

Capital Budget Request

Renovate Holden Hall

Overview

Agency	Virginia Polytechnic Institute and State University (208)
Project Code	none
Project Type	Improvements-Other
Biennium	2014-2016
Budget Round	Amended Bill
Request Origin	Previously Submitted
Building Name	Holden Hall
Project Location	Roanoke Area
Facility/Campus	Blacksburg Main Campus
Source of Request	Agency Request
Building Function	Higher Education Instruction & Research -- 100% E&G
Infrastructure Element	Classroom / Laboratory
Contains significant technology costs? No	
Contains significant energy costs? No	

Agency Narrative

Agency Description

This project has been on the University's plan since 1993, formerly titled Renovation/Addition of Holden Hall. The scope of the project is envisioned to include renovation and addition of offices, laboratories, STEM-H classrooms, and support spaces. This project will renovate the building with upgrades to include mechanical systems, electrical systems, fire protection and plumbing systems, telecommunication systems, accessibility, egress, installation of air-conditioning, refurbishment of architectural finishes, and building envelope repairs. These improvements will extend the useful life of the building for continued service for instruction, research and academic support programs.

This project requests authorization to renovate the 20,168 gross square foot historic three story south wing of Holden Hall and to demolish the 21,648 gross square foot single story east and north wings. The north wing will be replaced with a new four story wing and the east wing with a new three story wing. Each replacement wing will be built on the footprint of the existing single story wings. These replacement wings will total approximately 81,072 gross square feet and will more efficiently use the existing building footprint. The overall building square footage will total 101,240 (81,072 + 20,168) gross square feet of new and renovated space upon completion of the project. The renovation will also address accessibility and life safety codes and improve the programmatic function of the building.

The south wing renovation will address the need for upgraded HVAC systems, the installation of air conditioning, upgraded electrical systems, rehabilitated and improved plumbing systems, and renovations to attain facility building and life safety code compliance while preserving the historically significant features of the portion of the building fronting the drillfield. In addition the building envelope will be assessed and repaired as needed. These building renovations will extend the useful life of the facility as a critical science building on the university's campus.

The construction of an addition will incorporate modern wet and dry laboratories and support space to meet the shortfall in instructional and research laboratory space incurred by the Mining and Minerals Engineering program, the Materials Science and Engineering program, and the Computer Science Engineering program.

This project also creates the opportunity to develop an outdoor classroom and informal learning space through landscape improvements and site amenities.

Justification

Program Description:
 Holden Hall houses several departments in the College of Engineering. This College has seen enrollment grow from 7,558 to 8,958 majors (18 percent) over the past six years. Virginia Tech awarded 1,297 undergraduate and 653 graduate Engineering degrees in 2012-13. The requested renovations will fully renew the building and expand it to serve as high quality academic space to support engineering instruction and research enrollment growth.

Building Renovation Component: The 20,168 gross square foot south wing renovation program will include renovations and reconfiguration of STEM-H classrooms, seminar rooms, and teaching laboratories, and improved administrative space for academic departments within the

College of Engineering. These spaces will comprise approximately 2,800 net assignable square feet (nsf) of classroom and seminar space, approximately 1,680 nsf of laboratory space and approximately 8,050 nsf of administrative space

Building Partial Demolition and Replacement with Addition Component: An 81,072 GSF addition is planned on the east and north sides of Holden Hall, replacing the deteriorated single story 21,648 GSF east/north wings. The three and four story replacement wings will house approximately 26,000 square feet of new instructional laboratories including core computing facilities, 12,000 square feet of classrooms and 15,000 square feet of academic support and administrative space, constructed to meet contemporary design standards.

The university's long-term capital plan includes a project to update Randolph Hall for undergraduate engineering instruction. In the short term the addition to Holden Hall will serve as swing space for occupants in Randolph Hall as Randolph Hall undergoes improvements. After Randolph Hall construction is finished and the Holden Hall addition has completed its use as a swing space facility, the addition will house the Computer Science department. This new home will address a shortage of modern academic space capable of supporting the advanced technologies employed in the growing fields of computer science and engineering. The Computer Science department serves 680 majors (up 18 percent since 2007-08) and awarded 128 undergraduate and 68 graduate engineering degrees in 2012.

To meet the current demands for modern instructional space in computational science, the University temporarily leases approximately 45,000 net square feet of off-campus space in the research center, supplementing on-campus departmental space scattered around campus. Under this project, the expansion in Holden Hall will provide permanent space for the program to relocate back to the core of campus to meet the needs of the Department of Computer Science for modern classroom, laboratory, and academic office space.

The facility will provide a highly advanced computing infrastructure with considerable flexibility in its instructional spaces and research laboratories. The computing infrastructure will need to include state-of-the-art wired and wireless communication services and provide above normal levels of electrical and HVAC capacity to support large-scale servers and computing clusters in a high performance computing core facility. These servers and clusters provide the backbone of the technical infrastructure underlying the learning and research environment of the broader college and are themselves objects of study for advanced courses in high performance computing and grid computing. The flexibility will permit adaptation over time to evolution of new technologies, shift in research programs, repurposing of teaching laboratories, and experience with the subtle effects of the spatial arrangements on student learning.

This addition is envisioned to be clad in a combination of Hokie stone, precast concrete panels and trim, and a combination of curtain wall glazing and punched opening windows, complementing the architectural materials in the existing structure.

The university's strategic plan includes the following principle strategies that will be supported by this project:

- Ensuring competency in data analysis and computational methods as a component of general education for all students.
- Developing an appropriate infrastructure for high performance computing.
- Building upon existing and emerging strengths.
- Increasing undergraduate involvement in meaningful research experiences and experiential learning--hands-on, minds-on.
- Developing ways to integrate computational science/informatics and digital fluency for managing and analyzing complex data sets across a wide range of disciplines.
- Identifying opportunities during construction and renovation to create flexible classroom spaces that fully support e-learning components.

Existing Facilities:

Holden Hall: Holden Hall was constructed in 1940 and has not had any major renovations or building improvements since it went into service. The building totals about 42,100 gross square feet and houses the Mining and Minerals Engineering program and the Materials Science and Engineering program. In addition to a small basement the existing building comprises a three story south wing totaling approximately 20,168 gross square feet and east and north single story wings totaling approximately 21,648 gross square feet.

The building is outdated and does not adequately support engineering teaching and research in the 21st century. The building is no longer able to provide a satisfactory environment for contemporary STEM-H instruction. The needed use of modern scientific equipment ranging from computers, chemical fume hoods, and other specialized laboratory equipment exceeds the capabilities of the existing mechanical, electrical, plumbing, telecommunications, and environmental control systems. The building has become outdated and deterioration is progressing beyond the scope of normal operations and maintenance reserve repairs. The facility condition index of the building in FICAS is 39 percent.

The existing single story classroom and laboratory wing is an inefficient use of space in the north campus where academic space is at a premium and land for new facility construction is not available.

Department of Computer Science temporary facilities: Like other science programs at Virginia Tech, the rapidly growing Computer Science department was constrained in McBryde Hall with insufficient space and infrastructure to adequately support its growing program. McBryde Hall, built in the 1960's, does not have the building systems - electrical power, ventilation and air conditioning - to support advanced computing and networking required to deliver the curricula of the department or to carry out its research program. Further, the facilities are cramped and not well configured to support the interactive, hands-on, minds-on project-based course curricula that now are common in the undergraduate program. The space deficit was so severe that the University leased 45,000 square feet off-campus in its corporate research center to house a substantial part of the program as a temporary, stopgap measure to alleviate overcrowding of faculty and graduate student offices and to meet student course demands. This lease will be terminated when the occupants move to Holden Hall.

Funding Plan:

The program of this project is for instruction and research programs; thus, the funding plan for the \$75.5 million project calls for \$68 million of General Fund support for 100 percent of the instruction costs and 50 percent for the research costs and \$7.6 million of nongeneral fund support

for 50 percent of the research costs.

Alternatives Considered

Other options considered but not selected include continuing to lease space. Renovating and expanding the current facility is the selected option because it is the most cost effective solution to the shortage of modern instructional space for the Department of Computer Science and the short-term need to temporarily house programs dislocated by a renovation of Randolph Hall.

Continuing to lease is rejected as an option as a permanent solution because it is not financially favorable long-term to enter into a capital lease for this project. It is also problematic to have a growing academic department that serves residential students located more than a mile from central campus, particularly when the scheduling difficulties of students and faculty commuting to an off-campus location are considered.

Costing Methodology

This project will involve renovation of a historical building and construction of new laboratory space. Virginia Tech's project cost estimate is derived from a database of on-campus construction costs of comparable project types. Virginia Tech building construction reflects the high level of quality, durability and tradition that makes Virginia Tech a distinctive and memorable place for students. Our estimates also include the cost of technology, specialized instruction, and energy efficiency goals of the institution.

The building envelope will be comprised primarily of 'Hokie Stone' with precast concrete accents consistent with university standards as affirmed by the Board of Visitors. The Virginia Tech Board of Visitors has directed that all new building projects and expansion projects built on the Blacksburg central campus must use Hokie stone as the predominate building material on all building facades. Brick, metal panels, and siding materials are not permitted as substitutions for Hokie stone. In maintaining the random ashlar stone pattern of our collegiate Gothic buildings, the university has explored a wide range of contemporary stone erection means, methods and systems. The most efficient system tested that meets erection, insulation and moisture protection requirements utilizes a four-inch thick nominal stone thickness with a two-inch nominal air barrier over moisture resistant sheathing. Stainless steel anchoring straps and load bearing shelf angles and stainless steel flashings comprise the structural support and flashings system, meeting our requirement for a 50-100 year enclosure life expectancy. Because the university owns the stone quarry, the quarrying and stocking of all the cut stone is carried as a project (soft) cost, and the construction budget carries all erection, final stone dressing, installation and intensive quality assurance inspection costs. Renovation of the historic portion will require extensive repointing and installation of new windows.

Mechanical equipment and building automation systems will be designed to maximize energy efficiency and minimize operations and maintenance costs. Mechanical equipment will be located inside and screened from view to maximize student use of the campus landscape. Electrical systems will support current academic technologies and increased student use of individual technology equipment. Effective use of exterior and interior glazing will enhance energy efficiency lighting fixtures for an improved academic experience. Design priorities will include flexibility to maximize the long-term programmatic functionality of the building.

Virginia Tech produces the most STEM-H graduates of any university in the Commonwealth. Our role as the leading producer of STEM-H degrees relies upon a system of classrooms, instructional laboratories that support technology driven instruction in engineering, physical sciences, life sciences, and advanced mathematics. All buildings must have high-capacity wireless networks to support multiple devices (laptop computer, tablet computer, smartphone) used simultaneously by students to retrieve information and to communicate within the classroom and to connect digitally with instructional sites around campus and around the world. The use of electronic equipment in the classroom by student participants also requires dedicated power outlets corresponding to the seat/station count and power outlets in common areas. Raised floor systems are needed to accommodate these and future developments in technology and classroom configuration. Specialized degrees in engineering and physical sciences require specialized equipment specific to those fields and shielded or vibration protected areas in which to operate this equipment. The university operates its own communications network using primarily internet connectivity which requires accessible, climate controlled server rooms in lieu of the traditional phone closets. Because the communications infrastructure is installed by our own university operated auxiliary it is carried as a project (soft) cost outside of the normal construction budget.

This particular building, because it will serve the Computer Science department and may house a high performance computing core facility will require exceptional electrical, HVAC, and internet connectivity throughout.

Renovation of the historic portion will involve complete replacement of mechanical, plumbing, electrical systems that have exceeded their useful life. It will also require installation of sprinkler, fire alarm systems and accessibility improvements. The entire building envelope of the historic portion will be evaluated and repaired and replaced as needed.

The project is anticipated to have moderate site conditions but restricted site access in a dense and active part of campus will impact mobilization costs. This project will use a C-M at risk construction delivery method appropriate for the size and complexity of this project. Project costs are estimated to the mid-point of construction using three percent escalation in accordance with the instructions for developing the Six-Year Capital Outlay Plan.

Agency Funding Request

Phase	Year	Fund	Subject	Requested Amount
Full Funding	2016	0100 - General Fund	2322 - Construction, Buildings	\$67,950,000
Full Funding	2016	0815 - 9(D) Debt Service - Construction Costs	2322 - Construction, Buildings	\$7,550,000
Total				\$75,500,000

Project Costs			
Cost Type	Total Project Costs	Requested Funding	DGS Rec
Acquisition Cost	\$0	\$0	\$0
Building & Built-in Equipment	\$44,304,000	\$44,304,000	\$0
Sitework & Utility Construction	\$6,645,000	\$6,645,000	\$0
Construction Cost Total	\$50,949,000	\$50,949,000	\$0
Design & related Services from Other Costs tab	\$7,964,000	\$7,964,000	\$0
Inspection & Testing Services from Other Costs tab	\$1,667,000	\$1,667,000	\$0
Project Management & Other Costs from Other Costs tab	\$4,565,000	\$4,565,000	\$0
Furnishings & Movable Equipment	\$8,317,000	\$8,317,000	\$0
Construction Contingency	\$2,038,000	\$2,038,000	\$0
Total Project Cost	\$75,500,000	\$75,500,000	\$0

Capacity			
Cost Type	Unit of Measure	Units	Cost Per Unit
Acquisition Cost		0	\$0
Construction Cost	GSF	101,240	\$503
Total Project Cost	GSF	101,240	\$746

Other Costs			
Cost Type	Total Project Costs	Requested Funding	DGS Rec
Design & Related Service Items			
A/E Basic Services	\$6,763,000	\$6,763,000	
A/E Reimbursables	\$0	\$0	
Specialty Consultants (Food Service, Acoustics, etc.)	\$0	\$0	
CM Design Phase Services	\$637,000	\$637,000	
Subsurface Investigations (Geotech, Soil Borings)	\$105,000	\$105,000	
Land Survey	\$0	\$0	
Archeological Survey	\$0	\$0	
Hazmat Survey & Design	\$0	\$0	
Value Engineering Services	\$0	\$0	
Cost Estimating Services	\$39,000	\$39,000	
Other Design & Related Services	\$420,000	\$420,000	
Design & Related Services Total	\$7,964,000	\$7,964,000	
Inspection & Testing Service Items			
Project Inspection Services (inhouse or consultant)	\$1,350,000	\$1,350,000	
Project Testing Services (conc., steel, roofing, etc.)	\$317,000	\$317,000	
Inspection & Testing Services Total	\$1,667,000	\$1,667,000	
Project Management & Other Cost Items			
Project Management (inhouse or consultant)	\$1,010,000	\$1,010,000	
Work By Owner	\$76,000	\$76,000	
BCOM Services	\$0	\$0	
Advertisements	\$0	\$0	
Printing & Reproduction	\$0	\$0	
Moving & Relocation Expenses	\$85,000	\$85,000	
Data & Voice Communications	\$753,000	\$753,000	
Signage	\$34,000	\$34,000	
Demolition	\$0	\$0	

Hazardous Material Abatement	\$0	\$0
Utility Connection Fees	\$443,000	\$443,000
Utility Relocations	\$90,000	\$90,000
Commissioning	\$443,000	\$443,000
Miscellaneous Other Costs	\$1,631,000	\$1,631,000
Project Management & Other Costs Total	\$4,565,000	\$4,565,000

Operating and Maintenance Costs (Agency)

Cost Type	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
GF Dollars	\$0	\$0	\$746,573	\$768,970	\$792,039	\$815,800
NGF Dollars	\$0	\$0	\$186,643	\$192,243	\$198,010	\$203,950
GF Positions	0.00	0.00	4.49	4.49	4.49	4.49
NGF Positions	0.00	0.00	1.12	1.12	1.12	1.12
GF Transfer	\$0	\$0	\$0	\$0	\$0	\$0
GF Revenue	\$0	\$0	\$0	\$0	\$0	\$0
Layoffs	0	0	0	0	0	0

Planned start date of new O&M costs (if different than the beginning of the fiscal year):---

Supporting Documents

File Name	File Size	Uploaded By	Upload Date	Comment
CR-3 Holden Hall Renovation Expansion.xls	638,976	Rob Mann	6/27/2014	CR-3 Holden Hall Renovation

Workflow History

User Name	Claimed	Submitted	Step Name
Rob Mann	06/26/2014 01:22 PM	06/26/2014 01:22 PM	Enter Capital Budget Request
Rob Mann	06/26/2014 01:22 PM	06/26/2014 01:24 PM	Continue Drafting
Rob Mann	06/26/2014 01:59 PM	06/26/2014 02:00 PM	Continue Drafting
Rob Mann	06/27/2014 01:26 PM	06/27/2014 01:56 PM	Continue Drafting
Rob Mann	06/27/2014 02:58 PM	06/27/2014 03:00 PM	Agency Review Step 1
Rob Mann	06/27/2014 04:09 PM	06/27/2014 04:12 PM	Ready for DPB Submission
Bob Broyden	06/30/2014 02:51 PM	06/30/2014 02:58 PM	Ready for DPB Submission
Bob Broyden	06/30/2014 03:17 PM	06/30/2014 03:17 PM	Ready for DPB Submission
Bob Broyden	06/30/2014 03:55 PM	06/30/2014 03:55 PM	Ready for DPB Submission
			DPB Review