ECU High Performance Charrette
College Hill Phase I

This report is a summary of the
High Performance Charrette
conducted at East Carolina University - Greenville
on June 19, 2003

Funding provided by:

State Energy Office, N.C. Department of Administration
and
The U.S. Department of Energy, with State Energy Program funds
in cooperation with Triangle J Council of Governments

Other sponsors:

ECU Facilities Division

Alicia Ravetto, AIA – Architect
Brown and Jones Architects
Burt Hill Kosar Rittelmann Associates
Design Harmony, Inc.

EXECUTIVE SUMMARY

East Carolina University selected Burt Hill Kosar Rittelmann Associates to assist them in the design of the new dormitory building College Hill Phase I. As part of the early schematic design process for the project, the University and Burt Hill Kosar Rittelmann Associates embraced the idea of holding a High Performance Charrette. A charrette is an intensive, focused brainstorming session involving a variety of experts, intended to provide an effective means to identify realistic and cost-effective high performance measures that could be implemented in the facility's design. Critical to the charrette and its documentation was funding from the State Energy Office, N.C. Department of Administration and the U.S. Department of Energy, with State Energy Program funds in cooperation with Triangle J Council of Governments. Ongoing relationships with these partners, and with the diverse and knowledgeable charrette participants, will accrue additional benefits to the University. These relationships will continue to aid the University in meeting its overall energy and environmental commitments long after the College Hill Phase I project has been established as a leader in the field on the ECU campus.

The charrette took place on June 19, 2003 at the Colliseum , ECU Greenville campus. Its stated focus was to incorporate environmental excellence and high performance in the design of the College Hill Phase I by using the High Performance Guidelines developed by the Triangle J Council of Governments. In his welcoming remarks, David Hatton, noted the importance of balancing program and budget needs with high performance/"green" priorities. Approximately 40 individuals participated from various backgrounds and fields: the University (personnel, administration, etc.), NC State University, UNC Chapel Hill, state agencies, and private companies. Four distinct environmental design areas were addressed in detail: site & water, energy, materials, and indoor environmental quality.

Local experts in "integrated design", in the Triangle J High Performance Guidelines and LEED, and in each of the four design areas added their expertise to the charrette. In addition, representatives from Burt Hill Kosar Rittelmann Associates and from the University presented project information. ECU staff shared their creative thoughts and ideas on the new building while numerous other participants were asked to join in the brainstorming and to become "champions" of the charrette results. Participants formed three small work groups to address topics relevant to the College Hill Phase I Dormitory building. Each group looked at all high performance issues of the project and set priorities that they felt this project should address. At the conclusion of the day, all work groups presented the results of their discussions and then collaborated to determine a handful of Priority Action Items. The Priority Action Items determined by the Charrette participants are listed below.

Overall, the charrette proved to be fun and invigorating, and was filled with thoughtful insights for a realistic and strategic approach to incorporating high performance strategies into the renovation project. It laid good groundwork to expect that the design and construction of College Hill Phase I will raise the "high performance bar" at East Carolina University.

Priority Actions	
Actions	**Champions**
ENERGY EFFICIENCY: The energy goal for the building shall be 10% better than ASHRAE 90.1 1999	Chuck Gulledge, Engineer Moser Mayer Phoenix Associates (Design Team), Paul Carlson (Facilities Services Mechanical Engineer ECU)
HUMIDITY CONTROL: Compliance with ASHRAE 62, minimum 30% Relative Humidity and maximum 60%	Chuck Gulledge Engineer Moser Mayer Phoenix Associates (Design Team), Paul Carlson (Facilities Services Mechanical Engineer ECU)
EDUCATION "GREEN SUITES:	Mark Kimball, (Facilities Mechanical Engineer ECU) Jamie (ECU) Scott Sullivan, Project Manager Burt Hill Kosar Rittelmann (Design Team) Gina Shoemaker, Project Manager ECU
WATER USE REDUCTION: rainwater catchment	Sarah, John Gill, Landscape Architect ECU
MATERIALS: recycling construction and demolition waste – involve occupants	
Green roof Light pollution	

Thanks to all for making this High Performance Charrette a very fun and productive event!

CHARRETTE PARTICIPANTS

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- Marshall Mauney, Architect, State Construction Office, 1307 Mail Service Center, Raleigh NC 27699, phone 919-733-7962, email marshall.mauney@ncmail.net

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- Charles Brown, Principal, Brown & Jones, 701 N. Person St., Raleigh NC 27604, phone 919-831-2625, email charles@brownandjones.com

- Alicia Ravetto, Principal, Alicia Ravetto AIA, 400 W. Weaver St., Carrboro NC 27510, phone 919-933-0999, email ravetto@mindspring.com

- Gail Lindsey, Principal, Design Harmony, 4429 Trommel Ct., Wake Forest NC 27587, phone 919-562-7085, email glindsey@ipass.net

CHARRETTE GOALS and PROCESS

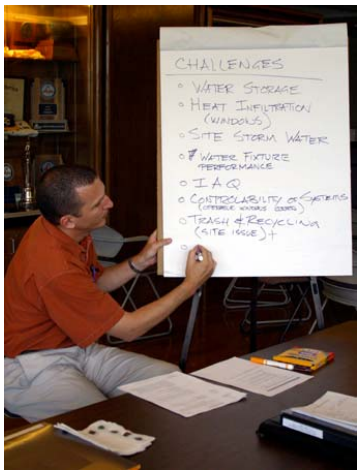
Charrette Goals:

1. Inform and educate charrette participants about the energy and environmental implications of designing a new building on the ECU-Greenville campus. At the same time, clarify the "integrated approach" concept, encouraging the effective use of the Triangle J Council of Government High Performance Guidelines to help define and implement high performance strategies.

2. Support North Carolina high performance or "greening" efforts tailored to the new College Hill Phase I building on the campus of East Carolina University. Encourage charrette participates to work "hands-on" with facilitators (who have wide expertise with high performance design) to develop a strategic integrated approach to the project's design/ construction approach and priority issues.

3. Identify economically viable and doable High Performance Priority Action items that the University could undertake that would incorporate high performance sustainable design measures into their College Hill Phase I building (and also with future university renovations).

4. Establish an initial database of contacts, champions, and partners for the identified sustainable design action items. Include (where possible) approximate costs and schedule implications. In addition, create a basis for the understanding of the levels of difficulty and commitment that will be needed required to fulfill each of the proposed action items.



5. Determine immediate next steps, champions, and strategies & technologies necessary to enable the design team to implement the proposed High Performance Priority Action Items.

Charrette Process:

After initial presentations by Judy Kincaid from the Triangle J Council of Government, the University, David Hatton, Scott Sullivan and Gina Baker from the Design Team, and Gail Lindsey, participants were each assigned to one of three work groups. In the morning, the groups analyzed the basic program requirements and

discussed all high performance issues that were deemed important to the project. Lunch was served at Colliseum allowing some time for the participants to see the presentation boards provided by the Design Team and a scale model of the building within the area on Campus. After lunch, Gail Lindsey proposed the following basic task list for the remainder of the day:

1. SET PRIORITIES:

- What 5 to 10 items do your group want to "champion"?
- If you could only accomplish one item, what would it be?
- How will you make each of them happen?

2. BE SPECIFIC:

- Identify the "champions", "partners" and "leaders" for each of these priority items
- What are the cost issues: $, $$, or $$$? (Little additional cost to high additional costs)
- What time issues are involved? (Additional research, O&M training, availability, etc.)
- What can be learned from others? (Case studies / mentors, what worked… what

3. SET SUCCESS INDICATORS:

- How will you get feedback and otherwise assess if the project is successful?

The pages that follow present the discussion results of the three work groups; under topic headings are both high performance strategies and, in boxed format, specific priority actions.

GROUP 1: OBSERVATIONS & RECOMMENDATIONS

PARTICIPANTS:

Alicia Ravetto, AIA (Facilitator) Architect
Patrick Beville, Project Manager, Appalachian State University
Gay Perez, Assistant Director, University Housing, NC State University
Chuck Gulledge, (Design Team) Moser Mayer Phoenix, Assoc., Mechanical Engineer
Jonathan Shambare, ECU Project Architect
Rebecca Bizzell, Director, Resource Management, Campus Operations, ECU
Tom Pohlman, ECU Environmental Manager
John Gill, ECU Landscape Architect
Cindy Shea, Sustainability Coordinator UNC-Chapel Hill
Joe Boehman, Assistant Director, Resident Education UNC- Chapel Hill

ENERGY	$$$ (Cost)	+++ (Value)

OVERALL RESOURCE: Chuck Gulledge, Mechanical Engineering, Moser Mayer Phoenix Associates (Design Team)

GENERAL KEY ISSUES DISCUSSED:

- Internal loads maximum in the mornings and evening/nights
- Orientation is fixed given the site constraints (NE)
- Study shading in the courtyard due to the size of the buildings
- Given:
  - utility corridor, entrance to dining, open,
  - maintain service routes
  - not too high/vertical = low profile
  - orientation
- Thermal storage: not a good idea. Ice storage could be possible.
- Operable windows, need screens, code issue for residences
- CO2 sensors
- Maintain positive pressure
- Mechanical equipment on the roof serves architecture of the building
- Remote control of HVAC systems – concern about railroad location and possible hazardous materials exposure – safe space inside by closing outside air, dampers
- Daylighting benefits during the day to offset peak load: consider lightwells, light tubes in the corridors, number and size of windows, glare control
- Energy efficient lighting, dual switching, task lighting

1) WINDOWS & DOORS:

- Design windows to reduce heat gain/losses
- Introduce Daylighting to reduce lighting load
- Use overhangs, light shelves, and glazing types as required by orientation
- Coordinate energy efficient and aesthetic issues
- Explore natural ventilation vs. controlled HVAC (operable vs. fixed windows)
- Implement more energy efficient lights + task lighting + zoning strategies

ENERGY (THERMAL ENVELOPE): **$$$** **+++**

CHAMPION: Burt Hill Kosar Rittelman (Design Team)
RESOURCE: Chuck Gulledge (Design Team)

PRIORITIES:
- Avoid piecemeal approach (the thermal envelope is very important!)
- Introduce daylighting and daylight controls (i.e. interior light shelves)
- Use super efficient windows: double glazing / low-e / argon filled / low-solar heat gain
- Increase R-value of walls and roofs
- Consider light color roofs / cool roofing initiative (Cool Roof Rating Council) www.coolroofs.com
- Consider an airlock entry

POSSIBLE BARRIERS:
- Additional effort but no additional time

SUCCESS INDICATORS:
- LCC/LCA to demonstrate success and value
- Performance based specs
- Aesthetic issues

***CRITICAL ISSUE: CHECK THE ENTIRE ENVELOPE (roof / walls / etc.)**

2) PLUG LOADS AND LIGHTING:

- Minimize internal loads
- Use Energy Star appliances
- Use Energy Efficient lighting (consider the use of T5 as a minimum standard)
- Encourage students to purchase energy efficient appliances and computer

3) HVAC:

- Set a total energy budget to exceed ASHRAE 90.1 1999 by 30%
- Review lifecycle costs for initial vs. long term operating costs
- Determine special HVAC and maintenance issues related to the location of the shafts

ENERGY (HVAC EFFICIENCY): **$** **+++**

CHAMPION: Chuck Gulledge (Design Team)

PRIORITIES:

- Premium efficiency motors (component)
- Lower supply air temperature (system)
- Higher delta T on chilled and hot water
- Energy reclamation from toilet exhaust
- Lower fan energy (increase face area of "stuff" check with Chuck Gulledge)
- Heat energy recovery – investigate flush steam recovery vs. solar hot water
- Install CO2 sensors

IEQ

CHAMPION: Chuck Gulledge (Design Team)

- VAV (one per suite) dependant on the extent of controls used
- Zoning: individual control vs. unit control
- Humidity control

CHAMPION: Burt Hill Kosar Rittelman (Design Team)

- Acoustic considerations: evaluate the sound transmission through wall construction
- IAQ Management Plan during construction

WATER

- Reclamation of water from condensate lines (water and energy savings) This has an impact on chiller efficienty
- Water use reduction: install low flow plumbing fixtures and waterless urinals (Check maintenance and access issues)
- ECU standards include 1.6 gallon/flush toilets, no automatic devices and front loading washing machines
- Stormwater reclamation and/or retention for irrigation and for toilets. Coordinate with existing irrigation system tied to computerized system with potable water.

- Use native and drought tolerant plants (verify ECU standards)
- Use low water needs turf

WATER: **$$** **+**

CHAMPION: John Gill, Landscape Architect, ECU

PRIORITIES:

- ❑ Reclamation of water from condensate lines
- ❑ Stormwater reclamation and/or retention

GROUP 2: OBSERVATIONS & RECOMMENDATIONS

PARTICIPANTS:

Charles Brown, (Facilitator) Brown & Jones Architects
Judy Kincaid, Triangle J Council of Governments
Scott Sullivan (Architect, Design Team) Burt Hill Kosar Rittelmann Assoc.
Marshall Mauney, Architect, State Construction Office
Steve Lofgren, Assistant Director, Housing Department, UNC-Chapel Hill
Larry Hicks, Associate Director, Resident Education, UNC-Chapel Hill
Bill Clutter, ECU
Mark Kimball, Facilities Mechanical Engineer, ECU
Eugene Langford, Construction and Renovation Design Technician, ECU, Steam Plant

BIG 5 ISSUES

- STORM WATER
  - Collection
  - Storage
- WATER EFFICIENCY
  - Flow rate testing
  - Fixture / Valve performance
- ENERGY USE (20% + savings)
  - Orientation
  - Lighting
  - Controlability of systems
- STUDENT EDUCATION
- IEQ (indoor Environmental Quality)

BARRIERS

- Reduce maintenance
- Budget
- Tight site

NO BRAINERS

- Construction waste management
- Use of local materials (500 miles radius): brick
- Low / NO VOC finishes
- Heat recovery
- Thermal and accoustic comfort

CHALLENGES

- Water storage
- Heat infiltration (windows)
- Site stormwater
- Water fixture performance
- IAQ
- Controlability of systems (operable windows coordination)
- Trash and recycling (site issue)
- Exceed ASHRAE by 20%

EDUCATION

EDUCATION:

CHAMPIONS: **Jamie Whitehurst (Housing Marketing ECU)**
Mark "The Thinker" Kimball (Maintenance ECU)

PRIORITIES:

- Educate students, facilities personnel, maintenance staff, housekeeping and contractors on green
- Green becomes marketing tool for housing **THE PLACE TO LIVE ON CAMPUS**
- Penthouse – self sustaining

THE GREEN SUITES

POSSIBLE PARTNERS:

- Facilities Department ECU
- Student clubs
- Burt Hill Kosar Rittelman (Design Team)

BENEFITS:

- Student buy-in (could also be an obstacle)
- Good PR for ECU
- Insures green gets built-maintained and operated
- Minimal cost
- Data collection

STORM WATER

1) **OBSTACLES:**
    - Space for water storage
    - Additional piping

2) **SOLUTIONS:**
    - Underground
    - Fountain / feature
    - Integrate with slope or steps in foundation
    - NCDENR grants

3) **SYNERGIES:**
    - Landscaping (drought tolerance)
    - Community (features)

WATER EFFICIENCY

- Reduce use
- No leaks

GROUP 3: OBSERVATIONS & RECOMMENDATIONS

PARTICIPANTS:

Gina Baker, Architect (Facilitator) Design Team Burt Hill Kosar Rittelmann Assoc.
David Hatton (Design Team) Principal, Burt Hill Kosar Rittelmann Assoc.
Brad Moore (Architect), NC State University
Gary Thompson, Assistant Director, Facilities NCSU
Paul Carlson, Facilities Services Mechanical Engineer, ECU
Stephen Peay, Facilities Engineer, ECU
Todd Marshall, Project Manager, ECU
Stephen Atkinson, Project Manager, ECU
Aaron Lucier, Associate Director, ECU

ENERGY

ENERGY: PRIORITY #1

CHAMPIONS: **Paul Carlson, ECU Campus Living (Housing)**
Chuck Gulledge, ME (Design Team)

PRIORITIES:
- Energy is # 1priority
- Achieve a goal of 10% better than ASHRAE 90.1 1999

POSSIBLE PARTNERS:
- G.U.C.
- Energy Star
- Laundry vendors

POSSIBLE BARRIERS:
- Up front cost $$

SYNERGIES: **$$$**
- Reduced maintenance
- Education for students, parents, staff

SCHEDULE MILESTONES:
- Design scope, CD's, estimates
- Bid process, submittals
- Finishes / furnishings by Owner

GREEN ROOF

<u>GREEN ROOF</u>: PRIORITY #2
CHAMPION: Paul Carlson, ECU Campus Living (Housing)

POSSIBLE PARTNERS:
- UNC Chapel Hill
- NC Stave University
- UNC Asheville
- Cool Roof Initiative
- NC DNR, Dept. Water Quality
- Charles Brown Architect

POSSIBLE BARRIERS:
- Up front cost $$$ - $$?
- Maintenance – how do you find leaks?
- "Internal forces"

SYNERGIES:
- "DO THE RIGHT THING" value
- Stewardship
- Energy impact
- Stormwater impact
- Recreation – mini-golf
- Education, publicity

SCHEDULE MILESTONES:
- Pre design research, CD's
- Politics

LIGHT POLLUTION

LIGHT POLLUTION: PRIORITY #3

CHAMPIONS: Bill Clutter, ECU Special Projects

PRIORITIES:
- Energy is # 1priority
- Achieve a goal of 10% better than ASHRAE 90.1 1999

POSSIBLE PARTNERS:
- G.U.C.
- Campus police
- Student government
- Board of Trustees
- RHA (Security)

POSSIBLE BARRIERS:
- $ for this project
- $ outside the scope of this project
- Scheduling

SYNERGIES:
- Campus impact / unity
- Operation / maintenance savings
- Aesthetics / Education
- Stewardship

SCHEDULE/ MILESTONES:
- Site design
- Subcontract for all of College Hill

NOT GIVING UP ON PRIORITY #1 ENERGY

PRIORITIES:
1. Indoor environmental quality
2. Energy Efficiency
   - HVAC
   - Lighting
3. Green Roof
4. Recycling in the building, C&D and operations
5. Eliminate light pollution –
   - New ECU lighting standards

GOAL: REDUCED POTABLE WATER USAGE

STRATEGIES:
- Rain water collection
- Low-flow fixtures
- Recycled water for irrigation

GOAL: DAYLIGHTING

STRATEGIES:
- Daylighting of public spaces
- Control in living rooms, public spaces

GOAL: GREEN ROOF (vegetated system)

STRATEGIES:
- Stormwater managamentn
- Life-cycle impact
- Contributes to view
- Energy benefits

GOAL: ENERGY EFFICIENCY

STRATEGIES:
- Lighting
- Energy efficient fluorescents
- Occupancy / daylight sensors
- High efficiency motors, fans, pumps - VSD

GOAL: IMPROVED IEQ

STRATEGIES:
- Low VOC materials
- Ventilation – air filtering
- Humidity control & temperature control (Issue: mold and mildew)

GOAL: RAPIDLY RENEWABLE MATERIALS

STRATEGIES:
- Bamboo ? Cork ? Issue: maintenance, accoustics, durability
- Recycled content materials

- Carpet
- Furniture

GOAL: CONSTRUCTION / DEMOLITION WASTE MANAGEMENT

- Incentives

GOAL: RECYCLING

- Casework designed to make recycling easy in each suite

GOAL: REDUCED LIFE-CYCLE COSTS

- Use local / regional materials

GOAL: REDUCE / ELIMINATE LIGHT POLLUTION

- Select proper lighting + landscape – Issue: security

ATTACHMENTS:

Charrette Agenda
Green Strategies Preliminary Narrative
Case Study Template
Sustainable Websites

Additional websites and resources:

National Websites:

- EPA Procurement guidelines www.ergweb2.com/cpg
- CSI Division materials www.oikos.org
- Energy Star Program www.energystar.gov
- Environmental Building News www.buildinggreen.com
- High Performance Buildings www.highperformancebuildings.gov/case_studies/
- Twenty River Terrace
  Battery Park City, NYC www.highperformancebuildings.gov/gbc_2002.html
- Target Finder – Energy Star www.energystar.gov
- LEED Rating Systems www.usgbc.org
- CD/videos www.gggc.state.pa.us
- Video www.savethebay.cbf.org

  www.ci.nyc.ny.us/nyclink/html/ddc/home.html