

**1407-1411 San Pablo Avenue  
Berkeley, California  
Structural Evaluation Report**

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**Introduction**

This report was prepared at the request of Mr. Matt Gondak of MRE Commercial Real Estate to address the general structural condition of the building at the above addresses and to evaluate its seismic safety and provide general recommendations for further evaluation or upgrading. The subject building is a single story structure constructed with concrete masonry walls and a timber framed roof. The portion with the address 1407 San Pablo is on the north side of the site to the west of a parking area (San Pablo Avenue is reference west). The portion with the address 1411 San Pablo Avenue occupies the southern portion of the site. 1411 San Pablo appears to have been constructed in 4 phases. Construction dates are not known.

In the course of preparing this report, I made a visit to the building site on July 21, 2009, during which time I made a visual inspection of the building exterior, all interior spaces, and the roof. I did not make any calculations or perform any tests to determine the strength of the existing construction.

I also reviewed documents that included the following:

1. Test report prepared by Smith-Emery Company and dated September 1, 1992, which includes the results of their testing to determine reinforcement spacing and the grouting of concrete masonry cells in the 1407 San Pablo portion of the building. Their report indicates that rebar spacing is 48 in. on center horizontally and 26 in. on center vertically. The report indicates that no grouting of cells was found at the two locations checked.
2. A proposal for seismic retrofitting of the building prepared by Denton and Terry general contractors and dated 11/12/92.
3. A proposal for seismic retrofitting of the building prepared by Unitek Structural Services and dated February 13, 1992.

4. A proposal for seismic retrofitting of the building prepared by Quality Bay Construction, Inc., and dated April 26, 1996. A City of Berkeley letter acknowledging receipt of a URM (unreinforced masonry) report and a Special Inspection and Testing Agreement were appended to this proposal. The proposal gives the address of 1407 San Pablo Avenue.

## **Field Observations**

### 1407 San Pablo Avenue:

The building is constructed with 8 in. concrete masonry walls on all four sides. The north and east walls are unbroken exterior walls. The south wall abuts to the north wall of 1411 San Pablo and has a single walk through opening. The west wall faces the parking area and has a single walk through opening. No significant cracking or other indication of damage or distress was noted in my inspection of the walls.

The roof of the structure is constructed with timber trusses that support 2x timber rafters spaced 16 in. on center. Diagonal roof sheathing is visible on top of the rafters. Retrofitted "holdown" type roof to masonry wall anchors spaced 5 to 6 ft. on center are visible on all four sides of the structure. I believe that these anchors are the work done in response to the City of Berkeley's unreinforced masonry ordinance and addressed in the seismic upgrading proposals listed above. No damage or distress in the roof structure was noted.

### 1411 San Pablo Avenue:

The building appears to have been constructed in stages to create four approximately rectangular areas. The south-west quadrant is constructed with brick walls on its north and south sides, and has a timber-framed roof with wood rafters and roof sheathing laid perpendicular to the rafters. Based on the use of brick and straight sheathing, this quadrant of the building appears to be the oldest.

The three remaining quadrants of the building are constructed with 8 in. concrete masonry perimeter walls, with the exception of the timber-framed storefront on the west side of the building. The north-west quadrant appears to be the newest section of the building, based on its use of a plywood roof diaphragm. The south-east quadrant, which has a diagonally sheathed timber framed roof, and the north-east quadrant, whose roof construction was hidden by a gypsum board ceiling, are believed to be intermediate in age.

Observable areas of the roof structure appear to be in good condition, with no damage or distress observed. There was no indication of retrofitted roof to wall anchors (as observed in 1407 San Pablo) or other seismic retrofitting in any part of the building. Inspection from the roof shows that the roof of 1411 San Pablo has been covered with a temporary plastic membrane. We presume that this was placed to alleviate water leaks, but do not know if the roof is currently leaking .

No significant cracks or other damage were noted in the brick or masonry walls. The walls of all four quadrants are relatively short, with roof to exterior wall attachment at 9 to 10 ft. elevation, and parapets are about 2 ft. maximum in height.

### **Conclusions and Recommendations**

A number of conclusions may be reached based on our field observations and document review. As noted above, no calculations have been made to verify the capacity of existing construction, and these conclusions should be verified by analysis.

1. All elements of the roof and wall vertical load bearing systems are of conventional construction for the time that they were built. Given the absence of observed damage or distress in these elements, there is no evidence of inadequacy in these systems or need for further evaluation.
2. 1407 San Pablo Avenue appears to have been upgraded in accordance with the requirements of the City of Berkeley unreinforced masonry ordinance. The southwest quadrant of 1411 San Pablo Avenue appears to be of unreinforced masonry construction, but has not been upgraded.
3. Evaluation of specific elements of the building's seismic load resisting system is as described below:
  - a. The diagonally sheathed and plywood sheathed areas of the roofs have reasonable resistance to lateral seismic forces. The straight sheathed diaphragm in the southwest quadrant of 1411 San Pablo Avenue is probably substantially deficient.
  - b. Roofs and parapets are not slender relative to their thickness, they are expected to have adequate strength to resist out of plane seismic forces without failure.
  - c. The buildings are relatively light in mass, and all brick and concrete masonry walls have substantial unbroken length. Consequently, these walls are expected to have adequate strength to resist in plane seismic forces without failure. The west wall of 1411 San Pablo, however, is a light wood framed wall that has no significant lateral load resistance. As a result, this wall is considered inadequate to resist lateral seismic forces acting in the north-south direction.
  - d. The roof to exterior wall anchorages that were retrofitted at 1407 San Pablo appear to follow common practice for such retrofits, and should be sufficient to resist imposed seismic forces without substantial structural damage. No similar retrofit has been carried out on the walls of 1411 San Pablo Avenue, however, and there is significant likelihood that the walls will separate from the roof in a major earthquake, and thereby present a possible structural hazard.

The above conclusions indicate likely seismic deficiencies in the roof diaphragm of the southwest quadrant of 1411 San Pablo, in the west wall of 1411 San Pablo, and in the roof to exterior wall anchorages of all sections of 1411 San Pablo. Because of this, we recommend a more detailed seismic evaluation be carried out that includes a numerical analysis of the seismic load resisting system of 1411 San Pablo Avenue, with likely upgrades that include the following:

1. Installation of a plywood roof diaphragm on the southwest quadrant of 1411 San Pablo. This may be done in conjunction with any reroofing so as to limit the additional incremental cost.

2. Retrofitting of the west wall of 1411 San Pablo to improve its in-plane seismic resistance. Timber shearwalling would provide the most economical retrofit, but would require the closing of some of the existing storefront windows. Alternatively, a tubular steel braced frame may be installed in one bay of the wall, which would limit obstruction of the storefront to a single diagonal member across one window bay. The least obtrusive retrofit (and the most costly) would employ a steel moment resisting frame, consisting only of two columns with a beam over the top of the windows.
3. Installation of roof to wall anchorages to all brick and concrete masonry walls in 1411 San Pablo. The form and spacing of these may be similar to the previously retrofit anchors in 1407 San Pablo.

Please contact us if any further information or clarification is required.