

SPDR-18-04



**A PHASE I PALEONTOLOGICAL RESOURCES INVENTORY FOR  
APN 434-050-032, TENTATIVE PARCEL MAP 35511, SAN JACINTO, CALIFORNIA**

±2.2 Acre Property

APN 434-050-032, TPM 35511, City of San Jacinto, Section 27,  
Township 4 South, Range 1 West, USGS San Jacinto Quadrangle

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**Report Summary:**

Results of the review of the records search provided by the Western Science Center and San Bernardino County Museum indicate that there are no previously recorded paleontological resources within the parcel or within a 1-mile radius of the current project area. The paleontological field survey did not identify any unknown paleontological resources on the property. However, Quaternary alluvial sand and clay deposits (Holocene) were identified in the subsurface of parcel. Because of the high sensitivity or potential of the Quaternary alluvial sand and clay deposits to yield paleontological resources under normal or surficial earthmoving activities associated with construction, it is recommended that if excavations exceed five (5) feet in depth a qualified paleontologist be present to monitor these activities according to the included PRIMP.

**Report Date:** August 6, 2018

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## MANAGEMENT SUMMARY

The goal of this study was to identify all paleontological resources situated within the boundaries of the project area. This information is required, since construction of the project could adversely affect such resources.

Results of the review of record searches provided by the Western Science Center (WSC, Radford 2018) and San Bernardino County Museum (SBCM, Scott 2007) indicate that there are no previously recorded paleontological resources within the parcel or within a 1-mile radius of the current project area. The parcel was originally surveyed and assessed for paleontological resources by L&L Environmental, Inc. (L&L) in 2007.

A paleontological field survey was conducted to determine what facies of Quaternary alluvium is present at the surface or preserved in the subsurface and determine if any fossils were present at the surface or exposed in soil test trench onsite. The surface of the site is mostly flat and regularly cleared for weed abatement purposes. During the initial survey by L&L (2007) several soil test trenches were present; however, there is currently only one (1) trench.

Quaternary alluvial deposits from the Holocene are mapped across the parcel. It is likely that the mapped surface deposit is relatively shallow and Quaternary older deposits from the Pleistocene underlay the Holocene deposits. Similar Pleistocene deposits in the vicinity have yielded significant finds and are considered highly sensitive. Because of the high sensitivity or potential of the Quaternary older alluvial deposits to yield paleontological resources under normal or surficial earthmoving activities associated with construction, it is recommended that if excavations exceed five (5) feet in depth a qualified paleontologist be present to monitor these activities according to the included PRIMP.

## **1.0) INTRODUCTION AND SETTING**

### **1.1) Introduction**

This report provides the results of the paleontological resources inventory for the proposed development of ±2.2 acres for commercial shops in the City of San Jacinto, Riverside County, California. State law, as set forth in the California Environmental Quality Act (CEQA) of 1970, requires public agencies not approve projects as proposed unless there are feasible alternatives or mitigation measures available that would substantially lessen significant environmental effects of such projects (Chapter 1, Section 21002). The California Public Resources Code 5097 protects vertebrate fossil sites, including fossilized footprints or any other paleontologic feature, situated on public land. Typical California requirements for paleontologic resource investigations and impact mitigation are outlined in Chapter 12.5, California Business and Professions Code, and Title 20, California Code of Regulations, Section 2012 et seq.

In compliance with CEQA and other regulations, L & L Environmental, Inc. (L&L) was retained to perform a records/literature review of paleontologic resources known to exist on or near the project area. The paleontologic resources inventory, presented herein, consists of the results of the paleontological record/literature review.

### **1.2) Project Goals**

The goal of this study was to identify all paleontological resources situated within the boundaries of the project area. This information is required, since construction of the project could adversely affect such resources.

The paleontological resource study consisted of:

- (1) A literature review, conducted to determine what geologic formations underlie the subject parcel.
- (2) A paleontological records search, conducted to determine whether any previously recorded significant fossil bearing formations underlie the subject parcel.
- (3) A field visit to examine the walls of soil test trenches.

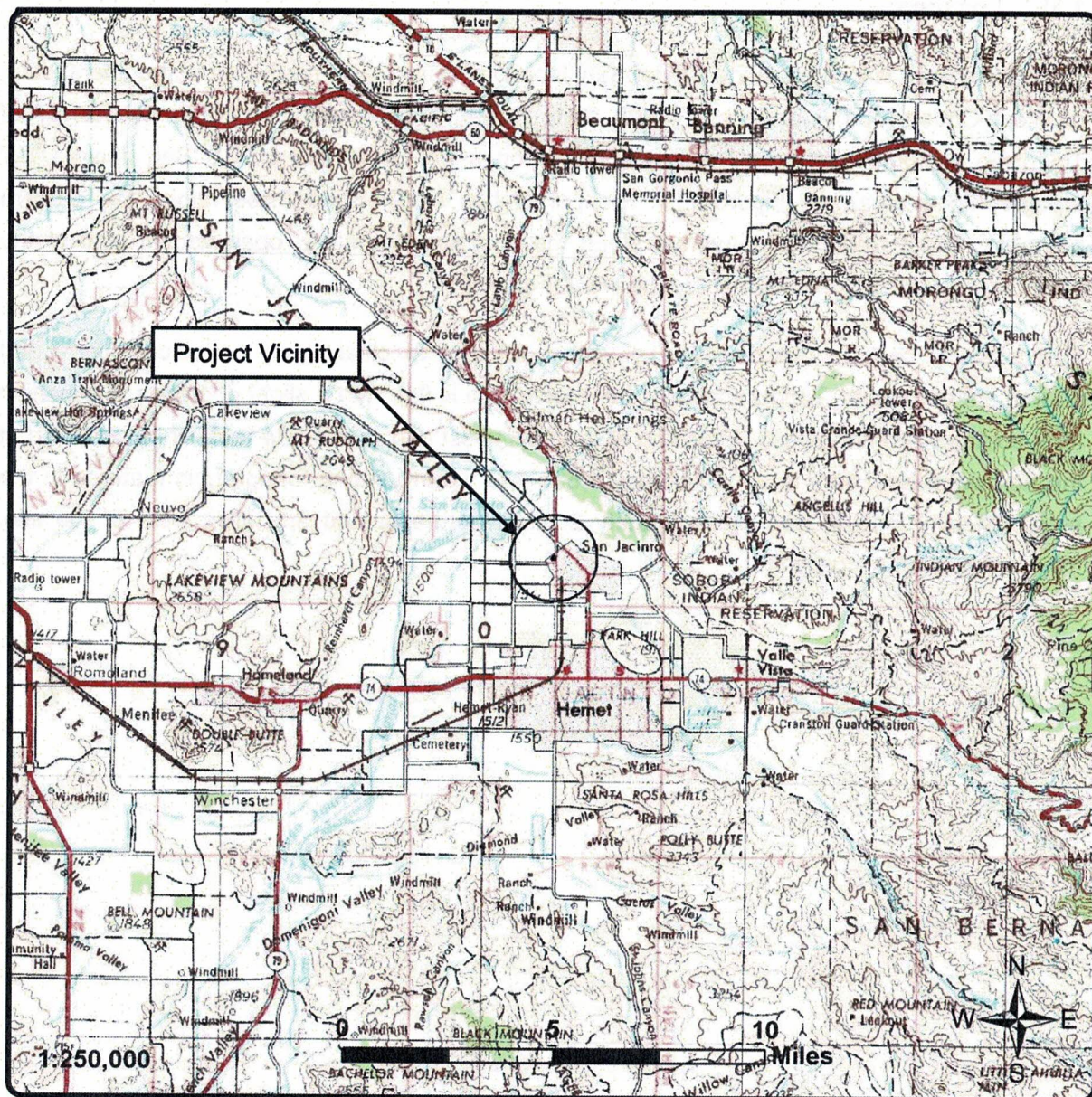


### 1.3) Location

The survey area is located in the City of San Jacinto (Figure 1) just northwest of the intersection of West Cottonwood Avenue and North State Street. The location is within Section 27 of Township 4 South, Range 1 West, as shown on a portion of the USGS San Jacinto 7.5' topographic quadrangle (Figure 2). The parcel has North State Street along the eastern boundary, West Cottonwood Avenue along the southern boundary, open vacant land to the north, and a housing development to the west (Figure 3).

The property can be described as a vacant lot that is cleared off periodically for weed abatement purposes. Topographically, the project site is flat, with a slight decrease in elevation from southeast to northwest. Elevation at the southwest corner is 1,534 feet, while elevation at the northwest boundary is approximately 1,530 feet. Surrounding topographic features in the project vicinity include hills approximately 2 miles northeast and 3.5 miles west of the site. Intervening land is mostly flat.





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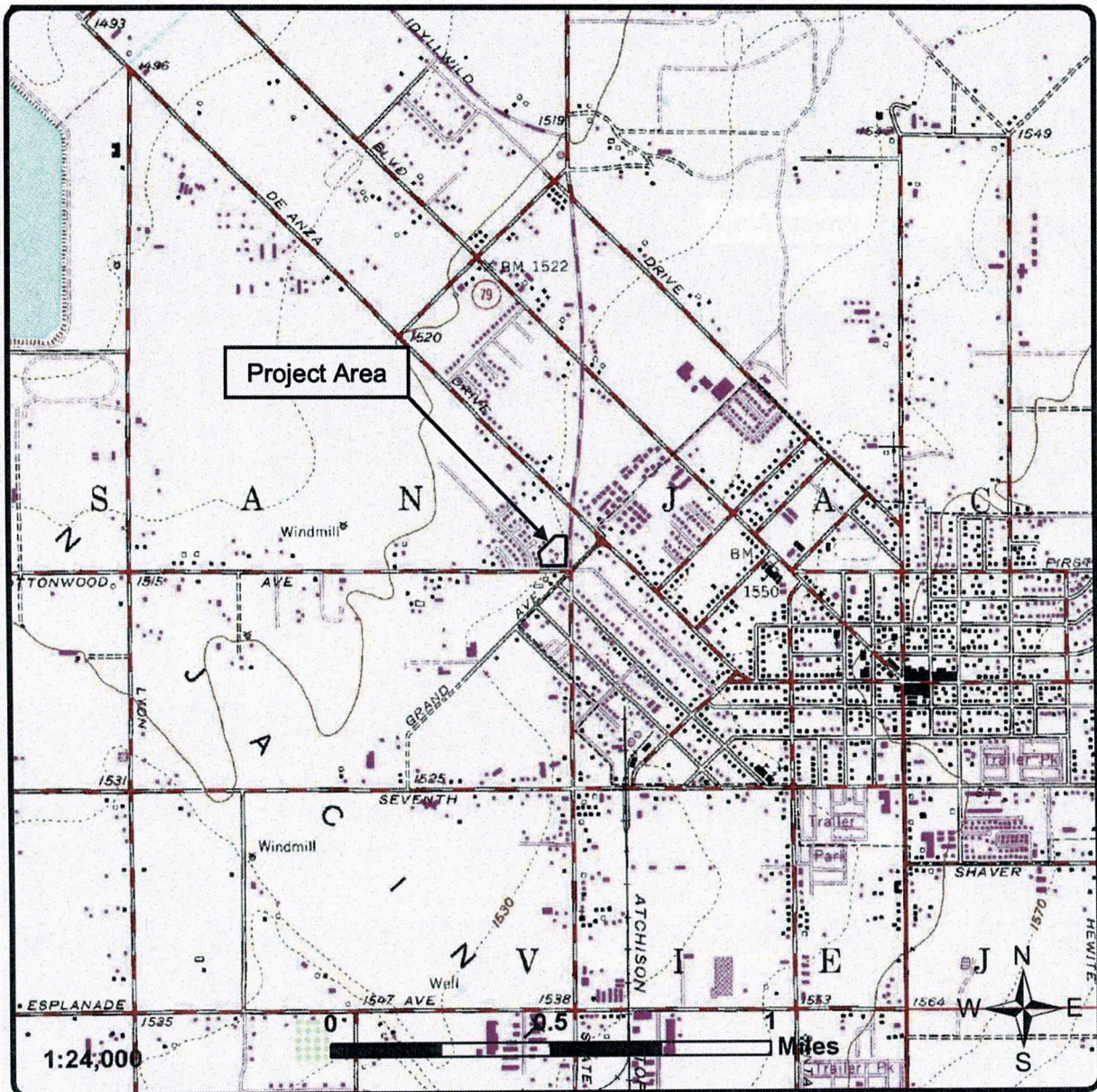
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**Figure 1**

**Project Vicinity Map**

TPM # 3551, City of San Jacinto  
 County of Riverside, California





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**Figure 2**

**Project Location Map**

(USGS San Jacinto [1979] quadrangle,  
Section 27, Township 4 South, Range 1 West)

TPM # 3551, City of San Jacinto  
County of Riverside, California





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**Figure 3**

**Aerial Photograph**

(Photo obtained from Google Earth, February 2018)

TPM # 3551, City of San Jacinto  
County of Riverside, California



## **2.0) REGULATORY BACKGROUND**

The paleontological resource of a rock encompasses any evidence preserved in the rock of once living organisms. As recognized here, this pertains to fossils preserved either as impressions of soft or hard parts, mineralized remains of hard parts, tracks, burrows, or other trace fossils, coprolites, seeds or pollen, and other microfossils. These organisms may have been terrestrial, aquatic, or aerial in life habit.

Fossils are an important resource to science, as they are useful in demonstrating and documenting the evolution of particular groups of organisms. Fossil remains enable geologists to reconstruct the environment in which the organisms lived and hence the environment during deposition of the rock. Fossils are also extremely useful in determining the age of the rock in which they are preserved. Paleontological resources include fossil remains, fossil localities, and formations that have produced fossil material in other nearby areas. The paleontological resource is a limited, nonrenewable, sensitive scientific and educational resource afforded protection under federal, state, and local legislation and policies.

### **2.1) Paleontologic Resource Requirements Under CEQA**

The California Environmental Quality Act (CEQA) requires a lead agency to determine whether a project may have a significant effect on paleontological resources. State of California environmental regulations (California Environmental Quality Act [CEQA], Section 15064.5, Appendix G) address construction activities that may impact paleontological resources. Appendix G provides a checklist of questions that a lead agency should normally address if relevant to a project's environmental impacts. A relevant section of Appendix G that addresses an analysis of Geology and Paleontology is Section (V) (c), which asks if the project will directly or indirectly destroy a unique paleontological resource or site or unique geological feature.

### **2.2) Local Laws and Ordinances**

#### **2.2.1) County of Riverside Requirements**

On October 25, 2011 the Riverside County Board of Supervisors voted to approve the SABER Policy (Safeguard Artifacts Being Excavated in Riverside County). The policy mandates preferential transfer of paleontological fossils to the Western Science Center located in the City of Hemet.



The policy also directs that the following condition be implemented when applicable: "The property owner and/or applicant on whose land the paleontological fossils are discovered shall provide appropriate funding for monitoring, reporting, delivery and curating the fossils at the institution where the fossils will be placed, and will provide confirmation to the County that such funding has been paid to the institution."

### **2.3) Professional Standards**

Within the Society of Vertebrate Paleontology (SVP) are guidelines titled, "The Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontologic Resources." They are a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources (SVP 2010).

Paleontological sensitivity is defined as the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, past history of the geologic unit in producing significant fossils, and fossil localities recorded from that unit. Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey. In "Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources" the SVP (2010) defines three (3) categories of paleontological sensitivity (potential) for sedimentary rock units: high, low, and undetermined:

- **High Potential:** Rock units from which vertebrate or significant invertebrate fossils or suites of plant fossils have been recovered and are considered to have a high potential for containing significant nonrenewable fossiliferous resources. These units include, but are not limited to, sedimentary formations and some volcanic formations that contain significant nonrenewable paleontological resources anywhere within their geographical extent and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. Sensitivity comprises both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, or botanical, and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, ecologic, or stratigraphic data. Areas that contain potentially datable organic remains older than Recent, including deposits associated with nests or middens, and areas that may contain new vertebrate deposits, traces, or trackways are also classified as significant.
- **Low Potential:** Reports in the paleontologic literature or field surveys by a qualified vertebrate paleontologist may allow determination that some areas or units have low



potentials for yielding significant fossils. Such units will be poorly represented by specimens in institutional collections.

- **Undetermined Potential:** Specific areas underlain by sedimentary rock units for which little information is available are considered to have undetermined fossiliferous potentials.

Note that highly metamorphosed rocks and granitic rock units generally do not yield fossils and therefore have low potential to yield significant nonrenewable fossiliferous resources.

In general terms, for geologic units with high potential, full-time monitoring typically is recommended during any project-related ground disturbance. For geologic units with low potential, protection or salvage efforts typically are not required. For geologic units with undetermined potential, field surveys by a qualified paleontologist are usually recommended to specifically determine the paleontologic potential of the rock units present within the study area.



### **3.0) RESEARCH DESIGN AND METHODS**

#### **3.1) Paleontological Research Design and Goals**

The paleontologic resource of a rock encompasses any evidence preserved of once living organisms in the rock. As recognized here, this pertains to fossils preserved either as impressions of soft or hard parts, mineralized remains of hard parts, tracks, burrows, or other trace fossils, coprolites, seeds or pollen and other microfossils. These organisms may have been terrestrial, aquatic, or aerial in life habit.

Fossils are an important resource to science as they are useful in demonstrating and documenting the evolution of particular groups of organisms. Fossils also enable geologists to reconstruct the environment in which the organisms lived and the environment during deposition of the rock, and are also extremely useful in determining the age of the rock in which they are preserved. Paleontologic resources include fossil remains, fossil localities, and formations that have produced fossil material in other nearby areas. The paleontologic resource is a limited, nonrenewable, sensitive scientific educational resource afforded protection under federal laws and regulations designed to preserve environmental quality. In California, the paleontologic resource is offered protection under CEQA.

Potential adverse environmental impacts that could result from excavation on the parcel and that might affect paleontologic resources (unrecorded fossil sites and remains) were assessed. Mitigation measures were then developed to reduce these impacts to an insignificant level. The assessment and mitigation measures are in compliance with 1995 Society of Vertebrate Paleontology (SVP) standard guidelines for reducing the potential adverse impact of construction on paleontologic resources.

#### **3.2) Assessment Criteria**

The paleontological sensitivity of a formation or unnamed sedimentary unit-described as high, low, unknown, or none, is the measurement most conducive to assessing the sensitivity of the paleontologic resources and reflects the potential productivity and importance of the fossils produced within a study area. The procedures utilized in this study to evaluate the paleontologic resource of a rock unit are similar to those utilized by the Society of Vertebrate Paleontology guidelines (2010).



The potential productivity of a formation is measured as high, low, unknown, or none, based upon the densities of fossil specimens or localities within or near the study area. Exposures of a particular formation within a study area most likely will yield fossils similar in number and kind to those previously recorded from the formation in the surrounding area and may contain a similar density of fossil sites. The criteria for establishing the potential productivity of a formation exposed within the study area are described in the table below:

Table 1. Potential Paleontological Sensitivity Criteria

Paleontological Sensitivity	Criteria
High potential	Formation contains a high density of fossil sites and/or has produced numerous remains locally and is very likely to yield additional remains.
Low potential	Poorly exposed or studied formation that contains a very low density of recorded fossil localities and has produced little remains locally.
Unknown potential	Formations for which no data, or insufficient data is available from the immediate vicinity to allow an accurate assessment of its potential for yielding important fossil remains within the study area.
No potential	Unfossiliferous igneous and metamorphic rock units with no potential for yielding any fossil remains or Recent to sub-Recent sedimentary deposits that are too young to yield organic remains greater than 10,000 years old.

### 3.3) Literature Review

The literature review for this study included an examination of geologic maps for the Project area and encompassed the entire Project footprint and a one-mile buffer. The review included previous geologic mapping of the area. In addition to the reviewed published geologic maps, technical reports provided the basis from which the regional and Project-specific geology was derived for this Project.

Pertinent published literature and unpublished manuscripts with regard to the geology and paleontology of extreme western Riverside County were also reviewed for this Project. In the process of conducting the background literature review, existing paleontological resource data—including such published resources as books, journals, and geologic maps, as well as information available via the internet on government websites—were consulted. Furthermore, an online database search was conducted to identify previous paleontological resource assessments conducted within the Project boundaries and in the surrounding area.



### **3.4) Paleontological Records and Collections Search**

Due to the unknown nature of the fossil record, paleontologists cannot ascertain either the quality or the quantity of fossils present in a given geologic unit prior to exposure by natural erosion or human-caused disturbance. Therefore, in the absence of surface fossils it is necessary to assess the sensitivity of the rock units based on their known potential to yield scientifically significant paleontological resources elsewhere in the same geologic units (both within and outside of the study area) or a unit representative of the same depositional environment.

The paleontology impacts of the proposed project are discussed below under subheadings corresponding to each of the significance criterion presented in the preceding section. The analysis describes the impacts of the proposed project related to paleontological resources for each criterion and determines whether implementation of the proposed project would result in significant impacts by evaluating effects of earthmoving by the proposed project against the affected environment.

To evaluate potential paleontological impacts due to earthmoving associated with construction, a paleontological records and literature search was conducted at institutions and museums (Western Science Center and San Bernardino County Museum) that house paleontological collections from the study area. Pertinent published literature and unpublished manuscripts on the geology and paleontology of Perris Valley and surrounding areas were reviewed.

The geologic rock unit in the proposed project area will be rated for paleontological resources that may be present on the surface or would be exposed during ground disturbing construction activities based on the SVP Guidelines (SVP 2010).



## **4.0) RESULTS**

### **4.1) Literature Review**

A comprehensive literature search was conducted. The project area is underlain by Quaternary alluvial deposits from the Holocene (Dibblee and Minch 2003, see Figure 4).

**Older Alluvium – Quaternary Alluvium, Surficial alluvial deposits of sand, silt and clay (Qoa, Qal, Qf):** Deposits of Recent, or Holocene age (Qa) cover a majority of the San Jacinto Valley and many flat areas that occur throughout the Perris Block in this region of Riverside County in undisturbed areas that have been dissected by younger drainages and tributaries, exposed by uplift or deformation due to tectonic activities or as a result of construction activities. Quaternary alluvium may occur as a thin veneer of recent age deposits overlying older alluvial deposits of late Pleistocene age, usually referred to as Older Alluvium or other sedimentary or igneous rocks close to the ground surface, but are not presently exposed. In this region of the San Jacinto Valley there is some evidence of tectonic activities that resulted in the uplift or exposure of Pleistocene age deposits of Park Hill within 1.5 miles southeast of this property.

### **4.2) Paleontological Records Search**

A comprehensive museum collections records search of the Western Science Center (Radford 2018, see Appendix A) and San Bernardino County Museum (Scott 2007, see Appendix A) indicated no previously recorded sites on or immediately adjacent to the property. The WSC and SBCM records search response letters both indicated that no vertebrate fossils have been found onsite or nearby; however, fossils have been found in similar sediments. The WSC letter include the following regarding nearest known fossils and recommended monitoring:

The geologic units underlying this project are mapped entirely as alluvial fan deposits dating from the Pliocene to Holocene period (Jennings, Strand, & Rogers, 1977). Alluvial fan units are considered to be of high paleontological sensitivity. The Western Science Center does not have localities within the project area or within a 1 mile radius, but does have numerous fossil localities in similarly mapped units associated with the Diamond Valley Lake Project within 5 miles of the project area that resulted in thousands of Pleistocene mammal fossil specimens.

Any fossils recovered from the San Jacinto Retail Center Project (KPA-07-895) Project area would be scientifically significant. Excavation activity associated with development of the project area could impact the paleontologically sensitive Pleistocene units and it is the recommendation of the Western Science Center that a paleontological resource mitigation program be put in place to monitor, salvage, and curate any recovered fossils associated with the current study area. (Radford 2018, see Appendix A).



The SBCM letter includes the following regarding nearest known fossils and recommended monitoring:

Previous geologic mapping (Rogers, 1965) indicates that the proposed project property is situated entirely upon Holocene alluvium. This alluvium is likely too young to contain significant nonrenewable paleontologic resources, and so is assigned low paleontologic sensitivity. However, this Holocene alluvium forms a thin sedimentary veneer overlying subsurface sediments of Pleistocene age. This subsurface Pleistocene older alluvium has high potential to contain significant fossil resources, and so is assigned high paleontologic sensitivity. Elsewhere throughout Riverside and inland San Bernardino Counties, Pleistocene valley sediments have frequently yielded significant fossils of extinct animals and plants from the "Ice Ages" (Jefferson, 1991; Reynolds and Reynolds, 1991; Woodburne, 1991; Springer and Scott, 1994; Scott, 1997; Springer and others, 1998, 1999; Anderson and others, 2002). Fossils recovered from these Pleistocene sediments represent extinct taxa including mammoths, mastodons, ground sloths, dire wolves, short-faced bears, sabre-toothed cats, large and small horses, large and small camels, and bison (Jefferson, 1991; Reynolds and Reynolds, 1991; Woodburne, 1991; Springer and Scott, 1994; Scott, 1997; Springer and others, 1998, 1999). For this reason, these Pleistocene sediments can be confidently interpreted to have high paleontologic sensitivity. However, it is not known *a priori* at what depths such Pleistocene sediments might be encountered; for the purposes of this report, it is inferred that such sediments may be present at depths in excess of 5' below the existing ground surface.

For this review, I conducted a search of the Regional Paleontologic Locality Inventory (RPLI) at the SBCM. The results of this search indicate that no paleontologic resource localities are recorded from within the boundaries of the proposed project property, nor for at least one mile in any direction.

### Recommendations

The results of the literature review and the check of the RPLI at the SBCM demonstrate that excavation in conjunction with development may have high potential to adversely impact significant nonrenewable paleontologic resources present within the boundaries of the proposed project property, depending upon the proposed depth of excavation. If excavation is restricted to depths of approximately 5' below the existing ground surface, or less, then older Pleistocene sediments are not expected to be encountered. At these depths, no program to mitigate adverse impacts to paleontologic resources is recommended at this time.

In the event that excavation is expected to exceed 5' below the existing ground surface in depth, a qualified vertebrate paleontologist must be retained to develop a program to mitigate impacts to such resources. This mitigation program should be consistent with the provisions of the California Environmental Quality Act (Scott and Springer, 2003), as well as with regulations currently implemented by the County of Riverside and the proposed guidelines of the Society of Vertebrate Paleontology. This program should include, but not be limited to:

1. Monitoring of excavation in areas identified as likely to contain paleontologic resources by a qualified paleontologic monitor. Based upon the results of this



review, areas of concern include any and all previously-undisturbed sediments of Pleistocene older alluvium present at depth within the boundaries of the property. Paleontologic monitors should be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors must be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. As discussed above, monitoring is not necessary unless fossils and/or potentially-fossiliferous units are encountered and determined upon exposure and examination by qualified paleontologic personnel to have potential to contain fossil resources. If the potentially-fossiliferous units described herein are present in the subsurface, but are determined upon exposure and examination by qualified paleontologic personnel to have low potential to contain fossil resources, monitoring is not necessary.

2. Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. Preparation and stabilization of all recovered fossils are essential in order to fully mitigate adverse impacts to the resources (Scott and others, 2004).
3. Identification and curation of specimens into an established, accredited museum repository with permanent retrievable paleontologic storage (e.g., SBCM). These procedures are also essential steps in effective paleontologic mitigation (Scott and others, 2004) and CEQA compliance (Scott and Springer, 2003). The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities. Mitigation of adverse impacts to significant paleontologic resources is not complete until such curation into an established museum repository has been fully completed and documented.
4. Preparation of a report of findings with an appended itemized inventory of specimens. The report and inventory, when submitted to the appropriate Lead Agency along with confirmation of the curation of recovered specimens into an established, accredited museum repository, would signify completion of the program to mitigate impacts to paleontologic resources. (Scott 2007, see Appendix A).

#### **4.3) Field Survey**

The four (4) test trenches excavated on the property exposed deposits of undisturbed gray, well consolidated, fine-grained to silty micaceous sandstones with small gray clay balls to a depth of three feet. It was underlain by a gray, poorly consolidated, medium to coarse-grained arkosic sandstone with small clay balls. At all other locations mapped as Recent Quaternary alluvium observed in the San Jacinto Valley, the deposits have been unconsolidated sands and silts with abundant bioturbation (rodent burrows) indicative of soft unconsolidated deposits to a depth of at least 5 feet below the ground surface. Within the current property area the deposits at the surface are well consolidated silty sandstones that lack conspicuous bioturbation and extend to a depth of at least 3 feet below the ground surface in the south and western portion of the parcel

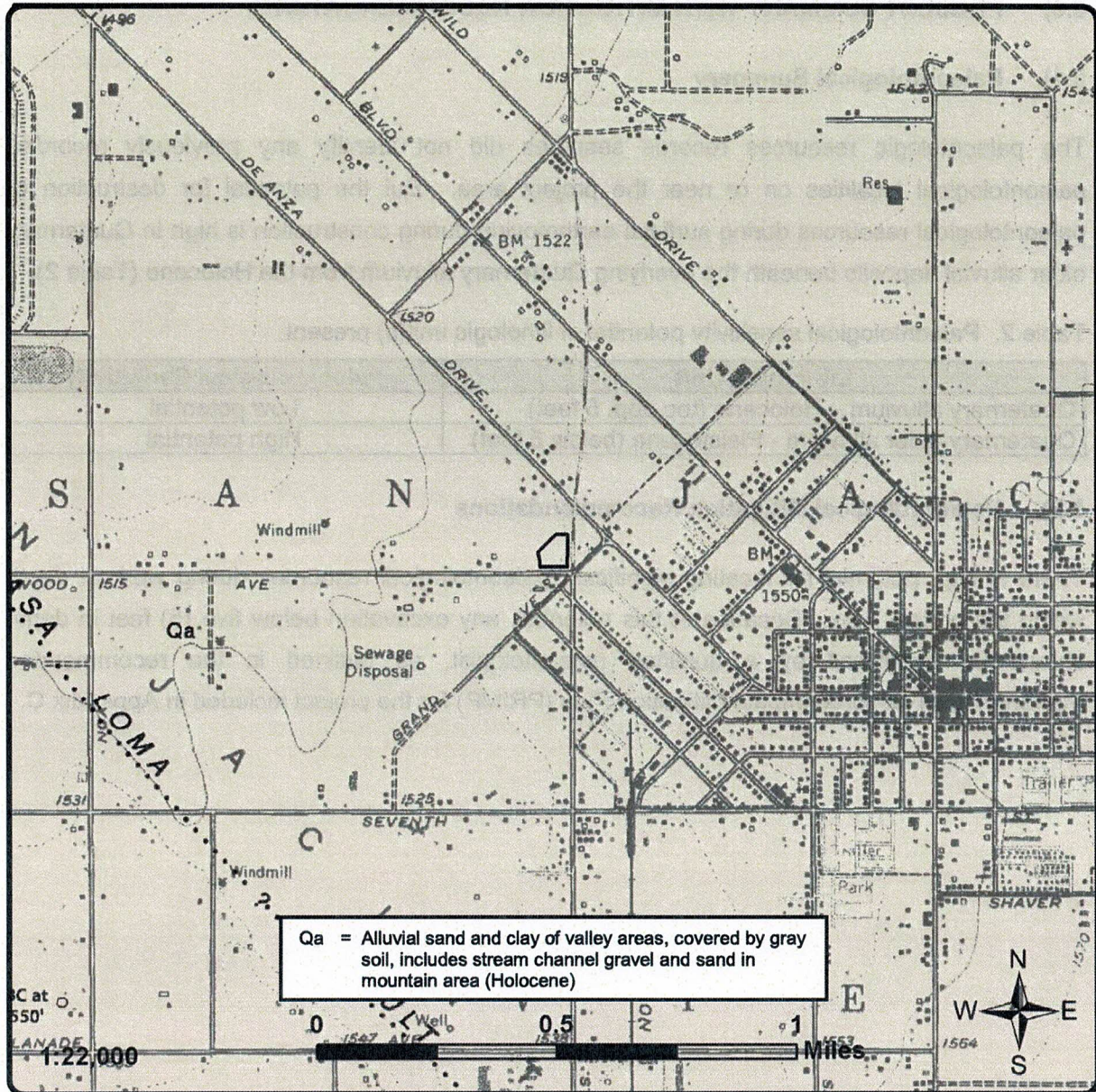


and to a depth of 5 feet at the northeastern corner of the property. The deposits exposed in the trenches are well consolidated resembling Older Alluvium and may possibly be the "Bautista Beds". They did not resemble any of the deposits considered to be Recent Alluvium observed elsewhere in the vicinity of the nearby city of Hemet. It should be noted that these deposits occur a half mile north of the projected trace of the Casa Loma Fault (Dibblee 2003) that forms the southern margin of Park Hill a little over a mile to the southeast in the city of Hemet.

The flat surface of the project area implies basin deposits, and the surface deposits are either fine-grained silty sandstones or siltstones. However, they are well consolidated and exhibit bedding. For this reason, these deposits are here tentatively referred to as Older Alluvium due to the amount of consolidation and due to the facies change (coarse sandstone at a depth of 3.5 feet to 5+ feet) below the ground surface. Scott (2007) notes that in the Perris Block area Holocene alluvium can form a thin veneer over sediments of Pleistocene age. At this location, the Pleistocene age deposits appear to be right at the surface.

The field survey consisted of examining the sedimentary rocks exposed in the four (4) trenches excavated within the property boundaries of the current project area. The survey revealed the presence of well-consolidated fine and coarse-grained sedimentary deposits suggestive of fluvial and lacustrine environment of deposition. This area of the San Jacinto Valley is mapped as Quaternary Alluvium of Holocene (Recent) age. However, the well consolidated sediments at this location strongly suggest that these deposits are significantly older and were probably deposited during late Pleistocene time. No fossils were observed in the limited area exposed in the trenches or on the ground surface; however, the fine-grained nature of the deposits coincide with the change in facies from a silty sandstone to a coarse-grained sandstone and indicated that these sediments were deposited in an environment good for the preservation of fossils.





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**Figure 4**

**Paleontology Map**

(Dibblee, T. W. and J. A. Minch. 2003. Geologic map of the San Jacinto quadrangle, Riverside County, California.)

TPM # 3551, City of San Jacinto  
 County of Riverside, California



## 5.0) PROJECT SUMMARY WITH MITIGATION RECOMMENDATIONS

### 5.1) Paleontological Summary

The paleontologic resources records searches did not identify any previously recorded paleontological localities on or near the project area. But the potential for destruction of paleontological resources during surficial earthmoving during construction is high in Quaternary older alluvial deposits beneath the overlying Quaternary alluvium from the Holocene (Table 2).

Table 2. Paleontological sensitivity potential of lithologic unit(s) present.

Lithologic Unit	Paleontological Sensitivity
Quaternary alluvium – Holocene (top app. 5 feet)	Low potential
Quaternary older alluvium - Pleistocene (below 5 feet)	High potential

### 5.2) Paleontological Mitigation Recommendations

There is high potential for locating significant paleontological resources during work at depth within the project area. Because of this potential, any excavation below five (5) feet in depth should be monitored by a qualified paleontologist, as outlined in the recommended Paleontologic Resource Impact Mitigation Plan (PRIMP) for the project included in Appendix C.



## 6.0) REFERENCES

- Dibblee, T. W. and J. A. Minch. 2003. Geologic map of the San Jacinto quadrangle, Riverside County, California.
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## 7.0) CERTIFICATION

Certification: I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

DATE: August 6, 2018

SIGNED: 

Leslie Irish, Principal, L&L Environmental, Inc.  
909-335-9897

DATE: August 6, 2018

SIGNED: 

Hugh M. Wagner, Sr. Paleontologist, L&L Environmental, Inc.  
909-335-9897



## APPENDICES

### Appendix A – Record Search Results





August 2, 2018

L&L Environmental  
Jeffrey Sonnentag  
721 Nevada Street, Suite 307  
Redlands, CA 92373

Dear Mr. Sonnentag,

This letter presents the results of a record search conducted for the San Jacinto Retail Center Project (KPA-07-895) in the city of San Jacinto, Riverside County, California. The project site is located west of State Street and north of Cottonwood Avenue in Section 27, Township 4 South, Range 1 West on the San Jacinto USGS 7.5 minute quadrangle.

The geologic units underlying this project are mapped entirely as alluvial fan deposits dating from the Pliocene to Holocene period (Jennings, Strand, & Rogers, 1977). Alluvial fan units are considered to be of high paleontological sensitivity. The Western Science Center does not have localities within the project area or within a 1 mile radius, but does have numerous fossil localities in similarly mapped units associated with the Diamond Valley Lake Project within 5 miles of the project area that resulted in thousands of Pleistocene mammal fossil specimens.

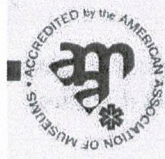
Any fossils recovered from the San Jacinto Retail Center Project (KPA-07-895) Project area would be scientifically significant. Excavation activity associated with development of the project area could impact the paleontologically sensitive Pleistocene units and it is the recommendation of the Western Science Center that a paleontological resource mitigation program be put in place to monitor, salvage, and curate any recovered fossils associated with the current study area.

If you have any questions, or would like further information about the Diamond Valley Lake Project, please feel free to contact me at [dradford@westerncentermuseum.org](mailto:dradford@westerncentermuseum.org)

Sincerely,

Darla Radford  
Collections Manager





## SAN BERNARDINO COUNTY MUSEUM

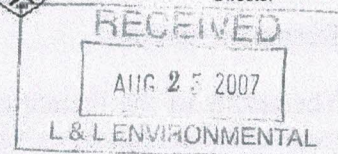
2024 Orange Tree Lane • Redlands, California USA 92374-4560  
(909) 307-2669 • Fax (909) 307-0539 • www.sbcountymuseum.org  
TDD (909) 792-1462



COUNTY OF SAN BERNARDINO  
PUBLIC AND SUPPORT  
SERVICES GROUP

ROBERT L. McKERNAN  
Director

31 July 2007



L&L Environmental, Inc.  
attn: Kristie Blevins, Senior Archaeologist  
1269 Pomona Road, Suite #102  
Corona, CA 92882

re: **PALEONTOLOGY LITERATURE AND RECORDS REVIEW, SAN JACINTO  
RETAIL CENTER, SAN JACINTO, RIVERSIDE COUNTY, CALIFORNIA**

Dear Kristie,

The Division of Geological Sciences of the San Bernardino County Museum (SBCM) has completed a literature review and records search for the above-named ~1.7-acre property in the City of San Jacinto, Riverside County, California. The study area is located in the southwestern quadrant of section 27, Township 4 South, Range 1 West, San Bernardino Base and Meridian, as seen on the San Jacinto, California 7.5' United States Geological Survey topographic quadrangle map (1953 edition, photorevised 1979).

Previous geologic mapping (Rogers, 1965) indicates that the proposed project property is situated entirely upon Holocene alluvium. This alluvium is likely too young to contain significant nonrenewable paleontologic resources, and so is assigned low paleontologic sensitivity. However, this Holocene alluvium forms a thin sedimentary veneer overlying subsurface sediments of Pleistocene age. This subsurface Pleistocene older alluvium has high potential to contain significant fossil resources, and so is assigned high paleontologic sensitivity. Elsewhere throughout Riverside and inland San Bernardino Counties, Pleistocene valley sediments have frequently yielded significant fossils of extinct animals and plants from the "Ice Ages" (Jefferson, 1991; Reynolds and Reynolds, 1991; Woodburne, 1991; Springer and Scott, 1994; Scott, 1997; Springer and others, 1998, 1999; Anderson and others, 2002). Fossils recovered from these Pleistocene sediments represent extinct taxa including mammoths, mastodons, ground sloths, dire wolves, short-faced bears, sabre-toothed cats, large and small horses, large and small camels, and bison (Jefferson, 1991; Reynolds and Reynolds, 1991; Woodburne, 1991; Springer and Scott, 1994; Scott, 1997; Springer and others, 1998, 1999). For this reason, these Pleistocene sediments can be confidently interpreted to have high paleontologic sensitivity. However, it is not known *a priori* at what depths such Pleistocene sediments might be encountered; for the purposes of this report, it is inferred that such sediments may be present at depths in excess of 5' below the existing ground surface.

For this review, I conducted a search of the Regional Paleontologic Locality Inventory (RPLI) at the

MARK H. LITTE  
County Administrative Officer  
NORMAN A. RANDOL  
Assistant County Administrator  
Public and Support  
Services Group

BRAD MITCHELL  
PAUL BLANK

Board of Supervisors  
First District: JENNIS HANSENBERGER  
Second District: GARY C. DYTT  
Third District: JUDITH GONZALES  
Fourth District: PAUL BLANK



SBCM. The results of this search indicate that no paleontologic resource localities are recorded from within the boundaries of the proposed project property, nor for at least one mile in any direction.

## Recommendations

The results of the literature review and the check of the RPLI at the SBCM demonstrate that excavation in conjunction with development may have high potential to adversely impact significant nonrenewable paleontologic resources present within the boundaries of the proposed project property, depending upon the proposed depth of excavation. If excavation is restricted to depths of approximately 5' below the existing ground surface, or less, then older Pleistocene sediments are not expected to be encountered. At these depths, no program to mitigate adverse impacts to paleontologic resources is recommended at this time.

In the event that excavation is expected to exceed 5' below the existing ground surface in depth, a qualified vertebrate paleontologist must be retained to develop a program to mitigate impacts to such resources. This mitigation program should be consistent with the provisions of the California Environmental Quality Act (Scott and Springer, 2003), as well as with regulations currently implemented by the County of Riverside and the proposed guidelines of the Society of Vertebrate Paleontology. This program should include, but not be limited to:

1. Monitoring of excavation in areas identified as likely to contain paleontologic resources by a qualified paleontologic monitor. Based upon the results of this review, areas of concern include any and all previously-undisturbed sediments of Pleistocene older alluvium present at depth within the boundaries of the property. Paleontologic monitors should be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors must be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. *As discussed above, monitoring is not necessary unless fossils and/or potentially-fossiliferous units are encountered and determined upon exposure and examination by qualified paleontologic personnel to have potential to contain fossil resources.* If the potentially-fossiliferous units described herein are present in the subsurface, but are determined upon exposure and examination by qualified paleontologic personnel to have low potential to contain fossil resources, monitoring is not necessary.
2. Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. Preparation and stabilization of all recovered fossils are essential in order to fully mitigate adverse impacts to the resources (Scott and others, 2004).
3. Identification and curation of specimens into an established, accredited museum repository with permanent retrievable paleontologic storage (e.g., SBCM). These procedures are also essential steps in effective paleontologic mitigation (Scott and others, 2004) and CEQA compliance (Scott and Springer, 2003). The paleontologist must have a written repository



agreement in hand prior to the initiation of mitigation activities. Mitigation of adverse impacts to significant paleontologic resources is not complete until such curation into an established museum repository has been fully completed and documented.

4. Preparation of a report of findings with an appended itemized inventory of specimens. The report and inventory, when submitted to the appropriate Lead Agency along with confirmation of the curation of recovered specimens into an established, accredited museum repository, would signify completion of the program to mitigate impacts to paleontologic resources.

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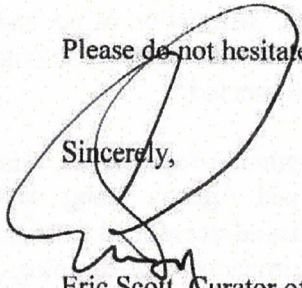


Literature / records review, Paleontology, L&L: San Jacinto Retail Center

4

Please do not hesitate to contact us with any further questions you may have.

Sincerely,



Eric Scott, Curator of Paleontology  
Division of Geological Sciences  
San Bernardino County Museum



## Appendix B – Paleontologic Resource Impact Mitigation Plan (PRIMP)

PALEONTOLOGIC RESOURCE IMPACT MITIGATION PLAN (PRIMP)  
FOR APN 434-050-032, TENTATIVE PARCEL MAP 35511  
SAN JACINTO, CALIFORNIA

APN 434-050-032

Section 12, Township 4 South, Range 1 West, USGS San Jacinto Quadrangle

Proposed Plan

San Jacinto

DAI Capital Resources, LLC  
21002 Torrance Parkway, Suite 204  
Torrance, CA 90503  
jon@daicapital.com  
801-917-1230

John M. Wagner, Paleontologist  
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John M. Wagner, Paleontologist  
John M. Wagner, Paleontologist

John M. Wagner, Paleontologist

Report Date: August 6, 2018



**PALEONTOLOGIC RESOURCE IMPACT MITIGATION PLAN (PRIMP)  
FOR APN 434-050-032, TENTATIVE PARCEL MAP 35511,  
SAN JACINTO, CALIFORNIA**

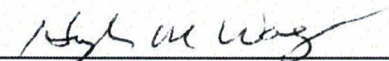
APN 434-050-032

Section 27, Township 4 South, Range 1 West, USGS San Jacinto Quadrangle

**Prepared For:**

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Leslie Irish, Principal    [lirish@lleviroinc.com](mailto:lirish@lleviroinc.com)  
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\_\_\_\_\_  
Hugh M. Wagner: Supervising Paleontologist

**Report Date: August 6, 2018**



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## **SECTION 1**

### **INTRODUCTION**

A paleontologic resource impact mitigation program (PRIMP) is required by the County of Riverside for development of a Farmer Boys restaurant and associated access areas and parking. The site is an empty lot covering APN 434-050-032 that has North State Street along the eastern boundary, West Cottonwood Avenue along the southern boundary, open vacant land to the north, and a housing development to the west. This PRIMP is being required because of the potential for scientifically important fossil remains being uncovered by earth moving at previously unrecorded fossil sites within the project area. Without the PRIMP, fossil remains and associated specimen data and corresponding geologic and geographic site data could be lost to earth moving and unauthorized fossil collecting.

The mitigation measures detailed below are based on measures presented in the paleontologic resource inventory/impact assessment that this PRIMP is found as an appendix within. The measures were developed in compliance with Society of Vertebrate Paleontology (2010) standard measures for reducing construction-related impacts on paleontologic resources and museum repository conditions for accepting a paleontologic mitigation program fossil collection. The PRIMP will be implemented by Hugh M. Wagner, Ph.D., project paleontologist, L&L Environmental, Inc. (L&L).

The PRIMP will substantially reduce the potentially significant adverse environmental impacts of earth moving on paleontologic resources of the site to an acceptable level by: 1) allowing for recovery of fossil remains and associated specimen data and corresponding geologic and geographic site data; and 2) allowing for their preservation in the Western Science Center (WSC) or other qualified repository where they will be available for future study by qualified investigators. Moreover, with the PRIMP, earth moving could result in beneficial effects, including the exposure and recovery of numerous scientifically highly important fossil remains and associated data.

The parcel was researched by Hugh M. Wagner and found to be underlain by Quaternary older alluvial deposits (Dibblee and Minch 2003).

The site has been impacted by regular clearing for weed abatement purposes; however, if previously undisturbed soils/formations are present at depth there is potential for remains being uncovered by earth moving activities. Identifiable fossil remains (particularly of vertebrates), if



any, recovered at the site will be scientifically highly important if they represent new or rare species, geologic (temporal) and/or geographic range extensions, age-diagnostic taxa, and/or more complete specimens than are now available for their respective taxa. The recovery of remains representing age-diagnostic taxa will be critical in confirming, refining, and/or correcting previous age assignments for the fossil-bearing rock unit and its fauna, and the recovery of remains representing environmentally sensitive taxa will be critical in paleoenvironmental reconstruction. Moreover, the remains will contribute to a more comprehensive documentation of the diversity of extinct animal life that existed in the San Jacinto Valley area during the Quaternary Epoch and to a more accurate reconstruction of the geologic history of the area.

The PRIMP will consist of paleontologic monitoring of earth moving to ensure recovery of larger fossil remains and, if warranted, processing of rock samples to ensure recovery of smaller fossil remains. The level of monitoring in any particular area of the site will be based on the rock unit underlying that area. Recovery of fossil remains as part of this PRIMP will be allowed under CEQA Appendix G (5.c). Recovered remains will be prepared and submitted to knowledgeable paleontologists for identification. The remains will then be curated and accessioned into the WSC fossil collection and associated specimen data and corresponding site data archived (entered into corresponding museum catalogs and computerized databases).



## **SECTION 2**

### **MITIGATION PROGRAM PROCEDURES**

The mitigation measures detailed below for the PRIMP are in compliance with Paleontology Mitigation Measures for the overall project as recommended in the Phase I Paleontological Resources Inventory.

#### **Paleontology 1: Review Geotechnical Report Data**

In conjunction with the final design phase of each program-related improvement, a qualified vertebrate paleontologist will review the geotechnical report data, with particular regard to location and depth of earth moving and the rock unit(s) being encountered. The review is for the purpose of assessing potential for fossil remains being encountered by earth moving. If previously undisturbed strata with potential for containing fossil remains will be encountered by earth moving, the following measures will be implemented.

#### **Paleontology 2: Museum Storage Agreement**

The WSC will be the designated museum repository for any vertebrate, invertebrate, and plant fossil remains and associated specimen data and corresponding geologic and geographic site data that might be recovered from the site as a result of the PRIMP. Prior to any earth moving at the project site, the paleontologist will develop a formal agreement with the museum regarding final disposition and permanent storage and maintenance of the fossil collection and associated data. The agreement will cover, but not necessarily be limited to, museum requirements regarding: 1) level of treatment of the collection; 2) storage and maintenance fees, if any; 3) purchase of specimen storage cabinets and drawers, as well as specimen trays, vials, specimen data cards, and other curatorial supplies, if required.

#### **Paleontology 3: Preconstruction Meeting**

The paleontologist or field supervisor, as well as a paleontologic construction monitor, will attend a preconstruction meeting to explain the PRIMP to construction contractor and D&D Capital Resources, LLC staff. The presentation will summarize mitigation procedures to be employed by PRIMP personnel and will detail procedures and lines of communication, as specified in the County of Riverside, Conditions of Approval, to be followed by specific project personnel when fossil remains are found at the site.



The paleontologist or field supervisor will inform construction contractor and D&D Capital Resources, LLC staff of the following items:

- 1) Routine mitigation measures (primarily monitoring and test screening) to be employed by a monitor during earth moving.
- 2) The potential for fossil remains being uncovered by earth moving in particular areas of the site and the need to implement specific actions and additional mitigation measures when a fossil occurrence is uncovered by earth moving.
- 3) Functions and responsibilities of the monitor when fossil remains are uncovered by earth moving and can be recovered without diverting the monitor from monitoring (temporarily divert earth moving around fossil site until remains evaluated, recovered, and earth moving allowed to proceed through site by monitor; if approved by construction contractor, enlist assistance of earth-moving equipment and operator to expedite recovery of remains, obviate need for additional personnel, and reduce any potential construction delay).
- 4) Functions and responsibilities of the monitor when a fossil occurrence is uncovered by earth moving and is sufficiently large or productive that it cannot be recovered without diverting the monitor from monitoring.
  - 4a) Flag the site.
  - 4b) Advise construction contractor to avoid fossil site until further notice (probably less than 2 days).
  - 4c) Call the project paleontologist or field supervisor to site.
- 5) Functions and responsibilities of the paleontologist or field supervisor when notified by the monitor that a large or productive fossil occurrence has been uncovered by earth moving and cannot be recovered without diverting the monitor from monitoring. Evaluate occurrence to determine if recovery is warranted.
  - 5a) If recovery is warranted - notify construction contractor and D&D Capital Resources, LLC of necessity for implementing additional mitigation measures specified in DC/TP initiating increased level of monitoring, if not already in effect, in immediate vicinity of fossil site and assigning additional personnel to PRIMP.
  - 5b) Within 24 hours after D&D Capital Resources, LLC approval as secured by L&L, mobilize recovery crew to recover occurrence; supervise recovery of occurrence and its transport to laboratory facility or to location elsewhere at site approved by construction contractor for initial/field



- processing of a fossiliferous rock sample or to laboratory facility for preparation of a fossil specimen.
- 5c) If warranted and approved by construction contractor, enlist assistance of the earth-moving equipment and operator to expedite recovery of occurrence.
  - 5d) To obviate need for additional personnel and reduce any potential construction delay, after recovery of occurrence, have construction contractor allow earth moving to proceed through fossil site.
  - 5e) Notify D&D Capital Resources, LLC of recovery (or of decision not to recover fossil occurrence, if appropriate) and of authorization for earth moving to proceed through fossil site.
  - 6) Responsibilities of the construction contractor and earth-moving equipment operators if fossil remains are uncovered by earth moving, particularly if a monitor is not present at the site when the remains are encountered.
    - 6a) Avoid disturbance of fossil site by earth moving.
    - 6b) Notify monitor, the paleontologist, or the field supervisor and D&D Capital Resources, LLC of the fossil occurrence.
    - 6c) Avoidance of fossil site by earth-moving activities.
    - 6d) Assist with equipment and operator to expedite recovery of occurrence.

These measures will obviate need for additional personnel, reduce any potential construction delay, and allow for earth moving to proceed through the site following approval by monitor. The construction contractor and D&D Capital Resources, LLC staff will be shown examples of fossil specimens similar to those that might be encountered by earth moving at the site.

If warranted, the paleontologist or field supervisor and a monitor will give a similar presentation to the earth-moving equipment operators at one of their earliest safety meetings. The operators will be instructed on recognizing fossil remains in the field, informed of their responsibilities if they observe fossil remains when the monitor is not present at the site (avoid disturbance of occurrence by earth moving; have construction contractor call monitor to fossil site; expedite recovery of occurrence, if requested), and advised that unauthorized collecting of fossil remains is illegal.



#### **Paleontology 4: Monitoring Earth Moving**

Earth moving will be monitored by a paleontologic monitor only in those areas of the site where earth moving will disturb soils greater than five (5) feet deep (monitoring will not be conducted in areas in which soils will be buried, but not disturbed). Monitoring will not be implemented until earth moving has reached a depth of five (5) feet below current grade. Monitoring will consist of visually inspecting freshly exposed rock and debris for larger fossil remains and periodically dry test screening a small (25 pound) sample of rock and debris with a 20-mesh box screen for smaller vertebrate fossil remains. Monitoring will be conducted on a full-time basis. However, if too few or no fossil remains are uncovered by earth moving in areas underlain by a particular rock unit and with the approval of D&D Capital Resources, LLC as secured by L&L, monitoring can be reduced. Generally, to half or quarter time or suspended once 50% of earth moving in the area underlain by the rock unit has been completed. Alternatively, if sufficient fossil remains are uncovered by earth moving and with the approval of D&D Capital Resources, LLC as secured by L&L, monitoring may be increased in areas underlain by the fossil-bearing rock unit, at least in the immediate vicinity of the fossil site.

#### **Paleontology 5A: Large-Specimen Evaluation and Recovery Option**

- 1) If a large fossil specimen is found as a result of monitoring earth moving and the specimen can be recovered without significantly diverting the monitor from monitoring, earth moving will be temporarily diverted around the fossil site and the specimen will be evaluated, and, if warranted, excavated, covered with a protective plaster-impregnated burlap jacket, if required, and recovered.

If necessary and approved by the construction contractor, earth-moving equipment and an operator will be enlisted to expedite recovery of the specimen and obviate the need for additional personnel, and the construction contractor will be allowed to have earth moving proceed through the fossil site immediately after recovery of the specimen. A temporary field number will be assigned to the specimen; the field number, a preliminary field identification, and pertinent specimen (field number, identification by taxon and element) and geologic (particularly stratigraphic level within rock unit) and geographic site data (location, elevation) recorded in the monitor's daily monitoring log; and the field number recorded and the fossil site location plotted on a map of the site.

At the end of the day the monitor or (following his next site inspection) the field supervisor will transport the fossil remains and associated data to a laboratory facility for further treatment (see Paleontology 7). If appropriate, samples of fossil wood will be submitted for carbon-14 dating analysis.



- 2) If a fossil specimen is found and is sufficiently large that it cannot be recovered without significantly diverting the monitor from monitoring, the fossil site will be flagged with colored survey ribbon to temporarily divert earth moving around the site, the construction contractor will be advised to avoid the site until further notice (probably less than 2 days), and the paleontologist or field supervisor will be called to the site. The grading contractor will notify D&D Capital Resources, LLC and L&L of the occurrence and of the avoidance of the site. The paleontologist or field supervisor in turn will evaluate the specimen to determine if recovery is warranted.

- 2a) If specimen recovery is not warranted, no further action will be taken to preserve the fossil site or remains, the construction contractor will be allowed to have earth moving proceed through the site immediately, and D&D Capital Resources, LLC will be notified of the decision not to recover the specimen and of authorization for earth moving to proceed through the fossil site.

- 2b) If specimen recovery is warranted, the paleontologist or field supervisor will notify the construction contractor, and D&D Capital Resources, LLC of the necessity for implementing additional mitigation measures specified in the DC/TP, initiating full-time monitoring, if not already in effect, at least in the immediate vicinity of the site in areas underlain by the fossil-bearing rock unit, and assigning additional personnel to the PRIMP. Within 24 hours after D&D Capital Resources, LLC approval as secured by L&L, a recovery crew will be mobilized to recover the specimen. The size of the crew will reflect the size of the specimen and the need to recover the specimen as quickly as possible.

The specimen will be excavated with hand tools, covered with a protective plaster-impregnated burlap jacket, and recovered. If necessary and approved by the construction contractor, earth-moving equipment and an operator will be enlisted to expedite recovery of the specimen, reduce any potential construction delay, and obviate the need for additional personnel. The construction contractor will be allowed to have earth moving proceed through the fossil site immediately after recovery of the specimen. D&D Capital Resources, LLC will be notified of the recovery and of authorization for earth moving to proceed through the fossil site.

A temporary field number will be assigned to the specimen; the field number, a preliminary field identification, and pertinent specimen (field number, identification by taxon and element) and geologic (particularly stratigraphic level within rock unit) and geographic site data (location, elevation) recorded in the monitor's daily monitoring log; and the field number recorded and the fossil site location plotted on a map of the site. The field supervisor and, if necessary, a crew member will transport the fossil specimen and associated site data to a laboratory facility for further treatment (see Paleontology 7).



## **Paleontology 5B: Small-Specimen Sample Evaluation, Recovery, and Processing**

If a sufficient number of smaller vertebrate fossil remains are found at one (1) site as a result of test screening by the monitor, the fossil site will be flagged with colored survey ribbon to temporarily divert earth moving around the site. The construction contractor will be advised to avoid the site until further notice (probably less than two [2] days), and if requested by the monitor to expedite recovery of a fossiliferous rock sample reduce any potential construction delay and obviate the need for additional personnel, the construction contractor will have earth-moving equipment and an operator acquire a rock sample from the fossil site and transport the sample, if possible, to a nearby temporary location at the site approved by the construction contractor.

The construction contractor will notify D&D Capital Resources, LLC and L&L of the occurrence and of the avoidance of the fossil/storage site. If a sample is recovered, the construction contractor will be allowed to have earth moving proceed through the fossil site immediately after recovery of the sample. The monitor will notify D&D Capital Resources, LLC of the recovery of the sample and of authorization for earth moving to proceed through the fossil site. The paleontologist or field supervisor will be called to the fossil/storage site to determine if the fossil site/sample is sufficiently productive to warrant recovery of a large sample of fossiliferous rock to process for additional small remains. Previous experience has demonstrated that only some fossil sites require sampling/sample processing. On the other hand, more than 95 percent of the specimens recovered as a result of some mitigation programs were recovered as a result of sample processing.

- 1) If the site/sample is determined too unproductive or the remains too poorly preserved or insufficiently diagnostic, no further action will be taken to preserve the fossil site/sample or remains, the construction contractor will be allowed to have earth moving proceed through the fossil/storage site immediately, and D&D Capital Resources, LLC will be notified of the decision not to recover/process a sample and of authorization for earth moving to proceed through the fossil/storage site.
- 2) If sample recovery is warranted, the paleontologist or field supervisor will notify the construction contractor and D&D Capital Resources, LLC of the necessity for implementing additional mitigation measures specified in the DC/TP and assigning additional personnel to the PRIMP.
  - 2a) Within 24 hours after D&D Capital Resources, LLC approval as secured by L&L, a recovery crew will be mobilized to recover the sample. The



size of the crew will reflect the need to recover the sample as quickly as possible. The field supervisor will record the size and supervise recovery of the sample. Up to 3 tons of fossiliferous rock will be recovered. The sample will be excavated with hand tools for recovery. If necessary and if approved by the construction contractor, earth-moving equipment and an operator will be enlisted to expedite transportation of the sample to the processing facility site, obviate the need for additional personnel, and reduce any potential construction delay and the construction contractor will be allowed to have earth moving proceed through the fossil site immediately after recovery of the sample. The paleontologist or field supervisor will notify D&D Capital Resources, LLC of recovery of the sample and of authorization for earth moving to proceed through the fossil site.

- 2b) A temporary field number will be assigned to the sample; the field number and pertinent specimen (field number, identification by taxon and element) and geologic (particularly stratigraphic level within rock unit) and geographic site data (location, elevation) recorded in the monitor's daily monitoring log; and the field number recorded and the fossil site location plotted on a map of the site. The field supervisor and, if necessary, a crew member will transport the sample to a location elsewhere at the site approved by the construction contractor or to an offsite location for initial/field processing (wet screening) of the sample. The total weight of all samples from each fossil-bearing rock unit at the site will not exceed 3 tons.
- 2c) If warranted, the field supervisor will setup a field processing facility for wet screening the sample at a site location approved by the construction contractor. Wet screening will consist of sieving rock through a 20- (and/or finer) mesh box screen immersed in a tub of water to remove the smaller (clay and silt) particles from the larger (sand and rock) particles and small fossil remains, and could result in a reduction in sample weight/volume in excess of 90%. If necessary, rock will be soaked in an environmentally safe dispersant (citrus oil) prior to screening to improve the separation of the clay particles from the rest of the sample during screening. The monitor will conduct wet screening if screening can be accomplished without diverting the monitor from monitoring. If it is not possible to have the monitor perform the wet screening, a field technician will be assigned to the task. Following his next site inspection, the field supervisor will transport the concentrate (larger particles and small fossil remains) generated by initial processing to a laboratory facility for final/laboratory processing.
- 2d) If the fossil remains in the concentrate are sufficiently fossilized (dense), an environmentally safe heavy liquid (sodium polytungstate), if appropriate, will be used by the senior vertebrate paleontologist to separate the remains from the remaining sand and rock particles. When added to a beaker filled with heavy liquid, the concentrate will separate, the particles floating to the surface, and the remains sinking to the



bottom, from where they are retrieved. This technique can result in a further sample weight/volume reduction in excess of 90% (less than 1% of original sample size). The final concentrate will be examined under a microscope and fossil specimens recovered from any remaining sand and rock particles. If the fossil bone in the original concentrate is not sufficiently dense for use of the heavy-liquid separation technique, the entire sample of concentrate will be sorted under a microscope for fossil remains. Recovered fossil remains will then be treated (see Paleontology 7).

- 2e) During the final processing of a sample, the senior vertebrate paleontologist will continually evaluate the results of field and laboratory processing. If the sample is insufficiently productive or the fossil remains, too poorly preserved, the senior vertebrate paleontologist will have the option of discontinuing further laboratory processing of the sample, having field processing of the remainder of the sample suspended, and disposing of the remainder of the sample and unprocessed concentrate. Similarly, processing will be discontinued if, after preliminary identification of some specimens, the remains are determined insufficiently diagnostic or diverse taxonomically, or the species represented are the same as those in another sample from the fossil-bearing rock unit. Previous experience has demonstrated that only some fossil sites require sample processing, and only some of these sites require processing of an entire 3-ton sample. If appropriate, small splits from one or more samples will be submitted for palynological analysis.

## **Paleontology 6: Fossil Treatment**

Final treatment of all fossil specimens recovered from the site as a result of the PRIMP will be conducted at a laboratory facility. Larger vertebrate fossil specimens will be removed from their protective jackets, prepared to the point of identification using hand tools, and hardened or stabilized with a penetrating solution by a preparator. All recovered fossil specimens will be identified to the lowest taxonomic level possible by knowledgeable vertebrate and invertebrate paleontologists and, if required, other knowledgeable paleontologists (i.e., paleobotanists, micropaleontologists, palynologists). The specimens will then be curated (assigned and labeled with museum specimen data and corresponding site numbers, placed in specimen trays and, if appropriate, vials with completed specimen data cards), catalogued (specimen and site numbers and specimen data and corresponding geologic and geographic site data, respectively, archived [entered into appropriate catalogs and computerized databases]), and accessioned into the museum fossil collection, where they will be permanently stored, maintained, and, along with associated data, made available for future study by qualified investigators. With the possible exception of those tasks (curation, cataloging) that might be conducted by museum staff, all treatment of the fossil specimens will be conducted by a



laboratory technician. Fossil specimen preparation, identification, curation, and cataloguing are now required before a fossil collection will be accepted by the WSC. Moreover, the scientific importance of a fossil specimen cannot be evaluated until the specimen has been identified to the lowest taxonomic level possible, and specimen identification often is not possible without prior preparation.

#### **Paleontology 7: Final Report**

A final technical report of findings will be prepared by the paleontologist and will describe the site's stratigraphy, summarize field and laboratory methods employed during the PRIMP, include a taxonomic list and an inventory of catalogued fossil specimens recovered as a result of the PRIMP, evaluate the scientific importance of the specimens, and discuss the relationship of the fossil assemblage from any newly recorded fossil site at the project site to relevant fossil assemblages from fossil sites in other areas. The report will be submitted to the contractor and to D&D Capital Resources, LLC.

Submission of the final report will signify completion of the PRIMP and will ensure D&D Capital Resources, LLC compliance with Public Resources Code Section 21081.6 (mitigation monitoring, reporting, and compliance).



### **SECTION 3**

#### **ACRONYMS**

CEQA	California Environmental Quality Act
EIR	Environmental Impact Report
DC/TP	Discovery Clause/Treatment Plan
L&L	L&L Environmental, Inc.
PRIMP	Paleontologic Resource Impact Mitigation Program
SVP	Society of Vertebrate Paleontology
WSC	Western Science Center



## **SECTION 4**

### **LITERATURE CITED**

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