

Structural Report



KJWW Engineering, July 2008

As prepared by

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Executive Summary



- ❧ The major portion of the existing facility is in original condition with several areas having had minor renovations. The minor renovations have not included any substantial upgrades to the mechanical, electrical or structural systems. Most of the existing utilities appear to be original to the building.
- ❧ Our investigation of the existing mechanical and electrical systems indicates substantial upgrades to both would be required in order to accommodate a renovation.
- ❧ Our investigation of the structural systems indicates making any mechanical and electrical upgrades will be difficult and in some cases cost-prohibitive.
- ❧ During the field investigation portion of our task, we also noticed several architectural deficiencies we feel would need to be addressed if any major renovations are proposed for the Courthouse.

General



- ☞ In general the entire roof is in poor condition and needs to be replaced. Leakage at the skylights is evident and water stains on the Fourth Floor were visible.
- ☞ There did not appear to be any fire or smoke separations in the building.
- ☞ The existing main lobby that is open the entire height of the building would be considered an Atrium by today's codes. A Smoke Control system would need to be implemented. The Smoke Control system would involve the addition of an emergency exhaust system for the atrium and some means of introducing make-up air at the First Floor.
- ☞ The entire building's windows appear to be single pane with low thermal performance. Several windows have cracked glazing and are noticeably drafty. The windows appear to be past their life expectancy and should be replaced.
- ☞ There are several deficiencies with the existing elevator:
 - ☞ The elevator shaft is not vented.
 - ☞ There are no elevator vestibules present.
 - ☞ Additional elevators will likely be needed based on occupancy.
 - ☞ The emergency recall system is missing components and we are unable to determine its functionality.
- ☞ The only stairwell in the building is open to the Atrium and to each floor. Enclosed stairwells will be required to ensure proper egress from the building. The existing fire escapes may be adequate if proper egress and enclosures to the stairwell is provided.
- ☞ The building is comprised of enclosed and inaccessible ceilings, and structurally significant wall construction in areas that have not been recently renovated. Extensive architectural work would be required to allow for any mechanical or electrical upgrades.
- ☞ It was not determined that asbestos is present on site, but KJWW Engineering recommends having a professional abatement contractor evaluate the building before any renovations are planned.

Mechanical Systems



❧ Fire Protection

- ❧ The Rock Island County Courthouse is not protected by a sprinkler system. If the County decides to proceed with any type of renovation, the local fire marshal needs to be consulted to determine whether they will either require the entire building be sprinkled as part of the renovation, require only the renovated portion to be sprinkled, or another alternative determined.

Mechanical Systems (Cont'd.)



Plumbing

- ❧ A 4" incoming domestic water service is located in the southwest corner of the basement. The incoming water service is metered, but does not have a backflow preventor.
- ❧ Separate electric water heaters are located throughout the building to provide hot water. A hot water recirculating system was not observed. The water heaters did not appear to be original to the building and per the Courthouse staff, they are unaware of any deficiencies with the water heaters.
- ❧ Deficiencies
 - ❧ A backflow preventor is required for the incoming water service to be compliant with current codes.

Mechanical Systems (Cont'd.)



☞ HVAC Systems

- ☞ The HVAC for the County Courthouse consists of several systems spread throughout the building. These systems include dedicated air handling units for courtrooms on the First Floor, dedicated air handling units for the Fourth Floor, a few standalone fan coil units serving offices, and several window air conditioning units on upper perimeter floors. Some rooms' only means of conditioning was operable windows. The central core did not have any means of heating or cooling.
 - ☞ Based on discussions with courthouse staff, lack of cooling is a common complaint throughout the building.
 - ☞ The only system that appears to include ventilation air (outside air) is the courtroom air handling units. The amount of ventilation air is unknown, but based upon the tonnage of the unit and the high density of people in a courtroom, it is likely the units did not meet the code requirements for ventilation air.
 - ☞ Ventilation air is not present for any of the other HVAC systems.
 - ☞ Code requires a certain amount of outside air be delivered to a space to provide adequate indoor air quality. Ventilation air can be delivered to a space through forced ventilation via a central air handling unit with mechanical cooling or through natural ventilation via operable windows or vents. For most commercial buildings, natural ventilation through operable windows is not desirable from an energy and comfort standpoint. Operable windows are not likely to be open during winter months, so a supplemental means of introducing ventilation air would be needed for these times.
 - ☞ The air handling units serving the first floor court rooms appeared to be 30 plus years old and is likely past their life expectancy. Per discussions with Courthouse staff, the courtrooms consistently have complaints about the lack of cooling.
 - ☞ Roof mounted equipment on the roof includes condensing units for the air handling units and exhaust fans. All of the equipment on the roof appears to be past its life expectancy. The equipment has been exposed to extreme weather conditions over several decades and has resulted in rusted equipment and rotting of the wooden equipment curbs.
 - ☞ Deficiencies
 - ☞ Overall, the existing HVAC systems do not provide adequate cooling to the space, they do not provide the code required amount of ventilation air, and the majority of the systems appear to be past their life expectancy. New HVAC systems would be required for any type of renovation.
 - ☞ The location for the new HVAC system would need to be provided. Currently, there is no dedicated mechanical space for equipment, so existing space would either need to be claimed for the mechanicals or the equipment would need to be located on the roof. Refer to the structural items below for issues and limitations concerning mechanical equipment locations.

Mechanical Systems (Cont'd.)



☞ Steam System

- ☞ Boilers located in the adjacent Rock Island County Jail provide steam to the Rock Island County Courthouse. The size and number of boilers located in the jail is not known, but there were installed in approximately 2002 and per the Courthouse staff, they are unaware of any deficiencies with the boilers.
- ☞ A condensate return station is located in the basement of the County Courthouse and condensate returns back to the County Jail Boiler system. The condensate station appears rusted and is in poor condition. It appears to be original to the building and appears to be operating well past its life expectancy.
- ☞ Steam and condensate are piped throughout the County Courthouse to perimeter steam radiant heaters. The radiant heaters provide the majority of the heating for the County Courthouse during the winter.
- ☞ Deficiencies
 - ☞ Per discussions with Courthouse staff, inadequate heat is a common complaint of occupants during the winter. It was observed in several offices the perimeter steam radiant heaters had been removed to allow furniture to be located near windows. The steam and condensate piping that had served the previous radiant heaters is stubbed up and capped at the floor.

Electrical Systems



☞ Lighting System

- ☞ There are incandescent, compact fluorescent retrofit, compact fluorescent and T-12 fluorescent lamps in use throughout the courthouse.
- ☞ The existing lighting controls are basic and appropriate for the age of the building, with only local control provided in each room. Occupancy controls, energy conservation controls, time-based controls, and lighting level controls were not present in the building.
- ☞ There are several self-contained emergency lighting fixtures throughout the public spaces, and a few in the private spaces. Areas that have been renovated contain a higher density of emergency lighting fixtures.
- ☞ Deficiencies
 - ☞ Newer, more energy efficient lamping technologies should be implemented throughout the building, and dependent upon the size of the renovation may be required to meet current energy codes.
 - ☞ The existing lighting controls would require an upgrade to be compliant with current energy codes. These controls would include occupancy detection, lighting level adjustment, time-based, and energy conservation controls.
 - ☞ All exterior exits lack acceptable emergency egress lighting, and in some cases are lacking lighting fixtures themselves.
 - ☞ Acceptable emergency lighting coverage throughout the interior of the building is required to meet current emergency egress illumination requirements.

Electrical Systems (Cont'd.)



⌘ Power System

- ⌘ The courthouse is currently fed from a 1600A, 240V, 3-phase service from the local Utility Company. There is a pad mounted utility transformer located directly adjacent to the building.
- ⌘ The existing service has been upgraded a few times and currently appears to meet the needs of the existing facility. However, it was noted there is very little spare capacity in both the service size and the main distribution.
- ⌘ The existing service is not protected by ground fault or surge suppression equipment.
- ⌘ Power distribution is provided by branch panels located throughout the building, with a significant amount of surface conduits and raceways throughout the public spaces.
- ⌘ Besides the UPS in the existing data rack and battery lighting fixtures there are no provisions for emergency power in the Courthouse.
- ⌘ Deficiencies
 - ⌘ If only renovations are planned for the Courthouse, the existing utility service size appears adequate.
 - ⌘ In order to accommodate any major renovations or HVAC upgrades, the existing service equipment requires reconfiguration and expansion, including ground fault protection, to provide additional distribution.
 - ⌘ If any sort of addition is planned along with the renovations, the existing utility service will require a complete upgrade.
 - ⌘ The existing branch panels throughout the building are at capacity and will require replacement, in most cases, to accommodate renovations.
 - ⌘ While emergency power is not required, it was mentioned by Courthouse staff to be an important addition to the building to be consistent with the nearby jail that was recently constructed. In order to provide emergency power the following will be required:
 - ⌘ A generator, probably to be outdoor mounted in a weatherproof enclosure (given the lack of available space and clearance in the basement).
 - ⌘ A minimum of two transfer switched, one for life safety loads and one for general emergency loads.
 - ⌘ Distribution equipment for the generator. Loads desired to be on the emergency circuits would need to be rewired to this new equipment.

Electrical Systems (Cont'd.)



❧ Fire Alarm System

- ❧ The existing zone type fire alarm system consists of smoke detectors for elevator recall, although not at every floor, a few manual pull stations, and audio/visual annunciation devices located only in public areas.
- ❧ The system is integral to the security system in the building and it is unknown if the system meets the UL listings for fire alarm.
- ❧ There are a few additional fire alarm devices located sporadically throughout the building. However, some of these are standalone hardwired (or battery) devices not tied into the main fire alarm system or security system.
- ❧ The system has not been extended into renovated areas due to lack of expansion capabilities.
- ❧ Deficiencies
 - ❧ The entire fire alarm system needs to be replaced and brought up to current codes.
 - ❧ Areas of greatest concern:
 - ❧ No detector coverage in elevator shaft.
 - ❧ Limited or non-existent audio/visual coverage in most areas other than the main public lobbies.
 - ❧ Incomplete elevator recall system.
 - ❧ Travel distance between manual pull stations exceeds code minimum.
 - ❧ Detector coverage is inadequate for a building not protected by a sprinkler system.

Structural Systems



- ❧ No existing drawings are available that show the structural framing of the building.
- ❧ From field observations, it appears the structure is framed with steel beams bearing on masonry walls. The spacing of the beams is not known since they are concealed by the floor, roof and ceiling construction. It also appears that the floor structure consists of a flat tile arch, which spaces between beams. The flat tile arches are covered with a terrazzo slab of unknown thickness. We also assume there are steel rods at mid-height of the steel beams at unknown spacing to resist the thrust of the flat tile arches and to provide confinement of the clay tile.
- ❧ Due to the existing floor and roof framing system, it will be difficult to create new floor and roof openings for new mechanical or electrical chases.
- ❧ Since most of the roof structural members are concealed, it will be difficult to determine if the roof structure will be capable of supporting additional mechanical HVAC equipment.
- ❧ Deficiencies
 - ❧ There are some cracks in the terrazzo floor topping, but it is our opinion these are only a cosmetic imperfection and not structural problems.

Known Repair Items



Estimated Costs

Courthouse



No renovation, just to continue to utilize without code compliance

- ❧ Elevator Replacement (2)
\$175,000
- ❧ Roof Repair \$500,000
- ❧ Electrical \$500,000
- ❧ Plumbing \$500,000
- ❧ Windows \$500,000
- ❧ HVAC \$500,000
- ❧ Fix entryway/steps
\$100,000

Additional renovation costs to make code compliant

- ❧ Sprinkler System
- ❧ Enclose Staircase
- ❧ Fill in Rotunda
- ❧ Lead abatement
- ❧ Asbestos abatement
- ❧ ADA & OSHA
Compliance

County Office Building



No renovation, just to continue to utilize without code compliance

- ❧ Elevator Replacement (2) \$175,000
- ❧ Roof Repair \$500,000
- ❧ Electrical \$500,000
- ❧ Plumbing \$500,000
- ❧ Windows \$500,000
- ❧ HVAC \$500,000
- ❧ Fix entryway/steps \$100,000

Additional renovation costs to make code compliant

- ❧ Sprinkler System
- ❧ Fill in Rotunda
- ❧ Lead abatement
- ❧ Asbestos abatement
- ❧ ADA & OSHA Compliance

Ostrom Hall



No renovation, just to continue to utilize without code compliance

- ❧ Painting/Siding \$15,000
- ❧ Windows \$50,000
- ❧ HVAC \$15,000
- ❧ Parking \$5,000
- ❧ Fix entryway/steps \$40,000

Additional renovation costs to make code compliant

- ❧ Sprinkler System
- ❧ Lead abatement
- ❧ Asbestos abatement
- ❧ ADA & OSHA Compliance