



# PENC Introduction to Commissioning & LEED Gold Case Study



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# Introduction




# Who is in the Audience?

- Engineers
  - Mechanical Engineers
  - Electrical Engineers
  - Commissioning Engineers
  - Test and Balance Engineers
  - Structural Engineers
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# Overview of Presentation

- a. Commissioning NC best practices
  - b. HVAC, BAS controls, lighting controls (and other electrical), Hot water distribution
  - c. TAB
  - d. Envelope Cx
  - e. Case study LEED Gold Elon Field House
    - i. Challenges
    - ii. Lessons learned
- 



**Commissioning New Construction  
Best Practices Based on Building  
Commissioning Association's  
recently released document**





# Predesign



# Design Phase



# Construction Phase





# Turnover Phase





# Operating Phase





# What do we Commission?

➤ HVAC & BAS Controls





# What do we Commission?

➤ TAB and Envelope





# What do we Commission?


➤ Electrical and Plumbing





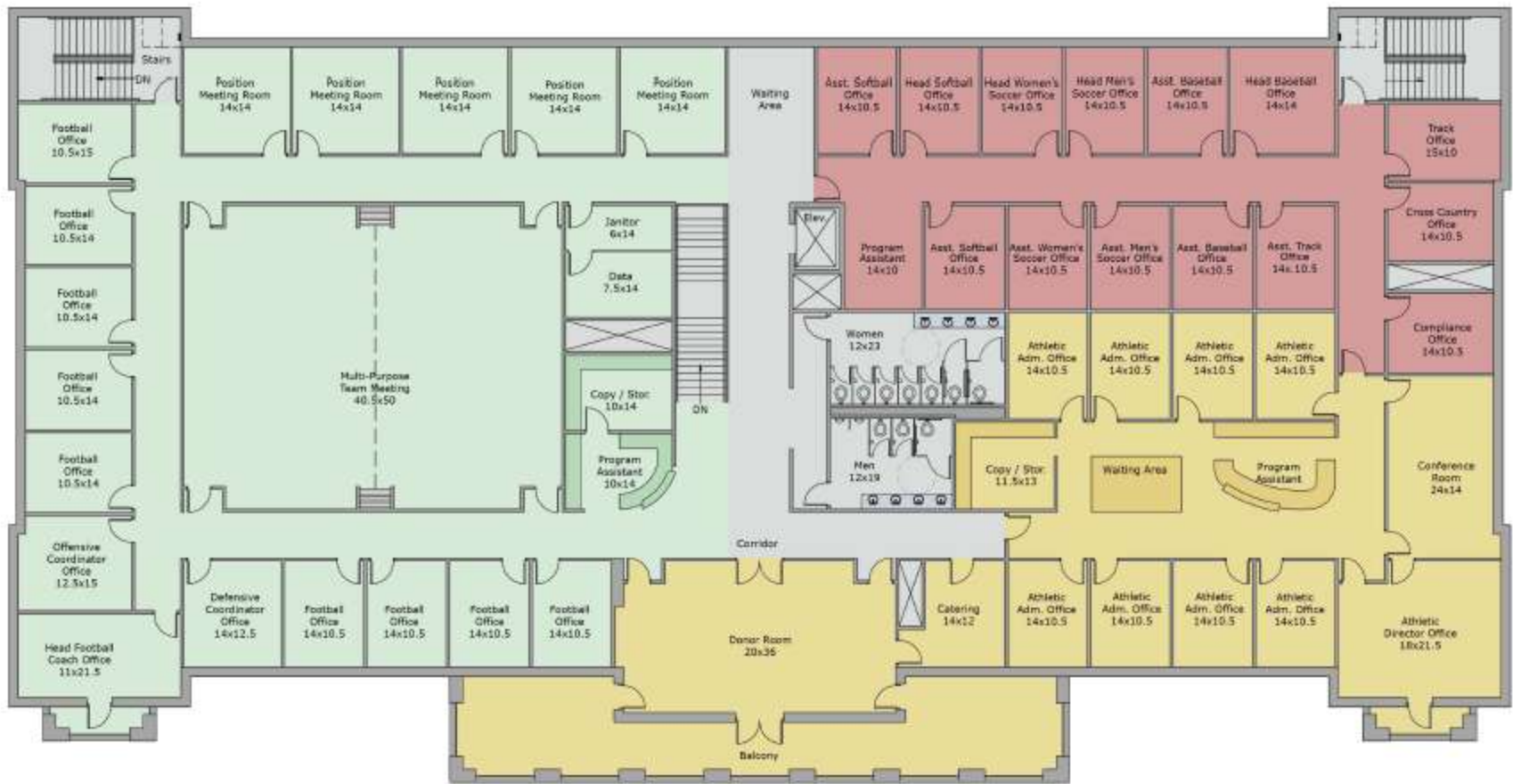
# Case Study:

## LEED Gold Elon Field House

- 31,000 square feet. 2 story Field House with offices, locker rooms, strength training rooms, hot and cold whirl-pool rooms , training rooms, and meeting rooms.
  - Systems: Variable Refrigerant Flow system with central energy recovery ventilator for all exhaust and make-up air to all units.
  - Control system was a DDC over-laid on the variable refrigerant flow system, communicating through BACNET.
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Ground Level Plan




Upper Level Plan






# Challenges

- High humidity
  - Addition of dryers changed the pressurization of the building
  - Getting outside air to the right places
  - Maintaining enough exhaust on the building
  - Extreme load in the strength training area
  - Test and balance challenges
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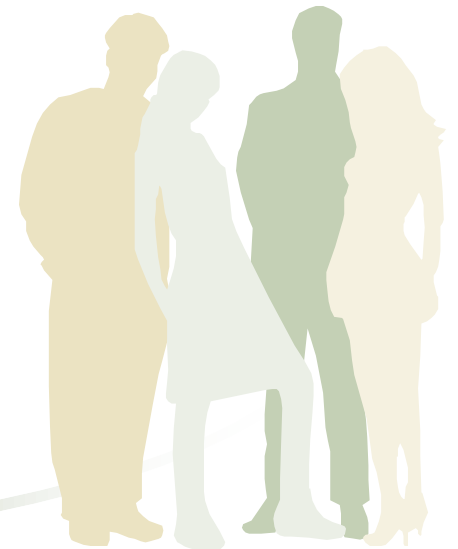


# Lessons Learned

- Need to be careful in application of variable refrigerant flow in high humidity situations.
  - Should centrally control temperature and humidity of outside air completely and feed neutral to the spaces.
  - Questions about providing outside air to variable refrigerant flow systems.
  - Question about interface of variable refrigerant flow control system to full DDC control front end.
  - You can achieve LEED Gold on a fairly complex building
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# References

- Best Practices Guide?
- Existing Buildings Best Practice Guide
- BCA website: [www.bcxa.org](http://www.bcxa.org)
- PEI website: [www.peci.org](http://www.peci.org)
- USGBC website: [www.usgbc.org](http://www.usgbc.org)



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# Questions ?

