CapSix Database

# Construct Human & Agricultural Biosciences Building I & II

project 1 of 1

**Virginia Cooperative Extension and Agriculture Experiment Station (229)**

## General Information

Project Type: New Construction Project Code: 17681 Start Year: 2011

Agy Priority: 2 Location: Southwest Facility:

Building #: Building Name:

Building Function: Higher Education - Academic

Is this an Umbrella Project? No OR a higher education blanket project? No

Projected time to submit working drawings: 2 months

Projected time to occupy facility or complete project: 28 months

Projected time to award construction contract: 4 months

Included in the existing Six Year Capital Plan Yes

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## Agency Narrative

**Description**

The Human and Agriculture Biosciences Building project was a University top priority request in the 2008 budget session, and the state placed it in the tier two funding section of Chapter 1, 2008 with $2.04 million of detail planning funds. The planning funds have been allotted under project code 17681 and schematic design is nearly complete. Under the planning work, the University has determined with a high degree of confidence that the originally envisioned building of approximately 92,500 gross square feet (GSF) may be accomplished for the originally proposed total budget of $54.275 million, including the $2.04 million of planning funds authorized in Chapter 1.

The proposed construction is a state-of-the-art laboratory facility to meet the current demands of biological systems engineering and food science and technology research and discovery. New technologies, such as genetic engineering, biotechnologies, and information technologies, are revolutionizing agriculture, the life sciences, and other natural resources. The laboratory facilities at Virginia Tech are not sufficient to meet the demands of this rapidly evolving area; thus, a new, modern laboratory is needed. The life expectancy of the proposed project is approximately 80 years with proper maintenance.

The project scope takes the next step in realizing the college's and universities strategic goals to address future issues affecting Virginians, the nation and the global society. These needs have resulted in a focused effort in the life sciences with emphasis areas in (1) infectious diseases; (2) food, nutrition, and health; (3) bio-design and bio-processing (including, bio-renewable energy); (4) community viability; (5) agricultural profitability and efficiency of production, environmental sustainability; and (6) specialty crop agriculture. Work in these areas has and is expected to result in significant advances in research and education in biochemistry, genetics and genomics, bioengineering, molecular biology, biomaterials, biotechnology, nanoscience, biomedical engineering, and proteomics. These areas

will have profound impacts on human health issues (obesity, disease prevention and management) and upon energy independence and quality of life. Virginia Tech is uniquely positioned to tie innovative discoveries in the laboratory to practical programs delivered to citizens through Virginia Cooperative Extension.

The Human and Agriculture Biosciences Building project is listed in the state's capital plan as Phases I and II in Chapter 46 (2009) for the full 92,500 GSF project, which is currently under design. This project will meet the intent and be programmatically consistent with the original project proposal that justified the planning funds. The project is on schedule for a October 2010 construction start date, and the University is requesting authorization and funding in the 2010 budget session to move the entire project (Phases I and II) to the construction phase to continue an efficient project implementation.

**Justification**

Program Description:
The frontier of agriculture research exists at the molecular scale. Increasingly, research in genomics, microbiology, bacteriology, and immunology are driving the development of new approaches to solving problems that impact human and animal health, agricultural production, and the environment. The availability of state-of-the-art research facilities that can support interdisciplinary teams will enhance the quality and quantity of research in the food science, bioprocessing and conversion of biomass to food, fiber, feed and other value-added materials such as biofuels. Biotechnology has made significant strides in the past two decades. The human genome and genomes of some bacteria, yeasts, and plants have been sequenced. There is now a drive to relate the genome to genetic diseases, improve crop yields, enhance the use of crops for pharmaceutical purposes, biofuels, and industrial proteins and develop better products for the market place. Directed evolutionary methods are being developed to improve enzyme production; thus, improving the production of fuels and chemicals from renewable biomass resources, functional foods, and biopharmaceuticals.

Federal agencies such as National Institutes of Health, National Science Foundation, and the U.S. Department of Energy favor funding interdisciplinary research teams rather than single investigators examining a limited area of a problem. Virginia Tech has a unique capability to develop interdisciplinary teams and connect laboratory based research with practical applications through the Experiment Station. In this way, "test-tube" technologies can be developed, implemented, refined, and then distributed with significant impact on the lives of citizens.

Five biomedical research areas in which Virginia Tech has existing strengths have been identified as the focus of future Experiment Station research: (1) Molecular and cellular regulation, including cell cycle, cell structure and biochemistry, and cell signaling; (2) genomics science, including functional genomics and proteomics, computational genomics and comparative genomics; (3) infectious disease and immunology, including biology of the microbe, host responses, vaccines, therapeutics and diagnostics; (4) neuroscience, including central nervous system neurotoxicology and neurodegeneration, environmental neurotoxicology, molecular neuroscience, and cognitive, affective, behavioral neurosciences; and (5) public health sciences, including food, nutrition and health, chronic disease prevention, and environmental health. Significant research and discovery in these five focus areas will lead to advances in medical treatments, pharmaceuticals and control of infectious diseases across the globe and impact the quality of life for people in developed and developing nations.

The faculty of Virginia Tech include a diverse expertise in crop production, genetic engineering, bioprocessing engineering, biotechnology and resources economics. The faculty expertise enable to the coupling of scientific and engineering progress with economic analysis of process technologies. This approach identifies specific unit operations for efficient utilization of limited resources and makes the entire process economically and technically feasible. Thus, Virginia Tech is in a unique position to establish the necessary facilities to successfully support a Biodesign and Bioprocessing Research Center at Virginia Tech. The pilot scale development of bioproducts is usually very costly and it is potentially the stage where a many startup companies fail. The proposed research building will enable the development of pilot scale facilities and provide training for startup companies so that discoveries can be thoroughly evaluated and their commercial viability assessed without the expense of building such facility from scratch. We believe that the establishment of such a facility at Virginia Tech will facilitate the rapid commercialization of biotechnology products in Virginia. To our knowledge no such facility exists in the Commonwealth of Virginia.

Our goal is to reshape the agricultural, biochemical, and biopharmaceutical industries in a sustainable manner by combining the scientific and engineering intellectual talents of faculty with the practical delivery of new technologies. These activities will contribute to the agribusiness of the Commonwealth while furthering the University's goal of reaching the top tier of research universities in the country.

Further, the Food, Nutrition, and Health initiative has been under development through the Experiment Station since 1997. The Food, Nutrition, and Health (FNH) faculty advisory committee has promulgated a vision and mission of the FNH initiative: "promote and protect the public's health through scientific discovery and information dissemination". The mission will be accomplished using advanced technologies from the development of new foods, improved

nutrition, food safety, and the adoption of health-promoting behaviors to prevent illness and reduce health costs. Virginia Tech has significant strength in this area, and there are substantial and expanding opportunities for research and external funding related to this health problem. New faculty, attracted by Virginia Tech's strategic combination of food, nutrition, and health programs, hired within the last year have already begun to establish a solid research foundation with significant established research programs in obesity issues. Laboratory based research, conducted by nationally renowned biosciences researchers, will connect advances at the microbiological level with food production, food delivery and consumption, and improved human health and well-being.

The mission statement of Virginia Tech as a public land-grant University serving the Commonwealth of Virginia, the nation, and the world community includes discovery and dissemination of new knowledge central to its mission. Through its focus on teaching and learning, research and discovery, and outreach and engagement, the University creates, conveys, and applies knowledge to expand personal growth and opportunity, advance social and community development, foster economic competitiveness, and improve the quality of life.

The University's strategic plan includes three scholarship domains: Learning, Discovery, and Engagement; and three Foundational Strategies: Development of the Organization, Investment in the Campus Infrastructure, and Effective Resource Development, Allocation, and Management. This project supports several key domains and strategies of the strategic plan, and the specific goals of each area addressed by this project are listed below.

Learning: (1) Increase student involvement in discovery and engagement by creating more opportunities for undergraduates to be involved in research capstone experiences, education abroad, and experiential learning; (2) Invest in departmental and university-level support for undergraduate education; (3) Enhance quality graduate and professional education; (4) Establish a graduate education portfolio reflective of a 21st century university; (5) Contribute to the holistic and transformative educational experiences of Virginia Tech undergraduate and graduate students; and (6) Improve the capital assets that underpin student learning and support programs.

Discovery: (1) Strengthen research activities with a focus on the environment; (2) Establish research strengths in the study of infectious disease; (3) Establish research strengths in the study of health, food, and nutrition; and (4) Achieve research strength in the areas of innovative technologies and complex systems through the strategic integration and support of critical research areas.

Engagement: (1) Connect the University's discovery, learning, and engagement assets through partnerships with both the public and private sectors to advance the economic vitality of the commonwealth and the quality of life of its citizens; and (2) Engage students, at the undergraduate and graduate levels, in opportunities for service learning and experiential education that prepare them to serve a diverse and complex marketplace and society while building the capacity of communities.

Foundational Strategies: (1) Effectively manage the University's space and land resources for learning, living, and work; and (2) Enhance health, safety, and security operations to support the University's discovery, learning, and engagement endeavors.

In summary, the proposed construction is a state-of-the-art laboratory facility to meet the current demands of animal and plant science research and discovery. New technologies, such as genetic engineering, biotechnologies, and information technologies, are revolutionizing agriculture, the life sciences, and other natural resources; which a new facility will allow the college and its departments to fully realize its potential in these areas.

Existing Facilities:
With the exception of a couple modern laboratories, the laboratory facilities at Virginia Tech are not sufficient to meet the demands of this rapidly evolving area; thus, a new, modern laboratory is needed. The majority of Virginia Tech's existing laboratory spaces for biosciences research around the Agriculture Quad include the following buildings: Agnew Hall (1940), Hutcheson Hall (1940), Price Hall (1907), Saunders Hall (1931), Seitz Hall (1940) and Smyth Hall (1939.) These buildings were all constructed prior to World War II, are obsolete for the advanced research activity needed to support the modern agriculture industry, and are too costly to renovate or upfit to support modern biosciences laboratory work. The task of bringing these structures up to 21st century building codes as research facilities would be very expensive and would not contribute to recruitment, retention, and research productivity. The costs of building upgrades, utility enhancements, and installation of research equipment such as chemical hoods, will exceed the cost of a new facility and, because of size limitations, would still not provide a facility adequate for the needs of future research in the biosciences. The University has future facility plans to renovate these buildings to support other programs that do not require intensive research laboratories.

Three other biosciences facilities located outside the Agriculture Quad, including Engel Hall (1961), the Food Science and Technology complex (1952, 1965, 1968), and Wallace Hall (1969), share many of the same concerns with the buildings in the nearby Agriculture Quad. Although these facilities may require less structural renovations, their overall

design reflects the research needs from 40 years ago and, like the Agriculture Quad buildings, replacement is likely to cost less than extensive renovation for modern research activity. The University may raze one of the existing buildings described above if the proposed project is funded.

Funding Plan:
The total project cost estimate of the proposed 92,500 gross square foot laboratory is $54.275 million. This request is to fully fund the balance of the project budget (net $52.235 million) to provide the complete laboratory requirements of the Experiment Station. The request is for 100 percent General Fund support because, based on the historic state mission of the Experiment Station, the agency does not generate nongeneral fund revenue to support capital projects. Thus, the state has addressed the cost of research facilities for the agency.

**Options Considered**

Other options considered but not selected include leasing, renovating existing space, or delaying the project entirely. Constructing a new facility is the selected option because of the significant and unique facility demands required to support the agricultural and life sciences programs slated to occupy the facility. Delaying the project to a future biennium is not a viable option for the Experiment Station because, without the near term availability of modern research facilities, the college will miss the opportunity to participate in new, ground-breaking interdisciplinary research in the life sciences, agriculture, and public health.

**Costing Methodology**

The costs are based on schematic design cost estimates from professional consulting services. Virginia Tech has secured the services of Lord Aeck Sargent to perform architectural and engineering design services for the construction of a new facility to house a series of research laboratories, graduate student research spaces, faculty offices, and pilot plant high bay spaces. The program is currently in the schematic design phase and has recently improved the program and space while remaining within the project budget of $54.275 million. The University is currently in the competitive negotiation phase of selecting a Construction Manager for this project to ensure the project meets the programmatic goals of the University. 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.

**Project Costs**

| | |
|---|---|
| 1. Aquisition of Property: | $0 |
| 2. Acquisition of Plant | $0 |
| 3. Building and Built-in Equipment | $39,300,000 |
| 4. Sitework and Utilities | $3,380,000 |
| 5. Architectural and Engineering Fee | $4,123,000 |
| 6. Loose Furnishings and Equipment | $2,170,000 |
| 7. Contigencies | $755,000 |
| 8. Project Inspection | $1,030,000 |
| 9. Other Costs | $3,517,000 |
| **Total Cost** | **$54,275,000** |

The following items (10, 11, 12) are included in above costs

| | |
|---|---|
| 10. Estimated Total Planning Costs: | $3,962,000 |
| 11. Estimated New Construction Costs: | $44,957,000 |
| 12. Estimated Improvements Costs: | $0 |

**Itemized "9. Other Costs"**

| | |
|---|---|
| 1. Project Management In Capital Project Budget: | $53,000 |
| 2. Special Consultants (if not included in A & E fees): | |
| A. Scheduling Consultant | $0 |

| | |
|---|---|
| B. HVAC Commissioning | $215,000 |
| C. Furniture Design | $0 |
| 3. Asbestos and lead based paint survey and design: | $0 |
| 4. Asbestos abatement: | $0 |
| 5. Independent Cost Estimates: | $0 |
| 6. Value engineering | $0 |
| 7. Subsoil investigations: | $85,000 |
| 8. Construction testing services: | $295,000 |
| 9. Printing | $0 |
| 10. Advertisements | $3,000 |
| 11. Work by owner | $1,997,000 |
| 12. Signage | $43,000 |
| 13. Miscellaneous utility charges | $0 |
| 14. Moving expenses | $0 |
| 15. Miscellaneous other costs (itemize): | A. Native Stone $305,000 |
| B. Review Process | $19,000 |
| C. Other | $502,000 |
| D. _____ | $0 |

**Operating and Maintenance Costs**

| | 1st Year | 2nd Year | |
|---|---|---|---|
| 1. Personal Services | | | $277,532 |
| 2. Nonpersonal Services | $370,043 | $814,827 | $1,086,436 |
| 3. Equipment | $50,000 | $7,500 | |
| **Total O and M** | **$1,142,359** | **$1,463,979** | |
| 4. FTE Employees: | 9.00 | 9.00 | |
| 5. One Time Costs: | $42,500 | $0 | |
| 6. Cost Savings | $0 | $0 | |
| 7. FTE Savings | $0 | $0 | |

8. Planned start date of new O and M costs (if different than the beginning of the fiscal year): 2012-10-01 00:00:00.0

**Funding Requests**

| F Year | GF | NGF | Tax Debt | 9c Debt | 9d Debt | Total Request |
|---|---|---|---|---|---|---|
| 2011 | $52,235,000 | $0 | $0 | $0 | $0 | $52,235,000 |

Funding Phase: Construction

**Prior Funding**

| Biennium | Appropriation Act | Act Item | Funding Source | Project Code | Amount |
|---|---|---|---|---|---|
| 2008-10 | Chapter 1 | Enactment 3 - Sec. 1 | General Fund | 17681 | $2,040,000 |

**Project Scope**

1. Acquisition - Property: 0 Sq. Ft. / Acres — Cost per Sq. Ft. or Acre: n/a

| | | | | | |
|---|---|---|---|---|---|
| 2. Acquisition - Plant | 0 | Sq. Ft. | Cost per Sq. Ft. | n/a |
| 3. New Construction | 92,500 | Sq. Ft. | Cost per Sq. Ft. | $486 |
| 4. Improvements | 0 | Sq. Ft. | Cost per Sq. Ft. | n/a |
| 5. Capacity | 0 | Beds/Units | Cost per bed/unit | n/a |

**Capital Lease**

Name of Lessor:

Space Requirements:

Need for Leased Space:

Time Period

Proposed Effective Date of Lease: Proposed Duration: months

Include Periodic Renewal: No Renewal at option of: Renewal Extension Period: months

Lease payments that would be made during the six year capital planning period

| Fund | Year1 | Year2 | Year3 | Year4 | Year5 | Year6 |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| *subtotals* | $0 | $0 | $0 | $0 | $0 | $0 |

Total lease payments for six year period: $0

Total payments for the duration/terms of the lease:

**Energy Component**

Energy Component Description

Annual Energy Operating Costs by Energy Type and Fund Source

| Energy Type | Fund Source | Cost |
|---|---|---|
| | | |
| | Total | $0 |

Cost Estimate for Energy Component

| Subcomponent | Cost |
|---|---|
| Materials Cost | $0 |
| Labor Cost | $0 |
| Engineering & Design Cost | $0 |
| Total | $0 |

Annual Cost Savings for Energy Component

| Fund | Savings |
|---|---|
| | $0 |
| Total | $0 |

PID: 5840