

Contact: Sheila Doyle

REGISTER OF IOWA STATE UNIVERSITY
CAPITAL IMPROVEMENT BUSINESS TRANSACTIONS

Actions Requested: Consider approval of:

1. Permission to utilize the services of a construction manager (CM) and to begin the selection process for the **Chemistry Facilities** project.
2. Permission to consider the use of a construction-manager-agent (CM) delivery system for the **Biorenewables Complex** project.
3. For the **New Century Farm** project, a major capital project as defined by Board policy.
 - a. Acknowledge receipt of the University's final submission of information to address the Board's capital project evaluation criteria (see Attachment A);
 - b. Accept the Board Office recommendation that the project meets the necessary criteria for Board consideration; and
 - a. Approve the project description and budget (\$19 million) and the schematic design for the Bio-Processing Research Laboratory component, with the understanding that this approval will constitute final Board approval and authorization to proceed with construction.

Executive Summary: The **Chemistry Facilities** project would construct a 100,000 net square foot chemical sciences building adjacent to Gilman Hall to provide state-of-the-art teaching and computer laboratories, classrooms, and other areas, and upgrade and expand existing research and computer laboratories, classrooms, and office areas to support modern instruction and research. Given the scope and complexity of the project, the University wishes to utilize a construction manager (CM) to serve as its agent in coordinating and managing multiple prime contractors to complete the project. The University reports the use of a CM on this project is expected to provide many benefits, including expertise in construction means and methods, current material and labor costs, material availability, and industry workload; CM oversight would optimize the balance between construction cost, quality and schedule.

The University is considering the use of CM for the **Biorenewables Complex** project (formerly named Agricultural and Biosystems Engineering), which would construct a new facility to consolidate the Department of Agricultural and Biosystems Engineering, the Office of Biorenewable Programs and 10 to 12 research teams, and the Engineering Policy and Leadership Institute. The project would include multiple components, and possibly the construction of multiple buildings on a single site with concurrent construction schedules. Construction of the Biorenewables Research Laboratory component received funding from the 2007 General Assembly. While still under evaluation, the University reports the use of a CM as its agent in coordinating and managing multiple prime contractors would provide flexibility in packaging and bidding the work to ensure all commitments are met and all phasing schemes are feasible and cost effective. The University will determine the feasibility of utilizing a CM for the project as it better defines the project scope, schedule, and phasing. If the University decides to utilize a CM firm, it would request Executive Director authorization to proceed with the advertisement for CM services.

The **New Century Farm** project would establish the first integrated and sustainable biofuel feedstock demonstration farm in the United States. The Farm would serve as a model for American biorenewable energy and bioproducts production, and would demonstrate the transformation of agriculture to become feedstock ready. The Farm would be located at the site of the Agricultural and Biosystems Engineering and Agronomy Research Farm located west of Ames on Highway 30. (A location map is included as Attachment B.)

The emerging bioeconomy and emphasis on bio-renewable fuels and bioproducts produced from biomass (crop residues and cellulosic crops) provide the opportunity to develop new industries, diversify agriculture, and attract the development of biorefineries. All require the development of new crops (to complement corn and soybean production), and new cropping systems, to produce the type and quantities of feedstocks needed by this industry. The Bio-Processing Research Laboratory, the central focus of the New Century Farm, would provide dedicated areas for biochemical, bioprocessing and thermochemical research for development of the necessary technologies for this initiative. Several smaller steel farm structures (for pre-processing, biomass storage, and equipment) would also be constructed at the farm.

The project would support: 1) research, by bringing together scientific expertise to address biomass cropping systems, biofuel processing, logistics of biomass supply, and positive environmental effects; 2) teaching, by providing a research lab and training resource for training future scientists, producers and extension experts; and 3) extension, by demonstrating to producers, policymakers, and the public, the economic, social and environmental viability of biorenewable energy and bioproducts production.

The project budget of \$19 million would be funded by private and federal funds (\$11,014,475), the Small Business Administration (\$3,671,525), the Iowa Values Fund (\$3,314,000), and capital appropriations (\$1,000,000). The University reports that proceeding with the construction project is contingent upon the receipt of the state and federal funding.

Details of Projects:

Chemistry Facilities

Project Summary

	<u>Amount</u>	<u>Date</u>	<u>Board Action</u>
Report on University's Capital Request		Nov. 2005	Received Report
Initial Review and Consideration of Capital Capital Project Evaluation Criteria		May 2006	Received Report
Permission to Proceed		May 2006	Approved
Use of Construction Manager		Aug. 2007	Requested

Biorenewables Complex (formerly Agricultural and Biosystems Engineering)

Project Summary

	<u>Amount</u>	<u>Date</u>	<u>Board Action</u>
Initial Review and Consideration of Capital Capital Project Evaluation Criteria		Sept. 2006	Received Report
Permission to Proceed		Sept. 2006	Approved
Use of Construction Manager		Aug. 2007	Requested

New Century Farm

Project Summary

	<u>Amount</u>	<u>Date</u>	<u>Board Action</u>
Initial Review and Consideration of Capital Project Evaluation Criteria		March 2007	Approved
Permission to Proceed		March 2007	Approved
Program Statement		July 2007	Not Required
Final Review and Consideration of Capital Project Evaluation Criteria		Aug. 2007	Requested
Schematic Design for Bio-Processing Research Laboratory		Aug. 2007	Requested
Project Description and Total Budget	\$ 19,000,000	Aug. 2007	Requested

The schematic drawings for the Bio-Processing Research Laboratory, the main facility at the New Century Farm, are included as Attachments C through F. The Bio-Processing Research Laboratory would include separate areas dedicated to biochemical, bioprocessing, and thermochemical research. Support areas for these functions would include chemical, storage and grinding areas to the west, and research laboratories to the east. The offices and public entrance and waiting area would be located at the far east end of the building. The facility would consist of a pre-engineered steel structure with metal roofing and siding, and block or stone accents.

The square footages in the schematic design are identical to those in the approved building program.

Detailed Building Program

	<u>Program</u>	<u>Schematic</u>	
<u>Bio-Processing Areas</u>			
Bio-processing	2,857	2,857	
Biochemical	2,856	2,856	
Thermochemical	2,856	2,858	
Office Suite	3,165	3,165	
Laboratories (3)	1,969	1,969	
Grinding	871	871	
Storage	683	683	
Chemical	<u>634</u>	<u>634</u>	
Total Net Assignable Space	15,891	15,891	nsf
Anticipated Gross Square Feet	23,370	23,370	gsf

Anticipated Net-to-Gross Ratio = 68 Percent

Project Budget

Construction	\$ 6,291,940
Professional Fees	1,364,840
Movable Equipment	57,860
Contingencies	<u>11,285,360</u>
TOTAL	<u>\$ 19,000,000</u>
Source of Funds:	
Private Giving/Federal Funds	\$ 11,014,475
Small Business Administration	3,671,525
Iowa Values Fund	3,314,000
Capital Appropriation	<u>1,000,000</u>
TOTAL	<u>\$ 19,000,000</u>

The University anticipates beginning construction in the late fall of 2007 for completion in the fall of 2008.

New Century Farm
Evaluation Criteria

Since the project meets the Board's definition of a major capital project, the University has provided the following information in response to the Board's evaluation criteria.

Institutional Mission/Strategic Plan: The emerging bioeconomy and the emphasis on bio-renewable fuels and bioproducts made from biomass (crop residues and dedicated cellulosic crops) means for our nation, especially rural areas, an opportunity to develop new industries and to diversify its agriculture. Key to the success in attracting the development of biorefineries will be the ability of producers to grow the kind and quantities of feedstocks needed by the industry. It is widely recognized that the renewable fuels economy cannot be supported by corn grain alone — that a variety of annual and perennial cellulosic crops must be grown to complement corn and soybean production.

If carefully designed and implemented, a transformed agriculture will:

- serve the bioeconomy, as well as provide food and feed;
- be profitable;
- conserve soil, water and other natural resources; and
- strengthen rural communities and improve the quality of life for those who produce and supply biomass materials.

Achieving this vision of sustainable bioenergy and bioproducts production will require new crops and new cropping systems. It will require the integration of disciplines in the agronomic and biological sciences, social sciences and engineering into teams focused on biofuels and bioproducts. It will require, at all stages of the research and development process, input from producers, industry representatives and policy-makers.

The New Century Farm's vision will encompass:

Research that brings together scientific expertise to address biomass cropping systems, biofuel processing, logistics of biomass supply and positive environmental effects such as recycling nutrients and carbon back to the land.

Teaching that serves as a research laboratory and resource for training future scientists, producers and extension experts.

Extension that demonstrates economic, social and environmental viability of biorenewable energy and bioproducts production to producers, policy-makers and the public.

Other Alternatives Explored: Research conducted on the New Century Farm will address some of the most critical questions facing biorenewables, including:

- Crop production: What are the optimal biomass production systems (species, crop rotations, nutrient and energy inputs, management practices)?
- Germplasm development: How can selection and breeding improve conventional and alternative biomass crops (both herbaceous and woody)?
- Environmental impact: How can biomass production improve environmental quality? What practices help ensure that producing and harvesting biomass will not compromise natural resources?
- Harvest, storage and transport: Because biorefineries will require large amounts of bulky materials that need to be collected, stored and transported, what new equipment and associated technologies will enable this to be accomplished most efficiently and with acceptable environmental trade-offs?

- Biomass processing: In a test facility conducting comprehensive research evaluations, how will biochemical, thermochemical, bioprocessing and hybrid technologies that convert biorenewables to fuels and biobased products perform? To what extent could various processing byproducts such as “char” be recycled through the feedstock production system to minimize inputs to the agro-ecosystem and improve soil?

The New Century Farm will be highly visible on its own site adjacent to Highway 30, a major entrance corridor to Ames/ISU and near the recently announced permanent Farm Progress Show site. The site has excellent access for many kinds of arrivals and departures, including biomass, co-products, equipment, scientists, cooperators, students, and visitors.

The location has ample land area for storage, pre-processing, handling, processing, and delivery of biomass materials at one site. This is a key attribute that significantly minimizes costs, simplifies logistics, and enhances research and demonstration possibilities. Biomass from research plots (small to very large), ISU bulk fields, and from neighboring private farmer-owned fields can be readily aggregated at the site for later use. All biomass research activities can occur at one location rather than at several.

The location on the ISU Ag Engineering/Agronomy Research Farm has the advantages of a rural setting to accommodate the noise, odor, dust, etc., generated by the biomass plant’s activities. In addition, by being on the research farm, there is the potential for shared equipment, staff, dryers, coolers, shops, and storage. Also, the potential synergies of scientists across many disciplines of agroecology, crops, soils, agricultural engineering, mechanical engineering, chemical engineering, plant breeding, and social science are greatly enhanced by locating all segments of the process adjacent to one another.

By siting the Bio-processing Research laboratory near the research plots and farmlands, the potential for the entire biorenewable system, from soils to crops to harvest to processing and returning wastes back to the soil, can be documented in a holistic systems approach. “Waste” products from the bioenergy production can be captured, quantified, and recycled. This information will be critical in building a new bioenergy industry in Iowa.

Impact on Other Facilities and Square Footage: The Bio-processing Research laboratory will be approximately 23,370 gsf. This new activity will not be relocated from existing laboratory facilities.

Financial Resources for Construction Project:

Capital Appropriation	\$ 1,000,000
IDED Iowa Values Fund	\$ 3,314,000
Federal Small Business Administration	\$ 3,671,525
Private Giving/Federal Funds	\$ 11,014,475

Financial Resources for Operations and Maintenance: Estimated operations and maintenance costs of the new facility are:

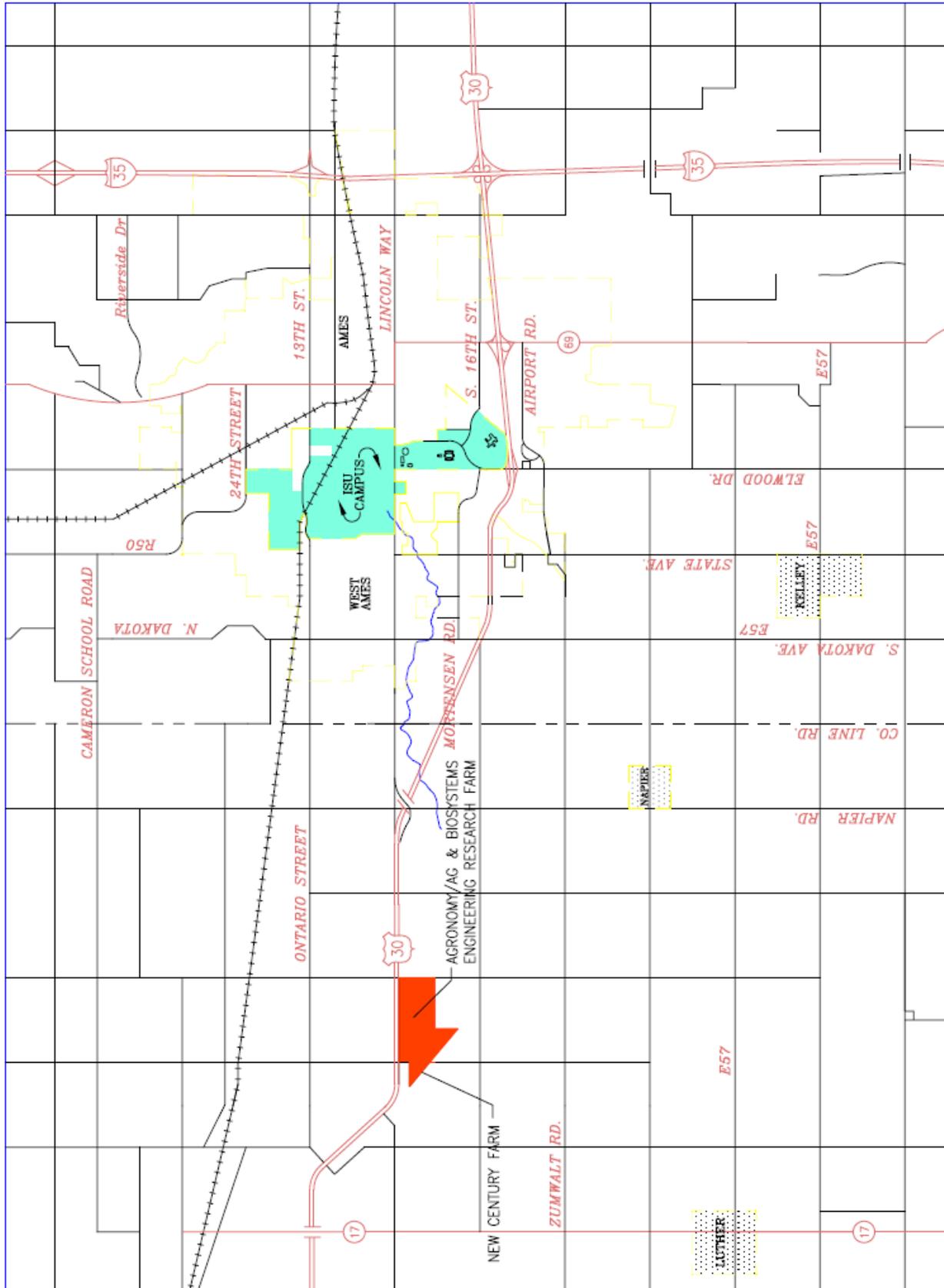
Custodial and routine maintenance	\$ 75,000
Utilities	\$ 300,000
Other (Grounds/Mail/EHS/DPS)	\$ 55,000
Annual Capital Renewal	\$ 70,000

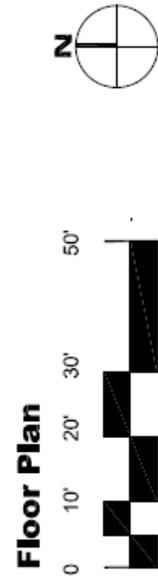
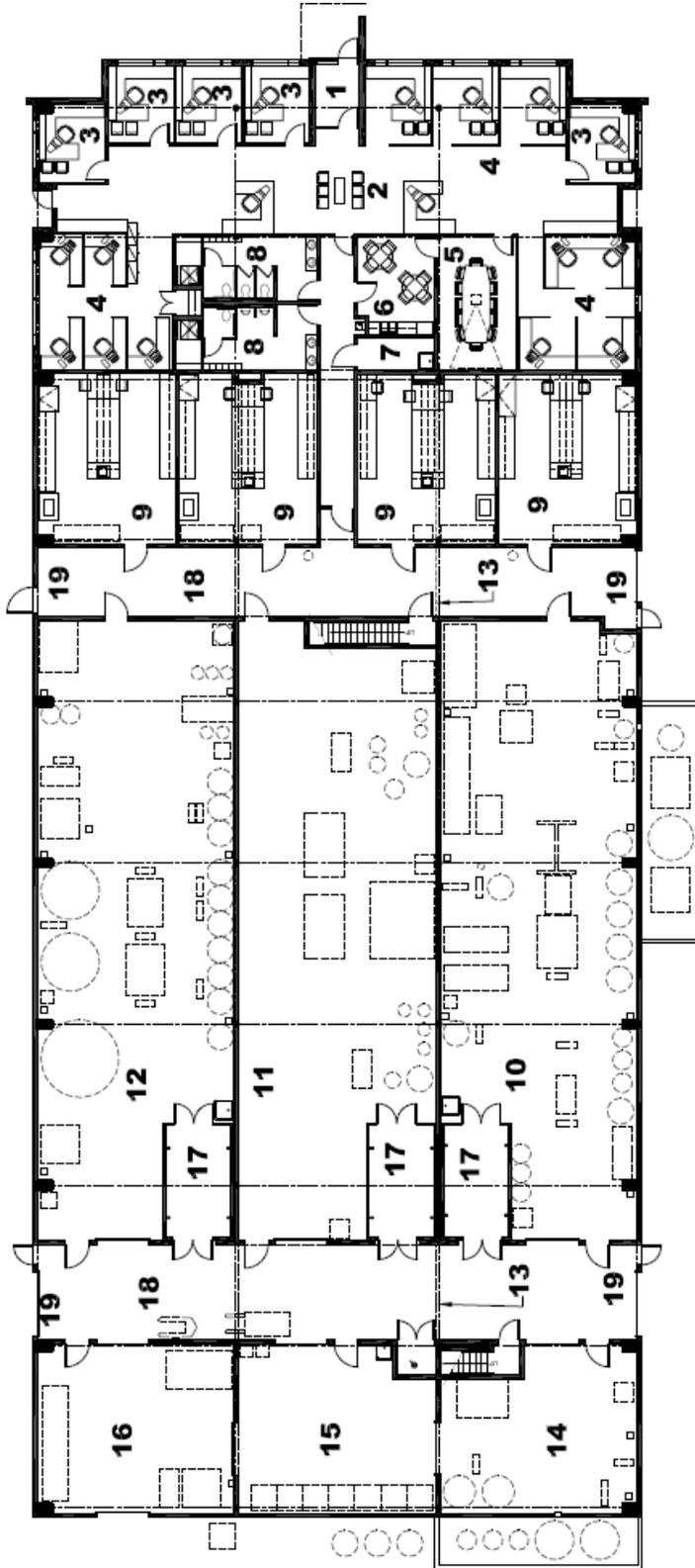
The proposed sources of funds for operations and maintenance are: 1) College of Agriculture, 2) sponsored research awards, and 3) fees for research at the processing facility.

External Forces: The emerging bioeconomy and the emphasis on renewable fuels produced from living biomass plants and crop residues present our nation — and especially rural areas — with a unique opportunity to develop new industries, diversify its agriculture and sustain its communities and environment.

The university is a research leader in biorenewable energy and bioproducts production. The NCF will help to ensure this national leadership. There are very important state and national policy issues and the university is expected to play a role in answering these important and challenging questions.

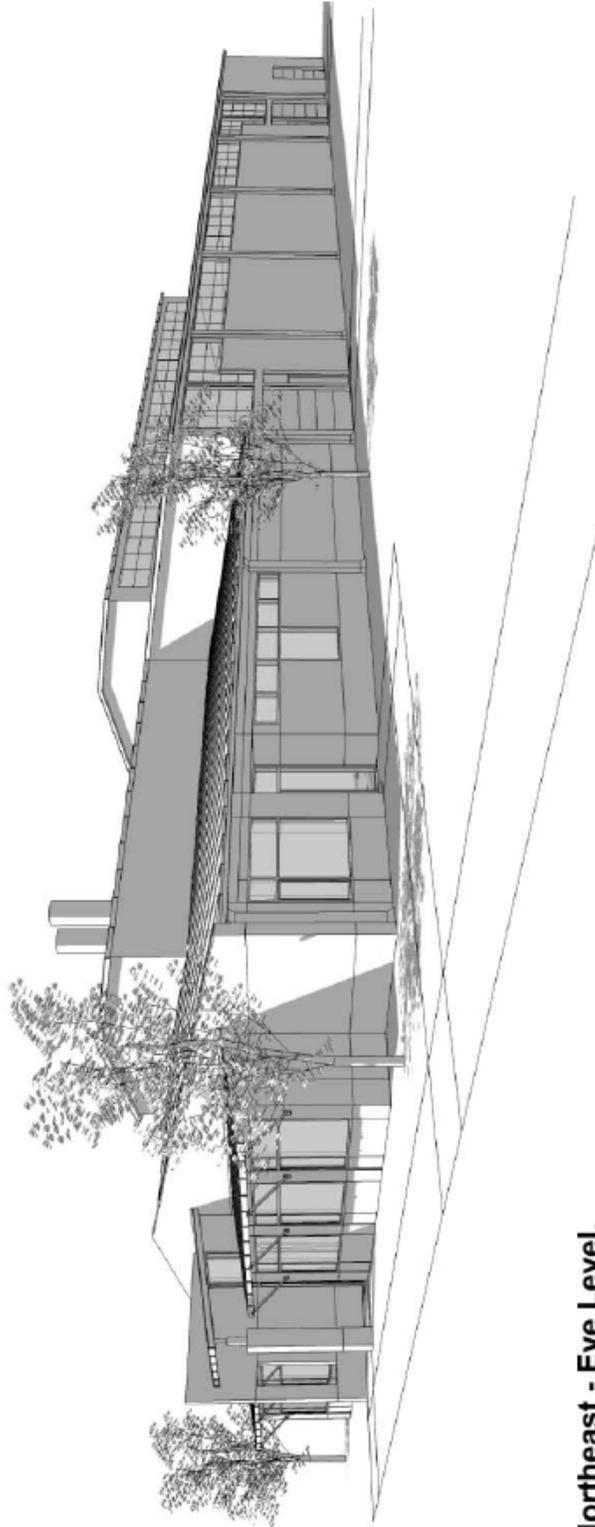
Global events are revolutionizing the agricultural and bioeconomy industries. The New Century Farm will be an important contributor to the expertise needed for the transformation of agriculture to become feedstock-ready.



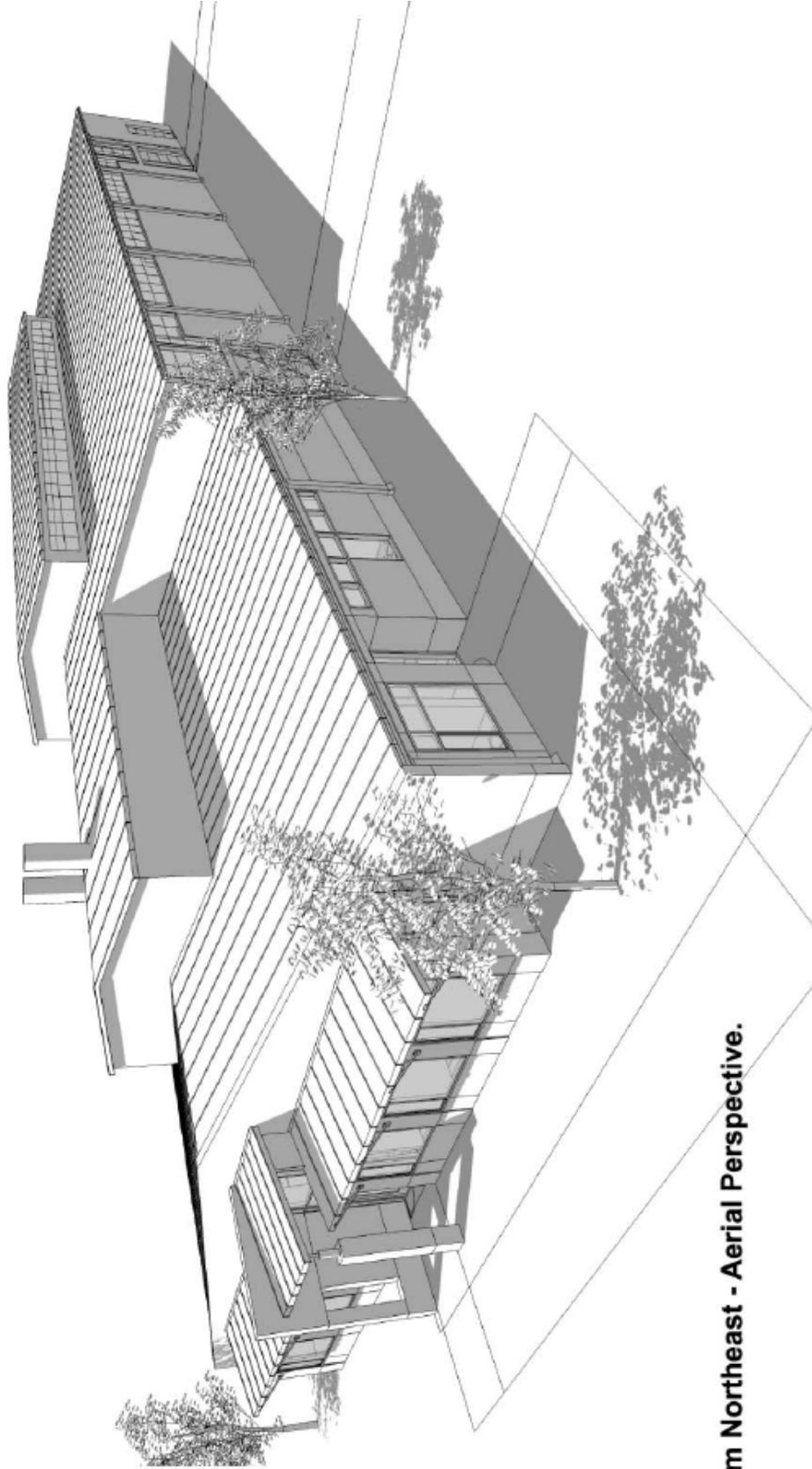


Floor Plan
New Century Farm
Blo-processing Research
Laboratory
Iowa State University

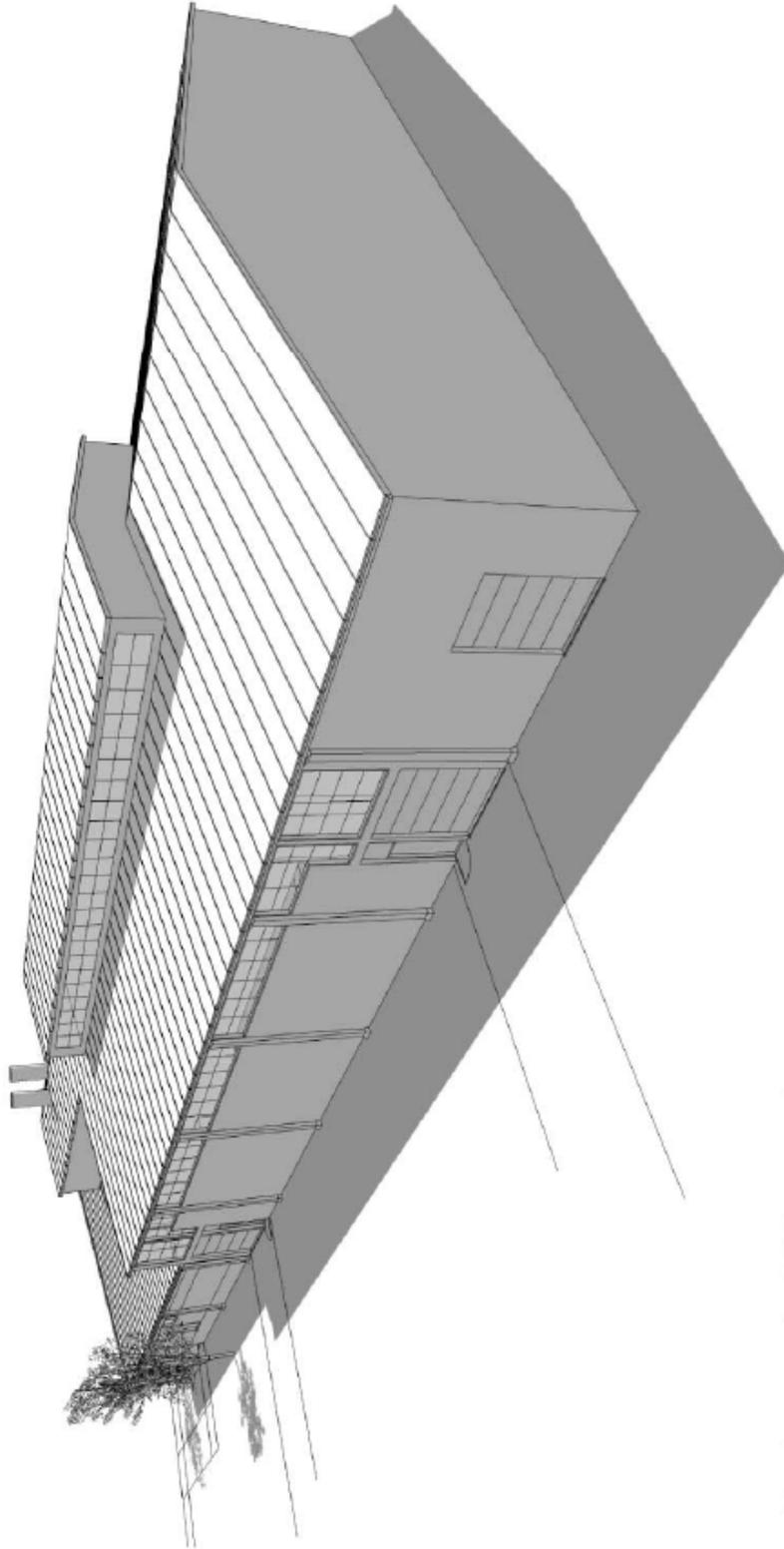
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|-----------|-------------------|-----------|-------------------------------|
| 1 | Public Entrance | 11 | Thermochemical Train |
| 2 | Waiting Area | 12 | Bloprocessing Train |
| 3 | Office | 13 | Projection of Mezzanine Above |
| 4 | Open Office | 14 | Chemical Component |
| 5 | Conference Room | 15 | Storage |
| 6 | Break Room | 16 | Grinding Room |
| 7 | Janitor's Closet | 17 | Walk-in Cooler |
| 8 | Restrooms | 18 | Corridors |
| 9 | Laboratory | 19 | Service Entrance |
| 10 | Biochemical Train | | |



View From Northeast - Eye Level.



View From Northeast - Aerial Perspective.



View From Northwest - Aerial Perspective.