Higher Education Energy Efficiency Partnership Program

BEST PRACTICES AWARDS

UC / CSU Sustainability Conference, June 2005

A program created by the
UC/CSU/IOU Partnership
under the auspices of the
California Public Utilities Commission

callfornia state university long beach

molecular and life sciences center

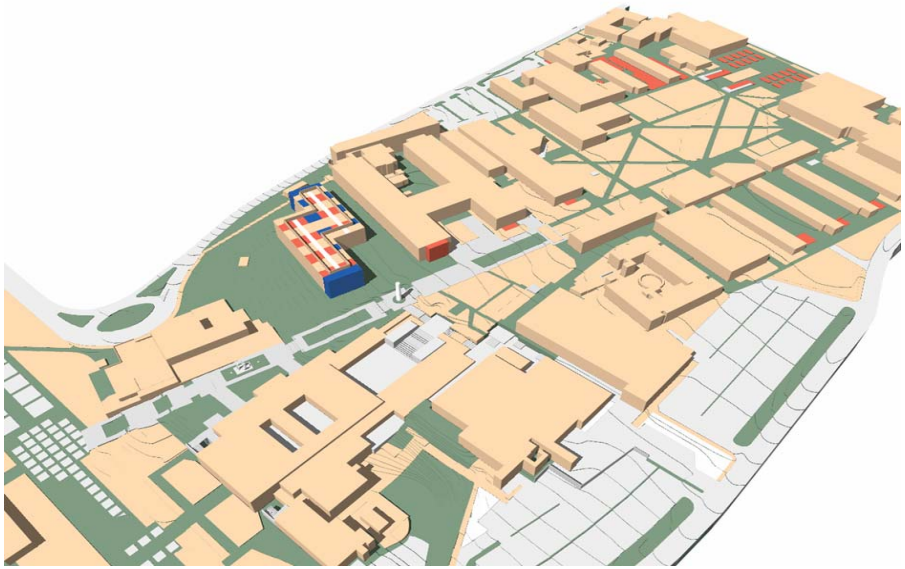
architects/programmers: **ac martin partners**

mechanical engineers: **p2s engineerIng**

lab planners: **ahsc mclellan copenhagen**

structural engineers: **ac martin partners**

Project Timeline



- Design started in 1998
- Construction completed in 2004

CSULB Molecular & Life Sciences Center

- Best Practice Award Categories
  - HVAC Design
  - Innovative Control / Energy Information Systems

The Association of Energy Engineers

Energy Project of the Year, 2005
Southern California Chapter


1999

HONOR AWARD

FOR EXCELLENCE IN DESIGN

THE AMERICAN INSTITUTE
OF ARCHITECTS
LONG BEACH/SOUTH BAY CHAPTER

New Science Building
PROJECT

California State University Long Beach
OWNER

A.C. Martin
ARCHITECT

CONTRACTOR

John M. Cordwell, AIA, President

PANEL OF JUDGES

CSULB Molecular & Life Sciences Center

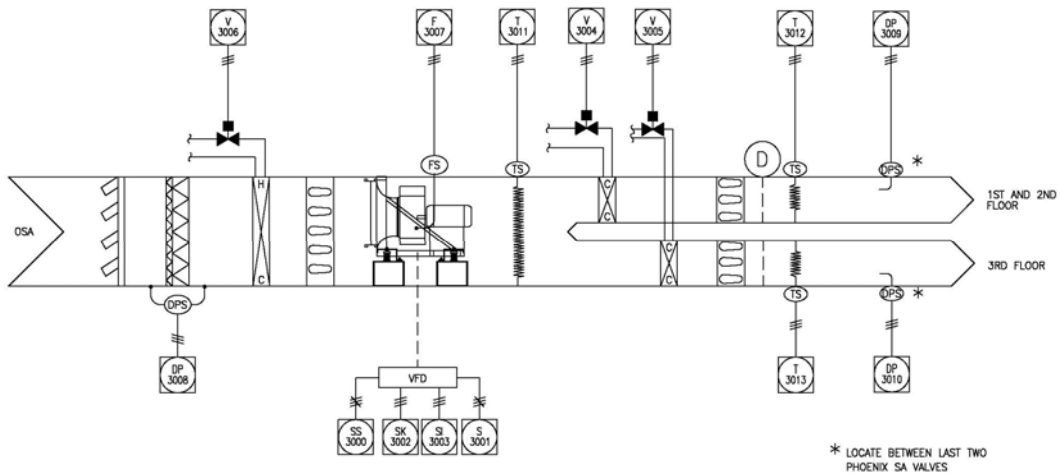
- 3-story, 95,000 GSF Sciences Center
- Anatomy, Physiology, Biology, Bio-Chemistry and Organic Chemistry research and teaching laboratories
- 114 fume hoods

Early Project Goals

- High standard of safety, health and comfort
- Highly energy efficient
- Effective energy use monitoring & reporting
- Establish a basis for future development

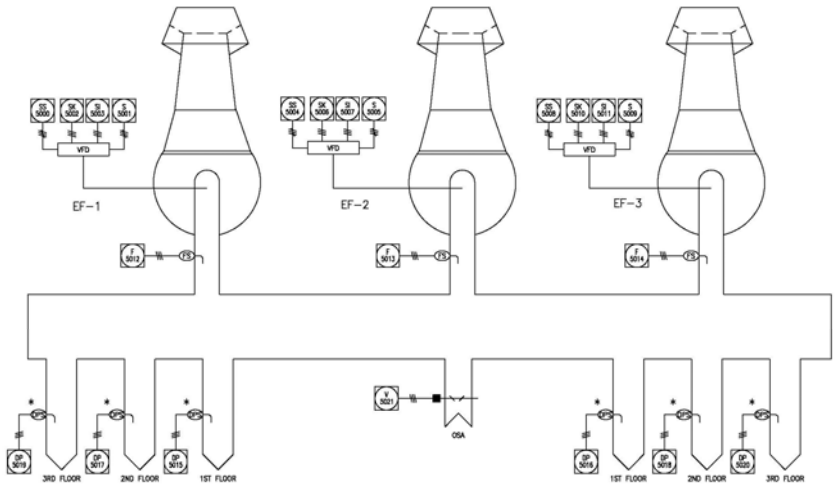
Building Systems Summary

- HVAC Supply Systems
  - Manifolded variable air volume
  - Separate cooling decks for different densities
  - Low pressure drop design
    - Low velocities
    - Simple routing
    - Diversity



Building Systems Summary

- Laboratory Exhaust Systems
  - Mostly manifolded variable air volume
  - N+1 redundancy
  - Low pressure drop design



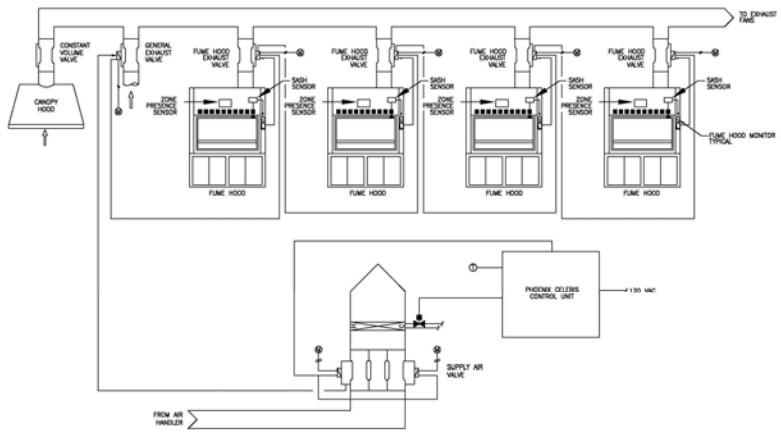
Control System Summary

- LON-based building direct digital controls
  - Web-based
  - Laboratory controls integration

- Building utility metering
  - Electrical
  - Gas
  - CHW & HHW

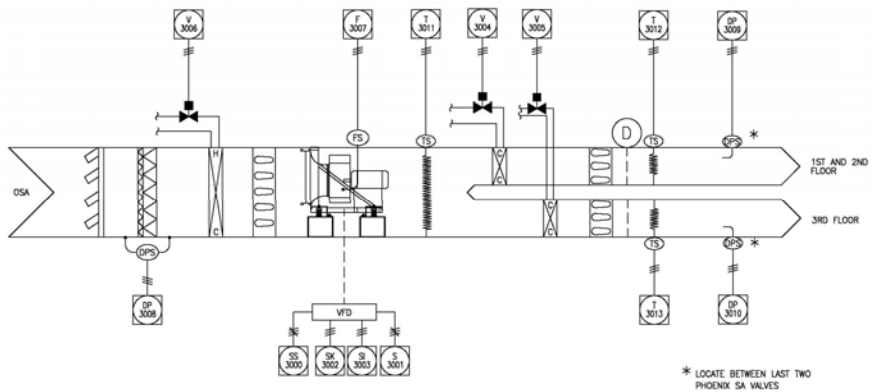
Control System Benefits

- Direct digital control for the HVAC, lighting and plumbing systems
- Trend data allows future optimization as building needs change



Energy Reduction Control Strategies

- Variable air volume supply & exhaust
- Control system resets supply air temperature to save on unnecessary cooling and reheat when not required
- Control system resets minimum air changes in laboratories during night time unoccupied hours
- Zone presence sensors were used on fume hoods in teaching labs to reset fume hood face velocities when nothing is present in front of the hood



Control System / Energy Monitoring Benefits

- Complete control system operation was verified with the campus building engineers and design engineer
- Measurement-based commissioning project

Summary of Lessons Learned

- Plan for success early
  - Involve all stakeholders
  - Set project goals
- Whole building design approach
- Building energy monitoring data can be used to continuously improve building energy efficiency

Acknowledgements of Team

College of Natural Sciences & Mathematics
Physical Planning & Facilities Management

ac martin partners, inc.

AHSC McLellan Copenhagen
Programming, Planning & Design for the Scientific Community

P2S
ENGINEERING

Contact Information

Tim Ball
CSU Long Beach
timball@csulb.edu

Kent W. Peterson, P.E.
P2S Engineering, Inc.
kent.peterson@p2seng.com