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

July 17, 2019
T0031G

TO: Kelly Reynolds, P.E.
Associate Civil Engineer
CITY OF FREMONT ENGINEERING DEPARTMENT
39550 Liberty Street
Fremont, California 94537-5006

SUBJECT: **Supplemental Engineering Geologic and Geotechnical Engineering Peer Review**
RE: Proposed Residential Subdivision
Omaha Way and East Warren Avenue

At your request, we have completed an engineering geologic and geotechnical engineering peer review of an application for proposed site development using:

- Supplemental Information and Response to Comments, Proposed Site Development, Tiffany Park Estate Property, East Warren Avenue (Letter) prepared by Upp Geotechnology, dated July 10, 2019;
- Vesting Tentative Map, Tract 8467, Omaha Way (9 Sheets) prepared by Carlson, Barbee & Gibson, Inc., dated July 8, 2019; and
- Addendum to Updated Geotechnical and Geologic Study, Proposed Site Development, Tiffany Park Estate Property, East Warren Avenue (Report) prepared by Upp Geotechnology, dated December 14, 2018.

In addition, we have reviewed pertinent technical maps and documents from our office files.

DISCUSSION

The applicant proposes to construct a new, 13 lot residential development at the subject property. Access to the proposed subdivision requires construction of streets extending from Omaha Way.

Our previous peer review letter (dated April 29, 2019) provided peer review comments regarding landslides, slope stability and seismic displacement analyses, foundation design, and the stability of temporary cuts. The referenced letter addresses those peer review comments. In the referenced letter (dated July 10, 2019), the Project Geotechnical Consultant clarified that the proposed landslide mitigation will include all landslides on the subject property and consist of removal of landslide debris and replacement with granular fill composed of granular onsite material and select import granular material. They also stated that all engineered (non-landscaping) fill will be placed at a minimum of 90% relative compaction.

The referenced tract tentative map shows the 13 planned residential lots, the locations of the proposed residential structures, and the proposed roadways. It also depicts two planned common areas. The second sheet of the map indicates the locations of the landslides on the site and notes that the mapped landslides will be mitigated according to geotechnical recommendations.

CONCLUSIONS AND RECOMMENDED ACTION

In our previous peer review letter, we recommended that the Project Geotechnical Consultant consider recommending mitigation of all landslides at the subject property. Based upon our review of the referenced letter, it appears that the consultant recommends mitigation of all of the landslides at the property.

The site is located within the Alquist-Priolo Earthquake Fault Zone surrounding the Hayward fault. Based upon our analysis of the available fault trenching data and our review of the referenced addendum report (dated December 14, 2018), the site fault rupture hazards appear to have been characterized in conformance with the minimum standards required by the State of California. There remain some questions about the potential fault rupture hazards southeast of trench T13 and northwest of trench T4, so it will be important for the Project Geotechnical Consultant to inspect excavations carefully during site grading to confirm the fault traces previously identified. If the consultant identifies other faults during site grading, the City Geotechnical Consultant should be notified and provided the opportunity to inspect the excavations and fault exposures prior to placement of fill.

Where exploratory trenches encountered claystone at the site, the trench walls tended to fail, even when shoring was placed to help support the walls. Thus, the stability of temporary cuts that would expose claystone and colluvium during subdivision grading is a significant concern. In the referenced letter, the Project Geotechnical Consultant states that they intend to address the stability of temporary cuts at the design level during preparation of the grading and drainage plan. Based on that intent, we recommend that the consultant prepare recommendations for temporary cuts as part of a design-level geotechnical report for the project. During preparation of the grading plans, the consultant should pay close attention to inclinations of cut slopes in colluvium and claystone and potential dip slope conditions in claystone.

The project tentative map includes rough grading quantities that appear to indicate extensive export of cut material without indication of imported fill. Based upon our review of the referenced letter, it appears likely that some granular import fill material will be needed for site grading, including landslide mitigation. The Project Geotechnical Consultant and Project Civil Engineering Consultant should work together to provide an estimate of the potential quantity of import granular material needed for site grading. The project grading and drainage plan should include a grading quantity estimate that indicates the estimated volume of import fill material.

The high expansion potential of colluvium and claystone at the site presents challenges for foundation design. In the referenced letter, the Consultant states that they will address the potential for high uplift pressures from the expansive materials by recommending void forms under the grade beams. This recommendation may address

uplift pressures on grade beams but not on the pier foundations. Thus, it is important that the consultant provide recommendations at the design level for minimum pier embedment into bedrock to resist the potential uplift pressures on piers. We understand that the consultant plans to address this issue in an upcoming design-level geotechnical report for the project, as indicated in the referenced letter.

Based on our understanding of the responses to our previous peer review comments, we recommend geotechnical approval of the Subdivision Tentative Map with the understanding that Items 1, 2, and 3 listed below, will be completed during the design-level phase for the subdivision and prior to geotechnical approval of the proposed subdivision for construction. Item 4 should be completed during project construction.

1. **Design-Level Geotechnical Engineering Evaluations** – Following approval of the subdivision tentative map, the Project Geotechnical Consultant should prepare a design-level geotechnical report providing their recommendations for grading, foundations, retaining walls, and stability of temporary cuts. The Consultant should provide specific recommendations for minimum embedment of piers into bedrock and the stability of temporary cuts in claystone and colluvium. The report should also address the problem of stability of dip-slope cuts in claystone. The Consultant should also consider recommending pier-supported retaining walls for the areas directly upslope and downslope of the residences.

   The results of the Design-Level Geotechnical Engineering Evaluations should be summarized in a report and submitted to the City for peer review by the City Geotechnical Consultant prior to geotechnical approval of the proposed subdivision for construction.

2. **Grading and Drainage Plan** - The Project Civil Engineering Consultant should review the project geotechnical reports summarizing the results of the supplemental geotechnical evaluations and design-level geotechnical engineering evaluations and prepare a grading and drainage plan for the project. The Project Civil Engineer should confirm that the locations of the structures are no closer to the fault trace than the minimum required building setback. Grading quantity estimates should also include an estimate of import materials.

   The grading and drainage plan should be submitted to the City for peer review by the City Geotechnical Consultant prior to geotechnical approval of the proposed subdivision for construction.

3. **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, site drainage improvements and design parameters for foundations, retaining walls and driveway) to ensure that their recommendations have been properly incorporated.

   Appropriate documentation to address the above should be submitted to the City Engineer prior to issuance of the building permits.

4. **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, site surface and subsurface drainage improvements, and excavations for foundations and retaining walls prior to the placement of steel and concrete.

   The Project Geotechnical Consultant should inspect all excavations during project grading to confirm the locations of faults previously mapped. If the consultant identifies other faults during site grading, the City Geotechnical Consultant should be allowed to inspect the excavations and fault exposures prior to placement of fill. The project Geotechnical Consultant should also review the performance of temporary cut slopes during project grading. If temporary slopes appear to be unstable, the consultant should provide supplemental recommendations to address stability of the temporary slopes.

   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 (as-built) project approval.

LIMITATIONS

This engineering geologic and geotechnical engineering peer review has been performed to provide technical advice to assist the City with discretionary permit decisions. Our services have been limited to review of the documents previously identified and preparation of this peer review letter. 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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