June 10, 2013

MEMORANDUM

TO: Dr. R. Bowen Loftin

SUBJECT: CBE Recommendation: Thermal Storage Tank SUF1

At its May 14, 2013, meeting, the Council for the Built Environment discussed a report from the Design Review Sub-Council on the conceptual design of a high thermal storage tank to be constructed at the SUF1 facility on west campus. The thermal tank’s construction is part of the implementation of the approved Utilities & Energy Capital Plan approved on July 11, 2012; however, given the considerable modifications to the previously approved size of the thermal storage tank (an increase of 30’ height, making the tank 80’ tall x 80’ wide) the Design Review Sub-Council brought the revised design to the CBE for input. An overwhelming majority of the CBE members voted ‘no’ to the construction plan for the thermal tank as proposed. Reservations are based on aesthetic concerns as well as the precedence this construction might establish for future buildings in highly visible locations on the west campus.

The CBE does not recommend the President’s approval for the Thermal Storage Tank SUF1 as proposed.

Karan L. Watson
Provost and Executive Vice President
for Academic Affairs
Co-Chair, Council for the Built Environment

Rodney P. McClendon
Vice President for Administration
Co-Chair, Council for the Built Environment

Dr. R. Bowen Loftin
President

cc: Sub-Council Chairs, Council on the Built Environment
Mr. James Riley, Director for Utilities & Energy Management
MEMORANDUM

TO:         Dr. Karan Watson  
             Provost and Executive Vice President for Academic Affairs

             Dr. Rodney McClendon  
             Vice President for Administration

FROM:  Lilia Gonzales, AIA  
        University Architect and Chair, Design Review Sub-Council

DATE:  April 30, 2013

RE:  Design Review Sub-Council (DRsc) Report  
      Thermal Energy Storage Tank at SUP1

On May 9, 2012, the Design Review sub-council (DRsc) reviewed the proposed Utilities & 
Energy Capital Plan, which included conceptual design of a 50 ft. high thermal storage tank to 
be constructed at the SUP1 facility on west campus. At that time, the DRsc recommended 
approval of the Utilities & Energy Capital Plan, and awaited further schematic design details of 
the tank. The Utilities & Energy Capital Plan was approved by President Loftin on July 11, 2012.

On April 3, 2013, Jim Riley from Utilities & Energy Services presented to the DRsc for 
review and approval the design details for the thermal storage tank, as well as the 
addition of an electrical building at the Central Utility Plant (CUP). These projects are part 
of the implementation of the approved Utilities & Energy Capital Plan.

Addition of Small Building at the CUP

A small electrical building and transformer would be added to the inside of the CUP, as seen in 
the attached renderings. This building would be designed to blend in to the adjacent structures. 
A future project would expand and completely build out the electrical room. The oak tree located 
in front of the CUP is not healthy and will need to be removed either this year or the next.

Recommendation
The Design Review sub-council unanimously voted for approval of the proposed 
electrical building at the CUP, as part of the implementation of the Utilities and 
Energy Capital Plan, with the caveat that consideration be given to plant new trees 
along Ross Street in front of the CUP whenever the existing oak tree is removed.

As this project is part of the implementation of the approved Utilities and Energy 
Capital Plan and has a minimal aesthetic impact to the campus, the report on this 
item is provided as an update and the DRsc believes that no action is required of 
the CBE.

Addition of Thermal Energy Storage Tank at SUP1

The thermal energy storage tank is proposed to be located on west campus on the existing 
green space between the SUP1 facility and parking lot 97, across John Kimbrough Blvd from
Reed Arena. The 22,500 ton-hours tank to serve the west campus is now proposed to be 80 ft. in diameter and 60 ft. high in lieu of its original proposed height of 50'. The exterior material would be of welded steel construction with vertical panels having an anodized painted surface. The exterior color is proposed to be painted an "Aggie tan" color. This may consist of two or three horizontal bands of alternating color with one as a darker "Aggie tan" color.

The height of the tank is being driven by the height of the tallest building on west campus. A thermal storage tank is most effective when it is as tall as the buildings it is serving. This will provide for the maximum return of the University's investment and eliminate additional costs for new chillers within the design of future buildings on west campus. If the tank is shorter than the buildings it is serving, then large and/or many valves and additional pumping is required and the diameter of the tank will need to increase.

DRsc members expressed concern over the large tank in such a visible location and asked that the UES staff return to the following DRsc meeting to present additional information and alternate options for the tank, including the possibility of relocating the tank to an area north of the SUP1 building in parking lot 74.

On April 17, 2013, representatives from Utilities & Energy Services as well as Burns & McDonnell (engineering firm) presented further information on the tank location and size to the DRsc. Location 1, which is west of the SUP1 building as originally proposed and per the Campus Master Plan, has a reduced cost of approximately $500,000 and would make more funds available for aesthetic enhancements such as planting of mature trees and the addition of an architectural fence/wall around the tank. Location 2, which is north of the SUP1 building in parking lot 74, would partially block the tank from view from Reed Arena, but it would result in a loss of 56 parking spaces and would put the project behind schedule one year. It could also limit future building development as shown in the Campus Master Plan.

Lilia Gonzales, University Architect and DRsc Chair, shared her research of thermal storage tanks at other universities. Some of these tanks have already been installed or are in the process of being designed. In addition, some of these have had to manage height and pressure hydraulically. The exterior materials of these tanks are welded steel construction with an anodized painted surface the same as to what is being proposed by UES.

- University of Illinois: 52 ton-hours, 77' tall
- University of Texas: 30 ton-hours, 67' tall and 104' diameter
- Princeton: 40 ton-hours, 70' tall (20' into the ground)
- Purdue: 52 ton-hours, 95' tall

The 95 ft. high tank at Purdue was proposed in the fall of 2012 to the Board of Trustees and tabled due to concerns of aesthetics and location. The tank was later approved because of its economic benefits with the caveat that the tank be located near the existing power plant.

**Recommendation**

DRsc members are not in favor of such a large tank in this visible location on west campus; however the proposed location is in alignment with the Campus Master Plan's long range utility infrastructure development. In addition, the efficiency and economic benefits of such a tank outweigh these aesthetic concerns and is more conducive to continuing future campus growth. After much discussion, the DRsc unanimously voted to recommend approval of the Thermal Storage Tank at SUP1 as proposed at 80 ft. high and 80 ft. in diameter to be located on the west side of SUP1, with the following caveats:
- Additional aesthetic considerations such as landscaping (planting of mature trees) and fencing/walls should be addressed with the understanding that this planning will not affect the construction timeline.
- An allocation not to exceed 1% of the project budget should be set aside for graphical and/or other aesthetic improvements to the painted surface of the tank.

Please let us know if you need additional information. For your reference, attached are selected images that were presented to the DRsc on April 17, 2013.

cc:  Jim Riley
     DRsc Members
     Patti Urbina
Benefits of Thermal Storage at TAMU

- Improved Sustainability
- Reduced Energy Consumption
- Reduced GHG Emissions and lower Carbon Footprint
- Cost Avoidance of $500,000 annually with 8-10 Year Payback
- Increased Cooling Capacity to Serve Campus Growth
- Increased Reliability and Redundancy to Serve Campus
- $2 Million Reduction in Capital Investment vs. Chiller Option

Final Design Review
FY13 Utility Production Upgrade

Les Williams - Director
Bob Henry - Manager for Technical Services
Jon Schwartz - Burns & McDonnell

April 17, 2013
Location 1, View From East

Location 1, View From South, Future View
<table>
<thead>
<tr>
<th>Benefits of Location 1 (West of SUP) vs. Location 2 (North of SUP)</th>
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</thead>
<tbody>
<tr>
<td>Aesthetic enhancements finanically viable with Location 1</td>
</tr>
<tr>
<td>Improved landscaping with larger diameter trees</td>
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<tr>
<td>Upgraded wall vs. chain-link fencing</td>
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<tr>
<td>Improved tank exterior appearance</td>
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<tr>
<td>Lower capital cost (location 1 - $300,000 less than location 2)</td>
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<td>Design review approval allows project to remain on schedule</td>
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<tr>
<td>Allows for construction of future building on PA 74</td>
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Location 1, View From West, Future View