

Include as part of the study, please include the committee's full evaluation summary along with the individual score sheets at the end of the study.

**SITE EVALUATION FOR**

**U22059**

**Chilled Water Modeling & Master Plan Updates – Thermal Energy Storage Tank**

**Date:** April 27, 2023

**Prepared By:** *Dennis L. Craig, Architect/Planner, Mark Roessler, Project Manager and Brad Klein, Associate Director (Interim) – Project Planning*  
Facilities & Services, Capital Programs  
University of Illinois at Urbana Champaign



**Facilities & Services**

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN



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## I. SUMMARY

### A. Justifications

Utilities & Energy Services retained PRVN Consultations, Inc. to conduct a chilled water system master plan update, including the evaluation of the existing of current and future loads, a review of the chilled water assets available, and an evaluation of the existing chilled water distribution system. This included recommending an approach to reliably expand the installed capacity and chilled water distribution network to maintain campus resiliency.

### B. Project Scope Summary

The University’s chilled water system includes one Thermal Energy Storage (TES) tank and associated pumphouse that collects chilled water as it is charged from campus Utility production during off peak hours (night) and discharges the chilled water during peak hours (day). The chilled water modeling study identified the increase of future chilled water loads as campus adds more buildings to the existing system (both existing buildings being added, and new buildings being constructed) and therefore the need for a second TES tank to increase the chilled water capacity on campus. This program will identify possible sites for the tank and recommend a preferred location.

All three proposed locations are in a more visible area than the existing TES tank on the south campus. Therefore, aesthetics will be an important consideration in the design. There are a variety of exterior treatments for aboveground tanks that can be integrated with the exterior cladding that could help with the aesthetics and provide possible branding opportunities to promote the University or the energy savings efforts that are part of the campus chilled water loop system.

### C. Background and Vision

#### 1. Space Analysis

The chilled water system master plan found that a minimum net volume of 5,533,000 gallons is needed to support the chilled water capacity. Therefore, any potential site must accommodate maximum height of 82’ and maximum diameter of 118’-6” and associated pump house. This volume is smaller than the existing TES tank off of South Oak Street, which has a 6,500,000 gallon capacity and is also approximately 82’ tall and approximately 118-6’ in diameter.

#### 2. Utilities Required

Chilled Water

Data/Telecommunications

Steam

Audio-Visual



- |   |   |
|---|---|
| <input type="checkbox"/> Water                  | <input type="checkbox"/> Sanitary Sewer         |
| <input checked="" type="checkbox"/> Electricity | <input checked="" type="checkbox"/> Storm Water |
| <input type="checkbox"/> Gas                    | <input type="checkbox"/> Raw Water              |
| <input checked="" type="checkbox"/> Lighting    | <input type="checkbox"/> Irrigation             |
| <input type="checkbox"/> Helium                 | <input type="checkbox"/> Compressed Air         |

**3. Historic Preservation Issues**

No historic structures will need to be demolished on any of the potential sites. The distance between the proposed locations and any historic structure is above the required setback for consideration.

**4. Land Acquisition**

The proposed sites are currently owned by the University of Illinois.

**5. Circulation, Transportation, and Parking Needs**

Service vehicles will infrequently need to access the site. Since the facility will not include full time workers there will be no parking needs. The proposed locations offer beneficial locations for engineering consideration of the proposed tank and associated campus chilled water piping. **Two of the proposed site locations would require purchasing and decommissioning of existing parking spaces.** The Parking Department has reviewed the proposed locations and have determined that **location #1 is their preferred location.** Their comments are included in the Site Summary sections below.

**D. Pre-Selection Instructions**

Each committee member is to be given a draft copy of this Site Evaluation Study including the specific site summaries for each site. Each committee member will be given one week to review the material and score each site on the evaluation sheets provided. These score sheets will be tallied, and the results shared with the committee. The committee will make a final review of the scores and formally make a final site selection recommendation which will be forwarded to the Chancellor’s Capital Review Committee (CCRC).

**II. SITE EVALUATION COMMITTEE**

Committee Member	Title	Email
Brad Klein, Project Planning, Committee Co-Chair	Associate Director (Interim) – Project Planning	<a href="mailto:bradklei@illinois.edu">bradklei@illinois.edu</a>
Mark Roessler, Project Management, Committee Co-Chair	Project Manager	<a href="mailto:mroessler@illinois.edu">mroessler@illinois.edu</a>



Dennis Craig, Planning	Architect, Campus Historic Preservation Officer	<a href="mailto:dlcraig@illinois.edu">dlcraig@illinois.edu</a>
Frank Colacicco, Utilities & Energy Services	Associate Director, Utility Distribution	<a href="mailto:frankc10@illinois.edu">frankc10@illinois.edu</a>
Elise Riehle, University Office of Real Estate	Assistant Director, Real Estate Services	<a href="mailto:eriehle@uillinois.edu">eriehle@uillinois.edu</a>
Mike Larson, Campus Unit	Director, Utility Operation	<a href="mailto:mjlarso1@illinois.edu">mjlarso1@illinois.edu</a>
Sandy Yoo, University Office of Capital Programs	Architect, Assistant Director, University Office of Capital Programs	<a href="mailto:syoolee@illinois.edu">syoolee@illinois.edu</a>

### III. SITE & PROGRAM CRITERIA

#### Site Criteria

##### A. Parcel Size

Is the site large enough to accommodate the proposed facility? Consideration should be given to proper land coverage ratios, building heights, and site development.

##### B. Facility Expansion

Is there facility expansion space available on site? Consideration should be given to the possibility of future expansion of the facility whether or not it is identified in the program statement.

##### C. Physical Characteristics

Do the site’s physical characteristics afford ease in construction of the proposed facility? Consideration of soil conditions (if known), slope, existence of mature or specimen plant materials, and other site-specific factors should be taken into account.

##### D. User Access (Vehicular/Pedestrian/Bicycle)

Does the site have adequate user access (various modal linkages) to the campus as a whole? Consideration should be given to the quality of access to the site from other areas of campus and the general community.

##### E. Service Access

Does the site allow for ingress/egress of service vehicles and personnel? Consideration should be given to reasonably direct and uninhibited access (including maneuvering space for trash removal equipment) to the facility delivery and maintenance areas.

##### F. Utility Access

Are the required main utility lines available at this site? If utility mains must be extended from another location, is the cost reasonable? Consideration should be given to adequate sizes for the expected capacities.



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**G. Parking (Auto/Bicycle)**

Is sufficient parking available proximate to the site or (if needed) can it be added on or near the site? Consideration should be given for visitor (automobile) parking.

**H. Demolition**

Does use of this site require removal of another structure, parking lot, etc.? Consideration should be given to the desirability of this removal as well as its cost.

**I. Land Use Compatibility**

Does the proposed land use relate to surrounding land uses and general land use priorities? Considerations should be given to general guidelines of the campus master plan and basic planning principles.

**J. Architectural Compatibility**

Does the proposed facility relate well to the visual quality of surrounding facilities? Consideration should be given to design characteristics such as size, mass, interrelationship with other structures, etc.

**K. Master Plan Compatibility**

Does the proposed facility relate well to the Board of Trustees approved campus master plan? Consideration should be given to long-term plan objectives.

**L. University Ownership**

Is the site owned by the University or the University of Illinois Foundation? Consideration should be given to whether or not it can be acquired as well as under what circumstances and cost.

**M. Other**

**Program Criteria**

**N. Program Priorities**

Of all programs (academic, administrative, operational, etc.) possibly located at this site, is the one under consideration the highest and best use?

**O. Program Dislocation**

Will locating the proposed facility at this site dislocate another program? Consideration should be given to the dislocation significance to the overall scheme.

**P. Program Relationship**

Will locating the proposed facility at this site functionally enhance the program? Consideration should be given to the functional relationship between the proposed facility and auxiliaries at this site.



**Q. Urban Impact**

Will locating the proposed facility this site have a positive or negative impact on adjacent, existing facilities? Consideration should be given to building(s) shadow intrusions, parking demand, traffic congestion, municipal services loading, public safety, etc.?

**R. Aesthetics**

Will this site offer characteristic desired for this program? Consideration should be given to appearance psychological image, public relations visibility, etc.

**S. Other**

**IV. LOCATIONS OF SITES CONSIDERED**

**2018 Campus Master Plan with sites identified.**





Aerial of North Campus Area with sites identified.





## V. SITE SUMMARIES

### **A. Location 1 – Southwest corner of Harvey Street and Clark Street (Urbana) in Parking Lot B17**



#### **1. Site Criteria Considerations**

- a. Parcel Size: Available parcel size is approximately 80 feet by 180 feet for an approximate total area of 14,400 square feet and appears to be adequate for the proposed building program.
- b. Facility Expansion: Site is adequate for expansion.
- c. Physical Characteristics: The site is currently a hard-surface parking lot. There are mature trees around the perimeter.
- d. Service Access: Service access can be from Clark Street on the north and would need to be shared with Campbell Hall.
- e. Utility Access: Utilities are generally readily available. Chilled water for the tank is available from a main in Main Street to the south.
- f. Parking: This site uses a portion of surface parking lot B17. Parking is available in the balance of Lot B17 as well as lot B22 to the north.
  - a. Parking Department has reviewed this location and offers the following comments: “The location on this site divides the Lot that has one access point (from the North) limiting the amount of parking to remain and potentially the service access to Campbell Hall. There appears to be a limited amount of parking south of the proposed site and not sure about having the limited amount of parking and working to make that area workable as a new entrance would need to be installed and that new entrance would potentially impact city of Urbana street parking. If the installation could go farther south in the Lot, this would be one of the better set-ups in Parking’s opinion.”
  - b. By moving the installation further to the south of the lot appears to be a better set up and would allow for the remaining parking lot to remain in one piece as opposed to be broken up into two different lots.
- g. Demolition: This site will require the demolition of existing surface parking. Additionally, depending on the structures’ design, approximately 80 parking spaces will need to be eliminated



from parking lot B17, requiring a payment to Campus Parking of approximately \$2,800,000 (80 spaces @ \$35,000 each). This site will also require the demolition and possible relocation of a gas line, a sanitary sewer lateral, electrical service, and parking lot lighting.

- h. Land Use Compatibility: Prominent utility structures are nearby – large communications antenna array is at the southwest corner of the site, which gives the site a preexisting utilitarian aesthetic.
- i. Architectural Compatibility: Prominent utility structures are nearby - large communications antenna array is at the southwest corner of the site, which gives the site a preexisting utilitarian aesthetic.
- j. Master Plan Compatibility: The use of this site for development is generally compatible with the 2018 Master Plan as a building was shown on this site. Masterplan indicates future development at this location, but it is a generic designation, and no specific development has been identified.
- k. University Ownership: The parcel is owned by the University.
- l. Other: This location offers advantages in the engineering of the tank and the campus chilled water system.

## 2. Program Criteria Considerations

- m. Program Priorities: Need is to provide thermal/chilled water storage on campus and prepare for future increase in loads.
- n. Program Dislocation: Parking will be dislocated by using this site for the proposed tank; however, this is in line with the long term goal to get rid of surface parking.
- o. Program Relationship: This site location, at the corner of Harvey and Clark, is closely adjacent to the CHW loop and where future loads are needed.
- p. Urban Impact: This site is close to residential developments.
- q. Aesthetics: The storage tank could be designed to mitigate negative aesthetics and would be an opportunity for branding - either for the campus or energy efficiency promotion.
- r. Other: This location is near the eastern edge of campus and could be suitable for branding or other advertisements on the tank.



**B. Location 2 – Southeast corner of Goodwin Avenue and Main Street (Urbana) in vacant lot.**



**1. Site Criteria Considerations**

- a. Parcel Size: Available parcel size is approximately 80 feet by 180 feet for an approximate total area of 14,400 square feet and appears to be adequate for the proposed building program.
- b. Facility Expansion: Site is adequate for expansion.
- c. Physical Characteristics: The site is currently a vacant lot. There are mature trees around the perimeter.
- d. Service Access: Service access can be from Main Street on the north or Goodwin Avenue to the west.
- e. Utility Access: Utilities are generally readily available. Chilled water is available from a main in Main Street to the north.
- f. Parking: This site does not affect existing parking.
  - a. Parking Department has reviewed this location and has offered the following comments: “The location shown is University property and the least impacting any current parking lots. So we like this as an option, as it doesn’t chop up a parking lot. The drawback is that Goodwin is a highly trafficked street and not tucked back into a corner of campus.”
- g. Demolition: This site will require the demolition of a vacant lot with little to no utility relocations required.
- h. Land Use Compatibility: Prominent utility structures are nearby – large communications antenna array is directly across Main Street to the northwest, which gives the site a preexisting utilitarian aesthetic.



- i. Architectural Compatibility: Prominent utility structures are nearby – large communications antenna array is directly across Main Street to the northwest, which gives the site a preexisting utilitarian aesthetic.
- j. Master Plan Compatibility: **The use of this site for development is generally compatible with the 2018 Master Plan as a building was shown on this site.** Masterplan indicates future development at this location, but it is a generic designation, and no specific development has been identified.
- k. University Ownership: The parcel is owned by the University.
- l. Other: **This site has also been identified as a potential location for “Building X”.** Additionally, the tank would be too close to existing overhead power lines to the south, making this site not feasible without significant utility relocations.

## 2. Program Criteria Considerations

- m. Program Priorities: Need is to provide thermal/chilled water storage on campus and prepare for future increase in loads.
- n. Program Dislocation: This site is currently vacant and has most recently been used as temporary construction staging. No permanent programming would be dislocated.
- o. Program Relationship: This site location, at the corner of Goodwin Avenue and Main Street, is closely adjacent to the CHW loop and where future loads are needed.
- p. Urban Impact: This site is close to residential developments.
- q. Aesthetics: The storage tank could be designed to mitigate negative aesthetics and would be an opportunity for branding - either for the campus or energy efficiency promotion.
- r. Other: This location is near the eastern edge of campus and could be suitable for branding or other advertisements on the tank.

## C. Location 3 – Southwest corner of Harvey Street and Stoughton Street



### 1. Site Criteria Considerations

- a. Parcel Size: Available parcel size is approximately 80 feet by 180 feet for an approximate total area of 14,400 square feet and appears to be adequate for the proposed building program.
- b. Facility Expansion: Site is adequate for expansion.



- c. Physical Characteristics: The site is currently a hard-surface parking lot. There are mature trees around the perimeter.
- d. Service Access: Service access can be from Stoughton Street on the north or Harvey Street to the east.
- e. Utility Access: Utilities are generally readily available. Chilled water is available from a main in Harvey Street to the east.
- f. Parking: This site uses a portion of surface parking lot B18. Parking is available in the balance of Lot B18 as well as lot B2 to the west.
  - a. The Parking Department has reviewed this location and offers the following comments: “The Location as it is shown has potential issues. The Alleyway that runs East-West is not university property that I am aware of. Public Safety has requested alterations to the Lot and we have run into complications because of the Alley. I do not know of the exact availability of spaces in this lot, but as shown 72 of the 131 spaces get removed. Public Safety uses 27 spaces just for their fleet vehicles. This would leave 22 spaces for staff spread out between 2 areas. I know Public Safety has been working on trying to expand their Fleet parking area in this lot.”
- g. Demolition: This site will require the demolition of existing surface parking. Additionally, depending on the structures’ design, approximately 72 parking spaces will need to be eliminated from parking lot B18, requiring a payment to Campus Parking of approximately \$2,520,000 (72 spaces @ \$35,000 each). This site will also require the demolition and possible relocation of a gas line, sanitary sewer lateral, storm sewer, and parking lot lighting.
- h. Land Use Compatibility: The site is close to residential development to the east, and University structures to the west. The utilitarian aesthetic is not as compatible as other sites.
- i. Architectural Compatibility: The site is close to residential development to the east, and University structures to the west. The utilitarian aesthetic is not as compatible as other sites.
- j. Master Plan Compatibility: The use of this site for development is generally compatible with the 2018 Master Plan as a building was shown on this site. Masterplan indicates future development at this location, but it is a generic designation, and no specific development has been identified.
- k. University Ownership: The parcel is owned by the University.
- l. Other: This site would be on a main thoroughfare for campus and would be the most visible along Springfield Avenue.

## 2. Program Criteria Considerations

- m. Program Priorities: Need is to provide thermal/chilled water storage on campus and prepare for future increase in loads.
- n. Program Dislocation: Parking will be dislocated by using this site for the proposed tank; however this is in line with the long term goal to get rid of surface parking.
- o. Program Relationship: This site location, at the corner of Harvey Street and Springfield Avenue, is closely adjacent to the CHW loop and where future loads are needed.
- p. Urban Impact: This site is close to residential developments.
- q. Aesthetics: The storage tank could be designed to mitigate negative aesthetics and would be an opportunity for branding - either for the campus or energy efficiency promotion.
- r. Other: This location is near the eastern edge of campus and could be suitable for branding or other advertisements on the tank.



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## **VI. RECOMMENDATION AND CONCLUSION**

Based on the scoring by the committee members, Site **xx** is the recommended site for Thermal Energy Storage tank. Site **xx**, located on **xxxx and xxx**, is recommended for the following reasons:

- The site is **consistent** with the 2018 Campus Master Plan.
- The site is adjacent existing campus chilled water mains.
- There are adequate utilities in the area to serve the new facility.
- The site is beneficial to the engineering for the campus chilled water **system**.

Following concurrence from the Chancellor’s Capital Review Committee with the site selection committee’s recommendation of Site **xx** being the approved site for the Thermal Energy Storage tank, this revised building program concept should be put forth for review and approval by the appropriate campus bodies so that the utility project can be implemented in a timely manner.



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## VII. APPENDICES

### **A. The Site Selection Process and Master Planning**

Academic instruction buildings, research laboratories, administrative and support facilities, residential housing, recreational and athletic venues, social and cultural centers and other related structures represent the American university's presence in communities across the nation. Not only do these buildings facilitate important global academic missions, they also clearly demonstrate how higher education contributes to improving the quality of life in local societies. These contributions include the creation of outdoor civic spaces, courtyards and quadrangles; the preservation of historic structures and national landmarks; the commitment to improve environmental quality and energy conservation efforts; and, the potential to spark economic revitalization of urban centers and business districts on the municipal front line.

Critical decisions made at the beginning of every capital endeavor have major consequences for the overall success of the project. The site selection decision has a dramatic impact on almost every facet of the design and construction process. It influences building massing, functionality, multi-modal movement / connections, sustainability, operational and economic efficiency, security and certainly aesthetic attributes.

The University posits the site selection framework to assist the project team on the road to success. It addresses issues of both process and principle and is an extension of its quest to ensure that campus buildings are inviting, productive, and efficient, safe places to conduct scholarly activities. The selection of a site should not be based on spiritual, cultural or political convictions alone. Nor should it be driven by immediate gratification or climate diffusive initiatives. The selection policy purposefully excuses personal criteria for ones rooted in objective assets such as space planning, real estate, topography, utility infrastructure, zone density, functional adjacencies, and programmatic districting.

Siting a facility is a "life cycle" decision that recognizes the balance between near-term objectives, mid-course goals and long range master planning. This means placement must observe provisional opportunities and benefits, while at the same time embracing the providential obligation to reserve land for future development or conservation.

#### **Reference Document–**

*Administrative Guidelines in University of Illinois at Urbana-Champaign Campus Master Plan, Updated August 2018*

<https://www.uocpres.uillinois.edu/resources/uiucplan>

### **B. Site Selection Process – University of Illinois**

#### **SITE EVALUATION STUDY**

Identifying locations that merit consideration is the sole purpose of the *Site Evaluation Study*. This list should not be too narrow as to risk eliminating those sites that may be less obvious; yet, it should not be so large that it becomes unwieldy. General guidelines used in compiling the list include:

- A size approximating what is required;
- A reasonable location for the program under consideration; and
- University ownership (or reasonable acquisition availability).



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Experience suggests the list of sites compiled for consideration may be as few as three or upwards of ten. Those preparing the study must use their best judgment in developing the list of sites; however, a good rule of thumb is that if there is a question of whether or not to include a particular site, it should be included.

**Reference Document–**

*Site Selection Process – University of Illinois, March 2018, prepared by the University Office for Capital Programs and real Estate Services <https://www.uocpres.uillinois.edu/resources/planning>*



**C. Site Utilities Map with Considered Sites Indicated**

