Architectural Program

Chiller Building #1
Haworth Hall Chiller Replacement

State of Kansas A-013910
KU Project No. 003-12163

Date: August 16, 2019

Prepared by:
The University of Kansas, Lawrence Campus
Office of Facilities Planning & Development
Programming Committee

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Table of Contents

<table>
<thead>
<tr>
<th>Item</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programming Committee</td>
<td>2</td>
</tr>
<tr>
<td>Table of Contents</td>
<td>2</td>
</tr>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Project Overview</td>
<td>3</td>
</tr>
<tr>
<td>Design Criteria &amp; Goals</td>
<td>3</td>
</tr>
<tr>
<td>Space &amp; Program Needs</td>
<td>4</td>
</tr>
<tr>
<td>Site Improvements &amp; Infrastructure</td>
<td>4</td>
</tr>
<tr>
<td>Code Requirements</td>
<td>5</td>
</tr>
<tr>
<td>Design Standards &amp; Consultant Services</td>
<td>5</td>
</tr>
<tr>
<td>Historic Preservation Reviews</td>
<td>7</td>
</tr>
<tr>
<td>KU - City Cooperation Agreement</td>
<td>7</td>
</tr>
<tr>
<td>Impact on Overall Campus Space</td>
<td>7</td>
</tr>
<tr>
<td>Annual Maintenance &amp; Operating Costs</td>
<td>7</td>
</tr>
<tr>
<td>Proposed Project Delivery Process</td>
<td>7</td>
</tr>
<tr>
<td>Project Budget</td>
<td>8</td>
</tr>
<tr>
<td>Project Schedule</td>
<td>8</td>
</tr>
<tr>
<td>Existing Site Plan</td>
<td>9</td>
</tr>
<tr>
<td>Proposed Chiller Plant Location</td>
<td>10</td>
</tr>
</tbody>
</table>
Introduction

Buildings on the KU Lawrence Campus have traditionally been cooled by stand-alone, building-based systems. In an effort to improve operational and energy efficiency, the University has developed district chilled water plants to serve clustered groups of buildings.

The recent catastrophic failure of the 500 ton chiller serving Haworth Hall in July 2019 has created a deficit in cooling capacity affecting critical research, animal care and teaching facilities. That deficiency is being filled on a temporary basis with a rental chiller, and the University wishes to restore that permanent capacity by adding chillers at the Chiller Building #1.

This project will consist of an addition to Chiller Building #1, the site of a chilled water plant serving six buildings on the Lawrence campus. The addition will be approximately 2,000 square feet and will house two chillers and accessories.

Project Overview

Existing Mechanical Systems

Haworth Hall was served by a 500 ton building chiller, and also has a connection to the district chilled water plant in Chiller Building #1 for peak cooling and redundancy. This chilled water district also serves Malott Hall, Dole Human Development Center, Hall Center, Stauffer-Flint and Wescoe Halls.

Chiller Building #1 currently houses three chillers with a total capacity of 2,500 tons. It will be expanded to include the 500 ton chiller lost at Haworth, and another similar machine to provide a measure of redundancy necessary to support research and animal care facilities.

The addition would also house associated controls and pumps for the chiller and accompanying cooling tower.

Related KU Projects

None – Emergency project
Design Criteria and Goals

The design for this project shall address the following needs, goals and objectives:

- Provide reliable, energy efficient source of chilled water to serve Haworth Hall.
- Provide redundancy to minimize potential for single point of failure; ideally as N+1.
- Provide all required utilities and infrastructure.
- Verify variable flow chilled water distribution to facilities served by the district chilled water plant.
- Comply with KU design standards for energy conservation.
- Address life safety issues and meet current code requirements.
- The plant location was determined to be an addition to Chiller Building #1.
- Provide additional chilled water capacity, and/or ability to add capacity for redundancy.

Space and Program Needs

Proposed improvements include the following items, which will be prioritized in collaboration with KU and which shall be completed to the extent that current funding allows. Alternate bids will be taken for flexibility in bid awards & overall phasing.

Mechanical

- Select chiller plant equipment on the basis of life-cycle cost analysis. Options shall include but not be limited to chiller type and energy recovery opportunities.
- Evaluate options for improvement of distribution system to existing buildings to meet current demand.
- Schematic design phase capacity estimate for the fully configured plant is approximately 3,500 tons. The consultant will verify required capacity to provide firm capacity to satisfy connected loads.

Electrical

- Provide electric service to the chiller plant addition including building power and lighting.

Telecommunications, Life Safety & Security

- Extend connectivity to the new addition.
- Provide fire sprinkler and fire alarm systems in accordance with published KU design standards.

Site Improvements & Infrastructure

Site Improvements

- To be determined based on selected location of the addition.

Utilities & Infrastructure

- Extension of required utility services including water, sanitary and storm sewer, electric service, telecommunications and chilled water distribution is included in this work.
- All utility or M/E system shutdowns or outages shall be planned well in advance, in collaboration with FPD and FS personnel, and others who may be affected.

Hazardous Materials

The KU Environmental Health & Safety Office will perform tests of existing materials which will be affected by the project work, in order to determine if they are asbestos-containing and to solicit proposals from abatement contractors.

KU’s standard policy is to remove all hazardous materials when undertaking major renovations of existing buildings.
**Code Requirements**

- Codes currently used on KU projects include the following:
  - International Building Codes, 2018 editions.
  - Other codes as listed at the State of Kansas, Office of Facilities & Procurement Management – Design, Construction & Compliance (OFPM-DCC) website.
  - Code Footprint templates of the existing building shall be prepared by FPD and furnished to the A/E on FPD’s standard 11x17 code footprint sheets.
  - A/E shall update these drawings to reflect all proposed work and submit them for approval to OFPM thru FPD/UFMA, immediately following approval of the Schematic Design phase.
  - Electronic files of the approved code drawings shall be forwarded to FPD in both .PDF and .DWG formats.
- Construction Exiting: Temporary fire-rated exit corridors shall be provided through the construction site, if required to protect and direct occupants from all required exits in the surrounding occupied existing buildings to a public way. They shall remain in-place at all times while construction work is underway.
- Fire alarm systems shall be designed and installed consistent with current code and KU requirements for an intelligent addressable system.
- Project scope will include any code or ADA-related improvements that are required in order to complete the proposed scope of work, including required ADA path of travel improvements to primary function areas.

**Design Standards / Consultant Services**

The architectural/engineering (A/E) team shall comply with the latest provisions of the University of Kansas Design and Construction Standards, as maintained by the Office of Facilities Planning and Development (FPD), posted online at FPD’s website at: [http://www.FPD.ku.edu/standards](http://www.FPD.ku.edu/standards)

- The A/E team shall also comply with supplemental updates to these standards, which may be issued during the course of the project.
- The A/E team shall comply with KU Audit and Strategic Sourcing guidelines, also posted at the FPD website.

- The Owner’s Representative shall be a FPD staff person assigned to serve as KU’s Project Manager, and who shall be the primary point of contact for all communications between the Owner, A/E and Contractor.
- Special Consultants that will be required on the A/E team, in addition to the usual A/E disciplines:
  - Project Engineer shall have district chilled water plant expertise.
- Electronic Files: Consultants shall deliver to KU a complete set of electronic files for all drawings and specs for each design submittal, bid set & as-built documents.
  - Each set of electronic files shall include both PDF and AutoCAD .DWG files for each drawing sheet.
- State Contracts: Since this project is considered to be state funded, A/E selection and contracting will be via State of Kansas, using OFPM’s standard form of contract.
- Program Verification: A/E shall review and confirm all program needs with KU client/FPD, and shall reconcile the proposed project scope with the available funding.
### University Energy Policy

The University is engaged in ongoing reviews of campus energy use and sustainability plans and policies, and has adopted an *Energy Policy* that includes requirements for projects to be designed and constructed so as to minimize energy use. The full policy is found at the KU Policy Library [http://policy.ku.edu/provost/energy-policy](http://policy.ku.edu/provost/energy-policy). The consultant shall become acquainted with this policy in its entirety.

- The following excerpt is from paragraph III-B *New Construction* of the *Energy Policy*. The design requirements included in this excerpt shall be considered project requirements.
  - New construction should be designed and built to minimize energy use.
  - 2016 version of ASHRAE Standard 90.1 - Energy Efficient Design of New Buildings Except Low Rise Residential Buildings should be set as the minimum energy efficiency guideline, since it has been shown that further reductions in energy use are economically achievable. The current KU standard for new construction is 15% improvement on 2016 ASHRAE 90.1.
  - The design process should include energy life cycle costing analyses.
  - New construction should be added to the existing building automated control system for enhanced energy management capabilities.
  - Alternative energy sources such as passive solar heating and heat recovery should be considered, as well as daylighting and other strategies for decreasing building energy consumption. Primary consideration should be given to connecting and/or extending central systems for heating, cooling and other mechanical systems.
  - Year-round cooling needs should be met by utilizing the most energy efficient systems, for example plate-and-frame heat exchangers versus less efficient air-cooled systems.
  - All new construction should include utility metering (electricity, natural gas, steam, and water).

With regard to the University’s expectations for sustainable designs, the current University Sustainability Plan, issued July 2011 can be found at: [http://www.provost.ku.edu/pdf/sustainability-plan.pdf](http://www.provost.ku.edu/pdf/sustainability-plan.pdf)

There is no specific funding identified within the budget of this project to account for incremental project costs that might arise from designing to meet LEED Silver criteria. However, the consultant should become familiar with both University sustainability policy and LEED criteria and is expected to identify design opportunities for University consideration during completion of schematic design.

### Construction Bid Document Preparation

The consultant shall prepare a consolidated set of construction drawings and specifications that encompass all anticipated work.

The anticipated design sequence will follow requirements of the State Office of Facilities and Property Management’s (OFPM) Building Design and Construction Manual. At a minimum, the following milestones are anticipated:

- Schematic Design Review
- Design Development Review
- 50% Construction Document Review
- 100% Construction Document Review
Construction Administration
The consultant will be expected to provide construction administration (CA) services during the construction phase of the project. CA service requirements will follow requirements of the OFPM Building Design and Construction Manual.

Historic Preservation Reviews
The planned chilled water plant location is in the historic district. Historic preservation reviews will be required.

KU - City Cooperation Agreement
KU and the City of Lawrence entered into a jointly-beneficial Cooperation Agreement in April 2005. It designated a compatibility buffer zone that extends 150’ deep onto KU’s property from the primary exterior boundary of KU’s property.

New construction on the KU Lawrence campus within the 150’ buffer zone must comply with designated City land-use regulations, standards and requirements.

Note: This project is not located within the 150’ buffer zone, therefore the agreement is not in effect for this project.

Impact on Overall Campus Space
This project may add up to approximately 2,000 GSF to the University’s space inventory.

Annual Maintenance & Operating Costs
Funding for annual maintenance and operating costs will come from existing University resources or new private resources. No new state funding will be required to cover any of these costs.

Proposed Project Delivery Process
Competitive Bid
The University of Kansas proposes to use a traditional but expedited design-bid-build process for this project. The Owner and consultant team shall jointly develop strict pre-qualification criteria, designed to ensure that contractors approved to bid this project have a proven track record of delivering similar projects, under a similar expedited construction timeframe, and successfully meeting those schedules.
**Project Budget**

<table>
<thead>
<tr>
<th>Costs</th>
<th>Amount</th>
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<tbody>
<tr>
<td><strong>Construction Costs</strong></td>
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<tr>
<td>Construction</td>
<td>2,400,000</td>
</tr>
<tr>
<td><strong>Subtotal - Construction Costs</strong></td>
<td>$2,400,000</td>
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<tr>
<td><strong>Miscellaneous Costs</strong></td>
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</tr>
<tr>
<td>Fees - Consultants, State &amp; KU Agencies, IRF</td>
<td>360,000</td>
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<tr>
<td>Printing &amp; Shipping of Bid Documents; Misc.</td>
<td>10,000</td>
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<tr>
<td>Asbestos &amp; HazMat Abatement (scope TBD)</td>
<td>40,000</td>
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<tr>
<td>Construction Testing &amp; M/E Commissioning</td>
<td>70,000</td>
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<tr>
<td>Bidding &amp; Construction Contingency (5%)</td>
<td>120,000</td>
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<td><strong>Subtotal - Miscellaneous Costs</strong></td>
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<td><strong>Total Project Cost</strong></td>
<td>$3,000,000</td>
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**Notes:**
1) Funding is proposed to be from FY 20 EBF funds and restricted fee funds.

**Project Schedule**

<table>
<thead>
<tr>
<th>Event</th>
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</tr>
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<tbody>
<tr>
<td>A/E Selection</td>
<td>Sept 2019</td>
</tr>
<tr>
<td>Negotiate A/E Fees</td>
<td>Sept 2019</td>
</tr>
<tr>
<td>Start Design</td>
<td>Oct 2019</td>
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<tr>
<td>Complete CD’s, submit for permit</td>
<td>Nov 2019</td>
</tr>
<tr>
<td>Receive Bids; Award Contract</td>
<td>Dec 2019</td>
</tr>
<tr>
<td>Construction Starts</td>
<td>Jan 2020</td>
</tr>
<tr>
<td>Construction Completion</td>
<td>April 2020</td>
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</tbody>
</table>

**Notes:**
1) The dates for issuance of construction documents for bidding and construction are dependent on confirmed funding (TBD) in current or future fiscal year.