

L. M. Swayze Engineers, PLLC

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141 Broadmoor Street,
Meadowlakes, Texas 78654

July 1, 2022

Redeemer Church
Attention: Mr. Drew Barker
Brady, Texas

Re: Site Visit to 200 West 4th Street,
Brady, Texas

Purpose of Visit: Visual Observation of Existing
School Building, circa 1942, to
Try to Determine Condition of
Existing Structure

Mr. Barker,

At the request of your pastor, Paden Behrens, and Dan Jacobson, member of Griffin & Jacobson Architects, LLC, I visited the referenced property to observe the 80 year old school building located at 200 West 4th Street, Brady, Texas. According to a previous property inspection report by Texas Commercial Real Estate Inspections, PLLC, the building was constructed as a school in 1942. It is my understanding that it has been utilized as an elementary school, a middle (junior high) school, and a high school. At one time, the school board condemned the building.

It is also my understanding that New Song Christian Fellowship has used the building, along with an addition to the original building at the east end, as a church/worship facility for the past 15 years, and it is the desire of Redeemer Church to continue using the building for the same purpose.

GENERAL OBSERVATIONS

Interior:

The building is two stories tall and constructed in the typical style of schools of the 1940's. There is a continuous 10 to 12 foot wide corridor that runs the length of the original building on each floor; there are classrooms on each side of the corridor, except at the west end where there are no classrooms on the north side of the corridor.

The demising walls are constructed with clay tile units that have been plastered on each side. The corridor walls terminate at the bottom of a cast-in-place concrete beam at the top on each floor. Therefore, the corridor walls are not load bearing walls.

Given the age of the building, it is my professional opinion that the cracking that appears in those walls is minimal, with the exception of the easternmost wall; the interior tile that serves as exterior masonry veneer back-up, has experienced major horizontal movement that presents 1/2 inch to 1 inch wide cracks that mirror through the exterior masonry. This will be addressed in the "Exterior" portion of this report.

The first floor is suspended above grade and supported with steel joists fabricated from small steel angles, spaced at 16 to 24 inches on center. The second floor is framed in the same manner. A small access opening was available through the ceiling below the second floor in the west end of the building. The second floor slab system is a thin concrete slab supported by what appears to be paper-backed rib lath.

Access to the first floor framing system was limited to the extent that viewing it was not possible. However, I suspect the first floor is a thin concrete slab constructed like the second floor slab in the corridor and wood framing and decking in the classroom areas.

Both the first and second floor slabs are covered with vinyl tile in the hallways and wood flooring in the classrooms.

Access to the roof framing system was also limited to a small opening through the second floor ceiling in one of the classrooms at the west end of the building on the south side. A steel joist framing system was noted spanning in a north-south direction supporting a diagonal wood deck that appeared to be tongue-and-grooved.

The fastening method of the rib lath and wood decking to the steel joists is not apparent.

There is an abandoned concrete basement near the center of the length of the building that formerly housed the boiler for the building heating system. The boiler has been removed; some of the boiler piping remains, though. There is a musty smell in the basement that could indicate the presence of moisture in the concrete walls and floor slab. It is unknown if a french drain system is currently in place.

EXTERIOR

Foundation:

The foundation is suspended above the ground surface with 12 inch by 12 inch air vents present on the north and south sides of the building. Those vents are covered with expanded steel mesh in most cases. Therefore, access to the underfloor system from the exterior is limited and viewing the floor framing system is difficult at best. Refer to photo on Page 9.

The floor system is discussed in previous paragraphs in the "Interior" portion of this report.

The exterior concrete beams support the first floor steel joist/concrete slab framing system, the brick veneer, and the clay tile back-up for the brick veneer.

Numerous expansion cracks and settlement cracks were noted on all sides of the foundation. Small cracks were also noted at the upper re-entrant corners of the previously mention foundation vents. Refer to photos on Pages 9 and 10.

A 1 1/2 inch chamfer was cast into the upper exterior corner of the beam.

No construction joints were noted in the exterior foundation beams.

Masonry Veneer:

The masonry veneer is constructed with common brick with a vertical striation pattern on each masonry unit. It is laid in a common Flemish bond pattern. No expansion joints are present in the veneer. This has caused the veneer on the south side of the building to move horizontally at least 1 1/2 inches at the west end and a smaller amount at the east end. The west side veneer at the southwest corner and the southside veneer at that same corner, have moved enough horizontally such that the west and south faces of the veneer are flush with the vertical face of the concrete beam on each side of that corner. Refer to photos on Page 6.

Extensive expansion cracking has occurred on the south face of the building and will be a continuous maintenance issue throughout the remaining life of the building. Those same type of cracks are present on the other faces of the building.

The masonry veneer is supported over the windows by steel lintels that have been rusting for quite some time. The thickness of those lintels is unknown. Refer to the photo on Page 8.

Roof:

A visual observation of the roof was not a part of this assignment.

STRUCTURAL OBSERVATIONS

Based on my visual observations during this site visit, and my past experience with buildings of this type of construction and age, it is my opinion that the main superstructure of this building is a formed, cast-in-place concrete system consisting of concrete beams supported by concrete columns, bearing on spread footings at an unknown depth and of unknown dimension. The concrete beams support the previously mentioned steel joist/thin concrete slab system at the first and second floors, and the steel joist/wood decking system at the roof level.

It is not known if there are any cast-in-place shear walls in the system, nor is it known how or whether the cross walls constructed of clay tile, are fastened to the concrete frame.

No detailed construction documents were available. Although unlikely, the Brady School System might still have those documents. It would certainly be worth the time and effort to ask their Facilities Manager if they still exist.

The corners of the foundation present the worst visible foundation damage on the structure. The damage seems to have been caused by horizontal movement of the masonry veneer due to expansion from solar heating, because no expansion joints in the veneer were installed initially.

Settlement of the southeast corner spread footing has exacerbated the cracking in the east masonry veneer at that corner; the cracking telegraphs into the interior clay tile back-up wall. Apparently, water damage has also occurred in that area.

Overall, the degree of foundation settlement that has occurred to date, would be expected given the age and construction type of the building.

Although the visible portions of the steel floor and roof joists appear to be in good condition, when viewed from the bottom, as do the floor slab and wood roof decking, the report prepared by Texas Commercial Real Estate Inspections, PLLC (TCREI), stated that it is possible that the roof has already leaked as evidenced by the water stains present in the existing ceiling tile in several locations. Those areas need to be closely examined at the roof level to determine the condition of the diagonal wood roof decking; any rotted areas will need to be repaired or replaced.

CONCLUSIONS

The building in question appears to be structurally sound but there are several items that need to be more closely examined to verify and reinforce this conclusion.

1. The areas on the roof that are in poor condition, as mentioned in the TCREI report noted above, need to be examined from below to determine the condition of the diagonal wood decking. Any rotted wood will need to be replaced.

Review of the 1940 Uniform Building Code did not specifically state that diagonal wood decking was unacceptable as a roof deck. The concern with using this material is its effectiveness as a horizontal roof diaphragm in transferring the lateral loads due to the wind, into the structural framing system. Obviously, it has stood the test of time.

2. Due to the lateral movement of the south wall at the southeast corner, it will be necessary to examine the joist seat conditions where the first and second floor joists, and the roof joists bear on their respective concrete beams. If damage has occurred, it will need to be repaired to provide adequate joist bearing.
3. The corners of the long building will need to be surveyed to determine the degree of settlement, if any, has occurred. The southeast corner is of particular concern, regarding further settlement. The goal, in any case, is to arrest any further settlement rather than jacking the corner back into its original position. It has been my experience that trying to return any part of a building of this age, to its original grade configuration, causes additional stress and cracking in the walls and structural members; this should be avoided if at all possible.

For instance, at the southeast corner, pouring a new diagonal concrete beam supported by a drilled pier on each end, below the existing concrete foundation beam (to avoid the existing corner footing) would arrest any further settlement.

The idea of arresting (stopping) future settlement is to prevent further damage to the cast-in-place concrete structure, the exterior masonry veneer and its clay tile back-up walls, the existing cross-walls, and the floor and roof framing systems. Any jacking operations will also involve cutting the respective concrete beams loose from the existing below-grade spread footings, risking further unanticipated movement.

4. New 3/8" thick masonry expansion joints with backer rod and the appropriate caulking compound, should be cut into the exterior veneer to facilitate reworking the masonry at the corners of the long building and ease the expansion stresses in the veneer. The joints should be approximately 20 feet on center or at the upper and lower corners of the sets of multiple windows on the long faces of the building.

5. The steel plate lintels supporting the masonry veneer over the windows, have undergone significant rusting during the life of the building. This item is in a gray area of structural integrity. However, it will become a safety issue sooner than later. Those lintels should be replaced with galvanized plate (G-90) to aid in the stability of the veneer over the windows and eliminate a maintenance item for the future. Refer to the photo on Page 8.
6. The exposed roof structure in the existing Worship space appears to be in good condition. The large trusses and the framing between those trusses appear to be performing as designed.
7. The thin concrete floor slabs, estimated to be 2 to 2 1/2 inches thick, supported by the steel floor joists spaced at 16 to 24 inches on center, also appear to be performing as designed. The live load capacity of the slab system is adequate to support a classroom uniform load of 40 pounds per square foot (psf), the second floor corridor load and of 80 psf, and the first floor corridor load of 100 psf, based on a 2 inch thick concrete slab with a compressive strength of 2,500 psi and a joist spacing of 24 inches.

It is my professional opinion that the structural system of this building is basically sound. Items 1 through 5 listed above are things that need to be dealt with in the near future to prolong the life of the building.

These further recommendations should also be followed:

1. The classroom population should be limited to no more than 20 persons;
2. Heavy concentrated loads, such as those imparted by the wheels of a piano, should be avoided;
3. Running and jumping in all areas should be avoided;
4. All of the interior wall cracks and exterior veneer and foundation cracks should be monitored.

This concludes my report. Should you have any questions, please feel free to contact me.

The opinions expressed in this report are based on the visual observations of the author obtained during a site visit to the aforementioned facility at 200 West 4th Street, Brady, Texas, on June 8, 2022. References were also made to the report prepared by Texas Commercial Real Estate Inspections, PLLC, dated June 6, 2022. No warranty, expressed or implied, is made to the opinions expressed herein.

Respectfully submitted,



Larry M. Swayze, P. E.
T.B.P.E. Registration no. 38354



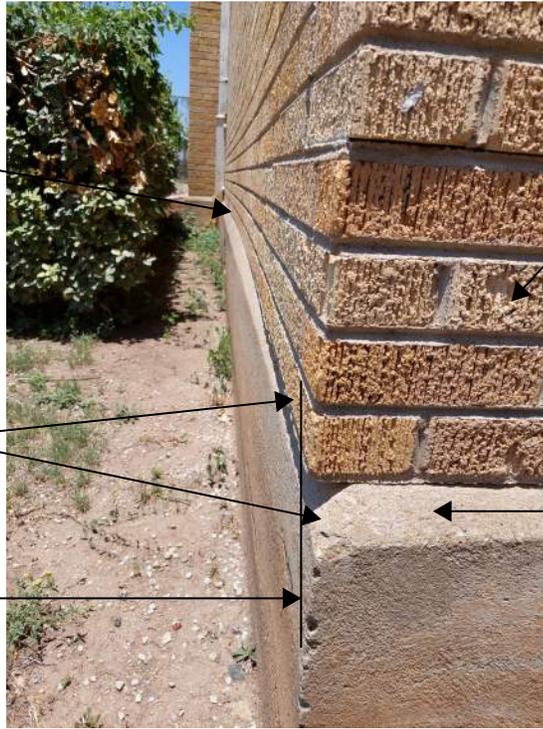
Copy to: Mr. Paden Behrens
Mr. Wayne McDonald

Mr. Anthony Pynes w/TCREI, PLLC
Mr. M. Dan Jacobson, G & J Architects, LLC

Notice how the masonry veneer has moved back to the original position @ the edge of the 1 1/2" chamfer, as you look down the face of the wall to the north .

Masonry veneer has moved to the west and is now flush with the 1 1/2" chamfer of top of foundation beam.

Face of veneer and foundation beam.



Masonry veneer above the 4th course has moved to the south and now protrudes outward approx. 1/2" while the bottom 4 courses remain in their original position @ top of 1 1/2" chamfer.

1 1/2" chamfer of top of foundation beam.

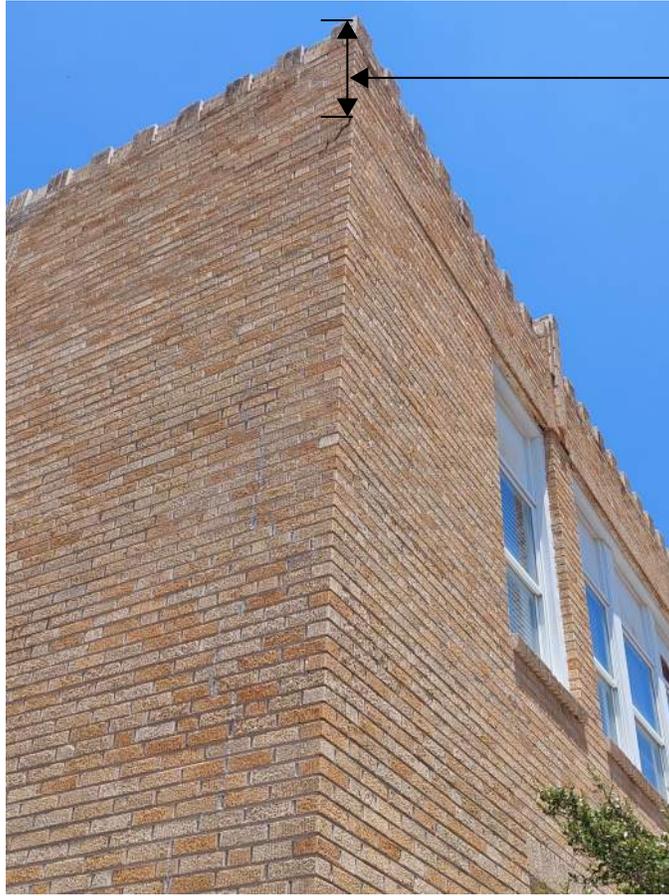
Southwest corner looking north



Masonry veneer above the 4th course has moved to the south and now protrudes outward approx. 1/2" while the bottom 4 courses remain in their original position @ top of 1 1/2" chamfer.

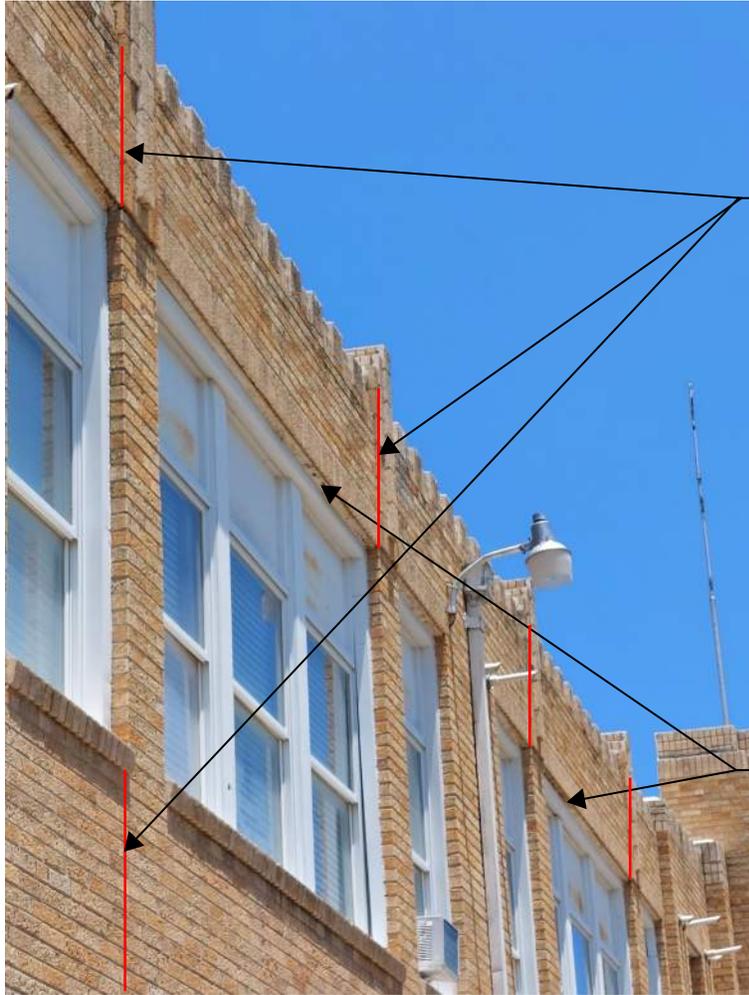
Southwest corner looking east

Masonry veneer band at the parapet level has moved to the south and and to the west and now protrudes outward approx. 1/2", while the bottom veneer panel on each side of the corner behaves as described on Page 6.



Masonry veneer band at the parapet level.

Southwest corner looking northeast



Possible locations of control joints in the veneer.

Rusting steel plate lintels above windows. Typical @ all windows.

Typical Window Sets on South Wall

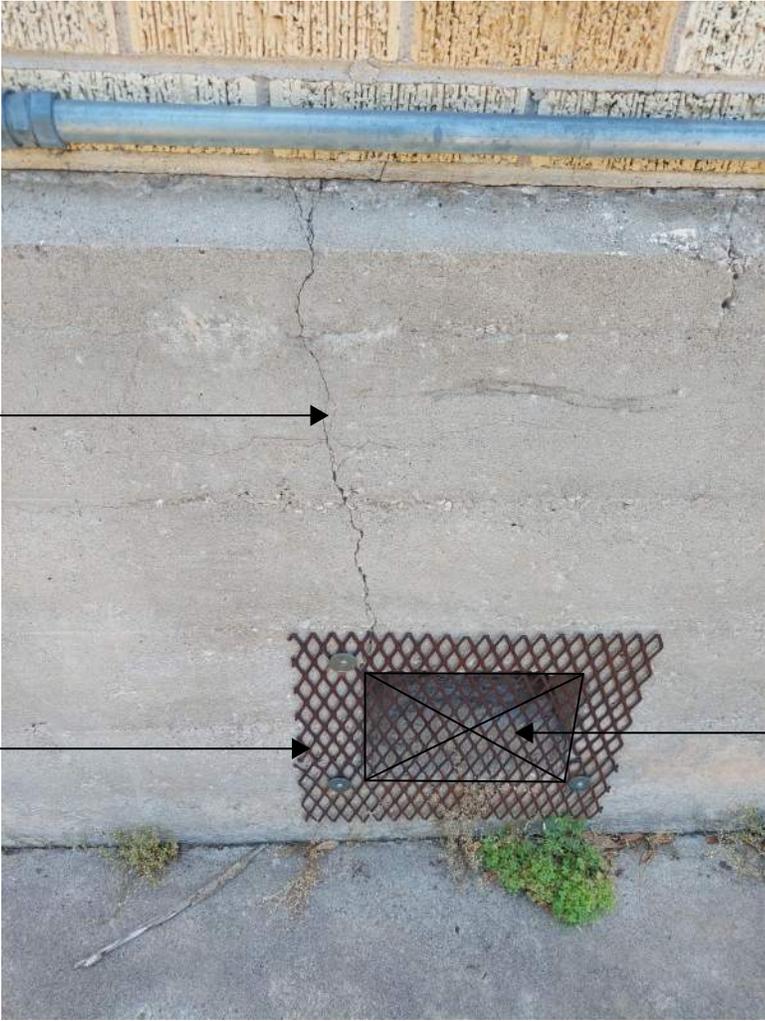
Typical crack @ re-entrant corner of foundation vent.



Typical expanded metal on all foundation vents.



Typical foundation vent opening.



Typical Underfloor Foundation Vent



Typical Foundation Cracking Condition at Corners
Caused by Movement of Masonry Veneer Where
Veneer Bonded to Masonry Lug @ Foundation

(Photo from TCREI, PLLC report dated June 6, 2022.
Used with permission.)