

OAKLAND ZOO IN KNOWLAND PARK MASTER PLAN UPDATE
MITIGATION MEASURES

(Modifications to the Mitigation Measures are indicated in **Bold Type** for additions and ~~Strikethrough-Print~~ for deletions)

EARTH MITIGATION MEASURES

- 1a) The geotechnical report prepared for the Center for Science and Environmental Education and the African Savanna Exhibit recommended the use of retaining walls, the creation of keyed and benched slopes, proper slope gradients, proper fill compaction, removal of expansive soils and the development of proper drainage facilities to reduce slope failure. These recommendations as well as any additional suggestions from the City of Oakland Building and Engineering Departments shall be adhered to.
- 1b) City of Oakland standards for engineering controls and slope stabilization outlined in the Oakland Grading Ordinance shall be adhered to prior to and during facility and roadway construction.
- 1c) Additional geotechnical studies shall be required prior to design and construction of the remaining proposed Master Plan buildings, roads and facilities.
- 1d) All proposed facilities shall be constructed in conformance with the Uniform Building Code and California Amendments, and incorporate specific engineering design recommendations from the geotechnical and soils reports.
- 1e) Close construction inspection, testing and quality control shall be performed by the proposed geotechnical engineer or engineering geologist to ensure that site grading plans and geotechnical recommendations criteria are adequate and appropriate.
- 2a) Facilities and infrastructure improvements should be designed to control runoff so that it is not directed over unprotected slopes. Drainage improvements shall be designed to adequately collect surface water runoff and convey it to the proper storm drain system. **A permanent storm drain shall be designed, installed, and maintained to catch water from the existing natural drainage pattern in Knowland Park above Stella Street. The water will be redirected to City storm drain system.**
- 2b) The construction contractor shall use water bars, temporary swales and culverts, mulch and jute netting, silt fences, straw bales and sediment traps to prevent surface water from eroding soil and transporting it to nearby creeks and natural drainages. These and other methods as outlined in the California Stormwater Best Management Practice Handbook, Construction Activity, shall be implemented to reduce erosion.
- 2c) Grading and construction activities shall be restricted to the dry season. Exposed surface areas shall be watered down, especially during construction, to reduce wind erosion.
- 2d) Erosion control methods and implementation procedures shall be monitored during construction and modified as conditions warrant.
- 3a) Mitigation Measures 2a - 2d shall be implemented.

- 4a) Implement the recommendations from the Harza report such as removal of expansive soils, clearing of rich compressible organic soils and use of appropriately engineered fill materials shall be adhered to for the development of the Center for Science and Education and the African Savanna Exhibit.
- 4b) Additional geotechnical and soils studies for the presence of expansive soils shall be required prior to design and construction of the remaining buildings, roads and facilities proposed by the Master Plan.
- 4c) New structures and facilities proposed by the Master Plan shall incorporate the recommendations of the additional geotechnical reports and any additional requirements from the City of Oakland.
- 5a) The geotechnical recommendations in the Harza report for the Center for Science and Environmental Education and the African Savanna Exhibit located within the Alquist Priolo Zone shall be incorporated into the final design and siting of these facilities. Geotechnical recommendations in the supplemental Kleinfelder report shall also be incorporated into the final design of the Center.
- 5b) Geotechnical evaluations shall be performed for each additional facility proposed by the Master Plan and recommendations to reduce seismic related hazards shall be incorporated into the design and siting of these new facilities.
- 5c) All proposed structures shall be designed and constructed in accordance with the Uniform Building Code and California Amendments. The interpretation of the applicability of the appropriate UBC standard for each proposed structure shall be determined by the Oakland Building and Engineering staff at the time of preliminary plan submittal.
- 5d) Proper earthquake-resistant techniques for securing indoor fixtures, machinery and furnishings within proposed structures shall be used during construction to minimize the risk of damage or injury from toppled objectives.
- 5e) **The Zoo's Emergency Preparedness and Response Plan, and Animal Capture Plan shall be updated as proposed facilities are developed. The Zoo and Neighborhood (KPHA and SHRA) Associations will work together to educate the neighborhood about the Zoo's Emergency Preparedness and Response Plan and how it is implemented. This will be accomplished through written communication and a phone tree. The Zoo will provide a demonstration to the representatives of KPHA and SHRA of the safety of the animal enclosures in the case of a natural disaster.**
- 5f) **A balanced cut and fill grading plan shall be used for all project development so import and export of fill is minimized.**

AIR MITIGATION MEASURE

- 8a) The following Basic Dust Control Measures shall be implemented at all construction sites:
 - Water all active construction areas at least twice daily.
 - Cover all trucks hauling soil, sand, and other loose debris *or* require all trucks to maintain at least two feet of freeboard.
 - Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.

- Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.

WATER MITIGATION MEASURES

- 10a) Mitigation Measures 2a - 2d shall be implemented.
- 10b) The proposed Trail and picnic facilities shall be sited at least 100 feet away from the high water level of the creek.
- 10c) In the event of a proposed creek crossing and/or the need to access the creekbed during construction, proper permitting and noticing requirements of the Regional Water Quality Control Board, the California Department of Fish and Game and the U.S. Fish and Wildlife Department shall be followed.
- 10d) Project infrastructure improvements shall be designed and sited to adequately control and handle increased surface water runoff. These improvements shall be approved by the City of Oakland Engineering Department, the California Department of Fish and Game and the East Bay Municipal District.
- 10e) Proposed facilities and animal night houses shall be sited at least 100 feet away from drainage channels.
- 10f) In the event that drainage channels cannot be avoided, the project applicant shall comply with the appropriate notification, permitting and monitoring requirements of the Regional Water Quality Control Board, the California Department of Fish and Game, the U.S. Department of Fish and Wildlife, the City of Oakland, Alameda
- 11a) See Mitigation Measure 10e.

BIOTIC MITIGATION MEASURES

- 13a) The proposed Master Plan would include the implementation of a Habitat Enhancement Plan that would enhance oak woodlands, native grasslands, coastal scrub and riparian woodland, and remove eucalyptus, French broom and other exotic plants from the California 1820 Exhibit area and Upper Knowland Park. The Habitat Enhancement Plan should include the following:
- An annual assessment of the species and distribution of invasive non-native weeds (examples of invasive species would include artichoke thistle, French broom, giant reed, German ivy, pampas grass, Algerian ivy, acacia and eucalyptus). The assessment would include a map and estimate of abundance of weeds.
 - A management element for the control of each weedy species. Methods used for each species should be based on currently accepted best available practices, including hand-pulling, cutting followed by topical application of suitable herbicide, use of livestock, removal or burning of cut plant materials, and so on. The justification for the control methods used should be explained, and a tracking system maintained to document areas treated, methods used, and effectiveness of the result.

- A revegetation element for areas where heavy infestations of weeds comprise a significant portion of the existing vegetation. The riparian zone of lower Arroyo Viejo Creek, for example, is so dominated by non-natives that planting of indigenous tree and shrub species following the removal of weeds is needed to speed up the restoration process. This element would include a tracking system for areas treated, a record of the source and species of plant materials used, methods of installation and maintenance, and an assessment of the success of each effort.
- 13b) A Tree Protection and Revegetation Plan shall be prepared to protect, replace, and preserve trees on the project site. The Plan shall include the following:
- Native trees lost to development shall be replanted at a minimum ratio of 3:1. Non-native trees lost to development shall be replanted with native trees at a minimum ratio of 1:1.
 - Every 10 years, prepare a census of trees qualifying for protection under the Oakland Tree Protection Ordinance within the project area. The census will document the condition of such trees, and recommend actions to extend the life and health of the trees. Recommended actions could include protective devices for reduction of vandalism, excessive treading by pedestrians or rubbing of bark, modification of drainage, erosion or sedimentation to protect trees, and modification of irrigation patterns to reduce pathogens. Recommendations and actions taken would be reported to the City of Oakland and the Department of Fish and Game.
 - Protection of oaks in Upper Knowland Park outside of the developed areas of the Zoo will be addressed through the development of a management element for Upper Knowland Park. Since a close-canopy oak woodland is a "fire-safe" vegetation type and is visually pleasing, the maximum natural extent of oak woodland may be the management goal. Management practices needed to achieve and maintain oak woodland or forest are: a minimum of grazing livestock, especially during the dry months; few fires; and slope stability. Maintenance of oak woodland would dovetail with weed control measures discussed under Mitigation Measure 13a.
- 13c) Although mitigations recommended by the Master Plan to minimize impacts to wildlife due to vehicle and pedestrian traffic would reduce potential impacts to less than significant, the following mitigation measure would further reduce the impact. If feasible, the Shuttle Road should be a maximum of 15 feet in width with no curbs or gutters to reduce potential impacts to the Alameda whipsnake.
- 13d) To mitigate for the potential impacts to small vertebrates from construction of the viewing platforms, the platforms shall be constructed in the dry season (late summer/ fall), and native riparian species shall be planted in areas disturbed by construction activities and mitigation measures 2a - 2d included under the Earth section of this Initial Study shall be implemented.
- 14a) The Shuttle Road should be re-routed to avoid the robust monardella colony. A buffer of a minimum of 25 feet shall be established between any project soils disturbance and the existing colony.
- 14b) The Bison Exhibit boundary shall be revised to exclude the robust monardella colony; alternatively, the robust monardella shall be protected with a perimeter fence providing a 25-foot buffer around the colony.

- 14c) Obtain a Permit for Management of a rare or threatened species pursuant to Fish and Game Code Section 2081. The Management Permit will include all details of a Mitigation and Monitoring Plan which will be prepared by the East Bay Zoological Society. The Mitigation and Monitoring Plan will be subject to approval by the California Department of Fish and Game and the U. S. Fish and Wildlife Service. A summary of the measures to be incorporated into the Mitigation and Monitoring Plan are presented below.
- 14d) All removal of scrub or chaparral habitat shall be done by hand with axes or machetes. Chain saws could be used for larger shrubs.
- 14e) A biologist qualified to handle Alameda whipsnakes shall monitor all scrub or chaparral removal and all construction activities which may impact the Alameda whipsnake.
- 14f) Alameda whipsnake habitat shall be preserved in perpetuity on property owned by the East Bay Zoological Society and contiguous to the east of the California 1820 Exhibit area. Numerous large areas of scrub and/or chaparral habitat are present in the proposed mitigation area and these appear to provide an adequate amount of habitat to offset impacts within the project site. The amount of habitat preserved shall be in accordance with current requirements of the California Department of Fish and Game.
- 14g) To reduce the potential for mortality on the shuttle road to a level less than significant, a maximum speed of 10 miles per hour shall be required and shuttle drivers and personnel driving to the off-site breeding exhibit will be instructed to watch for and yield to all wildlife. The road shall also be a maximum of 15 feet in width with no curbs or gutters. Specially designed "snake crossings" under the shuttle road may also be required.
- 14h) Measures will be taken to prevent the spread of French broom on the site and to remove as much French broom from the site as possible in order to keep it from degrading higher quality whipsnake habitat.
- 14i) Prior to construction of the creek-viewing platforms, and construction of the Shuttle Road through woodland areas, surveys for nesting Cooper's hawks should be conducted. If no nests are present, construction can proceed. If a nest is present in the vicinity of the site for the viewing platforms, construction should be delayed until the young have fledged. Once the platforms and Shuttle Road are completed, their presence and the presence of hikers on the Trail would be considered a less than significant impact.
- 14j) During construction, dust control mitigation measures included in the Air Quality section of this Initial Study (8a) shall be implemented, which will reduce potential impacts to the air passages of San Francisco lacewings.
- 15a) The operations and maintenance plan for the new exhibits shall include a weed management and control element. This should include monitoring the natural portions of Upper Knowland Park for infestations of non-native weeds, and implementation of control measures to prevent the weeds from degrading the natural vegetation.
- 16a) The Trail shall be constructed 100 feet from the creek bank and on the outer edges of the riparian vegetation. Streambed crossings shall consist of walkways constructed well above the banks. Creek viewing platforms located within the 100-foot buffer shall be located to minimize impacts to riparian vegetation. Disturbed riparian vegetation will be enhanced by removal of non-native species and planting and maintenance of indigenous species. Erosion control requirements

contained in Ordinance No. 10312 would prevent sedimentation resulting from construction of the Trail and viewing platforms.

NOISE MITIGATION MEASURES

18a) Project contractors shall be required to implement noise control techniques to minimize disturbance to adjacent or nearby sensitive noise receptors during project construction in the vicinity of the southern Park boundary:

1. The proposed solid wood or masonry fence along the southern Park boundary shall be constructed and completed prior to construction of proposed improvements to the main entrance parking lot and overflow parking lot.
2. Equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and/or acoustically-attenuating shields or shrouds, wherever feasible and necessary) in order to minimize construction noise impacts. Construction equipment shall not generate noise levels above 75-80 dBA at 50 feet as listed in Table B-2 of Appendix B, or as required by City ordinance, in order to provide acceptable interior noise levels at nearby or adjacent residential receptors.
3. Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically-powered tools. However, where use of pneumatically powered tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used where feasible, and this could achieve a reduction of 5 dBA. Quieter procedures shall be used such as drilling rather than impact equipment whenever feasible.
4. During project construction, truck operations shall be prohibited during the nighttime hours (8 p.m. to 7 a.m.) and the operation of heavy equipment shall be limited to 7:30 a.m. to 7:30 p.m., Monday through Saturday, to minimize potential disturbance of adjacent and nearby residential receptors.
5. Stationary noise sources shall be located as far from sensitive receptors as possible. If they must be located near existing receptors, they should be adequately muffled to the extent feasible and enclosed within temporary sheds.

When construction occurs along the section of the uphill loop road that extends along the southern Park boundary, residences to the south (which would be approximately 150 feet away) would be subject to noise peaks of 70 to 80 dBA, periodically exceeding the 70-dBA criterion. However, the short-term nature of these noise peaks (two to four weeks for construction of this 500-foot long section of the Shuttle Road) and implementation of noise control measures listed above would reduce potential impacts to a less-than-significant level. Residential receptors located 1,000 feet or more from the northern Park boundary would not be significantly affected by construction noise; at 1,000 feet, the intervening distance would be adequate to maintain construction noise peaks at or below the 70-dBA criteria.

TRANSPORTATION/CIRCULATION MITIGATION MEASURE

26a) **Construction traffic shall only use existing improved public roads.**

27a) ~~To prevent traffic from the Zoo parking lots from exiting onto Golf Links Road via Zoo Drive, appropriate traffic barriers and signage shall be installed.~~ **To prevent heavy traffic from exiting the Zoo in one direction, traffic will be directed between Golf Links Road and 106th Avenue in order to balance the traffic flow. At no time will the Golf Links exit be closed to heavy traffic.**