Appendix E

Paleontological Resources Letter Report

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MEMORANDUM

To:	Mr. William Morrison, Ocean Creek, LLC
From:	Sarah Siren, M.S., GISP, and Michael Williams, Ph.D.
Subject:	Paleontological Resources Review – Ocean Creek, LLC Project
Date:	6/7/21
cc:	Sean Kilkenny, Dudek
Attachment(s):	Paleontological Records Search Results Letter

Dudek is providing this memo after completing a review of the potential for impacts to paleontological resources during on- and off-site construction activities for the Ocean Creek, LLC Project (project). The project site is located near the intersection of Oceanside Boulevard and Crouch Street, south of the Crouch Street Sprinter Station and east of Interstate 5 in the City of Oceanside (City), northwestern San Diego County, California.

The published geological mapping indicates that the project site is underlain by late Holocene age alluvium (~<4,200 years ago; map unit Qa), Pleistocene age old paralic deposits (~450,000 to 45,000 years old; map unit Qop2-4), and middle Eocene age Santiago Formation (~49-40 million years old; map unit Tsa) bedrock (SDNHM, 2020; Kennedy et al., 2007; Wilson, 1972).

Based on the records search results obtained from the San Diego Natural History Museum ([SDNHM], 2020), the Santiago Formation is known to produce scientifically significant paleontological resources throughout northern San Diego County (SDNHM, 2020). These marine, estuarine, and fluvial deposits have yielded plant, invertebrate, and vertebrate fossils. Of particular note, a new genus and species of extinct, rhino-like brontothere (*Parvicornus occidentalis)* was recovered from these same age deposits north of the project site, during grading of the Ocean Ranch development (Mihlbachler and Deméré, 2009). These middle Eocene age deposits have a high paleontological resource sensitivity according to the County of San Diego (2009) guidelines.

Holocene age sedimentary deposits have a low paleontological sensitivity due to their young age (Deméré and Walsh, 1993; County of San Diego, 2009). Any fossil material found in these deposits are ex-situ and would not be considered scientifically significant or unique. However, Pleistocene age old paralic deposits are known to produce scientifically significant paleontological resources, and have a high paleontological resource sensitivity.

There are a total of six fossil localities documented from correlative deposits of the Pleistocene age old paralic deposits (e.g., Bay Point Formation) by the SDNHM (2020) within a one-mile radius of the project site. These localities yielded marine invertebrates and marine and terrestrial vertebrates, including bryozoans, snails, clams, mussels, oysters, scallops, barnacles, crabs, sand dollars, sea urchins, rays, bony fish, a grebe, reptile, and tapir.

A single fossil locality was recovered from nearby construction of the North County Transit District (NCTD) Crouch Street Sprinter Station in deposits mapped as the Santiago Formation. However, paleofaunal data indicate that these deposits are at least in part, Oligocene in age (~33 million years old; Deméré and Walsh 1993). The fossils recovered from this locality are characteristic of late Chadronian or Orellan North American Land Mammal Ages.

This would suggest that these younger deposits are representative of the Sespe/Vaqueros Formation (undivided), which may occur within the project site. Fossils recovered include scutes of squamate reptiles and teeth of rodents (e.g., cf. *Metanoiamys* sp., *Metadjidaumo* sp., cf. *Yoderimys* sp., cf. *Heliscomys* sp., unidentified geomyoids, and a sciurid) (SDNHM, 2020). The Santiago Formation and undifferentiated Sespe/Vaqueros Formation deposits are considered to have a high paleontological sensitivity (SDNHM, 2020).

No paleontological resources were identified within the project site, or off-site improvement areas as a result of the institutional records search and desktop geological review. However, intact paleontological resources may be encountered below a surficial layer of topsoil during excavation into previously undisturbed sedimentary deposits of the Santiago Formation, Sespe/Vaqueros Formation (undivided), or Pleistocene old paralic deposits. It is likely that high sensitivity formational sediments will be encountered, with the potential for impacting the Santiago Formation, Sespe/Vaqueros Formation (undivided), or old paralic deposits. Given the proximity of past fossil discoveries in the area and the underlying paleontologically sensitive deposits, the project site has the potential to yield scientifically significant paleontological resources. In the event that intact paleontological resources are located on the project site, ground-disturbing activities associated with construction of the project, such as grading during site preparation and trenching for utilities, have the potential to destroy a unique paleontological resource or site. Dudek recommends the following measure during construction to reduce or avoid potentially destroying a unique paleontological resource:

> Prior to commencement of any grading activity on-site, the applicant shall retain a qualified paleontologist, subject to the review and approval of the City's Building Official, or designee. The paleontologist shall prepare a Paleontological Resources Impact Mitigation Program (PRIMP) for the project. The PRIMP shall be consistent with the guidelines of the Society of Vertebrate Paleontology (SVP) (2010). The qualified paleontologist shall attend the preconstruction meeting and be on-site during all rough grading and other significant ground-disturbing activities in previously undisturbed Santiago Formation, Sespe/Vaqueros Formation (undivided), or Pleistocene old paralic deposits, if encountered. In the event that paleontological resources (e.g., fossils) are unearthed during grading, the paleontological monitor will temporarily halt and/or divert grading activity to allow recovery of paleontological resources. The area of discovery will be roped off with a 50-foot radius buffer. Once documentation and collection of the find is completed, the monitor will remove the rope and allow grading to recommence in the area of the find. Upon completion of the paleontological monitoring program, the qualified paleontologist shall prepare a final monitoring report documenting the results of the mitigation program. This report should include discussions of the methods used, stratigraphic section(s) exposed, fossils collected, and significance of recovered fossils.

With implementation of the above recommended monitoring, potential impacts to potentially significant paleontological resources during on- and off-site construction of the project would be reduced or avoided.

If you have any questions regarding this memo, please feel free to contact me (760.846.9326 or ssiren@dudek.com).

Sincerely,

Sarah A. Siren, M.S., GISP

Senior Paleontologist

Michael Williams, Ph.D.

Senior Paleontologist

Enc. Paleontological Records Search Results Letter

References Cited

County of San Diego. 2009. *Guidelines for Determining Significance: Paleontological Resources*. San Diego, California: County of San Diego Land Use and Environment Group, Department of Planning and Land Use, Department of Public Works. Approved March 19, 2007, modified January 15, 2009.

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Kennedy, M.P., S.S. Tan, K.R. Bovard, R.M. Alvarez, M.J. Watson, and C.I. Gutierrez, 2007. *Geologic map of the Oceanside 30x60-minute quadrangle, California*: California Geological Survey, Regional Geologic Map No. 2, scale 1:100,000.

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Society of Vertebrate Paleontology (SVP), 2010. *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources.* 11 p. Available; http://vertpaleo.org/PDFS/68/68c554bb-86f1-442f-a0dc-25299762d36c.pdf.

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Attachment A

Paleontological Records Search Results Letter

5 February 2020

Sarah Siren
Dudek
605 Third Street
Encinitas, CA 92024

RE: Paleontological Records Search – Crouch Street (Dudek PN 12064)

Dear Ms. Siren:

This letter presents the results of a paleontological records search conducted for the Crouch Street project (Project), located in the City of Oceanside, San Diego County, California. The Project site is located along either side of Crouch Street, to the south of the NCTD Crouch Street Station, and is bordered to the northwest by NCTD rail line, to the north and northeast by undeveloped land, to the southeast by Grandview Street, to the southwest by existing residential development, and to the west by county government facilities.

A review of published geological maps covering the Project site and surrounding area was conducted to determine the specific geologic units underlying the Project site. Each geologic unit was subsequently assigned a paleontological resource sensitivity (Deméré and Walsh, 1993). In addition, a search of the paleontological collection records housed at the San Diego Natural History Museum (SDNHM) was conducted in order to determine if any documented fossil collection localities occur at the Project site or within the immediate surrounding area.

Geologic Units Underlying the Project Area

Published geological reports (e.g., Kennedy and Tan, 2007) covering the Project area indicate that the proposed Project has the potential to impact late Holocene-age alluvial flood plain deposits, Pleistocene-age old paralic deposits (broadly equivalent to the Bay Point Formation), and the middle Eocene-age Santiago Formation. However, previous paleontological mitigation of the 2006 construction of the NCTD Sprinter Rail Line in the vicinity of the Project site determined that deposits mapped as the Santiago Formation in this area may actually represent the Oligocene-age undifferentiated Sespe and Vaqueros Formations. These geologic units and their paleontological sensitivity are summarized below. The SDNHM has seven recorded fossil localities within one mile of the Project site, discussed in greater detail below.

alluvial flood plain deposits – The northern portion of the Project site is underlain at the surface by late Holocene-age (less than 4,200 years old) alluvial flood plain deposits. These deposits are assigned a low paleontological sensitivity based on their relatively young geologic age and lack of recorded fossil collection localities. However, these deposits commonly overlie geologic units of high paleontological sensitivity (e.g., Santiago Formation/undifferentiated Sespe and Vaqueros Formations, see below) that could be impacted by construction where the contact is relatively shallow.

old paralic deposits (Bay Point Formation) – The nearshore marine and nonmarine deposits of the Pleistocene-age (approximately 450,000 to 45,000 years old) Bay Point Formation occur

within the Project site along Grandview Street. The SDNHM has six fossil collection localities from the Bay Point Formation within a one-mile radius of the Project site, which produced marine invertebrates (e.g., bryozoans, snails, clams, mussels, oysters, scallops, barnacles, crabs, sand dollars, and sea urchins), marine vertebrates (e.g., rays, bony fish, and grebe), and terrestrial vertebrates (e.g., reptile and tapir). The Bay Point Formation has been assigned a high paleontological sensitivity for the diverse and well-preserved fossils of marine invertebrates, marine vertebrates, and rare terrestrial vertebrates that have been recovered from these deposits.

Santiago Formation/undifferentiated Sespe and Vaqueros Formations – As mapped by Kennedy and Tan (2007), strata of the middle Eocene-age (approximately 49 to 40 million years old) Santiago Formation underlie the central portion of the Project site. However, these strata may actually represent younger, Oligocene-age deposits of the undifferentiated Sespe and Vaqueros Formations, as observed during monitoring of earthwork in the vicinity of the NCTD Crouch Street Station and as indicated by a nearby fossil locality, which yielded fossils characteristic of the late Chadronian or Orellan North American Land Mammal Ages. The nearby locality produced scutes of squamate reptiles and teeth of rodents (e.g., cf. *Metanoiamys* sp., *Metadjidaumo* sp., cf. *Yoderimys* sp., cf. *Heliscomys* sp., unidentified geomyoids, and a sciurid). Both the Santiago Formation and undifferentiated Sespe and Vaqueros Formations have been assigned a high paleontological sensitivity.

Summary and Recommendations

The high paleontological sensitivity of the Bay Point Formation and Santiago Formation/undifferentiated Sespe and Vaqueros Formations in San Diego County (Deméré and Walsh, 1993), as well as the presence of fossil collection localities in the vicinity of the Project site, suggests the potential for construction of the proposed Project to result in impacts to paleontological resources. Any proposed excavation activities that extend deep enough to encounter previously undisturbed deposits of these geologic units have the potential to impact the paleontological resources preserved therein. For these reasons, implementation of a complete paleontological resource mitigation program during ground-disturbing activities is recommended.

The fossil collection locality information contained within this paleontological record search should be considered private and is the sole property of the San Diego Natural History Museum. Any use or reprocessing of information contained within this document beyond the scope of the Crouch Street project is prohibited.

If you have any questions concerning these findings please feel free to contact me at 619-255-0321 or kmccomas@sdnhm.org.

Sincerely,

Katie McComas, M.S.
Paleontological Report Writer & GIS Specialist
San Diego Natural History Museum

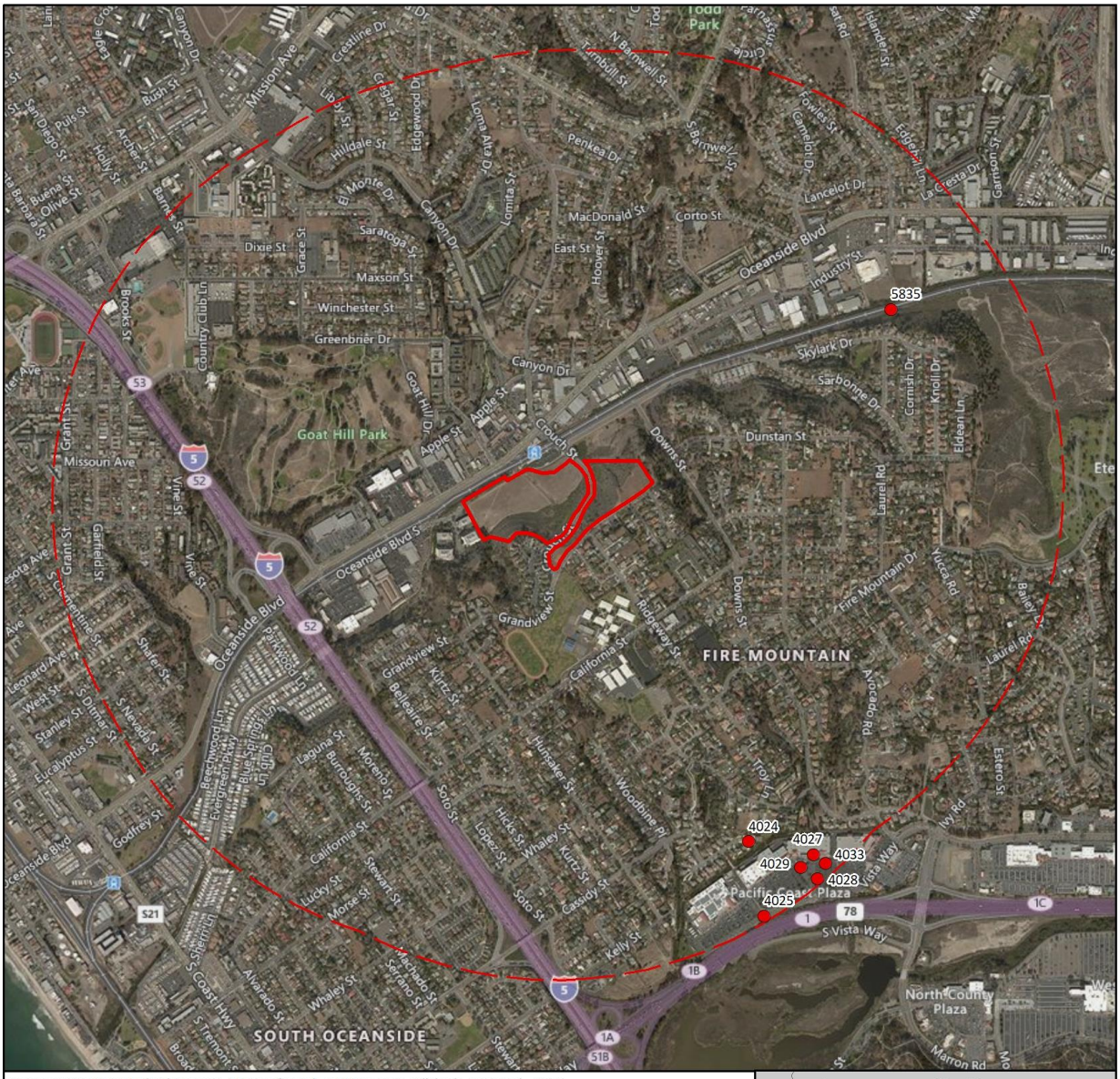
Enc: Figure 1: Project map
Appendix: List of SDNHM fossil localities in the vicinity of the project

Literature Cited

Deméré, T.A., and S.L. Walsh. 1993. Paleontological Resources, County of San Diego. Unpublished technical report prepared for the San Diego County Department of Public Works: 1–68.

Kennedy, M.P., and Tan, S.S. 2007. Geologic Map of the Oceanside 30' x 60' Quadrangle, California. California Geological Survey, Regional Geologic Map Series 1:100,000 scale, map no. 2.

San Diego Natural History Museum (SDNHM), unpublished paleontological collections data.


5835
4024
4027
4033
4029
4028
4025
Goat Hill Park
FIRE MOUNTAIN
SOUTH OCEANSIDE
Oceanside Blvd
Crouch St
Canyon Dr
Skylark Dr
Dunstan St
Missouri Ave
Fire Mountain Dr
S Vista Way
North County Plaza
Todd Park
Sources: Bing Maps Hybrid Imagery, Microsoft et al., 2019; Terrain Hillshade, Esri et al., 2019
Project boundary
1 mile radius buffer
SDSNH localities
Riverside
map extent
San Diego
PaleoServices
San Diego Natural History Museum
FIGURE 1
Project Map
Crouch Street
City of Oceanside
San Diego County, California
0
0.4
scale in miles
N

Appendix: Locality List
San Diego Natural History Museum
Department of Paleontology

Locality Number	Locality Name	Location	Elevation (feet)	Geologic Unit	Era	Period	Epoch
4024	Pacific Coast Plaza	City of Oceanside, San Diego County, California	81	Bay Point Formation, unnamed nonmarine deposit	Cenozoic	Quaternary	Pleistocene
4025	Pacific Coast Plaza	City of Oceanside, San Diego County, California	49	Bay Point Formation, unnamed marine deposit	Cenozoic	Quaternary	Pleistocene
4027	Pacific Coast Plaza	City of Oceanside, San Diego County, California	55	Bay Point Formation, unnamed marine deposit	Cenozoic	Quaternary	Pleistocene
4028	Pacific Coast Plaza	City of Oceanside, San Diego County, California	46	Bay Point Formation, unnamed marine deposit	Cenozoic	Quaternary	Pleistocene
4029	Pacific Coast Plaza	City of Oceanside, San Diego County, California	49	Bay Point Formation, unnamed marine deposit	Cenozoic	Quaternary	Pleistocene
4033	Pacific Coast Plaza	City of Oceanside, San Diego County, California	58	Bay Point Formation, unnamed marine deposit	Cenozoic	Quaternary	Pleistocene
5835	NCTD Sprinter Rail Line	City of Oceanside, San Diego County, California	61	Sespe/Vaqueros Formation	Cenozoic	Paleogene	early Oligocene