

852 Middle Street, Sullivan's Island Structural Assessment

August 2, 2021

This report concerns our structural assessment of 852 Middle Street on Sullivan's Island, South Carolina. The report also contains some observations and estimation of the house's age, and the evolution of the form of the house. Our observations are general in nature and are limited to the structure which was accessible to view, in this case the foundation and first floor framing from the crawl space, some wall framing from inside the house, and the roof and attic framing of the main body of the house from the attic.

House Description

852 Middle Street is a one story wood framed house. Facing the house from the street you are looking at the west elevation of the house. The main body of the house is a simple gable shape with the ridge running north to south. There is a shed roof porch to the street, and a shed roof to the rear that extends over a kitchen, a back porch, and a bedroom. This is most likely the original form of the house. On the south end of the gable, there has been attached an addition with an unusual shaped roof; hip shaped in the rear, or southeast corner, and shed shaped in the front, or southwest corner. My only thought to as why there is a shed roof addition at the front of the house is that if the plate height of the original front porch, which is fairly low, was carried all the way across the front, then turned down the south side of the addition, the rooms in the addition would then have very low ceilings. (see Photo 1)

The original and addition's foundation of the house consists of round or rectangular timber piles, traditionally either driven or jetted to some depth. (see Photo 2) The bottom of some of the piles seemed to be at grade in some instances, suggesting they were not driven into the ground at all, but placed like piers just at or slightly below grade. (see Photo 3) It was difficult to determine without digging. Immediately adjacent to many of the piles are concrete block piers, which may or may not be supported by footings. The block piers are also placed where timber piles were most likely located but have since been removed. The piles for the original house are in rows running north to south, with the rows being approximately seven feet apart, with the front porch bay closer to 8 feet. Spanning from pile to pile are wood girders of various sizes. Almost all the girders are shimmed up from the top of the piles or piers various amounts by blocks of wood, with no connection between pile or pier and the girder. The floor joists span east to west over the girders and are in general 3x6's at approximately 27 inches on center. The finish flooring is laid directly on the joists with no subfloor. The front porch framing appears to be not as old as the rest of the

house and consists of 4x4 joists at 2 feet on center spanning north to south between 4x6 girders that are approximately 7'-6" on center.

Along with the south gable end of the original house there are two rows of piles which were added running in the east to west direction to support the addition. The rows are approximately 6 feet apart. Girders spanning between piles and block piers are various sizes of wood members. Again, various amounts of blocking are added to the tops of the piles and piers to provide bearing for the girders. The joists span north to south and are 3x8's at approximately 27 inches on center. Like in the original house, the finish flooring is fastened directly to the joists with no subfloor.

Both the original house and the addition are balloon framed, meaning the exterior wall load bearing studs bear directly on the girder below, and their bases can be seen from the crawl space. Seen from inside the house in a few locations where interior siding has been removed, the studs are 3x4's except at the corners, seen on the fully exposed south gable end, where there are larger corner posts and diagonal bracing. The original gable end wall framing was altered for a new doorway when the addition was attached. The only studs visible from the inside belonged to the original main gable shape of the house. Those studs support a continuous top plate of undetermined size.

The accessible attic space is directly above the original main gable shape of the house. (see Photo 7) The attic is empty except for the occasional wire. 3x4 attic joists at 32 inches on center span the 14 feet of the gable depth and bear on the bearing walls' top plate. On top of the joist end there is a 1x plate that the rafters bear on. The rafters align with the ceiling joists at 32 inches on center, are 3x4's and span from the 1x plate to the peak of the roof where they abut the corresponding 3x4 coming from the other side of the roof. There is no ridge beam or ridge board. On top of the rafters are spaced ¾ x 8 inch slats, which support a metal roof. No other portion of the attic space or rafter framing was accessible to view.

Structural Conditions Observed

The timber piles are in considerably poor condition. Most are rotten, many are so rotten at the ground level that they seem to have separated from the remaining pile in the ground, if indeed the piles were driven below grade. In some instances the round or rectangular piles appeared to stop at grade or just below similar to a pier. (see Photo 3) It was difficult to determine their extent without digging adjacent to a pile. The concrete block piers have obviously been placed adjacent to extremely deteriorated piles, and some have been located to replace a removed deteriorated pile. The tops of the remaining wood piles and the concrete block piers are not at a consistent elevation (possibly indicating they are not driven piles but the tops of piles bearing at grade and settling), and so nearly every pile or pier has a leveling block of wood placed on top. (see Photo 5) Some of the concrete piers appear to have settled.....perhaps they do not bear on a proper footing.....and no longer provide bearing for the girder. Most of the concrete block piers were constructed with mortar, however some of the piers are dry stacked, have settled, and the blocks have shifted in relation to one another in the stack. (See Photo 4) This lack of a consistent bearing elevation for the floor framing can be seen inside the house in unlevel floors. None of the piles or

piers had a structural connection to the girder. In general, the house has an extremely poor and deteriorated foundation.

The girder and floor joist system has suffered termite damage to various extents. The damage is widespread, but it appeared that no single joist or girder was without some structural integrity. There is termite damage to the wood flooring, possibly indicating unseen damage to the tops of the floor joists. The floor framing for the front and back porch appeared relatively new, which might be expected considering the amount of water porches are exposed to. A lot of structural work was performed on Sullivan's Island houses after Hurricane Hugo (1989) and I suspect some of the porch framing and new concrete block foundation piers dates from that time.

There is a considerable amount of termite damage to the stud framing that is exposed inside the house. (see Photo 6) You can see the deterioration of many of the studs' base from the crawl space. The termite damage extends to the wall top plate which can be seen as deteriorated from below inside the house and deteriorated from above inside the attic.

Some of the attic joists are termite damaged where they bear on a deteriorated top of wall plate. (see Photo 8) Some of the roof rafters have been water stained at roof leaks and have been termite damaged where they bear on the 1x plate above the attic joists. Nearly all the roof rafters and ceiling joists seem sound (they may need to be drilled to determine there are no internal termite tracks) except for at their bearings.

Recommendations

I understand the house is to be renovated. In this renovation, I would urge the house be considered a historic structure, as I believe the house dates to at least the 1920's, possibly earlier, as the type of wood construction here can be seen for several decades centered around 1900. I am not familiar with the history of recreational use of Sullivan's Island and that is why I conservatively put its construction date at approximately 1920. I believe the addition was built soon after.

If the house is considered historic, then there are special variances afforded it by the 2018 IEBC code, and by FEMA.

In any case, I would recommend the following:

- 1) A much more thorough structural/architectural investigation as to the extent of the damaged floor framing, wall framing and roof framing.
- 2) I think it should be made a given that the house be raised, to what elevation (not necessarily to FEMA level because of its historic nature) to be determined and a new foundation be provided either in the same footprint location on the lot or a different one. A house mover could easily lift and move this house to allow a foundation (either driven piles, or footings and piers) to be built.
- 3) Either the exterior siding, or interior board finish will need to be removed to investigate the extent of deteriorated wood stud wall framing.

- 4) A more complete report can then be made about the extent of damage, and more specific recommendations be made.
- 5) Construction documents can then be prepared to show how the house and its individual structural members can be repaired/strengthened without removing historic fabric.
- 6) Last but certainly not least, the house needs a thorough investigation by a termite control company, and a plan for keeping the termites under control must be made.

If you have any questions, or would like to talk about aspects of the report or any future work on the house, please do not hesitate to contact me.

A handwritten signature in black ink that reads "John Moore PE". The signature is written in a cursive style with a large initial "J" and a stylized "P" at the end.

John Moore, PE



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8

