



## Memo

Project: UCB Alumni House  
Re: UCB HVAC and Plumbing Recommendations  
Attn: Frederic Knapp  
CC: J.C. Reyes  
Date: 8/1/2011

Dear Frederic,

The recommendations in this memo represent minimum improvements that should be made to the mechanical, electrical, and plumbing systems at the U.C. Berkeley Alumni House. These improvement recommendations are based on the replacement of the west wing and minimum upgrades to the east wing. The existing conditions listed in this memo are based upon the 1953 historical drawings as well as observations made during a site visit on 6/16/2011.

### **HVAC SYSTEM**

The building's existing heating is provided by steam from the central plant. The west wing space heating is provided by steam convectors, with one located in each office. Ventilation air is provided to these spaces by an outdoor cooling only condensing unit. The east wing space heating is provided by a supply fan with steam coil located in the attic space above the restrooms. This wing does not have cooling.

#### OPTION 1 – Rehab Existing System:

- Central System
  - Keep low pressure steam system and replace piping, accessories, and insulation as necessary.
- West Wing and Lobby Distribution
  - Replace steam piping, convectors, and accessories with new. The size and quantity will change based on the new west wing plan.
  - Reuse existing cooling only condensing unit to provide mechanical ventilation in basement.
- East Wing
  - Replace steam piping insulation as necessary.
  - Replace supply and return fans and steam coils with new of equal capacity.
  - All ductwork and grilles that can be reused shall remain.

#### OPTION 2 – Convert Existing Steam to HHW:



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- Central System
  - Convert the building steam system to hydronic with steam to heating hot water (HHW) generators located in the building mechanical room.
- West Wing and Lobby Distribution
  - Replace steam piping, convectors, and accessories with hydronic fin-tube baseboard heaters or steel panel radiators.
  - Install thermostatic radiator valves, copper distribution piping, and new traps at the zone level.
  - If possible, reuse existing cooling only condensing unit to provide mechanical ventilation in basement.
- East Wing Distribution
  - Replace steam coils, steam piping, and accessories with HHW coils, copper piping, and HHW accessories.
  - Replace supply and return fans with new of equal capacity.
  - All ductwork and grilles that can be reused shall remain.

## PLUMBING

The building domestic hot water is provided by electric hot water heaters. The restroom fixtures are all the original fixtures installed in the 1950's. The tank type water closets are all 5 gallon tanks and cannot be retrofitted to low flush/dual flush. The wall mounted urinals have a high flush rate and also cannot be retrofitted with low flow flush valves. The wall mounted lavatories do not have low flow fixtures but may be retrofitted. If the east wing will not be modified, the existing non-code compliant fixtures may stay. The west wing however will need to be upgraded to code compliant fixtures.

Note: Starting on July 1, 2011, the water flow requirements in the California Code for water closets and urinals change. Single and dual flush water closets cannot exceed an effective flow rate of 1.28 gpf and urinals cannot exceed 0.5 gpf. The maximum flow rate allowances for shower heads and faucets remain at 2.5 gpm (@ 80psi) and 2.2 gpm (@ 60psi), respectively.

### West Wing

- Water closets should be removed and replaced. The tank type water closets we recommend are dual flush with 0.8/1.6 gpf for liquids and solids, respectively.
- The urinals should be removed and replaced which can be one of the following.
  - Zero water consumption urinals maximize water conservation and these urinals are our top pick.
  - If zero water consumption urinals are not desirable by UCB then we would recommend 1/8<sup>th</sup> gpf urinals with an auto flush device. These urinals aid in water conservation and function like an ordinary urinal but use significantly less water. The existing urinals cannot be retrofitted with the 1/8<sup>th</sup> gpf flushometer.



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- The wall hung lavatories are in good shape and can be reused. The lavatory faucets should be replaced with 0.5 gpm faucets.
- The electric hot water heater serving the west wing looks to be in good shape and upon further investigation may be reused. If this unit proves to not have enough capacity to serve the new west wing, an electric instantaneous tankless hot water heater may be added to serve one of the new restrooms.
- The piping material may or may not be reused. Testing of the cast iron pipe will be required to determine if some or all of the piping should be replaced as part of this scope of work. Since much of the copper is most likely reaching its life expectancy, we would recommend the replacement of the copper pipe.

### East Wing

- Water closets should be removed and replaced. The tank type water closets we recommend are dual flush with 0.8/1.6 gpf for liquids and solids, respectively.
  - If the water closets are not replaced, water savings from these fixtures will not be realized as they cannot be retrofitted.
- The urinals should be removed and replaced which can be one of the following.
  - Zero water consumption urinals maximize water conservation and these urinals are our top pick.
  - If zero water consumption urinals are not desirable by UCB then we would recommend 1/8<sup>th</sup> gpf urinals with an auto flush device. These urinals aid in water conservation and function like an ordinary urinal but use significantly less water. The existing urinals cannot be retrofitted with the 1/8<sup>th</sup> gpf flushometer.
  - If the urinals are not replaced, water savings from these fixtures will not be realized.
- The wall hung lavatories are in good shape and can be reused. The lavatory faucets should be replaced with 0.5 gpm faucets.
- The electric hot water heater serving the East Wing looks to be in good shape and upon further investigation may be reused.
- The piping material may or may not be reused. Testing of the cast iron pipe will be required to determine if some or all of the piping should be replaced as part of this scope of work. Since much of the copper is most likely reaching its life expectancy, we would recommend the replacement of the copper pipe.

### **ELECTRICAL**

The existing building electrical equipment is the original 1953 equipment which has become obsolete and unreliable. Panel boards have a 30 year life span and wiring has a 50 year life expectancy. The receptacle layout is minimal with “doghouse” type surface boxes in the areas requiring floor outlets.



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The building was originally lit with some fluorescent and mostly incandescent sources. It appears that some of the original fixtures have been upgraded, but these newer fixtures are still not energy efficient, nor are they aesthetically compatible with the building.

At this point, we are still determining the adequacy of the low voltage systems: phone, data, fire alarm, security, etc., but it is assumed any existing systems are obsolete.

### West Wing

- A new electrical switchboard will be required. The estimated size will be 1000 amps, 208 volt, 3 phase. The East Wing will be without electrical service during the construction of the new building.
- Two branch panel boards will be required on each floor.
- Each office will have a minimum of two receptacles as appropriate to support today's technology. Conference rooms will have three or more receptacles, including flush floor receptacles under the table in the large conference rooms.
- New lighting will include primarily suspended fluorescent direct/indirect lighting fixtures with latest generation T8 lamps and program start ballasts. Where downlights are appropriate, they will be compact fluorescent. It is anticipated that several decorative fixtures will be needed in public spaces, to be coordinated with the architect.
- Exterior walkway lighting will be installed to match campus standards.
- Lighting controls will include dual switching in offices with occupancy sensor override. Timer switches or occupancy sensors will be used in utility spaces and restrooms. Architectural dimming systems will be used in the conference rooms. Public and exterior spaces will be controlled via a lighting control panel incorporating an astrological timeclock.
- The building will require a new telephone system. In order to save cabling, it is recommended to install a VOIP system and operate the telephone through the data system.
- A new data system will be installed with jacks in office and conference room. It is recommended to install Cat 6A rated equipment.
- A manual fire alarm system will be provided.
- An intrusion security system will be installed including motion detectors, door and window contacts, keypads and an alarm horns.
- Large conference rooms are recommended to have a multi media system including lighting controls, overhead projection screen, projector, speakers and tie in for the presenter's laptop.

### East Wing

- It is recommended to replace the existing panel board in the East Wing

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- It is recommended to replace the lighting in the East Wing with energy efficient lighting that is appropriate for the historical ambiance of the space.
- The new phone and data systems will be extended to the East Wing as required.
- The new fire alarm system will be extended to the East Wing so the entire building is protected.
- The security system will be extended to the East Wing.