

Exhibit 1
4-06-163
Vicinity Map

4455 28
400'

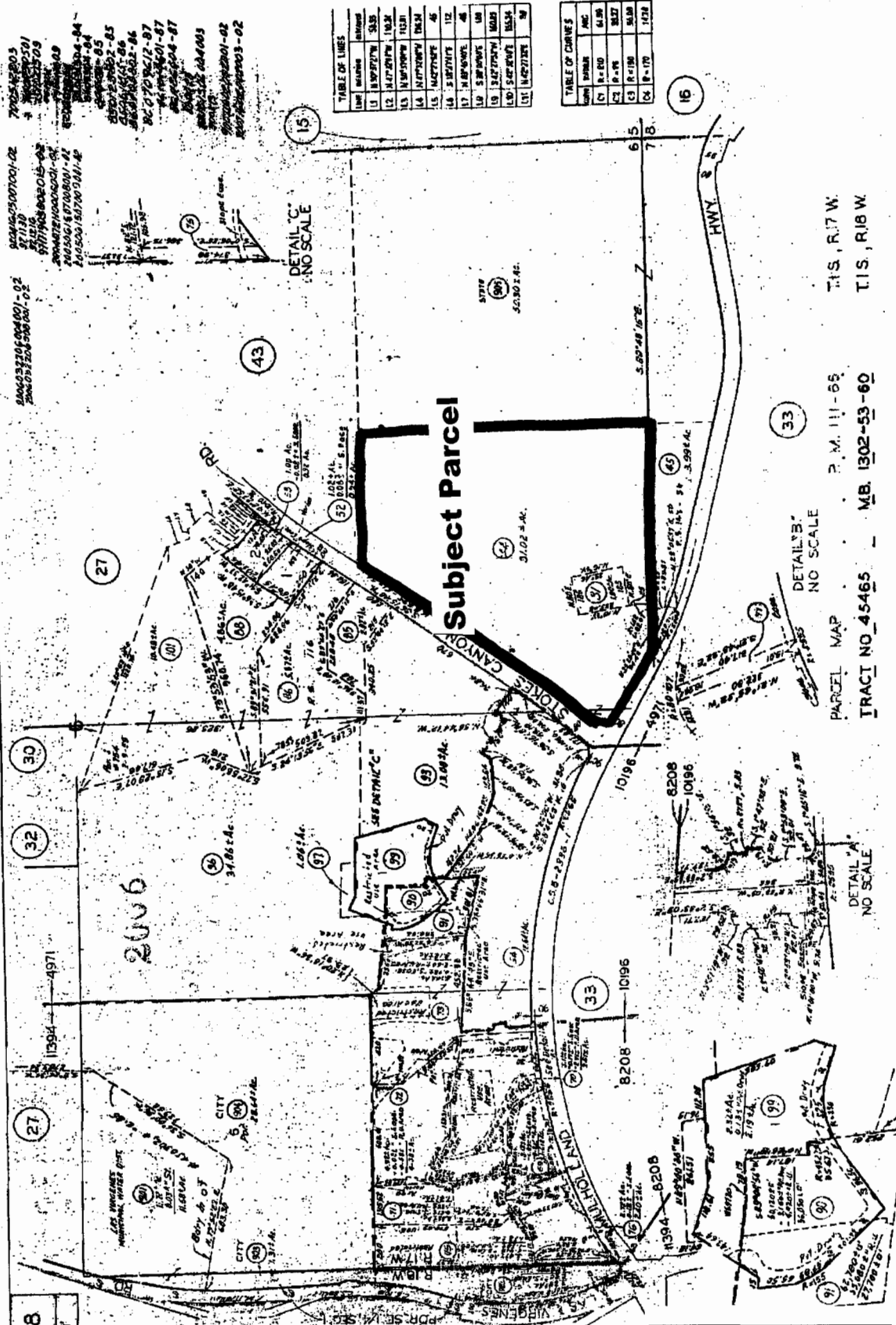


TABLE OF LINES

LINE	BEARING	DISTANCE
11	S 89° 27' 00" W	54.35
12	S 17° 20' 00" W	10.24
13	S 89° 27' 00" W	10.24
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100	S 17° 20' 00" W	10.24

TABLE OF CURVES

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C100	11-100	11-100	90.00

Exhibit 2
4-06-163
Parcel Map

PARCEL MAP
TRACT NO. 45465
P. M. 111-65
T. 1 S., R. 17 W.
T. 1 S., R. 18 W.

DETAIL 'C'
NO SCALE

DETAIL 'B'
NO SCALE

DETAIL 'A'
NO SCALE

Subject Parcel

2006



CALIFORNIA COASTAL COMMISSION

45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105-2219
VOICE AND TDD (415) 904-5200
FAX (415) 904-5400



April 19, 2000

Jan Perez, Statewide Enforcement Program
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2219

SUBJECT: Boundary Determination No. 18-2000
APN 4455-028-044, Los Angeles County

Dear Ms. Perez:

Enclosed is a copy of a portion of the adopted Coastal Zone Boundary Map No. 135 (Malibu Beach Quadrangle) with the approximate location of Los Angeles County APN 4455-028-044 indicated. Also included is an assessor parcel map exhibit that includes the subject property, to which the coastal zone boundary has been added.

Based on the information provided and that available in our office, the APN 4455-028-044 appears to be bisected by the coastal zone boundary in the manner indicated on Exhibit 2. Any development activity proposed within the coastal zone would require coastal development permit authorization from the Coastal Commission.

Please contact me at (415) 904-5335 if you have any questions regarding this determination.

Sincerely,

A handwritten signature in black ink, appearing to read "Darryl Rance".

Darryl Rance
Mapping/GIS Unit

Enclosures

cc: Jack Ainsworth, CCC-SCC

Exhibit 3
4-06-163
CZ Boundary
Determination

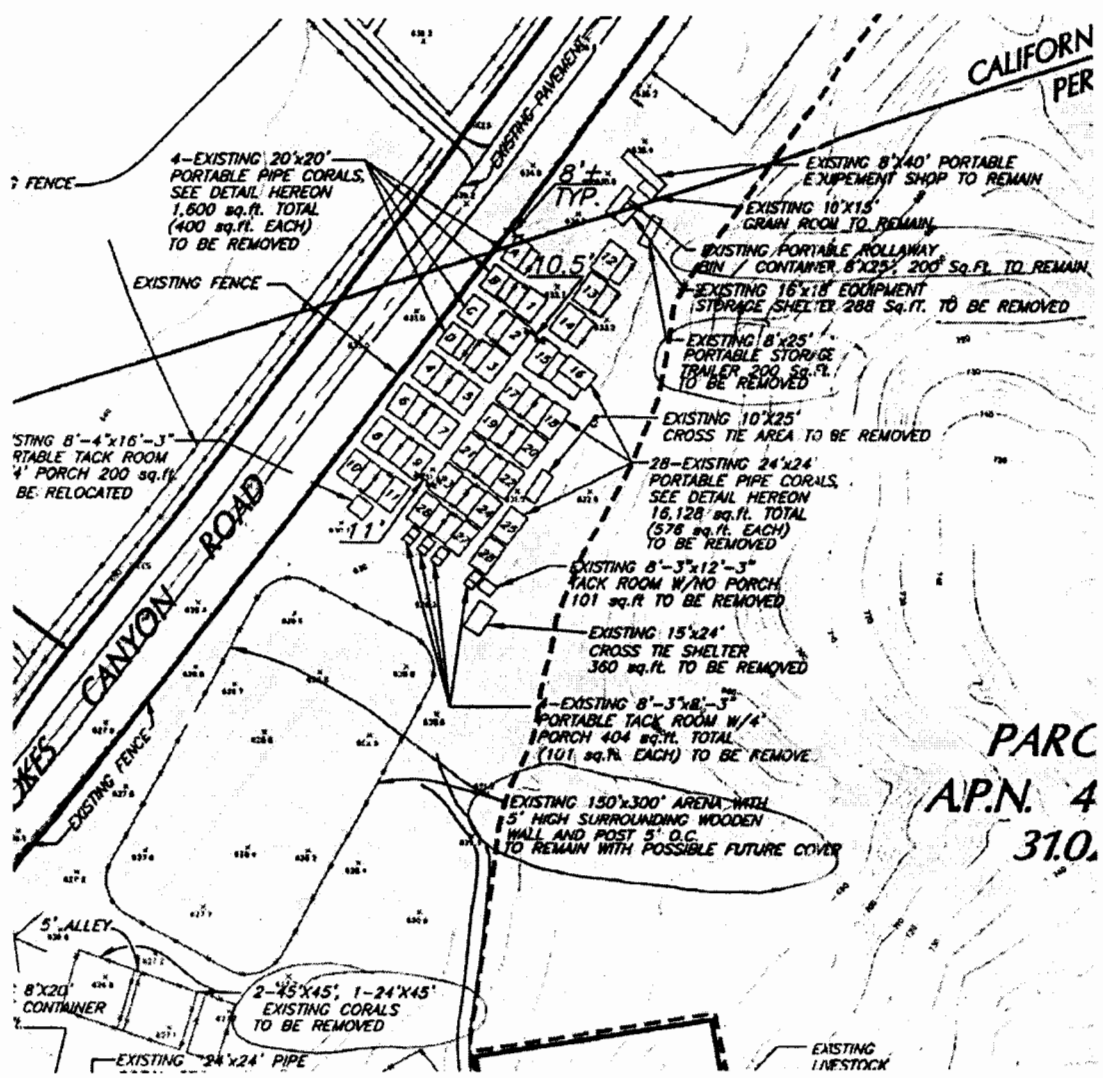


Exhibit 5
 4-06-163
 Site Detail-North
 (Existing)

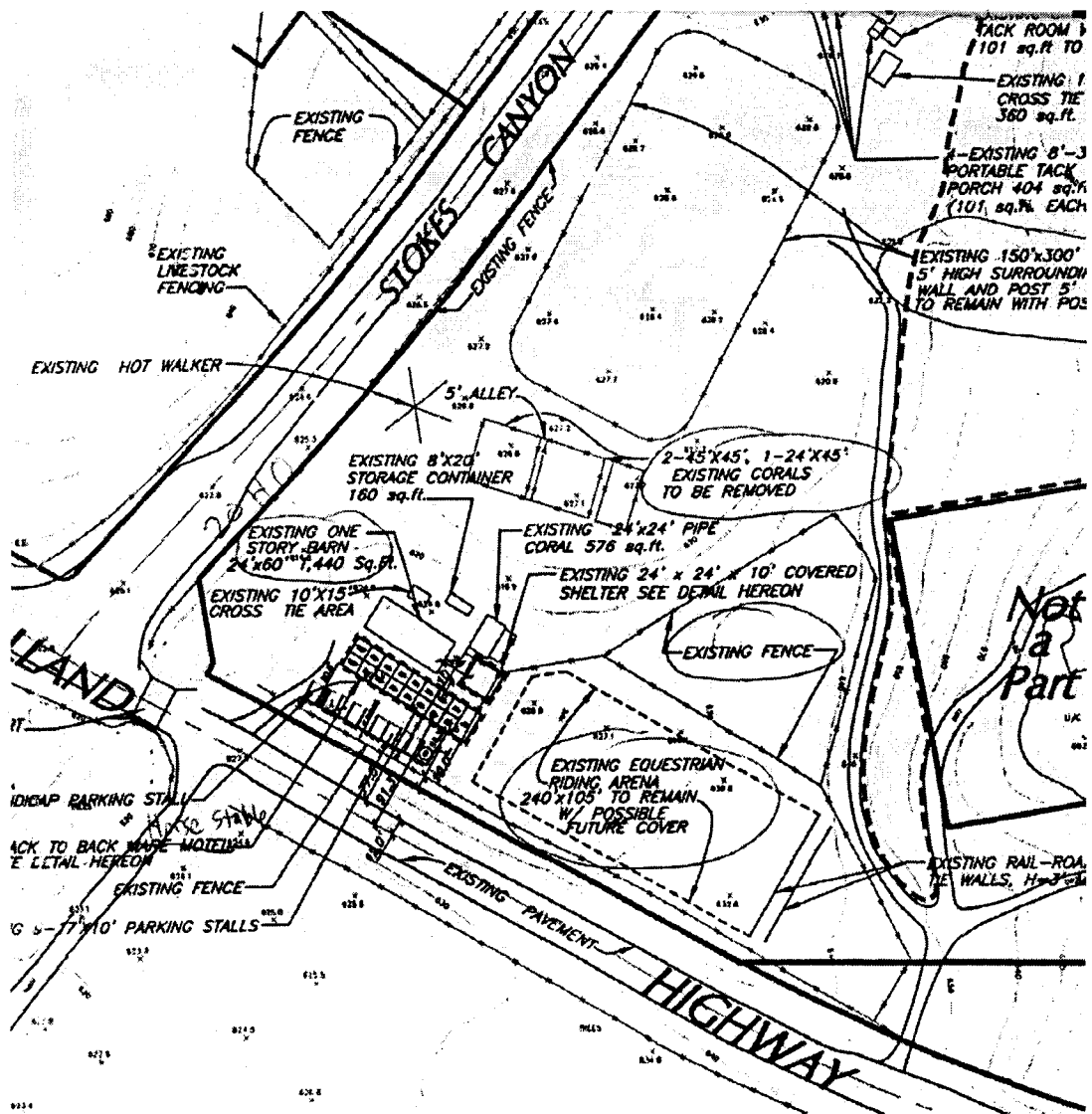
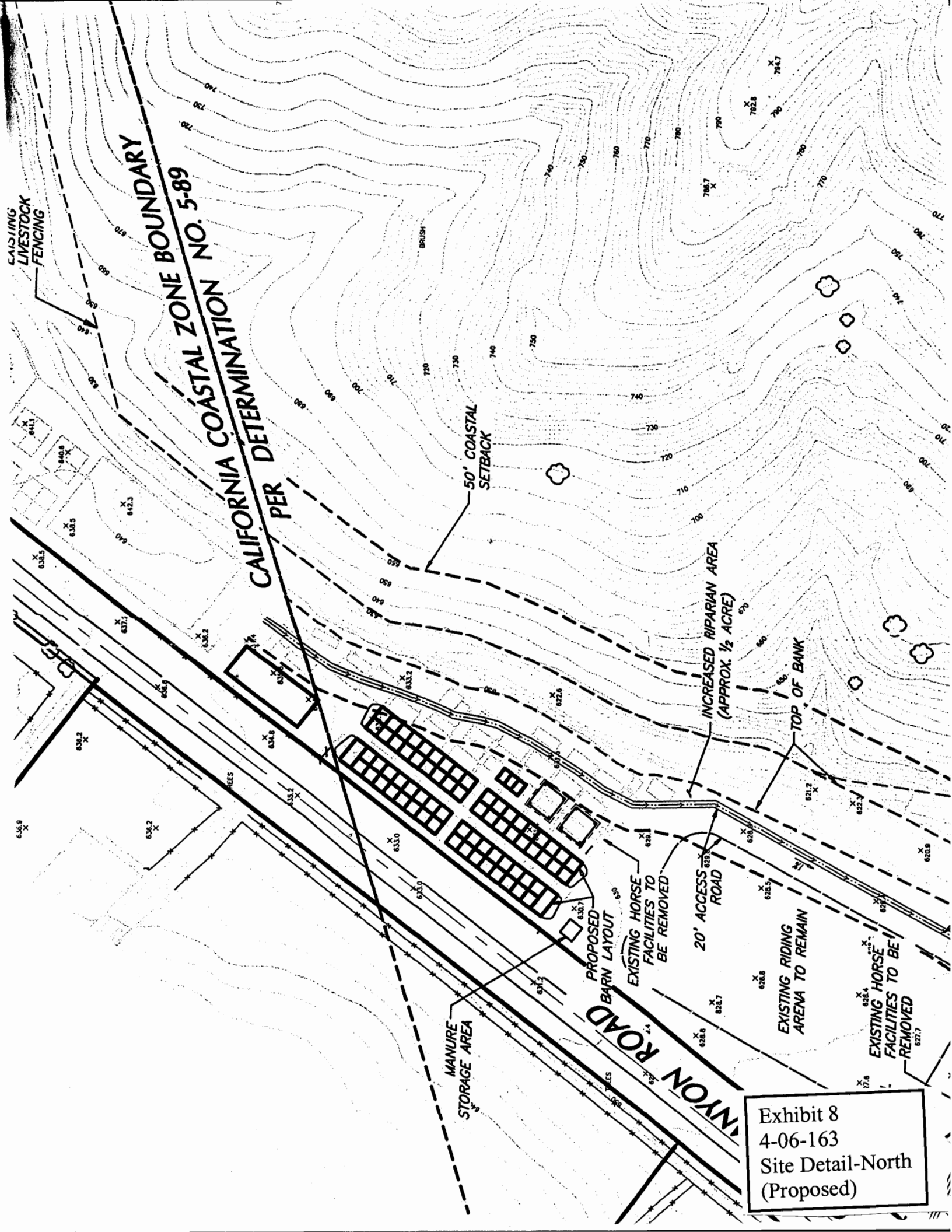


Exhibit 6
 4-06-163
 Site Detail-South
 (Existing)



CAISING LIVESTOCK FENCING

CALIFORNIA COASTAL ZONE BOUNDARY NO. 5-89 PER DETERMINATION

50' COASTAL SETBACK

INCREASED RIPARIAN AREA (APPROX. 1/2 ACRE)

TOP OF BANK

MANURE STORAGE AREA

PROPOSED BARN LAYOUT

EXISTING HORSE FACILITIES TO BE REMOVED

20' ACCESS ROAD

EXISTING RIDING ARENA TO REMAIN

EXISTING HORSE FACILITIES TO BE REMOVED

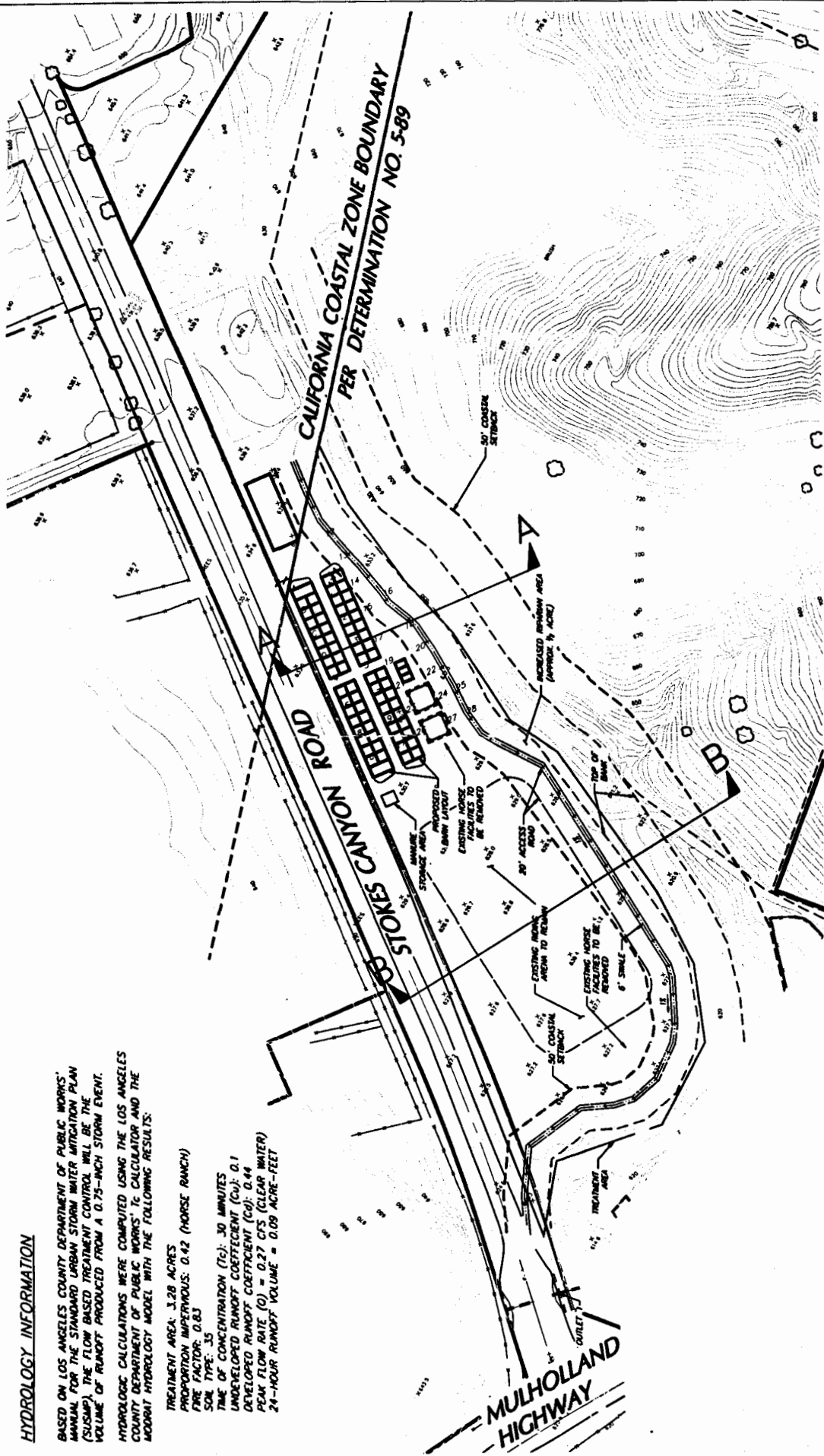
NYON ROAD

Exhibit 8
4-06-163
Site Detail-North
(Proposed)

HYDROLOGY INFORMATION

BASED ON LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS' MANUAL FOR THE STANDARD URBAN STORM WATER MITIGATION PLAN (SUSMP), THE FLOW BASED TREATMENT CONTROL WILL BE THE VOLUME OF RUNOFF PRODUCED FROM A 0.75-INCH STORM EVENT. HYDROLOGIC CALCULATIONS WERE COMPUTED USING THE LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS' TC CALCULATOR AND THE MODRAT HYDROLOGY MODEL WITH THE FOLLOWING RESULTS:

- TREATMENT AREA: 3.28 ACRES
- PROPORTION IMPERVIOUS: 0.42 (HORSE RANCH)
- FIRE FACTOR: 0.83
- SOIL TYPE: S5
- TIME OF CONCENTRATION (TC): 30 MINUTES
- UNDEVELOPED RUNOFF COEFFICIENT (Cu): 0.1
- DEVELOPED RUNOFF COEFFICIENT (Cd): 0.44
- PEAK FLOW RATE (Q) = 0.27 CFS (CLEAR WATER)
- 24-HOUR RUNOFF VOLUME = 0.09 ACRE-FEET



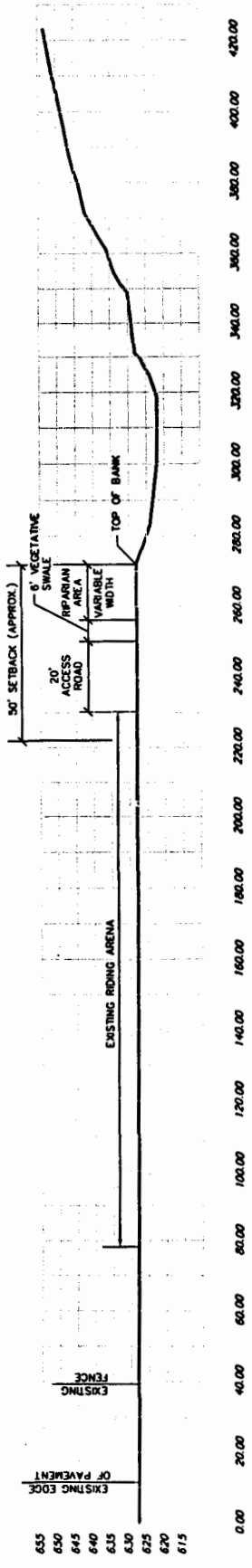
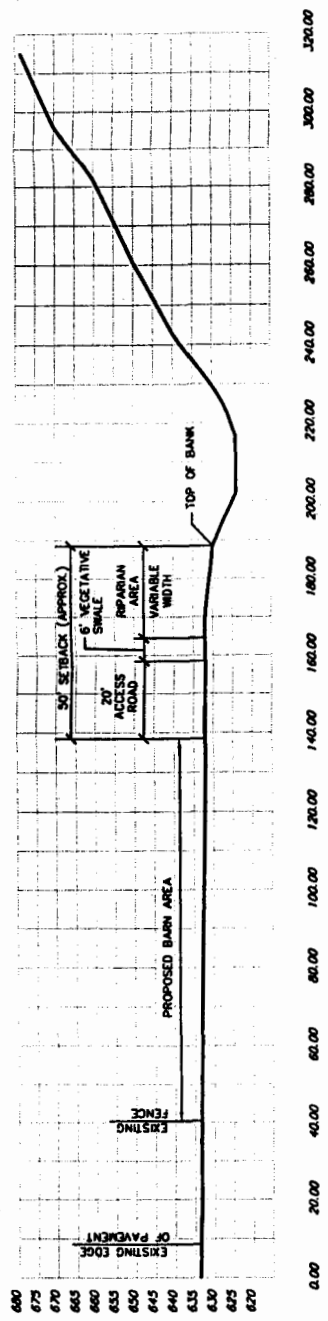
MALIBU VALLEY FARMS
COMPREHENSIVE
MANAGEMENT PLAN
PROJECT No: 034

EXHIBIT A
NORTH SIDE
DRAINAGE SITE
PLAN

DIAMOND WEST
engineering a better tomorrow
Diamond West Engineering, Inc.
28000 Agoura Road, Suite 100
Calabasas, California 91301
Tel: 818-252-3683 Fax: 818-252-3684
E-mail: diamondwest@earthlink.net

SCALE: 1"=100'

Exhibit 9
4-06-163
Drainage Detail-
North (Proposed)



SCALE:
HORIZONTAL: 1"=50'
VERTICAL: 1"=5'

MALIBU VALLEY FARMS
COMPREHENSIVE
MANAGEMENT PLAN
PROJECT No: 034

EXHIBIT B
NORTH SIDE
CROSS-SECTIONS

DIAMOND WEST
engineering a better tomorrow
Diamond West Engineering Inc.
2800 Agoura Road, Suite 100
Calabasas, California 91301
909.892-3687 / 909.892-3616
E-mail: dwest@diamondwest.com

Exhibit 10
4-06-163
Drainage Cross-section- North

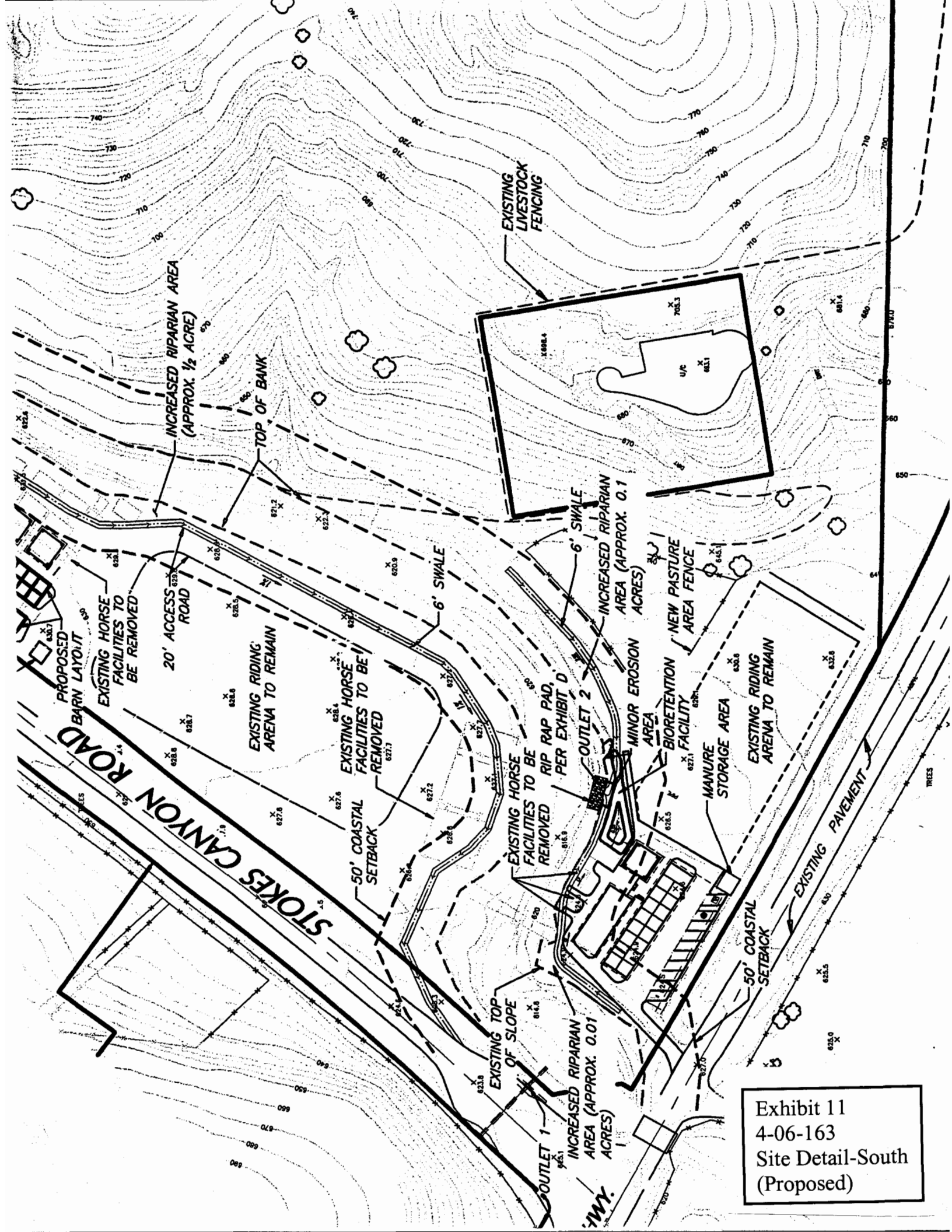


Exhibit 11
 4-06-163
 Site Detail-South
 (Proposed)

HYDROLOGY INFORMATION

BASED ON LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS' MANUAL FOR THE STANDARD URBAN STORM WATER MITIGATION PLAN (SUSMP), THE FLOW BASED TREATMENT CONTROL WILL BE THE VOLUME OF RUNOFF PRODUCED FROM A 0.75-INCH STORM EVENT.

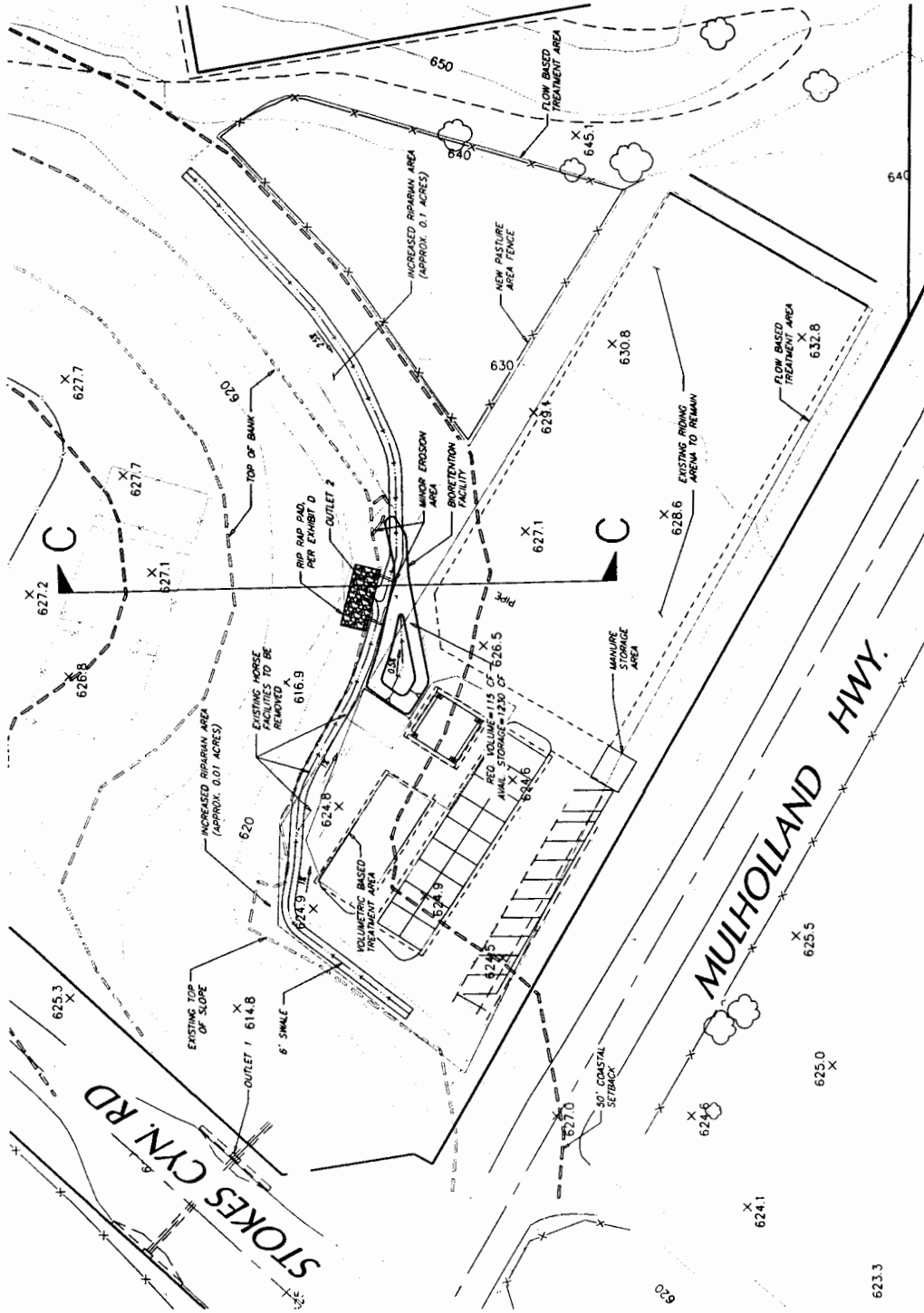
HYDROLOGIC CALCULATIONS WERE COMPUTED FOR THE TOTAL DRAINAGE AREA USING THE LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS' TC CALCULATOR AND THE MODRAT HYDROLOGY MODEL WITH THE FOLLOWING RESULTS:

DRAINAGE AREA: 11.49 ACRES
 PROPORTION IMPERVIOUS: 0.0613
 FIRE FACTOR: 0.83
 SOIL TYPE: 35
 TIME OF CONCENTRATION (Tc): 30 MINUTES
 UNDEVELOPED RUNOFF COEFFICIENT (Cu): 0.1
 DEVELOPED RUNOFF COEFFICIENT (Cd): 0.44
 PEAK FLOW RATE (Q) = 0.41 CFS (CLEAR WATER)
 24-HOUR RUNOFF VOLUME = 0.13 ACRE-FEET

TWO SEPARATE DRAINAGE AREAS WERE CONSIDERED FOR TREATMENT PURPOSES AND WILL UTILIZE A BIOTRETION FACILITY AND VEGETATIVE SWALES. THE FOLLOWING HYDROLOGY RESULTS ARE FOR THE TREATED SUB-DRAINAGE AREA:

RANCH AREA
 TOTAL TREATMENT AREA: 1 ACRE
 PROPORTION IMPERVIOUS: 0.42
 FIRE FACTOR: 0.83
 SOIL TYPE: 35
 TIME OF CONCENTRATION (Tc): 30 MINUTES
 UNDEVELOPED RUNOFF COEFFICIENT (Cu): 0.1
 DEVELOPED RUNOFF COEFFICIENT (Cd): 0.44
 PEAK FLOW RATE (Q) = 0.073 CFS (CLEAR WATER)
 24-HOUR RUNOFF VOLUME = 0.027 ACRE-FEET
 BIOTRETION VOLUME = 0.0026 ACRE-FEET

PASTURE AREA
 TOTAL TREATMENT AREA: 0.33 ACRE
 PROPORTION IMPERVIOUS: 0.01
 FIRE FACTOR: 0.83
 SOIL TYPE: 35
 TIME OF CONCENTRATION (Tc): 30 MINUTES
 UNDEVELOPED RUNOFF COEFFICIENT (Cu): 0.1
 DEVELOPED RUNOFF COEFFICIENT (Cd): 0.44
 PEAK FLOW RATE (Q) = 0.01 CFS (CLEAR WATER)
 24-HOUR RUNOFF VOLUME = 0.002 ACRE-FEET



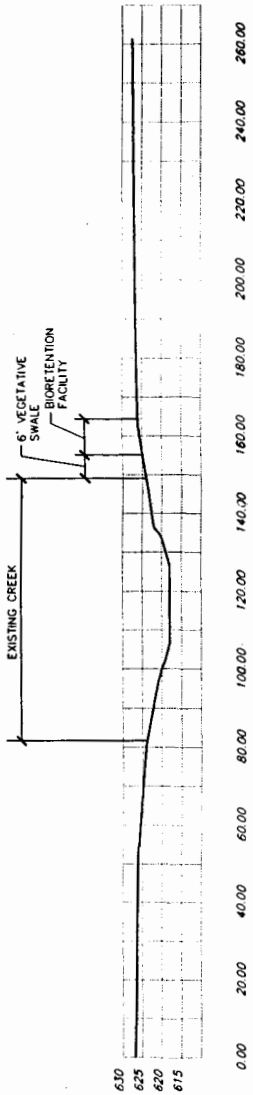
MALIBU VALLEY FARMS
 COMPREHENSIVE
 MANAGEMENT PLAN
 PROJECT NO: 034

EXHIBIT C
 SOUTH SIDE
 DRAINAGE SITE
 PLAN

DIAMOND WEST
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 E-mail: dew@diamonwest.net

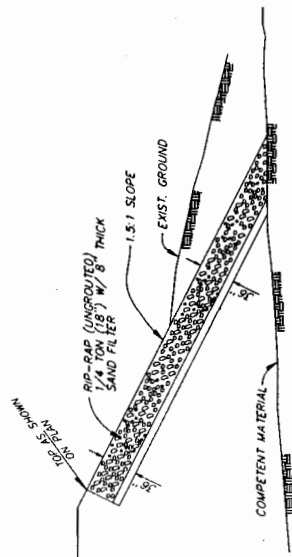
SCALE: 1"=50'

Exhibit 12
 4-06-163
 Drainage Detail-
 South (Proposed)



SECTION C-C

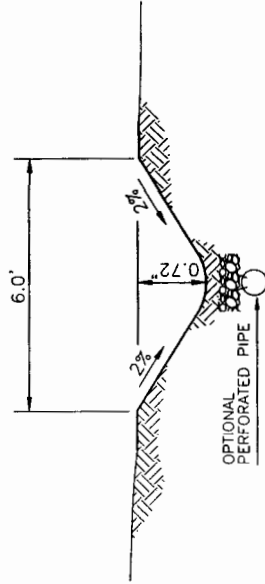
SCALE:
HORIZONTAL: 1"=30'
VERTICAL: 1"=3'



NOTES:

- BEDROCK TO BE VERIFIED BY GEOTECHNICAL ENGINEER OR ENGINEERING GEOLOGIST INSPECTION REPORT TO BE PROVIDED TO THE BUILDING OFFICIAL.

ROCK RIP RAP PAD DETAIL
(NOT TO SCALE)



LONGITUDINAL SLOPE AT 1% MIN.

VEGETATIVE SWALE DETAIL
(NOT TO SCALE)

DIAMOND WEST
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 Diamond West Engineering Inc.
 28000 Agoura Road, Suite 100
 Calabasas, California 91301
 Tel: 818/225-3433 Fax: 818/225-8213
 E-mail: dce@diamondwest.net

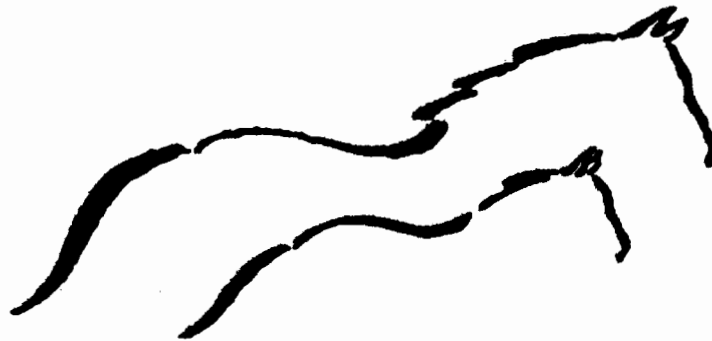
MALIBU VALLEY FARMS
COMPREHENSIVE
MANAGEMENT PLAN
 PROJECT No: 034

EXHIBIT D
SOUTH SIDE
CROSS-SECTION
AND DETAILS

Exhibit 13
4-06-163
Drainage Cross-
section- South

Malibu Valley Farms Comprehensive Management Plan

A Site Specific Animal Management and Emergency Preparedness Manual



MALIBU VALLEY FARMS

December 2006

RECEIVED
JAN 26 2007

**C
SOUTH**

**Exhibit 15
4-06-163
Site Management Plan**

Introduction

The Malibu Valley Farms Comprehensive Management Plan is being included as part of the Farm's Coastal Development Permit application. Per the Coastal Commission's request, this Plan has been prepared to provide the operators of Malibu Valley Farms design and on-going management guidance that will ensure a safe and environmentally sensitive farm operation.

Malibu Valley Farms is an existing equestrian-based farm located at the intersection of Stokes Canyon Road and Mulholland Highway in Calabasas, California. The Farm has an award winning operation based on its manure and site management. This document incorporates the existing award winning management practices with additional construction and operational based Best Management Practices (BMP's).

Several horse farm management and Best Management Practice documents were researched and concepts from these documents were incorporated into the Malibu Valley Farms Comprehensive Management Plan. These documents include:

- *Equestrian-Related Water Quality Best Management Practices, A Cooperative Effort among Private and Public Entities in Orange and San Diego Counties, California in response to NPDES permits issued by the Santa Ana and San Diego Regional Water Quality Boards, June 2004.*
- *Developing Planning for Storm Water Management, 2002.* Los Angeles County Public Works.
- *Horse Keeping: A Guide to Land Management for Clean Water, 2001.* The Council of Bay Area Resource Conservation Districts.
- *Stable and Horse Management in the Santa Monica Mountains, A Manual on Best Management Practices for the Reduction of Non-point Source Pollution, 1999.* Resource Conservation District of the Santa Monica Mountains.
- *Disaster Preparedness for Horse Owners. State of California, Department of Food and Agriculture, Animal Health and Food Safety Services, Animal Health Branch, Animal Care Program.*

In addition, several site specific biological analyses were performed on the Farm and this data assisted in preparation of the Management Plan. These include:

- *Biological Assessment in Support of Malibu Valley Farms, Inc. Coastal Development Permit Application (No. 4-02-131), 2005. Sapphos Environmental, Inc.*
- *Biological Resource Analysis of Proposed ESHA Setback for Malibu Valley Farms Equestrian Center Improvements, 2004. Frank Hovore and Associates (FH & A).*
- *Evaluation of Surface Water and Groundwater Quality Impacts Resulting from Proposed Equestrian Facility at 2200 Stokes Canyon Road, Calabasas, California, 2002. Jones and Stokes.*

The Plan is divided into four sections; Erosion Control, Water Quality/Run-off Mitigation, General Housekeeping Management, and Emergency Preparedness Plan / Fire Safety. An Emergency Preparedness / Fire Safety Section is included because it is essential to recognize both environmental and safety issues when considering Best Management Practices and Design, particularly with fire hazard concerns in the Santa Monica Mountains.

Erosion Control

Pasture Management

Pastures shall be rotated to allow them to rest from grazing to give time for grasses to grow and mature so they will reseed. Feed, salt, minerals, and water shall be located away from the creek and salt blocks shall be moved regularly to distribute grazing. Hay piles should be placed far apart with more piles than the number of horses being fed. This will minimize trampling from fighting horses and maximize distribution.

Vegetative Swale / Basin

The incorporation of a vegetative bio-swale and basin is a critical component of the management plan and has both erosion control and water quality benefits. From an erosion control standpoint, the swales will capture all run-off water from the site and distribute the run-off slowly into specific outlets that are designed with Velocity Reducers that can handle run-off without causing erosion. In addition, the swale and basin will block potential sediment from entering the creek (see further discussion under Water Quality).

Velocity Reducers

Velocity Reducers or Energy Dissipaters are placed at channel outlets to reduce the velocity and energy of concentrated storm flows, prevent scour, and minimize downstream erosion. Runoff from the Farm is designed to outlet into the Creek at two locations after adequate bio-filtration has occurred. Outlet 1 is an existing storm drain inlet/outlet located off Stokes Canyon Road with existing rip rap that acts as a velocity reducer. Outlet 2 is located on the south side of the Creek and is designed to outlet into a rip rap slope to control erosion (*See Exhibit 1, Revised Site Plan*).

Stream Bank Stabilization

Minor slope erosion has occurred along the south side of the Creek (*See Exhibit 1, Revised Site Plan*). This erosion will be repaired and stabilized with a combination of rip rap and erosion control blankets (or other suitable methods). Bare and repaired slopes will be planted with native riparian vegetation.

Dust Control

Concrete washed sand or its equivalent should be used for arena bottoms and non-vegetated areas. This coarser washed sand has a larger grain size with better drainage and dust control characteristics. In addition, arenas and other

non-vegetated areas shall be watered down at least one time per day during dry periods.

Water Quality / Runoff Mitigation Plan

An engineered Storm Water Runoff Plan has been prepared by Diamond West Engineering, Inc. and is located in Appendix C. This engineered runoff plan was developed in compliance with the National Pollutant Discharge Elimination System (NPDES) Permit as defined in the Federal Water Pollution Control Act (also known as the Clean Water Act). The plan's two main components are the addition of a vegetative swale and basin and increasing and restoring the riparian buffer between the creek and the Farm.

Vegetative Swale / Basin

The vegetative swales are designed to travel parallel to the creek and capture all run-off from the Farm. As water travels through the vegetative swale, flow velocity is reduced, allowing suspended solids to settle and other pollutants to infiltrate the soil or be absorbed into the vegetation; providing nutrients to the vegetation while protecting the Creek. The vegetative swales are limited to an average 1% slope in order to achieve long detention times for maximum contact between the runoff water and the vegetation or soil.

Increased and Restored Riparian Buffer

The proposed improvements to the Farm include restoring and increasing the riparian buffer between the Creek and the Farm facilities (*See Exhibit 1, Revised Site Plan*). Bare and non-vegetated areas within the Riparian Canopy will be restored. In addition, approximately ½ acre of additional riparian canopy will be planted. The increased buffer has the following benefits:

- Dense grasses to trap sediment, promote infiltration, and slow runoff flows;
- Grasses, shrubs, and trees to utilize excess nutrients;
- Trees and shrubs help stabilize stream banks and create a shade canopy to cool water for aquatic life, reduce floodwater velocity and erosive power, and trap debris during floods. A diverse mix of grasses, shrubs, and trees that provide wildlife habitat for a wide range of mammals, reptiles, amphibians, birds, and invertebrates species. Connected stretches of buffers become wildlife corridors; and
- A visual screen that also acts as a windbreak and helps capture dust.

In addition to the recommendations in the Storm Water Runoff Plan, Malibu Valley Farms is proposing the following storm water mitigation measures:

Gutters/Downspouts/Pipes

Managing runoff from roof tops is a key factor to keeping water clean. All remaining and proposed roofed structures within Malibu Valley Farms are designed with Gutters and Downspouts that direct clean water from roof tops into pipes that outlet into the creek. This will ensure that water from roof top does not mix with bare or manured areas before entering the creek.

Minimize Access to Creek and Riparian Areas

Access to the Creek will be limited to the two existing creek crossings. The remaining riparian areas will be surrounded by wildlife fencing (such as four-rail fencing) with appropriate educational signage to reduce the potential for horse or human generated degradation.

Parking Lots

All remaining and future parking lots will have impervious gravel bottom to decrease the potential of polluted runoff.

General Housekeeping Management

Manure Management

Malibu Valley Farms proposes to continue its current manure management program, including:

- All stalls, corrals, barns, wash areas, etc. shall be cleaned and manure removed three times per day.
- Manure is to be placed in two separate large trash bins (used exclusively for manure waste); one for the north side and one for the south side of the farm.
- Manure trash bins will be located on an impervious surface and will have tarps placed over them during rains.
- Trash bins will be collected at least once a week and will be taken to a mushroom farm for recycled use. If the mushroom farms are unable to accept the manure, the manure will be taken to the local landfill.

Wash Racks

The following guidelines pertain to the use of Wash Racks:

- Use a shut-off nozzle or low-flow nozzle at the end of the hose.
- Use horse grooming and health products properly. Follow instructions and use recommended amounts, and clean up spills.
- Use plain water to rinse horses - avoid using soap as much as possible.

Utilize Integrated Pest Management

The Farm Manager should utilize Integrated Pest Management (IPM) techniques. Integrated Pest Management is an ecologically based pest control strategy that focuses on long-term prevention and control of pests and their damage. A combination of techniques are used such as inspecting and identifying the pest, learning the pest and host life cycles and biology, removing or reducing the pest habitat when possible, using natural enemies, using resistant plant varieties, using mechanical control for weed removal, monitoring frequently, establishing a threshold for damage, choosing the control tactic and then evaluating the results.

Stabilize bare slopes; use native vegetation whenever possible to reduce the use of fertilizers.

Use IPM techniques to reduce the amount of chemicals, pesticides, fertilizers and herbicides placed on landscaping that may be washed away.

Refer to the University of California Davis website for further details:
www.ipm.ucdavis.edu

Dust Control

Water down arenas and other dirt areas at least once a day during dry periods.

Winterize Checklist

- The Farm Manager shall follow the "Winterization Checklist" (
- See *Appendix A*) as shown in: *Horse Keeping: A Guide to Land Management for Clean Water*, 2001. The Council of Bay Area Resource Conservation Districts.

Emergency Preparedness Plan / Fire Safety

The following Emergency Preparedness Plan guidelines shall be followed (*For Additional Guidelines See Appendix B, Disaster Preparedness for Horse Owners prepared by the State of California, Department of Food and Agriculture, Animal Health and Food Safety*):

Design

- Defensible space around structures and facilities. The Farm is designed with an access road around the perimeter of most facilities and structures. This driveway will act as ingress and egress during an emergency. The driveway will also create a buffer between structures and heavy vegetation for fire safety purposes.
- Ingress and Egress. The Farm has access to both Mulholland Highway and Stokes Canyon Road. However, the site is bisected by Stokes Creek. It is important to maintain the two existing creek crossings in case one access is blocked. All interior dirt roads shall be properly maintained and kept clear of obstructions throughout the year to ensure adequate ingress and egress.
- Barns and Roof Structures. All roofed structures should be made of non-flammable materials.
- Post the address clearly at the outside of the property.
- Outlet boxes and switch boxes should have metal coverings and kept free of dust and water. All outside wiring should be encased in metal conduit pipe. Light fixtures should be moisture resistant.
- Place fire extinguishers at each barn and hay storage area.

Before an Emergency

- The Farm should have a minimum of three days feed and water on hand.
- Evacuation. The Farm Manager should keep the addresses and phone number of local horse evacuation areas on-site at all times. This list should be updated annually.
- Vehicles. Keep trailers and vans well-maintained, full of gas, and ready to move at all times.

- Provide ladders, shovels, a rake and at least one 100-foot hose around each barn area.

During an Emergency

- Listen to the Emergency Alert System (EAS) on the television or radio. Evacuate your horses early, if possible, to ensure their safety.
- Take all vaccinations and medical records and enough hay and water for three days.
- Call the destination to make sure the site is still available. Use roads not in use for human evacuation when you transport your horses to the sheltering site.
- If animals must be left, leave them in a pre-selected area appropriate for disaster type. Leave enough hay for 48 to 72 hours.
- Do not rely on automatic watering systems. Power may be lost.

Appendix A

Winterization Checklist (From - Horse Keeping: A Guide to Land Management for Clean Water)

Preparing for the rainy season while the weather is still nice can save a lot of time in the long run. Take time to inspect your facility before the rains start. Write and post a "winterization" checklist in your barn to help set priorities, organize work, and take action. It is important to check many of these areas throughout the winter, particularly during and after major storms.

Buildings

- Inspect, repair, and remove debris from **gutters** and **downspouts**. Make sure **gutters, downspouts** and pipelines are connected.
- Clear debris from **diversions, pipe inlets, grates, culverts, and trash racks**.
- Make sure **energy dissipaters** (such as rock) are placed at outlets.

High-Use Areas

- Replenish footing in high-use areas.
- Make sure kickboards are in place to help keep footing material in place.
- Clear debris from **diversions** and other drainage structures.

Manure Management

- Scrupulously clean out **paddocks**.
- Remove all horse waste from **manure storage areas** by the fall.
- Cover **manure storage areas** and provide runoff controls. Make sure "clean" water is diverted from manured areas.
- Apply manure to pastures in early fall, and in spring when grasses are actively growing. Do not spread manure near creeks.

Pasture Management and Filter Strips

- Re-seed pastures and grass **filter strips** by October 15, if needed. Remove weeds regularly.
- Mow, maintain and/or reseed grass **filter strips** downslope of high-use areas.
- In the fall, check **Residual Dry Matter** (RDM) levels in pastures. (See Section 5.8 of the Resources Directory.)

Roads and Trails

- Clean out **ditches, culvert inlets, and trash racks**.
- Make sure **waterbars** and **energy dissipaters** are in place and functional.
- Check roads and trails after storms for any emergency repairs.
- Close roads and trails not essential for winter traffic. **Seed** and **mulch** seldom used roads or trails by October 15.

Appendix B

Disaster Preparedness for Horse Owners



Before

- ◆ **Plan Ahead.** Determine the best place for animal confinement in case of a disaster. Find alternate water sources in case power is lost and pumps are not working or have a hand pump installed. You should have a minimum of three days feed and water on hand.
- ◆ **Evacuation.** Decide where to take your horses if evacuation is necessary. Contact fairgrounds, equestrian center, and private farms/stables about their policies and ability to take horses temporarily in an emergency. Have several sites in mind. Familiarize yourself with several evacuation routes to your destination.
- ◆ **Identification.** Photograph, identify, and inventory your horses. Permanent identification such as tattoos, brands, etched hooves or microchips are best. Temporary identification, such as tags on halters, neck brands, and duct tape with permanent writing will also work. Include your name and phone number. Keep identification information with you to verify ownership. (Breed registration papers may already have this information.)
- ◆ **Medical records and vaccinations.** Your horses need to have current vaccinations. Keep medical histories and record special dosing instructions, allergies, and dietary requirements. Write down contact information for your veterinarian.
- ◆ **Vehicles.** Keep trailers and vans well-maintained, full of gas, and ready to move at all times. Be sure your animals will load. If you don't have your own vehicles, make arrangements with local companies or neighbors before disaster strikes.

During

- ◆ Listen to the Emergency Alert System (EAS) on the television or radio.
- ◆ Evacuate your horses early, if possible, to ensure their safety and ease your stress
- ◆ Take all vaccinations and medical records, the Emergency disaster kit, and enough hay and water for three days.
- ◆ Call your destination to make sure the site is still available.
- ◆ Use roads not in use for human evacuation when you transport your horses to the sheltering site.
- ◆ If you must leave your animals, leave them in a preselected area appropriate for disaster type. Leave enough hay for 48 to 72 hours. Do not rely on automatic watering systems. Power may be lost.

Disaster Preparedness for Horse Owners con't



After

- ◆ Check fences to be sure they are intact. Check pastures and fences for sharp objects that could injure horses. Be aware of downed power lines, fallen trees, and debris. Familiar scents and landmarks may have changes, and animals can easily become confused and lost.
- ◆ If you find someone else's animal, isolate it from your animals until it is returned to its owner or can be examined by a veterinarian. Always use caution when approaching and handling strange or frightened horses.
- ◆ If you've lost an animal, contact your veterinarians, humane societies, stables, surrounding farms, and other facilities. Listen to the EAS for groups that may be accepting lost animals.
- ◆ Check with your veterinarian for information about possible disease outbreaks.

Disaster Preparedness Kit

- Your veterinarian's information
- Portable radio and extra batteries
- Plastic trash barrel with a lid
- Water buckets
- Feed for 3 days (minimum)
- Non-nylon leads, halters, and shanks
- Leg wraps
- Horse blanket or sheet
- First Aid items
- Tarps
- Portable generators
- Flashlights
- Shovel
- Lime or bleach
- Fly spray
- Wire cutters
- Sharp knife
- Hoof pick
- A current photograph of horse(s)

This emergency information was developed by the State of California, Department of Food and Agriculture, Animal Health & Food Safety Services, Animal Health Branch, Animal Care program, 1220 N St., Sacramento, CA 95814 and distributed by the California Veterinary Medical Association, 5231 Madison Ave., Sacramento, CA 95841.

Appendix C

County of Los Angeles

Malibu Valley Farms Comprehensive Management Plan Stormwater Runoff Appendix

December 2006

MALIBU VALLEY FARMS

Stormwater Runoff Appendix

Prepared for:

*Malibu Valley Farms
2200 Stokes Canyon Road
Calabasas, CA 91302*



12/11/06

Prepared by:

Diamond West Engineering, Inc.
26800 Agoura Road, Suite 100
Calabasas, CA 91301
Telephone (818) 444-1800 • Telecopier (818) 223-9215

Executive Summary

In accordance with the Los Angeles County Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), this Comprehensive Management Plan (CMP) defines the Best Management Practices (BMPs) that will be implemented to help mitigate the potential for stormwater runoff pollution into receiving water bodies. The project is named Malibu Valley Farms and is situated at the northeast corner of Mulholland Highway and Stokes Canyon Road.

Legal Framework

The permanent BMPs defined herein will be developed to comply with the National Pollutant Discharge Elimination System (NPDES) Permit as defined in the Federal Water Pollution Control Act (also known as the Clean Water Act).

According to the SUSMP, outdoor animal care facilities shall address the applicable sections of the SUSMP when completing the project design. This project is associated with the following SUSMP development category.

"Location within or directly adjacent to or discharging directly to an environmentally sensitive area if the discharge is likely to impact a sensitive biological species or habitat and the development creates 2500 square feet or more of impervious surface."

Stormwater Quality Control Measures

Source control measures are recommended for implementation during specific project design, construction, and operations phases. These measures should include conserving natural areas, minimizing storm water pollutant of concern, protecting slopes and channels, providing storm drain stenciling and signage, property design and construct outdoor material and refuse storage areas, and properly design and construct parking lots.

In addition to source control measures, treatment control Best Management Practices (BMPs) will need to be provided to remove the potential pollutants of concerns from the runoff before leaving the site. Treatment control BMPs will require ongoing maintenance. BMPs can be provided in a variety of ways that can vary from catch basin filters, to proprietary treatment devices placed in the main storm drain infrastructure, to grass swale filters, to extended impoundment facilities that allow sedimentation of pollutants to occur.

Structural control measures are also recommended and have already been implemented as the project developed. These structural facilities are designed and constructed to mitigate any adverse impacts of stormwater pollution (i.e. canopy, structural enclosure, or diversion devices to prevent commingling of treated and

untreated stormwater runoff). This category may include both treatment control BMPs and source control BMPs.

BMP Selection & Design Criteria

With the rural project surroundings, vegetative swales have been selected as the primary permanent treatment BMPs. This treatment device is the most conducive to the adjoining environmental settings. A portion of the south-side treatment area requires a volume-based treatment device because of its proximity to the creek. A retention basin will be used in this case.

The vegetative swale is a flow-based treatment device. According to the SUSMP, the BMP treatment design storm is based on a 0.75-inch, 24-hour storm event. The hydraulic residence time is required to be at least 5 minutes in order to treat the "first flush" stormwater runoff event for flow-based devices. Retaining the design storm event would be satisfactory for volume-based treatment devices.

The north-side swale has a treatment area of about 3.3 acres within the Coastal Zone. The treatment rate for the design storm event is 0.28 cfs for the swale parameters defined herein. Therefore, the vegetative swale length shall be at least 261 feet to satisfy the SUSMP requirements. This swale surface discharges into the Stokes Canyon Road right-of-way.

Likewise, the south-side (west) swale has a flow-based treatment area of just under 1.0 acre within the Coastal Zone. The treatment rate for the design storm event is 0.07 cfs for the swale parameters defined herein. Therefore, the vegetative swale length shall be at least 186 feet to satisfy the SUSMP requirements. This swale surface discharges into Stokes Creek. The south-side volume-based treatment area is only about 0.1 acres. This would require an impoundment volume of at least 115 cubic feet. Finally, the south-side (east) swale has a flow-based treatment area of about 0.3 acres within the Coastal Zone. The treatment rate for the design storm event is 0.01 cfs for the swale parameters defined herein. Therefore, the vegetative swale length shall be at least 165 feet to satisfy the SUSMP requirements. This swale also surface discharges into Stokes Canyon Creek.

Summary

The north-side swale is more than 1,000 feet long. The south-side (east & west) swales are both more than 200 feet long respectively. In addition, the south-side retention volume is more than 115 cubic feet. Therefore, the permanent vegetative swales and the retention area as defined herein meet or exceed the requirements of the SUSMP for treating stormwater runoff as required by the Clean Water Act.

Not only does this plan define treatment control devices, the overall operation of the project has already implemented source control BMPs and structural control BMPs. These control measures are defined in more detail in the body of this CMP.

This CMP is in accordance with the requirements for stormwater runoff as defined by the State Regional Water Quality Control Board which issues the area wide NPDES Permit.

Malibu Valley Farms

Increased Riparian Buffer Plant List (2-23-07)

The "Increased Riparian Buffer" will utilize native riparian plants from the following list:

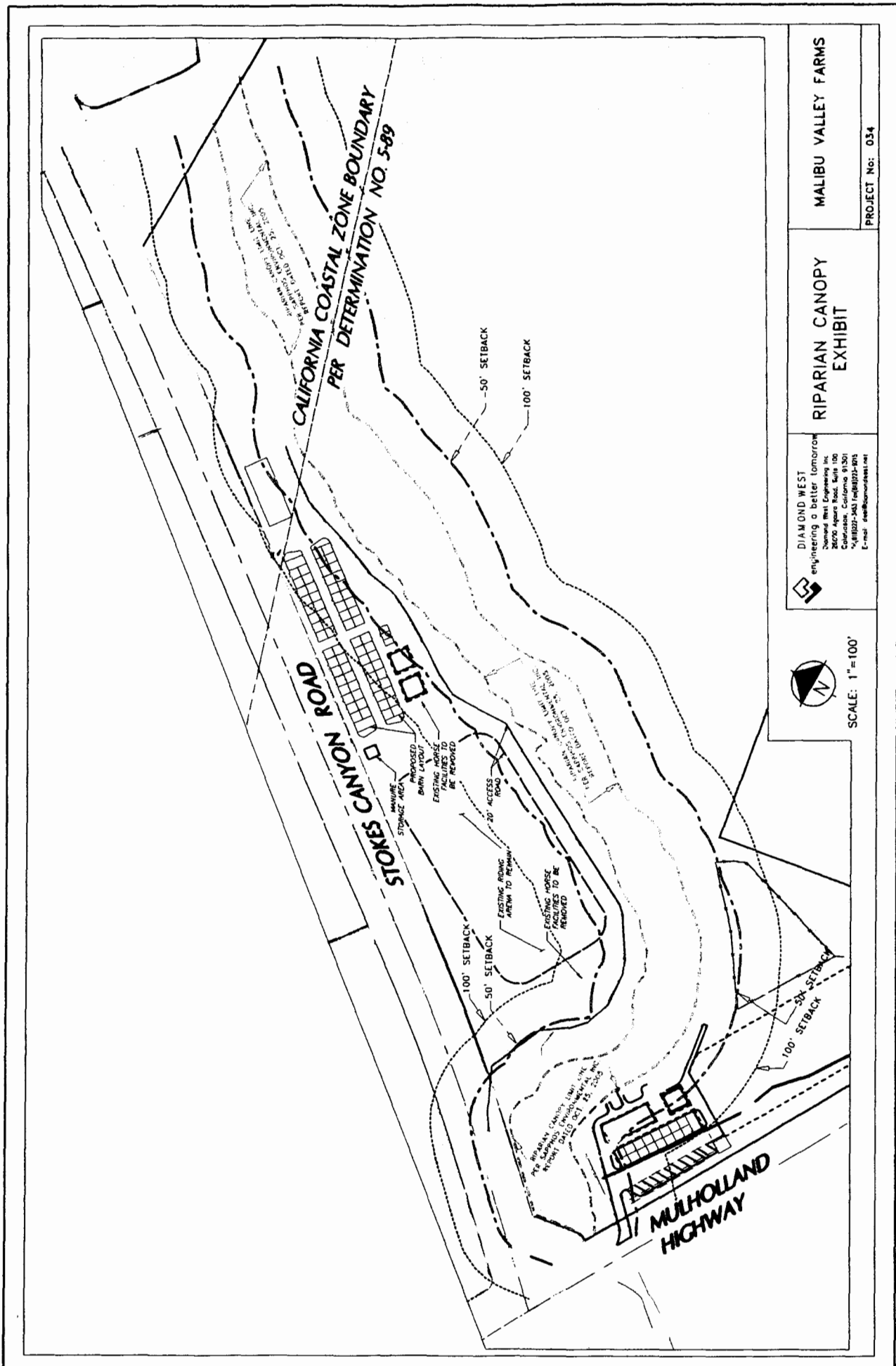
- Coastal Wood Fern
- Meadow Barley
- Yarrow
- Western Wallflower
- Golden Currant
- Hummingbird Sage
- Meadow Rue
- California Blackberry
- Leather Root
- Brown Dogwood
- Red Willow
- Arroyo Willow
- Box Elder
- White Alder
- Foothill Ash
- Western Sycamore
- Black Cottonwood
- Fremont Cottonwood

The bio-swales and basin will utilize native grasses from the following list:

- Deergrass
- Creeping Wildrye
- Spike Bentgrass
- June Grass
- Meadow Barley

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SOUTH CENTRAL COAST DISTRICT



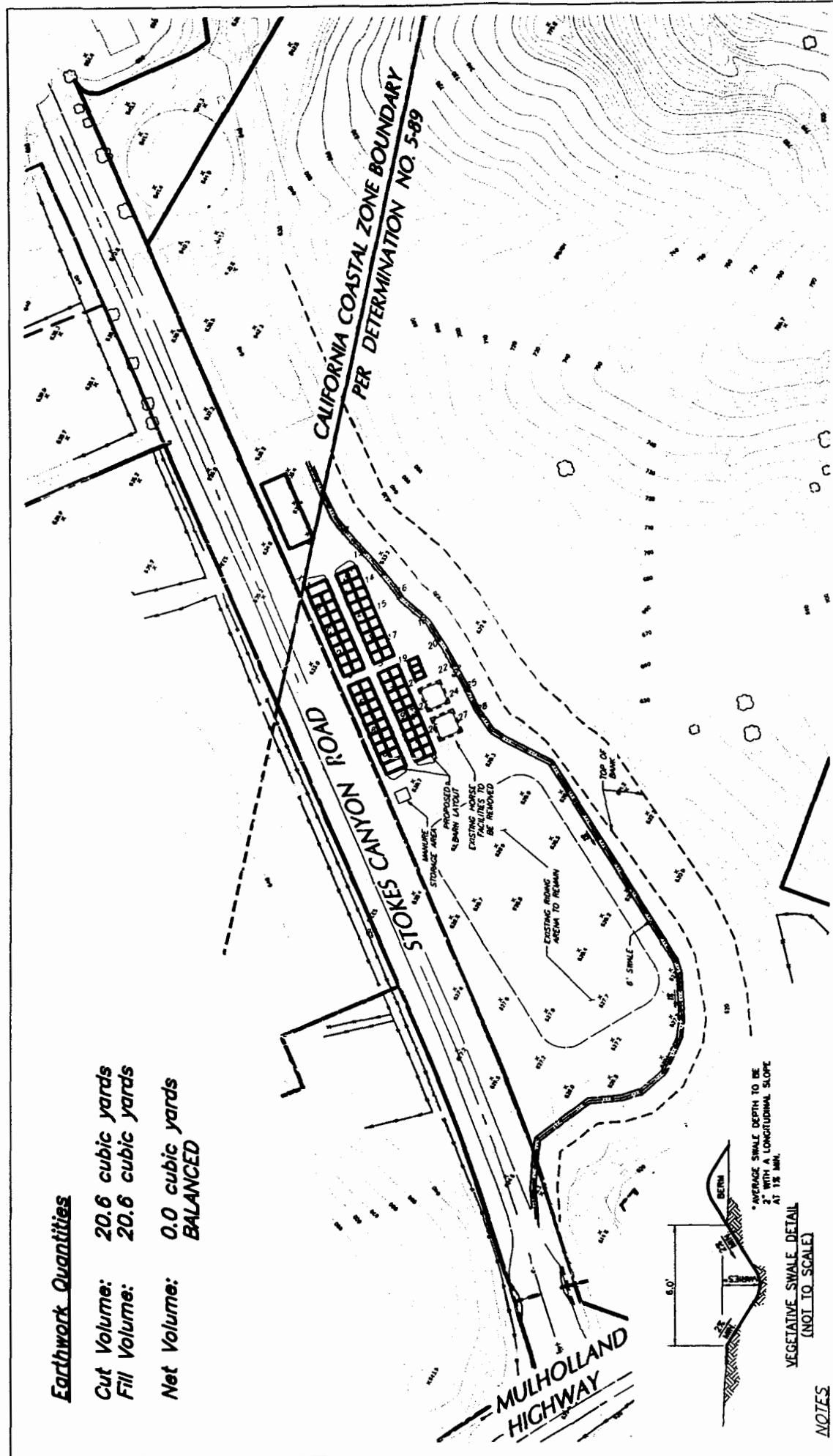
DIAMOND WEST
 engineering a better tomorrow
 Diamond West Engineering, Inc.
 28200 Agave Road, Suite 100
 Calabasas, California 91301
 Tel: 818/227-2427 Fax: 818/227-4974
 E-mail: info@diamondwest.net

**RIPARIAN CANOPY
 EXHIBIT**

MALIBU VALLEY FARMS
 PROJECT NO: 034

Earthwork Quantities

Cut Volume: 20.6 cubic yards
 Fill Volume: 20.6 cubic yards
 Net Volume: 0.0 cubic yards
BALANCED



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 28790 Agoura Road, Suite 100
 Calabasas, California 91301
 Tel: (818) 222-3453 Fax: (818) 222-8888
 E-mail: diamondwest@earthlink.net

SCALE: 1"=100'

**EXHIBIT A
 NORTH SIDE
 EARTHWORK
 EXHIBIT**

MALIBU VALLEY FARMS

PROJECT No: 034

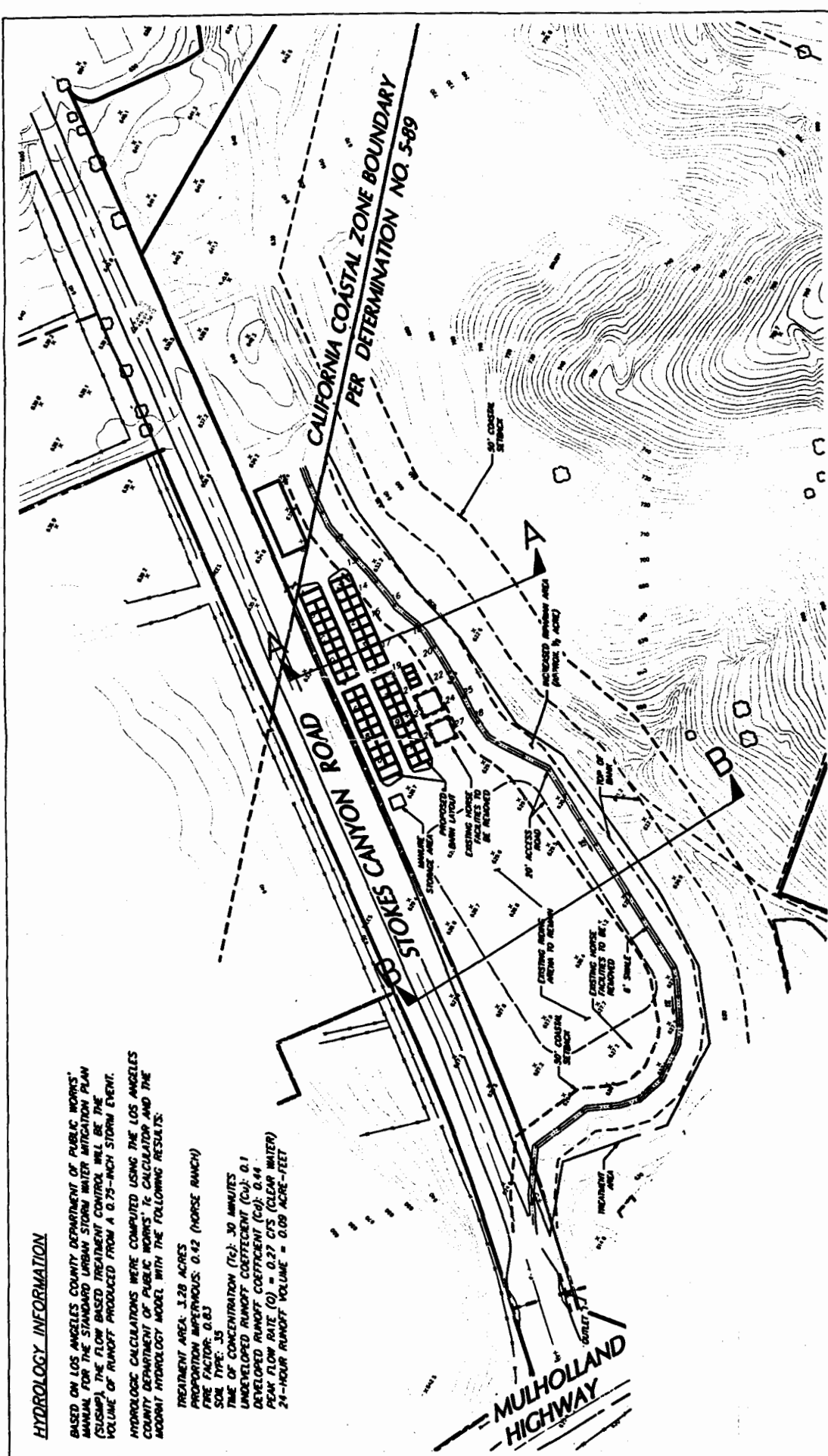
- NOTES**
- Quantities shown here are for preliminary earthwork calculation purposes only and shall not be used for bidding and/or contracting purposes. Contractor shall be required to verify all quantities prior to commencement of any grading work.
 - Refer to soils report for additional information and/or requirements.

HYDROLOGY INFORMATION

BASED ON LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS' MANUAL FOR THE STANDARD URBAN STORM WATER MITIGATION PLAN (SUSMP), THE FLOW BASED TREATMENT CONTROL WILL BE THE VOLUME OF RUNOFF PRODUCED FROM A 0.75-INCH STORM EVENT.

HYDROLOGIC CALCULATIONS WERE COMPUTED USING THE LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS Tc CALCULATOR AND THE ACOONAI HYDROLOGY MODEL WITH THE FOLLOWING RESULTS:

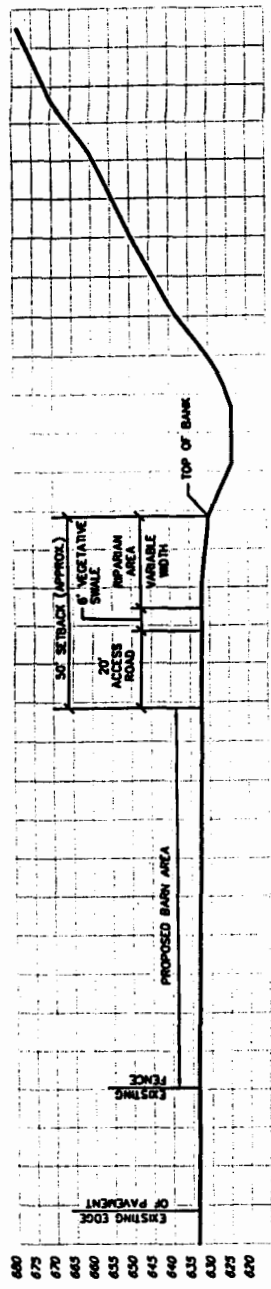
- TREATMENT AREA: 3.28 ACRES
- PROPORTION IMPERVIOUS: 0.42 (HORSE RANCH)
- PIRE FACTOR: 0.83
- SOIL TYPE: 35
- TIME OF CONCENTRATION (Tc): 30 MINUTES
- UNDEVELOPED RUNOFF COEFFICIENT (Cu): 0.1
- DEVELOPED RUNOFF COEFFICIENT (Cd): 0.44
- PEAK FLOW RATE (Q) = 0.27 CFS (CLEAR WATER)
- 24-HOUR RUNOFF VOLUME = 0.09 ACRE-FEET



<p>EXHIBIT A NORTH SIDE DRAINAGE SITE PLAN</p>	<p>MALIBU VALLEY FARMS COMPREHENSIVE MANAGEMENT PLAN</p>
<p>PROJECT No: 034</p>	

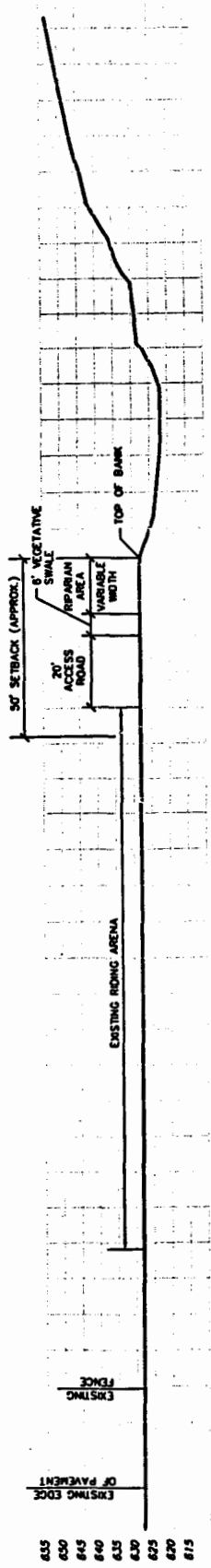
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 Diamond West Engineering, Inc.
 28000 Agnes Road, Suite 100
 Culver City, California 91501
 Telephone: 310 541-8820-8815
 E-mail: dwest@diamondwest.net

SCALE: 1"=100'



0.00 20.00 40.00 60.00 80.00 100.00 120.00 140.00 160.00 180.00 200.00 220.00 240.00 260.00 280.00 300.00 320.00 340.00 360.00 380.00 400.00

SECTION A-A



0.00 20.00 40.00 60.00 80.00 100.00 120.00 140.00 160.00 180.00 200.00 220.00 240.00 260.00 280.00 300.00 320.00 340.00 360.00 380.00 400.00 420.00 440.00 460.00 480.00

SECTION B-B

SCALE:
HORIZONTAL: 1"=30'
VERTICAL: 1"=3'

MALIBU VALLEY FARMS
COMPREHENSIVE
MANAGEMENT PLAN

EXHIBIT B
NORTH SIDE
CROSS-SECTIONS

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PROJECT No: 034

HYDROLOGY INFORMATION

BASED ON LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS' MANUAL FOR THE STANDARD URBAN STORM WATER MITIGATION PLAN (SUSMP), THE FLOW BASED TREATMENT CONTROL WILL BE THE VOLUME OF RUNOFF PRODUCED FROM A 0.75-INCH STORM EVENT.

HYDROLOGIC CALCULATIONS WERE COMPUTED FOR THE TOTAL DRAINAGE AREA USING THE LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS' TC CALCULATOR AND THE MODRAT HYDROLOGY MODEL WITH THE FOLLOWING RESULTS:

DRAINAGE AREA: 11.49 ACRES
 PROPORTION IMPERVIOUS: 0.0613
 FIRE FACTOR: 0.83
 SOIL TYPE: 35

TIME OF CONCENTRATION (Tc): 30 MINUTES
 UNDEVELOPED RUNOFF COEFFICIENT (Cu): 0.1
 DEVELOPED RUNOFF COEFFICIENT (Cd): 0.44
 PEAK FLOW RATE (Q) = 0.41 CFS (CLEAR WATER)
 24-HOUR RUNOFF VOLUME = 0.13 ACRE-FEET

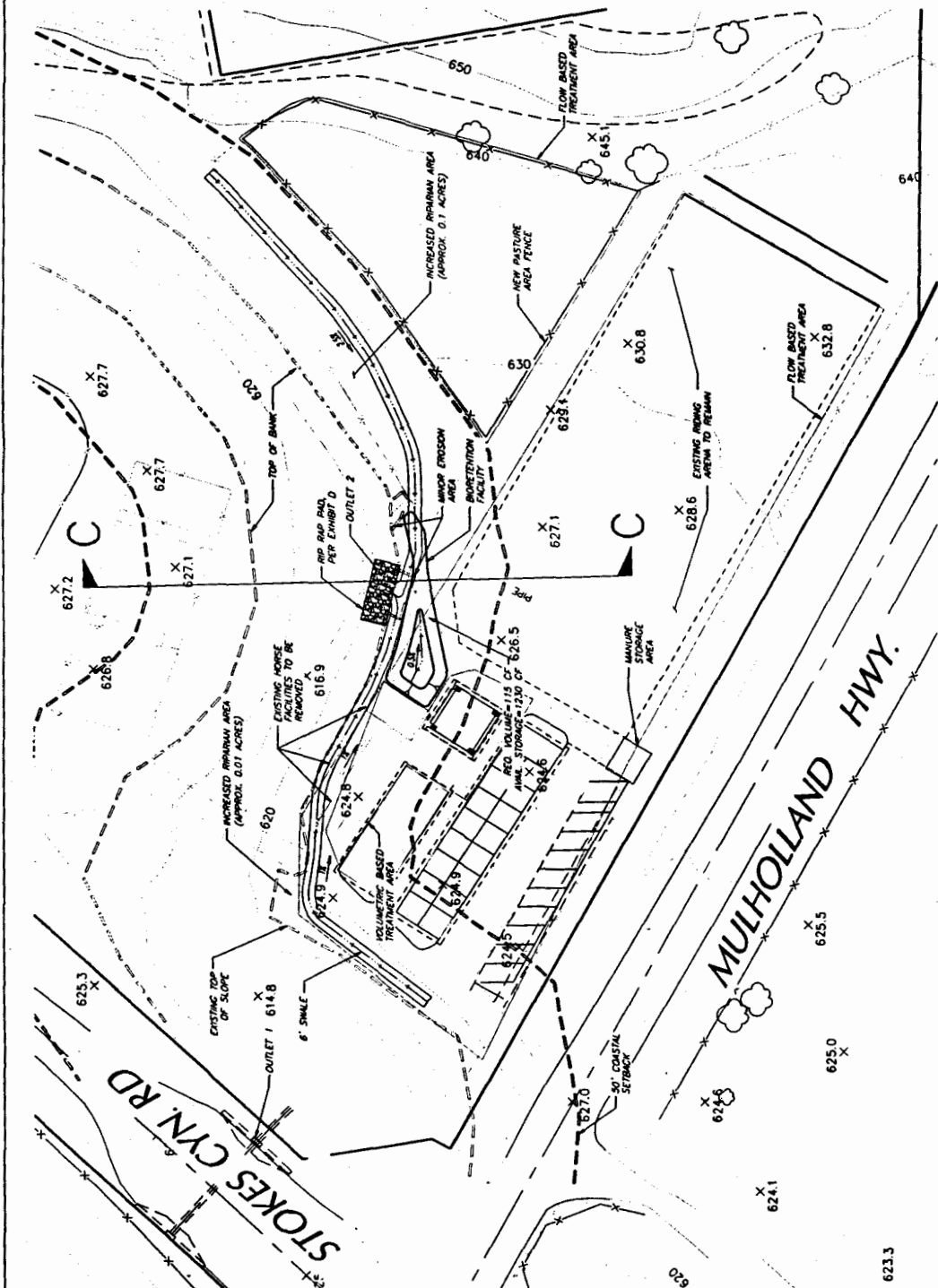
TWO SEPARATE DRAINAGE AREAS WERE CONSIDERED FOR TREATMENT PURPOSES AND WILL UTILIZE A BIORETENTION FACILITY AND VEGETATIVE SWALES. THE FOLLOWING HYDROLOGY RESULTS ARE FOR THE TREATED SUB-DRAINAGE AREA:

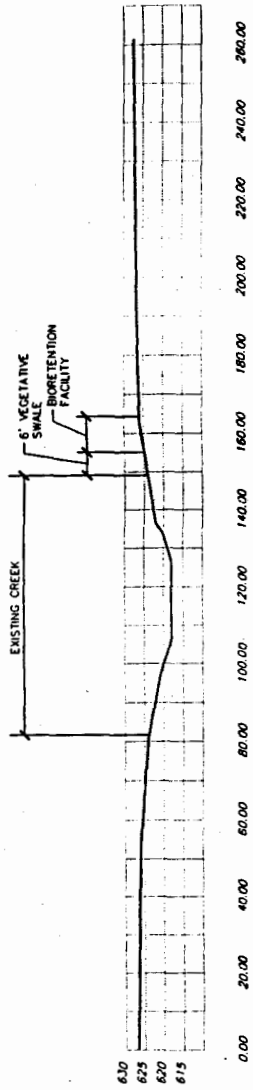
RANCH AREA
 TOTAL TREATMENT AREA: 1 ACRE
 PROPORTION IMPERVIOUS: 0.42
 FIRE FACTOR: 0.83
 SOIL TYPE: 35

TIME OF CONCENTRATION (Tc): 30 MINUTES
 UNDEVELOPED RUNOFF COEFFICIENT (Cu): 0.1
 DEVELOPED RUNOFF COEFFICIENT (Cd): 0.44
 PEAK FLOW RATE (Q) = 0.073 CFS (CLEAR WATER)
 24-HOUR RUNOFF VOLUME = 0.027 ACRE-FEET
 BIORETENTION VOLUME = 0.0028 ACRE-FEET

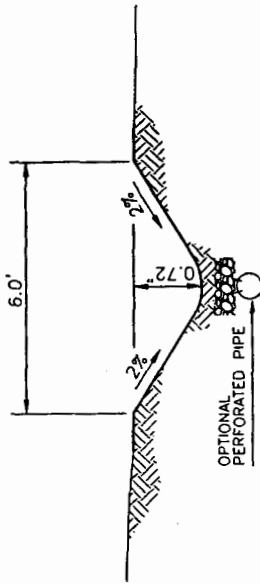
PASTURE AREA
 TOTAL TREATMENT AREA: 0.33 ACRE
 PROPORTION IMPERVIOUS: 0.01
 FIRE FACTOR: 0.83
 SOIL TYPE: 35

TIME OF CONCENTRATION (Tc): 30 MINUTES
 UNDEVELOPED RUNOFF COEFFICIENT (Cu): 0.1
 DEVELOPED RUNOFF COEFFICIENT (Cd): 0.44
 PEAK FLOW RATE (Q) = 0.01 CFS (CLEAR WATER)
 24-HOUR RUNOFF VOLUME = 0.002 ACRE-FEET



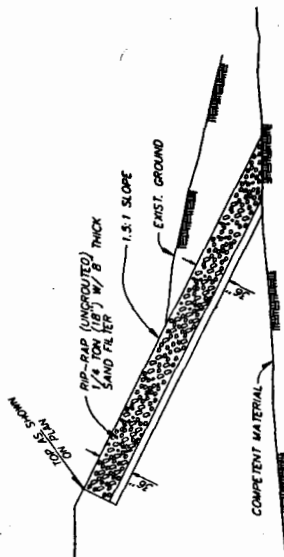


SECTION C-C
 SCALE:
 HORIZONTAL: T=30'
 VERTICAL: T=3'



LONGITUDINAL SLOPE AT 1% MIN.

VEGETATIVE SWALE DETAIL
 (NOT TO SCALE)



NOTES:

- BEDROCK TO BE VERIFIED BY GEOTECHNICAL ENGINEER OR ENGINEERING GEOLOGIST INSPECTION REPORT TO BE PROVIDED TO THE BUILDING OFFICIAL.

ROCK RIP RAP PAD DETAIL
 (NOT TO SCALE)

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 E-mail: dwest@diamondwest.net

EXHIBIT D
SOUTH SIDE
CROSS-SECTION
AND DETAILS

MALIBU VALLEY FARMS
COMPREHENSIVE
MANAGEMENT PLAN

PROJECT No: 034

CALIFORNIA COASTAL COMMISSION

45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105-2 219
VOICE AND TDD (415) 904-5 200
FAX (4 15) 904-5 400



MEMORANDUM

FROM: John Dixon, Ph.D.
Ecologist / Wetland Coordinator

TO: Ventura Staff

SUBJECT: Designation of ESHA in the Santa Monica Mountains

DATE: March 25, 2003

In the context of the Malibu LCP, the Commission found that the Mediterranean Ecosystem in the Santa Mountains is rare, and especially valuable because of its relatively pristine character, physical complexity, and resultant biological diversity. Therefore, areas of undeveloped native habitat in the Santa Monica Mountains that are large and relatively unfragmented may meet the definition of ESHA by virtue of their valuable roles in that ecosystem, regardless of their relative rarity throughout the state. This is the only place in the coastal zone where the Commission has recognized chaparral as meeting the definition of ESHA. The scientific background presented herein for ESHA analysis in the Santa Monica Mountains is adapted from the Revised Findings for the Malibu LCP that the Commission adopted on February 6, 2003.

For habitats in the Santa Monica Mountains, particularly coastal sage scrub and chaparral, there are three site-specific tests to determine whether an area is ESHA because of its especially valuable role in the ecosystem. First, is the habitat properly identified, for example as coastal sage scrub or chaparral? The requisite information for this test generally should be provided by a site-specific biological assessment. Second, is the habitat largely undeveloped and otherwise relatively pristine? Third, is the habitat part of a large, contiguous block of relatively pristine native vegetation? This should be documented with an aerial photograph from our mapping unit (with the site delineated) and should be attached as an exhibit to the staff report. For those habitats that are absolutely rare or that support individual rare species, it is not necessary to find that they are relatively pristine, and are neither isolated nor fragmented.

**Designation of Environmentally Sensitive Habitat in the
Santa Monica Mountains**

The Coastal Act provides a definition of "environmentally sensitive area" as: "Any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments" (Section 30107.5).

Exhibit 16 4-06-163 ESHA Memo

There are three important elements to the definition of ESHA. First, a geographic area can be designated ESHA either because of the presence of individual species of plants or animals or because of the presence of a particular habitat. Second, in order for an area to be designated as ESHA, the species or habitat must be either rare or it must be especially valuable. Finally, the area must be easily disturbed or degraded by human activities.

The first test of ESHA is whether a habitat or species is rare. Rarity can take several forms, each of which is important. Within the Santa Monica Mountains, rare species and habitats often fall within one of two common categories. Many rare species or habitats are globally rare, but locally abundant. They have suffered severe historical declines in overall abundance and currently are reduced to a small fraction of their original range, but where present may occur in relatively large numbers or cover large local areas. This is probably the most common form of rarity for both species and habitats in California and is characteristic of coastal sage scrub, for example. Some other habitats are geographically widespread, but occur everywhere in low abundance. California's native perennial grasslands fall within this category.

A second test for ESHA is whether a habitat or species is especially valuable. Areas may be valuable because of their "special nature," such as being an unusually pristine example of a habitat type, containing an unusual mix of species, supporting species at the edge of their range, or containing species with extreme variation. For example, reproducing populations of valley oaks are not only increasingly rare, but their southernmost occurrence is in the Santa Monica Mountains. Generally, however, habitats or species are considered valuable because of their special "role in the ecosystem." For example, many areas within the Santa Monica Mountains may meet this test because they provide habitat for endangered species, protect water quality, provide essential corridors linking one sensitive habitat to another, or provide critical ecological linkages such as the provision of pollinators or crucial trophic connections. Of course, all species play a role in their ecosystem that is arguably "special." However, the Coastal Act requires that this role be "especially valuable." This test is met for relatively pristine areas that are integral parts of the Santa Monica Mountains Mediterranean ecosystem because of the demonstrably rare and extraordinarily special nature of that ecosystem as detailed below.

Finally, ESHAs are those areas that could be easily disturbed or degraded by human activities and developments. Within the Santa Monica Mountains, as in most areas of southern California affected by urbanization, all natural habitats are in grave danger of direct loss or significant degradation as a result of many factors related to anthropogenic changes.

Ecosystem Context of the Habitats of the Santa Monica Mountains

The Santa Monica Mountains comprise the largest, most pristine, and ecologically complex example of a Mediterranean ecosystem in coastal southern California.

California's coastal sage scrub, chaparral, oak woodlands, and associated riparian areas have analogues in just a few areas of the world with similar climate. Mediterranean ecosystems with their wet winters and warm dry summers are only found in five localities (the Mediterranean coast, California, Chile, South Africa, and south and southwest Australia). Throughout the world, this ecosystem with its specially adapted vegetation and wildlife has suffered severe loss and degradation from human development. Worldwide, only 18 percent of the Mediterranean community type remains undisturbed¹. However, within the Santa Monica Mountains, this ecosystem is remarkably intact despite the fact that it is closely surrounded by some 17 million people. For example, the 150,000 acres of the Santa Monica Mountains National Recreation Area, which encompasses most of the Santa Monica Mountains, was estimated to be 90 percent free of development in 2000². Therefore, this relatively pristine area is both large and mostly unfragmented, which fulfills a fundamental tenet of conservation biology³. The need for large contiguous areas of natural habitat in order to maintain critical ecological processes has been emphasized by many conservation biologists⁴.

In addition to being a large single expanse of land, the Santa Monica Mountains ecosystem is still connected, albeit somewhat tenuously, to adjacent, more inland ecosystems⁵. Connectivity among habitats within an ecosystem and connectivity among ecosystems is very important for the preservation of species and ecosystem integrity. In a recent statewide report, the California Resources Agency⁶ identified wildlife corridors and habitat connectivity as the top conservation priority. In a letter to governor Gray Davis, sixty leading environmental scientists have endorsed the

¹ National Park Service. 2000. Draft general management plan & environmental impact statement. Santa Monica Mountains National Recreation Area – California.

² Ibid.

³ Harris, L. D. 1988. Edge effects and conservation of biotic diversity. *Conserv. Biol.* 330-332. Soule, M. E., D. T. Bolger, A. C. Alberts, J. Wright, M. Sorice and S. Hill. 1988. Reconstructed dynamics of rapid extinctions of chaparral-requiring birds in urban habitat islands. *Conserv. Biol.* 2: 75-92. Yahner, R. H. 1988. Changes in wildlife communities near edges. *Conserv. Biol.* 2:333-339. Murphy, D. D. 1989. Conservation and confusion: Wrong species, wrong scale, wrong conclusions. *Conservation Biol.* 3:82-84.

⁴ Crooks, K. 2000. Mammalian carnivores as target species for conservation in Southern California. p. 105-112 in: Keeley, J. E., M. Baer-Keeley and C. J. Fotheringham (eds), 2nd Interface Between Ecology and Land Development in California, U.S. Geological Survey Open-File Report 00-62. Sauvajot, R. M., E. C. York, T. K. Fuller, H. Sharon Kim, D. A. Kamradt and R. K. Wayne. 2000. Distribution and status of carnivores in the Santa Monica Mountains, California: Preliminary results from radio telemetry and remote camera surveys. p 113-123 in: Keeley, J. E., M. Baer-Keeley and C. J. Fotheringham (eds), 2nd Interface Between Ecology and Land Development in California, U.S. Geological Survey Open-File Report 00-62. Beier, P. and R. F. Noss. 1998. Do habitat corridors provide connectivity? *Conserv. Biol.* 12:1241-1252. Beier, P. 1996. Metapopulation models, tenacious tracking and cougar conservation. In: *Metapopulations and Wildlife Conservation*, ed. D. R. McCullough. Island Press, Covelo, California, 429p.

⁵ The SMM area is linked to larger natural inland areas to the north through two narrow corridors: 1) the Conejo Grade connection at the west end of the Mountains and 2) the Simi Hills connection in the central region of the SMM (from Malibu Creek State Park to the Santa Susanna Mountains).

⁶ California Resources Agency. 2001. Missing Linkages: Restoring Connectivity to the California Landscape. California Wilderness Coalition, Calif. Dept of Parks & Recreation, USGS, San Diego Zoo and The Nature Conservancy. Available at: <http://www.calwild.org/pubs/reports/linkages/index.htm>

conclusions of that report⁷. The chief of natural resources at the California Department of Parks and Recreation has identified the Santa Monica Mountains as an area where maintaining connectivity is particularly important⁸.

The species most directly affected by large scale connectivity are those that require large areas or a variety of habitats, e.g., gray fox, cougar, bobcat, badger, steelhead trout, and mule deer⁹. Large terrestrial predators are particularly good indicators of habitat connectivity and of the general health of the ecosystem¹⁰. Recent studies show that the mountain lion, or cougar, is the most sensitive indicator species of habitat fragmentation, followed by the spotted skunk and the bobcat¹¹. Sightings of cougars in both inland and coastal areas of the Santa Monica Mountains¹² demonstrate their continued presence. Like the "canary in the mineshaft," an indicator species like this is good evidence that habitat connectivity and large scale ecological function remains in the Santa Monica Mountains ecosystem.

The habitat integrity and connectivity that is still evident within the Santa Monica Mountains is extremely important to maintain, because both theory and experiments over 75 years in ecology confirm that large spatially connected habitats tend to be more stable and have less frequent extinctions than habitats without extended spatial structure¹³. Beyond simply destabilizing the ecosystem, fragmentation and disturbance

⁷ Letters received and included in the September 2002 staff report for the Malibu LCP.

⁸ Schoch, D. 2001. Survey lists 300 pathways as vital to state wildlife. Los Angeles Times. August 7, 2001.

⁹ Martin, G. 2001. Linking habitat areas called vital for survival of state's wildlife Scientists map main migration corridors. San Francisco Chronicle, August 7, 2001.

¹⁰ Noss, R. F., H. B. Quigley, M. G. Hornocker, T. Merrill and P. C. Paquet. 1996. Conservation biology and carnivore conservation in the Rocky Mountains. *Conserv. Biol.* 10: 949-963. Noss, R. F. 1995. Maintaining ecological integrity in representative reserve networks. World Wildlife Fund Canada.

¹¹ Sauvajot, R. M., E. C. York, T. K. Fuller, H. Sharon Kim, D. A. Kamradt and R. K. Wayne. 2000. Distribution and status of carnivores in the Santa Monica Mountains, California: Preliminary results from radio telemetry and remote camera surveys. p 113-123 in: Keeley, J. E., M. Baer-Keeley and C. J. Fotheringham (eds), 2nd Interface Between Ecology and Land Development in California, U.S. Geological Survey Open-File Report 00-62. Beier, P. 1996. Metapopulation models, tenacious tracking and cougar conservation. In: *Metapopulations and Wildlife Conservation*, ed. D. R. McCullough. Island Press, Covelo, California, 429p.

¹² Recent sightings of mountain lions include: Temescal Canyon (pers. com., Peter Brown, Facilities Manager, Calvary Church), Topanga Canyon (pers. com., Marti Witter, NPS), Encinal and Trancas Canyons (pers. com., Pat Healy), Stump Ranch Research Center (pers. com., Dr. Robert Wayne, Dept. of Biology, UCLA). In May of 2002, the NPS *photographed* a mountain lion at a trip camera on the Back Bone Trail near Castro Crest – Seth Riley, Eric York and Dr. Ray Sauvajot, National Park Service, SMMNRA.

¹³ Gause, G. F. 1934. The struggle for existence. Baltimore, William and Wilkins 163 p. (also reprinted by Hafner, N.Y. 1964). Gause, G. F., N. P. Smaragdova and A. A. Witt. 1936. Further studies of interaction between predators and their prey. *J. Anim. Ecol.* 5:1-18. Huffaker, C. B. 1958. Experimental studies on predation: dispersion factors and predator-prey oscillations. *Hilgardia* 27:343-383. Luckinbill, L. S. 1973. Coexistence in laboratory populations of *Paramecium aurelia* and its predator *Didinium nasutum*. *Ecology* 54:1320-1327. Allen, J. C., C. C. Brewster and D. H. Slone. 2001. Spatially explicit ecological models: A spatial convolution approach. *Chaos, Solitons and Fractals.* 12:333-347.

can even cause unexpected and irreversible changes to new and completely different kinds of ecosystems (habitat conversion)¹⁴.

As a result of the pristine nature of large areas of the Santa Monica Mountains and the existence of large, unfragmented and interconnected blocks of habitat, this ecosystem continues to support an extremely diverse flora and fauna. The observed diversity is probably a function of the diversity of physical habitats. The Santa Monica Mountains have the greatest geological diversity of all major mountain ranges within the transverse range province. According to the National Park Service, the Santa Monica Mountains contain 40 separate watersheds and over 170 major streams with 49 coastal outlets¹⁵. These streams are somewhat unique along the California coast because of their topographic setting. As a "transverse" range, the Santa Monica Mountains are oriented in an east-west direction. As a result, the south-facing riparian habitats have more variable sun exposure than the east-west riparian corridors of other sections of the coast. This creates a more diverse moisture environment and contributes to the higher biodiversity of the region. The many different physical habitats of the Santa Monica Mountains support at least 17 native vegetation types¹⁶ including the following habitats considered sensitive by the California Department of Fish and Game: native perennial grassland, coastal sage scrub, red-shank chaparral, valley oak woodland, walnut woodland, southern willow scrub, southern cottonwood-willow riparian forest, sycamore-alder woodland, oak riparian forest, coastal salt marsh, and freshwater marsh. Over 400 species of birds, 35 species of reptiles and amphibians, and more than 40 species of mammals have been documented in this diverse ecosystem. More than 80 sensitive species of plants and animals (listed, proposed for listing, or species of concern) are known to occur or have the potential to occur within the Santa Monica Mountains Mediterranean ecosystem.

The Santa Monica Mountains are also important in a larger regional context. Several recent studies have concluded that the area of southern California that includes the Santa Monica Mountains is among the most sensitive in the world in terms of the number of rare endemic species, endangered species and habitat loss. These studies have designated the area to be a local hot-spot of endangerment in need of special protection¹⁷.

Therefore, the Commission finds that the Santa Monica Mountains ecosystem is itself rare and especially valuable because of its special nature as the largest, most pristine,

¹⁴ Scheffer, M., S. Carpenter, J. A. Foley, C. Folke and B. Walker. 2001. Catastrophic shifts in ecosystems. *Nature* 413:591-596.

¹⁵ NPS. 2000. op.cit.

¹⁶ From the NPS report (2000 op. cit.) that is based on the older Holland system of subjective classification. The data-driven system of Sawyer and Keeler-Wolf results in a much larger number of distinct "alliances" or vegetation types.

¹⁷ Myers, N. 1990. The biodiversity challenge: Expanded hot-spots analysis. *Environmentalist* 10:243-256. Myers, N., R. A. Mittermeier, C. G. Mittermeier, G. A. B. da Fonseca and J. A. Kent. 2000. Biodiversity hot-spots for conservation priorities. *Nature* 403:853-858. Dobson, A. P., J. P. Rodriguez, W. M. Roberts and D. S. Wilcove. 1997. Geographic distribution of endangered species in the United States. *Science* 275:550-553.

physically complex, and biologically diverse example of a Mediterranean ecosystem in coastal southern California. The Commission further finds that because of the rare and special nature of the Santa Monica Mountains ecosystem, the ecosystem roles of substantially intact areas of the constituent plant communities discussed below are "especially valuable" under the Coastal Act.

Major Habitats within the Santa Monica Mountains

The most recent vegetation map that is available for the Santa Monica Mountains is the map that was produced for the National Park Service in the mid-1990s using 1993 satellite imagery supplemented with color and color infrared aerial imagery from 1984, 1988, and 1994 and field review¹⁸. The minimum mapping unit was 5 acres. For that map, the vegetation was mapped in very broad categories, generally following a vegetation classification scheme developed by Holland¹⁹. Because of the mapping methods used the degree of plant community complexity in the landscape is not represented. For example, the various types of "ceanothus chaparral" that have been documented were lumped under one vegetation type referred to as "northern mixed chaparral." Dr. Todd Keeler-Wolf of the California Department of Fish and Game is currently conducting a more detailed, quantitative vegetation survey of the Santa Monica Mountains.

The National Park Service map can be used to characterize broadly the types of plant communities present. The main generic plant communities present in the Santa Monica Mountains²⁰ are: coastal sage scrub, chaparral, riparian woodland, coast live oak woodland, and grasslands.

Riparian Woodland

Some 49 streams connect inland areas with the coast, and there are many smaller drainages as well, many of which are "blue line." Riparian woodlands occur along both perennial and intermittent streams in nutrient-rich soils. Partly because of its multi-layered vegetation, the riparian community contains the greatest overall biodiversity of all the plant communities in the area²¹. At least four types of riparian communities are discernable in the Santa Monica Mountains: walnut riparian areas, mulefat-dominated riparian areas, willow riparian areas and sycamore riparian woodlands. Of these, the

¹⁸ Franklin, J. 1997. Forest Service Southern California Mapping Project, Santa Monica Mountains National Recreation Area, Task 11 Description and Results, Final Report. June 13, 1997, Dept. of Geography, San Diego State University, USFS Contract No. 53-91S8-3-TM45.

¹⁹ Holland R. F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. State of California, The Resources Agency, Dept. of Fish and Game, Natural Heritage Division, Sacramento, CA. 95814.

²⁰ National Park Service. 2000. Draft: General Management Plan & Environmental Impact Statement, Santa Monica Mountains National Recreation Area, US Dept. of Interior, National Park Service, December 2000. (Fig. 11 in this document.)

²¹ Ibid.

sycamore riparian woodland is the most diverse riparian community in the area. In these habitats, the dominant plant species include arroyo willow, California black walnut, sycamore, coast live oak, Mexican elderberry, California bay laurel, and mule fat. Wildlife species that have been observed in this community include least Bell's vireo (a State and federally listed species), American goldfinches, black phoebes, warbling vireos, bank swallows (State listed threatened species), song sparrows, belted kingfishers, raccoons, and California and Pacific tree frogs.

Riparian communities are the most species-rich to be found in the Santa Monica Mountains. Because of their multi-layered vegetation, available water supply, vegetative cover and adjacency to shrubland habitats, they are attractive to many native wildlife species, and provide essential functions in their lifecycles²². During the long dry summers in this Mediterranean climate, these communities are an essential refuge and oasis for much of the areas' wildlife.

Riparian habitats and their associated streams form important connecting links in the Santa Monica Mountains. These habitats connect all of the biological communities from the highest elevation chaparral to the sea with a unidirectional flowing water system, one function of which is to carry nutrients through the ecosystem to the benefit of many different species along the way.

The streams themselves provide refuge for sensitive species including: the coast range newt, the Pacific pond turtle, and the steelhead trout. The coast range newt and the Pacific pond turtle are California Species of Special Concern and are proposed for federal listing²³, and the steelhead trout is federally endangered. The health of the streams is dependent on the ecological functions provided by the associated riparian woodlands. These functions include the provision of large woody debris for habitat, shading that controls water temperature, and input of leaves that provide the foundation of the stream-based trophic structure.

The importance of the connectivity between riparian areas and adjacent habitats is illustrated by the Pacific pond turtle and the coast range newt, both of which are sensitive and both of which require this connectivity for their survival. The life history of the Pacific pond turtle demonstrates the importance of riparian areas and their associated watersheds for this species. These turtles require the stream habitat during the wet season. However, recent radio tracking work²⁴ has found that although the Pacific pond turtle spends the wet season in streams, it also requires upland habitat for refuge during the dry season. Thus, in coastal southern California, the Pacific pond turtle requires both streams and intact adjacent upland habitats such as coastal sage

²² Walter, Hartmut. Bird use of Mediterranean habitats in the Santa Monica Mountains, Coastal Commission Workshop on the Significance of Native Habitats in the Santa Monica Mountains. CCC Hearing, June 13, 2002, Queen Mary Hotel.

²³ USFWS. 1989. Endangered and threatened wildlife and plants; animal notice of review. Fed. Reg. 54:554-579. USFWS. 1993. Endangered and threatened wildlife and plants; notice of 1-year petition finding on the western pond turtle. Fed. Reg. 58:42717-42718.

²⁴ Rathbun, G.B., N.J. Scott and T.G. Murphy. 2002. Terrestrial habitat use by Pacific pond turtle in a Mediterranean climate. *Southwestern Naturalist*. (in Press).

scrub, woodlands or chaparral as part of their normal life cycle. The turtles spend about four months of the year in upland refuge sites located an average distance of 50 m (but up to 280 m) from the edge of the creek bed. Similarly, nesting sites where the females lay eggs are also located in upland habitats an average of 30 m (but up to 170 m) from the creek. Occasionally, these turtles move up to 2 miles across upland habitat²⁵. Like many species, the pond turtle requires both stream habitats and the upland habitats of the watershed to complete its normal annual cycle of behavior. Similarly, the coast range newt has been observed to travel hundreds of meters into upland habitat and spend about ten months of the year far from the riparian streambed²⁶. They return to the stream to breed in the wet season, and they are therefore another species that requires both riparian habitat and adjacent uplands for their survival.

Riparian habitats in California have suffered serious losses and such habitats in southern California are currently very rare and seriously threatened. In 1989, Faber estimated that 95-97% of riparian habitat in southern California was already lost²⁷. Writing at the same time as Faber, Bowler asserted that, "[t]here is no question that riparian habitat in southern California is endangered."²⁸ In the intervening 13 years, there have been continuing losses of the small amount of riparian woodlands that remain. Today these habitats are, along with native grasslands and wetlands, among the most threatened in California.

In addition to direct habitat loss, streams and riparian areas have been degraded by the effects of development. For example, the coast range newt, a California Species of Special Concern has suffered a variety of impacts from human-related disturbances²⁹. Human-caused increased fire frequency has resulted in increased sedimentation rates, which exacerbates the cannibalistic predation of adult newts on the larval stages.³⁰ In addition impacts from non-native species of crayfish and mosquito fish have also been documented. When these non-native predators are introduced, native prey organisms are exposed to new mortality pressures for which they are not adapted. Coast range newts that breed in the Santa Monica Mountain streams do not appear to have adaptations that permit co-occurrence with introduced mosquito fish and crayfish³¹. These introduced predators have eliminated the newts from streams where they previously occurred by both direct predation and suppression of breeding.

²⁵ Testimony by R. Dagit, Resource Conservation District of the Santa Monica Mountains at the CCC Habitat Workshop on June 13, 2002.

²⁶ Dr. Lee Kats, Pepperdine University, personal communication to Dr J. Allen, CCC.

²⁷ Faber, P.A., E. Keller, A. Sands and B.M. Massey. 1989. The ecology of riparian habitats of the southern California coastal region: a community profile. U.S. Fish and Wildlife Service Biological Report 85(7.27) 152pp.

²⁸ Bowler, P.A. 1989. Riparian woodland: An endangered habitat in southern California. Pp 80-97 in Schoenherr, A.A. (ed.) Endangered plant communities of southern California. Botanists Special Publication No. 3.

²⁹ Gamradt, S.C., L.B. Kats and C.B. Anzalone. 1997. Aggression by non-native crayfish deters breeding in California newts. *Conservation Biology* 11(3):793-796.

³⁰ Kerby, L.J., and L.B. Kats. 1998. Modified interactions between salamander life stages caused by wildfire-induced sedimentation. *Ecology* 79(2):740-745.

³¹ Gamradt, S.C. and L.B. Kats. 1996. Effect of introduced crayfish and mosquitofish on California newts. *Conservation Biology* 10(4):1155-1162.

Therefore, because of the essential role that riparian plant communities play in maintaining the biodiversity of the Santa Monica Mountains, because of the historical losses and current rarity of these habitats in southern California, and because of their extreme sensitivity to disturbance, the native riparian habitats in the Santa Monica Mountains meet the definition of ESHA under the Coastal Act.

Coastal Sage Scrub and Chaparral

Coastal sage scrub and chaparral are often lumped together as “shrublands” because of their roughly similar appearance and occurrence in similar and often adjacent physical habitats. In earlier literature, these vegetation associations were often called soft chaparral and hard chaparral, respectively. “Soft” and “hard” refers to differences in their foliage associated with different adaptations to summer drought. Coastal sage scrub is dominated by soft-leaved, generally low-growing aromatic shrubs that die back and drop their leaves in response to drought. Chaparral is dominated by taller, deeper-rooted evergreen shrubs with hard, waxy leaves that minimize water loss during drought.

The two vegetation types are often found interspersed with each other. Under some circumstances, coastal sage scrub may even be successional to chaparral, meaning that after disturbance, a site may first be covered by coastal sage scrub, which is then replaced with chaparral over long periods of time.³² The existing mosaic of coastal sage scrub and chaparral is the result of a dynamic process that is a function of fire history, recent climatic conditions, soil differences, slope, aspect and moisture regime, and the two habitats should not be thought of as completely separate and unrelated entities but as different phases of the same process³³. The spatial pattern of these vegetation stands at any given time thus depends on both local site conditions and on history (e.g., fire), and is influenced by both natural and human factors.

In lower elevation areas with high fire frequency, chaparral and coastal sage scrub may be in a state of flux, leading one researcher to describe the mix as a “coastal sage-chaparral subclimax.”³⁴ Several other researchers have noted the replacement of chaparral by coastal sage scrub, or coastal sage scrub by chaparral depending on fire history.³⁵ In transitional and other settings, the mosaic of chaparral and coastal sage

³² Cooper, W.S. 1922. The broad-sclerophyll vegetation of California. Carnegie Institution of Washington Publication 319. 124 pp.

³³ Longcore, T and C. Rich. 2002. Protection of environmentally sensitive habitat areas in proposed local coastal plan for the Santa Monica Mountains. The Urban Wildlands Group, Inc., P.O. Box 24020 Los Angeles, CA 90024. (See attached comment document in Appendix).

³⁴ Hanes, T.L. 1965. Ecological studies on two closely related chaparral shrubs in southern California. Ecological Monographs 41:27-52.

³⁵ Gray, K.L. 1983. Competition for light and dynamic boundary between chaparral and coastal sage scrub. Madrono 30(1):43-49. Zedler, P.H., C.R. Gautier and G.S. McMaster. 1983. Vegetation change in response to extreme events: The effect of a short interval between fires in California chaparral and coastal sage scrub. Ecology 64(4): 809-818.

scrub enriches the seasonal plant resource base and provides additional habitat variability and seasonality for the many species that inhabit the area.

Relationships Among Coastal Sage Scrub, Chaparral and Riparian Communities

Although the constituent communities of the Santa Monica Mountains Mediterranean ecosystem can be defined and distinguished based on species composition, growth habits, and the physical habitats they characteristically occupy, they are not independent entities ecologically. Many species of plants, such as black sage, and laurel sumac, occur in more than one plant community and many animals rely on the predictable mix of communities found in undisturbed Mediterranean ecosystems to sustain them through the seasons and during different portions of their life histories.

Strong evidence for the interconnectedness between chaparral, coastal scrub and other habitats is provided by "opportunistic foragers" (animals that follow the growth and flowering cycles across these habitats). Coastal scrub and chaparral flowering and growth cycles differ in a complimentary and sequential way that many animals have evolved to exploit. Whereas coastal sage scrub is shallow-rooted and responds quickly to seasonal rains, chaparral plants are typically deep-rooted having most of their flowering and growth later in the rainy season after the deeper soil layers have been saturated³⁶. New growth of chaparral evergreen shrubs takes place about four months later than coastal sage scrub plants and it continues later into the summer³⁷. For example, in coastal sage scrub, California sagebrush flowers and grows from August to February and coyote bush flowers from August to November³⁸. In contrast, chamise chaparral and bigpod ceanothus flower from April to June, buck brush ceanothus flowers from February to April, and hoaryleaf ceanothus flowers from March to April.

Many groups of animals exploit these seasonal differences in growth and blooming period. The opportunistic foraging insect community (e.g., honeybees, butterflies and moths) tends to follow these cycles of flowering and new growth, moving from coastal sage scrub in the early rainy season to chaparral in the spring³⁹. The insects in turn are followed by insectivorous birds such as the blue-gray gnatcatcher⁴⁰, bushtit, cactus wren, Bewick's wren and California towhee. At night bats take over the role of daytime insectivores. At least 12 species of bats (all of which are considered sensitive) occur in

³⁶ DeSimone, S. 2000. California's coastal sage scrub. *Fremontia* 23(4):3-8. Mooney, H.A. 1988. Southern coastal scrub. Chap. 13 in Barbour, M.G. and J. Majors; Eds. 1988. *Terrestrial vegetation of California*, 2nd Edition. Calif. Native Plant Soc. Spec. Publ. #9.

³⁷ Schoenherr, A. A. 1992. *A natural history of California*. University of California Press, Berkeley. 772p.

³⁸ Dale, N. 2000. Flowering plants of the Santa Monica Mountains. California Native Plant Society, 1722 J Street, Suite 17, Sacramento, CA 95814.

³⁹ Ballmer, G. R. 1995. What's bugging coastal sage scrub. *Fremontia* 23(4):17-26.

⁴⁰ Root, R. B. 1967. The niche exploitation pattern of the blue-gray gnatcatcher. *Ecol. Monog.* 37:317-350.

the Santa Monica Mountains⁴¹. Five species of hummingbirds also follow the flowering cycle⁴².

Many species of 'opportunistic foragers', which utilize several different community types, perform important ecological roles during their seasonal movements. The scrub jay is a good example of such a species. The scrub jay is an omnivore and forages in coastal sage scrub, chaparral, and oak woodlands for insects, berries and notably acorns. Its foraging behavior includes the habit of burying acorns, usually at sites away from the parent tree canopy. Buried acorns have a much better chance of successful germination (about two-fold) than exposed acorns because they are protected from desiccation and predators. One scrub jay will bury approximately 5000 acorns in a year. The scrub jay therefore performs the function of greatly increasing recruitment and regeneration of oak woodland, a valuable and sensitive habitat type⁴³.

Like the scrub jay, most of the species of birds that inhabit the Mediterranean ecosystem in the Santa Monica Mountains require more than one community type in order to flourish. Many species include several community types in their daily activities. Other species tend to move from one community to another seasonally. The importance of maintaining the integrity of the multi-community ecosystem is clear in the following observations of Dr. Hartmut Walter of the University of California at Los Angeles:

"Bird diversity is directly related to the habitat mosaic and topographic diversity of the Santa Monicas. Most bird species in this bio-landscape require more than one habitat for survival and reproduction." "A significant proportion of the avifauna breeds in the wooded canyons of the Santa Monicas. Most of the canyon breeders forage every day in the brush- and grass-covered slopes, ridges and mesas. They would not breed in the canyons in the absence of the surrounding shrublands. Hawks, owls, falcons, orioles, flycatchers, woodpeckers, warblers, hummingbirds, etc. belong to this group. Conversely, some of the characteristic chaparral birds such as thrashers, quails, and wrentits need the canyons for access to shelter, protection from fire, and water. The regular and massive movement of birds between riparian corridors and adjacent shrublands has been demonstrated by qualitative and quantitative observations by several UCLA students⁴⁴."

Thus, the Mediterranean ecosystem of the Santa Monica Mountains is a mosaic of vegetation types linked together ecologically. The high biodiversity of the area results

⁴¹ Letter from Dr. Marti Witter, NPS, dated Sept. 13, 2001, in letters received and included in the September 2002 staff report for the Malibu LCP.

⁴² National Park Service. 1993. A checklist of the birds of the Santa Monica Mountains National Recreation Area. Southwest Parks and Monuments Assoc., 221 N. Court, Tucson, AZ. 85701

⁴³ Borchert, M. I., F. W. Davis, J. Michaelsen and L. D. Oyler. 1989. Interactions of factors affecting seedling recruitment of blue oak (*Quercus douglasii*) in California. *Ecology* 70:389-404. Bosserma, I. 1979. Jays and oaks: An eco-ethological study of a symbiosis. *Behavior* 70:1-118. Schoenherr, A. A. 1992. A natural history of California. University of California Press, Berkeley. 772p.

⁴⁴ Walter, Hartmut. Bird use of Mediterranean habitats in the Santa Monica Mountains, Coastal Commission Workshop on the Significance of Native Habitats in the Santa Monica Mountains. CCC Hearing, June 13, 2002, Queen Mary Hotel.

from both the diversity and the interconnected nature of this mosaic. Most raptor species, for example, require large areas and will often require different habitats for perching, nesting and foraging. Fourteen species of raptors (13 of which are considered sensitive) are reported from the Santa Monica Mountains. These species utilize a variety of habitats including rock outcrops, oak woodlands, riparian areas, grasslands, chaparral, coastal sage scrub, estuaries and freshwater lakes⁴⁵.

When the community mosaic is disrupted and fragmented by development, many chaparral-associated native bird species are impacted. In a study of landscape-level fragmentation in the Santa Monica Mountains, Stralberg⁴⁶ found that the ash-throated flycatcher, Bewick's wren, wren-tit, blue-gray gnatcatcher, California thrasher, orange-crowned warbler, rufous-crowned sparrow, spotted towhee, and California towhee all decreased in numbers as a result of urbanization. Soule⁴⁷ observed similar effects of fragmentation on chaparral and coastal sage scrub birds in the San Diego area.

In summary, all of the vegetation types in this ecosystem are strongly linked by animal movement and foraging. Whereas classification and mapping of vegetation types may suggest a snapshot view of the system, the seasonal movements and foraging of animals across these habitats illustrates the dynamic nature and vital connections that are crucial to the survival of this ecosystem.

Coastal Sage Scrub

"Coastal sage scrub" is a generic vegetation type that is inclusive of several subtypes⁴⁸. In the Santa Monica Mountains, coastal sage scrub is mostly of the type termed "Venturan Coastal Sage Scrub." In general, coastal sage scrub is comprised of dominant species that are semi-woody and low-growing, with shallow, dense roots that enable them to respond quickly to rainfall. Under the moist conditions of winter and spring, they grow quickly, flower, and produce light, wind-dispersed seeds, making them good colonizers following disturbance. These species cope with summer drought by dying back, dropping their leaves or producing a smaller summer leaf in order to reduce water loss. Stands of coastal sage scrub are much more open than chaparral and contain a greater admixture of herbaceous species. Coastal sage scrub is generally restricted to drier sites, such as low foothills, south-facing slopes, and shallow soils at higher elevations.

⁴⁵ National Park Service. 1993. A checklist of the birds of the Santa Monica Mountains National Recreation Area. Southwest Parks and Monuments Assoc., 221 N. Court, Tucson, AZ. 85701. and Letter from Dr. Marti Witter, NPS, Dated Sept. 13, 2001, in letters received and included in the September 2002 staff report for the Malibu LCP.

⁴⁶ Stralberg, D. 2000. Landscape-level urbanization effects on chaparral birds: A Santa Monica Mountains case study. p 125-136 in: Keeley, J. E., M. Baer-Keeley and C. J. Fotheringham (eds), 2nd Interface Between Ecology and Land Development in California, U.S. Geological Survey Open-File Report 00-62.

⁴⁷ Soule, M. E, D. T. Bolger, A. C. Alberts, J. Wright, M. Sorice and S. Hill. 1988. Reconstructed dynamics of rapid extinctions of chaparral-requiring birds in urban habitat islands. *Conserv. Biol.* 2: 75-92.

⁴⁸ Kirkpatrick, J.B. and C.F. Hutchinson. 1977. The community composition of Californian coastal sage scrub. *Vegetatio* 35:21-33; Holland, 1986. op.cit.; Sawyer and Keeler-Wolf, 1995, op.cit.

The species composition and structure of individual stands of coastal sage scrub depend on moisture conditions that derive from slope, aspect, elevation and soil type. Drier sites are dominated by more drought-resistant species (e.g., California sagebrush, coast buckwheat, and *Opuntia* cactus). Where more moisture is available (e.g., north-facing slopes), larger evergreen species such as toyon, laurel sumac, lemonade berry, and sugar bush are common. As a result, there is more cover for wildlife, and movement of large animals from chaparral into coastal sage scrub is facilitated in these areas. Characteristic wildlife in this community includes Anna's hummingbirds, rufous-sided towhees, California quail, greater roadrunners, Bewick's wrens, coyotes, and coast horned lizards⁴⁹, but most of these species move between coastal sage scrub and chaparral during their daily activities or on a seasonal basis.

Of the many important ecosystem roles performed by the coastal sage scrub community, five are particularly important in the Santa Monica Mountains. Coastal sage scrub provides critical linkages between riparian corridors, provides essential habitat for species that require several habitat types during the course of their life histories, provides essential habitat for local endemics, supports rare species that are in danger of extinction, and reduces erosion, thereby protecting the water quality of coastal streams.

Riparian woodlands are primary contributors to the high biodiversity of the Santa Monica Mountains. The ecological integrity of those riparian habitats not only requires wildlife dispersal along the streams, but also depends on the ability of animals to move from one riparian area to another. Such movement requires that the riparian corridors be connected by suitable habitat. In the Santa Monica Mountains, coastal sage scrub and chaparral provide that function. Significant development in coastal sage scrub would reduce the riparian corridors to linear islands of habitat with severe edge effects⁵⁰, reduced diversity, and lower productivity.

Most wildlife species and many species of plants utilize several types of habitat. Many species of animals endemic to Mediterranean habitats move among several plant communities during their daily activities and many are reliant on different communities either seasonally or during different stages of their life cycle. Without an intact mosaic of coastal sage scrub, chaparral, and riparian community types, many species will not thrive. Specific examples of the importance of interconnected communities, or habitats, were provided in the discussion above. This is an essential ecosystem role of coastal sage scrub.

A characteristic of the coastal sage scrub vegetation type is a high degree of endemism. This is consonant with Westman's observation that 44 percent of the species he sampled in coastal sage scrub occurred at only one of his 67 sites, which were

⁴⁹ National Park Service. 2000. Draft: General Management Plan & Environmental Impact Statement, Santa Monica Mountains National Recreation Area, US Dept. of Interior, National Park Service, December 2000.

⁵⁰ Environmental impacts are particularly severe at the interface between development and natural habitats. The greater the amount of this "edge" relative to the area of natural habitat, the worse the impact.

distributed from the San Francisco Bay area to Mexico⁵¹. Species with restricted distributions are by nature more susceptible to loss or degradation of their habitat. Westman said of this unique and local aspect of coastal sage scrub species in California:

"While there are about 50 widespread sage scrub species, more than half of the 375 species encountered in the present study of the sage scrub flora are rare in occurrence within the habitat range. In view of the reduction of the area of coastal sage scrub in California to 10-15% of its former extent and the limited extent of preserves, measures to conserve the diversity of the flora are needed."⁵²

Coastal sage scrub in southern California provides habitat for about 100 rare species⁵³, many of which are also endemic to limited geographic regions⁵⁴. In the Santa Monica Mountains, rare animals that inhabit coastal sage scrub⁵⁵ include the Santa Monica shieldback katydid, silvery legless lizard, coastal cactus wren, Bell's sparrow, San Diego desert woodrat, southern California rufous-crowned sparrow, coastal western whiptail, and San Diego horned lizard. Some of these species are also found in chaparral⁵⁶. Rare plants found in coastal sage scrub in the Santa Monica Mountains include Santa Susana tarplant, Coulter's saltbush, Blockman's dudleya, Braunton's milkvetch, Parry's spineflower, and Plummer's mariposa lily⁵⁷. A total of 32 sensitive species of reptiles, birds and mammals have been identified in this community by the National Park Service.⁵⁸

One of the most important ecological functions of coastal sage scrub in the Santa Monica Mountains is to protect water quality in coastal streams by reducing erosion in the watershed. Although shallow rooted, the shrubs that define coastal sage scrub have dense root masses that hold the surface soils much more effectively than the exotic annual grasses and forbs that tend to dominate in disturbed areas. The native shrubs of this community are resistant not only to drought, as discussed above, but well adapted to fire. Most of the semi-woody shrubs have some ability to crown sprout after

⁵¹ Westman, W.E. 1981. Diversity relations and succession in Californian coastal sage scrub. *Ecology* 62:170-184.

⁵² Ibid.

⁵³ Atwood, J. L. 1993. California gnatcatchers and coastal sage scrub: The biological basis for endangered species listing. pp.149-166 *In: Interface Between Ecology and Land Development in California*. Ed. J. E. Keeley, So. Calif. Acad. of Sci., Los Angeles. California Department of Fish and Game (CDFG). 1993. The Southern California Coastal Sage Scrub (CSS) Natural Communities Conservation Plan (NCCP). CDFG and Calif. Resources Agency, 1416 9th St., Sacramento, CA 95814.

⁵⁴ Westman, W.E. 1981. op. cit.

⁵⁵ Biological Resources Assessment of the Proposed Santa Monica Mountains Significant Ecological Area. Nov. 2000. Los Angeles Co., Dept. of Regional Planning, 320 West Temple St., Rm. 1383, Los Angeles, CA 90012.

⁵⁶ O'Leary J.F., S.A. DeSimone, D.D. Murphy, P.F. Brussard, M.S. Gilpin, and R.F. Noss. 1994. Bibliographies on coastal sage scrub and related malacophyllous shrublands of other Mediterranean-type climates. *California Wildlife Conservation Bulletin* 10:1-51.

⁵⁷ Biological Resources Assessment of the Proposed Santa Monica Mountains Significant Ecological Area. Nov. 2000. Los Angeles Co., Dept. of Regional Planning, 320 West Temple St., Rm. 1383, Los Angeles, CA 90012.

⁵⁸ NPS, 2000, op cit.

fire. Several CSS species (e.g., *Eriogonum cinereum*) in the Santa Monica Mountains and adjacent areas resprout vigorously and other species growing near the coast demonstrate this characteristic more strongly than do individuals of the same species growing at inland sites in Riverside County.⁵⁹ These shrub species also tend to recolonize rapidly from seed following fire. As a result they provide persistent cover that reduces erosion.

In addition to performing extremely important roles in the Mediterranean ecosystem, the coastal sage scrub community type has been drastically reduced in area by habitat loss to development. In the early 1980's it was estimated that 85 to 90 percent of the original extent of coastal sage scrub in California had already been destroyed.⁶⁰ Losses since that time have been significant and particularly severe in the coastal zone.

Therefore, because of its increasing rarity, its important role in the functioning of the Santa Monica Mountains Mediterranean ecosystem, and its extreme vulnerability to development, coastal sage scrub within the Santa Monica Mountains meets the definition of ESHA under the Coastal Act.

Chaparral

Another shrub community in the Santa Monica Mountain Mediterranean ecosystem is chaparral. Like "coastal sage scrub," this is a generic category of vegetation. Chaparral species have deep roots (10s of ft) and hard waxy leaves, adaptations to drought that increase water supply and decrease water loss at the leaf surface. Some chaparral species cope more effectively with drought conditions than do desert plants⁶¹. Chaparral plants vary from about one to four meters tall and form dense, intertwining stands with nearly 100 percent ground cover. As a result, there are few herbaceous species present in mature stands. Chaparral is well adapted to fire. Many species regenerate mainly by crown sprouting; others rely on seeds which are stimulated to germinate by the heat and ash from fires. Over 100 evergreen shrubs may be found in chaparral⁶². On average, chaparral is found in wetter habitats than coastal sage scrub, being more common at higher elevations and on north facing slopes.

The broad category "northern mixed chaparral" is the major type of chaparral shown in the National Park Service map of the Santa Monica Mountains. However, northern mixed chaparral can be variously dominated by chamise, scrub oak or one of several species of manzanita or by ceanothus. In addition, it commonly contains woody vines and large shrubs such as mountain mahogany, toyon, hollyleaf redberry, and sugarbush⁶³. The rare red shank chaparral plant community also occurs in the Santa Monica Mountains. Although included within the category "northern mixed chaparral" in

⁵⁹ Dr. John O'Leary, SDSU, personal communication to Dr. John Dixon, CCC, July 2, 2002

⁶⁰ Westman, W.E. 1981. op. cit.

⁶¹ Dr. Stephen Davis, Pepperdine University. Presentation at the CCC workshop on the significance of native habitats in the Santa Monica Mountains. June 13, 2002.

⁶² Keely, J.E. and S.C. Keeley. Chaparral. Pages 166-207 in M.G. Barbour and W.D. Billings, eds. North American Terrestrial Vegetation. New York, Cambridge University Press.

⁶³ Ibid.

the vegetation map, several types of ceanothus chaparral are reported in the Santa Monica Mountains. Ceanothus chaparral occurs on stable slopes and ridges, and may be dominated by bigpod ceanothus, buck brush ceanothus, hoaryleaf ceanothus, or greenbark ceanothus. In addition to ceanothus, other species that are usually present in varying amounts are chamise, black sage, holly-leaf redberry, sugarbush, and coast golden bush⁶⁴.

Several sensitive plant species that occur in the chaparral of the Santa Monica Mountains area are: Santa Susana tarplant, Lyon's pentachaeta, marcescent dudleya, Santa Monica Mountains dudleya, Braunton's milk vetch and salt spring checkerbloom⁶⁵. Several occurring or potentially occurring sensitive animal species in chaparral from the area are: Santa Monica shieldback katydid, western spadefoot toad, silvery legless lizard, San Bernardino ring-neck snake, San Diego mountain kingsnake, coast patch-nosed snake, sharp-shinned hawk, southern California rufous-crowned sparrow, Bell's sparrow, yellow warbler, pallid bat, long-legged myotis bat, western mastiff bat, and San Diego desert woodrat.⁶⁶

Coastal sage scrub and chaparral are the predominant generic community types of the Santa Monica Mountains and provide the living matrix within which rarer habitats like riparian woodlands exist. These two shrub communities share many important ecosystem roles. Like coastal sage scrub, chaparral within the Santa Monica Mountains provides critical linkages among riparian corridors, provides essential habitat for species that require several habitat types during the course of their life histories, provides essential habitat for sensitive species, and stabilizes steep slopes and reduces erosion, thereby protecting the water quality of coastal streams.

Many species of animals in Mediterranean habitats characteristically move among several plant communities during their daily activities, and many are reliant on different communities either seasonally or during different stages of their life cycle. The importance of an intact mosaic of coastal sage scrub, chaparral, and riparian community types is perhaps most critical for birds. However, the same principles apply to other taxonomic groups. For example, whereas coastal sage scrub supports a higher diversity of native ant species than chaparral, chaparral habitat is necessary for the coast horned lizard, an ant specialist⁶⁷. Additional examples of the importance of an interconnected communities, or habitats, were provided in the discussion of coastal sage scrub above. This is an extremely important ecosystem role of chaparral in the Santa Monica Mountains.

Chaparral is also remarkably adapted to control erosion, especially on steep slopes. The root systems of chaparral plants are very deep, extending far below the surface and

⁶⁴ Ibid.

⁶⁵ Biological Resources Assessment of the Proposed Santa Monica Mountains Significant Ecological Area. Nov. 2000. Los Angeles Co., Dept. of Regional Planning, 320 West Temple St., Rm. 1383, Los Angeles, CA 90012.

⁶⁶ Ibid.

⁶⁷ A.V. Suarez. Ants and lizards in coastal sage scrub and chaparral. A presentation at the CCC workshop on the significance of native habitats in the Santa Monica Mountains. June 13, 2002.

penetrating the bedrock below⁶⁸, so chaparral literally holds the hillsides together and prevents slippage.⁶⁹ In addition, the direct soil erosion from precipitation is also greatly reduced by 1) water interception on the leaves and above ground foliage and plant structures, and 2) slowing the runoff of water across the soil surface and providing greater soil infiltration. Chaparral plants are extremely resistant to drought, which enables them to persist on steep slopes even during long periods of adverse conditions. Many other species die under such conditions, leaving the slopes unprotected when rains return. Since chaparral plants recover rapidly from fire, they quickly re-exert their ground stabilizing influence following burns. The effectiveness of chaparral for erosion control after fire increases rapidly with time⁷⁰. Thus, the erosion from a 2-inch rain-day event drops from 5 yd³/acre of soil one year after a fire to 1 yd³/acre after 4 years.⁷¹ The following table illustrates the strong protective effect of chaparral in preventing erosion.

Soil erosion as a function of 24-hour precipitation and chaparral age.

Years Since Fire	Erosion (yd ³ /acre) at Maximum 24-hr Precipitation of:		
	2 inches	5 inches	11 inches
1	5	20	180
4	1	12	140
17	0	1	28
50+	0	0	3

Therefore, because of its important roles in the functioning of the Santa Monica Mountains Mediterranean ecosystem, and its extreme vulnerability to development, chaparral within the Santa Monica Mountains meets the definition of ESHA under the Coastal Act.

Oak Woodland and Savanna

Coast live oak woodland occurs mostly on north slopes, shaded ravines and canyon bottoms. Besides the coast live oak, this plant community includes hollyleaf cherry, California bay laurel, coffeeberry, and poison oak. Coast live oak woodland is more

⁶⁸ Helmers, H., J.S. Horton, G. Juhren and J. O'Keefe. 1955. Root systems of some chaparral plants in southern California. *Ecology* 36(4):667-678. Kummerow, J. and W. Jow. 1977. Root systems of chaparral shrubs. *Oecologia* 29:163-177.

⁶⁹ Radtke, K. 1983. *Living more safely in the chaparral-urban interface*. General Technical Report PSW-67. U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station, Berkeley, California. 51 pp.

⁷⁰ Kittredge, J. 1973. *Forest influences — the effects of woody vegetation on climate, water, and soil*. Dover Publications, New York. 394 pp. Longcore, T and C. Rich. 2002. Protection of environmentally sensitive habitat areas in proposed local coastal plan for the Santa Monica Mountains. (Table 1). The Urban Wildlands Group, Inc., P.O. Box 24020 Los Angeles, CA 90024. Vicars, M. (ed.) 1999. *FireSmart: protecting your community from wildfire*. Partners in Protection, Edmonton, Alberta.

⁷¹ *Ibid.*

tolerant of salt-laden fog than other oaks and is generally found nearer the coast⁷². Coast live oak also occurs as a riparian corridor species within the Santa Monica Mountains.

Valley oaks are endemic to California and reach their southern most extent in the Santa Monica Mountains. Valley oaks were once widely distributed throughout California's perennial grasslands in central and coastal valleys. Individuals of this species may survive 400-600 years. Over the past 150 years, valley oak savanna habitat has been drastically reduced and altered due to agricultural and residential development. The understory is now dominated by annual grasses and recruitment of seedlings is generally poor. This is a very threatened habitat.

The important ecosystem functions of oak woodlands and savanna are widely recognized⁷³. These habitats support a high diversity of birds⁷⁴, and provide refuge for many species of sensitive bats⁷⁵. Typical wildlife in this habitat includes acorn woodpeckers, scrub jays, plain titmice, northern flickers, cooper's hawks, western screech owls, mule deer, gray foxes, ground squirrels, jackrabbits and several species of sensitive bats.

Therefore, because of their important ecosystem functions and vulnerability to development, oak woodlands and savanna within the Santa Monica Mountains met the definition of ESHA under the Coastal Act.

Grasslands

Grasslands consist of low herbaceous vegetation that is dominated by grass species but may also harbor native or non-native forbs.

California Perennial Grassland

Native grassland within the Santa Monica Mountains consists of perennial native needlegrasses: purple needlegrass, (*Nassella pulchra*), foothills needlegrass, (*Nassella lepida*) and nodding needlegrass (*Nassella cernua*). These grasses may occur in the same general area but they do not typically mix, tending to segregate based on slope

⁷² NPS 2000. op. cit.

⁷³ Block, W.M., M.L. Morrison, and J. Verner. 1990. Wildlife and oak-woodland interdependency. *Fremontia* 18(3):72-76. Pavlik, B.M., P.C. Muick, S. Johnson, and M. Popper. 1991. *Oaks of California*. Cachuma Press and California Oak Foundation, Los Olivos, California. 184 pp.

⁷⁴ Cody, M.L. 1977. Birds. Pp. 223-231 in Throver, N.J.W., and D.E. Bradbury (eds.). *Chile-California Mediterranean scrub atlas*. US/IBP Synthesis Series 2. Dowden, Hutchinson & Ross, Stroudsburg, Pennsylvania. National Park Service. 1993. A checklist of the birds of the Santa Monica Mountains National Recreation Area. Southwest Parks and Monuments Assoc., 221 N. Court, Tucson, AZ. 85701

⁷⁵ Miner, K.L., and D.C. Stokes. 2000. Status, conservation issues, and research needs for bats in the south coast bioregion. Paper presented at *Planning for biodiversity: bringing research and management together*, February 29, California State University, Pomona, California.

and substrate factors⁷⁶. Mixed with these native needlegrasses are many non-native annual species that are characteristic of California annual grassland⁷⁷. Native perennial grasslands are now exceedingly rare⁷⁸. In California, native grasslands once covered nearly 20 percent of the land area, but today are reduced to less than 0.1 percent⁷⁹. The California Natural Diversity Database (CNDDDB) lists purple needlegrass habitat as a community needing priority monitoring and restoration. The CNDDDB considers grasslands with 10 percent or more cover by purple needlegrass to be significant, and recommends that these be protected as remnants of original California prairie. Patches of this sensitive habitat occur throughout the Santa Monica Mountains where they are intermingled with coastal sage scrub, chaparral and oak woodlands.

Many of the raptors that inhabit the Santa Monica Mountains make use of grasslands for foraging because they provide essential habitat for small mammals and other prey. Grasslands adjacent to woodlands are particularly attractive to these birds of prey since they simultaneously offer perching and foraging habitat. Particularly noteworthy in this regard are the white-tailed kite, northern harrier, sharp-shinned hawk, Cooper's hawk, red-shouldered hawk, red-tailed hawk, golden eagle, American kestrel, merlin, and prairie falcon⁸⁰.

Therefore, because of their extreme rarity, important ecosystem functions, and vulnerability to development, California native perennial grasslands within the Santa Monica Mountains meet the definition of ESHA under the Coastal Act.

California Annual Grassland

The term "California annual grassland" has been proposed to recognize the fact that non-native annual grasses should now be considered naturalized and a permanent feature of the California landscape and should be acknowledged as providing important ecological functions. These habitats support large populations of small mammals and provide essential foraging habitat for many species of birds of prey. California annual grassland generally consists of dominant invasive annual grasses that are primarily of Mediterranean origin. The dominant species in this community include common wild oats (*Avena fatua*), slender oat (*Avena barbata*), red brome (*Bromus madritensis* ssp. *Rubens*), ripgut brome, (*Bromus diandrus*), and herbs such as black mustard (*Brassica nigra*), wild radish (*Raphanus sativus*) and sweet fennel (*Foeniculum vulgare*). Annual grasslands are located in patches throughout the Santa Monica Mountains in previously disturbed areas, cattle pastures, valley bottoms and along roadsides. While many of

⁷⁶ Sawyer, J. O. and T. Keeler-Wolf. 1995. A manual of California vegetation. California Native Plant Society, 1722 J St., Suite 17, Sacramento, CA 95814.

⁷⁷ Biological Resources Assessment of the Proposed Santa Monica Mountains Significant Ecological Area. Nov. 2000. Los Angeles Co., Dept. of Regional Planning, 320 West Temple St., Rm. 1383, Los Angeles, CA 90012.

⁷⁸ Noss, R.F., E.T. LaRoe III and J.M. Scott. 1995. Endangered ecosystems of the United States: a preliminary assessment of loss and degradation. Biological Report 28. National Biological Service, U.S. Dept. of Interior.

⁷⁹ NPS 2000. op. cit.

⁸⁰ NPS 2000. op. cit.

these patches are dominated by invasive non-native species, it would be premature to say that they are never sensitive or do not harbor valuable annual native species. A large number of native forbs also may be present in these habitats⁸¹, and many native wildflowers occur primarily in annual grasslands. In addition, annual grasslands are primary foraging areas for many sensitive raptor species in the area.

Inspection of California annual grasslands should be done prior to any impacts to determine if any rare native species are present or if any rare wildlife rely on the habitat and to determine if the site meets the Coastal Act ESHA criteria.

Effects of Human Activities and Development on Habitats within the Santa Monica Mountains

The natural habitats of the Santa Monica Mountains are highly threatened by current development pressure, fragmentation and impacts from the surrounding megalopolis. The developed portions of the Santa Monica Mountains represents the extension of this urbanization into natural areas. About 54% of the undeveloped Santa Monica Mountains are in private ownership⁸², and computer simulation studies of the development patterns over the next 25 years predict a serious increase in habitat fragmentation⁸³. Development and associated human activities have many well-documented deleterious effects on natural communities. These environmental impacts may be both direct and indirect and include the effects of increased fire frequency, of fire clearance, of introduction of exotic species, and of night lighting.

Increased Fire Frequency

Since 1925, all the major fires in the Santa Monica Mountains have been caused by human activities⁸⁴. Increased fire frequency alters plant communities by creating conditions that select for some species over others. Strong resprouting plant species such as laurel sumac, are favored while non-sprouters like bigpod ceanothus, are at a disadvantage. Frequent fire recurrence before the non-sprouters can develop and reestablish a seed bank is detrimental, so that with each fire their chances for propagation are further reduced. Resprouters can be sending up new shoots quickly, and so they are favored in an increased fire frequency regime. Also favored are weedy and invasive species. Dr. Steven Davis in his abstract for a Coastal Commission

⁸¹ Holstein, G. 2001. Pre-agricultural grassland in Central California. *Madrono* 48(4):253-264. Stromberg, M.R., P. Kephart and V. Yadon. 2001. Composition, invasibility and diversity of coastal California grasslands. *Madrono* 48(4):236-252.

⁸² National Park Service. 2000. Draft: General Management Plan & Environmental Impact Statement, Santa Monica Mountains National Recreation Area, US Dept. of Interior, National Park Service, December 2000.

⁸³ Swenson, J. J., and J. Franklin. 2000. The effects of future urban development on habitat fragmentation in the Santa Monica Mountains. *Landscape Ecol.* 15:713-730.

⁸⁴ NPS, 2000, op. cit.

Workshop stated⁸⁵ *"We have evidence that recent increases in fire frequency has eliminated drought-hardy non-sprouters from chaparral communities near Malibu, facilitating the invasion of exotic grasses and forbs that further exacerbate fire frequency."* Thus, simply increasing fire frequency from about once every 22 years (the historical frequency) to about once every 12 years (the current frequency) can completely change the vegetation community. This has cascading effects throughout the ecosystem.

Fuel Clearance

The removal of vegetation for fire protection in the Santa Monica Mountains is required by law in "Very High Fire Hazard Severity Zones"⁸⁶. Fuel removal is reinforced by insurance carriers⁸⁷. Generally, the Santa Monica Mountains are considered to be a high fire hazard severity zone. In such high fire hazard areas, homeowners must often resort to the California FAIR Plan to obtain insurance. Because of the high risk, all homes in "brush areas" are assessed an insurance surcharge if they have less than the recommended 200-foot fuel modification zone⁸⁸ around the home. The combination of insurance incentives and regulation assures that the 200-foot clearance zone will be applied universally⁸⁹. While it is not required that all of this zone be cleared of vegetation, the common practice is simply to disk this zone, essentially removing or highly modifying all native vegetation. For a new structure not adjacent to existing structures, this results in the removal or modification of a minimum of three acres of vegetation⁹⁰. While the directly impacted area is large, the effects of fuel modification extend beyond the 200-foot clearance area.

Effects of Fuel Clearance on Bird Communities

The impacts of fuel clearance on bird communities was studied by Stralberg who identified three ecological categories of birds in the Santa Monica Mountains: 1) local and long distance migrators (ash-throated flycatcher, Pacific-slope flycatcher, phainopepla, black-headed grosbeak), 2) chaparral-associated species (Bewick's wren, wrentit, blue-gray gnatcatcher, California thrasher, orange-crowned warbler, rufous-crowned sparrow, spotted towhee, California towhee) and 3) urban-associated species

⁸⁵ Davis, Steven. Effects of fire and other factors on patterns of chaparral in the Santa Monica Mountains, Coastal Commission Workshop on the Significance of Native Habitats in the Santa Monica Mountains. CCC Hearing, June 13, 2002, Queen Mary Hotel.

⁸⁶ 1996 Los Angeles County Fire Code Section 1117.2.1

⁸⁷ Longcore, T and C. Rich. 2002. Protection of environmentally sensitive habitat areas in proposed local coastal plan for the Santa Monica Mountains. The Urban Wildlands Group, Inc., P.O. Box 24020 Los Angeles, CA 90024. Vicars, M. (ed.) 1999. FireSmart: protecting your community from wildfire. Partners in Protection, Edmonton, Alberta.

⁸⁸ Fuel Modification Plan Guidelines. Co. of Los Angeles Fire Department, Fuel Modification Unit, Prevention Bureau, Forestry Division, Brush Clearance Section, January 1998.

⁸⁹ Longcore, T and C. Rich. 2002. Protection of environmentally sensitive habitat areas in proposed local coastal plan for the Santa Monica Mountains. The Urban Wildlands Group, Inc., P.O. Box 24020 Los Angeles, CA 90024.

⁹⁰ Ibid.

(mourning dove, American crow, Western scrub-jay, Northern mockingbird)⁹¹. It was found in this study that the number of migrators and chaparral-associated species decreased due to habitat fragmentation while the abundance of urban-associated species increased. The impact of fuel clearance is to greatly increase this edge-effect of fragmentation by expanding the amount of cleared area and "edge" many-fold. Similar results of decreases in fragmentation-sensitive bird species are reported from the work of Bolger et al. in southern California chaparral⁹².

Effects of Fuel Clearance on Arthropod Communities

Fuel clearance and habitat modification may also disrupt native arthropod communities, and this can have surprising effects far beyond the cleared area on species seemingly unrelated to the direct impacts. A particularly interesting and well-documented example with ants and lizards illustrates this point. When non-native landscaping with intensive irrigation is introduced, the area becomes favorable for the invasive and non-native Argentine ant. This ant forms "super colonies" that can forage more than 650 feet out into the surrounding native chaparral or coastal sage scrub around the landscaped area⁹³. The Argentine ant competes with native harvester ants and carpenter ants displacing them from the habitat⁹⁴. These native ants are the primary food resource for the native coast horned lizard, a California "Species of Special Concern." As a result of Argentine ant invasion, the coast horned lizard and its native ant food resources are diminished in areas near landscaped and irrigated developments⁹⁵. In addition to specific effects on the coast horned lizard, there are other Mediterranean habitat ecosystem processes that are impacted by Argentine ant invasion through impacts on long-evolved native ant-plant mutualisms⁹⁶. The composition of the whole arthropod community changes and biodiversity decreases when habitats are subjected to fuel modification. In coastal sage scrub disturbed by fuel modification, fewer arthropod

⁹¹ Stralberg, D. 2000. Landscape-level urbanization effects on chaparral birds: a Santa Monica Mountains case study. Pp. 125–136 in Keeley, J.E., M. Baer-Keeley, and C.J. Fotheringham (eds.). *2nd interface between ecology and land development in California*. U.S. Geological Survey, Sacramento, California.

⁹² Bolger, D. T., T. A. Scott and J. T. Rotenberry. 1997. Breeding bird abundance in an urbanizing landscape in coastal Southern California. *Conserv. Biol.* 11:406-421.

⁹³ Suarez, A.V., D.T. Bolger and T.J. Case. 1998. Effects of fragmentation and invasion on native ant communities in coastal southern California. *Ecology* 79(6):2041-2056.

⁹⁴ Holway, D.A. 1995. The distribution of the Argentine ant (*Linepithema humile*) in central California: a twenty-year record of invasion. *Conservation Biology* 9:1634-1637. Human, K.G. and D.M. Gordon. 1996. Exploitation and interference competition between the invasive Argentine ant, (*Linepithema humile*), and native ant species. *Oecologia* 105:405-412.

⁹⁵ Fisher, R.N., A.V. Suarez and T.J. Case. 2002. Spatial patterns in the abundance of the coastal horned lizard. *Conservation Biology* 16(1):205-215. Suarez, A.V. J.Q. Richmond and T.J. Case. 2000. Prey selection in horned lizards following the invasion of Argentine ants in southern California. *Ecological Applications* 10(3):711-725.

⁹⁶ Suarez, A.V., D.T. Bolger and T.J. Case. 1998. Effects of fragmentation and invasion on native ant communities in coastal southern California. *Ecology* 79(6):2041-2056. Bond, W. and P. Slingsby. Collapse of an Ant-Plant Mutualism: The Argentine Ant (*Iridomyrmex humilis*) and Myrmecochorous Proteaceae. *Ecology* 65(4):1031-1037.

predator species are seen and more exotic arthropod species are present than in undisturbed habitats⁹⁷.

Studies in the Mediterranean vegetation of South Africa (equivalent to California shrubland with similar plant species) have shown how the invasive Argentine ant can disrupt the whole ecosystem.⁹⁸ In South Africa the Argentine ant displaces native ants as they do in California. Because the native ants are no longer present to collect and bury seeds, the seeds of the native plants are exposed to predation, and consumed by seed eating insects, birds and mammals. When this habitat burns after Argentine ant invasion the large-seeded plants that were protected by the native ants all but disappear. So the invasion of a non-native ant species drives out native ants, and this can cause a dramatic change in the species composition of the plant community by disrupting long-established seed dispersal mutualisms. In California, some insect eggs are adapted to being buried by native ants in a manner similar to plant seeds⁹⁹.

Artificial Night Lighting

One of the more recently recognized human impacts on ecosystem function is that of artificial night lighting as it effects the behavior and function of many different types of organisms¹⁰⁰. For literally billions of years the only nighttime sources of light were the moon and stars, and living things have adapted to this previously immutable standard and often depend upon it for their survival. A review of lighting impacts suggests that whereas some species are unaffected by artificial night lighting, many others are severely impacted. Overall, most impacts are negative ones or ones whose outcome is unknown. Research to date has found negative impacts to plants, aquatic and terrestrial invertebrates, amphibians, fish, birds and mammals, and a detailed literature review can be found in the report by Longcore and Rich¹⁰¹.

Summary

In a past action, the Coastal Commission found¹⁰² that the Santa Monica Mountains Mediterranean Ecosystem, which includes the undeveloped native habitats of the Santa Monica Mountains, is rare and especially valuable because of its relatively pristine

⁹⁷ Longcore, T.R. 1999. Terrestrial arthropods as indicators of restoration success in coastal sage scrub. Ph.D. Dissertation, University of California, Los Angeles.

⁹⁸ Christian, C. 2001. Consequences of a biological invasion reveal the importance of mutualism for plant communities. *Nature* 413:635-639.

⁹⁹ Hughes, L. and M. Westoby. 1992. Capitula on stick insect eggs and elaiosomes on seeds: convergent adaptations for burial by ants. *Functional Ecology* 6:642-648.

¹⁰⁰ Longcore, T and C. Rich. 2002. Protection of environmentally sensitive habitat areas in proposed local coastal plan for the Santa Monica Mountains. The Urban Wildlands Group, Inc., P.O. Box 24020 Los Angeles, CA 90024.

¹⁰¹ Ibid, and Ecological Consequences of Artificial Night Lighting, Conference, February 23-24, 2002, UCLA Los Angeles, California.

¹⁰² Revised Findings for the City of Malibu Local Coastal Program (as adopted on September 13, 2002) adopted on February 6, 2003.

character, physical complexity, and resultant biological diversity. The undeveloped native habitats within the Santa Monica Mountains that are discussed above are ESHA because of their valuable roles in that ecosystem, including providing a critical mosaic of habitats required by many species of birds, mammals and other groups of wildlife, providing the opportunity for unrestricted wildlife movement among habitats, supporting populations of rare species, and preventing the erosion of steep slopes and thereby protecting riparian corridors, streams and, ultimately, shallow marine waters.

The importance the native habitats in the Santa Monica Mountains was emphasized nearly 20 years ago by the California Department of Fish and Game¹⁰³. Commenting on a Draft Land Use Plan for the City of Malibu, the Regional Manager wrote that, "It is essential that large areas of land be reclassified to reflect their true status as ESHAs. One of the major needs of the Malibu LUP is that it should provide protection for entire drainages and not just stream bottoms." These conclusions were supported by the following observations:

"It is a fact that many of the wildlife species of the Santa Monica Mountains, such as mountain lion, deer, and raccoon, have established access routes through the mountains. They often travel to and from riparian zones and development such as high density residential may adversely affect a wildlife corridor.

Most animal species that exist in riparian areas will, as part of their life histories, also be found in other habitat types, including chapparal (sic) or grassland. For example, hawks nest and roost in riparian areas, but are dependent on large open areas for foraging. For the survival of many species, particularly those high on the food chain, survival will depend upon the presence of such areas. Such areas in the Santa Monica Mountains include grassland and coastal sage scrub communities, which have been documented in the SEA studies as supporting a wide diversity of plant and animal life."

This analysis by the Department of Fish and Game is consonant with the findings of the Commission in the case of the Malibu LCP, and with the conclusion that large contiguous areas of relatively pristine native habitat in the Santa Monica Mountains meet the definition of ESHA under the Coastal Act.

¹⁰³ Letter from F. A. Worthley, Jr. (CDFG) to N. Lucast (CCC) re Land Use Plan for Malibu dated March 22, 1983.