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April 22, 2014

W.O. 6562-A-SC

Mr. John Gamble
c/o **Matthew Fagan Consulting Services**
42011 Avenida Vista Ladera
Temecula, California 92591

Subject: Site Reconnaissance and Limited Review of Geologic Maps and Literature Relative to the Proposed Wake Rider Beach Park, Mark Avenue, ±2.73-Acre Parcel, APN 381-040-005, City of Lake Elsinore, Riverside County, California

Dear Mr. Gamble:

In accordance with your request and authorization, GeoSoils, Inc. (GSI) has performed a site reconnaissance and limited review of geologic maps and literature relative to the proposed construction of the Wake Rider Beach Park, located on Mark Avenue (APN 381-040-005), in the City of Lake Elsinore, Riverside County, California. The scope of our services has included a review of the referenced report by GSI (2013; see the Appendix), a review of the Riverside County - Land Information System (Riverside County -LIS, 2014), a cursory review of the current improvement plans prepared by Gary Daugherty Architect (GDA, 2012), performance of a field review of surficial conditions conducted on April 14, 2014, and preparation of this summary report presenting our findings, conclusions, and recommendations. Unless specifically superceded herein, the conclusions and recommendations contained in the referenced report by GSI (see the Appendix), remains pertinent and applicable, and should be appropriately implemented during planning, design, and construction of the project.

PROPOSED DEVELOPMENT

Based on our cursory review of current site improvement plans by GDA (2012), GSI understands that proposed development of the site will consist of a beach park facility to include; a bath house structure and garage structure with associated driveways, parking and trailer camping areas, a trash enclosure, and underground utility improvements. In addition, a floating dock, a boat launch ramp, and tent camping and beach/picnic use areas are also proposed on the northeastern portion of the site.

It is our understanding that conventional cut and fill grading techniques would be necessary to bring the site to design grades for the proposed development. We further understand that the buildings are proposed as one-story structures, with slab-on-grade/continuous and/or deepened footings, utilizing wood-frame and/or cinder

block type construction. Building loads are assumed to be typical for this type of relatively light construction. Sewage disposal is anticipated to be accommodated by tying into the regional system. It is also our understanding that importing of soils for development of the site will not be allowed by the City; however, this would likely exclude the importation of road base and/or utility bedding.

BACKGROUND AND CURRENT SITE CONDITIONS

The site was previously environmentally evaluated by GSI in 2013. Our Phase I Environmental Site Assessment (ESA) and Limited Phase II soil screening evaluation concluded that, based on our review of readily available reports, historical aerial photographs, and historical topographic maps, the subject property has been historically vacant and undeveloped. With the exception of possible asbestos cement pipe (ACP) in the subsurface of the site, the ESA (GSI, 2013) had revealed no readily apparent evidence of recognized environmental conditions in connection with the subject property that could pose environmental risks to human health at that time. For a detailed discussion of environmental development recommendations, the reader is referred to our Phase I ESA and Limited Phase II soil screening evaluation for the project (GSI, 2013).

A recent site field reconnaissance was performed on April 14, 2014, by an engineering geologist from our firm who geologically evaluated and mapped readily observable surface conditions within the property. The subject site consists of a trapezoidal-shaped parcel consisting of approximately ± 2.73 -Acres (Assessors Parcel Number [APN] 381-040-005), located northeast of Mark Avenue in the City of Lake Elsinore, Riverside County, California. The property is bounded by Mark Avenue to the southwest, by Lake Elsinore to the northeast, by a boat and recreational vehicle storage yard to the northwest, and by residential property to the southeast. The site is currently undeveloped/vacant.

Observations included: a low growth of native weeds and grasses, several mature trees scattered across the site, several piles of vegetation and cut tree-rounds, along with three old concrete footings near the northwest corner of the site. Geologic observations included: Surficial soils consisting of dry, light gray to brown, loose (apparently due to previous tilling for weed abatement), sands and silty sands mantling the site.

GEOLOGIC REVIEW AND POTENTIAL GEOLOGIC HAZARDS

The site is mapped as being underlain by Holocene and late Pleistocene alluvial fan deposits (Morton and Weber, 2003). Holocene lacustrine (lake) deposits were also locally mapped along the shoreline area of Lake Elsinore. Topographically, the site is situated along the southwesterly shore of Lake Elsinore and consists of relatively flat-lying to gentle northeasterly sloping terrain. Elevations across the site range from approximately $\pm 1,275$ feet Mean Sea Level (MSL) in the southeast portion of the site to $\pm 1,236$ feet MSL

in the northwest portion of the site. Therefore, overall topographic relief is on the order of ± 39 feet. Site drainage appears to be accommodated by sheet-flow runoff that is primarily directed in a northeasterly direction where it ultimately discharges into Lake Elsinore.

Based on field observations, and the granular nature of surficial soils, the earth materials encountered throughout the site are expected to generally be very low in expansion potential; however, the presence of low to medium expansive soils can not be precluded. Based on information obtained from nearby properties, the soils are generally anticipated to have negligible sulfate contents per the 2013 California Building Code ([CBC], California Building Standards Commission [CBSC], 2013). Accordingly, the use of sulfate resistant concrete is not currently anticipated. Due to the proximity of this project to Lake Elsinore, corrosion protection for buried metallic improvements may be necessary. Based on the above, site specific testing for Expansion Index (E.I.), sulfate/corrosion potential, etc. should be conducted during the preliminary geotechnical investigation of the site.

Regional seismic shaking, ranging from moderate to severe, may occur on the site associated with nearby and/or regional faults. Accordingly, the proposed structures and foundations should be designed to resist seismic forces in accordance with the criteria contained in the 2013 CBC (CBSC, 2013). Based on our review, the site is not located within an Alquist-Priolo Earthquake Fault Zone (Bryant and Hart, 2007). However, our review of the County of Riverside Planning Department - Land Information System (County of Riverside - LIS, 2014) indicates the far northeastern portion of the site is located within a County fault zone. Currently, no habitable structures are proposed within this area, as the area of the County fault zone lies near the shoreline of Lake Elsinore, as delineated by the County [LIS, 2014]). Based upon the current development plans provided (GDA, 2012), and lack of proposed habitable structures within this area, a specific fault finding investigation does not appear warranted, at this time.

Geotechnical developmental considerations include thick potentially compressible alluvium, and site seismicity and secondary seismic concerns. Our review indicates that the site is mapped as being potentially susceptible to liquefaction and subsidence (County of Riverside - LIS, 2014). As such, and in accordance with current standards of practice (California Geological Survey [CGS] Special Publication 117A, 2008), site specific liquefaction and subsidence studies should be conducted. This would generally include the advancement of hollow-stem borings, as well as Cone Penetration Tests (CPT) to correlate with the hollow-stem borings advanced onsite. This is contingent on the occupancy rating of the proposed bath house structure and garage structure proposed onsite.

Other secondary seismic hazards include a seiche (standing wave oscillation) within the lake during or shortly after an earthquake. Based on work conducted on other nearby properties, the approximate height of the seiche would be approximately the same as a design boat wake, and generally can be mitigated through typical shoreline protection. Due the flat-lying nature of the site, and relative distance from any hillside terrain, the

potential for seismically induced landslides is considered low. Other adverse geologic features that would preclude project feasibility were not observed onsite.

GROUNDWATER

Seeps, springs, or other indications of a high groundwater level were not noted on the subject property during the time of our recent site reconnaissance. Based on other nearby studies conducted by GSI, regional groundwater levels are anticipated to generally correlate with the surface level of Lake Elsinore. Our review of "Lake Levels" provided by the Elsinore Valley Municipal Water District (EVMWD, 2014), indicate that the surface water elevation is currently on the order of $\pm 1,240$ feet MSL. This would generally correlate with an estimated groundwater level ranging between ± 35 and ± 0 feet below ground surface (b.g.s.), at current lake levels, depending on the particular elevation across the site. However, Lake Elsinore is supplied by inflow from the San Jacinto River and local watershed runoff (EVMWD, 2014), as such fluctuates with seasonal inflows. During significant storm events, if the inflow to Lake Elsinore is greater than the outlet channel capacity, the surface water elevation of the lake will continue to rise until it reaches 1,262 feet MSL. The 100-year flood elevation of Lake Elsinore is 1263.3 feet MSL (EVMWD, 2014). In general and based upon the available data to date, regional groundwater has existed historically as shallow as 10 to 15 feet in depth (GSI, 2006), and shallower groundwater, seepage, and seasonal perched water should be anticipated onsite. These observations reflect site conditions at the time of our evaluation and do not preclude future changes in local groundwater conditions from excessive irrigation, precipitation, or that were not obvious, at the time of our evaluation. The potential for perched water to occur during grading and after development exists, and should be anticipated. This potential should be disclosed to all interested/affected parties including owners and any owners association.

CONCLUSION AND RECOMMENDATIONS

As a result of our recent field reconnaissance and geologic mapping, cursory review of the current development plans provided (GDA, 2012), review of available published geologic literature, and our evaluation, the following conclusions and recommendations are provided:

- Based on our recent site reconnaissance, geologic mapping, and evaluation, the currently proposed development of the project site appears geologically feasible, provided the conclusions and recommendations contained herein, and within the referenced report by GSI (2013), are appropriately implemented during planning, design, and construction of the project.

- Based on conversations and correspondence with the Client, it is our understanding that no site specific geotechnical investigation has been conducted on the subject property. As such, and in accordance with current standards of practice, site specific geotechnical studies will need to be conducted for the proposed commercial development of the property.
- As discussed herein, the site is located within a zone of potential liquefaction (as delineated by the County of Riverside - LIS, 2014), ranging from very low to a very high potential. Based on the potential for liquefaction at the site, and as per the California Department of Conservation (2008, Special Publication 117A), site specific liquefaction analyses may need to be conducted. This would generally include the advancement of hollow-stem borings, as well as Cone Penetration Tests (CPT) to correlate with the hollow-stem borings advanced onsite. This is contingent on the occupancy rating of the proposed bath house structure and garage structure proposed onsite.
- The recommendations presented in this report should be incorporated into the preliminary design and construction considerations of the project.

LIMITATIONS

The materials encountered on the project site and utilized for our evaluation are believed representative of the area; however, soil and bedrock materials vary in character between excavations and natural outcrops or conditions exposed during site grading. Site conditions may vary due to seasonal changes or other factors not obvious at the time of our study.

Inasmuch as our study is based upon our review and geologic evaluation, the conclusions and recommendations are professional opinions. These opinions have been derived in accordance with current standards of practice, and no warranty, either express or implied, is given. Standards of practice are subject to change with time. GSI assumes no responsibility or liability for work or testing performed by others, or their inaction; or work performed when GSI is not requested to be onsite, to evaluate if our recommendations have been properly implemented. Use of this report constitutes an agreement and consent by the user to all the limitations outlined above, notwithstanding any other agreements that may be in place. In addition, this report may be subject to review by the controlling authorities. Thus, this report brings to completion our scope of services for this portion of the project.

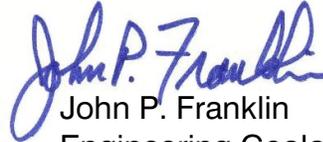
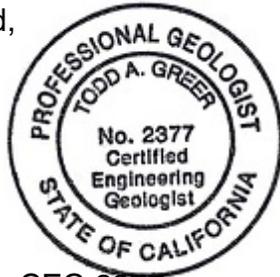
We appreciate the opportunity to be of service. If you have any questions, please do not hesitate to contact the undersigned.

Respectfully submitted,

GeoSoils, Inc.



Todd A. Greer
Engineering Geologist, CEG 2377



John P. Franklin
Engineering Geologist, CEG 1340



TAG/JPF/ATG/jh

Attachment: Appendix - References

Distribution: (2) Addressee
(3) Gary Daugherty Architect, Attention: Mr. Scott Zeida (2 wet signed)

APPENDIX

REFERENCES

- Bryant, W.A., and Hart, E.W., 2007, Fault-rupture hazard zones in California, Alquist-Priolo earthquake fault zoning act with index to earthquake fault zones maps; California Geological Survey, Special Publication 42, interim revision.
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- _____, 2006, Preliminary geotechnical investigation, commercial and residential development, ±4.87-Acre Parcel, APN 381-030-005, Lake Elsinore, Riverside County, California, W.O. 5043-A-SC, dated May 25.
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