

**Higher Education Bond Oversight Committee
Bond Program
Final Report**

September 2010

Executive Summary

Facility Adequacy/Enrollment Growth – Aging facilities, repair backlogs, and space needs pushed by higher education enrollment growth required visionary capital solutions.

In 1999 the UNC Board of Governors approved *Building for the New Millennium*. The exhaustive report documented outmoded buildings, a huge backlog of deferred maintenance, and a looming shortage of critical science and technology facilities on the University of North Carolina (UNC) campuses and affiliates, including UNC-TV. The North Carolina Community College System (NCCCS) also completed the fourth phase of its *Funding Formula Study*, recommending a new capital outlay model featuring an ability-to-pay index for low-wealth counties. Clearly, a number of existing facilities were inadequate and substantial enrollment growth was anticipated. In response, the General Assembly authorized a \$3.1 billion bond referendum and with the support of the voters in November 2000, the largest capital bond issue for higher education in U.S. history was passed.

A Planned Program – A comprehensive and funded multi-year capital program provided for more effective use of human and capital resources, and resulted in superior execution.

A total of 728 projects, involving new construction or renovation, were completed at universities and affiliates associated with the UNC system and community colleges throughout the State under the bond program. The existence of a capital program, itself, with a funding commitment over several years provided a level of project coordination and planning unheard of in the era of individual project requests. This cohesive program permitted more effective sequencing of projects for the universities, including improved ability to address infrastructure needs and swing space. While the community colleges were not fully able to take advantage of this benefit because they did not have planning funds to position themselves prior to the bond's passage, they have subsequently received funding and completed master plans for each campus which will allow them to do so in the future. The focus and leverage provided to program managers because of the higher level oversight found in the Higher Education Bond Oversight Committee (HEBOC), provided a level of accountability that improved performance.

Bond program projects fulfilled a broad range of needs from additional classroom spaces, modern science facilities, student service spaces, libraries, and residence halls, to infrastructure for electricity, heating, cooling, communications, and land acquisition. With additional funding from State appropriations, repairs and renovations funds, county contributions, and non-appropriated sources such as grants, receipts, and gifts, the total amount of funding exceeded \$4 billion.

Job Creation – Capital infusion during economic recession created jobs, stabilized the construction industry, and provided permanent value-added improvements.

With the economic recession of 2000-2001, the bond program provided a critical funding infusion to keep the construction industry afloat until the economy could begin to recover. Within just the first three years of the program 33,000 jobs were generated from the University's portion of the bond program alone. By the end of the program, more than 118,600 jobs were created or saved. Bond funding was expended in every county across the State. The productive output resulting from these jobs generated permanent improvements in infrastructure and facilities for the State.

State Treasurer – Timely bond issuance saved interest expense while supporting project progress.

The program could not have been successful without the Treasurer's commitment to the timely issue of bonds to meet cash flow requirements. In both the universities and community colleges, schedules were generated for all of the program's projects, updated monthly, and consolidated into cash flow projections for communication with the State Treasurer's Office to plan for appropriate bond sales to support the work. Bond issues were timed to allow the bond program to proceed unconstrained by cash flow requirements and favorable market conditions resulted in interest rates that saved the State an estimated \$390.5M in interest under initial program projections.

Program Management – Consistently monitoring and reporting key program measurements ensured success.

One of the biggest keys to the program's success was program management involving ongoing schedule, cash flow, HUB participation, and scope monitoring, as well as regular, frequent reporting on the entire program. While the Community College System performed well with limited resources and absent a defined program at the outset, the UNC System was outstanding in managing the program to achieve the goal of delivering the program on budget, on schedule, and within scope. The universities used a project management software system, "Primavera," to provide cash projections which were tied to the schedules and so revised as schedules were revised. The Community Colleges System Office consolidated spreadsheet updates from their local colleges into an overall cash flow projection. These data sources were also used for monitoring project progress, identifying and addressing issues affecting success, and reporting to the Higher Education Bond Oversight Committee (HEBOC).

HUB Participation – A commitment to HUB strategies has provided business opportunities to the HUB community.

Legislation, enacted during the program, changed the primary construction delivery methods in use and enhanced opportunities for historically underutilized businesses (HUB). Effective January 1, 2002, agencies were permitted to routinely use single-prime bidding or Construction Manager at Risk (CM@R) construction delivery methods, and goals and strategies were set for improved HUB participation. The change in construction delivery methods had a substantial impact on the program's ability to attract sufficient construction industry participation to build large, complex projects, preserve competition, improve the quality of construction, and minimize claims.

The HUB strategies provided opportunities for these firms to participate in the economic benefits of the bond program and actual HUB participation that exceeded established goals. However, the perception exists that even higher HUB participation is achievable in the future, particularly for African-American firms. Increasing sensitivity to diversifying contract awards among all minority classifications of HUB firms is critical. Because construction project awards are made based on the lowest bid, successful HUB participation is predicated on successful bidding by these firms. They must be positioned to compete more effectively if participation is to increase. Larger scale firms, capable of larger, more complex work must be fostered, and improved access to financial markets for working capital, bonding, and competitive procurement of materials and supplies must be available.

Lessons Learned – Experience in this program showed the critical value of planning, scheduling, staffing, communicating, and auditing.

Throughout the bond program, each experience provided a learning lesson to inform future project success. Having a road map for the future in the form of master plans sets the stage. A schedule that all parties to the process monitor and measure consistently, ensures that everyone is committed to and following the same path. Sufficient human resources including plan reviewers and trained owners are essential ingredients. The ability for the universities to use capital funding for staffing in support of the projects made resources available and success possible. The community colleges were not afforded this opportunity, but allowing the Community Colleges to use funds in this manner would greatly benefit a future bond program. In addition, there is an ongoing need to expand the breadth of construction community involvement via HUB firms. And, as is true of almost all endeavors, communications is a vital ingredient to success. Finally, monitoring quality through selected audits provides a checkpoint to continue the cycle of improvement.

Conclusion – The bond program’s projects met a vital need at a critical time. It was visionary and well executed but significant needs still remain.

Each individual project has a story. Some are triumphs over adversity, but all have filled important needs for the university and community college campuses on which they exist. North Carolina has a long history of commitment to higher education and it has been well-served by the completion of the bond program. In the 1999 report to the Board of Governors under the legislative “Capital Equity and Adequacy Study,” it was noted that “...there is a new round of work to be done—to help assure the competitiveness of the people, businesses and communities of North Carolina....” This is no less true today and, in fact, has been reinforced in the UNC Tomorrow Commission’s final report (December 2007) which renews our State’s commitment to education, ensuring access to higher education, and preparing its citizens for engaged, productive lives.

Overview

In the fall of 2000, citizens of every county of North Carolina, including over 70% of all voters, approved the Higher Education Bond Program which included \$2.5B for the University System and \$600M for the North Carolina Community College System. This section is intended to provide a broad overview of both programs.

Projects

The programs were totally different in that the legislation defined 316 projects with scopes and budgets for the university system, but only a lump sum budget amount for the community colleges. Because the community colleges did not have planning monies available to them, they did not have projects designed or ready to begin design at the program’s outset. As a result, their plans changed over the life of the program. By July 2005, the community colleges’ cash flow model identified 392 projects, 47 less than the initial list. This reduction was due primarily to increased construction cost during the 2004-2005 time frame, combining repair and renovation projects, or abandoning projects altogether. By December 2009, their cash flow model identified 409 projects. With legislative approval of changes, the university system ended the program with a net 319 projects.

The chart below describes the nature of the program’s projects across the universities and community colleges.

Type of Buildings - Projects	New Construction Projects	New Construction Funds	% of Total Funds	Repair & Renovation Projects	Repair & Renovation Funds	% of Total Funds
Classroom – General Purpose, Cultural Arts, Humanities	120	\$ 668,364,385	22%	215	\$ 412,841,778	13%
Computing, Engineering	67	\$ 780,544,893	25%	32	\$ 282,261,409	9%
Student Services, Administrative	43	\$ 224,546,132	7%	45	\$ 83,672,178	3%
Land Acquisition	36	\$ 62,603,783	2%			0%
Infrastructure, HVAC, Roofs	43	\$ 250,084,599	8%	82	\$ 84,242,837	3%
Libraries	3	\$ 70,539,529	2%	3	\$ 16,847,950	1%
Residence Halls	8	\$ 83,226,353	3%	15	\$ 35,315,173	1%
Technology Infrastructure	16	\$ 44,909,001	1%			
		\$ 2,184,818,675			\$ 915,181,325	

Funding

In order to meet the overall needs of the University campuses, the initial bond program plan involved a shared funding arrangement with the bond program to provide 60% and the campuses 40% of the needs, which would have equated to an additional \$1.67B. The campuses brought additional projects such as residence halls and student services facilities, over and above the bond program, contributing over twice their expected share for a total additional contribution of \$3.6B. The campuses also brought supplemental funding of \$667M directly into bond program projects, as shown in the table below. Community college bond funds were broadly designated with \$498,702,279 for new construction and \$101,297,721 for repair and renovation and most were required to provide some matching local funds in order to receive bond funds.

Both systems supplemented bond funds with other sources including state appropriations, repairs and renovations funding, county funds, and non-appropriated sources such as receipts, grants, Title III, and gifts. The university campuses’ total appropriated addition to bond projects was \$84.9M and the non-appropriated was \$581.6M, making the total funds expended \$3.167B, excluding the additional \$3.6B in projects funded entirely without bond sources. The community colleges brought an additional \$327M to their program, making their total \$927M.

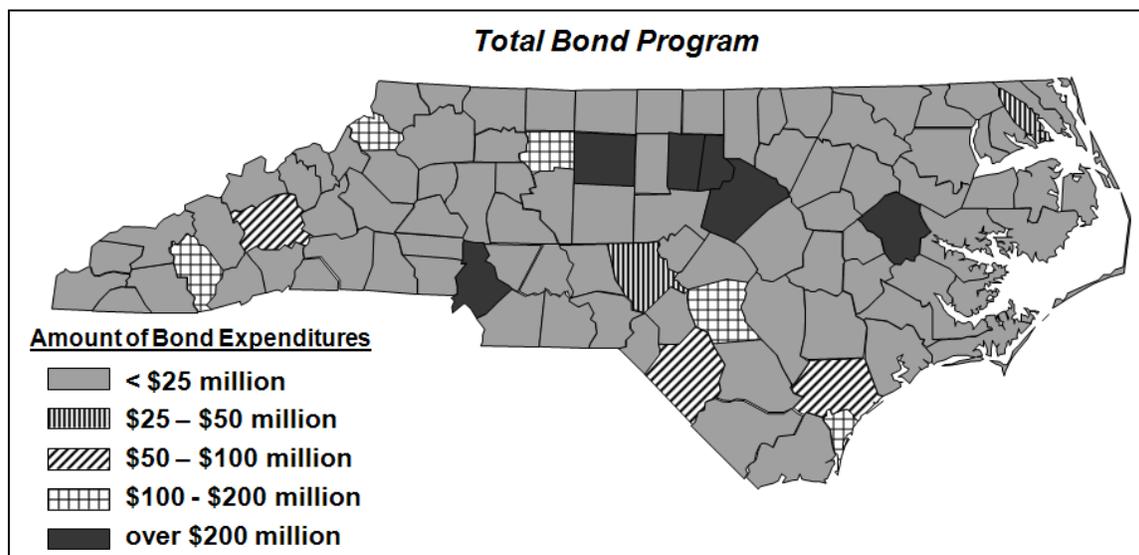
Bond and Supplemental Funds Summary

	Original Bond Funds - \$M	Required Match - \$M	Funds from Other Sources - \$M	Total - \$M
UNC	\$2,500	-	\$667	\$3,167
NCCCS	\$600	\$94	\$233	\$927
Total	\$3,100	\$94	\$900	\$4,094

Economic Impact

At the outset of the bond program, moving into 2001, the state and nation were experiencing an economic recession. As private-sector construction work slowed, the bond program was cranking up, providing an opportunity for the industry's design and construction firms to hold on until the larger economy was re-energized. No bids opened over budget for the first 75 university bond project bid openings. By December 31, 2003, there were 86 bond projects under design, 154 under construction, and 41 already completed within the university system. "In the first three years of the bond program, more than 33,000 new jobs were created throughout the state by the construction of bond-financed buildings in the UNC system alone. The bond construction program under way in the UNC system is a bright light in still often dark times for the construction industry in North Carolina," said Steve Gennett, president and CEO of Carolinas AGC (Associated General Contractors). "Its positive impact also is having a ripple effect across the state." Ultimately, over 46,700 jobs were created from University bond-financed construction projects alone and more than 118,600 over the life of the entire program, including bond and other funding contributions for both the University and Community Colleges.

The program became the modern "Works Progress Administration" (WPA) program for our times. Bond funds were expended in counties across the state and in substantial amounts in many as illustrated below.



Statistics

- University
 - 316 projects in legislation, 34 scope changes, 8 projects added, 5 projects deleted
 - 6M square feet added
 - Total dollars paid to designers - \$286.3M
 - Total dollars paid for construction - \$2.562B
 - 86% of design dollars and 97% of construction dollars went to firms having permanent offices in North Carolina
 - Greatest expenditure in one month - \$60,885,176, November 2004
 - Greatest number of projects active at one time – 255, June 2004
 - Greatest number of projects in design at one time – 153, November 2001
 - Greatest number of projects in construction at one time – 163, June 2004
 - Greatest dollar amount under contract at one time - \$1.244B, July 2005
 - Largest single contract - \$88,816,259, UNC-CH Science Phase I
- Community Colleges
 - Greatest number of projects active at one time – 213, July 2005
 - 6.1M square feet added
 - Greatest number of projects in construction at one time – 116, July 2005
 - Largest project – Project Budget - \$27,501,108, Wake Technical Community College, Northeast Campus Development (Building & Infrastructure)

Scheduling/Cash Flow

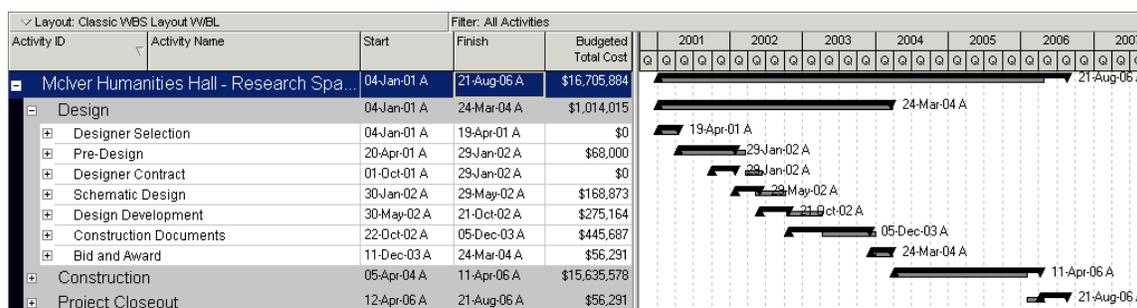
The bond program was the first substantial capital initiative in North Carolina that was based on a funding stream provided through debt financing, rather than full project appropriations in-hand prior to beginning a project. As a result, the need to develop and maintain project schedules and related cash flow in order to predict borrowing needs was a vital component of the program. Both the university and community college systems used mechanisms to aid in this process.

Within the university system, early campus project schedules were prepared manually, with only the use of Excel spreadsheets. The first comprehensive schedules, including the April 2002 baseline, were prepared using Microsoft Project as the scheduling tool. Because of the need to predict cash flow requirements in order to plan bond purchases, alternative planning tools were assessed, as Microsoft Project did not easily support this activity. In early 2003, the decision was made to use Primavera Enterprise Scheduling software, and the system was brought on line in September 2003.

The system was established with all project schedules in a single database. This permitted review of a single project's details or the roll up of information for a higher level overview by campus or of the overall program as illustrated in the screen which follows.

[-] ◆ UNC SYSTEM	General Administration	05-Nov-96 A	26-Oct-18	\$5,341,543,968
[-] ◆ ASU	Appalachian State Univers...	01-Mar-00 A	22-Jun-09	\$189,134,915
[-] ◆ ECU	East Carolina University	01-Feb-00 A	12-Oct-09	\$266,146,800
[-] ◆ ECSU	Elizabeth City State Univer...	29-Aug-00 A	07-Apr-09	\$46,190,424
[-] ◆ FSU	Fayetteville State University	08-Nov-00 A	01-Sep-10	\$101,836,058
[-] ◆ NC A&T	North Carolina A&T State ...	08-Nov-00 A	20-Feb-12	\$207,356,807
[-] ◆ NCCU	North Carolina Central Uni...	16-Jun-99 A	13-Nov-09	\$120,865,023
[-] ◆ NCSA	North Carolina School of t...	15-Nov-00 A	20-Apr-09	\$46,795,954
[-] ◆ NCSU	North Carolina State Unive...	03-Jul-00 A	24-Jun-13	\$1,198,891,116
[-] ◆ UNCA	University of North Carolin...	19-May-99 A	13-Jul-09	\$58,764,375
[-] ◆ UNC-CH	University of North Carolin...	15-Sep-99 A	31-Mar-09	\$832,331,158
[-] ◆ UNCC	University of North Carolin...	01-Dec-98 A	09-Mar-14	\$653,805,951
[-] ◆ UNCG	University of North Carolin...	07-Nov-00 A	01-Jul-10	\$174,573,266
[-] ◆ UNCP	University of North Carolin...	07-Nov-00 A	03-Mar-10	\$74,594,204
[-] ◆ UNCW	University of North Carolin...	04-Nov-98 A	25-Mar-13	\$135,322,314
[-] ◆ WCU	Western Carolina University	05-Nov-96 A	04-Mar-09	\$91,422,889
[-] ◆ WSSU	Winston-Salem State Univ...	21-Jan-99 A	30-Mar-09	\$51,030,541
[-] ◆ UNC-TV	University of North Carolin...	29-May-00 A	16-Aug-10	\$61,653,522
[-] ◆ NCSSM	North Carolina School of S...	09-Oct-00 A	07-Jul-08	\$10,280,221
[-] ◆ NCARB	The North Carolina Arbore...	01-Dec-00 A	07-Jul-08	\$21,887,253

Templates for different project types were established and used as the starting point for each project's schedule. This insured consistency for specific activities, such as design milestones, agency plan reviews, bid dates, etc. Costs were assigned to appropriate activities, and the total of all costs were required to sum to the total project budget. This cost loaded schedule became the basis for cash flow forecasting. Campuses were responsible for establishing and maintaining their own project schedules, with updates required monthly. Baselines, a snapshot of the schedule, were created every quarter so that progress could be monitored over time. A sample schedule is shown below.

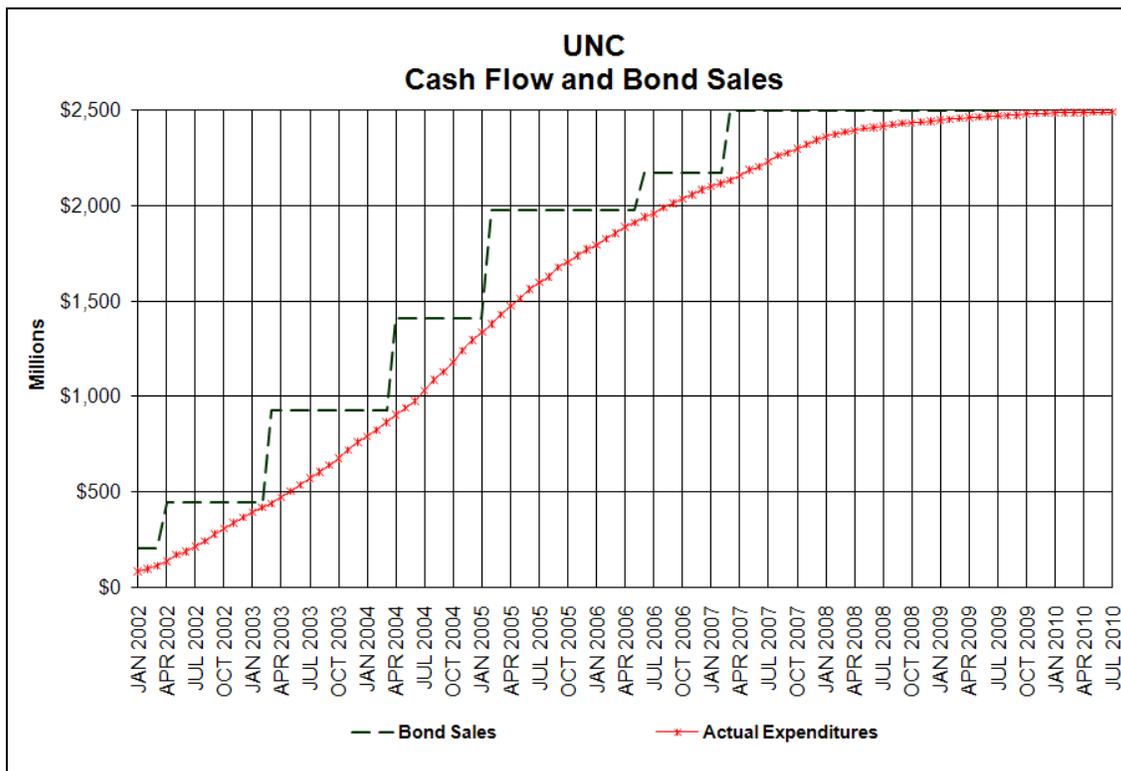


Having a single database that permitted review of an individual schedule for any project on any campus, the campus overall, or the entire program was a key part of managing the program and providing oversight to the Higher Education Bond Oversight Committee (HEBOC). Comparing progress over time, utilizing appropriate baselines, allowed General Administration to quickly identify problems and pursue them with the respective campuses.

The Primavera software tracks each activity, its duration, the dollar values associated with it, and a cash distribution curve, and computes the cash flow for that activity. It then sums all of the

cash flow for each project, so that expenditures may be predicted for any given time interval over the life of the project. This feature, rolled up to the campus level for all of their projects and then to the program level, was used to forecast cash flow on a monthly basis. Using a standard project management axiom that “dollars spent equals work accomplished,” the forecast cash flow was compared against expenditures as a gauge of the accuracy of the schedules, and thus of work put in place. As with the baseline schedules, this provided an early warning mechanism that allowed General Administration to focus on and address project issues with the respective campuses to maintain budget and schedule adherence.

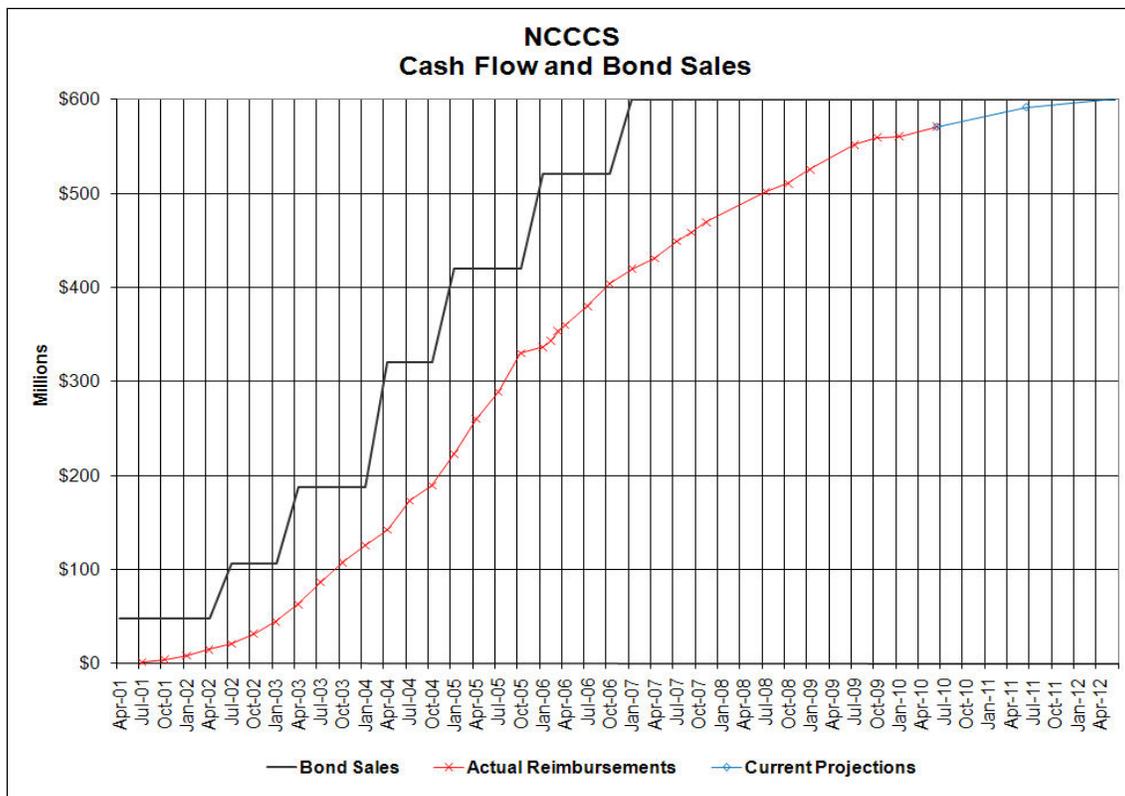
The cash flow forecast for the program that was generated from Primavera was also used to help the State Treasurer determine the timing and amount of bond sales. This helped control the cost of the program by minimizing unnecessary debt service. Bond issues were timed to allow the bond program to proceed unconstrained by cash flow requirements and favorable market conditions resulted in interest rates that saved the State an estimated \$390.5M under initial program projections. The chart below shows the ‘just-in-time’ nature of bond sales to meet UNC expenditures.



In addition, by taking advantage of the database supporting the Primavera application, various information related to each project such as scope, budget, other fund sources and amounts, milestone dates, etc. was stored in the database and used in reporting program progress. This resource simplified reporting, particularly the quarterly HEBOC report, with a dramatic (96%) reduction in production time over reports prepared in the early months of the program. The improvement in production efficiency for this report, alone, resulted in a savings of approximately \$1.8M over the life of the program, allowing these funds to be directed at program needs rather than reporting requirements.

Within the community college system, early cash flow projections revealed cash shortfalls. As a result, the colleges were called upon to reexamine their optimistic project start dates and move them to more realistic timelines, keeping in mind the schedule of the bond sales. Many of the larger colleges could have moved their projects forward more quickly. However, allowing them to do so could have delayed projects at many of the smaller colleges because of limited funds availability based on the scheduled bond sales.

The Community Colleges System Office staff populated individual models updated by the colleges, into one spreadsheet to determine cash needs for dialog with the State Treasurer’s Office. The requirement for county matching funds made cash flow prediction particularly challenging. While individual projects could be identified, scoped, budgeted, and planned, the reliance on county governments to determine if, when, and how much matching funding would be available could change a project’s schedule and related cash flow overnight. Responsive cash flow planning under these trying circumstances required greater project management systems and human resources than the community college system found at its disposal during the program. On the community college campuses, the person that managed the cash flow model, as well as overseeing construction projects, was typically one individual, usually the Vice President for Business & Finance or Administration. That person was responsible for the colleges’ budget, day-to-day operation of cafeterias, bookstores, purchasing, security, and the maintenance of facilities. Sufficient staff was not available on each campus to manage these facilities, construction projects, and operations. In fact, it is rare for a community college campus to have a facilities engineer in their employ. These staffing levels, skill sets, and competing job responsibilities made project schedule and cash flow projections particularly challenging for the community colleges.



Construction Delivery Methods/Construction Manager at Risk (CM@R)

Prior to the Higher Education Improvement Bond Program, multi-prime contracting was the standard construction delivery method in North Carolina, with single-prime permitted under specific bidding conditions. In multi-prime contracting, the owner holds separate contracts with the general, electrical, mechanical, and plumbing contractors, each of whom bids separately and may or may not wish to work together. In single prime contracting, the owner holds a single contract with the general, who must then be responsible for securing and coordinating trade contractors. In both cases, construction contracts are awarded based on lowest responsible bid, which may not necessarily result in the best overall value.

Senate Bill 914, enacted in 2001 and effective January 1, 2002, routinely allowed single prime and Construction Manager at Risk (CM@R) construction procurement methods. The legislation also specified a qualification-based selection process for CM@R with fee to be negotiated after selection. This selection process permits the owner to select a firm best suited for the specific project. It also allows the contractor's record of previous performance to be considered in the selection decision. In preparation for this legislation, the University System worked with the State Construction Office and the State Attorney General to develop a set of procedures and new CM@R documents.

Single prime and CM@R construction delivery were necessary to execute the program, as many of the projects were large and technically demanding, particularly at the universities. Many competent contractors simply would choose not to work in the litigious, multi-prime contracting environment. Many of the larger contractors needed to execute the program would not bid on multi-prime projects, and some would not bid at all, but worked only under CM@R or negotiated construction contracts. While the university system used both contracting methods, executing a total of 35 CM@R projects, the community college system's projects were largely single prime, with only a single CM@R project experience. The award of a single prime contract eliminates a significant source of conflict and minimizes the number of players involved in a project's execution. With the increased collaboration that results from selecting your own team under CM@R contracting, projects become more of a partnership working toward a common goal, instead of an antagonistic struggle.

Evidence of the success of the single prime and CM@R construction methods can be found in the small number of claims the bond program experienced. A total of 17 projects at UNC and 3 at the community colleges involved formal claim filings. The result, within the university system, was a net payout of slightly less than \$1.5M against more than \$18M in claims by contractors and designers and within the community college system a net payout of just over \$473,000 against \$1.1M in claims. Overall, there were claims totaling \$19.3M against the program's \$4.094B, or less than one-half of one percent of the program involved in claims.

As with any new process, there was a learning curve, both for the university campuses and for the contractors. There were training sessions and coaching by General Administration to minimize problems and ensure that the new procedures were understood and followed. Under CM@R, trade subcontractors bid competitively and publicly. Teaching trade and specialty contractors to prepare bids and bid publicly rather than simply quoting prices to a contractor was challenging, especially in the early stages of this construction delivery method. Successful execution of a CM@R project requires active participation from all team members involved in the process; the CM, the owner, and the architect. In some cases, getting owners and architects to assume their roles as team members in such a participative design process has also proven challenging, but as this construction delivery method has matured and all players have gained experience, these challenges have lessened.

Some challenges remain a work in progress. Because the CM@R fee is negotiated after selection, it is critical that agreements be clear regarding the components of the project's cost, whether part of the cost of the work, the general conditions, or the fee. Reaching clarity on "General Conditions" as an element of project cost continues to be refined.

Based on a published study comparing construction delivery methods, "Selecting Project Delivery Systems" published by The Project Delivery Institute in 1999 (the only such study the authors have been able to identify to date), there is some minimum cost saving, but significant time saving for CM@R compared to the traditional design-bid-build method. In fact, selecting the CM@R under a qualifications-based selection process increases the likelihood that the contractor will be well-suited to the project, with size, experience, and current capacity to perform well and assure the best possible quality in the finished product.

While it may appear that there is reduced risk with a post bid GMP when all subcontractor prices are known, there are many risks in the construction business, only one of which is financial. It is true that the financial risk associated with subcontractors may be eased, but the CM must still manage the project within the parameters of the negotiated general conditions and fee in order to be financially successful. The real risk for the CM remains to perform well, including on schedule and with the required level of quality throughout the life of the project and, remember that award of future work will be made on a qualifications-based selection process. Under overheated economic conditions, such as those experienced in 2004 and 2005, shared risk under CM@R with timely preliminary or final GMPs can insure a sufficient pool of competitive bidders and keep prices from being inflated in order to cover excess risk associated with volatile price markets.

In the North Carolina CM at Risk process, all unused funds from the cost of the work, general conditions, and CM contingency return to the owner, offering little incentive for the CM to pad estimates. As a result, there has been little evidence of excessive estimates, although the 2008-2009 economic downturn has resulted in receipt of a number of bids below the CM's estimate.

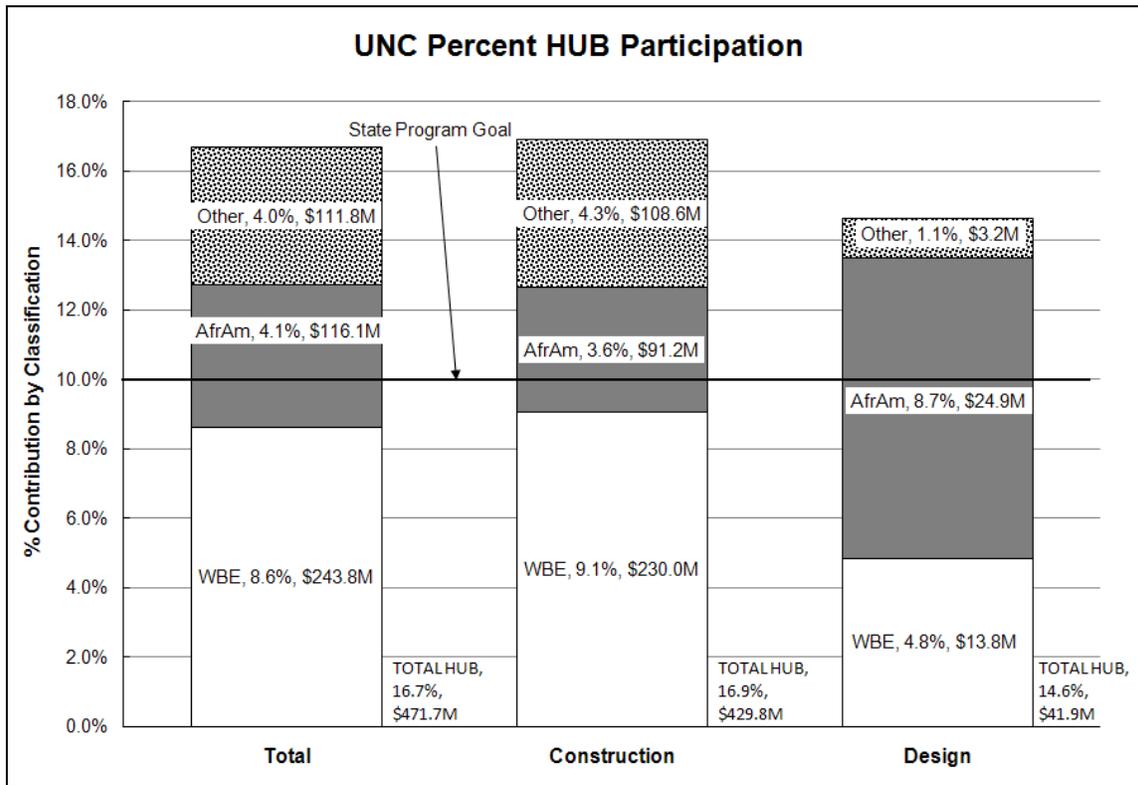
The CM@R construction delivery method has contributed significantly to current capital project construction success. Having the contractor at the table during the design process to validate cost estimates, suggest modification to design details that simplify and speed construction, and to establish common expectations with regard to project schedule minimizes surprises during construction and so improves project execution. Establishing a team approach to the project planning and execution ameliorates the sometimes adversarial relationship between owner, designer, and contractor. Finally, because CM@R permits the development of a specific plan of HUB outreach and inclusion, coupled with subcontractor bid packages broken into sizes suitable for smaller firms who may not otherwise be successful in competing for projects, CM@R has been successful in achieving significantly higher minority participation over other methods of construction project delivery; in the 20% range achieved through CM as compared to 15-16% achieved through other contracting methods.

Historically Underutilized Businesses (HUB)

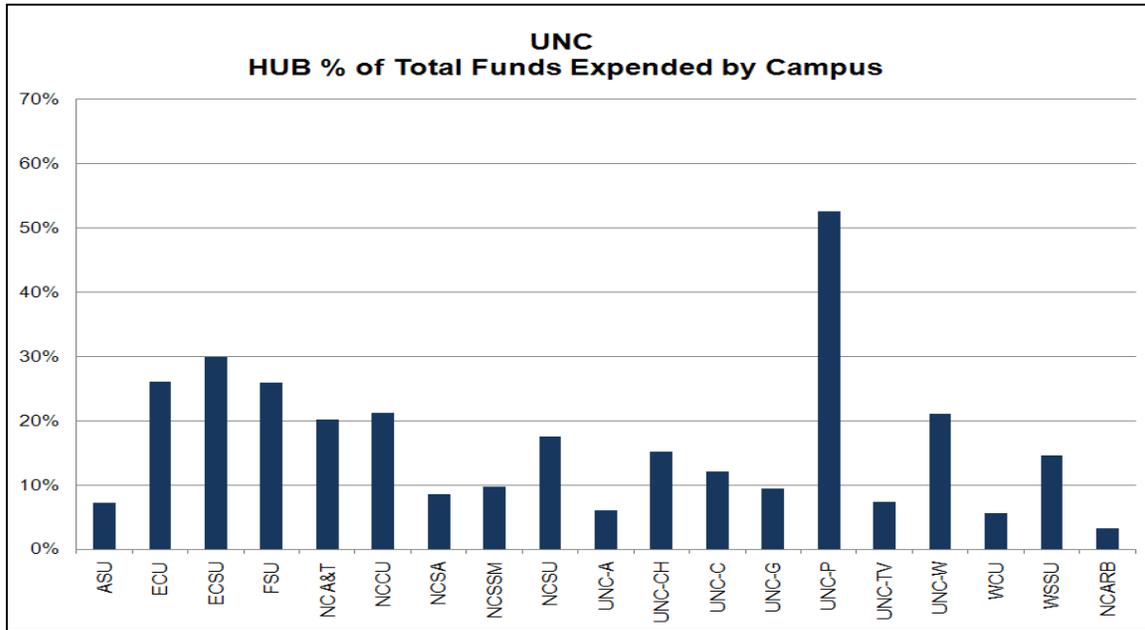
Session Law 2001-496 Public Construction Law Changes (Senate Bill 914), the University Board of Governor’s Policy of equal access for construction contracting, and the subsequent development of a University HUB Plan, provided a basic strategy to promote equal and increased opportunities for all segments of the design and construction community to participate in University construction projects. The Plan identified a methodology of:

- Identification, Recruitment and Certification
- Outreach & Education
- Legislated Good Faith Efforts
- System Program Monitoring
- System Reporting

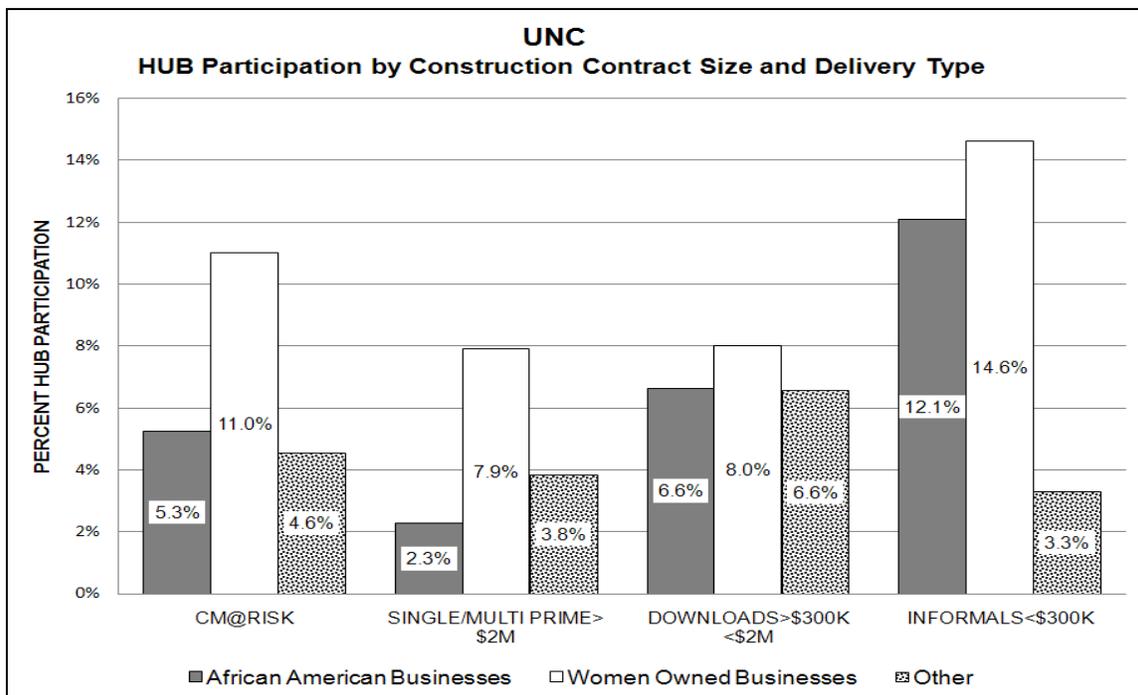
Within the university system, liaisons and/or coordinators at the institutions were designated to implement the HUB Plan. The following charts demonstrate the system results. Overall minority participation was 16.7%, including design and construction contracts, which significantly exceeded the 10% goal identified in SB914. The chart below shows the breakdown of this participation by classification, with minority classifications combined into three categories. “Other Minorities” combines Hispanic, Native and Asian Americans, and Socially and Economically Disadvantaged into a single category, while African American and Women-owned businesses are identified separately.



HUB participation varied across UNC institutions as indicated in the chart below which shows the percentage of design and construction contracts awarded to HUB firms out of the total dollar amount of contracts awarded by each constituent institution and affiliate.

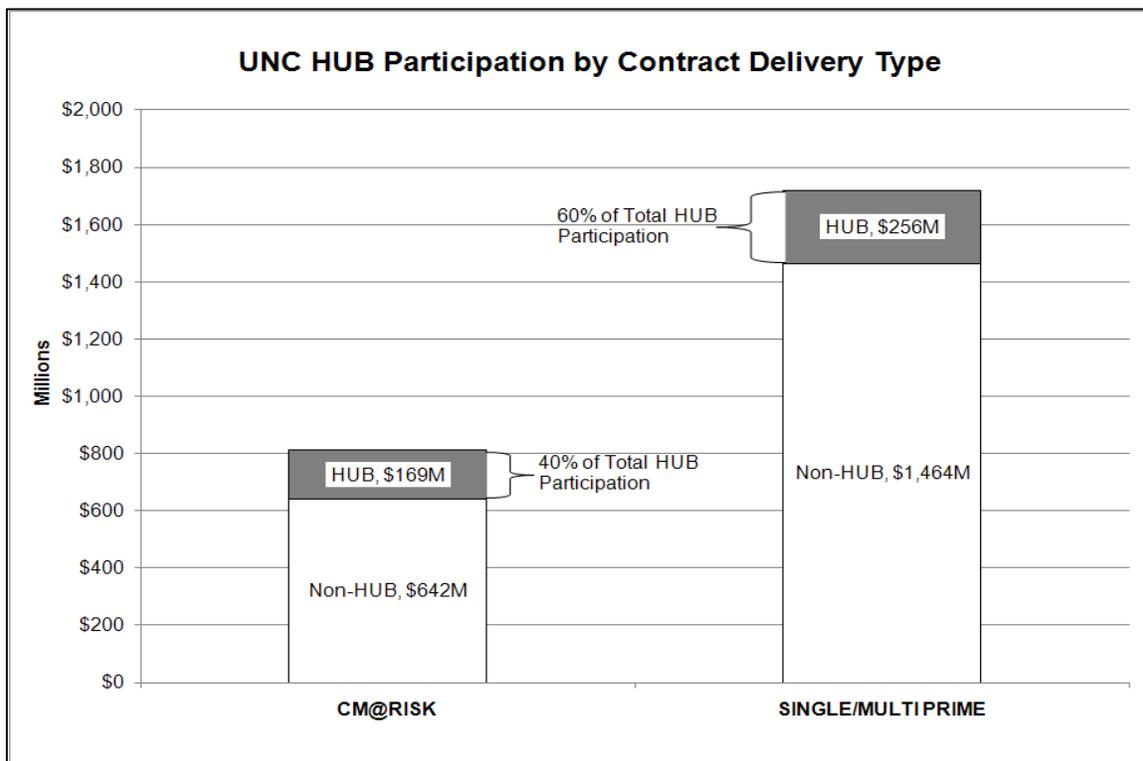


Within the university system, project size and construction delivery method (i.e. hard bid vs. CM@R) played a significant role in determining the level of HUB participation, especially for African American firms, as illustrated in the following charts. The first chart shows significantly increased African American participation for CM@R projects and smaller contract sizes.

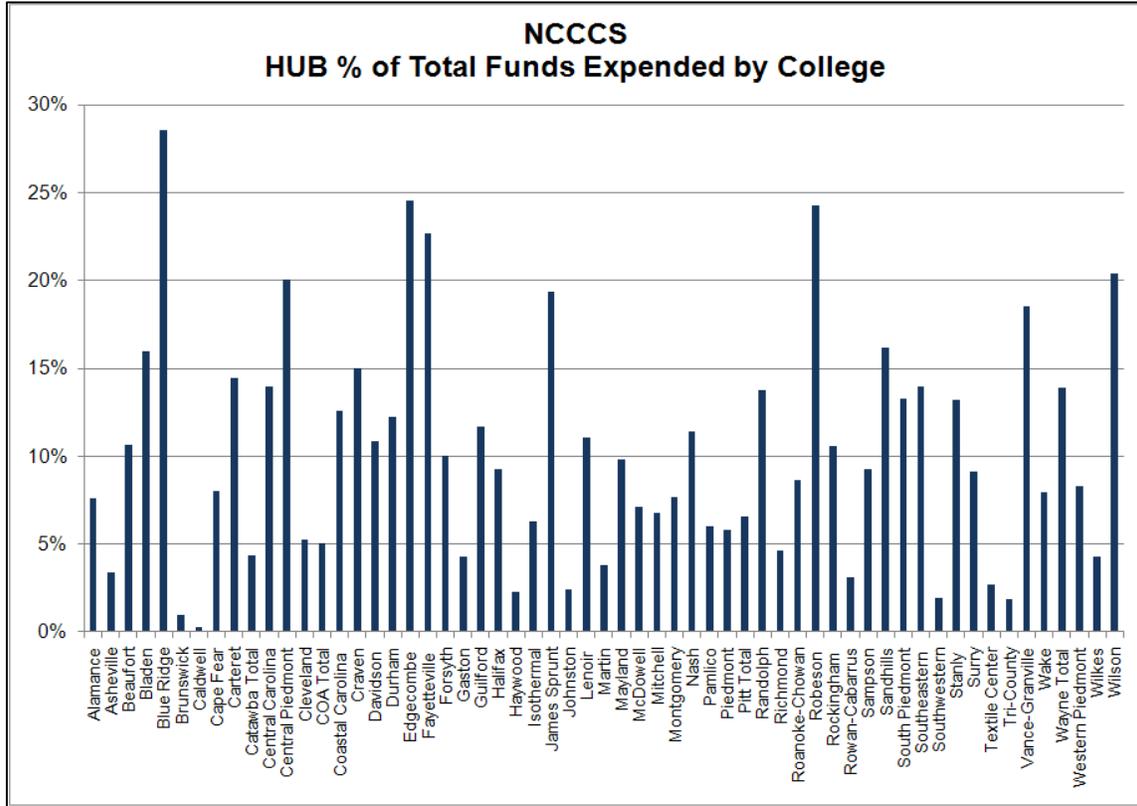


Because all construction project awards are made based on the lowest bid, as a matter of standard procedure, firms of limited scale and organizational structure, sporadic contracting opportunities, and financial disadvantages have diminished contracting opportunity. The CM@R process can include opportunities to reduce these barriers to success, increase outreach efforts, and mentor aspiring firms. Informal contract processes allow for limited bonding requirements and provide opportunities for manageable project size, relationship-building, and repeat contracting for firms that perform well. A targeted, creative, and committed approach is needed to foster growth for small firms and increase their success in competitive bidding.

Projects constructed under the CM@R construction procurement method accounted for roughly 32% of the program’s construction contract value, yet contributed 40% of the HUB participation. CM@R projects are required to provide a pre-defined HUB Plan, which can be fine-tuned to meet specific HUB participation objectives, and to prequalify subcontractors who then compete, on a lowest bid basis, for each trade package. As noted earlier, CM@R projects have performed above the norm for HUB participation. Reduced barrier packages targeted for HUB and small firms create smaller, more biddable packages which address bonding and capacity impediments. These efforts have produced results. In addition, many large CM’s have been receptive to partnering and mentoring emerging HUB firms to prepare them to handle small CM@R projects. This exposure is a key component of capacity building. In the future, both of these components of CM@R are anticipated to provide the construction opportunities that some small firms need in order to grow larger, establish a track record of good performance, and build financial and bonding capacity.

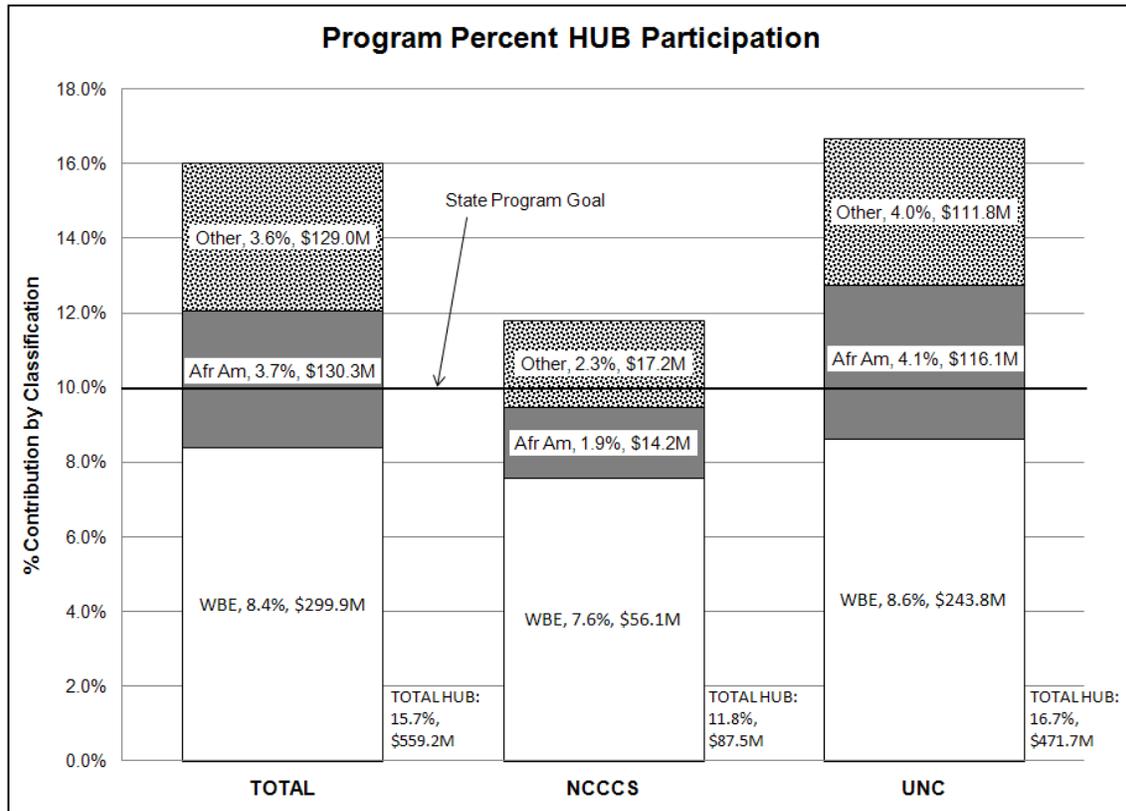


For the community colleges, HUB participation is as illustrated below.



The staff of the Community College System Office has communicated to the community colleges the need for increased efforts regarding individual campus HUB participation, which currently varies widely, as illustrated in the chart above. A committee has been established and will work to develop detailed processes that colleges should engage in for all future construction projects. This committee held their first meeting on Friday, March 5, 2010 to establish committee goals.

Overall HUB participation for the bond program, for both UNC and the Community College System, is illustrated below.



Despite the current bond program's successes in HUB participation, it is evident that more can and should be done to create an environment for the successful startup, growth, and development of small businesses and HUB firms in particular. These emerging firms need access to capital, competitive bonding, insurance and materials procurement opportunities, and professional training opportunities. By laying the groundwork that fosters development and strengthens infrastructure, these firms can gain experience by competing on larger projects. Opportunities for tutelage under larger, more experienced firms can facilitate a stronger subcontracting, general contracting, and construction management foundation in the state. Additional efforts are needed to engage more diverse participation across HUB categories. Above all, a continued commitment is needed from all parties to the process to continue and expand good faith efforts.

HUB construction participation within the UNC system increased from 11.1% to 16.9%, from the initial bond program report in 2002 to the end of the program. Early in the program, though, it became apparent that the available pool of HUB firms consisted predominately of trade subcontractors and general contractors at limited licensing levels. These small firms, for the most part, had limited financial, bonding and organizational capacity, along with limited exposure to public bidding and university/community college contracts. As evidenced by the data on contract size shown above, the majority of successes are on small jobs which do not require bonding, provide quick pay, do not devastate cash flow (crucial to any entity's survival) and have a targeted effort by the owner to include these emerging businesses in bidding opportunities. Only through a consistent and high volume of contract opportunities can these same firms begin to build a portfolio of jobs adequate for consideration by sureties, financial institutions, and owners, in order to expand

to projects of increasing size and develop their capacity to the next level. Of the more than 118,600 jobs generated as a result of the entire bond program, it is estimated that more than 18,500 were in the HUB contracting community.

Without the provision of necessary financial support by capital markets, it is unrealistic to expect any measure of “good faith” efforts, outreach, training or mentoring will generate opportunities that promote the emergence of viable, competitive small to large HUB businesses in the state. The challenge of growing any small business without adequate access to capital and bonding is daunting. In addition, many firms need ongoing, readily available access to resources for developing their organizational structures and internal infrastructures. In recent years, legislation (S.L. 2007-441 Small Business Contractors Act) began opening the door for financial support, absent the necessary funding which is essential for success. In the 2010 session, legislation passed (HB 1035, SL2010-148) that matches the bonding requirements of smaller projects to the previously legislated threshold for informal projects at \$500,000. This, and other phased bonding policies, can foster small business growth.

The enormous need for training to equip contractors to compete for bond projects was only partially addressed through the HUB Academy. The Academy was developed and initially steered by the UNC campuses and General Administration, in partnership with the Carolinas Associated General Contractors (CAGC), the North Carolina Institute of Minority and Economic Development, and a few large, majority-owned construction firms. The program received support from the General Assembly and administration of Academy funds was subsequently transferred to the guidance of the State Construction Office. The Academy provided a basic background in construction-related business practices such as project management, scheduling, reading construction blueprints, estimating, and bidding, as well as organizational structures, public contracts, risk management, and lien and bond law. Twelve Academies were held with instructors provided through a combination of university staff, CAGC members, and majority contractors. Class sizes ranged from 16 to 40 business owners and staff each, and were held in several regions of the state. As funding was exhausted, the program developed additional partnerships with supporters such as the North Carolina Department of Transportation (NCDOT). The program is currently suspended due to lack of funding. A revitalization of this or similar initiatives is needed to further level the playing field, enabling HUB firms to be better equipped to take advantage of business opportunities and improve their abilities to realistically compete.

Finally, a strengthening of legislated Good Faith Efforts (GFEs) which are intended to insure that HUBs are provided an opportunity to successfully bid on state projects is needed. GFEs, alone, are not sufficient, as frequently making a good faith effort simply became a replacement for meeting participation goals. A minimal effort is required to demonstrate good faith. Contracts are awarded based on low bid and many HUBs are disadvantaged by:

- lack of access to capital, such as lines of credit,
- lack of competitive pricing of materials and supplies comparable to larger, more established firms, and
- a slow-to-develop relationship network, still in its infancy by most standards, with larger construction firms and traditional suppliers.

Good faith efforts will not be sufficient to foster increased HUB participation, absent progress in these other areas. It is clear that some combination of all of these measures is required to continue to bolster success and grow HUB businesses.

Best Practices

During the life of the bond program there were many learning experiences that will contribute to more successful future capital projects. Having a road map for the future in the form of master plans sets the stage. A schedule that all parties involved in the process must monitor and measure consistently, ensures that everyone is committed to and following the same path. Sufficient human resources including plan reviewers and trained owners are essential ingredients, as is an ongoing need to expand the breadth of construction community involvement via HUB firms. As is true of almost all endeavors, communications is a vital ingredient to success. Finally, checking quality through selected audits contributes to the cycle of improvement.

Planning

One of the reasons the university bond program was successful in executing projects in a timely manner is that the projects were identified and scoped in the legislation. Some projects had preliminary planning underway that allowed a fast start. In addition, the existence of campus master plans at many institutions supported coordinated strategies for the placement of buildings and infrastructure. Campuses are required to have a Master Plan that is reviewed and updated on a 5 year cycle. Master Plans are critical to facility planning, especially in terms of infrastructure, pedestrian and vehicular circulation, and parking, which are often missed when dealing with individual projects in isolation. The fact that the bond program facilitated a comprehensive campus strategy rather than individual projects of uncertain timing provided a better outcome.

The community college system did not have the advantage of advance planning funds and therefore colleges did not have any plans ready when the bond referendum passed. This is evident upon reviewing the timing of community college expenditures which began 12-18 months into the bond program as a result of the necessary design time. In addition, as a result of not having projects ready to bid on bond passage, many community college projects were bid during the construction cost peak during 2005.

Scheduling

Formally scheduling projects and ensuring that schedules were routinely used, not just filed, marked an important change in the way capital projects were executed. Most campuses had no experience with Primavera and little if any experience with scheduling software of any kind, so there was a learning curve. Perhaps the hardest concept to grasp was the relationship between cost loading, schedule updates and cash flow. Having all schedules available at the program level was a key element for effective program management for the universities and allowed General Administration to easily analyze the program and focus on problems and simplified reporting. By standardizing the schedules, and utilizing milestones for key events, workload forecasts could be provided to state review agencies, future bid dates could be published for designers and contractors, and overall project metrics, such as time in design, review, and construction were examined. Measurement is essential to improvement and these metrics have been used to better schedule future projects and heighten mutual accountability between the partners to the process; owners, designers, state agencies, and contractors. While some campuses have embraced scheduling as a management tool, others continue to use it primarily as a reporting mechanism to General Administration. Work remains to be done to fully benefit from this scheduling tool at all institutions.

Staffing

The University System was allowed to use 5% of project funds for project management, providing temporary funding for staffing, but no provision was made for increasing resources at the

community colleges as noted previously, or for the State review agencies. As a result, reviews sometimes delayed the capital project process. The original schedule for reviews was 30 days to review Schematic Designs (SDs), 30 days to review Design Development (DDs) documents, and 60 days for review of Construction Documents (CDs). As the queue lengthened for reviews, and therefore their turnaround times lengthened, representatives from General Administration began meeting regularly with representatives from the State Construction Office (SCO) and the Department of Insurance (DOI) to try to mutually improve the process. General Administration began providing quarterly forecasts of projected reviews as a planning tool for the review agencies. A combination of events including staffing levels, workload, and the need for plans to be resubmitted resulted in some projects at the height of the program experiencing six months or more in review time alone. Legislation provided additional positions, but not in time to help the bond projects. However, legislation has also changed the number of review agencies involved and so provides encouraging signals for future capital project processes.

Training

Even when funding provides for additional staffing, resources may remain insufficient if appropriate training is not provided. Staffing the university campuses to handle the project workload proved to be challenging, even with the 5% funding availability and many of the new staff had no experience in the State system. New staff members were provided Capital Project Coordinators (CPC) training under the auspices of the State Construction Office and an additional capital project orientation course by General Administration staff, focusing on the policies and procedures unique to the university setting. Quarterly meetings were held with people from each campus that were responsible for the bond program to discuss emerging issues, lessons learned, problems, schedules, and generally share information. This group was known as the Bond Alliance. The spring and fall meetings were expanded to include all project managers, and related functions and topics such as facilities operations. Specific training courses were provided in environmental permitting, managing construction claims, and administratively closing projects.

HUB Firm Capacity

Before additional substantial progress can be made in HUB participation, HUB firms of significant capacity must participate in the public construction process. The vast majority of HUB participation is currently taking place on very small, informal projects (less than \$300,000), requiring a large volume of contract awards for a significant increase in the dollar value of HUB contracts and a commensurate increase in HUB participation percentages. Transitioning a small firm to an emerging larger firm, capable of larger project work, requires knowledge on the firm's part of how to effectively grow their business; moving from doing the work to managing the work. Owners must be stringent in reinforcing goals from the top down, awarding contracts on achievement of the participation objectives and not just the effort. The term 'responsive' must be clearly defined and used diligently when awarding projects. Equally important is the requirement of systemic support for access to capital, buying agreements, bonding, and other resources. A more diverse utilization of HUB firms will better serve the University's goals of inclusiveness.

Communicating

The value of timely communication with all stakeholders in the capital project process should not be underestimated. Many problems were avoided because of regular contact that provided a forum for raising and resolving issues. The Bond Alliance, as noted above, met quarterly during the program to share questions and experiences. Where one institution raised a problem, in many cases another institution had experience that could provide a solution. Routine meetings with the Carolinas Association of General Contractors (CAGC), the American Institute of Architects-North Carolina (AIA-NC), and American Consulting Engineers Council (ACEC), provided a conduit

for issues to be raised from a service provider/contractor's perspective. Also, meetings with review agencies (State Construction Office, Department of Insurance) facilitated mutual rather than adversarial problem-solving approaches when long review times were a frustrating part of everyday project management. Keeping communications channels open and maintaining regular contact, not just incident-driven dialog should be a best practice that extends far beyond the bond program experience.

Auditing

Finally, checking the quality of work is always a good practice. A number of independent audits were performed on selected projects within the university system, and were valuable for identifying and addressing potential problems. Audits of CM@R projects highlighted some misclassified expenses and release of payments that allowed these areas to be tightened following sharing of this information across the system. Savings resulted in subsequent projects. The community colleges performed a control audit to ensure that procedures were being uniformly followed. A few audits, reasonably early in the program, generated benefits that would not have been achieved had any audits been relegated to a closing activity and ensured consistency and transparency important to the tax-paying public.

The Lessons of Experience

Capital Program vs. Individual Projects

With the passage of the bond referendum, the university and community college systems had, for the first time, a known stream of capital project funding over an extended period of time. The value of this program as compared to the authorization of individual projects was of significant benefit for the universities, who had a known list of prescribed projects and budgets. Knowing the scope, budget, and number of projects, allowed each campus to plan the sequence of project execution.

The most common sequence was to build new facilities, move occupants into those facilities, and then renovate the old facilities. This provided for more efficient swing-space opportunities, as one of the biggest challenges in major renovations almost always involves the provisioning of temporary quarters for building occupants during renovation. With space tight to begin with, there are often no feasible options. Under the individual project authorization model, space was often unable to be converted to its best and highest use for the campus because there was no opportunity to address swing space and the related project sequencing required. The bond program supported this need. In addition, at two institutions, NCSU and UNC-W, swing space was constructed and served dual purposes; first as swing space during the bond program, and now as a solution to other, ongoing space needs for each institution. NCSU's project provides flexible lab space which allows for the fluid nature of research at a major research institution.

The capital program also supported planning for necessary utilities and consideration of traffic and pedestrian flow, as well as interruptions in these areas resulting from construction. Infrastructure projects are traditionally hard to fund since they are not glamorous opportunities for ground-breaking or building naming and are particularly difficult when projects are funded individually. Where a campus has a central or regional utility plant, it is difficult to tell which project will trigger the need for an additional boiler or chiller. If projects are funded one at a time, each project must include sufficient funds to pay for the additional boiler or chiller, should it be the one to trigger the need. Again, knowing the extent of the legislated program, each campus could decide when the appropriate time was for such an addition. Most campuses replaced and/or expanded their utility infrastructure and contributed an additional \$172M to the bond program for

this. At one campus, ECSU, the ability to predict utility needs with this programmatic approach allowed them to construct a central utility plant to support more efficient, centralized heating and cooling.

In addition, under the individual project funding model, planning, estimating, and prioritizing for all capital project types was typically completed on a massive scale biennially, with fine-tuning in the intervening years and the often unfortunate outcome that no capital or only partial capital funding was forthcoming. This funding roulette challenged all campuses to manage projects effectively under a high degree of uncertainty. The bond program allowed staff energy to be focused on the thoughtful execution of the projects, with the certain knowledge of available funds.

Because the community colleges did not have the opportunity to define projects in advance, their benefit from this aspect of the program was limited. However, they are poised to take advantage of any future such opportunities since they have updated master plans available. To maximize the effectiveness of these master plans, additional planning funds are needed.

While the certainty of the bond program provided benefits, it was also appropriately flexible in permitting changes in project scope and in moving funds between projects. Each campus, whether university or community college, is a unique and ever-changing entity. Academic programs grow and shrink, driven by many factors, so the facility needs are constantly changing. Because, for the universities, the projects were scoped and budgeted before the referendum went to the voters, changes had already begun to occur by the time the campuses began developing schedules. With the scope and budget being set before the program went to the voters, the legislation allowed for changes, but only with the approval of the legislature. Thirty-four scope changes were approved for the universities, or a little over 10% of the program. The scope changes varied including reducing scope, deleting the project, and adding new projects. During the life of the program, the textile and furniture industry workforces were forced to seek alternative skills. As local communities suffered plant closures, community colleges experienced significant strains on their space and resources. The flexibility to change scope allowed universities and community colleges to continue to meet the needs of their respective communities.

The flexibility to move funds between projects was also important to the ability of these groups to spend funds cost effectively. Inflation varied over the life of the program. Many university campuses reduced budgets on early projects, when the economy was down and bids were low, and put those funds into later projects, to allow for inflation. If the campuses had not had that capability, as in the case of single funded projects, the projects that were executed later in the program would have been noticeably reduced. At the community colleges, similar needs to increase project budgets or decrease scope resulted from inflationary pressures, but their efforts were complicated by the need to approach county commissioners in their respective project areas in order to ask for more money for the project, move money between projects, or eliminate projects. A community college analysis during the program showed a 37% per square foot cost increase from projects completed in 2003-2004 to those under construction in 2005. Although a program approach cannot mitigate the impact of market forces such as oil markets on asphalt prices or construction for the Olympics in Beijing on concrete, it does allow more choice over where the impact is felt. The ability to manage funding across the group of projects in the program allowed both organizations to achieve the most benefit for the available funding.

Oversight

As part of the legislation authorizing the bond program, an oversight committee was established to meet quarterly. The program was fortunate to have the same co-chairs for the entire duration, which provided consistent management oversight and an understanding of the history of

the program as it unfolded. Both the university and community college systems needed central staff support to provide cash flow forecasting to the State Treasurer, quarterly reports to the HEBOC, and generally oversee the program and provide consistent information across campuses. This central administrative level, at both the university and community college system, provided review and feedback to ensure accountability for the program, but the existence of a legislative committee forced a level of discipline and accountability that contributed to the program's successful delivery on budget and on schedule.

Further, because the projects were funded from the sale of general obligation bonds, they had to be expended in a timely manner, necessitating that each project also be administratively closed in a timely manner. The existence of the oversight committee, whose responsibilities would end at the conclusion of the program, also put pressure on closing all project aspects, not just occupying a facility. This had the benefit of forcing true project completion, including promptly obtaining final documentation which has traditionally been difficult and closure of the accounting records, which had historically extended years beyond building occupancy. Even with these pressures, closing projects has continued to be challenging and in most cases took over a year from the time of actually occupying the facility. While some would argue that another review organization contributes to bureaucracy, in practice it has ensured that performance was taken with due seriousness. Just as a teacher finds discipline support in her principal, the oversight committee provided useful leverage when needed.

Professional Staff

Under the Bond Program, capital project funds were permitted to be used to hire and train project management staff for the first time. This only applied to the university system. Several campuses had not had a major capital project in years and were suddenly faced with 10 or more. The campuses needed staff to manage those, and had no operating funds for staffing. The majority of the campuses would not have been able to accomplish their programs without this funding. While community colleges had similar staffing limitations, they were not authorized to use capital project funds to increase project management capacity and expertise. Any future such capital program should authorize the Community Colleges System Office to hire and train regionally located staff to assist local colleges.

The Future of Capital Projects

As initially envisioned, the bond program would meet the first half of identified capital needs for UNC to address the adequacy of existing space and the quantity of additional space required to meet burgeoning enrollment as described in the report which resulted from the legislature's 1997 special provision mandating a "Capital Equity and Adequacy Study of The University of North Carolina." The need for ongoing maintenance and repair funding, both to retire significant levels of deferred maintenance (\$883M in 1998) and to continue to maintain facilities once the backlog was addressed, was recognized.

Two events have heightened these needs, even with the advent of the bond program. First, economic circumstances limited the availability of funding for repairs and renovations. While the studies resulting from the 1997 special provision recommended an ongoing, annual stream of not less than 3% of the current replacement value of all buildings plus infrastructure, funding has been far below those levels. No repair funding was provided at all for 2001 and 2002 and limited funding provided under debt (Certificates of Participation) in selected subsequent years. Many facilities constructed or renovated earlier under the bond program are now in need of maintenance or repair themselves, with inadequate funding to preserve these resources. The current backlog of

deferred maintenance is a staggering \$2.92B, with needs identified as immediate (within one year) at \$1.66B.

In addition, UNC enrollment growth occurred far more rapidly than anticipated, increasing space pressures. Projections for 2008 enrollment were met as early as 2002 for some institutions and by 2005 for others. By 2008, most institutions exceeded their enrollment targets. See the summary table below.

University of North Carolina Enrollment Comparisons

Institution	Fall 2008 Target Headcount ¹	2008 Fall Headcount Enrollment (Actual)	Percentage Above (or below) Target Headcount
ASU	14,000	16,610	18.6%
ECU	24,000	27,677	15.3%
ECSU	3,000	3,104	3.5%
FSU	6,000	6,217	3.6%
NCA&T	10,600	10,388	-2.0%
NCCU	8,300	8,035	-3.2%
NCSU	30,100	32,872	9.2%
UNC-A	3,500	3,629	3.7%
UNC-CH	27,500	28,567	3.9%
UNC-C	23,500	23,300	-0.9%
UNC-G	14,800	19,976	35.0%
UNC-P	4,200	6,303	50.1%
UNC-SA	1,200	879	-26.8%
UNC-W	12,500	12,643	1.1%
WCU	9,400	9,050	-3.7%
WSSU	4,200	6,442	53.4%
Total	196,800	215,692	9.6%

¹ From "The University of North Carolina Capital Equity/Adequacy Study Phase II Work Paper II-B-9, Enrollment Driven Capital Needs, March 5, 1999," Figure 5, page 13.

By 2008 in the Community College System, 55% of the colleges were below the industry standard for assignable square feet per full-time equivalent student, as a growing number of students entered the system for re-training to improve their employment prospects and transfer students increasingly turned to the system as an affordable way to begin their pursuit of a four-year degree. In the last academic year, alone, full-time equivalent (FTE) student enrollment at community colleges has grown from 216,945 to 246,710, a collective 30,000 FTE; roughly the size of NC State University, the State's largest public university. While online instruction supported 24% of that growth, the remaining growth was served in traditional classroom settings or through a combination of traditional classroom and distance education. Clearly distance learning has played a key role in the ability to serve these students, but there are limits to the types of classes that can be effectively provided online. Distance learning is not an effective teaching method to train nurses, dental hygienists, welders, and carpenters who need face-to-face, hands-on instruction.

Current demographics predict space will be needed for an additional 70,000 students in the next 10 years. While some needs may be met by online learning, there will continue to be a need for some hands-on and traditional instructional experiences. The successful completion of the bond

program may have bought some time in terms of facilities needs, but the dual pressures of funding repairs and meeting enrollment growth needs mean that the work cannot end with the completion of this program. In the 1999 report to the Board of Governors under the legislative “Capital Equity and Adequacy Study,” it was noted that “...there is a new round of work to be done—to help assure the competitiveness of the people, businesses and communities of North Carolina...” This is no less true today and, in fact, has been reinforced in the UNC Tomorrow Commission’s final report (December 2007) which renews the State’s commitment to education, ensuring access to higher education, and preparing its citizens for engaged, productive lives. Will the university and community colleges be ready?

Sources

Portions of this document were compiled from previously released reports including:

Building for the New Millennium – A Report to the University of North Carolina Board of Governors, April 9, 1999, Eva Klein & Associates, Ltd.

Responding to a New Imperative – A mid-term progress report on the 2000 Higher Education Bond Program, North Carolina Business-Higher Education Foundation, Inc., 2004.

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