



Building Systems



M S P

Building Systems

Introduction

The following are descriptions of heating, ventilating and air conditioning (HVAC), plumbing, fire protection and electrical systems at major buildings within the Jefferson City Correction Center, are based on a brief building and site walk-throughs and discussions with facility operating personnel.

Central Plant

Existing Conditions

The central plant consists of four 1000 BHP and one 300 BHP high-pressure steam boilers. They are headered together to provide a redundant heating system for the prison. Under current operating conditions, the summer boiler (300 BHP) is too small to satisfy the summer load. In the winter, two large boilers can satisfy the load. The plant has been well maintained and appears to be in excellent condition.

Central hot water is also generated and distributed to each building from the central plant through a steam to hot water heat exchanger.

Proposed Actions

The plant if maintained at its current level could service the facility for the next 20 to 30 years. The boilers are currently an asset to the State and should be considered in any transfer of the property.

In our opinion, the future of the boiler plant hinges on ownership of the property and individual buildings. If the property, or a significant portion of the property, is held by a single entity, then a central boiler plant could provide operating benefits to the facility of reduced maintenance, optimized operational (energy and personnel) cost savings and reduced building construction costs. The cost of central utilities could



Boiler Plant Auxiliaries



Boiler Plant Exterior

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be incorporated into the individual rate structures. A full cost benefit ratio could be performed to determine if this would be a viable/attractive concept. However, if individual title is transferred for the properties, then we believe that the central utility system should be abandoned and individual systems serving each facility constructed.

It should be noted that the current development plant calls for major new road construction directly at the current boiler plant site. If this is the case this equipment will need to be relocated, or some combination of central and distributed plant established, or the unused portions of the facility mothballed under new individual heating plant are established.

If the plant is to be disposed, of the State should considered dismantling the plant and relocating it to the new prison or other State facility.



Boilers



Overhead Steam, Condensate & DHW Piping from Boiler Plant

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Utility Distribution & Steam Tunnels

Existing Conditions

The steam tunnels are a mixture of brick arch structures and new reinforced concrete tunnels. The piping in these tunnels were replaced in the mid-1980's. The steam piping appears to be in good condition, but operating personnel indicate that they have noticed increased maintenance requirements with the piping. No water leakage or standing water was observed during our visit, although some steel angle supports showed signs of advanced deterioration.

Central domestic hot water piping appears to be in good condition. A large portion of this piping appears to be uninsulated.

Domestic cold water piping is also installed in the tunnels. This piping appears to be in very poor condition.

Proposed Actions

The steam tunnels, in general, appear to be in satisfactory condition and could be reutilized; however, we have observed structural conditions that need to be addressed. The piping in the tunnel is currently 20 years old and will require escalating maintenance. Again, we believe that the future of the tunnels and piping depend on the future ownership of the campus. See Central Plant.

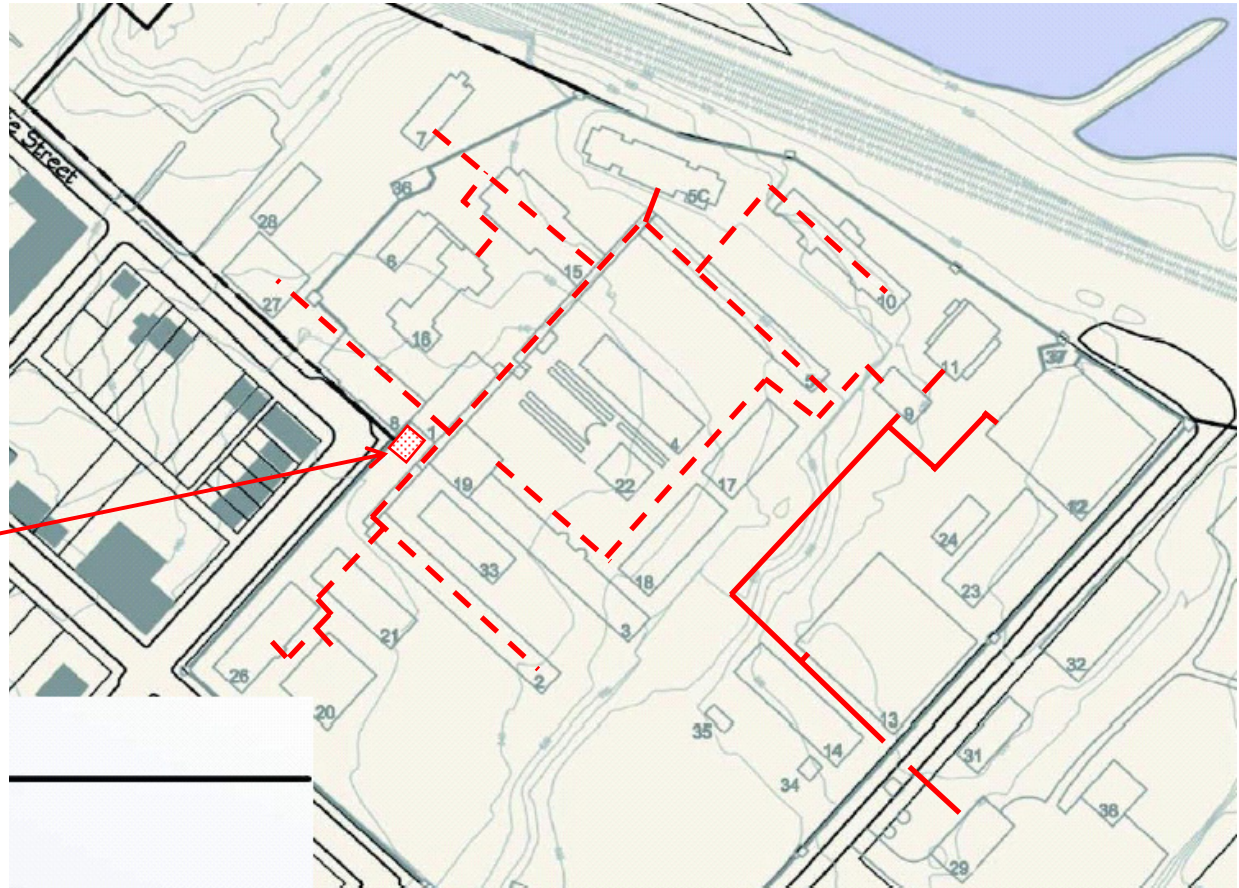


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Steam Tunnels – Utility Distribution

- Overhead Distribution
- - - Underground (Direct Buried, Tunnels or Through Basements) Distribution

Utility Transformers



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Gas Chamber

Existing Conditions

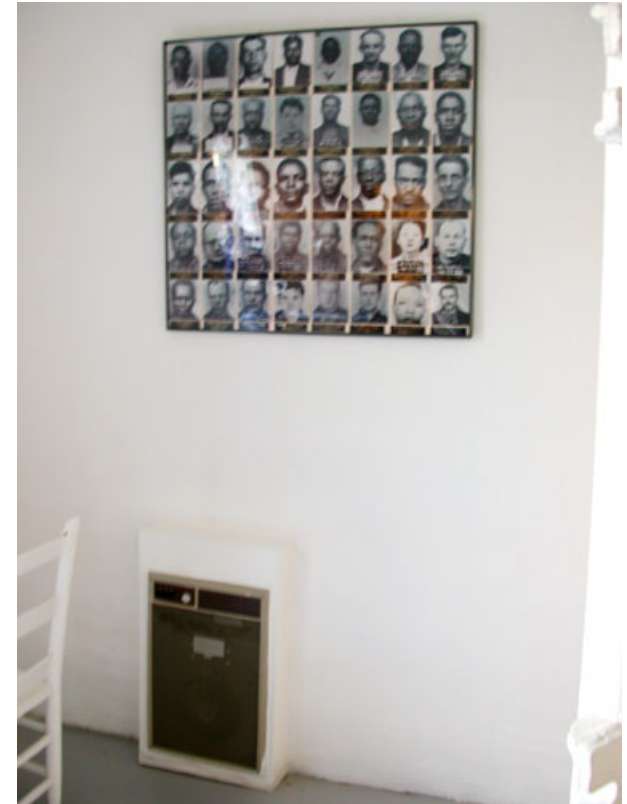
The gas chamber is a stand-alone structure. It is electrically heated with recessed unit heaters by the doors. Minimal plumbing and electrical systems are provided.

Propose Actions

We understand that the building is to be preserved in its current condition, as an historical artifact.



Gas Chamber Door



Wall Mounted Unit Heater

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Furniture Factory

Existing Conditions

The Furniture Factory provides furniture for State facilities. We understand that almost all of the furniture equipment infrastructure will be relocated to the new prison. The building is serviced with steam heat from the central plant from overhead lines. Pressure is reduced inside the building to 15 lbs. The building is heated with large unit heater style equipment. There is no central ventilation system. The building is fully sprinklered.

Electrically the building is served from an 800 amp/440 volt, 3 phase panel. The building has adequate power for machine shop activities.

Proposed Actions

The building remains viable for light machining applications. A new ventilation system and spot cooling would likely be required for a commercial setting.



Condensate Pump



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Metal Working Plant

Existing Conditions

The Metal Working Plant provides license plates for motor vehicles throughout the state. We understand that almost all of the equipment and infrastructure will be relocated to the new prison. The building is serviced with steam heat from the central plant from overhead lines. Pressure is reduced inside the building to 15 lbs. A summer steam boiler (1380 lbs./hour) is contained in the building. It is currently not utilized. The boiler should be capable of providing minimal heating to a 30,000 sq. ft. structure.



The building is heated with large unit heater style equipment. There is no central ventilation system. Exhaust is only provided in the finishing area. The building is fully sprinklered.

Electrically the building is served from a two 600 amp/440 volt, 3 phase panel. The building has adequate power for machine shop activities. Lighting is a mixture of incandescent and fluorescent

Proposed Actions

The building remains viable for light machining applications. A new ventilation system and spot cooling would likely be required for a commercial setting. In general, the systems could continue to be serviceable in an industrial setting.



Auxiliary Boiler

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Shoe Factory

Existing Conditions

The Shoe Factory has been renovated over the years to be a manufacturing facility of “finer” quality goods which require detailed tasks. In general, lighting has been improved and minimal power distributed for sewing machines and presses. The building is heated with steam unit heaters from distribution piping in the basement. No ventilation is currently provided.

Proposed Actions

If the Shoe Factory is to be renovated into a commercial center, then all new mechanical/electrical infrastructure will be required. Existing electrical service is likely not adequate to service commercial requirements.



Basement Storage Room – Steam Pipe



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Boiler House

Existing Conditions

The Boiler House contains the original boiler plant from the 1930's and supplemented in 1979. The equipment is virtually useless with spare parts being stripped for other facilities.

The building currently serves two functions:

- 1) as a transition between the new steam plant distribution system and the original steam distribution system.
- 2) To provide space for new condensate pumps were recently installed to return condensate to the new Boiler House.

Proposed Actions

The building is no longer a necessary part of the campus infrastructure except for the two minimal space requirement functions noted above. Gutted, abated and cleaned the building could be functional space adapted to many uses.



Old Boiler Plant and Overhead Piping

Interior View

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Housing Unit #1

Existing Conditions

Housing Unit #1 is provided with minimal mechanical and electrical systems. Steam unit heaters provide space heating; ceiling fans provide circulation. No central ventilation system is provided. The building is fully sprinklered.

The building is equipped with a 225 amp/440 volt service. Lighting and distributed power are minimal but meet current space requirements.

Proposed Actions

Any adaptive retrofit would require a wholesale gut rehab of the mechanical/electrical systems in the facility.



Building Systems

Housing Unit #2

Existing Conditions

Housing Unit #2 is provided with minimal mechanical and electrical systems. An abandoned heating/ventilating system is provided at the rooftop level. Steam unit heaters provide space heating; ceiling fans provide circulation. No central ventilation system is provided. The building is fully sprinklered.

The building is equipped with a 500 amp/440 volt service. Lighting and distributed power are minimal but meet current space requirements.

Proposed Actions

Any adaptive retrofit would require a wholesale gut rehab of the mechanical/electrical systems in the facility.

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Housing Unit #3

Existing Conditions

Housing Unit #3 is provided with minimal mechanical and electrical systems. Heating and ventilating units (100 percent outdoor air) were installed in a basement mechanical room in the 1980's. These units appear to be in good condition. The building is fully sprinklered.

The building is equipped with a 400 amp/440 volt service. Lighting and distributed power are minimal but meet current space requirements.

Proposed Actions

Any adaptive retrofit would require a wholesale gut rehab of the mechanical/electrical systems in the facility.



Basement Heating and Ventilating Units



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Housing Unit #4

Existing Conditions

Housing Unit #4 is provided with minimal mechanical and electrical systems. Steam unit heaters provide space heating; ceiling fans provide circulation. No central ventilation system is provided. The building is fully sprinklered.

The building is equipped with a 440 volt service. (Amperage could not be determined.) Lighting and distributed power are minimal but meets current space requirements.

Proposed Actions

Any adaptive retrofit would require a wholesale gut rehab of the mechanical/electrical systems in the facility. However, we understand the current master plan may include reutilizing this facility as a history museum. If that is the case it will be important to introduce modern MEPF systems into the building in a manner that consistent with the period nature of the museum. In addition, a fully conditioned space may be difficult to achieve without substantial intrusion due to the construction of the cell units. Only partial environmental control of the cell blocks may be provided (in addition to being historically accurate), while the central core is a more conditioned space.



Typical Cell Converted to Office



Views of Main Corridor
with Unit Heaters



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Housing Unit #5

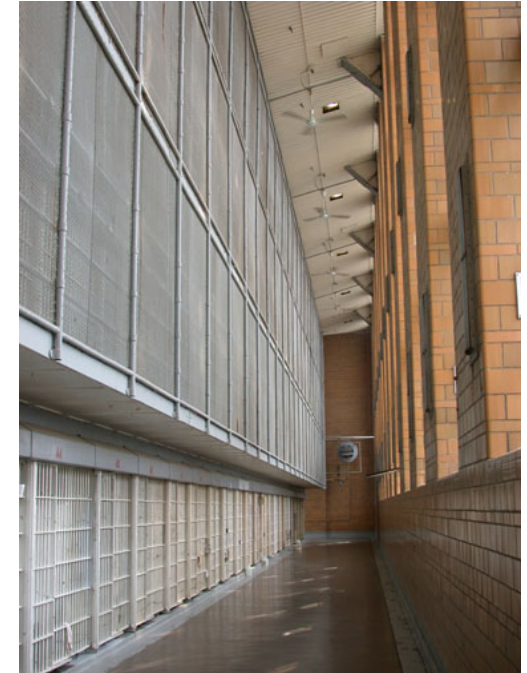
Existing Conditions

Housing Unit #5 is provided with minimal mechanical and electrical systems. Rooftop heating and ventilating units were abandoned in the 1980's and are in poor condition. Steam unit heaters provide space heating; ceiling fans provide circulation. No central ventilation system is provided. The building is fully sprinklered.

The building is equipped with a 225-amp/440 volt service from Building 5C. Lighting and distributed power are minimal but meets current space requirements.

Proposed Actions

Any adaptive retrofit would require a wholesale gut rehab of the mechanical/electrical systems in the facility.



Interior – Unit Heaters and Ceiling Fans



Interior Stairwell Core



Ice Plant Equipment