

Austin Woman's Club

Preliminary Structural Evaluation

SPARKS ENGINEERING, INC.

STRUCTURAL EVALUATION, DESIGN AND TESTING

September 29, 2014

John Volz, AIA
Volz O'Connell Hutson, Inc.
1105 West 42nd Street
Austin, Texas 78756
512-476-0433

**SUBJECT: PRELIMINARY STRUCTURAL
EVALUATION**
Austin Woman's Club
Carriage House Addition and
Retaining Walls along Nueces Drive
Austin, Texas

Dear Mr. Volz:

Sparks Engineering, Inc. (SEI) has completed our preliminary structural evaluation of the carriage house addition and retaining walls along Nueces Drive at the Austin Woman's Club in Austin, Texas. The purpose of the structural evaluation was to develop opinions and recommendations regarding major structural issues and repairs. These services were requested by you and were performed in accordance with our contract for consulting services.

Project Overview

During the evaluation distress was observed at the carriage house addition due to differential foundation movement between it and the carriage house. The retaining wall adjacent to the carriage house appeared stable with minor cracking. However, the wall south of the main drive appeared unstable and at risk for collapse. The conditions at the wall south of the main drive were noted with recommendations for immediate stabilization of the wall in the letter provided to Volz O'Connell Hutson, Inc. dated September 17. Our detailed observations, finding and recommendations are presented below.



By:

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On September 17, SEI project engineers Zach Webb and Wes Gibson visited the site to perform the evaluation. It included observation of the site features and drainage, visual inspection of the carriage house addition limestone veneer, observations of the typical structural systems on the interior of the addition, and a visual survey and measurement of lean of the limestone masonry retaining walls. Below is a site schematic for clarity of terms used in the report.

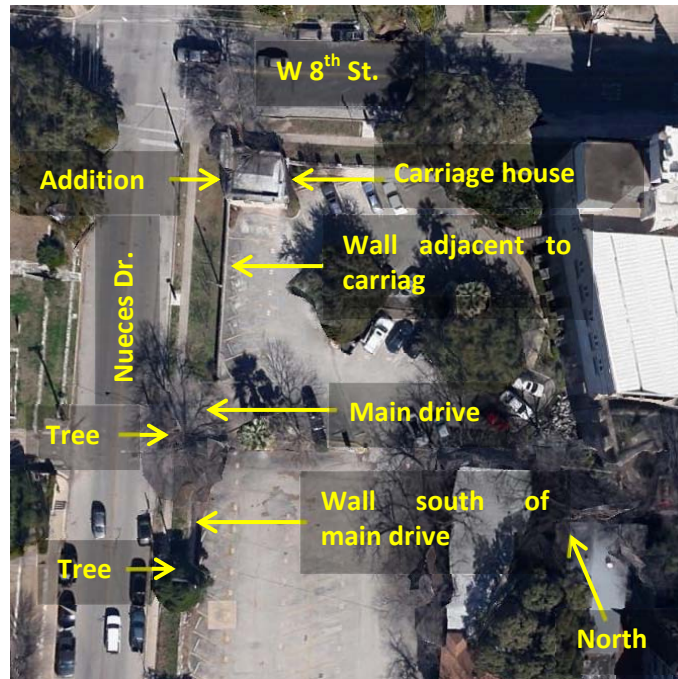


Figure 1: Overhead view of property for clarity of terms.

RETAINING WALLS

The retaining walls are constructed of multi-wythe limestone masonry and have clay pipe drains located approximately every 10-foot along the length. It was unclear at the time of the evaluation if the drains were properly functioning on either wall.

On the wall adjacent to the carriage house, slight outward movement of 1-inch at the center was observed (Figure 2, right). There was also minor cracking on the inside face at the north end of the wall (Figure 2, left). Overall this section of wall appeared to be performing adequately.



Figure 2: Wall adjacent to carriage house; Left, minor cracking on inside face on north end of wall (highlighted). Right, minimal outward lean at center of wall (lean of wall highlighted).

Significant signs of distress were observed at the wall on the south side of the main drive, including displacement-induced cracking on the outside face (Figure 4), outward displacement at the base (Figure 3, left), and significant outward lean along the length of the wall, up to 9-inches from plumb (Figure 3, right). The distress and movement is likely due to two adjacent trees (and roots) which are pushing on the inside face of the wall.



Figure 3: Wall on the south side of main drive; Left, displacement at base of wall. Right, the wall is leaning out up to 9-inches (lean of wall highlighted).

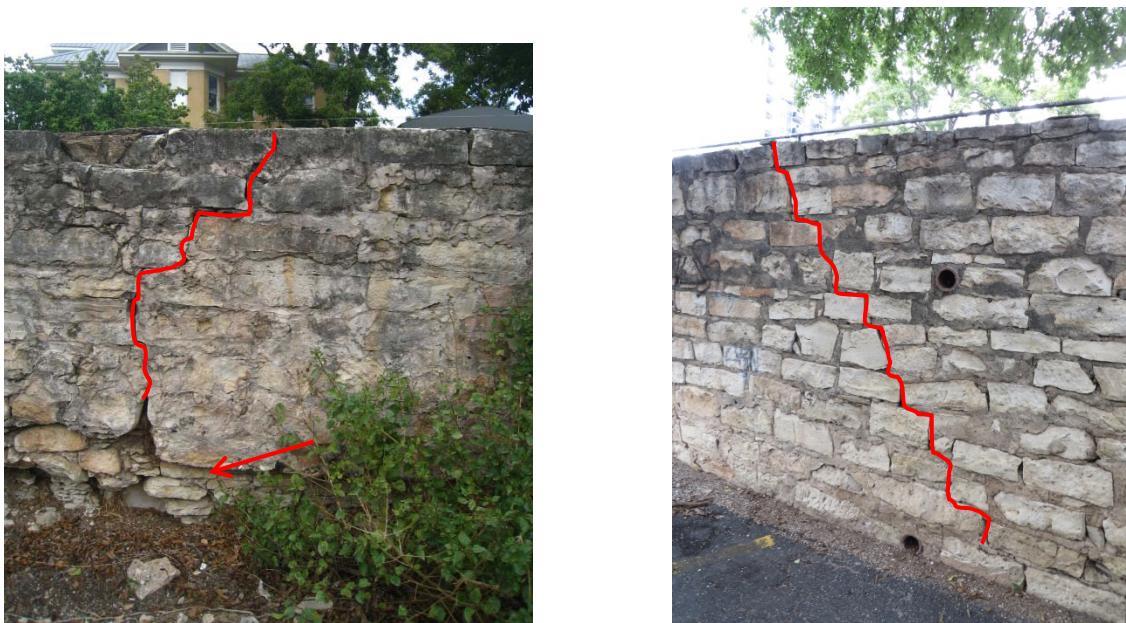


Figure 4: Wall on the south side of main drive; Left, cracking on outside face of wall and outward displacement at the base (highlighted). Right, stair step cracking on the outside face of the wall (highlighted).

Opinions and Recommendations

The wall adjacent to the carriage house is performing adequately, with minimal cracking. **The wall on the south side of the main drive is unstable and there is a risk of collapse.** The following is recommended;

Wall adjacent to carriage house

1. Obtain the services of a licensed plumber to locate and scope the existing below-grade drains and plumbing in and around the wall. As required, reinstall adequate drainage.

Wall on south side of main drive

1. Barricade the adjacent parking stalls and the grassy area along the top of the wall at street level.
2. Immediately provide lateral shoring along the length of the wall. The bracing members can be made of sawn timber or structural steel, such as tilt-wall pipe braces. The bracing must be anchored to either a dead man or a temporary foundation. The sketch below is shown to illustrate the general approach. We recommend that the owner engage a qualified contractor right away in order to expedite the work and coordinate on the design with regard to the most efficient means and methods.

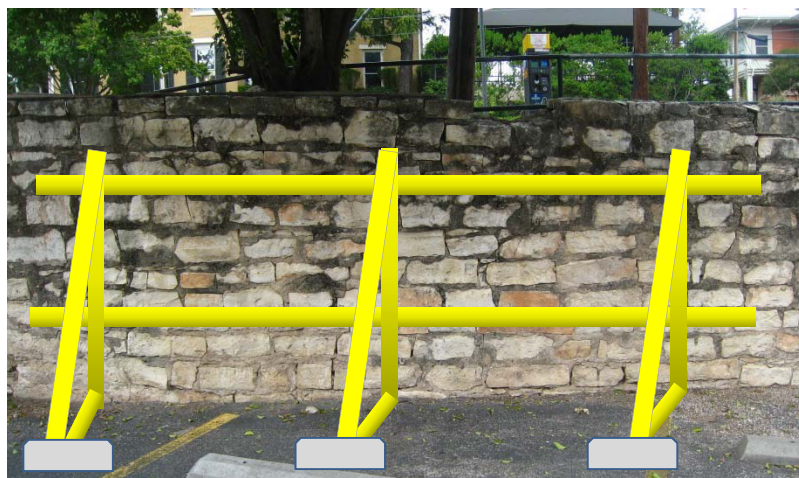


Figure 5: Suggested lateral shoring concept.

3. Remove the two trees located along the length of the wall.
4. Perform a geotechnical investigation to determine soil type at the location of the wall.
5. Demolish the existing wall and construct a new retaining wall. The actual design will be based on detailed analysis, however for planning purposes the wall will consist of an 8-inch thick reinforced concrete wall founded on drilled pier foundations spaced at 10-feet with a continuous pier cap. The foundation design will be based on recommendations from the geotechnical investigation. The wall can be built with a brick ledge in order to install a limestone masonry façade to match existing conditions. A permanent protective railing should be installed at the top of the wall. Drainage and weep holes should be provided along the length of the wall.

CARRIAGE HOUSE ADDITION

The carriage house addition is constructed with wood-framed walls and roof, and a limestone masonry veneer. The inside of the walls is plaster secured on metal lath. A test pit was installed outside of the west wall of the addition. From the test pit the 4-inch thick slab foundation of the addition was visible. A drainage pipe wrapped in fabric located 12-inches below grade was also noted from the test pit.

In addition, the following was observed at the carriage house addition;

1. Grade at the addition is sloped towards the building, instead of towards the street. Further, it was unclear if the drainage pipe was functioning properly.
2. Differential movement between the addition and carriage house has caused distress at the addition. Specifically; displacement away from the carriage house at the tops of the north and south addition walls, up to 1-inch (Figure 6, left). Failure of caulking between the wood roof at the addition and the masonry parapet on the carriage house (Figure 6, right). And continuous cracking at the bathroom floor and north kitchen wall in the addition (Figure 5).
3. It was unclear what kind and at what spacing, if any, connections were in place to secure the limestone masonry veneer to the wood framing. The veneer on the top of the north wall below the roof eave is loose and easily moved by hand.
4. The wood framing at the addition appears to be merely toenailed to the wood ledger at the carriage house.

The evaluation did not include the carriage house proper. However, after limited visual observations it appears to be stable, likely founded on limestone, with minimal cracking noted.



Figure 6: Displacement away from the carriage house, approximately 1-inch. Right, caulking failure along the roofline of the addition.



Figure 5: Left, continuous crack along the width of the floor between carriage house and the addition. Right, continuous crack in the wall along the interface of the carriage house and the addition (highlighted).

Opinions and Recommendations

Based on the displacements and cracking caused by differential movement between the addition and the carriage house, the following actions are recommended to stabilize the addition;

1. Perform a geotechnical investigation to determine soil type at the location of the addition.
2. Underpin the addition by installing drilled piers with a continuous cap or grade beam around the perimeter. The foundation design will be based on recommendations from the geotechnical report.
3. Remove the masonry veneer. Provide masonry ties between the wood studs and the veneer upon reinstallation.
4. Remove flooring inside the addition in order to expose the crack in the slab. Repair crack, or remove and replace concrete as necessary to provide a continuous, level floor.
5. Provide adequate drainage around building and slope grade away from building.

Due to the extent of repairs needed, it will likely be more efficient to demo and rebuild the edition using the available salvaged materials.

CLOSING

The investigation was limited to the carriage house addition and retaining walls along Nueces Drive. This report and recommendations are based on the observed conditions at the subject property at the time of the investigation. Other conditions may exist, or develop over time, which were not found during the investigation. These recommendations do not represent a final design or specification. Additional investigation may be required as part of a comprehensive program or design.

Please contact us if you have any questions regarding this report.

Sincerely,

SPARKS ENGINEERING, INC.



Patrick Sparks, P.E.
Principal

Wes Gibson, PE
Project Engineer



Zach Webb, PE
Project Engineer