seismically bracing the tray is difficult. It must be braced at a 45° angle every time it stops or starts at a firewall. We encountered many obstructions placing the cable tray, such as an eight-foot wide air handler for the air conditioning system, so it was difficult to find the right spot for the brace."

VOICE DATA VIDEO
SOUND AND COMMUNICATIONS
of Northern California