

RB23
Bowie State University
University System of Maryland

Capital Budget Summary

State-owned Capital Improvement Program
(\$ in Millions)

<i>Projects</i>	<i>Prior Auth.</i>	<i>2016 Request</i>	<i>2017 Est.</i>	<i>2018 Est.</i>	<i>2019 Est.</i>	<i>2020 Est.</i>	<i>Beyond CIP</i>
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Natural Sciences Center	\$30.942	\$39.728	\$31.550	\$0.000	\$0.000	\$0.000	\$0.000
Total	\$30.942	\$39.728	\$31.550	\$0.000	\$0.000	\$0.000	\$0.000

<i>Fund Source</i>	<i>Prior Auth.</i>	<i>2016 Request</i>	<i>2017 Est.</i>	<i>2018 Est.</i>	<i>2019 Est.</i>	<i>2020 Est.</i>	<i>Beyond CIP</i>
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GO Bonds	\$30.942	\$39.728	\$31.550	\$0.000	\$0.000	\$0.000	\$0.000
Total	\$30.942	\$39.728	\$31.550	\$0.000	\$0.000	\$0.000	\$0.000

CIP: *Capital Improvement Program*
GO: general obligation

Summary of Issues

Cost Overrun Exceeds \$12 Million: The new Natural Sciences Center (NSC) has experienced severe cost overruns totaling over \$12 million after value engineering. The Department of Legislative Services (DLS) is very concerned about the precedent this will set for other State projects that go over budget.

Summary of Recommended Bond Actions

1. New Natural Sciences Center

Approve.

2. Section 2 – Bowie State University Campuswide Site Improvements

Approve the de-authorization.

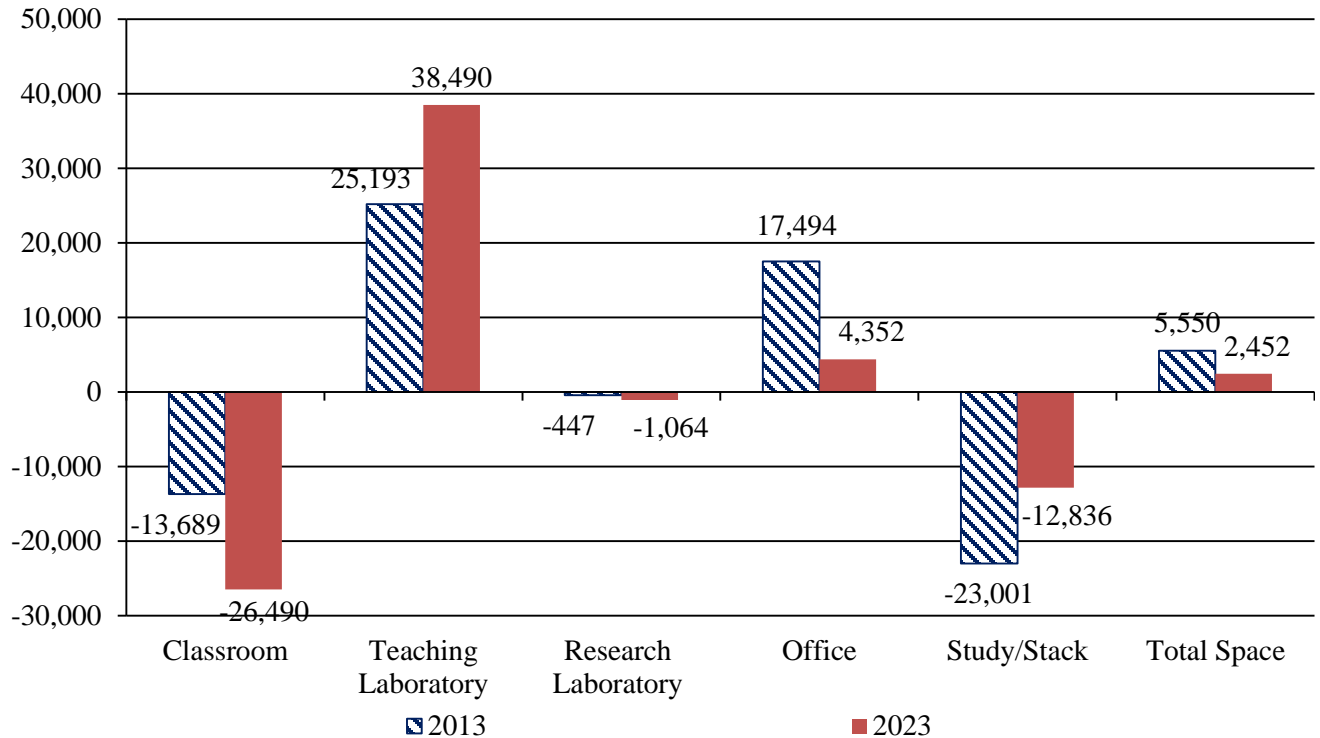
3. Section 12 – Bowie State University New Natural Sciences Center

Approve the pre-authorization for the 2016 session.

Performance Measures and Outputs

According to the fall 2013 facilities inventory, Bowie State University (BSU) academic space totals 346,933 net assignable square feet (NASF), which includes 55,329 NASF of classroom space; 93,553 NASF of teaching laboratory space; and 131,892 NASF of office space. **Exhibit 1** shows BSU's self-reported space deficiencies in fall 2013 and projected deficiencies in fiscal 2022. Nearly a decade from now, BSU currently expects to have space shortages in two of the five space categories but an overall net surplus of about 2,500 NASF. While the deficiency in classroom space increases, so does the surplus in teaching laboratory space. In fiscal 2023, BSU expects to have 19.5% more NASF than it did in fall 2013, compared to a statewide public four-year institution average increase of only 14.9%. The new NSC will provide all five types of academic spaces listed in Exhibit 1 and will assist BSU in meeting the planned enrollment growth and expansion of science, technology, engineering, and mathematics (STEM) programs.

Exhibit 1
Academic Space Surpluses/Deficiencies
Net Assignable Square Feet
Fall 2013 and Projected Fiscal 2023



Note: The 2013 figures include building scheduled for demolition.

Source: Four-year Public Colleges and Universities Academic Space Surplus/Deficit: Fall 2013, Projected Fiscal 2023; Maryland Higher Education Commission

Budget Overview

The fiscal 2016 budget programs a total of \$39.7 million to continue construction of NSC. As shown in **Exhibit 2**, one year ago, the 2014 *Capital Improvement Program* (CIP) called for \$48.3 million for construction and \$1.5 million for equipment, totaling \$49.8 million, in fiscal 2016. The difference in fiscal 2016 funding amounts is due to large cost overruns, which have delayed the project and altered the split funding schedule. One year ago, the overall project cost was \$89.7 million, but in the current CIP it has grown to \$102.2 million, an increase of \$12.5 million, or 13.9%. This is due to a 10.0% increase in equipment costs, from \$3.0 million to \$3.3 million, and a 15.6% increase in construction costs, from \$78.1 million to \$90.3 million. More information on this topic is provided in Issue 1 of this analysis.

Exhibit 2
Changes in the Capital Improvement Program for the Natural Sciences Center
(\$ in Millions)

	<u>Prior</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>Total</u>
2015 CIP	\$30.942	\$39.728	\$31.550	\$102.220
2014 CIP	30.942	49.800	9.000	89.742
<i>Difference</i>		-10.072	22.550	12.478
		-20.2%	250.6%	13.9%

CIP: *Capital Improvement Program*

Source: Department of Budget and Management

The fiscal 2015 budget provided \$23.3 million for construction administration services and to begin the actual construction process in fall 2014. However, due to the cost issues cited above, demolition did not begin as planned in October 2014, but rather in February 2015. This has pushed the project completion date back from January to May 2017. Nonbudgeted funds do not appear in the 2015 CIP, but BSU reports that it will contribute \$2.0 million toward this project.

When completed, the new NSC facility will provide modern laboratory and office space for expanding BSU programs in physical sciences, nursing, and mathematics. The project scope also includes demolishing both the Wiseman Center and the Crawford Science Building. In combination with the completion of a new Student Center building in August 2013 and the State-funded Fine and Performing Arts Center in early 2012, this will substantially alter BSU's campus space.

The NSC project includes the following components:

- demolishing the Wiseman Center to create space on campus for construction of NSC;
- constructing the modified NSC, which now includes additional facilities for nursing and mathematics research and classes; and
- demolishing the Crawford Science Building after NSC has been completed, as it is inadequate for current teaching needs, and the space can be repurposed as a plaza in front of the Student Center.

NSC will help improve BSU by creating a new teaching and research laboratory and classroom space. While the current science facility, the Crawford Science Building, offers about 15,000 NASF for laboratory space, NSC will offer, according to the 2015 CIP, about 39,000 NASF for laboratory

space. NSC also includes space for a greenhouse, lounge, central services, and data processing that are all important for improving educational spaces at BSU. NSC will also have about 16,000 NASF for offices and about 12,000 NASF for classrooms. While the 2013 CIP documentation noted that the NSC are about 85,672 net square feet (NSF), current documentation shows 89,934 NSF, an increase of 4,262 NSF, or 5%, mostly due to increased classroom laboratory space.

The overall NSC project includes demolition costs for the Crawford Science Building as BSU has abandoned plans to renovate the Crawford Science Building after the completion of NSC. The Crawford Science Building cannot accommodate the mechanical, electrical, and plumbing systems required for a modern science building. In addition, although the building was remodeled in 1991, it is estimated to be cost prohibitive to meet modern fire and Americans with Disabilities Act requirements due to structural design, such as low ceiling heights and interior load bearing walls. The demolition of the Crawford Science Building will enable a renovated plaza to be placed in front of the new Student Center, the first Leadership in Energy and Environmental Design-certified building on campus, which opened in August 2013.

As a result of this change, the project scope was expanded to include the Department of Nursing and the Department of Mathematics, as these departments will no longer be able to stay in the Crawford Building. While the nursing program is housed in the Center for Learning and Technology (CLT), it uses the Crawford Science Building for core science components. CLT does not have space for program growth, and the Crawford Science Building, as noted above, lacks sufficient space. NSC will add extensive new laboratory space for the nursing program to increase enrollment and to provide specialized spaces that simulate various clinical spaces found in a hospital, such as an operating room or a pediatric unit. NSC will also offer modern facilities for hazardous material storage, which are not currently available in the Crawford Science Building. Classrooms will be larger to accommodate more students, and NSC will include a lecture hall that can seat 100 students. Office layouts will improve to meet the State guideline of 166 NASF, whereas the Crawford Science Building only offers 90 NASF per office.

This project also assists an initiative by the University System of Maryland (USM) to increase the number of STEM degrees awarded by 40% by 2020. Additionally, the new 2013 State Plan for Postsecondary Education emphasizes the need to develop more STEM capacity in the State to meet labor market demand. USM states that achieving this goal will require an array of targeted strategies, such as convincing those interested in, or enrolled in, education programs to switch to STEM areas and notes that it has seen some success in this area with a 20% increase in math and science education majors in the past fiscal year. NSC will assist in attracting students to STEM fields and retaining students over the course of their studies. In fall 2012, natural sciences, mathematics, and nursing generated about 25% of all weekly student contact hours on campus. In fall 2014, BSU rejected 575 qualified nursing students because it did not have the physical space to teach them. NSC would provide space for an expanding nursing program and would also attract and retain highly qualified STEM faculty and staff. Finally, as all undergraduate students are required to take a science class with a laboratory component to meet general education requirements, NSC will serve as a means to introduce all students to STEM disciplines.

Issues

1. Cost Overrun Exceeds \$12.0 Million

The 2014 CIP estimated the total cost for NSC at \$89,742,000. The estimate, however, was not informed by final design stage input, which finished in spring 2014. However, when the construction manager (CM) finally did review the design documents from the architecture and engineering (A/E) firm, significant cost concerns immediately arose. Part of this misalignment of review and cost estimates came from a longer than anticipated procurement of the CM. By the time a CM was hired, the project had moved to the design development stage. This raises a question of whether BSU should have waited to move forward with design until the CM was retained. In November 2013, when the CM was procured, BSU was made aware that the cost estimates as reflected in the State's CIP would be inadequate to construct the facilities as stated in the facilities program. Neither the Department of Budget and Management (DBM) nor the budget committees were aware of the size of the cost overrun until the 2014 session capital hearing with BSU because the capital materials for that session did not reflect the cost changes.

The \$12.5 million cost overrun was due to the A/E leaving out or underestimating significant building components during the schematic design phase. This included:

- mechanical equipment such as chilled beams, cooling towers, and ductwork;
- building materials such as 1,200 cubic yards of concrete necessary for the foundation and \$0.9 million in polished concrete for external surfaces; and
- equipment such as \$2.5 million in nursing simulation equipment and \$0.1 million in tissue culture and growth chambers.

At this point in time, it is not clear why BSU proceeded with the project given the expected State support in the CIP and the lack of nonbudgeted support from BSU to make up the cost difference. The institution could have reevaluated the structure and rethought the building process. BSU did transmit a letter to DBM in December 2014 indicating that the university would contribute \$2.0 million toward NSC, but it is not clear what the source of the funds is or when it will be used. Additionally, this funding is on top of the final \$102.2 million cost, so it will not save any general obligation (GO) bonds.

The President and the USM Cost Center director should comment on why the project was not delayed to allow for redesign or a new A/E firm to modify the project to fit within the limits of State support.

Exhibit 3 shows the change in NASF from the 2014 CIP to the 2015 CIP. Value engineering required BSU to search for cost savings to bring the project in line with available funding. In the 2015 CIP, classroom and class laboratory space has been swapped for open laboratory space. There was also a small increase in shop/central service space and small declines across all other categories. BSU reports that this space swapping was the result of faculty feedback during program verification meetings with the architect rather than value engineering.

Exhibit 3
Proposed Net Assignable Square Feet for the Natural Sciences Center
2014 CIP versus 2015 CIP

	<u>2014 CIP</u>	<u>2015 CIP</u>	<u>#</u>	<u>%</u>
Classroom	12,378	9,810	-2,568	-20.7%
Class Laboratory	39,023	36,885	-2,138	-5.5%
Open Laboratory	618	5,814	5,196	840.8%
Research Laboratory	6,726	5,657	-1,069	-15.9%
Office/Meeting	15,775	15,519	-256	-1.6%
Study	3,283	2,784	-499	-15.2%
Green House	1,875	1,664	-211	-11.3%
Lounge	1,200	1,071	-129	-10.8%
Meeting	4,024	3,981	-43	-1.1%
Data Processing	456	455	-1	-0.2%
Shop/Central Service	4,576	4,788	212	4.6%
Total	89,934	88,428	-1,506	-1.7%

Note: Space type is determined using Higher Education General Information Survey codes.

Source: Department of Budget and Management

This raises two concerns. First, BSU is adding types of spaces of which it currently has a surplus. Currently, there is a 25,000 NASF surplus in teaching laboratory space and 17,500 NASF surplus in office space shown in Exhibit 1 in fiscal 2013. Reducing teaching laboratory or office space could have been considered to reduce the project's cost. The second concern is that BSU did not substantially change the size of the building to address the cost overruns. BSU reports that value engineering occurred during the programming stage and facilities program approval process. About \$3.8 million was value engineered out at the document design stage, while BSU reports \$7.4 million has been value engineered out since the beginning of the project. Using BSU's figure, this means the actual cost overrun was originally \$19.6 million, or an increase of 21.8%. The value engineering mainly included mechanical system features, such as the number of boilers, and nonessential features, such as a vegetative roof system. BSU has stated, and the value engineering sheet confirms, that no academic space was compromised through the multiple value engineering reviews. Given the space

surpluses in Exhibit 1 and the space being added in Exhibit 2, it is not clear why the building's overall size was not a component of the most recent value engineering.

Cost Overrun Options

When a project goes over budget, it turns to its own contingency fund, which is supposed to be 5.0% of the total project cost, but this may only be used for a project already in the construction phase. The agency or university can also appeal to DBM for a portion of the annually budgeted capital contingency fund, which, in fiscal 2016, is \$2.5 million on top of a \$1.5 million fund balance. The University of Maryland Center for Environmental Science received \$3.0 million from this fund in October 2014 due to cost overrun issues. NSC greatly exceeded both of these reserves, and the Administration ultimately decided to provide additional funding entirely through new GO bonds at a time of severe limitations in the growth of debt capacity at the State level.

DLS is very concerned by the precedent of awarding the full construction funding to NSC. Other State higher education projects, like the University of Maryland Baltimore's (UMB) Health Sciences Facility (HSF) III, are significantly more expensive and complex to construct but are progressing on time and on budget by using appropriate building methodologies and capital budget best practices. BSU has none of its own funding committed to the 2015 CIP for this project and expects the State to pick up the entire \$12.5 million additional cost of NSC.

An additional concern is that the equipment list for NSC has not been finalized as of March 2015. This could lead to yet more cost increases. DLS recommends that BSU seriously consider alternative methods to finish equipping spaces, particularly in the nursing program. Options available include:

- relying on federal research grants that allow some equipment purchasing; this is the method that UMB will use for finishing shell space in HSF III
- use BSU's annual historically black colleges and universities enhancement funding, which may be used for one-time upgrades; and
- use funding from the Maryland Higher Education Commission's Health Personnel Shortage Incentive Grants or Nursing Short Program II, which also permit expenses for allied health field education equipment.

Finally, BSU's prior two State-funded buildings also had cost overrun issues:

- The New Center for Business and Graduate Studies was initially planned for 37,700 NSF and \$17.1 million in fiscal 2003, but wound up at 37,900 NSF and \$21.1 million by fiscal 2006.
- The New Fine and Performing Arts Building was initially planned for 66,200 NSF and \$42.7 million in fiscal 2006, but wound up at 62,500 NSF and \$78.8 million in fiscal 2011.

Value engineering reduced the cost to \$71.4 million in fiscal 2012, although BSU reported that it had value engineered out \$16.3 million from the structure.

The President and the USM Cost Center director should comment on whether the cost overrun for NSC was preventable and why BSU’s past three State-funded projects have come in significantly over budget.

Given that demolition has already begun, DLS recommends approving the full fiscal 2016 funding for this project; however, it is not clear why BSU did not seek modifications to the 2014 CIP to better inform the General Assembly during the 2014 session, nor why BSU has not seriously considered alternative building sizes for the planned facility. With the switch to open lab space, as shown in Exhibit 3, the building functionally is both over budget and has reduced student capacity from the prior year’s CIP.

Operating Budget Impact Statement

Executive’s Operating Budget Impact Statement (\$ in Millions)

		<i>FY 2016</i>	<i>FY 2017</i>	<i>FY 2018</i>	<i>FY 2019</i>	<i>FY 2020</i>
Natural Sciences Center						
	Estimated Operating Cost	\$0.000	0.106	1.125	1.938	1.975
	Estimated Staffing	0	0	3	3	3

According to the 2015 CIP, NSC will impact the fiscal 2017 operating budget by \$0.1 million and grow to \$1.1 million in fiscal 2018 due to general costs for fuel and utilities, supplies and materials, and amortized equipment. Costs also rise to reflect 3 new positions required to maintain the facility and additional costs in running the building when it is completed in fiscal 2018. This matches the 2014 CIP but is a decrease from 4 positions listed in the 2013 CIP.

GO Bond Recommended Actions

1. Approve \$39.7 million in general obligation bonds for the construction of the new Natural Sciences Center on the campus of Bowie State University.
2. Approve the de-authorization of \$0.15 million in general obligation bonds for design and construction of the Campuswide Site Improvements at Bowie State University due to the project being complete.
3. Approve the pre-authorization of \$31.6 million in general obligation bonds for the 2016 session for the construction and equipping of the new Natural Sciences Center on the campus of Bowie State University.