4.3 GEOLOGY AND EROSION

The Initial Studies for the DFPMP and the Off-Leash Dog Park Locations Study provide a discussion of seismic activity, subsidence, expansive soils and grading for all three of the sites, and a discussion of erosion for the Hale Park and Shoreline Beach Area. The Initial Studies indicate that there would not be significant geophysical impacts to the Hale Park and Shoreline Beach Area sites, but that there may be potentially significant erosion impacts at the DFP site from recommendations in the DFPMP. The following discussion focuses on the erosion potential at the DFP site resulting from implementation of the DFPMP. Section 4.6 WATER RESOURCES discusses the potential impacts from erosion leading to sedimentation of the Arroyo Burro Creek and its tributary at the DFP.

4.3.1 Setting

The DFP site consists of Quaternary-age and older alluvial deposits overlying Miocene-age bedrock of the Monterey Formation. The older alluvial deposits consist of dusky brown silty fine sand to sandy silt, and appear to be 1-5 feet thick, based on observations of exposures visible at locations along the top of the bluffs. These deposits appear to be loose to medium dense, friable (crumbly), and easily eroded. The Monterey Formation exposed in the bluffs in the project vicinity consists primarily of extremely weathered, intensely to extremely fractured, thinly bedded claystone, interbedded with lesser amounts of siliceous and dolomitic shale.

There are minor amounts of artificial fill present at the top of the bluffs as a result of past agricultural or grading activities. Landslide deposits likely exist at the site, consisting of displaced Monterey Formation bedrock and older alluvial deposits. The deposits appear to be related to out-of-slope bedding or laterally unsupported bedding common along the majority of the bluff alignment. The northwest-southeast trending bluffs are about 150 to 160 feet high, and are steeply inclined.

The DFP site is in an area of active soil creep, defined by downslope movement of soil, observable by topographic features, leaning trees, and damage to trees. The bluffs are an area of active erosion, and seacliff areas undergo periodic erosion caused by very high tides or storm surge. Gullying and sedimentation are active during winter months.

As noted in the DFPMP, Hoover and Associates (1988), determined a historic sea-cliff retreat rate of 0.326 foot per year, or about one foot every three years. Given this rate, a 75-year geologic setback line was established at 25 feet inland of the bluff top.

Most recently, Fugro West, Inc. (April 2002) prepared an estimation of bluff retreat and 75-year setback limits for the DFP based on data review, aerial photographic review, and a site reconnaissance. This report is incorporated by reference and is included in Appendix 1 (bound separately)**.** The site reconnaissance consisted of geologic mapping of

the surficial materials and measuring geologic discontinuities (bedding planes, joints, fractures, etc.) at readily accessible locations on the bluff. Due to the large scale and differing scales of the available aerial photographs, and lack of long-term landmarks on the property, such as structures, accurate measurements of bluff retreat with time were not possible. Bluff retreat estimates were based on the trees that are present along the bluff top. Aerial photographs suggest that the trees were planted prior to 1928.

The Fugro West, Inc. report notes that the overall bluff outline in the vicinity of the site has remained relatively similar over the time period reviewed (73 years). Bluff retreat is estimated at about 20 feet in the past 70+ years, suggesting an average bluff retreat rate of about 3 inches per year. Nonetheless, due to the uncertainties involved in the estimation, as listed above, and considering published rates for various other bluff locations within Santa Barbara County, the report suggests a retreat rate of 6 inches per year. Consequently, the report recommends a 40-foot setback for structures on the site.

It should be noted that typically along the Santa Barbara coast, bluff locations can remain relatively static for years and then retreat during episodic events. Such episodic events can occur during relatively severe winter storms where storm surges, high tidal actions, and large waves can undermine the bluff causing slope failure and bluff retreat. At those times, the seacliff can slowly or catastrophically retreat a few to tens of feet. Hence, the bluffs typically do not retreat on a yearly basis at an average rate.

4.3.2 Policy

The City Local Coastal Plan (LCP) and the Seismic Safety/Safety Element of the City General Plan state that new development on the top of cliffs shall be placed at such distance away from the edge of the cliff that normal rates of erosion and cliff material loss will not seriously affect the structure during its expected lifetime. The City LCP identifies the lifetime of a structure as 75 years. Section 30253(2) of the California Coastal Act states that new development shall:

> *Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural land forms along bluffs and cliffs.*

4.3.3 Impact Analysis and Mitigation

a. Significance Thresholds. A significant impact would result if a structure were placed within the 75-year setback from the bluff at the DFP site. A significant impact would also result if the project would substantially contribute to erosion or geologic instability or would require the construction of protective devices that would substantially alter natural landforms along the bluff.

b. Project Impacts and Mitigation. The following impact and mitigation discussion relates to the potential for erosion at the DFP site as a result of the DFPMP implementation.

Impact Geo-1	**Placement of the caretaker's residence and public restroom within 39 feet of the bluff edge at the DFP would result in encroachment within the 75-year setback.**

The construction of a permanent caretaker's residence at the DFP, near the bluff at the Medcliff Road entrance, is identified in the DFPMP as an option. The DFPMP calls for the residence to be set back at least 25 feet from the bluff, based on the Hoover and Associates report (1988). However, the more recent establishment of the 75-year setback prepared by Fugro West, Inc. (Appendix 1, bound separately) indicates that a setback of 40 feet is more appropriate. Therefore, there would be a ***potentially significant, mitigable*** impact related to bluff erosion if the caretaker's residence were located within 39 feet from the bluff edge.

The public restroom is proposed in the DFPMP at either the Medcliff Road entrance or the Borton Drive entrance. Unlike the caretaker's residence, however, the DFPMP does not stipulate that the restroom be sited within any particular distance from the bluff. Therefore, there is the potential for a ***potentially significant, mitigable*** impact if the restroom were located within 39 feet from the edge of bluff.

Mitigation Measure. The following mitigation measure is **required**.

MM Geo-1	**Any structure on the DFP site shall be built outside of the 75-year bluff setback, per the most recent bluff retreat analysis (currently 40 feet).**

Residual Impact. The above noted mitigation measures would reduce the impacts to a ***less than significant*** level.

Impact Geo-2	**Surface water runoff resulting from construction of the caretaker's residence and the public restroom at the DFP, as well as allowing water to pool along the Loop Trail near the bluff, may result in a substantial increase in bluff erosion.**

The caretaker's residence would be established near the bluff, and the public restroom may be established near the bluff as well. Both the residential and restroom facilities have not yet been designed. While there is not anticipated to be a large amount of impervious surface associated with the buildings' construction, there remains the potential for an increase in storm water runoff that could flow to the bluffs, thereby contributing to erosion. This impact is considered ***potentially significant but mitigable.*** The DFPMP states that the pooling of water along trails shall not be controlled, rather alternate access as close as possible near the existing trail should be provided. This policy

would result in ***potentially significant, mitigable*** impacts for the portion of the Loop Trail nearest the coastal bluff, as water ponds near the bluff.

Mitigation Measure. The following mitigation measures are **required**.

MM Geo-2 **Drainage at and around the site of the caretaker's residence, and the public restroom at the DFP, if sited near the Medcliff Road entrance, shall be diverted away from the bluffs, so that no surface runoff flows over the bluffs.**

MM Geo-3 **Pooling of water shall be discouraged along the Loop Trail near the bluff, and positive drainage directed away from the bluff shall be required.**

Residual Impact. The above noted mitigation measures would reduce the impacts to a ***less than significant*** level.

Impact Geo-3	**Revegetating the bluff, and extending coastal bluff vegetation up-slope to the edge of the mesa at the DFP, requiring the removal of any existing vegetation, could result in erosion if the revegetation or other erosion prevention measures are not implemented before the rainy season, beginning November 1st. Erosion could also result if the revegetation requires substantial irrigation.**

The DFPMP contains several policies to reduce the risk of bluff failure (Policies VM-12, VM-15, VM-16, OM-4, RM-1). These include continuing to use downed wood and logs, set back a minimum of 10 feet from the bluff edge, to reduce pedestrian and dog access to portions of the bluff edge as a means to minimize erosion and compaction. Additionally, mulching with organic materials is proposed to minimize exposed soil at the top of the bluffs. Other important measures contained in the Plan call for revegetating the bluff lip with native plants, and extending coastal bluff vegetation up-slope to the edge of the mesa, where vegetative cover is currently sparse. These measures would serve to minimize surface water runoff from the mesa down the bluff faces.

Erosion could result if the vegetation is stripped and not replanted, and if the soils are not properly stabilized, before the rainy months. Erosion could also result if the replacement vegetation requires substantial irrigation. In all of these circumstances, the erosion would result in a ***potentially significant but mitigable*** impact. This impact would be the same for each of the dog use alternatives, since the revegetation in this area is not related to dog use at the site. (Refer to Section 4.6 Water Resources for further discussion of erosion impacts, especially those related to water quality).

Mitigation Measure. The following mitigation measure is **required**.

MM Geo-4 **Once the vegetation near the DFP bluff is removed,**

revegetation shall be completed, or alternative methods of erosion prevention shall be implemented in the interim, prior to the rainy season, beginning November 1st. Revegetation or restoration plans submitted to the City for approval shall ensure that sufficient vegetative cover will be achieved prior to this date, so that the potential for erosion is minimized, or alternate interim erosion prevention methods until the area is sufficiently revegetated shall be approved by a plant biologist or landscape architect, approved by the City and implemented prior to November 1st. Plants used in revegetation shall be drought tolerant, and require no more than minor, temporary watering to become established. Any proposed temporary irrigation shall be conducted so as to minimize water runoff in the bluff area, and shall be identified in the plans submitted to the City for approval.

Residual Impact. Implementation of the above mitigation measure would reduce the erosion impact to a ***less than significant*** level.

c. Policy Consistency. As proposed, the project is potentially inconsistent with adopted policies regarding development near the bluff and in the 75-year setback, and those relating to contributing to erosion and geologic instability. Upon implementation of the above mitigation measures, the project would be consistent with the policies relating to erosion.

d. Cumulative Impacts. Erosion impacts would not be cumulatively considerable and would be ***less than significant.*** The City of Santa Barbara and the general area around the DFP are already substantially developed and built out, with little additional space for new development. Currently in the general area, there are no proposals for large development that would involve a substantial amount of earthmoving or other similar activities that would pose a particular erosion concern. Therefore, the potential for other projects to substantially contribute to erosion is limited. This project would only contribute a very small amount to erosion, resulting in impacts that are less than significant after mitigation.