

Capital Budget Request

Renovate/Replace Brooks Center

Overview

Agency	Virginia Polytechnic Institute and State University (208)
Project Code	none
Project Type	Improvements-Infrastructure Repairs
Biennium	2018-2020
Budget Round	Initial Bill
Request Origin	New Project
Project Location	Roanoke Area
Facility/Campus	Other
Source of Request	Agency Request
Infrastructure Element	Laboratory / Classroom

Contains significant technology costs? No

Contains significant energy costs? No

Project will be used by other than a state or local governmental entity? No

Agency Narrative

Agency Description

Executive Summary:

The forest products industry in Virginia is a significant part of the economy of the Commonwealth. The harvesting, processing, and marketing of forest products generates over \$20 billion annually to the Virginia economy. Every county in the state benefits from the forest industry, as each and every one is represented through forest products operations and commercial forestland. Over 20 percent of industrial establishments within the state manufacture forest products. It continues to support one of the largest manufacturing industries in the state, ranking first in employment, wages and salaries and it generates more than 100,000 jobs (VDOF Annual Report on the State of our Forests).

The Brooks Forest Products Center is the academic home of the Department of Sustainable Biomaterials, which is one of the four academic departments in the College of Natural Resources and Environment (CNRE). The primary mission of the department's faculty and students is to support the \$20 billion dollar forestry/forest products sector in the Commonwealth of Virginia.

The Brooks Forest Products Center is a 35,000 gross square foot facility that is approximately 40 years old. The building has a flat roof, vertical plywood-sided building, and because of its age and condition requires constant maintenance from roof leaks, rotten walls, and outdated mechanical, electrical, and HVAC systems. The Center has an average facility condition index of 33 percent in the FICAS system as of June 9, 2017.

The size and condition of the center no longer adequately support the department's 15 faculty and 170 students. To ensure the program has sufficient facilities to continue its service to the Commonwealth, this capital project request is for a 35,000 gross square feet of renovation to the existing Brooks Center Facility and a 10,000 gross square foot addition to the facility. The total project costs are \$6.75 million and the funding plan calls for 100 percent General Fund support.

Project Description:

The Brooks Forest Products Center renovation and addition is needed to bring existing buildings systems and infrastructure up to modern standards and to provide additional space to accommodate growth of the department. This project request is for 35,000 gross square feet of renovation to the existing Brooks Center Facility and a 10,000 gross square foot addition to the facility.

The 35,000 gross square foot renovation would include 12,500 ASF of dry laboratories; 6,400 ASF of laboratory support spaces; and 7,500 ASF of office and conference room spaces. The building would include the following elements:

- Upgrade electrical and mechanical systems.
- Retrofitting the roof envelope to create adequate rain runoff, including possible addition of overhangs.
- Removal of all vertical plywood siding and replacement with a properly installed horizontal siding product such as Hardie Plank Lap siding.
- Replacement of all windows and installation of window blinds where needed.

- Removal of carpeting throughout and replacing floor coverings, with installation of wood or tile flooring.
- Replacing office lighting and furniture.
- Paint the entire inside of the facility.
- Interior wall removal and reconfiguration.

The 10,000 gross square foot addition would include the following elements:

- 12 faculty offices (allows for relocation of Cheatham faculty)
- One new classroom with a capacity for 70 stations.
- Two, 30 foot by 40 foot laboratories, with sinks, two vent hoods, and standard bench configuration in each laboratory.
- Storage for instruments, equipment, and materials
- Paved parking will be need to accommodate faculty and staff permanently assigned to this location.

The project scope, site development, and building configuration shall be consistent with the 2017 master plan update and include universal accessibility design principles as appropriate.

Justification

Program Description:

The forest products industry in Virginia is a significant part of the economy of the Commonwealth. The harvesting, processing, and marketing of forest products generates over \$20 billion annually to the Virginia economy. Every county in the state benefits from the forest industry, as each and every one is represented through forest products operations and commercial forestland. Over 20 percent of industrial establishments within the state manufacture forest products. It continues to support one of the largest manufacturing industries in the state, ranking first in employment, wages and salaries and it generates more than 100,000 jobs (VDOF Annual Report on the State of our Forests).

The Brooks Forest Products Center is the academic home of the Department of Sustainable Biomaterials, which is one of the four academic departments in the College of Natural Resources and Environment (CNRE). The Department of Sustainable Biomaterials (Wood Science and Forest Products) began in 1979 with four faculty to support the forest products in the commonwealth and the nation. Four U.S. Forest Service employees are also permanently located at the center.

The Center is also home for about one-third of the department's graduate student population. Since that time, it has grown to 15 faculty and over 170 students. Undergraduate classes are regularly held at the Brooks Center's only classroom, which is inadequate in size to accommodate several classes taught at the Center. The Department of Sustainable Biomaterials is the largest of its kind in North America based on undergraduate student enrollment. Renewable materials utilization is a critical and strategic component of our mission delivery and is core to our land grant heritage, as is serving the forestry/forestry products sector in Virginia and beyond.

Faculty for the department are separated into two locations with offices at either Cheatham Hall on campus or at the Brooks Center. Faculty and students travel between campus and the CRC to teach/attend classes, conduct research and engage with colleagues in the department. The department and the college have both reached capacity for office, laboratory, and classroom space in Cheatham Hall and the Brooks Forest Products Center.

The Center for Pallet and Unit Load Design is the world's leading pallet testing and evaluation laboratory, attracting a steady stream of industrial clients from around the world, and providing experiential, real-world research and development experience for students.

The department's new and growing packaging systems and design degree program is one of a limited number of programs in the United States.

This new degree program has grown to 115 undergraduate students and more than 10 graduate students in 18 months. Industry engagement in the program is very high, including funded research, equipment donations, internships, and career opportunities for students. Enrollment growth, and industry collaboration, is expected to grow significantly. Packaging systems and material utilization for packaging is an area of anticipated growth in research funding. Facilities, both quantity and quality of space are current critical constraints to program growth.

This program was recently ranked #7 out of the top 20 in the nation, and this degree program is offered almost exclusively at the Brooks Forest Products Center. Employment opportunities for students in the packaging sector are very strong and students often begin their careers with high starting salaries. The packaging sector is considered to be one of the leading economic sectors in the world.

The Department of Sustainable Biomaterials has three centers housed at the Brooks Center: the Center for Packaging and Unit Load Design (CPULD), the Wood Based Composite Center (WBC), and the Innovation Laboratory. Each center is briefly described below:

- The Center for Packaging and Unit Load Design (CPULD), which is located at the Brooks Center, is the leading University-industry center in support of the packaging and pallet industry in North America. The laboratory housing CPULD was the first building built on site, and was followed by several subsequent additions that expanded the Brooks Center to its current capacity. CPULD has experienced a substantial increase in research and contract testing services that we anticipate to continue into the future. In addition, the exponential growth in the undergraduate packaging systems degree program in two short years to more than 100 undergraduates places additional stress on scarce laboratory and classroom space at the Brooks Center.
- The Wood Based Composite Center is a collaboration with Oregon State to advance the science and technology of wood-based composite materials. The WBC currently has 18 industrial affiliates that contribute \$630,000 annually to match other external funding.
- The Innovation Laboratory houses a large CNC wood machining system, corrugated cutting table, and a recently donated custom box folding

machine. The Innovation lab is home to the Wood Enterprise Institute, a concept-to-market student-run business start-up, now in its tenth year. Classroom capacity (40) is a limiting factor due to a strong growing enrollment in the new Packaging Systems and Design degree program. This degree program is unique in the mid-Atlantic.

In order to meet student demand for the packaging systems and design degree, the department plans to increase enrollment to 150 from the current 115 by 2022. Additional classroom capacity is a strategic and urgent need at the Brooks Center as classes must be held where laboratories, equipment, and faculty are located.

The University's strategic plan includes the following principle strategies that this important project will help to achieve:

- Increasing the number of our programs recognized as among the best internationally.
- Ensuring competency in data analysis and computational methods as a component of general education for all students.
- Developing an appropriate infrastructure for e-learning.
- Developing an appropriate infrastructure for high performance computing.
- Emphasizing translational research and scholarship.
- Maintaining growth in research expenditures toward a target of \$680 million by 2018.
- Increasing graduate enrollment toward a target of 10,000 students across all campuses.
- Increasing undergraduate involvement in meaningful research experiences and experiential learning.
- Developing ways to integrate computational science/informatics and digital fluency for managing and analyzing complex data sets across a wide range of disciplines.
- Developing and implementing alternate pathways for the general education of all students.
- Continuing to investigate, develop, and utilize current and emerging technologies to enhance traditional classrooms, provide mobile access, and expand high-quality distance -learning opportunities.
- Identifying opportunities during construction and renovation to create flexible classroom spaces that fully support e-learning components.
- Pursuing quality-of-life initiatives in support of the University as a vibrant, dynamic, and sustainable workplace.

Existing Facilities:

The Brooks Forest Products Center is approximately 40 years old and was constructed with funding from the U.S. Forest Service, The National Wooden and Pallet Container Association, and the Commonwealth of Virginia. Three separate building additions have occurred over time to bring the total square footage to approximate 35,000 square feet of office, classroom, conference room, and high bay laboratory space. Constructed over time, the additions are all connected under the same roof structure.

As a flat roof, vertical plywood-sided building, the Brooks Center is in need of constant maintenance from roof leaks, rotten walls, and outdated mechanical, electrical, and HVAC systems.

Main features of the Brooks Center include the wood engineering lab, Center for Pallet and Unit Load Design (CPULD) laboratory, Innovation laboratory, wood drying laboratory, composites laboratory, one classroom, one conference room, 14 faculty and staff offices, office loft area for 12 graduate students, a machine shop, and a wood shop. The wood engineering laboratory consists of large test frames for testing and evaluation of large wood structures, wood beams, wood composites, and other wood materials. The Pallet and Unit Load Design Lab have two large hydraulic shaker tables, drop test equipment, incline test equipment, test frames, and a fast-track area with fork trucks to evaluate the materials handling aspects of pallet and unit loads.

The Brooks Center is approximately 35,000 square feet of office, classroom, conference room, and high bay laboratory space and is located on University property adjacent to campus.

The 40 year-old wood-framed facility has vertical plywood siding, and a flat-roof which requires constant maintenance. There have been three major additions to the original 1976 building, which makes logistics and people/material flow difficult within the structure. The electrical and mechanical systems are at the end of their useful life causing air flow, heating, and cooling to be a constant challenge. The flat roof with no overhang has led to constant issues with water degrading the plywood siding and adding to the need for constant maintenance. Faculty uses the Brooks Center as a perfect example of "how not to build a wood building".

The Brooks Center has an average facility condition index of 33 percent in the FICAS system as of June 9, 2017. The building components include:

- The Sardo Laboratory, built in 1976, has a facility condition index of 31 percent.
- The Wood Processing Lab, built in 1978, has a facility condition index of 51 percent.
- The Wood Engineering Lab, built in 1987, has a facility condition index of 27 percent.
- The Timber Harvest Lab, built in 1987, has a facility condition index of 28 percent.
- The Biobased Materials Processing Lab, built in 1993, has a facility condition index of 27 percent.

The Center's 4-high bay laboratories (wood engineering lab, composites lab, packaging and unit load lab, and the innovation lab) are home to large scale testing equipment, manufacturing equipment, and processing equipment. These laboratories are used extensively and are overcrowded with testing machinery and materials. Laboratories are in need of continual maintenance due to their age and intensive use.

Funding Plan:

The program of this project is entirely Educational and General to support the growing instruction program; thus, the funding plan calls for 100 percent General Fund support for this \$6.75 million project.

Options Considered:

Options considered but not selected were leasing additional space and deferring the project. Leasing space increases operating costs; reduces program cohesiveness by distributing students, faculty and staff across several buildings and adjacent areas to campus; unnecessarily expands the University space inventory, and extends the risks and costs of managing 35,000 gross square feet of highly deteriorated assets with significant deferred maintenance backlogs. Deferral of this project to a future biennium will impact the programs ability to efficiently provide instruction and to remain competitive for sponsored research projects.

Alternatives Considered

Costing Methodology

A. Methods Used to Estimate Costs:

The method for estimating costs for the Brooks Center renewal project includes: 1) using unit costs in the Bureau of Capital Outlay Management's Construction Costs Database updated October 2016 with a regional market multiplier and a multiplier for softs costs; and 2) comparables as shown in the CR-3. Both methods are escalated to a construction midpoint of 2021 at three percent in accordance with the instructions for developing the Six-Year Capital Outlay Plan.

On a total project cost basis, inclusive of design, construction, and equipment, the unit costs are \$150 per gross square foot. The building types in this request are high-bay, commercial quality, laboratory and office spaces in the Bureau of Capital Outlay Management's Construction Costs Database

Virginia Tech's building construction for this off campus location reflects commercial quality similar to structures in the University's Corporate Research Center. The estimates also include the cost of technology, specialized instruction, and energy efficiency goals of the institution.

This project will use a Design-Bid-Build delivery method appropriate for the size and complexity of this project.

B. The proposed costs include the following critical considerations to ensure the project fully meets the needs of the program and the University:

- 1) Replace entire vertical envelope siding with in-kind products.
- 2) Alignment of roof to provide better drainage away from siding and building
- 3) Communications infrastructure, wired and wireless, is installed by a University operated auxiliary; thus, these costs are shown in the Other Costs section of the proposed budget.
- 4) High-capacity wireless networks to support multiple devices (laptop computer, tablet computer, smartphone, and other WIFI devices) used simultaneously by students and faculty to retrieve information and to communicate and to connect digitally with sites around campus and around the world.
- 5) Power outlets corresponding to the seat/station count and power outlets in common areas will exceed the minimum code requirements by approximately 30 percent.

Agency Funding Request

Phase	Year	Fund	Subobject	Requested Amount
Full Funding	2019	01000 - General Fund	2322 - Construction, Buildings	\$6,750,000
Total				\$6,750,000

Project Costs

Cost Type	Total Project Costs	Requested Funding	DGS Rec
Acquisition Cost	\$0	\$0	
Building & Built-in Equipment	\$4,899,683	\$4,899,683	
Sitework & Utility Construction	\$0	\$0	
Construction Cost Total	\$4,899,683	\$4,899,683	
DESIGN & RELATED SERVICE ITEMS			
A/E Basic Services	\$616,850	\$616,850	

A/E Reimbursables	\$3,214	\$3,214
Specialty Consultants (Food Service, Acoustics, etc.)	\$0	\$0
CM Design Phase Services	\$0	\$0
Subsurface Investigations (Geotech, Soil Borings)	\$10,915	\$10,915
Land Survey	\$0	\$0
Archeological Survey	\$0	\$0
Hazmat Survey & Design	\$0	\$0
Value Engineering Services	\$56,781	\$56,781
Cost Estimating Services	\$0	\$0
Other Design & Related Services	\$0	\$0
Design & Related Services Total	\$687,760	\$687,760
INSPECTION & TESTING SERVICE ITEMS		
Project Inspection Services (inhouse or consultant)	\$86,794	\$86,794
Project Testing Services (conc., steel, roofing, etc.)	\$73,954	\$73,954
Inspection & Testing Services Total	\$160,748	\$160,748
PROJECT MANAGEMENT & OTHER COST ITEMS		
Project Management (inhouse or consultant)	\$51,662	\$51,662
Work By Owner	\$202,045	\$202,045
BCOM Services	\$19,318	\$19,318
Advertisements	\$0	\$0
Printing & Reproduction	\$0	\$0
Moving & Relocation Expenses	\$0	\$0
AV Cabling	\$0	\$0
IT Cabling	\$0	\$0
Telephone Cabling	\$0	\$0
AV Equipment	\$0	\$0
IT Equipment	\$68,470	\$68,470
Telephone Equipment	\$0	\$0
Signage	\$19,609	\$19,609
Demolition	\$0	\$0
Hazardous Material Abatement	\$0	\$0
Utility Connection Fees	\$0	\$0
Utility Relocations	\$32,523	\$32,523
Commissioning	\$39,667	\$39,667
Miscellaneous Other Costs	\$14,866	\$14,866
Project Management & Other Costs Total	\$448,160	\$448,160
Furnishings & Movable Equipment	\$463,664	\$463,664
Construction Contingency	\$89,985	\$89,985
TOTAL PROJECT COST	\$6,750,000	\$6,750,000

Capacity

Cost Type	Unit of Measure	Units	Cost Per Unit
Acquisition Cost		0	\$0
Construction Cost		0	\$0
Total Project Cost	GSF	45,000	\$150

Operating and Maintenance Costs (Agency)

Cost Type	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
GF Dollars	\$0	\$0	\$0	\$634,792	\$653,835	\$673,450

NGF Dollars	\$0	\$0	\$0	\$0	\$0	\$0
GF Positions	0.00	0.00	0.00	3.55	3.55	3.55
NGF Positions	0.00	0.00	0.00	0.00	0.00	0.00
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_Project Planner-07 Renovate Replace Brooks Center.xlsx	421,449	Rob Mann	7/7/2017	CR-3 Form_Brooks Center
07_Renovate Replace Brooks Center Program Chart.pdf	63,391	Rob Mann	7/7/2017	Brooks Center Program Chart

Workflow History

User Name	Claimed	Submitted	Step Name	Submit Action
Jennifer Hundley	06/06/2017 11:43 AM	06/06/2017 11:43 AM	Enter Capital Budget Request	Continue Working
Jennifer Hundley	06/06/2017 11:43 AM	06/06/2017 11:43 AM	Continue Drafting	Continue Working
Jennifer Hundley	06/06/2017 11:43 AM	06/06/2017 11:45 AM	Continue Drafting	Continue Working
Jennifer Hundley	06/09/2017 03:51 PM	06/09/2017 03:53 PM	Continue Drafting	Continue Working
Rob Mann	07/07/2017 11:27 AM	07/07/2017 11:52 AM	Continue Drafting	Submit for Agency Review
Rob Mann	07/07/2017 12:06 PM	07/07/2017 12:07 PM	Agency Review Step 1	Ready for DPB Bulk Submit
Bob Broyden	07/07/2017 04:35 PM	07/07/2017 04:35 PM	Ready for DPB Submission	Submit to DPB
			DPB Review	