18400 Von Karman Ave. Suite 600 Irvine, CA 92612 949.252.1022 kpff.com

AB design studio, inc
420 East Haley Street
Santa Barbara, CA 93101
www.abdesignstudioinc.com | 805.963.2100

MEMO

DATE: August 20, 2021

TO: Design Review Committee

FROM: Alan Tonissen, SE (kpff)
Eric Behr (AB design studio)

SUBJECT: Finney's Orange – Wall Anchors
204 W Chapman Ave, Orange, CA 92866
KPFF Project #2100072.01, File #1.10

The Finney's Orange project is a proposed tenant improvement to the building located at 204 W Chapman Ave in Orange, CA consisting of remodeling an existing retail space into a restaurant. A concern was raised during the initial Design Review Committee meeting pertaining to the proposed wall anchorage and parapet bracing along the north, east, and south wall elevations. The locations of these anchorage and bracing points are shown on the provided architectural elevations. This memo is provided to outline the code requirements for the proposed anchorage and bracing and the options for satisfying the code requirements.

Structural Alteration Requirements

The work area for the proposed interior alterations involves the entire building area. In accordance with the 2019 California Existing Building Code (Title 24 Part 10) Section 503.8 the unreinforced masonry walls must be anchored at the roof level since the building is located in Seismic Design Category D. Likewise Section 503.9 requires the unreinforced masonry parapet must be braced to the roof. The design of the wall anchorage and parapet bracing may be designed in accordance with the reduced seismic forces.

The provision of new bracing is not required per Sections 503.8 and 503.9 if "an evaluation demonstrates compliance of" existing wall anchorage and parapet bracing. KPFF determined during the original site investigation that a positive load path and anchorage between the walls and parapet with the roof structure does not exist. Therefore, the evaluation of the existing building does not demonstrate conformance with Sections 503.8 & 503.9.

The Reduced Seismic Forces are specified in Section 303.3.2 of the CEBC, and conformance with the requirement may be based on either of the three parts. Part 1 allows for design of the anchorage and bracing based on 75% of the forces in accordance with the 2019 CBC. Part 2 allows for design of the anchorage and bracing based on Appendix 1 of the CEBC, and Part 3 allows for design based on ASCE 41-17. The project design submitted to the building department was based on Part 1 – 75% of the forces in accordance with the 2019 CBC.

The 2019 California Historical Building Code (Title 24, Part 8) Section 8-702 states the "CHBC shall not be construed to allow the enforcing agency to approve or permit a lower level of safety of structural design and

construction than that which is reasonably equivalent to the regular code provisions in occupancies which are critical to the safety and welfare of the public." We understand this section to denote that the wall anchorage and parapet bracing required in the CEBC shall not be exempt by the CHBC. Likewise, the intent of the anchorage and bracing in the CEBC is in conformance with the design intent of the 2019 CBC requirements for new construction wall anchorage.

The 2019 CHBC allows for strengthening of unreinforced masonry wall structures in accordance with Appendix A1 of the 2019 CEBC. This section was not used for the project design since it deals with the strengthening of existing unreinforced masonry walls for in-plane loads. It is noteworthy that Section A113 of Appendix A1 requires anchorage of unreinforced masonry walls to the roof. Likewise, bracing of the parapets is required where the height to thickness ratio is greater than 1.5 based on the site seismic coefficients. Therefore, the design approach for this project in conformance with the 2019 CEBC Sections 503.8 and 503.9 are in conformance with the design intent of the 2019 CHBC.

Structural Alteration Design

To meet the wall anchorage and parapet bracing requirements KPFF developed the details 7,8/ S7.1 and 1-3/S7.3 provided in the Construction Documents package for the Design Review Committee. The north and south walls require anchorage of the walls at the roof level. The east wall required anchorage of the wall at the roof level and bracing of the parapet 12" from the top of the wall. This is required since the roof level slopes at the east and west walls to provide the roof gutter.

The design approach consists of thru bolts to the existing ungrouted, unreinforced masonry wall with a bolt head and face plate visible on the exterior. Adhesive anchor solutions from the inside of the wall are common in retrofit construction, but they are not viable in ungrouted walls. Through bolts are required to fully engage the anchor to the wall.

The alternative approach would consist of providing a flat plate welded to the thru bolt so the bolt head is not visible on the exterior of the wall. This approach would require welding of each anchor bolt to the flat plates rather than a fully bolted approach in the provided design.

Cost Implications

The applicant has reviewed the two anchorage options noted in the section above with a GC for pricing. For the work of Option 1 of the headed bolt (refer to structural details noted above) is $30,000. For the work of Option 2 of the flat plate detail is $80,000. The applicant desires to proceed based on Option 1, as it is a 2.5 times increase to perform the work of Option 2 which is an unreasonable financial hardship for the client. Option 1 is a very common detail that is prevalent amongst old URM buildings and is suitable for our project. The applicant proposes to paint the exposed plate and the headed bolt the same color as the proposed plaster to blend in and appear cohesive with the façade.

Conclusions

The proposed tenant improvement necessitates the addition of wall and parapet anchors based on the requirements of the 2019 California Existing Building Code and in conformance with the design intent of the 2019 California Historical Building Code. The design of the anchors has been provided in the structural drawings on sheets S7.1 and S7.3, with an alternative detail provided for consideration. The cost implications of the alternative detail provide a financial hardship. Therefore, it is our request the original structural anchorage details be approved for the Finney's Orange project.