Performance Standards for Sustainable, Energy-Efficient Public Buildings

Consolidated Report

Required under G.S. 143-135.39(g)

October 1, 2013

Table of Contents

Introduction

Per G.S. 143-135.39, the NC Department of Administration is responsible for administering the Sustainable Energy-Efficient Buildings Program. The Department has completed the directives in the statute, including creation of an Advisory Committee, development of policies and technical guidelines, and conducting education and training.

A report from the Sustainable, Energy-Efficient Buildings Advisory Committee can be found on the State Construction Office website along with a series of technical standards for energy and water efficiency[1]. A procedures flow chart is also provided[2]. The Sustainable, Energy-Efficient Buildings Advisory Committee work was completed during calendar year 2008.

Education and training required by the program has consisted of the following:

- State Energy Efficiency Buildings Conference on October 29 and 30, 2008.
- *Sustainability/Energy Efficiency in Existing Buildings* presentation at the March 23, 2010 State Construction Conference[3].
- Life Cycle Cost Panel Discussion at the March 24, 2011 State Construction Conference.
- *Senate Bill 668 – A Case Study* presentation at the March 22, 2012 State Construction Conference[4].
- *SB668 – The Sequel - The Case Studies* presentation at the March 28, 2013 State Construction Conference[5].
- Ongoing design review and performance evaluation of state facilities with The Energy Benchmarking Project presented on the State Construction Office website[6]. The Energy Benchmarking Project is updated approximately once a month.

Performance Review

As part of the Sustainable, Energy-Efficient Buildings legislation, the Department is responsible for providing a consolidated report, including a performance review, State Building Commission report, and recommendations for improving the standards. The following information makes up the consolidated report.

Implementation Cost

The first requirement in the performance review deals with the cost of implementing the energy-efficiency and water use standards. In budgeting funds for new buildings, it is estimated that a premium of between 2% and 4% should be added to account for energy-efficient design and construction. This premium includes additional design costs such as advanced planning and computer modeling of the buildings, as well as additional cost for commissioning. Additional construction costs for high-efficiency building systems are also included in the premium.

Implementation costs from data analyzed for 22 buildings completed under the program follow. Renaissance Residence Hall at FSU has not been included due to a lack of data.

- Advanced planning fees for the 22 buildings completed under the program include project programming and budgeting which are not specifically related to saving energy.

Unless specifically noted to include fees for energy modeling or LEED related expenses, advanced planning fees have not been included.

- Additional design fees for the 22 buildings completed under the program range from 0% to 1.1% of the construction cost with an average of 0.33% and a median of 0.55%. Some agencies have elected to pursue LEED accreditation for their projects separate from the requirements of this program. LEED accreditation also adds cost to the project that is included in the additional design fees noted here.
- Commissioning for the six buildings completed under the program have fees ranging from 0.49% to 1.77% of the construction cost with an average of 0.67% and a median of 1.13%. The lower percentage fees can be attributed to less complex and larger buildings while the higher percentage fees can be attributed to more complex and smaller buildings. Note that LEED certification also requires commissioning.
- Construction costs for energy saving systems have been estimated based on the designer's life cycle cost analysis and then deducted from the construction bid price for the project. The additional construction cost range from 0% to 21% of the construction bid price with an average of 4.4% and a median of 10.5%. The average additional construction cost of 4.4% for this report is 10% higher than the premium noted above.
- Total implementation cost for the 22 buildings completed under the program range from less than 1% to 23% with an average of 5% and a median of 12%. The low and high percentages are not the norm. The additional costs noted here are more than national averages of 2% to 4%. The data for state facilities will continue to be analyzed due to questionable meter data received to date.

Operational Savings

The second requirement in the performance review deals with operating savings, particularly the utility savings. Standards are in place to ensure that buildings are designed to use 30% less energy and 20% less water than a basic code-compliant building, including forms to be completed and certified by the architect and engineer of record[7]. 23 buildings have been completed and the project data required by the performance review is attached. The meter data received indicates an average 15% utility savings over code compliant facilities. Note the meter data is not conclusive due to a lack a steam and chilled water utility meter data.

Employee Productivity

The third requirement in the performance review dealing with impacts on employee productivity are difficult to quantify with engineering analysis and have yet to be determined. Independent studies[8] have shown there are positive effects to employee productivity and visual satisfaction with the use of day-lighting and other features associated with energy efficient design.

Program Effectiveness

The fourth requirement in the performance review deals with program effectiveness. The legislation and the standards developed to administer the program have been effective in requiring architects and engineers to design new buildings that are 30% more energy-efficient than code and renovated buildings that are 20% more energy-efficient than code. The

standards developed require all buildings designed to use 20% less water. The reporting forms certified by the engineer of record provide documentation to validate the improvements in energy-efficiency and water use.

The possible need for additional, stricter standards is addressed under the Improvements to Energy-Efficiency Standards section below.

Program Expansion

The fifth requirement in the performance review deals with expanding the program to include additional facilities. The size of buildings subject to this legislation, 20,000 square feet and larger, is a valid minimum for energy modeling and metering. Applying the standards to smaller buildings, with a few exceptions such as power plants and data centers, would reach diminishing returns and is not recommended.

Water savings can be achieved with the use of low flow plumbing fixtures in all state owned or supported facilities with no or little additional cost and with no loss of fixture performance. The program should be expanded to include low flow plumbing fixtures be specified for installation in all renovated and new facilities.

House Bill 628 or Session Law 2013-242[9] amended the program by adding definition "(a1) Net Savings Required." The definition added by the amendment requires a maximum simple payback of 10 years for implementation of the program beginning with projects initiated on or after October 1, 2013. HB 628 has the potential to reduce or limit the program instead of expanding the program.

Other Recommendations

The sixth and final requirement in the performance review deals with other recommendations. The year 2011 and 2012 Performance Reviews noted the Advisory Committee has identified technical corrections needed for the energy-efficiency statutes. The following technical corrections are repeated for the year 2013 performance review:

- 143-135.37(a) should be revised for compliance with the legislative intent stated in 143-135.35. The current wording allows major facilities financed through local funding to avoid compliance with the program requirements. The language in regards to funding from "an appropriation in the State capital budget or through a financing contract" should be removed from the statute.
- 143-135.37(c1) should change the word "stormwater" to "groundwater" throughout to accordance with Senate Bill 668 and the definition of "potable", as groundwater is typically potable, but stormwater is not.
- 143-135.37(c) replace the building code language to "on the basis of conventional irrigation of landscaped areas" since there are no irrigation requirements addressed by the North Carolina State Building Codes.

Recommendations:

- Indoor water consumption is required to exceed the 2006 North Carolina Plumbing Code. Two building code cycles have lapsed since the program went into effect. All code references should be corrected to indicate current code instead of reference to a specific year.
- An emphasis on cost savings will help reduce utility costs through rate negotiations with the public utility and installation of peak shaving systems such as thermal storage. Currently, there are no rewards in the energy-efficiency legislation for achieving energy cost savings. The year 2011 and 2012 Performance Reviews also noted, it would be helpful to reference energy cost savings in the legislation.
- The program requires the water savings to be measured in gallons. There is no requirement to model the cost savings associated with the water savings and compare the modeled cost to the actual cost of water consumed. It would be helpful to reference water cost savings in the legislation.
- Value engineering to bring a project within budget often removes from the project key components used to bring the building into compliance with the program. An example is removing automated heating and cooling controls and replacing with manual heating and cooling controls. A post bid energy model should be required to evaluate the impact of value engineering on the building energy consumption.

State Building Commission Report

There have not been any applications to the State Building Commission to exempt a project from the requirements of the Sustainable Energy-Efficient Buildings Program.

Improvements to Energy-Efficient Standards

Under G.S 143-135.40, the Department is responsible for monitoring the development of improved energy-efficiency standards and recommending stricter or additional requirements.

The Sustainable Energy-Efficient Buildings Program standards described in G.S. 143-135.37(b) require a new building to be 30% more efficient than ASHRAE 90.1-2004 and a renovated building to be 20% more efficient than ASHRAE 90.1-2004. The 2006 North Carolina Energy Conservation Code (NCECC) was in effect when the program was implemented and the 2006 NCECC referenced ASHRAE 90.1-2004.

The 2012 NCECC[5] references ASHRAE 90.1-2007 as the code basis. ASHRAE 90.1-2007 has been determined to be 6% more efficient than ASHRAE 90.1-2004. Also, Chapter 5, section 501.1 of the 2012 NCECC states that commercial buildings shall exceed ASHRAE 90.1-2007 standard by 20%. The NC Building Code Council has issued an interpretation allowing the use of ASHRAE 90.1-2010[11] as an optional compliance path. ASHRAE 90.1-2010 has been shown to be 30% more efficient than ASHRAE 90.1-2004 which is equivalent to the program.

The following improvements should be made:

- New buildings should be changed to exceed the requirements of ASHRAE 90.1-2007 by 24% or meet the requirements of ASHRAE 90.1-2010. This change will continue to

meet the energy efficiency requirements stated in the program and exceed the code requirements stated in the 2012 NCECC.

- Renovated buildings should be changed to meet the requirements of the 2012 NCECC and exceed ASHRAE 90.1-2007 by 20% or meet the requirements of ASHRAE 90.1-2010. This change will meet the energy efficiency minimum requirements in the 2012 NCECC and exceed the program requirements of being 20% better than ASHRAE 90.1-2004.

Indoor water consumption is required to be tracked as part of the program, but there is no cost of water required to be tracked. The program should include calculating the baseline cost of water along with the actual cost of water.

The life-cycle cost statute G.S. 143-64.15 was last written in year 2001[12] and is recommended for update in coordination with updates to the Sustainable Energy-Efficient Buildings Program.

Findings

Performing the analysis to develop this performance review of the actual data and comparison to the energy model and life cycle cost analysis has given State Construction Office data to share with agencies and institutions and designers to further develop and refine the program and provide realistic results. Individual building findings are noted below:

- Davis Arena Addition and Renovation for the Department of Agriculture and Consumer Services: Metered energy and water consumption data has not been received for this facility for the second year of occupancy. The first year of meter data has been included for comparison. Davis Arena has not been LEED certified[13].

- Cone Residence Hall Renovation at Appalachian State University: Cone was the first building completed under the program. Cone was presented as a case study at the March 22, 2012 State Construction Conference[14]. The first, second and third year of occupancy metered energy and water consumption was higher than the modeled energy and water consumption, but was still lower than national averages. Further analysis revealed the modeled energy consumption was low for a residence hall, lower than other residence halls studied for this report. Actual water consumption has been lower than modeled water consumption and lower than national averages of 60 to 70 gallons per person per day. Additional construction costs are inflated due to replacement of the windows and plumbing fixtures. The existing windows and plumbing fixtures were 40 years old and scheduled to be replaced as part of the project programming, not solely for increased energy and water savings. Cone Residence Hall has been LEED gold certified[15].

- Chidley Residence Hall at North Carolina Central University: Metered energy consumption continues to be low due to a lack of steam utility metering. Also, actual water consumption is extremely low for this type of facility or less than 140 gallons per resident per year. Meter data for actual steam and water consumption should be reviewed by the agency and the meters calibrated, repaired or replaced to provide

realistic data. Chidley Residence Hall has been LEED gold certified[16].

- Student Health Center Addition and Renovation at North Carolina State University: Modeled energy and water consumption is for the addition only. The actual energy and water metered consumption is for the addition and existing building combined. Therefore, the actual consumption for the addition and existing building is much greater than just the addition, which means the resulting energy savings is a negative number and percentage. The same comparison exists with the indoor water consumption data where the addition is compared to the addition and existing building combined. Student Health Center Addition has been LEED gold certified[17]. Second year metered energy use is 58% greater than first year energy use and has been reported to the owner for further investigation.

- Miltimore Residence Hall at UNC Charlotte: Modeled energy consumption is the highest presented for any state owned facility and greatly exceeds the national and regional averages for residence halls. Additionally, metered energy consumption is much lower than any state owned facility. Therefore, comparing the artificially high modeled consumption to an unrealistically low actual consumption equates to great savings on paper which requires further investigation by the owner. Miltimore (Phase IX) Residence Hall has been LEED silver certified[18].

- Prospector Hall Renovation at UNC Charlotte: Modeled energy and water consumption is for the renovated area only. The actual energy and water metered consumption is for the partial renovation and existing building combined. Therefore, the actual consumption for the partial renovation and existing building is much greater than just the partial renovation and the resulting energy savings is a negative number and percentage. The same comparison exists with the indoor water consumption data where the addition is compared to the partial renovation and existing building combined. Also, Prospector Hall is a dining facility and the indoor water consumption did not include water consumption for food service preparation and cleaning. Prospector Hall was not designed for LEED requirements.

- Gilchrist Education and Psychology Complex at Elizabeth City State University: Metered energy and water consumption data has not been received for this facility. Gilchrist has not been LEED certified[19].

- South Eastern NC Agriculture Events Center (The Pavilion), Lumberton: Metered energy and water consumption data has not been received for this facility. The Pavilion has not been LEED certified.

- NCDOA Veterans Administration Nursing Home, Swannanoa: Metered energy and water consumption data has not been received for this facility. Nursing Home was not designed for LEED requirements.

- Russell Classroom Building at Pitt Community College: Metered energy usage for the first year of occupancy was 38% higher than modeled while the metered energy cost was 42% lower than modeled. The correct utility rates do not appear to have been included in the energy model leading to the energy usage being higher than expected while the energy bill was lower than expected. Metered indoor water consumption was much lower than modeled indoor water consumption. Russell was not designed for LEED requirements.

- Quad Residence Halls (Bailey, Coit, Cotton, Gray, Hinshaw, Jamison and Shaw) at UNC Greensboro: Overall metered energy usage for the first year of occupancy follows the baseline or code compliant modeled energy usage. Metered energy cost averaged 50% lower than modeled energy cost due to the fact that the chilled water utility used for cooling was not metered for cost. Metered water usage exceeded modeled water usage, but was within the usage range expected for a residence hall. The Quad Residence Halls have been LEED gold certified[20].

- Harrill Residence Hall Renovation at Western Carolina University: Metered energy usage for the first year of occupancy exceeded the goals of the program for both energy use and energy cost. Energy use was 50% less than a code compliant building and energy cost was 57% less than a code compliant building. Indoor water consumption was 60% less than the modeled building and lower than expected for a residence hall. Harrill Residence Hall has not been LEED certified[21].

- Health Science Building at UNC Pembroke: Metered energy usage for the first year of occupancy was 6% higher than the modeled building and did not meet the program requirements. Metered energy cost was 17% higher than modeled. Indoor water consumption was 97% less than modeled and much lower than expected for a classroom and office building. Health Science Building LEED certification is in process[22].

- Renaissance Residence Hall at Fayetteville State University: Renaissance is a privately funded project on state land that is required to meet the program. Since the project is privately funded, SCO does not have data related to design and construction costs. Metered energy and water consumption data has not been received for this facility. Renaissance has not been LEED certified[23].

- Overlook Residence Hall at UNC Asheville: Metered energy usage was 25% less than the modeled building and was within the margin of error established by the program. Metered energy cost was 20% less than the modeled building. Indoor water consumption was 40% less than modeled and exceeded the program requirements, but indoor water consumption per resident was high at 5,975 gallons per resident per year. Overlook was not designed for LEED requirements.

- Viking Tower Residence Hall at Elizabeth City State University: Metered energy and water consumption data has not been received for this facility. Viking Tower was not designed for LEED requirements.

- Teaching Laboratory Building at UNC Wilmington: Metered energy and water consumption data has not been received for this facility. Teaching Laboratory Building has been LEED silver certified[24].

Note that 13 of the 23 buildings completed under the program were required by the owning agency to meet the requirements of LEED certification independent of the energy and water savings legislation. LEED and the energy and water savings legislation have many of the same goals except the energy and water savings legislation requires actual meter data to be collected and compared to the modeled energy data while LEED does not.

Conclusions

Energy and water utility meter data for the 23 buildings completed under the program continues to be unreliable. Energy and water utility meter data should continue to be analyzed to gain confidence in the collection and tracking of the data. The building model data should also be analyzed against other state owned facility models along with national and regional averages for similar buildings.

- Modeling data for the 23 buildings presented ranges from low to extremely high as compared to similar buildings. SCO is tracking the buildings analyzed under the program and advising designers when buildings are out of range. The SCO Energy Benchmarking Project is available for owners and designers to compare proposed buildings to existing similar state owned facilities[6].
- Metered utility data collected by the agencies has been inconsistent. Examples include water consumption at a dormitory indicating 148 gallons/student/year which is unrealistically low, to no steam utility data, and to total building energy consumption that is below local, regional and national averages.
- Steam utility meters have proven difficult in obtaining accurate readings. A more reliable option is to use condensate meters.
- Indoor water consumption for facilities other than dormitories is difficult to model and predict.
- Indoor water consumption for residence halls averages 5,000 gallons/student/year for the eleven residence hall analyzed to date. This information will be used in guiding designers and owners on future residence hall projects.
- Utility rates used in the energy model do not always agree with the energy rates billed to the owner.
- Commissioning typically continues during the first year of occupancy and meter data.

Project summaries for the 23 buildings studied are on pages 12 through 17 of this report.

Acknowledgements

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2012-2013 Performance Standards Review




	Agency/Institution	Ag&CS	ASU	NCCU	NCSU
	Project Name and Description	Davis Arena Addition & Renovation	Cone Residence Hall Renovation	Chidley North Residence Hall	Student Health Center Add & Renov
	Basic Project Data				
	Total Project Cost	$ 6,053,240	$ 8,538,280	$ 25,567,786	$ 6,758,383
	Project Size (SF)	67,904	58,803	133,570	24,663
	Cost/Square Foot	$ 89	$ 145	$ 191	$ 274
	LEED Certification	None	Gold	Gold	Gold
	Fees and Costs				
A	Basic Design Fee	$ 469,000	$ 832,067	$ 2,012,550	$ 567,570
B	Additional Design Fees	$ 33,000	$ 58,613	$ 173,500	$ 66,475
C	Total Design Fee	$ 502,000	$ 890,680	$ 2,186,050	$ 634,045
	% of Total Gen Cont(G)	0.60%	0.77%	0.75%	1.10%
D	Commissioning Fees (Cx)	$ 43,640	$ 62,500	$ 104,934	$ 106,438
	% of Total Gen Cont(G)	0.79%	0.82%	0.45%	1.77%
E	Estimated Basic Costs	$ 5,351,000	$ 5,965,486	$ 21,956,196	$ 5,778,782
F	Estimated Additional Costs	$ 156,600	$ 1,619,614	$ 1,320,606	$ 239,118
G	Total General Contract	$ 5,507,600	$ 7,585,100	$ 23,276,802	$ 6,017,900
	% of Total Gen Cont(G)	3%	21%	6%	4%
H	Baseline Utilities Cost	$ 72,840	$ 81,830	$ 292,778	$ 68,316
I	Metered Utilities Cost	$ 61,917	$ 125,840	$ 107,655	$ 166,676
J	Avoided Utility Cost	$ 10,923	$ (44,010)	$ 185,123	$ (98,360)
K	% Avoided Utility Savings	15%	-54%	63%	-144%
	Indoor Water (Gallons)				
	Baseline Water Use	109,500	2,000,376	6,283,057	320,198
	Metered Water Use	$ 329,868	1,462,000	73,068	304,227
	Water Savings	(220,368)	538,376	6,209,989	15,971
	Percent Water Savings	-201%	27%	99%	5%
	Total Additional Fees & Costs				
	Additional Design Fees	$ 33,000	$ 58,613	$ 173,500	$ 66,475
	Commissioning Fees (Cx)	$ 43,640	$ 62,500	$ 113,132	$ 106,438
	Estimated Additional Costs	$ 156,600	$ 1,619,614	$ 1,320,606	$ 239,118
	Total	$ 233,240	$ 1,740,727	$ 1,607,238	$ 412,031
	% of Total Gen Cont(G)	4%	23%	7%	7%

	Fees and Costs Defined:
A	Basic Design Fee: noted on the design contract or calculated from total design fee less additional design fees
B	Additional Design Fees: noted as LEED, SB 668, energy legislation, etc. on design contract (None used when no fees noted)
C	Total Design Fee: from the design contract (Fee does not include design ammendments)
D	Commissioning Fees: contract amount with owner
E	Estimated Basic Costs: the total general contract less the estimated additional costs (E=G-F)
F	Estimated Additional Costs: from the designer's life cycle cost analysis
G	Total General Contract: from the construction contract (Amount does not include change orders)
H	Baseline Utilities Cost: from the designer's life cycle cost and energy model analysis
I	Metered Utilities Cost: meter data from the owner
J	Avoided Utility Cost: modeled utilities cost less actual utilities cost (J=H-I)
K	Percent Savings: percent savings calculated from the designer's modeled utility cost and the actual utility cost

2012-2013 Performance Standards Review




	Agency/Institution	UNCC	UNCC	ECSU	Ag&CS
	Project Name and Description	Miltimore Residence Hall	Prospector Hall Partial Renovation	Gilchrist Ed & Psych Complex	SENC Agriculture Events Center
	Basic Project Data				
	Total Project Cost	$ 35,978,870	$ 4,389,300	$ 16,637,177	$ 4,447,345
	Project Size (SF)	173,086	22,705	48,112	55,605
	Cost/Square Foot	$ 208	$ 193	$ 346	$ 80
	LEED Certification	Silver	None	None	None
	Fees and Costs				
A	Basic Design Fee	$ 2,747,550	$ 295,000	$ 1,654,600	$ 363,080
B	Additional Design Fees	$ 58,700	$ -	$ 35,000	$ -
C	Total Design Fee	$ 2,806,250	$ 295,000	$ 2,186,050	$ 363,080
	% of Total Gen Cont(G)	0.18%	0.00%	0.24%	0.00%
D	Commissioning Fees (Cx)	$ 177,000	$ 65,100	$ 57,000	$ 11,870
	% of Total Gen Cont(G)	0.54%	1.62%	0.40%	0.29%
E	Estimated Basic Costs	$ 32,995,620	$ 3,944,812	$ 13,822,099	$ 3,919,435
F	Estimated Additional Costs	$ -	$ 84,388	$ 572,028	$ 152,960
G	Total General Contract	$ 32,995,620	$ 4,029,200	$ 14,394,127	$ 4,072,395
	% of Total Gen Cont(G)	0%	2%	4%	4%
H	Baseline Utilities Cost	$ 796,302	$ 30,538	$ 64,655	$ 42,886
I	Metered Utilities Cost	$ 147,061	$ 64,639	No Data	No Data
J	Avoided Utility Cost	$ 649,241	$ (34,101)		
K	% Avoided Utility Savings	82%	-112%		
	Indoor Water (Gallons)				
	Baseline Water Use	2,719,308	48,654	1,506,938	243,256
	Metered Water Use	5,153,838	1,963,971	No Data	No Data
	Water Savings	(2,434,530)	(1,915,317)		
	Percent Water Savings	-90%	-3937%		
	Total Additional Fees & Costs				
	Additional Design Fees	$ 58,700	$ -	$ 35,000	$ -
	Commissioning Fees (Cx)	$ 177,000	$ 65,100	$ 57,000	$ 11,870
	Estimated Additional Costs	$ -	$ 84,388	$ 572,028	$ 152,960
	Total	$ 235,700	$ 149,488	$ 664,028	$ 164,830
	% of Total Gen Cont(G)	1%	4%	5%	4%

	Fees and Costs Defined:
A	Basic Design Fee: noted on the design contract or calculated from total design fee less additional design fees
B	Additional Design Fees: noted as LEED, SB 668, energy legislation, etc. on design contract (None used when no fees noted)
C	Total Design Fee: from the design contract (Fee does not include design ammendments)
D	Commissioning Fees: contract amount with owner
E	Estimated Basic Costs: the total general contract less the estimated additional costs (E=G-F)
F	Estimated Additional Costs: from the designer's life cycle cost analysis
G	Total General Contract: from the construction contract (Amount does not include change orders)
H	Baseline Utilities Cost: from the designer's life cycle cost and energy model analysis
I	Metered Utilities Cost: meter data from the owner
J	Avoided Utility Cost: modeled utilities cost less actual utilities cost (J=H-I)
K	Percent Savings: percent savings calculated from the designer's modeled utility cost and the actual utility cost

2012-2013 Performance Standards Review

					
	Agency/Institution	**NCDOA-VA**	**Pitt CC**	**UNCG**	**UNCG**
	Project Name and Description	Swannanoa Nursing Home	Russell Classroom Building	Bailey Residence Hall Renovation	Coit Residence Hall Renovation
	Basic Project Data				
	Total Project Cost	$ 17,482,041	$ 8,431,397	$ 6,849,514	$ 6,849,514
	Project Size (SF)	108,770	50,434	30,735	30,735
	Cost/Square Foot	$ 161	$ 167	$ 223	$ 223
	LEED Certification	None	None	Gold	Gold
	Fees and Costs				
A	Basic Design Fee	$ 1,250,000	$ 943,138	$ 600,745	$ 600,745
B	Additional Design Fees	None	$ 52,150	$ 11,429	$ 11,429
C	Total Design Fee	$ 1,250,000	$ 995,288	$ 612,174	$ 612,174
	% of Total Gen Cont(G)	0.00%	0.71%	0.18%	0.18%
D	Commissioning Fees (Cx)	$ 96,941	$ 42,310	$ 40,879	$ 40,879
	% of Total Gen Cont(G)	0.60%	0.57%	0.66%	0.66%
E	Estimated Basic Costs	$ 15,834,228	$ 7,243,287	$ 6,016,156	$ 6,016,156
F	Estimated Additional Costs	$ 300,872	$ 150,512	$ 180,305	$ 180,305
G	Total General Contract	$ 16,135,100	$ 7,393,799	$ 6,196,461	$ 6,196,461
	% of Total Gen Cont(G)	2%	2%	3%	3%
H	Baseline Utilities Cost	$ 213,106	$ 91,928	$ 59,608	$ 59,608
I	Metered Utilities Cost	No Data	$ 53,735	$ 20,272	$ 22,516
J	Avoided Utility Cost		$ 38,193	$ 39,336	$ 37,092
K	% Avoided Utility Savings		42%	66%	62%
	Indoor Water (Gallons)				
	Baseline Water Use	4,378,540	1,217,970	327,880	327,880
	Metered Water Use	No Data	295,475	403,200	420,700
	Water Savings		922,495	(75,320)	(92,820)
	Percent Water Savings		76%	-23%	-28%
	Total Additional Fees & Costs				
	Additional Design Fees	None	$ 52,150	$ 11,429	$ 11,429
	Commissioning Fees (Cx)	$ 96,941	$ 42,310	$ 40,879	$ 40,879
	Estimated Additional Costs	$ 300,872	$ 150,512.00	$ 180,305	$ 180,305
	Total	$ 397,813	$ 244,972	$ 232,613	$ 232,613
	% of Total Gen Cont(G)	2%	3%	4%	4%

	Fees and Costs Defined:
A	Basic Design Fee: noted on the design contract or calculated from total design fee less additional design fees
B	Additional Design Fees: noted as LEED, SB 668, energy legislation, etc. on design contract (None used when no fees noted)
C	Total Design Fee: from the design contract (Fee does not include design ammendments)
D	Commissioning Fees: contract amount with owner
E	Estimated Basic Costs: the total general contract less the estimated additional costs (E=G-F)
F	Estimated Additional Costs: from the designer's life cycle cost analysis
G	Total General Contract: from the construction contract (Amount does not include change orders)
H	Baseline Utilities Cost: from the designer's life cycle cost and energy model analysis
I	Metered Utilities Cost: meter data from the owner
J	Avoided Utility Cost: modeled utilities cost less actual utilities cost (J=H-I)
K	Percent Savings: percent savings calculated from the designer's modeled utility cost and the actual utility cost

2012-2013 Performance Standards Review

					
	Agency/Institution	**UNCG**	**UNCG**	**UNCG**	**UNCG**
	Project Name and Description	Cotton Residence Hall Renovation	Gray Residence Hall Renovation	Hinshaw Residence Hall Renovation	Jamison Residence Hall Renovation
	Basic Project Data				
	Total Project Cost	$ 6,849,514	$ 6,849,514	$ 6,849,514	$ 6,849,514
	Project Size (SF)	30,735	30,735	30,735	30,735
	Cost/Square Foot	$ 223	$ 223	$ 223	$ 223
	LEED Certification	Gold	Gold	Gold	Gold
	Fees and Costs				
A	Basic Design Fee	$ 600,745	$ 600,745	$ 600,745	$ 600,745
B	Additional Design Fees	$ 11,429	$ 11,429	$ 11,429	$ 11,429
C	Total Design Fee	$ 612,174	$ 612,174	$ 612,174	$ 612,174
	% of Total Gen Cont(G)	0.18%	0.18%	0.18%	0.18%
D	Commissioning Fees (Cx)	$ 40,879	$ 40,879	$ 40,879	$ 40,879
	% of Total Gen Cont(G)	0.66%	0.66%	0.66%	0.66%
E	Estimated Basic Costs	$ 6,016,156	$ 6,016,156	$ 6,016,156	$ 6,016,156
F	Estimated Additional Costs	$ 180,305	$ 180,305	$ 180,305	$ 180,305
G	Total General Contract	$ 6,196,461	$ 6,196,461	$ 6,196,461	$ 6,196,461
	% of Total Gen Cont(G)	3%	3%	3%	3%
H	Baseline Utilities Cost	$ 59,608	$ 59,608	$ 59,608	$ 59,608
I	Metered Utilities Cost	$ 29,105	$ 26,790	$ 28,814	$ 20,202
J	Avoided Utility Cost	$ 30,503	$ 32,818	$ 30,794	$ 39,406
K	% Avoided Utility Savings	51%	55%	52%	66%
	Indoor Water (Gallons)				
	Baseline Water Use	327,880	327,880	327,880	327,880
	Metered Water Use	$ 404,100	424,200	358,150	389,100
	Water Savings	(76,220)	(96,320)	(30,270)	(61,220)
	Percent Water Savings	-23%	-29%	-9%	-19%
	Total Additional Fees & Costs				
	Additional Design Fees	$ 11,429	$ 11,429	$ 11,429	$ 11,429
	Commissioning Fees (Cx)	$ 40,879	$ 40,879	$ 40,879	$ 40,879
	Estimated Additional Costs	$ 180,305	$ 180,305	$ 180,305	$ 180,305
	Total	$ 232,613	$ 232,613	$ 232,613	$ 232,613
	% of Total Gen Cont(G)	4%	4%	4%	4%

	Fees and Costs Defined:
A	Basic Design Fee: noted on the design contract or calculated from total design fee less additional design fees
B	Additional Design Fees: noted as LEED, SB 668, energy legislation, etc. on design contract (None used when no fees noted)
C	Total Design Fee: from the design contract (Fee does not include design ammendments)
D	Commissioning Fees: contract amount with owner
E	Estimated Basic Costs: the total general contract less the estimated additional costs (E=G-F)
F	Estimated Additional Costs: from the designer's life cycle cost analysis
G	Total General Contract: from the construction contract (Amount does not include change orders)
H	Baseline Utilities Cost: from the designer's life cycle cost and energy model analysis
I	Actual Utilities Cost: meter data from the owner
J	Avoided Utility Cost: modeled utilities cost less actual utilities cost (J=H-I)
K	Percent Savings: percent savings calculated from the designer's modeled utility cost and the actual utility cost

2012-2013 Performance Standards Review




	Agency/Institution	UNCG	WCU	UNCP	FSU
	Project Name and Description	Shaw Residence Hall Renovation	Harrill Residence Hall Renovation	Health Science Building	Renaissance Residence Hall
	Basic Project Data				
	Total Project Cost	$ 6,849,514	$ 14,587,035	$ 16,886,020	No contract
	Project Size (SF)	54,847	71,505	87,000	85,000
	Cost/Square Foot	$ 125	$ 204	$ 194	
	LEED Certification	Gold	None	In Progress	None
	Fees and Costs				
A	Basic Design Fee	$ 600,745	$ 998,800	$ 2,004,260	No contract
B	Additional Design Fees	$ 11,429	None	$ 47,460	No contract
C	Total Design Fee	$ 612,174	$ 998,800	$ 2,051,720	
	% of Total Gen Cont(G)	0.18%	0.00%	0.32%	
D	Commissioning Fees (Cx)	$ 40,879	$ 153,235	$ -	No contract
	% of Total Gen Cont(G)	0.66%	1.14%	0.00%	
E	Estimated Basic Costs	$ 6,016,156	$ 11,750,000	$ 14,419,316	No contract
F	Estimated Additional Costs	$ 180,305	$ 1,685,000	$ 414,984	$ 850,000
G	Total General Contract	$ 6,196,461	$ 13,435,000	$ 14,834,300	No contract
	% of Total Gen Cont(G)	3%	13%	3%	
H	Baseline Utilities Cost	$ 59,608	$ 114,129	$ 98,379	$ 174,915
I	Metered Utilities Cost	$ 60,379	$ 49,483	$ 114,829	No Data
J	Avoided Utility Cost	$ (771)	$ 64,646	$ (16,450)	
K	% Avoided Utility Savings	-1%	57%	-17%	
	Indoor Water (Gallons)				
	Baseline Water Use	327,880	2,675,470	2,606,625	2,636,463
	Metered Water Use	$ 680,900	1,069,000	73,069	No Data
	Water Savings	(353,020)	1,606,470	2,533,556	
	Percent Water Savings	-108%	60%	97%	
	Total Additional Fees & Costs				
	Additional Design Fees	$ 11,429	$ -	$ 47,460	
	Commissioning Fees (Cx)	$ 40,879	$ 153,235	$ -	
	Estimated Additional Costs	$ 180,305	$ 1,685,000	$ 414,984	$ 850,000
	Total	$ 232,613	$ 1,838,235	$ 462,444	
	% of Total Gen Cont(G)	4%	14%	3%	

	Fees and Costs Defined:
A	Basic Design Fee: noted on the design contract or calculated from total design fee less additional design fees
B	Additional Design Fees: noted as LEED, SB 668, energy legislation, etc. on design contract (None used when no fees noted)
C	Total Design Fee: from the design contract (Fee does not include design ammendments)
D	Commissioning Fees: contract amount with owner
E	Estimated Basic Costs: the total general contract less the estimated additional costs (E=G-F)
F	Estimated Additional Costs: from the designer's life cycle cost analysis
G	Total General Contract: from the construction contract (Amount does not include change orders)
H	Baseline Utilities Cost: from the designer's life cycle cost and energy model analysis
I	Metered Utilities Cost: meter data from the owner
J	Avoided Utility Cost: modeled utilities cost less actual utilities cost (J=H-I)
K	Percent Savings: percent savings calculated from the designer's modeled utility cost and the actual utility cost

2012-2013 Performance Standards Review



	Agency/Institution	UNCA	ECSU	UNCW
	Project Name and Description	Overlook Residence Hall	Viking Tower Residence Hall	Teaching Laboratory Building
	Basic Project Data			
	Total Project Cost	$ 18,237,600	$ 13,759,446	$ 18,260,650
	Project Size (SF)	91,370	53,896	85,000
	Cost/Square Foot	$ 200	$ 255	$ 215
	LEED Certification	None	None	Silver
	Fees and Costs			
A	Basic Design Fee	$ 1,685,000	$ 1,159,950	$ 2,458,630
B	Additional Design Fees	$ -	$ 40,000	$ 156,820
C	Total Design Fee	$ 1,685,000	$ 1,199,950	$ 2,615,450
	% of Total Gen Cont(G)	0.00%	0.32%	1.00%
D	Commissioning Fees (Cx)	$ 85,000	$ 85,000	$ -
	% of Total Gen Cont(G)	0.52%	0.68%	0.00%
E	Estimated Basic Costs	$ 14,927,082	$ 12,222,788	$ 15,440,699
F	Estimated Additional Costs	$ 1,540,518	$ 251,708	$ 204,501
G	Total General Contract	$ 16,467,600	$ 12,474,496	$ 15,645,200
	% of Total Gen Cont(G)	9%	2%	1%
H	Baseline Utilities Cost	$ 89,281	$ 139,969	$ 142,633
I	Metered Utilities Cost	$ 107,053	No Data	No Data
J	Avoided Utility Cost	$ (17,772)		
K	% Avoided Utility Savings	-20%		
	Indoor Water (Gallons)			
	Baseline Water Use	2,888,310	1,193,460	751,030
	Metered Water Use	1,738,352	No Data	No Data
	Water Savings	1,149,958		
	Percent Water Savings	40%		
	Total Additional Fees & Costs			
	Additional Design Fees	$ -	$ 40,000	$ 156,820
	Commissioning Fees (Cx)	$ 85,000	$ 85,000	$ -
	Estimated Additional Costs	$ 1,540,518	$ 251,708	$ 204,501
	Total	$ 1,625,518	$ 376,708	$ 361,321
	% of Total Gen Cont(G)	10%	3%	2%

	Fees and Costs Defined:
A	Basic Design Fee: noted on the design contract or calculated from total design fee less additional design fees
B	Additional Design Fees: noted as LEED, SB 668, energy legislation, etc. on design contract (None used when no fees noted)
C	Total Design Fee: from the design contract (Fee does not include design ammendments)
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I	Metered Utilities Cost: meter data from the owner
J	Avoided Utility Cost: modeled utilities cost less actual utilities cost (J=H-I)
K	Percent Savings: percent savings calculated from the designer's modeled utility cost and the actual utility cost

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