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October 19, 2021

Mr. Stephanie Standerfer
Albert A. Webb Associates
3788 McCray Street
Riverside, CA 92506
Transmitted via email to stephanie.standerfer@webbassociates.com

RE: Paleontological Technical Memorandum for a Warehouse on the Southwest Corner of Rider Street and Redlands Avenue, City of Perris, Riverside County, California

Dear Ms. Standerfer,

At the request of Albert A. Webb Associates, Applied EarthWorks, Inc. (Æ) is providing this paleontological technical memorandum (memo) for Chartwell Warehouse Project (Project) on the southwest corner of East Rider Street and Redlands Avenue in the City of Perris, Riverside County, California. The proposed warehouse will be constructed on 6.26 acres of currently vacant land on Assessor Parcel Numbers 300-250-007-3 and 300-250-008-4.

Æ's scope of work included desktop review of geologic maps, paleontological literature, museum records searches, and preparation of this technical memo to summarize our findings. This memo was written by staff who satisfy the requirements of the California Environmental Quality Act (CEQA) by meeting mitigation paleontology industrywide standards (Murphey et al., 2019) as well as qualifications standards of the Society of Vertebrate Paleontology (SVP, 2010). The City of Perris (City) is the lead agency for CEQA compliance.

PROJECT DESCRIPTION AND BACKGROUND

The Project involves the construction and operation of an approximately 129,818 square-foot industrial, non-refrigerated warehouse distribution facility, with 3,000 square feet of office space and 3,000 square feet of mezzanine space, as well as associated site improvements, such as landscaping and parking spaces. The Project area is mapped in the northwest quadrant of Section 17 in Township 4 South, Range 3 West, as shown on the Perris, California 7.5-minute U.S. Geological Survey (USGS) topographic quadrangle map. The maximum depth of proposed ground disturbance is 11 feet below ground surface (bgs).

REGULATORY CONTEXT

This Project is subject to both state laws and local goals and policies. The following section provides an overview of the relevant laws and regulations.

State

At the state level, paleontological resources are protected under CEQA, which requires detailed studies that analyze the environmental effects of a proposed project. If a project is determined to have a potential significant environmental effect, the act requires that alternative plans and mitigation measures be considered. Specifically, Section VII(f) of Appendix G of the CEQA Guidelines, the Environmental Checklist Form, poses the question, "Will the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" If paleontological resources are identified as being within the proposed project area, the sponsoring agency must take those resources into consideration when evaluating project effects. The level of consideration may vary with the importance of the resource.

Local

The City of Perris General Plan, *Conservation Element* includes Policy IV.A and associated Implementation Measure IV.A.4, which address the protection of paleontological resources (City of Perris, 2008:47):

- **IV.A.4:** In Area 1 and Area 2 shown on the Paleontological Sensitivity Map, paleontologic [sic] monitoring of all projects requiring subsurface excavations will be required once any excavation begins. In Areas 4 and 5, paleontologic [sic] monitoring will be required once subsurface excavations reach five feet in depth, with monitoring levels reduced if appropriate, at the discretion of a certified Project Paleontologist.

The Project area falls within the City's *Perris Valley Commerce Center Specific Plan*. According to the *Final Environmental Impact Report* (PVCCSP FEIR) for this *Specific Plan*, Mitigation Measure (MM) Cultural 5 details procedures for mitigation of paleontological resources (City of Perris, 2011:11.0-26,27):

- **MM Cultural 5:** Prior to grading for projects requiring subsurface excavation that exceeds five (5) feet in depth, proponents of the subject implementing development projects shall retain a professional paleontologist to verify implementation of the mitigation measures identified in the approved Phase I Cultural Resources Study and to monitor the subsurface excavation that exceed five (5) feet in depth. Selection of the paleontologist shall be subject to the approval of the City of Perris Planning Manager and no grading activities shall occur at the site until the paleontologist has been approved by the City. Monitoring should be restricted to undisturbed subsurface areas of older alluvium, which might be present below the surface. The paleontologist shall be prepared to quickly salvage fossils as they are unearthed to avoid construction delays. The paleontologist shall also remove samples of sediments which are likely to contain the remains of small fossil invertebrates and vertebrates. The paleontologist shall have the power to temporarily halt or divert grading equipment to allow for removal of abundant or large specimens. Collected samples of sediments shall be washed to recover small invertebrate and vertebrate fossils. Recovered specimens shall be prepared so that they can be identified and permanently preserved. Specimens shall be identified and curated and placed into an accredited repository (such as the Western Science Center or the Riverside Metropolitan Museum) with permanent curation and retrievable storage. A report of findings, including an itemized inventory of recovered specimens, shall be prepared upon completion of the steps outlined above. The report shall include a discussion of the significance of all recovered specimens. The report and inventory, when submitted to the City of

Perris Planning Division, will signify completion of the program to mitigate impacts to paleontological resources.

PALEONTOLOGICAL RESOURCE POTENTIAL

Most professional paleontologists in California adhere to the guidelines set forth by the SVP (2010) to determine the course of paleontological mitigation for a given project unless specific city, county, state, or federal guidelines are available.

The City has developed its own paleontological sensitivity map, which divides the City of Perris and its immediate vicinity into five areas based on the geologic units exposed at or near the surface. Each area (geologic unit) is assigned to one of three categories—Low, High, and Low to High Sensitivity (City of Perris, 2008). Low or High Sensitivity indicate the geologic unit has low or high potential, respectively, to yield significant fossil resources. Low to High Sensitivity indicates the potential for impacts to fossil resources changes from low to high potential once excavation reaches 5 feet below ground surface (City of Perris, 2008).

METHODOLOGY

To assess the paleontological sensitivity of geologic units exposed at the ground surface and those likely to occur in the subsurface of the Project area, *Æ* reviewed published geologic maps and paleontological literature, and conducted museum records searches. For the records searches, *Æ* retained the Natural History Museum of Los Angeles County (NHMLAC) and the Western Science Center (WSC) in Hemet, California, to conduct a search of fossil localities recorded in their collections (Bell, 2021; MacDonald, 2021).

To augment these results, *Æ* also conducted searches of the online Paleobiology Database (PBDB) and the University of California Museum of Paleontology (UCMP). The PBDB lists a large collection of museum records and publications of fossil material, while the UCMP is the largest repository of fossils on the West Coast of the United States with an older history of collection than several other regional natural history museums.

RESOURCE CONTEXT

The Project area is within the northern portion of the Peninsular Ranges Geomorphic Province, which extends 125 miles south from the Transverse Ranges through the Los Angeles Basin to Baja California. A geomorphic province is a region of unique topography and geology that is distinguished from other regions based on its landforms and tectonic history (American Geological Institute, 1976). The Peninsular Ranges comprise a series of mountain ranges separated by northwest-trending valleys formed from faults branching from the San Andreas Fault (Norris and Webb, 1976; California Geological Survey, 2002). The mountain ranges are bounded to the east by the Colorado Desert and range in width from 30 to 100 miles (Norris and Webb, 1976). The Project area is located within the central part of the Perris Block, a relatively stable rectangular structural unit positioned between the Elsinore and San Jacinto fault zones (Morton et al., 2003; Morton et al., 2006a).

The basement rocks in this region are part of a large assemblage known as the Peninsular Ranges Assemblage. Rocks of the assemblage date from the Paleozoic Era[1] to the present, with most associated with the Mesozoic-age[2] Peninsular Ranges batholith, as well as pre-batholithic metasedimentary and metavolcanic rocks into which the batholith was emplaced (Jahns, 1954; Morton et al., 2006a). Cenozoic-age[3] sedimentary rocks and deposits, mostly Quaternary in age, form thick deposits that rest unconformably above the basement rocks in the vicinity of the Project area (Morton et al., 2006a).

The surficial geology of the Project area consists entirely of early to middle Pleistocene-age very old alluvial-fan deposits ($Qvof_a$, subscript "a" denotes "arenaceous, according to Morton et al., 2003, to refer to very coarse sand through very fine sand or sand-bearing") that are part of the alluvial-fan complexes, which originate on the south flanks of the San Gabriel and San Bernardino mountains and dominate the Perris Valley (Morton et al., 2003; Morton et al., 2006b). The $Qvof_a$ deposits include moderately to well consolidated silt, sand, gravel, and conglomerate with subunits divided on the basis of soil-profile development. The arenaceous Qvof deposits typically consist of medium to dark, reddish-brown lithic arkose (feldspar-rich) (Morton et al., 2006b). Deposits similar to those in the Project area have proven to be highly fossiliferous elsewhere in inland valleys of Riverside and San Bernardino counties (Reynolds and Reynolds, 1991) and have yielded a wide variety of Pleistocene megafauna, such as mammoths, ground sloths, dire wolves, saber-toothed cats, horses, camels, and bison, as well as numerous invertebrate and plant taxa (Scott, 2007; Springer et al., 2009).

RECORDS SEARCH RESULTS

Bell (2021) reports no fossil localities from the NHMLAC collections within the Project area, . However, she lists a few nearby localities from unknown depths within Pleistocene-age alluvial deposits similar to those mapped either at the surface or likely at depth in the Project area. The closest locality is LACM VP 6059 southwest of the Project area in the overflow area just east-southeast of Lake Elsinore, which yielded an unspecified camel specimen (Camelidae). The next closest is LACM VP 1207 northwest of the Project area, on the east side of a sewage disposal plant near the city of Corona. This locality yielded a specimen from the cattle family (Bovidae). Following that is LACM IP 437, east-southeast of the Project area on the west side of Castile Canyon, north of the Soboba Indian Reservation, which yielded a specimen of a protoorthopteran (cricket relative) insect (*Sobobapteron kirkbaye*) and a terebratulid (hole-borer) brachiopod (*Terebratalia hemphili*). LACM VP 7261 is slightly farther to the southeast at Skinner Reservoir in Auld Valley, which yielded a specimen of the elephant order (Proboscidea) and an unspecified ungulate. Localities VP 6967 and 7456 are still farther to the south-southeast near Highway 79 in Pauba Valley near Temecula. These localities yielded specimens of tree frog (*Hyla*), legless lizard (*Anniella*), garter snake (*Thamnophis*), pocket gopher (*Thomomys*), deer mouse (*Peromyscus*), and various snails (Gastropoda). Bell (2021) does not suggest an age of the alluvium, but the fossils also likely date to the Pleistocene Epoch. Records search results from NHMLAC and other institutions are detailed in Table 1.

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[1] Paleozoic Era: Approximately 541 to 252 million years ago (Cohen et al., 2021).
[2] Mesozoic Era: Approximately 252 to 66 million years ago (Cohen et al., 2021).
[3] Cenozoic Era (formerly Tertiary): 66 million years ago to present, including the Quaternary Period (2.6 million years ago to present). The Quaternary Period is subdivided into the Pleistocene and Holocene epochs; Pleistocene Epoch, or last Ice Age, lasted from approximately 2.6 million to 11,700 years ago when the Holocene Epoch began (Cohen et al., 2021).

Table 1
Fossil Localities Reported Near the Project Area

Locality No.	Geologic Unit (Date)	Taxa	Depth	Approximate Distance from Project Area
PBDB[1] – Lakeview localities	Alluvial deposits (Pleistocene)	*Mammuthus* (mammoth) *Smilodon* (saber-toothed cat) *Equus* (horse) *Bison* sp. cf. *B. antiquus* (bison) Numerous other vertebrates, invertebrates, and plants	Unknown	4–5 miles
LACM[2] VP 6059	Unknown formation (Pleistocene)	Camelidae (camel)	Unknown	10 miles
UCMP[3] – Lake Elsinore localities	Alluvial deposits (Pleistocene)	*Pinus* (pine) *Salix* (willow) *Acer* (maple) *Eriogonum* (buckwheat) *Ambrosia* (ragweed) Numerous other plants	Unknown	10–12 miles
LACM[2] VP 1207	Unknown formation (Pleistocene)	Bovidae (bovid)	Unknown	14 miles
LACM[2] IP 437	Unknown formation (Pleistocene)	*Sobobapteron kirkbaye* (protoorthopteran insect) *Terebratalia hemphili* (terebratulid brachiopod)	Unknown	14 miles
LACM[2] VP 7261	Unknown formation, arenaceous silt (Pleistocene)	Proboscidea (elephant order); Ungulate, unspecified	Unknown	15 miles
WSC[4] – Eastside Pipeline of Diamond Valley Lake Project, hundreds of localities	Alluvial deposits (Pleistocene)	*Camelops* (camel) *Equus* (horse) Numerous other megafauna and microfauna	Unknown	15–17 miles
LACM[2] VP 6967, 7456	Alluvium pebble – gravel, sand, silt, and clay (likely Pleistocene)	*Hyla* (tree frog) *Anniella* (legless lizard) *Thamnophis* (garter snake) *Thomomys* (pocket gopher) *Peromyscus* (deer mouse) Gastropoda (snails)	Unknown, but collected from subsurface during augering	22 miles

Sources: [1]PBDB, [2]Bell (2021), [3]UCMP, [4]Radford (2021)

MacDonald (2021) also reports no fossil localities from the WSC collections within the Project area. However, he notes that Pleistocene-age alluvial deposits in Southern California are well documented and known to contain abundant fossils, including megafauna, such as Columbian mammoth (*Mammuthus columbi*), Pacific mastodon (*Mammut pacificus*), saber-toothed cat (*Smilodon fatalis*), horse (*Equus*). A

WSC search for another recent project in nearby San Jacinto listed hundreds of fossils localities from the Eastside Pipeline portion of the Diamond Valley Lake Project approximately 15 to 17 miles southeast of the Project area (Radford, 2021). These localities yielded numerous specimens of megafauna, including camel (*Camelops*) and horse (*Equus*), as well as many microfauna specimens.

The PBDB online database does not list any fossil localities from Pleistocene-age alluvial deposits within the Project area, but shows numerous localities approximately 4 to 5 miles to the northeast near the community of Lakeview. These localities are documented in Reynolds and Reynolds (1991), and yielded mammoth (*Mammuthus*), saber-toothed cat (*Smilodon*), horse (*Equus*), bison (*Bison* sp. cf. *B. antiquus*), and numerous small mammals, reptiles, invertebrates, and plants. The PBDB also lists the NHMLAC's LACM IP 437 locality and the extensive Diamond Valley Lake localities reported by the WSC, the latter of which are documented in Springer et al. (2009).

The UCMP's online database does not list any fossil localities from Pleistocene-age alluvial deposits within the Project area, but shows numerous localities approximately 10 to 12 miles to the southwest near Lake Elsinore. These localities yielded over 450 pollen and seed specimens representing dozens of gymnosperm and angiosperm taxa including pine (*Pinus*), willow (*Salix*), maple (*Acer*), buckwheat (*Eriogonum*), ragweed (*Ambrosia*), and many others.

FINDINGS AND RECOMMENDATIONS

Æ used the City's (2008) sensitivity criteria to determine the paleontological potential of the Project area. When placed over the City's (2008) paleontological sensitivity map, the Project area is mapped in Area #4 (Low to High Sensitivity) near the boundary of Area #1 (High Sensitivity). However, while it is mapped in Area #4, Æ's desktop efforts and the museum and online records searches show the paleontological sensitivity of the Project area is more like that of nearby Area #1, as early to middle Pleistocene-age old alluvial-fan deposits are mapped across the entire ground surface. As documented in the previous section, such deposits are known to preserve scientifically significant fossils, potentially at all depths.

Construction-related ground disturbance has a high likelihood of encountering fossil resources in previously undisturbed early to middle Pleistocene-age alluvial sediments. As such, Æ suggests the Project be considered with projects that occur in Area #1, and recommends paleontological monitoring during all ground disturbance in accordance with the City's (2008) Implementation Measure IV.A.4. Æ also recommends Worker Environmental Awareness Program (WEAP) training for construction workers prior to ground disturbance in accordance with industrywide best practices. The WEAP training is a low-cost, proven tool to augment the number of on-site monitors while helping to ensure that nonrenewable paleontological resources are identified and treated properly during construction.

It has been a pleasure assisting you with this Project. If you have any questions, please do not hesitate to contact me at (626) 578-0119 x403.

Sincerely,

Chris Shi
Senior Paleontologist
Applied EarthWorks, Inc.

Edited and Approved By:

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Applied EarthWorks, Inc.

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