COTTON, SHIRES AND ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

August 25, 2021
Z6091

TO: Sharon Gong
Senior Planner
CITY OF BERKELEY
1947 Center Street, 2nd floor
Berkeley, California 94704

SUBJECT: **Geotechnical Peer Review – Liquefaction Zone**
RE: Su; New 6 Story Mixed Use Structure
ZP2021-0070
1201-1205 San Pablo Avenue

At your request, we have completed a geotechnical peer review of the proposed use permit application at the subject property using:

- Update of Geotechnical Investigation (report) prepared by Alan Kropp & Associates, Inc., dated March 23, 2021.

In addition, we have reviewed pertinent technical maps and reports from our office files (Z0055).

DISCUSSION

Based on our review of the referenced report and communication with City Staff, we understand the applicant proposes to merge two parcels and construct a new six-story mixed-use building at the currently vacant project site. The proposed project is located within a liquefaction hazard zone as mapped by the California Geological Survey. According to the State's Seismic Hazards Mapping Act, a qualifying project in this zone must be supported by a site-specific geotechnical investigation (report) addressing the mapped hazard.

The purpose of this geotechnical peer review is to determine whether the referenced 2021 Update of Geotechnical Investigation is consistent with State criteria for project approval with respect to liquefaction hazards. When site seismic hazards are confirmed to exist, the State requires that a minimum level of mitigation for a project be performed to reduce the risk of ground failure during an earthquake to a level that does not cause the collapse of buildings for human occupancy. Our geotechnical peer review

does not include evaluation of detailed construction plans and is not intended to address all geotechnical aspects of proposed project design.

SITE CONDITIONS AND GEOTECHNICAL EVALUATIONS

The Project Geotechnical Consultant (AKA) has advanced a subsurface exploration program at the site which included five geotechnical borings. The subsurface exploration penetrated a maximum of 50.5 feet below the ground surface, consistent with State guidelines for this level of investigation. Groundwater was measured during subsurface exploration at a depth of approximately 9 feet below the ground surface. The boring logs indicated earth materials consistent with USCS group symbols CH, CL, GC, GW-GC, SC and SM. The applicant's Consultant completed geotechnical laboratory testing including, but not limited to, Atterberg limits testing on four samples of surficial soil (CH), one sample of subsurface gravel (GW-GC), and one sample of subsurface clay (CL). The Consultant also completed grain size distribution analysis of twenty-one samples (CH, CL, GW-GC, SC, and SM).

The California Geological Survey (CGS) has mapped the historic high groundwater at depths of approximately 5 to 10 feet below the ground surface at the subject site. As previously mentioned, the site is located within a liquefaction hazard zone which requires an investigation as delineated by the CGS. The Project Geotechnical Consultant concludes that the site has a potential for liquefaction induced settlement with a total estimated settlement of approximately 1 to 3 inches and 1 inch of differential settlement over a distance of 20 to 30 feet. The Consultant notes that encountered near surface clay on the site is highly to critically expansive.

CONCLUSIONS AND RECOMMENDATIONS

The subject property is constrained by near surface expansive soils, liquefiable soils, and strong seismic ground shaking. Based on our review of the referenced report dated March 23, 2021, it appears that the potential for liquefaction has been satisfactorily evaluated by the Project Geotechnical Consultant. The applicant's Consultant recommends the structure be designed with a stiffened structural mat foundation to mitigate potential differential settlements. We conclude that the subsurface investigation has satisfactorily fulfilled State investigation requirements in mapped potential liquefaction hazard zones. The Project Geotechnical Consultant should be retained through the design and construction phases of the project to ensure site constraints are properly mitigated and their recommendations are properly incorporated. We recommend geotechnical approval of the subject land use permit application with the following conditions attached:

1. **Geotechnical Plan Review** - The applicant's geotechnical consultant should review and approve all geotechnical aspects of the final project building and grading plans (i.e., site preparation and grading including removal and replacement/treatment of expansive soils, site surface and subsurface drainage improvements including site runoff discharge, and design parameters for foundations and hardscape) to ensure that their recommendations have been properly incorporated and to ensure that the project concept has not changed significantly since preparation of their report.

   The results of the plan review should be summarized by the geotechnical consultant in a letter and submitted to the City Engineer for review and approval prior to issuance of building permits.

2. **Geotechnical Construction Inspections** - The geotechnical consultant should inspect, test (as needed), and approve all geotechnical aspects of the project construction. The inspections should include, but not necessarily be limited to: site preparation and grading including the removal and replacement/ treatment of expansive soils, site surface and subsurface drainage improvements, and excavations for foundations and other improvements prior to the placement of steel and concrete.

   The results of these inspections and the as-built conditions of the project should be described by the geotechnical consultant in a letter and submitted to the City Engineer for review prior to final (granting of occupancy) project approval.

LIMITATIONS

This geotechnical peer review has been performed to provide technical advice to assist the City with its discretionary permit decisions. Our services have been limited to review of the documents previously identified. Our opinions and conclusions are made in accordance with generally accepted principles and practices of the geotechnical profession. This warranty is in lieu of all other warranties, either expressed or implied.

Respectfully submitted,

COTTON, SHIRES AND ASSOCIATES, INC.
CITY GEOTECHNICAL CONSULTANT

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