# CapitalBudgetRequest

**Renovate Holden Hall**

**Overview**

| | |
|---|---|
| Agency | Virginia Polytechnic Institute and State University (208) |
| Project Code | none |
| Project Type | Improvements-Other |
| Biennium | 2014-2016 |
| Budget Round | Initial 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 of offices, laboratories, STEM-H classrooms, and support spaces. This project is requested to 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 academic, 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 more efficiently use the existing building footprint. The overall building will total 101,240 (81,072 + 20,168) gross square feet of new and renovated space upon completion of the project. Overall renovations intended to meet accessibility and life safety codes, and to improve the programmatic function of the building.

The south wing renovation work will address the need for upgraded HVAC systems, 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. These building renovations will extend the useful life of the facility as a critical science building on the university's campus. This project also requests authorization to construct an addition to incorporate modern laboratories and support space to meet the shortfall in instructional and research laboratory space incurred by the Mining and Minerals Engineering and the Materials Science and Engineering programs.

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

Justification

Program Description:

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 the Mining and Minerals Engineering program and the Materials Science Departments and other departments within the College of Engineering. These programs have seen enrollment growth of 25 percent and 92 percent, respectively, over the past six years. Virginia Tech awarded 1,254 undergraduate and 619 graduate Engineering degrees in 2012. The requested renovations will fully renew the building to serve as high quality academic space to support Engineering instruction and research.

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 new instructional laboratories classrooms and academic administrative space, constructed to meet contemporary design standards.

The University's Six-Year capital Outlay 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 665 majors (up 16 percent since 2008) and awarded 117 undergraduate and 56 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. In order to provide permanent space for the program, the University is requesting relocation to this proposed building addition 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 include state-of-the-art wired and wireless communication services and provide abundant electrical and HVAC capacity to support large-scale servers and computing clusters. These servers and clusters provide the backbone of the technical infrastructure underlying the learning environment 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 to 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.

Computer Science and Engineering Department temporary facilities: Like other science programs at Virginia Tech, the Computer Science Department was "land-locked" in McBryde Hall with insufficient space or 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 the new generation of computer systems and networking required to deliver the curricula of the department. 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 is so severe the University has leased 45,000 square feet off-campus in the 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 $67.95 million of General Fund support for 100 percent of the instruction costs and 50 percent for the research costs and $7.55 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, or delaying the project entirely. 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 not a feasible option as a permanent solution because it is not financially favorable long-term to enter into a capital lease for this project, particularly when the scheduling difficulties of students and faculty commuting to an off-campus location are considered.

Delaying the project to a future biennium is not a viable option because of the financial, programmatic, and logistical difficulties presented by the continued lease of off-campus space for the Department of Computer Science.

### 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 sometimes 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 closet. 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.

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 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 | Subobject | Requested Amount |
|---|---|---|---|---|
| Construction | 2015 | 0100 - General Fund | 2322 - Construction, Buildings | $67,950,000 |
| Construction | 2015 | 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 | RequestedFunding | 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 | $746,573 | $768,970 | $792,039 | $815,800 | $840,274 |
| NGF Dollars | $0 | $186,643 | $192,243 | $198,010 | $203,950 | $210,069 |
| GF Positions | 0.00 | 4.49 | 4.49 | 4.49 | 4.49 | 4.49 |
| NGF Positions | 0.00 | 1.12 | 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

*No supporting documents for this adjustment*

## Workflow History

| Step Name | User Name | Claimed | Submitted |
|---|---|---|---|
| Enter Capital Budget Request | Rob Mann | 05/31/2013 11:38 AM | 05/31/2013 11:38 AM |
| Continue Drafting | Rob Mann | 05/31/2013 11:38 AM | 05/31/2013 11:38 AM |
| Continue Drafting | Rob Mann | 05/31/2013 11:45 AM | 05/31/2013 11:46 AM |
| Continue Drafting | Rob Mann | 05/31/2013 12:03 PM | 05/31/2013 12:05 PM |
| Continue Drafting | Rob Mann | 06/20/2013 10:09 AM | 06/20/2013 10:28 AM |
| Continue Drafting | Rob Mann | 06/20/2013 11:18 AM | 06/20/2013 11:18 AM |
| Continue Drafting | Rob Mann | 06/20/2013 12:52 PM | 06/20/2013 12:59 PM |
| Continue Drafting | Jennifer Hundley | 06/21/2013 10:03 AM | 06/21/2013 10:06 AM |
| Continue Drafting | Jennifer Hundley | 06/21/2013 10:12 AM | 06/21/2013 10:16 AM |
| Agency Review Step 1 | Bob Broyden | 06/21/2013 02:05 PM | 06/21/2013 02:11 PM |
| Ready for DPB Submission | Rob Mann | 06/21/2013 05:40 PM | 06/21/2013 05:40 PM |
| DPB Review | Anne Smith | 06/26/2013 10:54 AM | 06/26/2013 11:00 AM |
| DPB Review | | | |