REQUEST FOR BOARD ACTION

HENDERSON COUNTY
BOARD OF COMMISSIONERS

MEETING DATE:	**September 19, 2007**
SUBJECT:	**Presentation of Historic Courthouse Energy Study**
ATTACHMENTS:	Yes 1. Henderson County Historic Courthouse Energy Assessment, Waste Reduction Partners

SUMMARY OF REQUEST:

As a part of Strategic Plan 1.1F (to Develop and Implement an Energy Policy and Plan), Mr. Dave Lowles, Waste Reduction Partners, will present the County Energy Team's Energy Assessment of the Historic Courthouse. Mr. Lowles and the County Engineer, Marcus Jones, will be available to answer any questions following the presentation.

This item is presented as information regarding specific progress being made on the County Strategic Plan. Thank you for your consideration.

BOARD ACTION REQUESTED:

No Board action requested.

Suggested Motion:

No motion suggested.

Energy Assessment, Final

Henderson County Historic Courthouse
Hendersonville, NC

Assessment Team:
Russ Jordan WRP
Dave Lowles WRP
Les Capps, County Facilities Director
Marcus Jones, County Engineer

Tour date 8/7/2007
Reviewed with the Architect and Engineer 9-4-2007

Prepared by:
Waste Reduction Partners
Land-of-Sky Regional Council

Sponsored by
The State Energy Office, Department of Administration,
NC Division of Pollution Prevention and Environmental Assistance N.C.
and U.S. Department of Energy

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This report was prepared by:

Waste Reduction Partners
Land-of-Sky Regional Council
25 Heritage Drive - Asheville, NC 28806
Phone (828) 251-6622 - FAX (828) 251-6353
E-Mail - WRP@landofsky.org

In Partnership with North Carolina Division of Pollution Prevention
And Environmental Assistance

Introduction:

This is a 100 + year old structure that has been remodeled several times and is now being restored to historic appearance, but with contemporary functions as the seat of county government. It will house the commissioners and their public meeting room, the county manager and his support staff and a Community activities center. A portion of the building will be used as history center under management by a citizens group.

This revision reflects the discussion with Gary Tweed, County Construction Manager for this project, Alan Antoine, architect, Tom Wilson, mechanical engineer and Marcus Jones County Engineer

Methodology:

Unlike many of our audits of completed buildings where we must guess at the design elements and construction methods, here we can see the bones and skin of this structure. However, we do not know the quality of the unfinished portions of construction. To learn more about these elements we reviewed and discussed the construction drawings and specifications. The comments below reflect that discussion.

Findings and Recommendations

1. **Building envelope:**
    a. The older sections of the walls are thick masonry with no insulation. In this remodeling, some of the rooms will be framed out with metal studs to support the new interior wallboard. These cavities will be filled with fiberglass insulation to reduce the heat transfer through the structure.
    b. In other spaces the new wallboard will be attached to old masonry. The heat transfer should be at a minimum, and the thermal mass of this building may allow cost savings by moving the cooling load to off-peak hours. This will have to be proven, and if so Time of Use (TOU) electrical rates might be appropriate for this building.
    c. The new addition is of block with1 ½ inch thick foam insulation and a brick exterior. The wallboard will be attached to metal studs and the enclosed space insulated with fiberglass batt insulation resulting in an R-value of 28.
    d. The windows are dual pane insulating low E glass with exception of the main entrance doors. These doors should have thermo pane glass installed, but will not to preserve the historic look of the building
    e. The ceilings in the upper floor rooms have many cutouts for recessed can lights as shown in the picture below. A fabricated fire-rated light box will be installed over each lighting assembly to block air flow. Nine inches of un-faced fiberglass insulation will installed over the existing blown-in insulation and the light boxes. The R-value of the finished ceiling assembly will be greater than 30.

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Historic Courthouse ceiling rehabilitation

f. The door seals in all exterior doors will be replaced to reduce air infiltration.

g. The soffits above the entrance pillars will have vents to allow outside air to flow under the roof to reduce heat build up in the attic space. This will help reduce summer cooling needs and improve the life of the sloped roof materials.

h. We suggest infrared thermal mapping by an independent contractor after the insulation is place, and then re-insulating any deficiencies that are found.

Comment [rU1]: Might mention $.01 to $.02 per square foot energy savings from improved weather-stripping. Also insure windows are sealed well.

2. Lighting

a. In reviewing the lighting design schedule, we noticed a number of incandescent lamps on the dimming circuits. When the design was developed, more energy efficient dimming fluorescent lamps were not commonly available. Now however, such lamps are available and should be considered.

1. The fluorescent lamps in the cove ceiling of the commissioners' meeting room are OK from an energy standpoint, but are going to be nearly impossible to change. One can barely get his hands into the access space. It appears that the contractor did not verify (as shown on the drawings) the space required to change bulbs and maintain these lamps. The maintenance staff may have to develop special tools or techniques for this task.

b. The lighting in all offices should have occupancy sensors. The opposing view is that occupancy sensors are expensive and require more maintenance. This is probably a function of the brand and model of the sensor / switch.

c. Outside lighting will be on timers or photocells to reduce energy consumption

3. HVAC.

a. The room air handling units have been delivered and placed in each office for determination of piping access. They are getting damaged and dusty with the construction activity. The metal covers will be replaced by custom wood covers to preserve the historic look of the rooms. The metal covers will thrown away, but in the meantime provide some damage protection for the units

b. Make up air will be supplied by a dedicated central duct system in the lower level supplying fresh air to all the first level rooms. The intake of this system should not be located where engine exhaust (from refuse trucks and automobiles) could get introduced to the fresh air system.

c. Heating Boiler will be non condensing unit with 88% efficiency. This meets the current code

d. Cooling chiller will have a 13.46 EEF. The current code requires an EEF of 13.25.

4. Construction management

a. The plans are being reviewed to reflect changes found upon tearing into the structure and the availability of more effective materials and components

b. Regular clean up should be encouraged, perhaps mandated.

c. An independent expert will need to tune up (commission) the HVAC controls to assure proper and economical functioning. This is required in the testing and balancing section of the specification section and is required prior to turning over the building to users. We all think that this should be revisited after the occupants move in and building has been in operation for several months. The later start up of the History Center may have an impact on this subject.

d. The contract requires that the building maintenance persons be trained on the operation of this facility. It would be wise to have several extra employees in this class to assure that talent is available when needed for this showcase facility.

e. The contractor will prepare four copies of the operating manual for this building. These should be carefully guarded and updated in a professional manner whenever changes are made.

5. Summary of recommendations:

a. We suggest infrared thermal mapping after the insulation is in place to look for heat leakage.

b. We recommend a second testing and balancing of the HVAC system after the building has been occupied for several months.

c. Train additional persons in the operation and maintenance of this high profile facility

d. Since the plans and manuals developed during this renovation are important to un-going operation of this building, and to architectural historians, this material should be carefully managed by those skilled the craft of records management. The county library may be the proper organization to manage this activity.

6. Energy Data

i. No energy consumption data is available as this facility has been shut down for a number of years.

7. **Attachments:** The following USI energy resource data sheets are a part of this report and were distributed with the preliminary version of this report.

- Caulking and weather stripping
- CFL lamps
- Drinking fountain and water coolers
- PC Monitor power management
- Exhaust fans
- Task lighting
- Occupancy Sensors

Additional copies are available from the Waste Reduction Partners website at www.landofsky.org/wrp.assessment.html