

**FACILITY DESIGN PLAN
FOR
ELECTRICAL ENGINEERING
AND COMPUTER SCIENCE BUILDING ADDITION
SOUTH DAKOTA STATE UNIVERSITY**

**July 13, 2010
OSE#R0310--27**

In accordance with the Board of Regents Capital Improvement Process, South Dakota State University (SDSU) requests approval of this Facility Design Plan for the Electrical Engineering and Computer Science Building Addition project. This submittal is a result of the schematic design completed by Architecture Incorporated. SDSU also requests authorization to continue planning the project and completion of design development and construction drawings.

A. Architectural, Mechanical & Electrical Schematic Design

Summary of Architectural Work:

1. The addition shall be designed to match the materials, colors and proportions of the existing building.
2. Exterior finishes consist of brick masonry, exterior insulated finish system, and aluminum framing with vision and spandrel glass.
3. Interior floor finishes include sealed concrete, vinyl composition tile, carpet tile, and ceramic tile.
4. Interior wall finishes include painted gypsum board, painted concrete masonry unit and ceramic tile.
5. Interior ceiling finishes include lay-in ceiling tile, painted gypsum board, and painted exposed structure.
6. The structure shall consist of poured concrete footings and foundation, steel column and beam frame with 8" precast core plank floor.
7. Exterior walls will consist of 6" load bearing steel studs and some masonry walls.
8. The building addition will be designed to the 2006 International Building Code.
9. The building addition shall be designed to meet LEED Silver requirements.

Description of Mechanical Systems:

1. Fire Protection:
 - a. The building will be fully sprinkled according to NFPA.
2. Plumbing:
 - a. Domestic hot and cold water shall be extend from the existing building into the addition where needed to meet the program requirements of each of the spaces. Waste piping shall be piped through out to meet the program requirements.
 - b. Storm water from the roof shall be piped internally in the building and discharged to the exterior where site drainage and/or storm systems shall drain the storm water away.
 - c. Reverse osmosis water, compresses air, and vacuum shall be piped from the systems located in the existing building to the research labs located in the lower level.
 - d. Natural gas service shall be piped into building to serve the research labs located in the lower level.
3. HVAC:
 - a. The heating, ventilating and air conditioning system shall be split out into two systems.

- 1) The larger air handling system shall serve all of the offices, instructional rooms, and some of the dry research spaces. The large instructional spaces shall have fan powered boxes with reheat to provide temperature control to each space. The office and other smaller spaces shall be grouped together for common air temperature control with reheat. Each office shall have individual radiant panel heating controls.
 - 2) A smaller air handling system shall serve the research labs in the lower level that have fume hoods. The exhaust from these labs shall be directed to a laboratory exhaust fan set located on the roof. Heat recovery run around loop shall be used recover energy from the exhaust air and preheat the supply air to the air handling system.
- b. Cooling systems on the existing building will be modified to expand the cooling capacity and flow with an additional chiller and pump as needed to meet the cooling loads of the addition. Piping shall extend to the new air handling units.
 - c. The heating systems in the existing building will be modified to expand the system flow with an additional pump. Piping shall extend to the new air handling units, reheat coils and radiant heating systems.

Description of Electrical Systems:

1. The electrical main service equipment shall be located in the existing electrical room in the existing building. A new main panel shall be connected to the existing building transformer. The new main panel will service panel boards throughout the addition.
2. Interior lighting shall be high efficient lighting designed to meet LEED requirements. Combination of switches and occupancy sensors shall provide lighting control.
3. Exterior lighting shall be installed on the building and with new paths located around the building addition. Exterior lighting shall be controlled by a time clock and photocell combination.

Project Timeline:

The A/E design development is nearly completed with construction document development beginning at the end of June 2010. Construction document submittals be completed by early August for owner review. Project advertisement is anticipated to begin August 20th. Bid Opening shall be September 9th with Construction starting within 30 days bid opening. Construction completion and building commissioning shall occur in October and November of 2011. Occupancy shall occur in December of 2011.

Project Schedule (Key Dates):

Advertisement: August 20, 2010 to September 9, 2010

Bid Opening: September 9, 2010

Construction: September 13, 2010 to December 1, 2011

Commissioning: November 1, 2011 to December 1, 2011

Owner Fit Out and Occupancy: December 1, 2011

	2010								2011											
	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Schematic Design	█	█																		
Design Development		█																		
Construction Documents		█	█	█																
Bidding				█																
Construction					█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Commissioning																			█	
Building Fit Out/Move In																				█

B. Changes from Facility Program Plan

The proposed schematic design has changed with the Facility Program Plan.

1. A mechanical equipment space is shown on the plans adjacent to the existing penthouse/mechanical space. Preliminary concepts had this space on 3rd floor. However, the size of the air handling equipment did not allow for this. Noise and vibration from the equipment was also a concern to the adjacent classrooms and offices. By moving the space adjacent to the existing mechanical room, the space required for both of the air handling systems is now sufficient. Noise and vibration issues are minimized, and it will improve cost and efficiency for duct installation and hydronic piping serving the air handling systems. The size of the space is approximately 1,380 square feet.

C. Impact to Existing Building or Campus Wide Heating/Cooling/Electrical Systems

Electrical Distribution:

The existing building has transformer that was sized to meet the loads of the proposed addition.

Impact to Existing Tunnels (and associated utilities):

No changes shall be required of the steam utility system that serves the existing building. The utilities are sized to meet the required heating capacities of the addition.

Water:

The existing building has water service. The water distribution within the existing building will be modified to extend the services to the addition. No changes will be required exterior to the building.

Sanitary Sewer:

The sanitary sewer will be piped to the city sanitary service main located at the intersection of 12th Avenue and 8th Street (southwest of the building addition).

Storm Sewer:

The storm sewer shall be modified as need to meet drainage design requirements for the site and building. Surface drainage and/or storm drainage shall be used.

Natural Gas:

The natural gas utility is located west of the proposed site. The service will need to be routed by the utility company up to the building.

D. Total Estimated Construction Costs:

The total project cost is estimated to be approximately \$4,833,109.00 for the design and construction of the facility. A breakdown is shown in the following table.

Construction Estimate	\$3,760,208.00
Contingency (10%)	\$376,021.00
A/E, Testing, and Survey Fees	\$394,900.00
Administration and Misc Expenses	\$301,980.00
TOTAL PROJECT COST	\$4,833,109.00

The project funding is \$4,850,000. To meet this budget, several bid alternates are proposed. Several research labs in the lower level and all of 3rd floor are proposed to remain unfinished. This would be approximately 9,056 SF of unfinished space. The estimated construction costs of these alternates are:

Bid Alternate: Lower Level - OEL 1, OEL 2, Nano-Characterization Labs	\$152,600.00
Bid Alternate: 3 rd Floor – Energy Labs, Classroom, and Offices	\$302,000.00
Total	\$454,000.00

These spaces would be completed as local funds from the departments and/or research funding becomes available.

A. Changes from Cost Estimates for Operation or M&R Expenses

The cost estimates for operational and M&R expenses have been updated with the current project information, reflecting an additional square footage of 1380 and total project increase to \$4,850,000.

Impact to M&R: The proposed additional square footage will be recorded on SDSU’s facilities inventory as an academic/administrative building, therefore the square footage will be included in SDSU’s HEFF M&R allocation. Based on recognized industry standards, the annual funding for maintenance and repair/capital renewal funding should be equal to 1.5-3% of the project costs or the building replacement value. The annual M&R allocation should be between \$72,750 and \$145,500 based on the current cost estimate of \$4,850,000. At actual HEFF M&R funding levels, the annual M&R allocation for the building is \$67,348.

Budget for ongoing operational costs: The additional utility expenses are estimated at \$65,581. This represents only utility consumption and does not include the costs of utility connections. Electrical costs reflect a higher rate due to the anticipated need to purchase power outside of the University’s WAPA allocation.

For routine maintenance expenses, a minimum of \$132,568 should be allocated each year.