CapitalBudgetRequest

Improve Research and Extension Facilities, Phase I

Overview

Agency	Virginia Cooperative Extension and Agricultural Experiment Station (229)
Project Code	none
Project Type	New Construction
Biennium	2022-2024
Budget Round	Initial Bill
Bill Version	Regular Session
Request Type	Previously Submitted
Project Location	Multiple Regions
Facility/Campus	Multiple
Source of Request	Agency Request
Infrastructure Element	Agricultural Facility

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:

The Virginia Tech Cooperative Extension/Agriculture Experiment Station agency, Agency 229, impacts are vast, diverse, and touch every sector of Virginia's economy. The innovative and applied research, education and training, and direct assistance provided to Virginians by Agency 229 have led to nationwide recognition of Virginia as a producer of superior agricultural products, better business management practices, and environmental stewardship that improves quality of life and attracts millions of tourists annually. The agency is the most substantial and wide-reaching source for production and operation research to advance and protect a variety of key industries in the Commonwealth. Ultimately, Agency 229 activity creates jobs and new investments through higher returns and profits for producers; technological innovation and new product launches for industry; billions in international exports; and talented, healthy citizens who contribute to a vibrant workforce.

Agency 229 operates a network of 11 the Agricultural Research and Extension Centers (ARECs) that are strategically positioned throughout the state to emphasize close working relationships between Virginia Agricultural Experiment Station, Virginia Cooperative Extension, and the industries they work with. The ARECs serve as program sites for producers, school groups, and the state's citizens and field-research sites and laboratories for undergraduate and graduate students. AREC faculty and staff, along with faculty based at the main campus, deliver research and extension programs at these sites, which represent the Commonwealth's diversity and take advantage of the unique characteristics and challenges found in each location.

The mission of the AREC system is to engage in innovative, leading-edge research to discover new scientific knowledge and create and disseminate science-based applications that ensure the wise use of agricultural, natural, and community resources while enhancing quality of life. Research is designed to provide knowledge that will enhance the quality of individual and family life and the social and economic vigor of Virginia. Researchers utilize the best techniques of qualitative and quantitative research to form the knowledge base for instruction of and application to the broader mission of the land-grant university. Apart from serving the needs of Virginia's animal, plant, and seafood industries, this research fosters conservation of natural resources and benefits consumers and all citizens of the state in rural, urban, and suburban communities.

In 2018, a study was conducted by VAES staff and the AREC directors and superintendents to identify strategic facility needs relative to anticipated growth and investment in support of the Agency 229 Smart Farm Innovation Network Initiative. With the median age of facilities at

some ARECs reaching over 50 years old, many existing research laboratories and supporting facilities across the ARECs are in poor condition, have surpassed their functional life expectancy, are not appropriate for conducting experiments required to respond to modern agricultural issues, and cannot support demand for the program activities.

The focus of this capital project request is on research areas in need of improved facilities to sustain and advance research supporting the Commonwealth's industries. Each AREC has minimum requirements to meet the basic needs of research/support, extension/outreach, housing, and infrastructure. This project is the initial part of a strategy to renew and expand the AREC locations to meet requirements and goals of the Smart Farm Innovation Network Initiative. This project represents the top capital project priorities as produced by the 2018 survey; in total, approximately 50,660 GSF of new construction and renovation across the ARECs. The remaining capital project priorities identified in the survey will be included in a future capital project request. This project will renovate approximately 12,160 SF and construct approximately 38,500 SF of storage, greenhouse, housing, research, and outreach facilities across the state to assist with bringing the system up-to-date and provide capacity to meet client demand for services.

The Improve Research and Extension Centers, Phase I will renew and expand 50,660 GSF of aging and deteriorating facilities at the Agricultural Research and Extension Centers around the state with a total General Fund appropriation request of $16.85 million.

Project Description:

Each AREC has minimum requirements to meet the basic needs of research/support, extension/outreach, housing, and infrastructure. This project will address the top priority infrastructure and renovation needs for ARECs across the state. The balance of the needs will be addressed in future project outlays.

- Alson H. Smith, Jr. AREC: This AREC has inadequate means by which to safely store pesticides and other chemicals, clean out sprayers and tanks, and dispose of wastewater and residual products to meet the safety requirements of pesticide storage and application. A renovation of Pesticide Building 0875 (5,400 SF) will provide this. This AREC also requires renovation to existing laboratories in Office and Laboratory 0878 (4,620 SF). The laboratory spaces are currently outdated, have been extended beyond their functional life, and are no longer able to meet the research needs of the AREC without redesign due to insufficient use of space.

- Eastern Shore AREC: Because this AREC is situated in a remote location of the state, it is difficult to find viable housing options. This is particularly the case for graduate students who spend a large portion of their time at the ARECs to conduct research and outreach activities. Providing housing options allows these extended stays to be more cost effective and allow students to conduct long term experimentation at the ARECs. Despite significant interest, undergraduate students and interns are also unable to contribute to the work of this AREC due to the lack of housing available. A new housing unit (3,000 SF) will provide graduate students housing options necessary for on-site field research.

- Eastern Virginia AREC: Due to its small size, this AREC cannot easily engage with or host stakeholder groups and the local community, which is one of its primary functions through the Virginia Cooperative Extension. A renovation to Experiment Building 0880 (900 SF) will provide this space, as well as more efficient 'dirty' lab space, more functional restrooms, and usable office space for personnel currently utilizing a large workroom for their office. This AREC also has inadequate areas for handling and processing seed materials; a seed drying addition to Building 0884 (200 SF) is required to fulfill the research goals of this AREC.

- Hampton Roads AREC: Controlled environment growth facilities are a critical component of the research program in a number of rapidly evolving fields supporting greenhouse and nursery producers, the pest management industry and vertical farming. State-of-the-art plant growing facilities ares necessary for researchers to remain current with industry partners and find innovative solutions to current world problems. This AREC requires a new Smart Greenhouse (3,500 SF) equipped with advanced technology and complete environmental control (BSL-2) as a critical feature of the AREC's work with the SmartFarm Innovation Network™.

- Middleburg AREC: This AREC's primary research and outreach revolves around animal-based programs. A new Animal Teaching/Outreach Facility (8,200 SF) is necessary to support ongoing animal management, extension programs, and data collection. Since the only indoor facility large enough for outreach programming is the AREC's garage and workshop building, a new multi-use, multi-level building with classroom seating, clinical lab space, and an indoor demonstration area is necessary. This facility will house the relocated equine treadmill, clearing the way for demolition of an old barn that is beyond its useful life.

- Reynolds Homestead FRRC: The existing laboratories at this AREC are in poor condition and are not suitable for conducting appropriate experiments. A renovation of this laboratory area, Building 1030 Basement (1,240 SF), is necessary to fulfill the research goals of this AREC.

- Southern Piedmont AREC: Controlled environment growth facilities are a critical component of the research and extension program. Having state-of-the-art plant growing facilities is necessary for researchers to remain current with industry partners and find innovative solutions to current world problems. This AREC requires a new BSL-2 Smart Greenhouse (3,000 SF) to more actively engage in the SmartFarm Innovation Network™, vertical farming, and production for hemp, vegetables and other specialty crops.

- Shenandoah Valley AREC: Due to the increasing size of agricultural equipment and the diverse nature of activities and programs at this AREC, it is necessary to have a new Multi-Purpose Building (7,500 SF) that includes large volume shed space available with conditioned office space, restroom facilities for farm staff and visitors to the historic McCormick Farm, and temperature-controlled facilities for sick calves needing warming in some limited animal pens. Such a facility would also allow for occasional large educational events and meetings to be held

indoors, which is not currently possible and has severely limited programming in the past.

- Southwest Virginia AREC: This AREC's primary research and outreach revolves around animal-based programs. Expanded livestock space (2,750 SF and 2,350 SF) is necessary to support ongoing animal management, extension programs and data collection. This covered livestock shed space would allow for better management of feeding trials, drier areas for more animals to be utilized on test, and allow for easier cleanout and sanitation during, and after tests are completed. These facilities would also improve accommodations for added SmartFarm Innovation Network™ technology equipment for livestock that could be added in the future.

- Tidewater AREC: Due to the increasing size of agricultural equipment and the diverse nature of activities and programs at this AREC, it is necessary to have a new Multi-Purpose Building (8,000 SF) that includes large volume shed space available with conditioned office space and restroom facilities for farm staff.

The collective items above represent an overall strategy to improve top priority projects across the full portfolio of AREC facilities and sites, bringing these portions of the system up to current standards and providing room for growth in new areas of study. New facilities will be flexible and open to the fullest extent for maximum configurability and to meet future needs for the ARECs and the Commonwealth. In total, this project includes multiple facilities across numerous sites across the Commonwealth that total approximately 50,660 gross square feet.

The project scope, site development, and building configuration of this project is consistent with the 2018 master plan update and include universal accessibility design principles as appropriate.

Justification

Program Description:

The Virginia General Assembly established the Virginia Agricultural Experiment Station (VAES) on March 1, 1886, in anticipation of the Federal Hatch Act of 1887, which created a network of state agricultural experiment stations nationwide as part of the land-grant higher education mission. This system links experiment station research to cooperative extension programs and college academic programs. The State Agricultural Experiment Stations were charged with conducting research and development projects on behalf of farmer, in forestry, animal health and disease, and multistate research programs.

Today, VAES research projects and activities encompass the work of more than 350 scientists in five colleges at Virginia Tech: College of Agriculture and Life Sciences, College of Natural Resources and Environment, College of Liberal Arts and Human Sciences, College of Science, and Virginia-Maryland College of Veterinary Medicine. The VAES research network also includes 11 field stations located throughout the state. Known as Agricultural Research and Extension Centers, these field stations and emphasize the close working relationships between the Virginia Agricultural Experiment Station and Virginia Cooperative Extension.

VAES research directly supports agriculture, the state's largest industry, accounting for one in every five jobs and providing an economic impact of approximately $70 billion annually with an additional annual contribution from the Forest Products industry of approximately $21 billion.

While VAES's mandate is to support Virginia citizens through research that will have positive economic impact, VAES's goal is to conduct research programs that will enhance the quality of life for all people. The mission of the Virginia Agricultural Experiment Station is to perform basic and applied research on agricultural, environmental, natural, and community resource issues related to the future needs of Virginia, the region, the nation, and the world.

Research is designed to provide knowledge that will enhance the quality of individual and family life and the social and economic vigor of Virginia. Researchers utilize the best techniques of qualitative and quantitative research to form the knowledge base for instruction of and application to the broader mission of the land-grant university.

Apart from serving the needs of Virginia's animal, plant, and seafood industries, VAES-supported research fosters conservation of natural resources and benefits consumers and all citizens of the state in rural, urban, and suburban communities. Discoveries resulting from VAES-supported research have facilitated economic development in the state in the form of start-up companies located in Virginia Tech's Corporate Research Center. In addition, the VAES research programs include numerous activities in the international arena.

VAES supports research faculty in a wide range of disciplines in projects located at Virginia Tech and across the Commonwealth, often in collaboration with Virginia Cooperative Extension, National Institute of Food and Agriculture, and other state and federal agencies.

VAES faculty are located at 11 Agricultural Research and Extension Centers and within the College of Agriculture and Life Sciences, the College of Natural Resources and Environment, and the Virginia-Maryland College of Veterinary Medicine at Virginia Tech. AREC faculty and staff, along with faculty based at the main campus, deliver research and extension programs at these sites, which represent the Commonwealth's diversity and take advantage of the unique characteristics and challenges found in each location. The ARECs serve as program sites for producers, school groups, and the state's citizens and as field-research sites for undergraduate and graduate students.

The existing AREC facilities do not support demand for the program activities and require improvements and expansion. This project will help bring the system up-to-date and provide capacity to meet client demand for services. Each AREC has minimum requirements to meet the basic needs of research/support, extension/outreach, housing, and infrastructure. This project contains several projects to meet or exceed

minimum requirements for the four basic programmatic needs at each AREC.

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

• Increase extramural research expenditures.
• Achieve top US public land-grant ranking.
• Increase graduate student enrollment.
• Advance the rural Virginia initiative.
• Increase and sustain excellence in research, discovery, and creativity.
• Increase institutional impact and visibility.
• 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.

Existing Facilities:

In 2018, a study was conducted by Virginia Agricultural Experiment Station staff and the AREC directors and superintendents to identify strategic facility needs relative to anticipated growth and investment in support of the Agency 229 Smart Farm Innovation Network Initiative. This capital project request identifies needs for renovation and/or expansion at the AREC sites.

This project will help bring the AREC system up-to-date and provide capacity to meet client demand for services. With the median age of facilities at some ARECs reaching over 50 years old, many existing research laboratories and supporting facilities across the ARECs are in poor condition, have reached their functional life expectancy, are not suitable for conducting experiments required to respond to modern agricultural issues, and cannot support demand for the program activities. The ARECs have inadequate means to meet safety requirements, conduct appropriate experiments, and support their ongoing research and extension programs. This project represents only the top priorities; the balance of the needs will be addressed in a future system-wide project.

Overall, the agency's research facilities are deteriorated and require repair or replacement to continue providing Virginia industries invaluable information. Without these facilities, education and development of the next generation of leaders would not be possible. Moreover, failure to support and grow the growing industries across the Commonwealth would negatively impact the financial stability of the economy.

Funding Plan:

The program for this project is 100 percent Educational and General for the Cooperative Extension/Agricultural Experiment Station improvement project; thus, the funding plan calls for 100 percent General Fund support for this $16.85 million project.

Options Considered:

Options considered and not selected include elimination or reduction of the research programs and deferring the project to a future biennium. Elimination or reduction of the programs is not feasible because of the significant negative impact to the program's support to industry and government. Deferring the project is not recommended because the facilities are no longer in a position to adequately support the research programs.

Methodology

Cost Explanation and Methodology:

A. Methods Used to Estimate Costs:

The method for estimating costs for the System-wide AREC Improvements project includes: 1) using unit costs in the Division of Engineering and Building's Construction Costs Database updated May 2020 with a regional market multiplier and a multiplier for soft costs; and 2) comparables as shown in the CR-1; 3) cost data from the College based upon site specific knowledge through the Renovation process. These methods are escalated to a construction midpoint of 2025 at 4.25 percent escalation in accordance with the instructions for developing the Six-Year Capital Outlay Plan 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 (as of July 2021).

On a total project cost basis, inclusive of design, construction, and equipment, the unit costs are $333 per gross square foot. The unit construction costs of the project are $244 per gross square foot, including self-performed construction work. The building types in this request are wet laboratory, dry laboratory, and classroom spaces in the Division of Engineering and Building's Virginia Construction Costs Database.

The university's project cost estimates are 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. The estimate also includes the cost of technology, specialized instruction, and energy efficiency goals of the institution.

Design-Bid-Build is the intended delivery method for this project.

B. Due to the similar nature of the subprojects included in this project, this section is combined and chiefly speaks to the increased expenses to manage multiple projects located in different geographic regions of the Commonwealth.

1) This capital project has packaged many smaller projects in multiple locations around the Commonwealth with some unique construction types. To make the projects attractive to the contracting community, the university will package similar types of construction in a geographic area resulting in many bid packages that will combine to deliver this entire capital project.

2) Multiple bid packages will increase the bidding services required by the A/E thus increasing the soft costs for the project.

3) The university will not realize economy of scale when constructing smaller buildings with specific needs such as smart greenhouses, seed drying facility, pesticide handling facilities, and multiple other agricultural centric facilities. This will increase the construction costs.

4) Each bid package and/or geographic location will require full time management by the General Contractor thus increasing the total quantity of contractor management across the entire capital project. This will increase the construction costs.

5) Each geographic location will require DEQ permitting. This will impact costs to both the construction line item as there will be a greater percentage of general condition as compared to one larger project at one geographic location. Due to the expenses associated with travel times for Virginia Tech forces we intend to use third party inspectors to ensure compliance with DEQ regulations. This will increase soft costs for DEQ related expenses.

6) The AREC projects that are remote from main campus will require increased third party clerk of the works inspections thus increase soft costs. Utilizing third party inspection in lieu of Virginia Tech forces will be more economical than the expenses associated with travel times from main campus.

7) Establishing utility connections for potable water, sewer, natural gas, electricity and internet to server the new facilities will increase the cost beyond a standard square footage estimation.

Funding Request

Phase	Year	Subobject	Fund	Amount
Full Funding	2023	2322 - Construction, Buildings	01000 - General Fund	$16,850,000
			Total	$16,850,000

Project Costs

Cost Type	Requested Funding
Acquisition Cost	$0
Building & Built-in Equipment	$12,343,449
Sitework & Utility Construction	$0
Construction Cost Total	**$12,343,449**
DESIGN & RELATED SERVICE ITEMS	
A/E Basic Services	$1,092,395
A/E Reimbursables	$7,407
Specialty Consultants (Food Service, Acoustics, etc.)	$16,046
CM Design Phase Services	$18,515
Subsurface Investigations (Geotech, Soil Borings)	$64,186
Land Survey	$3,703
Archeological Survey	$0
Hazmat Survey & Design	$247
Value Engineering Services	$22,218
Cost Estimating Services	$3,703
Other Design & Related Services	$60,483
Design & Related Services Total	**$1,288,903**
INSPECTION & TESTING SERVICE ITEMS	
Project Inspection Services (inhouse or consultant)	$319,695
Project Testing Services (conc., steel, roofing, etc.)	$91,342

Inspection & Testing Services Total	**$411,037**
PROJECT MANAGEMENT & OTHER COST ITEMS	
Project Management (inhouse or consultant)	$342,186
Work By Owner	$72,826
BCOM Services	$11,109
Advertisements	$7,406
Printing & Reproduction	$7,406
Moving & Relocation Expenses	$4,937
A/V Cabling	$0
IT Cabling	$0
Telephone Cabling	$0
A/V Equipment	$0
IT Equipment	$156,762
Telephone Equipment	$0
Signage	$37,030
Demolition	$0
Hazardous Material Abatement	$1,234
Utility Connection Fees	$62
Utility Relocations	$3,703
Commissioning	$69,123
Miscellaneous Other Costs	$275,259
Project Management & Other Costs Total	**$989,043**
Furnishings & Movable Equipment	$1,245,397
Construction Contingency	$572,171
TOTAL PROJECT COST	**$16,850,000**

Size and Scope

Cost Type	Unit of Measure	Units	Cost Per Unit
Acquisition Cost		0	$0
Construction Cost	GSF	50,660	$244
Total Project Cost	GSF	50,660	$333

Operating and Maintenance Costs

Cost Type	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
GF Dollars	$0	$0	$333,185	$343,180	$353,476	$364,080
NGF Dollars	$0	$0	$0	$0	$0	$0
GF Positions	0.00	0.00	3.94	3.94	3.94	3.94
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
AREC Facilities Master Plan - FINAL 4.23.19.pdf	23,162,119	Cassidy Limer	9/21/2021	
Improve ARECs Map 11.2020.pdf	705,872	Cassidy Limer	9/21/2021	
Improve ARECs Program Chart 9.2021.pdf	135,388	Cassidy Limer	9/22/2021	

229-1 CR-1 AREC Priorities 9.20.21.xlsx	578,656	Rob Mann	9/22/2021	

Workflow History

User Name	Claimed	Submitted	Step Name	Submit Action
Cassidy Limer	09/21/2021 10:01 AM	09/21/2021 10:01 AM	Enter Capital Budget Request	Continue Working
Cassidy Limer	09/21/2021 10:01 AM	09/21/2021 03:10 PM	Continue Drafting	Continue Working
Cassidy Limer	09/22/2021 09:38 AM	09/22/2021 01:43 PM	Continue Drafting	Submit for Agency Review
Rob Mann	09/22/2021 04:54 PM	09/22/2021 05:21 PM	Agency Review Step 1	Ready for DPB Bulk Submit
Rob Mann	09/23/2021 04:45 PM	09/23/2021 04:45 PM	Ready for DPB Submission	Submit to DPB
			DPB Review	