

## **JOHNSON & KING ENGINEERS**

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October 24, 2007

Ms. Irene Tyson  
The Boudreaux Group  
PO Box 5695  
Columbia, SC 29250

Re: Unitarian Universalist Fellowship of Columbia  
Review of Structural Condition

Dear Irene:

On October 16, 2007, along with you and other members of the design team, I made a site visit to the Unitarian Universalist Fellowship Church in Shandon for the purpose of observing the structural condition of the existing building and evaluating the feasibility of certain proposed architectural modifications. Observations were limited to structural elements that were exposed to view and which could be seen without removal of building finishes. This report is based on observations made during the site visit and a review of the architectural drawings for the original building. Drawings were not available for the later building additions. No testing or structural calculations were done. Cost figures mentioned in this report are approximate and do not represent a guarantee of actual costs which may be involved.

### Original Construction

The original building was designed for the Tree of Life Synagogue by LBC & W Architects and constructed around 1951. The structural system consists of a combination of load-bearing brick and concrete block walls and load-bearing wood stud walls supporting wood rafter framing and site-built wood truss framing.

Subsequent to the initial construction, a wood-framed barracks structure was obtained from Fort Jackson and added to the rear of the church to serve as an education wing. A free-standing octagonal-shaped library was constructed around 1974.

### Structural Condition

The original building structure appeared to be in generally good condition, based on the structural elements that could be observed. No significant cracks were observed in the interior masonry walls and no rotting or deterioration was observed in the limited portions of the wood structure which could be seen. No attic access was found, so the wood roof trusses were not observed. No evidence of sagging or deflection was observed inside the building or at the exterior roof lines. However,

some evidence of past roof leaks was observed on ceiling tiles (Photo 1), which could have resulted in some deterioration of wood structural members or roof sheathing. Cracks are present in the exterior brick veneer on the east side of the building at the wall outside the original choir area (Photo 2). The cracks are due to settlement, which is a common occurrence on a site such as this one. The grade slopes down towards the east so that the east wall where the cracks were observed was probably built on fill which may not have been fully compacted during the original construction. The roof leaks and settlement cracks are relatively minor issues.

Unlike the original main building, the education building which was built using a former barracks structure is in poor structural condition. This building was added to the east side of the main building, so it has experienced significant settlement, probably due to being built on fill on the sloping site. The education wing is supported around its perimeter on a continuous concrete block foundation wall which shows evidence of severe settlement cracking (Photos 3, 4). At the floor in the classroom at the east end of the wing, it can be seen that the wall is pulling away from the floor (Photo 5). The wall has moved outwards to such an extent that the floor framing has been losing support on the wall. As an apparent result of this being recognized, additional framing and shoring posts were added at some time in the past to provide additional support for the floor adjacent to the foundation wall (Photo 6). The interior floor framing of the education wing is supported on steel shoring posts (Photo 7) instead of concrete block piers as is more typical in crawl space construction. Posts such as these are generally considered to be temporary, rather than permanent, structural supports. In addition, these posts appear to bear on concrete blocks (Photo 8), rather than on concrete footings. Again, this type of construction is usually considered temporary rather than permanent.

The settlement problems in the exterior foundation wall and the temporary nature of the interior supports are serious deficiencies that could result in an unsafe condition. As long as this building remains in use, the foundation wall and interior support posts should be frequently inspected by the church to ensure that no movement has occurred to compromise the support of the structure.

No structural problems were observed at the library building.

### Seismic Considerations

Section 1614.2 of the 2003 IBC says: “When a change of occupancy results in a structure being reclassified to a higher seismic use group, the structure shall conform to the requirements for a new structure.” Any renovation of this church would not result in a change in the seismic use group, so the IBC would not require the existing building to be seismically retrofitted. However, any addition would be required to conform to the code requirements for new construction.

### Potential Modifications

The existing opening into the sanctuary area (Photo 9) can be made wider, up to about 33 feet wide, by replacing the existing lintel beam over the opening with a 30” deep steel beam supported on new steel columns and footings at each end. Approximate cost: \$35,000.

The existing window opening in the east wall of the building at the original choir area (Photo 10) can be enlarged by removing the brick veneer and wood framing below the existing opening. The width of the opening and the top of the opening would remain the same. The original drawings show wood siding on this wall, so it is possible that the brick was added after the original construction. The existing windows may be helping to support the brick and wood wall framing above the opening, so it is assumed that a new steel beam lintel with tube columns and footings may be needed at to span over the opening. Approximate cost: \$4,000 (not including new windows and finishes).

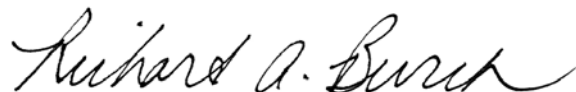
The existing window openings in the north exterior wall of the foyer area (Photo 11) can be enlarged by removing the portions of the brick wall below the existing openings. The width of the openings and the top of the openings would remain the same. Approximate cost: \$3,000 (not including new windows and finishes).

It is recommended that the masonry opening at the existing proscenium over the pulpit in the sanctuary not be made wider. The south side of this opening is at an exterior wall, so the opening cannot be enlarged in this direction. The north side could only be enlarged by a few feet, but this should not be done since this portion of masonry wall is one of the few walls currently serving to provide lateral resistance to wind loads on the sanctuary portion of the building in the north-south direction.

#### Recommendations

1. Due to the amount of wood construction present in the church, regular termite inspections should be performed.
2. The foundations of the education wing should be regularly monitored by church personnel. No recommendations are made for permanent repairs to the foundations since this is a very poor quality structure and it is understood that the master plan contemplates the eventual replacement of this wing. The education wing should be demolished as soon as practical based on the master plan.

Sincerely,

A handwritten signature in cursive script that reads "Richard A. Burch".

Richard A. Burch, PE

**Photos Taken on October 16, 2007**



Photo 1      Roof Leaks



Photo 2      Veneer Cracks



Photo 3      Foundation Wall Cracks



Photo 4      Foundation Wall Cracks



Photo 5      Wall Pulled Away



Photo 6      Shoring Added

**Photos Taken on October 16, 2007**



Photo 7 Post Shores



Photo 8 Concrete Block Footing



Photo 9 Opening to Sanctuary



Photo 10 Original Choir Area Windows



Photo 11 Foyer Windows