UNIVERSITY OF HOUSTON
Campus Facilities Planning Committee
Agenda Item Description Form

1. **ITEM:** Fire Pump and Water Tank at D1 and D2

2. **REQUESTING DEPARTMENT:** UH Fire Marshall

3. **CONTACT NAMES & PHONE NUMBERS:** Chris Mc Donald, 3-5866
Ken Oliver, 3-5602

4. **PRESENTER:** Ken Oliver

5. **RECOMMENDATION/ ACTION REQUESTED:** Approval

6. **SUMMARY:**

In December of 2012, changes to NFPA 101 obligated the University to provide greater fire pump capacity to Cullen Engineering Buildings D1 and D2.

A study performed in 2011 to determine the options available for providing a fire pump to the two engineering buildings concluded that a single fire pump servicing both was the most cost effective solution. A few site options were investigated but the University expressed a preference for the tank to be located below grade, an option which is much less aesthetically objectionable to the campus and surrounding areas.

An approximately 160-250 SF building will be constructed adjacent to Cullen Engineering Building D1 to contain the electrical switchgear, pump controls and accessories. The below grade tank will be located in the lawn to the east of the building. A louvered ventilation unit will extend from the tank to four feet above grade to allow proper airflow for the fire pump. This unit will be approximately five feet by five feet in plan and will be constructed of painted steel and aluminum louvered panels on all four sides.

Cullen Engineering Building D1 has a brick façade, whereas Cullen Engineering Building #2 is constructed with precast architectural panels. Since the new building for the fire pump project is directly adjacent to D1, it will be constructed with a brick façade to match the existing brick. Service doors to the building will match the door type and color of the existing building. The roof will be flat, with internal roof drains, and will be light colored.

7. **PROPOSED START DATE:** Upon Approval

8. **SUPPORTING DOCUMENTATION:** Site plan and rendering

Site Plan and Rendering

UNIVERSITY OF HOUSTON

CULLEN COLLEGE OF ENGINEERING

FIRE PUMP ADDITION – BUILDINGS ONE AND TWO

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SUMMARY

In December of 2012- NFPA 101 was adopted by the State of Texas, and the University of Houston is expected to comply with these new code requirements.

NFPA 45 "2011" was also adopted by reference at that time.
NFPA 45 requires sprinkler protection in labs

Option 'A" – Fire Pump and Storage Tank for Each Building

Option 'A' is significantly **more cost ($)** due to the magnitude of the pumps (two)

Storage tanks (two) will be required to service both buildings.

Option 'A' also has the greatest negative impact on the aesthetics of the campus.

Option "A"- Synopsis- The maximum size fire pump required by NFPA Code is a 1250 gallons per minute (gpm) and one building is going to require that, so if two separate fire pumps were purchased then you would double the cost of the fire pumps purchased. Each building is going to require a 1250 gpm pump. Both pumps will have to be attached to the backup generator power and the D2's building generator will not support a fire pump of this size.

With that being said, either a new generator will have to be purchased to Support the D2 new fire pump. Not to mention we **will still need** a new mechanical building to house the new 1250 gpm pump for D2 and the larger break tank which will add even a larger cost impact to this project.

Option 'B" – One Fire Pump and Storage Tank for Both Buildings

For both options, an exterior building will have to be constructed. This is why Option "B" shows the location for one fire pump building, controls and some associated pipe to be housed in this location. The mechanical room will house the fire pump controller. The house tank with one1250 gpm pump, that will suffice for the largest of the Two buildings will be located underground and will be fed from the newly installed water line on the East side of this building.

NFPA requires the break tank to be sized for the largest of the buildings that the fire pump is connected to so we will only have one break tank for all buildings instead of one for each building.

Therefore – Option "B" would provide the "Best Value" for this project.

NFPA 14: - Code Reference

7.10.1.1.5 The maximum flow rate shall be 1000 gpm (3785 L/min) for buildings that are sprinklered throughout, in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems, and 1250 gpm (4731 L/min) for buildings that are not sprinklered throughout, in accordance with NFPA 13.

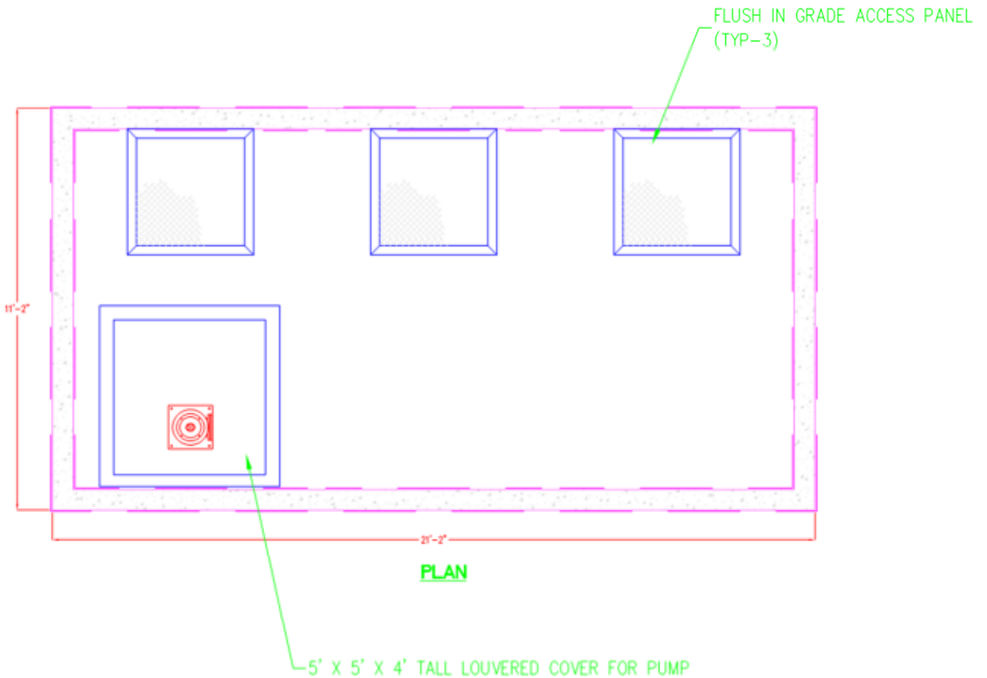
A.7.10.1.1 If a water supply system supplies more than one building or more than one fire area, the total supply can be calculated based on the single building or fire area requiring the greatest number of standpipes.
For a discussion of use by the fire department of fire department connections, see NFPA 13E, Recommended Practice for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems.

SELECTED CONFIGURATION

Locating the water storage tank, which weighs in excess of 250,000 lbs, in locations directly adjacent to the building creates significant structural issues with the existing building foundations. The recommendation from the Structural Engineer was that these configurations were not viable.

Option 'B' allows for the storage tank to be located away from the existing buildings and their structural foundations. Of these two options, the University expressed a preference for the tank to be below grade. This option is also much less aesthetically obstructive to the campus and surrounding areas. Option 'B' was therefore selected as the design solution.

Option 'B' will consist of a building located adjacent to Cullen Engineering Building #1 to contain the electrical switchgear, controls, and water accessories for the fire pump. A below grade tank will be located in the grass area to the east of the building. This tank will have three flush in grade access panels. A louvered ventilation cover will extend above the grade four feet to allow proper airflow for the fire pump. This cover will be approximately five feet by five feet in plan and will be constructed of painted steel and aluminum louvered panels on all four sides.



Plan View – Below Grade Storage Tank

MATERIALS

The existing Cullen Engineering Building #1 is a brick façade, whereas Cullen Engineering Building #2 is constructed with precast architectural panels.

Since the new building for the fire pump project is directly adjacent to Cullen Engineering Building #1, it will be constructed with a brick façade to match the existing brick of Cullen Engineering. The service doors will also match the door type and color of the existing building. The roof will be flat, with internal roof drains, and will be light colored.

RENDERING