

September 21, 2012

Chen Moore and Associates
500 West Cypress Creek Road, Suite 410
Fort Lauderdale, FL 33309



Attention: Mr. Oscar Bello, P.E.

Reference: **Schooner Wharf Bar Patio**
Key West, Florida
Structural assessment report

Dear Mr. Bello,

In accordance with our Agreement dated September 7, 2012, BCC Engineering made a site visit to the above-referenced project on September 12, 2012. Steven Goldstein, Chief Engineer – Building Structures, walked the site to observe existing conditions, took measurements of the existing structure, and took photographs to document typical conditions. Following the site visit, we met with Birch Ohlinger from the City of Key West’s Engineering Department, to verbally discuss our initial findings.

Project Description (General)

Schooner Wharf is a bar and restaurant at the northwest corner of William Street and Lazy Daze Avenue in the Key West Bight Area. The complex consists of a one-story bar building at the northeast corner of the property, with an adjacent covered outdoor patio to its west. There is a one-story kitchen and restroom building at the northwest corner of the property, and a covered stage at the southwest corner. An L-shaped wood dock wraps around the east and north sides of the building. We have been informed that the bar building is believed to have been constructed in the 1950’s and that the covered patio is believed to have been constructed in approximately 1989 or 1990.

Under a previous agreement with Chen Moore, BCC has designed building alterations and additions to the northeast building, consisting of the replacement of the roof structure of that building and the construction of a new two-story service building to the south of the existing building. Design of these structures has been completed. In preparation for construction, partial demolition of the existing building has commenced. Under a separate previous agreement with Chen Moore, BCC prepared repair documents for the wood dock. It is our understanding that the dock repairs have been completed.

The scope of the initial building alteration/addition documents did not include any work on the covered patio. Recent inspections by City of Key West personnel have raised concerns about the structural integrity of this structure. Since existing drawings of the patio structure are not available, our site visit included documenting sizes and locations of the patio’s structural members.

Project Description (Structural)

The roof structure, serving as a dining deck, consists of plywood sheathing supported by wood joists running in the north-south direction. The joists are supported by built-up wood girders spanning in the east-west direction. These girders are supported by wood columns. The east ends of the easternmost girders are supported by a ledger bolted to the existing bar building.

The wood joists appear to be bearing on girder ledgers, with perhaps a few toe-nails holding them in place. No metal connection hardware was observed at these connections. The girders are connected to the columns with steel angles and lag screws.

A wood railing surrounds the deck on its north, south and west sides, with the parapet of the bar building serving as the railing on the east side. A wood L-shaped staircase provides access from the ground floor to the roof deck.

Much of the flat portion of the deck is surrounded by a sloped roof, somewhat similar to a mansard. The sloped roofs consist of clear corrugated plastic decking, in some locations underlain by corrugated metal deck. This decking is supported by thin wood lattice members resting on sloped wood joists spanning between wood girders. Along the north side of the patio, there is an extension that appears to have been added subsequent to the initial patio deck construction. It consists of a fabric roof supported by a metal beam and column pipe frame resting on the wood dock structure.

The sloped wood joists are connected to the girders with nailed light-gage metal connectors. The girders are connected to the columns with steel angles and lag screws.

Foundation conditions are unknown. The wood columns are embedded into the ground floor concrete slab on grade. It is presumed that each column sits on some sort of foundation element located below the slab.

Observations

We found most of the structure to be in satisfactory condition. There were water stains on the underside of some plywood sheathing and on some of the wood framing members, due to roof leakage. It is not known whether the leakage has occurred through the current roofing system or through a previous roofing system. Although there were water stains, there was no evidence of decking or framing deterioration.

Deterioration was observed at the bases of several of the wood columns. There were some other columns where the base could not be observed because the column had a decorative rope wrapping or because the column was surrounded by a planter. Since both of those conditions are conducive for the collection of water, it is possible that some there was some additional column base deterioration that went unobserved.

Structural Analysis

Upon our return from the site visit, we performed a few critical calculations to assess key structural members. Although we were not requested to perform a comprehensive analysis of the entire structure as part of this report, we analyzed a typical roof joist, a typical interior built-up girder and a typical interior column. We analyzed these members based upon a superimposed dead load of 10 psf plus a live load of 100 psf. These loads are mandated by the current Florida Building Code, and we also believe this same loading requirement was in effect at the time of the original construction. The 100 psf live load is unlikely to be present during a typical day-to-day scenario, where the deck is occupied by dining patrons sitting at tables. However, we understand that during special events, the deck

serves as an observation platform. On these occasions, the actual live load could much more closely approach the 100 psf Code requirement.

We performed our analysis based upon the assumption that the wood is #2 Southern Pine, which is a commonly used material in South Florida. There is no method available to visually ascertain the actual grade and species of wood. The only way to make a determination would be to remove some samples and send them to a laboratory for load testing.

Our analysis indicated that the columns have adequate structural capacity to support the Code-mandated gravity loads. However, neither the joists nor the girders had adequate structural capacity. (If the wood is #1 Southern Pine, the joists would have adequate structural capacity, but the girders would still not be adequate.)

A wind load analysis was not requested as part of this report.

Conclusions and Recommendations

The first decision to be made is whether to demolish the existing structure and replace it, or whether to upgrade the existing structure. Given the disruption to the tenant's operations that would be result from demolition, and given the generally satisfactory condition of the structure, we believe that a retrofit is a feasible option.

Based upon our observations and analysis, we recommend that the following retrofits be implemented. These recommendations are being made in narrative form. For each recommendation, the City should retain an engineer to prepare construction documents, backed up with engineering calculations as required.

Critical items

1. The joists should be strengthened to support the Code-mandated dead and live loads. This can be accomplished by doubling the joists, either by "sistering" a new joist next to each existing joist or by adding new joists halfway between each joist.
2. The girders should be strengthened to support the Code-mandated dead and live loads. This can be accomplished by adding diagonal "knee braces" at each column. These knee braces serve the function of shortening the girder span to the point where the girder capacity is sufficient to support the load.
3. Deteriorated column bases should be repaired. This can be accomplished by shoring the roof at each affected column location, chipping out the slab around the column, cutting out the column base, and recasting the slab with a new steel connector that elevates the column off of the slab.
4. Construction of the new tie beam for the bar building will require that the patio deck be severed, at least temporarily from the bar building. However, we believe that reattaching the deck to the building will present a very difficult challenge. We believe that it will be most expeditious to permanently sever the patio from the building and create two independent structures. This will require the introduction of three new columns and foundations adjacent to the west wall of the bar building. Right now, the patio derives its lateral stability from its attachment to the building. Once the structures are severed, a new system of lateral stability will be required for the patio. The knee braces recommended in item 2 above can do "double duty" and provide this stability in the east-west direction. If the buildings are severed, knee braces would also have to be provided in the north-south direction.
5. For items 1 and 2 above, occupancy of the deck should be restricted until the joists and girders are strengthened. At a minimum, if the City believes it can control access so that occupancy is limited to seating at the tables that are currently in place, with no standees allowed on the deck, it would be safe to allow the deck to remain in operation. If the City does not believe it possible to control access, it may be prudent to close the deck until the repairs are made.

Recommended items

1. Pending completion of a wind analysis, it appears questionable that the wood-to-wood connections are

capable of resisting wind uplift and lateral forces mandated by the current Code, and perhaps even those mandated by the Code in effect at the time of construction. We recommend that these connections be upgraded by providing additional connection hardware.

2. The railing at the roof deck may not meet Code-mandated height requirements. We recommend that an architect investigate this issue, and that the railing be replaced if it is non-compliant.
3. If there is leakage through the roofing system, the deck should be re-roofed to protect the structural members from future deterioration.
4. Pending an analysis, it doesn't appear that the corrugated plastic sheets are adequately anchored down, and could blow away in a hurricane. We recommend that additional supporting members be added.

Sincerely,

BCC ENGINEERING, INC.



Steven Goldstein, P.E., S.I.

Chief Engineer – Building Structures

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