CapitalBudgetRequest

Expand Virginia Tech-Carilion School of Medicine and Fralin Biomedical Research Institute

Overview

Agency	Virginia Polytechnic Institute and State University (208)
Project Code	18682
Project Title	Expand Virginia Tech-Carilion School of Medicine and Fralin Biomedical Research Institute
Project Type	New Construction/Improvement
Biennium	2024-2026
Budget Round	Amended Bill
Bill Version	Regular Session
Request Type	Previously Approved
Project Location	Roanoke Area
Facility/Campus	Other
Source of Request	Agency Request
Infrastructure Element	Classroom / Laboratory

Contains O & M costs? Yes

Contains significant technology costs? No

Contains significant energy costs? No

Possible that project will be used by other than a state or local governmental entity, or for research under sponsored programs (higher education)? No

Agency Narrative

Agency Description

Executive Summary:

This capital budget request includes facility improvements for two programs: i) the Virginia Tech Carilion School of Medicine and ii) the Fralin Biomedical Research Institute (FBRI). Both programs are located in Roanoke, Virginia as part of Virginia Tech's strategic partnership in healthcare programs with Carilion Clinic.

Virginia Tech and Carilion have built a high-quality partnership around these programs. This partnership has generated a combined economic impact for the Commonwealth that is projected to exceed $1.5 billion through 2027 while providing eleven graduating classes of physicians.

The Virginia Tech Carilion School of Medicine has established a strong position among medical schools with an extraordinary demand among students seeking a medical education providing the skill sets of physicians who are trained as scientists. The school receives approximately 6,900 qualified applicants per year for its 49 available spots per class and could readily grow if it had larger facilities. The school is presently one of the smallest medical schools in the country with a total enrollment of 196 students. Meanwhile, the Commonwealth has a documented shortage of physicians. This request is to provide a larger facility to accommodate doubling the size of enrollment to 400 students to help satisfy the demand for physicians in the Commonwealth.

The Fralin Biomedical Research Institute has generated unprecedented growth, including doubling its enterprise and lab facilities in Roanoke in a single decade. The research institute currently employs over 400 faculty, staff, and students, including 40 faculty-led research teams focusing their innovations on preventing and providing new diagnostics and therapeutics for the conditions of most significant health impact including brain disorders, heart disease, and cancer. The institute's steady pace of growth is projected to fill its current facilities by 2028. Funding for biomedical research is expected to grow substantially over the coming decade. Thus, Virginia Tech must be strategically positioned to continue to compete at its high level of success for those outside funding sources. This project will ensure the research institute is positioned to grow at a steady pace and continue an upward trajectory. Without additional capacity, the potential growth of the research enterprise would be stunted.

The proposed project will provide new space to accommodate the high demand for enrollment in the medical school program and renovate

space to expand the capacity for leading-edge research at the research institute.

Project Description:

The medical school and research institute currently share a 151,000 gross square foot (GSF) facility constructed in 2010 and located in Roanoke, Virginia. The medical school occupies approximately 51,000 GSF of the building and the research institute occupies approximately 100,000 GSF.

This project request includes two components:

The first, an educational component, is the construction of a new approximately 100,000 GSF building for the school of medicine academic program plus approximately 25,000 GSF of parking beneath the building, which is assuming one-to-one calculation of parking garage square footage based on DGS guidance. This parking solution is driven by site constraints and floodplain management strategy (this is also consistent with the other buildings in the vicinity). The new free-standing academic facility will include patient clinical exam rooms and support space, a wet anatomy laboratory with a cadaver cooler, medical instruction laboratories, team instruction rooms, large and medium-sized lecture halls, a testing center, academic support space, and administration spaces. The scope of this facility will create capacity to accommodate the envisioned future total enrollment of 400 students. The facility will be located on land provided by Virginia Tech's partner, Carilion Clinic, in close proximity to the existing building.

The second, a research component, is an approximately 51,000 GSF backfill renovation of the existing medical school/FBRI facility to create a research laboratory and computation/data analytics capacity for the Fralin Biomedical Research Institute. Renovations will create additional dry research space, wet research space, office and administrative space, including customized spaces for the research institute's growing programs in human subjects and patient research. This renovation will allow the institute to grow its research portfolio, compete for additional research grants and contracts, and increase externally sponsored research in the Commonwealth.

The State authorized $9 million to plan this project in Item C-24.70 in Chapter 1 of Special Session I of the 2023 General Assembly. The project is currently in Schematic Design and is on pace to complete Preliminary Designs in the Summer of 2025. This request is for authorization of construction funding for the Virginia Tech-Carilion School of Medicine and Fralin Biomedical Research Institute Expansion and Renovation project.

Justification

Program Description:

School of Medicine:

The Virginia Tech Carilion School of Medicine was established in 2008 as a partnership between Carilion Clinic, Virginia Tech, and the Commonwealth. The school enrolled its first class in 2010. Since its inception, the school has enrolled 15 classes and graduated 11 classes, with a 99 percent matching rate into top-tier residencies. The school's current enrollment includes class sizes of 49 students for a total enrollment of 196 students.

The school uses small team learning methods, community engagement, inter-professional teams, science research training, mentored research projects, and health systems science in the curriculum to prepare students with skills that exceed the basic accreditation requirements for a medical degree. This immersion in scientific reasoning prepares graduates to practice medicine as critical thinkers who are informed by the very latest research. Graduates of a program with this perspective are better prepared to manage the uncertainties of the global medical field and to navigate new and conflicting scientific publications and guidelines. Graduates emerge seeing the world of patient care differently and are more capable of improving the quality and efficiency of care.

Feedback from residency program directors confirms that VTCSOM graduates are better prepared than their peers to think critically about the patients they care for and the systems in which they work, interact skillfully with colleagues from other disciplines, and understand that health begins in the community. These distinguishing skill sets prepare them to become experts and leaders in their communities of practice.

The VTCSOM is extremely competitive with more than 7,000 highly qualified applicants each year for just 49 slots, including out-of-state students who make Virginia their home after completing their medical education and residency training in Virginia. While the school has demand for growth, the current facility limits the total student body at 196, making the school one of the smallest medical schools in the U.S.

Meanwhile, the Commonwealth has a shortage of physicians which is not likely to be satisfied solely through the recruitment of out-of-state physicians. Training new physicians will be critical to addressing the Commonwealth's physician shortage. The June 2021 Association of American Medical College's study of the needs of the physician workforce for the United States predicts that by 2034 the nation will face a shortage of up to 124,000 physicians. The Virginia Healthcare Workforce Advisory Council's 2020 report identified the need for 16.3 percent more physicians in the Commonwealth by 2026, or a projected deficit of nearly 1,800 physicians by 2026. Earlier retirements associated with the COVID-19 pandemic are likely to increase the deficit further.

In summary, with an expansion of the school's facility, the university and Carilion Clinic are well-positioned to help address the physician shortage in the Commonwealth by increasing the class size to 100 students per class and the total student body to 400 students.

Research Institute:

The research institute operations support a $235 million grant portfolio that has cumulatively published over 1,000 discoveries in leading scientific journals. As one of the nation's fastest-growing biomedical research enterprises, the institute is a destination for world-class researchers and is a highly interdisciplinary environment that breaks down traditional siloed academic dividers.

The institute's scientists focus on diseases that are the leading causes of death and suffering in the U.S., including brain disease, heart disease, and cancer. In just 11 years, the institute has experienced unprecedented growth, including doubling its enterprise and laboratory facilities in Roanoke while also securing laboratory space in the new Children's National Research and Innovation Campus in Washington, D.C., to expand Virginia Tech's Cancer Research Alliance and study pediatric brain cancers. Top research areas include addiction and substance abuse, health behaviors, brain tumors, breast cancer, sudden cardiac death, traumatic brain injury, neuropsychiatric disorders and mental health, neuro-rehabilitation, developmental disorders, and tissue repair and regeneration.

The Commonwealth's and university's investment in research has generated significant returns, resulting in impactful, self-sustaining laboratories. In the most recent years, the institute's faculty have been awarded more than 30 percent of the competitive grants they have applied for, primarily from the National Institutes of Health (NIH).

The timing of this proposed renovation, with an occupancy target in fiscal year 2029, will provide space to ensure the research program may continue a steady pace of growth to compete for additional research grants and contracts, and increase the Commonwealth's and university's externally sponsored research activity.

Synergies of the Medical School and Research Institute:

Together, the school of medicine and the research institute generate powerful collaborations that are greater than the sum of their parts. A few illustrations include:

i) Fralin Biomedical Research Institute faculty train students enrolled in Virginia Tech undergraduate and graduate programs including the nationally recognized TBMH Ph.D. program, with many of the doctoral students training at the research institute landing major national awards including NIH predoctoral awards before they graduate;

ii) Fralin Biomedical Research Institute faculty serve as principal and co-principal investigators on significant external research grants;

iii) the medical school and research institute have bolstered Carilion Clinic's competitiveness by attracting medical talent, including specialists, to the Roanoke Valley;

iv) the research institute attracts extraordinary medical school talent from other universities;

v) research institute faculty have spun off multiple biotechnology companies based on the intellectual property they have developed at Virginia Tech, often with the participation of graduate students, undergraduates, and medical students;

vi) the medical school and TBMH graduate program have created a path for students to pursue combined medical degrees and PhD degrees to become physician-scientists who are in demand nationally.

The Commonwealth, Roanoke Valley, Carilion Clinic, and Virginia Tech have worked together to create an extraordinary opportunity to enhance and expand healthcare delivery, services, and economic development in the Commonwealth. This opportunity may be fully achieved only with advanced space planning to create a new medical school building in close coordination with Carilion Clinic along with the renovation of vacated space to accommodate the growth of the research institute.

Strategic Planning:

The university's strategic plan includes the following goals and objectives that will be supported by the completion of this project:
- Increase extramural research expenditures.
- Increase graduate student enrollment.
- Increase and sustain excellence in research, discovery, and creativity.
- Increase teaching and learning excellence for a holistic education.
- Increase institutional impact and visibility.
- Achieve top U.S. public land-grant ranking.
- Increase representational diversity, cultural competency, and address critical societal issues impacting humanity and equity.
- Attract, retain, and develop the talents of students, faculty, and staff prepared to serve both the local and global communities while also supporting lifelong engagement and learning.
- Continue to develop the physical campus and technology infrastructure.
- Increasing the number of programs recognized as among the best internationally.
- Ensure 50% of academic degrees have a required experiential learning component.

- Increase the number of post-doctoral positions in STEM-H research areas.
- Increase student involvement in meaningful research experiences and experiential learning through hands-on minds-on.
- Continue to investigate, develop, and utilize current and emerging technologies to enhance traditional classrooms, provide mobile access, and expand high-quality distance-learning opportunities.
- Identify opportunities during construction and renovation to create flexible classroom spaces that fully support e-learning components.
- Implement the Climate Action Commitment and Sustainability Plan as appropriate.

Existing Facilities:

The School of Medicine and Research Institute is currently housed in a 151,000 GSF building on the Health Sciences and Technology campus in Roanoke, Virginia. The building was constructed in 2010. The school of medicine occupies approximately 51,000 GSF of the building, and the Research Institute occupies approximately 100,000 GSF.

The building condition and systems are strong, but its size constrains the operations of both programs. At such time as the medical school may relocate to a new building, the existing building is expected to respond positively to a renovation for the research program.

Funding Plan:

The creation of the health sciences instruction and research programs in Roanoke are the result of a funding partnership between the state, Virginia Tech, and Carilion Clinic.

The total project cost is $164.5 million that is based on the current CR-1 form (Revision July 2024) assumptions for space categories' cost per square footage as well as construction escalation. This also includes an in-kind land donation by Carilion Clinic. The funding plan calls for $138.1 million of General Fund support for the instructional program and 50 percent of the research program. The remaining $26.4 million of nongeneral fund authorization is for the university’s 50 percent support of the research program. The nongeneral fund component is requested as a revenue bond authorization that will be repaid by overhead revenue generated from the research program.

Options Considered:

Options considered but rejected include the construction of a new building for the research institute and backfill renovation for the VTCSOM or deferral of the project to a future biennium.

Construction of a new building for the research institute and backfill renovation for the school of medicine would be a more cost-intensive solution in terms of capital expenditure and ongoing operations. The cost of this alternative would be over $245 million.

Forgoing or deferring this project to a future biennium will postpone significant benefits of economic development, healthcare delivery service, and research progress for the Commonwealth.

Methodology

Cost Explanation and Methodology:

A. Methods Used to Estimate Costs:

The method for estimating costs for the Expansion of the Virginia Tech-Carilion School of Medicine and Fralin Biomedical Research Institute project includes: 1) using unit costs in the Division of Engineering and Building’s Construction Costs Database updated July 2024 with a regional market multiplier and a multiplier for softs costs (via an in-house cost estimating system); and 2) comparable university historical costs as shown in the CR-1.

The project costs are escalated to a construction midpoint of 2027 in accordance with the instructions for developing the Six-Year Capital Outlay Plan and the rate utilized in the most recent CR-1 Project Planning form. The backfill renovation for the expansion of the research program will begin after the medical school vacates their existing space and relocates to the new building. The midpoint of construction for this renovation work is escalated to 2028.

While the project's estimates are derived from the newest state-issued CR-1 per the Capital Budget Request instructions, internal cost estimates and similar project history suggests that the estimates may undershoot actual project costs, in part due to cost escalation factors associated with building in the geologic terrain of Roanoke and the subcontractor market.

On a total project cost basis, inclusive of design, construction, and equipment, the unit costs are $934 per gross square foot. The unit construction costs of the project are $678 per gross square foot. The building types in this request reflect a combination of wet laboratory, dry laboratory, classrooms, student center, and office spaces in the Division of Engineering and Building’s Virginia Construction Costs Database.

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

1) Virginia Tech building construction reflects the high level of quality and durability required for a long service life of institutional-level use. The estimates also include the cost of technology, specialized instruction, and energy performance strategies to achieve operating cost controls.

2) The location of the new construction is the Riverside area of downtown Roanoke, Virginia, and the location is adjacent to a rail yard, rail tracks, and the Roanoke River. Site development costs in this region are historically in the medium to high range and require generally significant rock removal and deep foundations. However, in recent site exploration it has been discovered that the site has contaminated soil conditions, which will have to be remediated at an estimated cost of $1.75 million plus an additional $250,000 for site testing, observation, and remediation design ($2 million total plus contingencies).

3) The proposed new construction size is 125,000 GSF and is envisioned as a four-level structure for the academic program (100,000 GSF) with an approximately 25,000 square-foot footprint built on top of ground-level parking.

4) The building is envisioned to match the existing facilities in the Riverside complex with primarily brick veneer, precast concrete accents, and glazing.

5) The building types in this request are classroom/laboratory, wet lab, dry lab, and offices.

6) Mechanical equipment and building automation systems are designed and selected to meet performance requirements and to optimize total costs of ownership inclusive of energy costs and operations and maintenance costs. System selections are justified based on a 30-year economic life cycle analysis. Mechanical equipment will be covered and secured to maximize equipment life and service.

7) Academic buildings include interior glazing for energy efficiency, lighting for academic work, and to enhance pedagogy, while also creating a secure envelope.

8) Ceiling heights will be appropriate for proper sound attenuation in large lecture and assembly environments as required for effective pedagogy.

9) Building structural support systems will accommodate large, open, and unimpeded interior spaces to maximize long-term programmatic functionality and adaptation to new program space and technology arrangements. This includes raised floor systems for maximum adaptability.

10) 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, communicate, and connect digitally with sites around campus and around the world. Testing and instruction can utilize online applications that require the capacity for an entire classroom to be connected simultaneously.

11) Power outlets corresponding to the seat/station count and power outlets in common areas will exceed the minimum code requirements by approximately 30 percent.

12) Automated audiovisual and lighting controls are included for all classroom and class laboratory spaces.

13) Climate-controlled technology server rooms, 10 feet by 10 feet, on each floor of the building or as required to provide efficient distribution of services.

14) Communications infrastructure, both wired and wireless, is installed by a university-operated auxiliary; thus, these costs are shown in the Other Costs section of the proposed budget.

15) Utilities (power, domestic water, gas, sanitary sewer, technology, and stormwater infrastructure) do not terminate at the building site and their extension is included in the proposed budget.

16) Specialized instruments and equipment are required for research which requires shielding and vibration protected areas.

Funding Request

Phase	Year	Subobject	Fund	Amount
Full Funding	2026	2411 - Unallotted Capital Amount	01000 - General Fund	$138,100,000
Full Funding	2026	2411 - Unallotted Capital Amount	08150 - 9(D) Rev Bonds-Construction	$26,400,000
			Total	$164,500,000

Project Costs

Cost Type	Requested Funding

Acquisition Cost	$3,000,000
Building & Built-in Equipment	$119,296,367
Sitework & Utility Construction	$0
Construction Cost Total	**$119,296,367**
DESIGN & RELATED SERVICE ITEMS	
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A/E Basic Services	$10,721,118
A/E Reimbursables	$22,499
Specialty Consultants (Food Service, Acoustics, etc.)	$123,748
CM Design Phase Services	$247,496
Subsurface Investigations (Geotech, Soil Borings)	$11,249
Land Survey	$22,499
Archeological Survey	$0
Hazmat Survey & Design	$57,353
Value Engineering Services	$22,499
Cost Estimating Services	$11,249
Other Design & Related Services	$2,439,146
Design & Related Services Total	**$13,678,856**
Design & Related Services Total	**$13,678,856**
INSPECTION & TESTING SERVICE ITEMS	
INSPECTION & TESTING SERVICE ITEMS	
Project Inspection Services (inhouse or consultant)	$697,491
Project Testing Services (conc., steel, roofing, etc.)	$1,444,400
Inspection & Testing Services Total	**$2,141,891**
Inspection & Testing Services Total	**$2,141,891**
PROJECT MANAGEMENT & OTHER COST ITEMS	
PROJECT MANAGEMENT & OTHER COST ITEMS	
Project Management (inhouse or consultant)	$1,529,981
Work By Owner	$78,749
BCOM Services	$13,499
Advertisements	$5,512
Printing & Reproduction	$13,499
Moving & Relocation Expenses	$0
A/V Cabling	$0
IT Cabling	$0
Telephone Cabling	$0
A/V Equipment	$0
IT Equipment	$2,396,220
Telephone Equipment	$0
Signage	$143,639
Demolition	$0
Hazardous Material Abatement	$70,097
Utility Connection Fees	$0
Utility Relocations	$926,274
Commissioning	$1,271,234
Miscellaneous Other Costs	$5,636,182
Project Management & Other Costs Total	**$12,084,886**
Project Management & Other Costs Total	**$12,084,886**
Furnishings & Movable Equipment	$11,913,000
Construction Contingency	$2,385,000
TOTAL PROJECT COST	**$164,500,000**

Size and Scope

Cost Type	Cost	Unit of Measure	Units	Cost Per Unit
Acquisition Cost	$3,000,000		0	$0
Construction Cost	$161,500,000	GSF	176,000	$918
New Construction Cost	$108,700,000	GSF	125,000	$870
Improvement Cost	$52,800,000	GSF	51,000	$1,035

Operating and Maintenance Costs

Cost Type	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030
GF Dollars	$0	$0	$0	$2,107,447	$2,191,745	$2,279,415
NGF Dollars	$0	$0	$0	$0	$0	$0
GF Positions	0.00	0.00	0.00	7.89	7.89	7.89
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
SOM and FBRI Program Chart 11.2024.pdf	195,459	Suzanne Gooding	11/7/2024	
CR-1 New Medical School and FBRI COMBINED 11.8.24.xlsx	1,789,733	Rob Mann	11/8/2024	

Workflow History

User Name	Claimed	Submitted	Step Name	Submit Action
Matthew Digman	08/21/2024 03:27 PM	08/21/2024 03:27 PM	Enter Capital Budget Request	Continue Working
Matthew Digman	08/23/2024 02:37 PM	08/23/2024 03:03 PM	Continue Drafting	Continue Working
Matthew Digman	08/23/2024 03:03 PM	08/23/2024 03:06 PM	Continue Drafting	Continue Working
Rob Mann	08/23/2024 03:29 PM	08/23/2024 03:56 PM	Continue Drafting	Submit for Agency Review
Rob Mann	08/23/2024 03:57 PM	08/23/2024 03:57 PM	Agency Review Step 1	Ready for DPB Bulk Submit
Rob Mann	08/23/2024 04:46 PM	08/23/2024 04:46 PM	Ready for DPB Submission	Submit to DPB
Matt Jones	08/29/2024 01:23 PM	08/29/2024 01:42 PM	DPB Review	Continue Review
WorkflowActivityService	08/29/2024 01:42 PM	08/29/2024 01:42 PM	Create DGS Review Document	Continue Review
Aimie Gindi	09/09/2024 10:40 AM	09/09/2024 10:40 AM	DPB Review	Continue Review
Aimie Gindi	09/09/2024 01:43 PM	09/09/2024 01:46 PM	DPB Review	Continue Review
Matt Jones	09/10/2024 01:58 PM	09/10/2024 02:01 PM	DPB Review	Continue Review
Matt Jones	09/17/2024 12:51 PM	09/17/2024 01:00 PM	DPB Review	Continue Review
Matt Jones	09/17/2024 01:05 PM	09/17/2024 01:08 PM	DPB Review	Continue Review
Matt Jones	09/18/2024 09:50 AM	09/18/2024 09:52 AM	DPB Review	Continue Review
WorkflowActivityService	10/16/2024 06:29 AM	10/16/2024 06:29 AM	DPB Review	Continue Review
WorkflowActivityService	10/16/2024 06:38 AM	10/16/2024 06:38 AM	DPB Review	Continue Review
WorkflowActivityService	10/18/2024 01:55 PM	10/18/2024 01:55 PM	DPB Review	Continue Review
WorkflowActivityService	10/21/2024 07:26 AM	10/21/2024 07:26 AM	DPB Review	Continue Review
WorkflowActivityService	10/29/2024 10:20 AM	10/29/2024 10:20 AM	DPB Review	Continue Review
WorkflowActivityService	10/29/2024 01:57 PM	10/29/2024 01:57 PM	DPB Review	Continue Review
Matt Jones	10/30/2024 12:22 PM	10/30/2024 12:33 PM	DPB Review	Continue Review

Matt Jones	10/30/2024 12:39 PM	10/30/2024 12:39 PM	DPB Review	Continue Review
Matt Jones	10/30/2024 12:50 PM	10/30/2024 01:02 PM	DPB Review	Continue Review
Aimie Gindi	11/04/2024 04:28 PM	11/04/2024 04:28 PM	DPB Review	Continue Review
Matt Jones	11/06/2024 09:10 AM	11/06/2024 09:11 AM	DPB Review	Continue Review
Matt Jones	11/06/2024 02:45 PM	11/06/2024 03:03 PM	DPB Review	Return to Previous Submitter
WorkflowActivityService	11/06/2024 03:03 PM	11/06/2024 03:03 PM	Return To Submitter	Return to Previous Submitter
Rob Mann	11/06/2024 03:19 PM	11/06/2024 03:20 PM	Agency Review Step 1	Return for Further Data Entry
Suzanne Gooding	11/07/2024 04:07 PM	11/08/2024 09:38 AM	Continue Drafting	Submit for Agency Review
Rob Mann	11/08/2024 12:46 PM	11/08/2024 01:13 PM	Agency Review Step 1	Ready for DPB Bulk Submit
Rob Mann	11/08/2024 01:13 PM	11/08/2024 01:13 PM	Ready for DPB Submission	Submit to DPB
			DPB Review	