

Appendix K. Paleontological Resources Technical Memorandum

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MEMORANDUM

To: Jordan Moore, Senior Planner, City of San Diego
From: Kelsey Hawkins, Project Manager, Harris & Associates
RE: Revised De Anza Cove Amendment to the Mission Bay Park Master Plan – Paleontological Resources Memorandum
Date: March 6, 2023
Att: Figures; 1, 2019 Paleontological Resources Desktop Review Memorandum

A Paleontological Resources Desktop Review Memorandum for the De Anza Cove Amendment to the Mission Bay Park Master Plan was prepared by Dudek in March 2019. Since preparation of the 2019 Paleontological Resources Desktop Review Memorandum, the project has been revised to accommodate additional marshland habitat (De Anza Natural Amendment to the Mission Bay Park Master Plan). The purpose of this memorandum is to compare the components of the Updated Project (Proposed Project) to the Previous 2019 Project (2018 Proposal) to determine whether the Proposed Project would result in any paleontological impacts that were not addressed for the 2018 Proposal. The 2019 Paleontological Resources Desktop Review Memorandum for the 2018 Proposal is included as Attachment 1 to this memorandum.

Environmental Setting

The Proposed Project area is in the northeastern corner of Mission Bay Park in the City of San Diego (City) (Figure 1, Regional Location). The Proposed Project area is approximately 505.2 acres, including both land and water areas. It includes the Kendall-Frost Marsh Reserve/Northern Wildlife Preserve (KFMR/NWP), Campland on the Bay (Campland), Pacific Beach Tennis Club, athletic fields, Mission Bay Golf Course and Practice Center, and De Anza Cove area, including a vacated mobile home park and supporting infrastructure, Mission Bay RV Resort, public park, public beach, parking, and water areas (Figure 2, Project Location). The Proposed Project area falls within the boundaries of Mission Bay Park, a regional park that serves San Diego residents and visitors.

Description of the Proposed Project

The Proposed Project is an amendment to the Mission Bay Park Master Plan (MBPMP) to update existing language in the MBPMP and add new language and recommendations pertaining to the project area to serve local and regional recreation needs while preserving and enhancing the natural resources of the De Anza Cove area. The Proposed Project expands the Proposed Project area's natural habitat and improves water quality through the creation of additional wetlands while implementing nature-based solutions to protect the City against the risk of climate change, in line with the City's Climate Resilient SD Plan. The Proposed Project would enhance the existing regional parkland by providing a variety of uses, including low-cost visitor guest accommodations (recreational vehicles and other low-cost camping facilities), active and passive recreational opportunities to enhance public use of the area, and improvements to access to recreational uses. Finally, the Proposed Project would recognize the history and ancestral homelands of the Iipay-Tipay Kumeyaay people, providing opportunities to partner and collaborate on the planning and restoration of the area. The Proposed Project would include a combination of habitat restoration, active recreation, low-cost visitor guest accommodations, and open beach and regional parkland and would modify the open water portions of De Anza Cove (Figure 3, Site Plan). The proposed land use designations for the Proposed Project area are summarized in Table 1, Proposed Land Use Acreages.

The Proposed Project would include wetlands enhancement and restoration within the existing KFMR/NWP, the area currently occupied by Campland, the eastern side of Rose Creek, and the areas in De Anza Cove currently occupied by the vacated mobile home park and open water (Figure 3). The Proposed Project would provide a total of approximately 227.4 acres of wetlands, consisting of approximately 30.7 acres in the area currently occupied by Campland, approximately 86.8 acres of wetlands at the existing KFMR/NWP, and approximately 109.8 acres of other new wetlands. Approximately 37.4 acres of upland habitat, including dune, sage, and buffer area, would also be provided. Two new upland islands would be created: one in the area currently occupied by Campland and the other in the De Anza Cove area at the eastern terminus of the vacated mobile home park. Two possible locations for a new Interpretive Nature Center have been identified: one at the northwestern edge of the restoration area along Pacific Beach Drive and another within the regional parkland area just north of the open beach. The nature center and its parking/service areas would be buffered by native vegetation. The open water area of De Anza Cove would be increased to approximately 95.9 acres with the creation of new east and west outfalls that would allow water and sediment flows to proposed wetlands on either side of Rose Creek.

In addition, the Proposed Project would incorporate a range of active recreational uses on approximately 60.1 acres in the northeastern area of the Proposed Project area (Figure 3). A portion of the Mission Bay RV Resort and the vacated mobile home park would be replaced with approximately 48.5 acres of low-cost visitor guest accommodations land use. A new channel connecting Rose Creek to the De Anza Cove water area would be constructed at approximately Lilac Drive, creating a new island that would be accessed via two new bridges. Approximately 26.3 acres of regional parkland would be enhanced with new recreational amenities and opportunities. Three open beach areas totaling approximately 5.5 acres would be provided with access to De Anza Cove. The Proposed Project would also include approximately 2.6 acres for boat facilities and a clubhouse that could potentially be co-located with another user or public use. Two potential water lease locations would be located in the cove. Water quality design features are proposed along the edges of the active recreational areas. The proposed water quality detention basins would be of differing sizes and would capture and treat stormwater before flowing into Mission Bay. New water quality basins would be located to treat the entire Proposed Project area in accordance with local and state requirements.

Multi-use paths would be throughout areas proposed for active recreation, regional parkland, low-cost visitor guest accommodations, and dune and upland areas and along the beach shorelines. Vehicular access to the Proposed Project area would be provided from Pacific Beach Drive, Grand Avenue, and North Mission Bay Drive. Service roads, vehicular access, and parking would be in areas proposed for low-cost visitor guest accommodation, regional parkland, boating, and active recreation.

Table 1 also provides a comparison of the Proposed Project's proposed land uses to the 2018 Proposal's proposed land uses, summarizing the changes in land use designations and acreages between the Proposed Project and the 2018 Proposal. Overall, the Proposed Project area (approximately 505.2 total acres) is larger compared to the 2018 Proposal area (approximately 457 total acres) because the Proposed Project would provide additional opportunities for habitat enhancement (open water). The Proposed Project includes additional enhancement and restoration opportunities, including approximately 177.9 acres of expanded marshland and upland habitat, compared to the approximately 131 acres of marshland and upland habitat under the 2018 Proposal. The additional wetland enhancement would occur on either side of the connection to Rose Creek and as part of the redesign of the open water portion of the Proposed Project area, which includes an approximately 40-acre increase in open water compared to the 2018 Proposal. In addition, the Proposed Project reduces the amount of active recreational activities and eliminates the 1-acre restaurant lease space. Overall, the Proposed Project provides more habitat restoration and greater protection of natural resources compared to the 2018 Proposal.

**Table 1. Proposed Land Use Acreages**

Land Use	Proposed Project (Acres)	2018 Proposal (Acres)
KFMR/NWP	86.8	90
Expanded Marshland/Habitat	140.5 ¹	124
Upland Habitat (Dune, Sage) and Buffer Area	37.4	—
Low-Cost Visitor Guest Accommodations	48.5	—
Guest Housing	—	50
Regional Parkland	26.3	8
Boat Facilities/Clubhouse	2.6	—
Interpretive Nature Center (1 Location) ²	—	—
Boat Rental Lease – Land	—	1
Boat Rental Lease – Water	—	4
Water Leases (2 Locations) ³	2.1	—
Active Recreation	60.1	Not a Part
Athletic Fields/Tennis, Golf Course, and Water Quality Design Feature	—	63
Open Water	95.9	55
Open Beach	5.5	7
Road ⁴	1.6	19
Natural Recreation	—	24
Upland/Developed	—	7
Coastal Landscape	—	4
Restaurant Lease	—	1
Total	505.2	457

Notes: KFMR/NWP = Kendall-Frost Marsh Reserve/Northern Wildlife Preserve

¹ Expanded wetlands includes approximately 30.7 acres currently occupied by Campland and approximately 109.8 acres of other new wetlands.

² Area for the Interpretive Nature Center has not been determined, and programming for the center is assumed to occur after adoption of the amendment as part of a future General Development Plan. Two alternative locations are shown, allowing for the final location to be determined in the General Development Plan process.

³ Lease areas overlap with other land uses; therefore, acreages are not included in the total.

⁴ Service roads, vehicular access, and parking would be in areas proposed for low-cost visitor guest accommodations, regional parkland, boating, and active recreation, subject to future design and subsequent approvals.

Thresholds of Significance

The 2018 Proposal was analyzed for each of the following potential impacts based on the City's California Environmental Quality Act (CEQA) Significance Determination Thresholds (City of San Diego 2022) and Appendix G of the CEQA Guidelines:

- Over 1,000 cubic yards of excavation in a high resource potential geologic deposit/formation/rock unit
- Over 2,000 cubic yards of excavation in a moderate resource potential geologic deposit/formation/rock unit



Impact 1: Would the proposed project result in development that requires over 1,000 cubic yards of excavation in a high resource potential geologic deposit/formation/rock unit or over 2,000 cubic yards of excavation in a moderate resource potential geologic deposit/formation/rock unit?

Summary of 2018 Proposal Impacts

Based on the records search results obtained from the San Diego Natural History Museum for the 2018 Proposal, the Pleistocene, or “Ice Age,” Bay Point Formation underlies the western portion of the 2018 Proposal area and is known to produce scientifically significant paleontological resources throughout San Diego County, including within portions of the 2018 Proposal area. The remaining 2018 Proposal area is underlain by artificial fill.

Although the 2018 Proposal would involve grading, excavation would primarily occur in the Campland area and the east–west trending peninsula comprising De Anza Cove, which are areas underlain by artificial fill. Excavation is not proposed in areas in the western portion of the 2018 Proposal area where the Bay Point Formation is mapped on the surface adjacent to the KFMR/NWP. However, a fossil locality was discovered on the De Anza Cove peninsula, which was likely collected from Bay Point Formation sediments prior to artificial fill placement. This indicates that Bay Point Formation sediments may still be present in areas underlain by artificial fill and excavations in this area could potentially impact Bay Point Formation fossils. Therefore, the 2018 Proposal concluded that the 2018 Proposal would be required to comply with the City’s Municipal Code, Section 142.0151, General Grading Guidelines for Paleontological Resources, during excavation into high sensitivity paleontological formations to ensure that impacts would be less than significant.

Proposed Project Consistency Evaluation

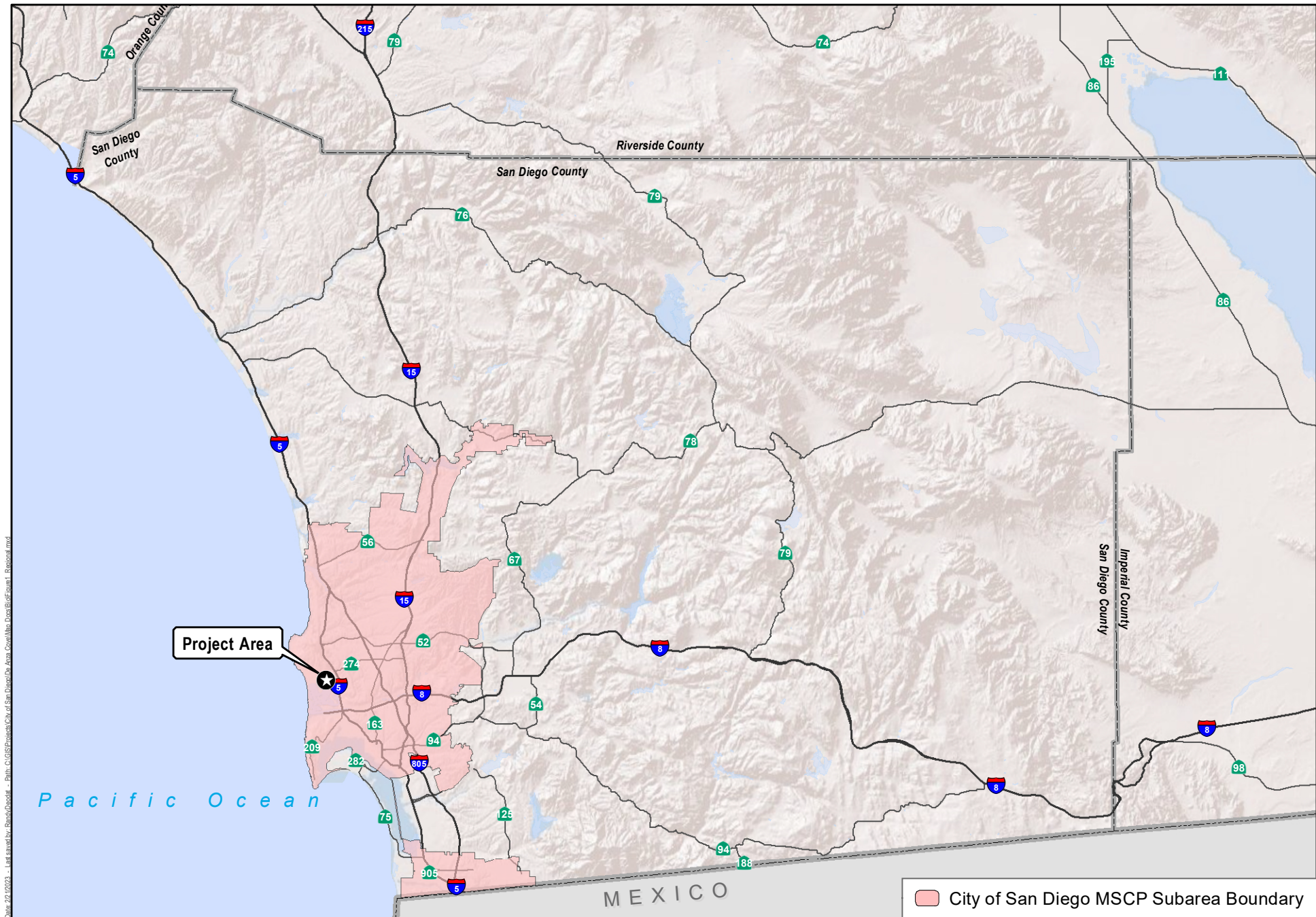
The Proposed Project’s land uses are consistent with what was evaluated for the 2018 Proposal. Similar to the 2018 Proposal, given the proximity of past fossil discoveries in the area and the underlying paleontologically sensitive deposits (Bay Point Formation), the Proposed Project area has the potential to yield scientifically significant paleontological resources. Therefore, consistent with the 2018 Proposal, the Proposed Project would be required to implement standard monitoring measures and proper procedures for fossil recovery, as detailed in the General Grading Guidelines for Paleontological Resources. Regulatory compliance would ensure that impacts to paleontological resources would be less than significant.

Summary

Similar to the 2018 Proposal, with implementation of the requirements of the City’s Municipal Code, Section 142.0151, General Grading Guidelines for Paleontological Resources, the Proposed Project would result in less than significant impacts to paleontological resources.

References

City of San Diego. 2022. CEQA Significance Determination Thresholds. September. Accessed March 2023.
https://www.sandiego.gov/sites/default/files/september_2022_ceqa_thresholds_final.pdf.



Source: ESRI 2020.

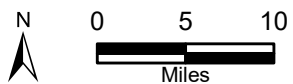


Figure 1

Regional Location

De Anza Natural Amendment to the Mission Bay Park Master Plan



Source: SanGIS Imagery 2019.

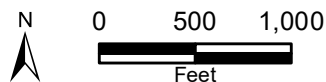


Figure 2
Project Location



Figure 3
Site Plan

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Attachment 1. 2019 Paleontological Resources Desktop Review

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MEMORANDUM

To: Scott Sandel, City of San Diego
From: Sarah Siren, M.S., GISP, Senior Paleontologist, Dudek
Subject: Paleontological Resources Desktop Review – De Anza Amendment to the Mission Bay Park Master Plan Project
Date: 3/7/19
cc: Caitlin Munson, Environmental Planner, Dudek
Attachment(s): Paleontological Records Search Results Letter, Land Development Manual Appendix P

Dudek is providing this memo after completing a desktop review of the potential for impacts to paleontological resources during construction of the De Anza Amendment to the Mission Bay Park Master Plan Project (project) located between Grand Avenue and Shore Drive, west of Interstate (I-) 5, within the Mission Bay Park Master Plan Area in the City of San Diego (City) in southern San Diego County, California. Fossil collecting localities are recorded within a one-mile radius buffer of the project area (SDNHM 2018).

The majority of the project area is underlain by mapped deposits of artificial fill (Kennedy, 1975; Kennedy and Tan, 2008). Impacts to paleontological resources were previously analyzed at a program-level in the Mission Bay Parks Master Plan Program EIR, SCH 93041010, dated May 10, 1994, which concluded that impacts were not expected to occur because the filling and dredging associated with the development of the area since the 1940's would have already disturbed any paleontological resources (City of San Diego 1994). However, based on the records search results obtained from the San Diego Natural History Museum ([SDNHM] 2018), the Pleistocene, or “Ice Age” Bay Point Formation underlies the western portion of the project area and is known to produce scientifically significant paleontological resources throughout San Diego County, and specifically within the project area (SDNHM 2018; Localities SDNHM 3326 and 4008). SDNHM Locality 4008 was collected from a wastewater project near Crown Point Drive, west of the project area, and produced marine invertebrate and vertebrate specimens (SDNHM 2018). Of particular note, a partial mammoth skeleton was recovered from these same age deposits in the Downtown area, during grading for the Thomas Jefferson School of Law (Rugh 2009). The Bay Point Formation has high paleontological resource sensitivity according to the City of San Diego (2011) guidelines. Artificial fill has no paleontological sensitivity due to the man-made nature of these deposits (City of San

Memorandum

Subject: Paleontological Resources Desktop Review – De Anza Amendment to the Mission Bay Park Master Plan Project

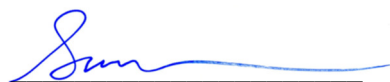
Diego 2011; Deméré and Walsh 1993; Stephenson et al. 2009). Any fossil material found in artificial fill is *ex-situ* and would not be considered scientifically significant, or unique.

There are a total of seventy-two fossil localities documented by the SDNHM (2018) within a one-mile radius of the project area. Only thirty-three of these localities were discovered within the Bay Point Formation. Additional localities listed were from formations not anticipated to be encountered within the project area (e.g., San Diego Formation, Scripps Formation, and Ardath Shale).

Intact paleontological resources may be encountered at depth, at least five feet below the ground surface and below surficial fill, especially along the western periphery of the project, for improvements including, but not limited to, excavation into previously undisturbed sedimentary deposits of the Bay Point Formation. Given the proximity of past fossil discoveries in the area and the underlying paleontologically sensitive deposits, the project area has the potential to yield scientifically significant paleontological resources. In the event that intact paleontological resources are located on the project area, ground-disturbing activities associated with construction of the proposed project, such as grading during area preparation, have the potential to destroy a unique paleontological resource or site. Without mitigation, the potential damage to paleontological resources during construction would be a potentially significant impact. However, upon implementation of mitigation measures consistent with the City's *Land Development Manual Appendix P* (see attachment), impacts would be reduced to below a level of significance. Impacts of the proposed project are considered less than significant with mitigation incorporated during construction. No further mitigation is required.

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, Dudek

Enc. Paleontological Records Search Results Letter, Land Development Manual Appendix P

Memorandum

Subject: Paleontological Resources Desktop Review – De Anza Amendment to the Mission Bay Park Master Plan Project

References Cited:

City of San Diego, 2011. *California Environmental Quality Act, Significance Determination Thresholds*. Development Services Department, 84 p.

City of San Diego, 1994. *Mission Bay Master Plan Update Environmental Impact Report*. Development and Environmental Planning Division, 6-3 p.

Deméré, T.A. and Walsh, S.L. 1993. *County of San Diego Paleontological Resources*. Prepared for the San Diego Planning Commission. 1-68.

Rugh, N.S., 2009. *Fossil Discoveries in Downtown San Diego, Part II*. Field Notes. Natural History Magazine. Available at: <http://www.naturalhistorymag.com/partner/fossil-discoveries-in-downtown-san-diego>

Kennedy, M.P, 1975. *Geology of the San Diego metropolitan area, California*. Section A- Western San Diego metropolitan area. California Division of Mines and Geology, Bulletin 200: 9-39.

Kennedy, M.P., and S.S. Tan, 2008. *Geologic Map of the San Diego 30' x 60' Quadrangle, California*. California Geological Survey, Regional Map Series 1:100,000 scale, map no. 3.

San Diego Natural History Museum (SDNHM), 2018. *Paleontological Records Search, De Anza Cove Revitalization Project*. Unpublished Records Search Results Letter from the San Diego Natural History Museum, San Diego, California.

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>.

Stephenson, B., and seven others, 2009. *County of San Diego Guidelines for Determining Significance, Paleontological Resources*. Land Use and Environment Group, Department of Planning and Land Use, Department of Public Works.

SAN DIEGO NATURAL HISTORY MUSEUM

2 July 2018

Ms. Sarah Siren
Dudek
605 Third Street
Encinitas, CA 92024

RE: Paleontological Records Search – De Anza Cove Revitalization Project

Dear Ms. Siren:

This letter presents the results of a paleontological records search conducted for the De Anza Cove Revitalization Project (Project), located in the Mission Bay Park Community Plan Area of the city of San Diego, San Diego County, CA. The Project site lies within the southeastern portion of the Pacific Beach Neighborhood and northeastern portion of the Mission Bay Neighborhood, and is bordered to the west by Crown Point Drive; to the north by Pacific Beach Drive, residential development, Mission Bay High School, and Grand Avenue; to the east by Mission Bay Drive; and to the south by the waters of Mission Bay.

A review of published geological maps covering the Project site and surrounding area was conducted to determine the specific geologic units underlying the Project. Each geologic unit was subsequently assigned a paleontological resource sensitivity following City of San Diego and County of San Diego guidelines (City of San Diego, 2011; Deméré and Walsh, 1993; Stephenson et al., 2009). Published geological reports covering the Project area (e.g., Kennedy, 1975; Kennedy and Tan, 2008) indicate that the proposed Project has the potential to impact artificial fill and the Pleistocene-age Bay Point Formation. These geologic units and their paleontological sensitivity are summarized in detail in the following section.

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 (Figure 1). The SDNHM has 72 recorded fossil localities within one mile of the Project site, 33 of which are from the Bay Point Formation and are described in greater detail below. The remaining 39 localities are from the Pliocene- to Pleistocene-age San Diego Formation and the Eocene-age Scripps Formation and Ardath Shale, which are not anticipated to be impacted by construction of the Project.

Geologic Rock Units Underlying the Project Area

artificial fill – Artificial fill underlies the majority of the Project site, and makes up much of the man-made shoreline of Mission Bay. The SDNHM does not have any fossil localities from deposits of artificial fill within a 1-mile radius of the Project. Because artificial fill has been previously disturbed and may have been imported to a project site, any contained fossil remains have lost their original stratigraphic contextual data and are thus of little scientific value. For these reasons, artificial fill is assigned no paleontological sensitivity.

Bay Point Formation – The nearshore marine deposits of the Pleistocene-age (approximately 10,000 to 750,000 years old) Bay Point Formation underlie the western margin of the Project site in the vicinity of Crown Point Drive. More specifically, these deposits rest on the Nestor terrace (approximately 120,000 years old) of Kern and Rockwell (1992), and are equivalent to Unit 6, old paralic deposits, of Kennedy and Tan (2008). The SDNHM has 33 fossil collection localities from the Bay Point Formation within a 1-mile radius of the Project site. These localities yielded trace fossils (e.g., sponge borings in shells) and fossilized impressions or remains of marine invertebrates (e.g., foraminifers, sponges, coral, bryozoans, polychaete worms, chitons, snails, clams, mussels, oysters, scallops, tusk shells, ostracods, crabs, shrimp, barnacles, sand dollars, heart urchins, and sea urchins), marine vertebrates (e.g., sharks, rays, and bony fish), and terrestrial vertebrates (e.g., birds, insectivorous mammals, rodents, rabbits, and mammoths). The Bay Point Formation has been assigned a high paleontological sensitivity for the diverse and well-preserved fossils of marine invertebrates and marine vertebrates that have been recovered from these deposits.

Summary and Recommendations

The high paleontological sensitivity of the Bay Point Formation in San Diego County (Deméré and Walsh, 1993; Stephenson et al., 2009), as well as the presence of numerous fossil localities in the vicinity of the Project site, suggest the potential for construction of the Project to result in impacts to paleontological resources. Any proposed excavation activities that extend deep enough to encounter previously undisturbed deposits of this geologic unit 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 records 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 De Anza Cove Revitalization 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,

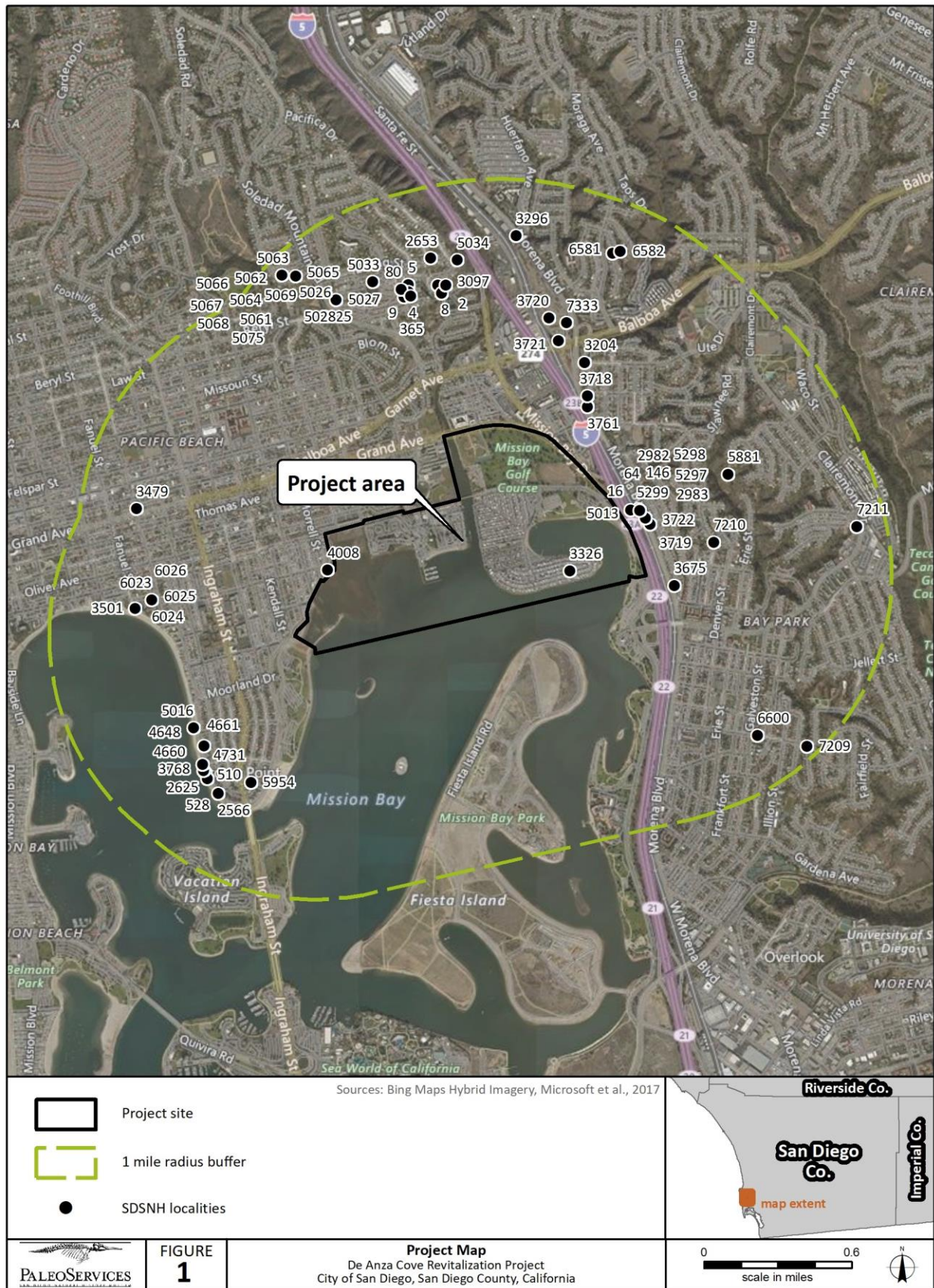


Katie McComas
Paleontology Collections Assistant
San Diego Natural History Museum

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

Literature Cited

- City of San Diego. 2011. California Environmental Quality Act, Significance Determination Thresholds. Development Services Department, 84 p.
- Deméré, T.A., and Walsh, S.L. 1993. Paleontological Resources, County of San Diego. Prepared for the San Diego Planning Commission: 1–68.
- Kennedy, M.P. 1975. Geology of the San Diego metropolitan area, California. Section A - Western San Diego metropolitan area. California Division of Mines and Geology, Bulletin 200: 9–39.
- Kennedy, M.P., and Tan, S.S. 2008. Geologic Map of the San Diego 30' x 60' Quadrangle, California. California Geological Survey, Regional Geologic Map Series 1:100,000 scale, map no. 3.
- Kern, J.P., and Rockwell, T.K. 1992. Chronology and deformation of Quaternary marine shorelines, San Diego County, California. In, Quaternary Coasts of the United States: Marine and Lacustrine Systems. Society of Economic Paleontologists and Mineralogists, Special Publication 48: 377–382.
- Stephenson, B., and seven others. 2009. County of San Diego Guidelines for determining significance, paleontological resources. Land Use and Environment Group, Department of Planning and Land Use, Department of Public Works, 46 p.



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

Locality Number	Locality Name	Location	Elevation (feet)	Geologic Unit	Era	Period	Epoch
2982	Morena Blvd.	City of San Diego, San Diego County, CA	0	Bay Point Formation	Cenozoic	Quaternary	late Pleistocene
2983	Morena Blvd. - Santa Fe Railroad	City of San Diego, San Diego County, CA	0	Bay Point Formation	Cenozoic	Quaternary	late Pleistocene
3326	DeAnza Point	City of San Diego, San Diego County, CA	0	Bay Point Formation	Cenozoic	Quaternary	Pleistocene
3501	Sail Bay, Mission Bay	City of San Diego, San Diego County, CA	-8	Bay Point Formation	Cenozoic	Quaternary	late Pleistocene
3718	Morena Boulevard	City of San Diego, San Diego County, CA	30	Bay Point Formation	Cenozoic	Quaternary	late Pleistocene
3719	Morena Boulevard	City of San Diego, San Diego County, CA	47	Bay Point Formation	Cenozoic	Quaternary	late Pleistocene
5013	Mission Bay East - Railroad Bed	City of San Diego, San Diego County, CA	26	Bay Point Formation	Cenozoic	Quaternary	Pleistocene
6600	Sewer & Water Group 756	City of San Diego, San Diego County, CA	109	Bay Point Formation	Cenozoic	Quaternary	middle Pleistocene
64	Morena Blvd. - Santa Fe Railroad	City of San Diego, San Diego County, CA	25	Bay Point Formation, Spanish Bight Faunal Horizon	Cenozoic	Quaternary	late Pleistocene
146	Morena Blvd. - Santa Fe Railroad	City of San Diego, San Diego County, CA	30	Bay Point Formation, Spanish Bight Faunal Horizon	Cenozoic	Quaternary	late Pleistocene
510	Crown Point	City of San Diego, San Diego County, CA	3	Bay Point Formation, Spanish Bight Faunal Horizon	Cenozoic	Quaternary	late Pleistocene
528	Crown Point	City of San Diego, San Diego County, CA	6	Bay Point Formation, Spanish Bight Faunal Horizon	Cenozoic	Quaternary	late Pleistocene
2566	Crown Point	City of San Diego, San Diego County, CA	0	Bay Point Formation, Spanish Bight Faunal Horizon	Cenozoic	Quaternary	late Pleistocene
2625	Crown Point	City of San Diego, San Diego County, CA	0	Bay Point Formation, Spanish Bight Faunal Horizon	Cenozoic	Quaternary	late Pleistocene
3479	Grand & Gresham	City of San Diego, San Diego County, CA	35	Bay Point Formation, Spanish Bight Faunal Horizon	Cenozoic	Quaternary	late Pleistocene
4648	Crown Point, 3543 Riviera Drive	City of San Diego, San Diego County, CA	18	Bay Point Formation, Spanish Bight Faunal Horizon	Cenozoic	Quaternary	late Pleistocene
4660	Crown Point, 3543 Riviera Drive	City of San Diego, San Diego County, CA	19	Bay Point Formation, Spanish Bight Faunal Horizon	Cenozoic	Quaternary	late Pleistocene
4661	Crown Point, 3543 Riviera Drive	City of San Diego, San Diego County, CA	18	Bay Point Formation, Spanish Bight Faunal Horizon	Cenozoic	Quaternary	late Pleistocene
4731	Crown Point, 3543 Riviera Drive	City of San Diego, San Diego County, CA	18	Bay Point Formation, Spanish Bight Faunal Horizon	Cenozoic	Quaternary	late Pleistocene
5016	Crown Point	City of San Diego, San Diego County, CA		Bay Point Formation, Spanish Bight Faunal Horizon	Cenozoic	Quaternary	late Pleistocene
5954	Crown Point - 3330 Jewell Street	City of San Diego, San Diego County, CA	14	Bay Point Formation, Spanish Bight Faunal Horizon	Cenozoic	Quaternary	late Pleistocene
6023	1353 La Palma - Bed A	City of San Diego, San Diego County, CA	19	Bay Point Formation, Spanish Bight Faunal Horizon	Cenozoic	Quaternary	late Pleistocene
6024	1353 La Palma - Bed B	City of San Diego, San Diego County, CA	18	Bay Point Formation, Spanish Bight Faunal Horizon	Cenozoic	Quaternary	late Pleistocene
6025	1353 La Palma - Bed C	City of San Diego, San Diego County, CA	17	Bay Point Formation, Spanish Bight Faunal Horizon	Cenozoic	Quaternary	late Pleistocene
6026	1353 La Palma - Bed D	City of San Diego, San Diego County, CA	17	Bay Point Formation, Spanish Bight Faunal Horizon	Cenozoic	Quaternary	late Pleistocene
16 A	Morena Blvd.	City of San Diego, San Diego County, CA	30	Bay Point Formation, Spanish Bight Faunal Horizon	Cenozoic	Quaternary	late Pleistocene
3675	Morena Boulevard Pipeline 1	City of San Diego, San Diego County, CA	30	Bay Point Formation, unnamed marine deposit	Cenozoic	Quaternary	late Pleistocene
3761	Morena Boulevard Pipeline 2	City of San Diego, San Diego County, CA	34	Bay Point Formation, unnamed marine deposit	Cenozoic	Quaternary	late Pleistocene
3768	Mission Bay Sewage Interceptor System	City of San Diego, San Diego County, CA	15	Bay Point Formation, unnamed marine deposit	Cenozoic	Quaternary	late Pleistocene
4008	Mission Bay Sewage Interceptor System/Pit 72	City of San Diego, San Diego County, CA	6	Bay Point Formation, unnamed marine deposit	Cenozoic	Quaternary	late Pleistocene
5297	Morena Blvd. - Santa Fe Railroad Tracks	City of San Diego, San Diego County, CA	30	Bay Point Formation, unnamed marine deposit	Cenozoic	Quaternary	late Pleistocene
5298	Morena Blvd. - Santa Fe Railroad Tracks	City of San Diego, San Diego County, CA	30	Bay Point Formation, unnamed marine deposit	Cenozoic	Quaternary	late Pleistocene
5299	Morena Blvd. - Santa Fe Railroad	City of San Diego, San Diego County, CA	30	Bay Point Formation, unnamed marine deposit	Cenozoic	Quaternary	late Pleistocene
2	Mt. Soledad	City of San Diego, San Diego County, CA	90	San Diego Formation	Cenozoic	Neogene	Pliocene
4	Mt. Soledad	City of San Diego, San Diego County, CA	140	San Diego Formation	Cenozoic	Neogene	Pliocene
5	Mt. Soledad	City of San Diego, San Diego County, CA	170	San Diego Formation	Cenozoic	Neogene	Pliocene
80	Mt. Soledad	City of San Diego, San Diego County, CA	165	San Diego Formation	Cenozoic	Neogene	Pliocene

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

Locality Number	Locality Name	Location	Elevation (feet)	Geologic Unit	Era	Period	Epoch
365	Mt. Soledad	City of San Diego, San Diego County, CA	0	San Diego Formation	Cenozoic	Neogene	Pliocene
2653	Mt. Soledad	City of San Diego, San Diego County, CA	0	San Diego Formation	Cenozoic	Neogene	Pliocene
3097	Mt. Soledad - Pacific Drive-In	City of San Diego, San Diego County, CA	150	San Diego Formation	Cenozoic	Neogene	Pliocene
3204	Morena and Balboa	City of San Diego, San Diego County, CA	100	San Diego Formation	Cenozoic	Neogene	Pliocene
5025	Mt. Soledad - Lamont Street	City of San Diego, San Diego County, CA	125	San Diego Formation	Cenozoic	Neogene	Pliocene
5026	Mt. Soledad - Lamont Street	City of San Diego, San Diego County, CA	141	San Diego Formation	Cenozoic	Neogene	Pliocene
5027	Mt. Soledad - Lamont Street	City of San Diego, San Diego County, CA	142	San Diego Formation	Cenozoic	Neogene	Pliocene
5028	Mt. Soledad - Lamont Street	City of San Diego, San Diego County, CA	143	San Diego Formation	Cenozoic	Neogene	Pliocene
5033	Mt. Soledad - Geranium St.	City of San Diego, San Diego County, CA	125	San Diego Formation	Cenozoic	Neogene	Pliocene
80 A	Mt. Soledad	City of San Diego, San Diego County, CA	0	San Diego Formation	Cenozoic	Neogene	Pliocene
5061	Mt. Soledad - Blackmore Court	City of San Diego, San Diego County, CA	195	San Diego Formation, upper member	Cenozoic		Pliocene/Pleistocene
5062	Mt. Soledad - Blackmore Court	City of San Diego, San Diego County, CA	201	San Diego Formation, upper member	Cenozoic		Pliocene/Pleistocene
5063	Mt. Soledad - Blackmore Court	City of San Diego, San Diego County, CA	196	San Diego Formation, upper member	Cenozoic		Pliocene/Pleistocene
5064	Mt. Soledad - Blackmore Court	City of San Diego, San Diego County, CA	201	San Diego Formation, upper member	Cenozoic		Pliocene/Pleistocene
5065	Mt. Soledad - Blackmore Court	City of San Diego, San Diego County, CA	210	San Diego Formation, upper member	Cenozoic		Pliocene/Pleistocene
5066	Mt. Soledad - Blackmore Court	City of San Diego, San Diego County, CA	216	San Diego Formation, upper member	Cenozoic		Pliocene/Pleistocene
5067	Mt. Soledad - Blackmore Court	City of San Diego, San Diego County, CA	210	San Diego Formation, upper member	Cenozoic		Pliocene/Pleistocene
5068	Mt. Soledad - Blackmore Court	City of San Diego, San Diego County, CA	205	San Diego Formation, upper member	Cenozoic		Pliocene/Pleistocene
5069	Mt. Soledad - Blackmore Court	City of San Diego, San Diego County, CA	205	San Diego Formation, upper member	Cenozoic		Pliocene/Pleistocene
5075	Mt. Soledad - Blackmore Court	City of San Diego, San Diego County, CA	198	San Diego Formation, upper member	Cenozoic		Pliocene/Pleistocene
5034	Mt. Soledad - Pacifica Drive	City of San Diego, San Diego County, CA	200	San Diego Formation, lower member	Cenozoic	Neogene	Pliocene
9	Mt. Soledad	City of San Diego, San Diego County, CA	130	San Diego Formation?	Cenozoic	Neogene	Pliocene?
3296	Morena Boulevard near Avati Street	City of San Diego, San Diego County, CA	100	Scripps Formation	Cenozoic	Paleogene	middle Eocene
5881	Dakota Residences	City of San Diego, San Diego County, CA	235	Scripps Formation	Cenozoic	Paleogene	middle Eocene
7209	Sewer and Water Group 785	City of San Diego, San Diego County, CA	167	Scripps Formation	Cenozoic	Paleogene	middle Eocene
7210	Sewer and Water Group 785	City of San Diego, San Diego County, CA	193	Scripps Formation	Cenozoic	Paleogene	middle Eocene
7211	Sewer and Water Group 785	City of San Diego, San Diego County, CA	198	Scripps Formation	Cenozoic	Paleogene	middle Eocene
8	Mt. Soledad	City of San Diego, San Diego County, CA	100	Ardath Shale	Cenozoic	Paleogene	middle Eocene
16	Morena Blvd.	City of San Diego, San Diego County, CA	30	Ardath Shale	Cenozoic	Paleogene	middle Eocene
3720	Morena Boulevard borehole #1	City of San Diego, San Diego County, CA	40	Ardath Shale	Cenozoic	Paleogene	middle Eocene
3721	Morena Blvd. Interceptor	City of San Diego, San Diego County, CA	35	Ardath Shale	Cenozoic	Paleogene	middle Eocene
3722	Morena Blvd. Interceptor	City of San Diego, San Diego County, CA	30	Ardath Shale	Cenozoic	Paleogene	middle Eocene
6581	Sewer and Water Group 754	City of San Diego, San Diego County, CA	245	Ardath Shale	Cenozoic	Paleogene	middle Eocene
6582	Sewer and Water Group 754	City of San Diego, San Diego County, CA	258	Ardath Shale	Cenozoic	Paleogene	middle Eocene
7333	SDGE Mid-Coast Trolley	City of San Diego, San Diego County, CA	79	Ardath Shale	Cenozoic	Paleogene	middle Eocene

LAND DEVELOPMENT MANUAL

APPENDIX P

GENERAL GRADING GUIDELINES FOR PALEONTOLOGICAL RESOURCES

Paleontological resources (i.e., fossils) are the buried remains and/or traces of prehistoric organisms (i.e., animals, plants, and microbes). Body fossils such as bones or teeth, shells, leaves, and wood, as well as trace fossils such as tracks, trails, burrows, and footprints, are found in the geologic deposits (formations) within which they were originally buried. Fossil remains are considered important if they are: 1) well preserved; 2) taxonomically identifiable; 3) type/topotypic specimens; 4) age diagnostic; 5) useful in environmental reconstruction; or 6) represent new, rare, and/or endemic taxa.

Fossils are typically found buried in geologic deposits of sedimentary rock layers. They are exposed by natural weathering as well as by manmade earthmoving operations. Paleontological resources may be encountered during grading/excavation activities associated with project construction (e.g., residential subdivision projects, new roadway projects, urban redevelopment projects, or utility installation/improvement projects) where such work would be performed in previously undisturbed geologic deposits/formations/rock units (i.e., not in artificial fill materials).

The mapping of geologic deposits/formations/rock units can be located in the published geologic maps by Kennedy and Tan, 2008 all areas of the City of San Diego except Otay Mesa; and Todd, 2004 for the Otay Mesa area. The maps use colors to indicate the geographic distribution of individual geologic deposits/formations/rock units, with a map legend for reference of the geologic deposits/formations/rock units that are present in the project area. The geologic maps are available through the California Geological Survey and United State Geological Survey. Online digital versions of 1:100,000 scale maps are available at the following websites: <https://ngmdb.usgs.gov/mapview/>; http://www.conservation.ca.gov/cgs/rghm/rgm/Pages/preliminary_geologic_maps.aspx; and <https://pubs.usgs.gov/of/2004/1361/>.

These General Grading Guidelines for Paleontological Resources do not replace the Significance Determination Thresholds set forth in Land Development Manual Appendix A for Paleontological Resources.

The following is the standard monitoring requirement that shall be placed on grading plans and implemented when required pursuant to LDC section 142.0151:

I. Prior to Permit Issuance

Entitlements Plan Check

Prior to issuance of any construction permits, including but not limited to, the first Grading Permit, Demolition Plans/Permits and Building Plans/Permits or a Notice to Proceed for Subdivisions, but prior to the first preconstruction meeting, whichever is applicable, the City Engineer (CE) and/or Building Inspector (BI) shall verify that the requirements for Paleontological Monitoring have been noted on the appropriate construction documents.

1. The applicant shall submit a letter of verification to Resident Engineer (RE) and/or Building Inspector (BI) identifying the qualified Principal Investigator (PI) for the project and the names of all persons involved in the paleontological monitoring program. A qualified PI is defined as a person with a Ph.D. or M.S. or equivalent in paleontology or closely related field (e.g., sedimentary or stratigraphic geology, evolutionary biology, etc.) with demonstrated knowledge of southern California paleontology and geology, and documented experience in professional paleontological procedures and techniques.

2. II. Prior to Start of Construction

A. Verification of Records Search

1. The PI shall provide verification to RE and/or BI that a site specific records search has been completed. Verification includes, but is not limited to a copy of a confirmation letter from the San Diego Natural History Museum, or another relevant institution that maintains paleontological collections recovered from sites within the City of San Diego.
2. The letter shall introduce any pertinent information concerning expectations and probabilities of discovery during trenching and/or grading activities.

B. PI Shall Attend Preconstruction Meetings

1. Prior to beginning any work that requires monitoring, the Applicant shall arrange a Preconstruction Meeting that shall include the PI, Construction Manager (CM) and/or Grading Contractor, RE, and BI, as appropriate. The qualified paleontologist (PI) shall attend any grading/excavation related Preconstruction Meetings to make comments and/or suggestions concerning the Paleontological Monitoring program with the Construction Manager and/or Grading Contractor.

- a. If the PI is unable to attend the Preconstruction Meeting, the Applicant shall schedule a focused Preconstruction Meeting with the PI, RE, CM or BI, if appropriate, prior to the start of any work that requires monitoring.
2. Identify Areas to be Monitored

Prior to the start of any work that requires monitoring, the PI shall submit a Paleontological Monitoring Exhibit (PME) based on the appropriate construction documents (reduced to 11x17) to RE and/or BI identifying the areas to be monitored including the delineation of grading/excavation limits. The PME shall be based on the results of a site specific records search as well as information regarding existing known geologic conditions (e.g., geologic deposits as listed in the Paleontological Monitoring Determination Matrix below).
3. When Monitoring Will Occur
 - a. Prior to the start of any work, the PI shall also submit a construction schedule to the RE and/or BI indicating when and where monitoring will occur.
 - b. The PI may submit a detailed letter to RE and/or BI prior to the start of work or during construction requesting a modification to the monitoring program. This request shall be based on relevant information such as review of final construction documents and geotechnical reports which indicate conditions such as depth of excavation and/or thickness of artificial fill overlying bedrock, presence or absence of fossils , etc., which may reduce or increase the potential for resources to be present.

III. During Construction

- A. Monitor Shall be Present During Grading/Excavation/Trenching
 1. The paleontological monitor shall be present full-time during grading/excavation/trenching activities as identified on the PME that could result in impacts to formations with high and moderate resource sensitivity. **The Construction Manager is responsible for notifying the PI, RE and/or BI of changes to any construction activities such as in the case of a potential safety concern within the area being monitored. In certain circumstances OSHA safety requirements may necessitate modification of the PME.**
 2. The PI may submit a detailed letter to RE and/or BI during construction requesting a modification to the monitoring program when a field condition such as trenching activities that do not encounter previously undisturbed and paleontologically sensitive geologic deposits as previously assumed, and/or when unique/unusual fossils are encountered, which may reduce or increase the potential for paleontological resources to be present.

3. The paleontological monitor shall document field activity via the Consultant Site Visit Record (CSV). The CSV's shall be emailed by the CM to the RE and/or BI the first day of monitoring, the last day of monitoring, monthly (**Notification of Monitoring Completion**), and in the case of ANY discoveries.

B. Discovery Notification Process

1. In the event of a discovery, the paleontological monitor shall direct the contractor to temporarily divert trenching activities in the area of discovery and notify the RE and/or BI. The contractor shall also process a construction change for administrative purposes to formalize the documentation and recovery program, including modification to Mitigation Monitoring and Compliance (MMC).
2. The paleontological monitor shall notify the PI (unless paleontological monitor is the PI) of the discovery.
3. The PI shall notify MMC of the discovery, and shall submit documentation to MMC within 24 hours by email with photos of the resource in context.

C. Recovery of Fossils

If a paleontological resource is encountered:

1. The paleontological monitor shall salvage unearthed fossil remains, including simple excavation of exposed specimens or, if necessary as determined by the PI, plaster-jacketing of large and/or fragile specimens or more elaborate quarry excavations of richly fossiliferous deposits.
2. The paleontological monitor shall record stratigraphic and geologic data to provide a context for the recovered fossil remains, including a detailed description of all paleontological localities within the project site, as well as the lithology of fossil-bearing strata within the measured stratigraphic section, and photographic documentation of the geologic setting.

V. Post Construction

A. Preparation and Submittal of Draft Paleontological Monitoring Report

1. The PI shall submit two copies of the Draft Paleontological Monitoring Report (even if negative), prepared to the satisfaction of the Development Services Department. The Draft Paleontological Monitoring Report shall describe the methods, results, and conclusions of all phases of the Paleontological Monitoring Program (with appropriate graphics) to MMC for review and approval within 90 days following the completion of monitoring,

- a. For significant or potentially significant paleontological resources encountered during monitoring, as identified by the PI, the Paleontological Recovery Program shall be included in the Draft Monitoring Report.
 - b. The PI shall be responsible for recording (on the appropriate forms) any significant or potentially significant fossil resources encountered during the Paleontological Monitoring Program in accordance with the City's Paleontological Guidelines (revised November 2017), and submittal of such forms to the San Diego Natural History Museum and MMC with the Draft Paleontological Monitoring Report.
 2. MMC shall return the Draft Paleontological Monitoring Report to the PI for revision or, for preparation of the Final Report.
 3. The PI shall submit revised Draft Paleontological Monitoring Report to MMC for approval.
 4. MMC shall provide written verification to the PI of the approved Draft Paleontological Monitoring Report.
 5. MMC shall notify the RE and/or BI, of receipt of all Draft Paleontological Monitoring Report submittals and approvals.
- B. Handling of Recovered Fossils
1. The PI shall ensure that all fossils collected are cleaned to the point of curation (e.g., removal of extraneous sediment, repair of broken specimens, and consolidation of fragile/brittle specimens) and catalogued as part of the Paleontological Monitoring Program.
 2. The PI shall ensure that all fossils are analyzed to identify stratigraphic provenance, geochronology, and taphonomic context of the source geologic deposit; that faunal material is taxonomically identified; and that curation has been completed, as appropriate.
- C. Curation of Fossil Remains: Deed of Gift and Acceptance Verification
1. The PI shall be responsible for ensuring that all fossils associated with the paleontological monitoring program for this project are permanently curated with an accredited institution that maintains paleontological collections (such as the San Diego Natural History Museum).
 2. The PI shall include an acceptance verification from the curation institution in the Final Paleontological Monitoring Report submitted to the RE and/or BI, and MMC.

D. Final Paleontological Monitoring Report(s)

1. The PI shall submit two copies of the Final Paleontological Monitoring Report to MMC (even if negative), within 90 days after notification from MMC that the Final Paleontological Monitoring Report has been approved.
2. The RE and/or BI shall, in no case, issue the Notice of Completion until receiving a copy of the approved Final Paleontological Monitoring Report from MMC, which includes the Acceptance Verification from the curation institution.

Paleontological Monitoring Determination Matrix

Geological Deposit/Formation/Rock Unit	Potential Fossil Localities	Sensitivity Rating
Alluvium (Qsw, Qal, or Qls)	All communities where this unit occurs	Low
Ardath Shale (Ta)	All communities where this unit occurs	High
Bay Point/Marine Terrace (Qbp) ¹	All communities where unit occurs	High
Cabrillo Formation (Kcs)	All communities where unit occurs	Moderate
Delmar Formation (Td)	All communities where unit occurs	High
Friars Formation (Tf)	All communities where unit occurs	High
Granite/Plutonic (Kg)	All communities where unit occurs	Zero
Lindavista Formation (Qln, Qlb) ²	A. Mira Mesa/Tierrasanta B. All other areas	A. High B. Moderate
Lusardi Formation (Kl)	Black Mountain Ranch/Lusardi Canyon Poway/Rancho Santa Fe B. All other areas	A. High B. Moderate
Mission Valley Formation (Tmv)	All communities where unit occurs	High
Mt. Soledad Formation (Tm, Tmss, Tmsc)	A. Rose Canyon B. All other areas where this unit occurs	A. High B. Moderate
Otay Formation (To)	All communities where unit occurs	High
Point Loma Formation (Kp)	All communities where unit occurs	High
Pomerado Conglomerate (Tp)	A. Scripps Ranch/Tierrasanta B. All other areas	High
River /Stream Terrace Deposits (Qt)	A. South Eastern/Chollas Valley/Fairbanks Ranch/Skyline/Paradise Hills/Otay Mesa, Nestor/San Ysidro B. All other areas	A. Moderate B. Low
San Diego Formation (Qsd)	All communities where this unit occurs.	High
Santiago Peak Volcanics (Jsp) A. Metasedimentary B. Metavolcanic	A. Black Mountain Ranch/La Jolla Valley, Fairbanks Ranch/Mira Mesa/Peñasquitos B. All other areas	A. Moderate B. Zero
Scripps Formation (Tsd)	All communities where this unit occurs	High
Stadium Conglomerate (Tst)	All communities where this unit occurs	High
Sweetwater Formation	All communities where this unit occurs	High
Torrey Sandstone (Tf)	A. Black Mountain Ranch/Carmel Valley B. All other areas	A. High B. Low

