Area of Special Biological Significance
ASBS #24 Mugu Lagoon to Latigo Point
Request for Exception

CITY OF MALIBU
23815 Stuart Ranch Road
Malibu, California 90265

July 2007

CITY OF MALIBU

REQUEST FOR EXCEPTION – ASBS #24

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Request for Exception for Discharges
Area of Special Biological Significance
ASBS #24 – Mugu Lagoon to Latigo Point

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23815 Stuart Ranch Road
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July 2007

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July 31, 2007

Dominic Gregorio, Executive Officer
STATE WATER RESOURCES CONTROL BOARD
Division of Water Quality
1001 "I" Street
P.O. Box 100
Sacramento, CA 95812-0100

RE: Request for Exception for Stormwater Discharges into the Mugu Lagoon to Latigo Point Area of Special Biological Significance (ASBS)

Dear Mr. Gregario:

The City of Malibu submits this letter in response to the State Water Resources Control Board's letter dated October 18, 2004, and recent correspondence dated June 18, 2007, alleging a violation of the prohibition against stormwater discharge in the ASBS. In response to the Board's direction, the City of Malibu requests the issuance of an exception for any stormwater discharges by the City of Malibu to the Mugu Lagoon to Latigo Point Area of Special Biological Significance (ASBS No. 24).

The City of Malibu is a unique land and marine environment. Approximately 11.7 miles of the City's 21 miles of coastline lie within the Mugu Lagoon to Latigo Point Area of Special Biological Significance (ASBS No. 24). Malibu is committed to protecting the environment. Part of that effort involves allocating resources to determine the sources of pollution and implementing a strong, well-informed, effective and comprehensive Clean Water Program. The City also welcomes the opportunity to work with the Board to develop cooperative, comprehensive, achievable regulations that will improve water quality.

To comply with the Board's current request to apply for an exception to the Ocean Plan, the City is submitting the enclosed package of information. As you will see, the materials presented today, and that will be supplemented in coming weeks, show that issuance of an exception to the Ocean Plan will serve the public interest and will not compromise protection of ocean waters for beneficial uses. The following information, which the State Board requires to consider an application for exception, is presented in this package:

1. Contact information for the City of Malibu;
2. This signed statement requesting an exception from the ASBS discharge prohibition in Sections III.E.1 and III.H.2 of the Ocean Plan;
3. List of applicable permits;
4. A description of the beneficial uses and marine life;
5. Receiving water data;

6. Characterization of the Malibu Creek Watershed;
7. Description of the current and planned treatment processes, controls and best management practices;
8. Compliance history for drainages into the ASBS; and
9. Documentation that the public interest will be served by granting the exception.

The City is working diligently to analyze the water in ASBS No. 24 and to provide all of the information required by the Board. The City has enlisted the services of Dr. Richard Ambrose, an environmental scientist at the University of California Los Angeles, to collect and analyze dry weather water samples from three locations within the ASBS. The water samples have been taken and the analysis is underway. The complete lab results and corresponding monitoring analysis are expected to be complete no later than September 1, 2007 and will be provided to the Board to supplement this submittal immediately thereafter. In its place, the scope of services describing the specific monitoring activities is included in the Receiving Water Data section of this package.

Additionally, the record-breaking period of dry weather in Southern California has precluded any wet weather sampling at this time. The City is prepared to conduct wet weather sampling at two municipal drain sites and at the Paradise Cove reference site upon occurrence of a sufficient storm event in the area. In the meantime, the City is providing an empirical runoff model which uses data on local rainfall, land use, drainage and local and national water quality to estimate pollutant loadings to the receiving waters. This data can be found in the Receiving Water Data section of this package.

We respectfully note that this request for an exception is subject to any and all objections and defenses that may be raised to the applicability of the Ocean Plan, the Porter-Cologne Act, or the Public Resources Code to any alleged discharges. Such objections and defenses include, without limitation, that the Ocean Plan should not be applied to stormwater discharges in the absence of a statewide stormwater policy and that the Board is obligated, pursuant to California Water Code Sections 13241 and 13242, to conduct an analysis of the impacts of the application of the Ocean Plan to stormwater discharges. The City of Malibu reserves the right to challenge a determination by the Board that any particular point source is discharging into the ASBS and does not waive any argument or defense by virtue of making this request.

Please direct all future correspondence related to this issue to Jennifer Voccola, Environmental Programs Coordinator, at (310) 456-2489, extension 275 or jvoccola@ci.malibu.ca.us.

Sincerely,

Jim Thorsen
City Manager

Enclosures

cc: Ms. Deborah Smith, Interim Executive Officer, LARWQCB

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State Water Resources Control Board

Division of Water Quality
1001 I Street • Sacramento, California 95814 • (916) 341-5455
Mailing Address: P.O. Box 100 • Sacramento, California • 95812-0100
FAX (916) 341-5463 • Internet Address: http://www.waterboards.ca.gov

Alan C. Lloyd, Ph.D.
Agency Secretary

Arnold Schwarzenegger
Governor

August 18, 2005

Mr. Yugal K. Lall
Public Works Director/City Engineer
City of Malibu
23815 Stuart Ranch Road
Malibu, CA 90265-4861

Dear Mr. Lall:

REQUEST FOR EXCEPTION FOR DISCHARGES INTO AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE

This letter is to acknowledge the receipt by the State Water Resources Control Board (State Water Board) of your letter dated January 4, 2005, requesting an exception from the California Ocean Plan (Ocean Plan) waste discharge prohibition for your discharges into the Mugu Lagoon to Latigo Point (a.k.a. Laguna Point to Latigo Point) Area of Special Biological Significance (ASBS). The following specific information needs to be submitted, by May 31, 2006, to support the State Water Board's consideration of an exception to the Ocean Plan for discharges to ASBS:

1. The discharger's name, address, and contact information.
2. Any applicable permit or order numbers, if the discharge is or has been regulated under a National Pollutant Discharge Elimination System (NPDES) Permit or Waste Discharge Requirements.
3. A signed statement requesting coverage under an exception from the ASBS waste discharge prohibition found in Sections III.E.1 and III.H.2 of the Ocean Plan.
4. Documentation that shows that allowing the discharge of storm water runoff to continue will not compromise protection of ocean waters for beneficial uses. Note that one beneficial use is the preservation and enhancement of ASBS, which are defined as "those areas designated by the [State Water Board] as requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable." This means that any data that you may have on the status and description of marine life in the ASBS, and on the natural background of the ASBS, are relevant and must be submitted. At a minimum, you must submit a quantitative description of marine life near the discharge and at a reference location away from the discharge.
5. An assessment of all available historical data on discharge volume, chemical and physical constituents, toxicity, and indicator bacteria in the runoff and in the ambient marine water of the ASBS. At a minimum, the information must include the measurement of a representative

sample within the last two years or the upcoming storm season (runoff and adjacent marine receiving water) during a storm event for each of the following constituents:

a. total Ocean Plan metals
b. polynuclear aromatic hydrocarbons (PAHs)
c. oil and grease
d. ammonia nitrogen
e. acute toxicity for a marine species
f. critical life stage (chronic) toxicity for three marine species
g. indicator bacteria including total coliform, fecal coliform (or *E. coli*), and enterococcus.

The applicable Ocean Plan detection limits and other applicable monitoring requirements must be adhered to in performing this work. If you are responsible for more than ten municipal discharge points then a representative sample must be (or have been) collected and analyzed for one of every ten discharge points. All samples must be collected during a storm event that is greater than 0.1 inch and at least 72 hours from the previously measurable storm event. Where feasible, the variance in the duration of the event and the total rainfall of the event should not exceed 50 percent from the average or median rainfall event in that area.

6. A characterization of the watershed areas draining to the ASBS in terms of land use, population density, and percentage of impervious surface. If there is land under your jurisdiction where pesticides or herbicides are applied, provide a listing of such treatments in terms of the chemicals and application rates.
7. A description of current treatment processes, pollution controls, and/or best management practices currently used or planned (with a schedule for implementation).
8. An analysis of alternatives to the discharge and their impacts if implemented.
9. Compliance history for drainages into the ASBS, including any spills or upset events that resulted in the discharge of toxic or otherwise prohibited substances, including untreated or partially treated wastewater.
10. Documentation that shows that the public interest will be served by granting the exception.

Please send this information to the State Water Board, Division of Water Quality, attention Dominic Gregorio, and to the Executive Officer of the Los Angeles Regional Water Quality Control Board (Los Angeles Water Board).

The State Water Board is holding a workshop in Monterey on August 31, 2005 to discuss the ASBS exception process. At that workshop, staff will propose the concept of a general exception as one option for addressing storm water runoff into ASBS. The exception process may be amended following the workshop. However, any exception is likely to include minimizing or eliminating dry weather flows, and reducing pollutants draining to ASBS to maintain natural water quality in the receiving waters. In the meantime, you are requested to plan for and institute best management practices to eliminate or minimize dry weather flow and to reduce pollutants in storm water runoff.

If the State Water Board issues an exception, the Los Angeles Water Board may allow your discharges to be covered under the Municipal Separate Storm Sewer Systems Phase I NPDES Permit, with appropriate provisions required in your storm water management plan. In all cases, the Los Angeles Water Board will enforce the mitigation measures described in the exception if it is granted by the State Water Board.

If you have any questions, feel free to contact me at (916) 341-5458 or smartinson@waterboards.ca.gov, or Dominic Gregorio, Chief of the Ocean Standards Unit, Division of Water Quality, at (916) 341-5488 or dgregorio@waterboards.ca.gov.

Sincerely,

Original signed by

Stan Martinson, Chief
Division of Water Quality

cc: Mr. Jonathan Bishop, Executive Officer
Los Angeles Regional Water Quality Control Board
320 West 4th St. Suite 200
Los Angeles, CA 90013

Bcc: Celeste Cantú, EXEC
Tom Howard, EXEC
Sheila Vassey, OCC
John Ladd, DWQ
Bruce Fujimoto, DWQ
Dominic Gregorio, DWQ

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Applicable Permits

The City of Malibu is a Permittee under the State of California's Regional Water Quality Control Board, Los Angeles Region, NPDES Permit No. CAS0004001, adopted on December 13, 2001 by Order No. 01-182 and amended on September 14, 2006 by Order No. R4-2006-0074. The NPDES permit contains the waste discharge requirements for municipal storm and urban runoff discharges within the County of Los Angeles and the incorporated cities within, excluding the City of Long Beach.

Beneficial Uses and Marine Life

The material in this section is to address the request for "*Documentation that shows that allowing the discharge of storm water runoff to continue will not compromise protection of ocean waters for beneficial uses. Note that one beneficial use is the preservation and enhancement of ASBS, which are defined as 'those areas designated by the [State Water Board] as requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable.' This means that any data that you may have on the status and description of marine life in the ASBS, and on the natural background of the ASBS, are relevant and must be submitted. At a minimum, you must submit a quantitative description of marine life near the discharge and at a reference location away from the discharge."*

Richard F. Ambrose, Ph.D., a local expert in the marine life of this area (his professional vita is included at the end of this Section), prepared this documentation for the City in his report summarizing existing studies and available information about the marine life in the portion of ASBS #24 that is within Malibu's city limits. Dr. Ambrose relied on the information his team of researchers has collected since 1994 as part of a long-term rocky intertidal monitoring program as well as information collected and compiled by others. His report synthesizes these data and, to the extent possible, includes a quantitative description of marine life near alleged location of discharge and at a reference location away from alleged discharge. Dr. Ambrose's scope of work and the final report of his findings are included in this section.

The City takes an active role in protecting both terrestrial and marine wildlife. The City has contracted for wildlife rescue and education services since 1996. Included in the appendix is a copy of the City's current contract for services with the California Wildlife Center and the most recent semi-annual report that details recent activities for Prescott grant which funds the program. This program is also referenced in the Treatment Processes and BMPs Section summary spreadsheet.

Summary of the Biological Resources of the Malibu Area of Biological Significance Mugu Lagoon to Latigo Point

Richard F. Ambrose, Ph.D.

Steven F. Lee, M.S.

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1. Introduction

An Area of Special Biological Significance (ASBS) has been established between Mugu Lagoon and Latigo Point (a.k.a. Laguna Point to Latigo Point, see Figure 1). ASBS regulations prohibit waste discharges, and the City of Malibu is requesting an exception to this prohibition. The California State Water Resources Control Board (SWRCB) has identified specific information it needs to consider the City's request for an exception.

In a letter to the City dated August 18, 2005, the Chief of the SWRCB Division of Water Quality listed a number of information requirements, including the following:

> "Documentation that shows that allowing the discharge of storm water runoff to continue will not compromise protection of ocean waters for beneficial uses. Note that one beneficial use is the preservation and enhancement of ASBS, which are defined as "those areas designated by the [State Water Board] as requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable." This means that any data that you may have on the status and description of marine life in the ASBS, and on the natural background of the ASBS, are relevant and must be submitted. At a minimum, you must submit a quantitative description of marine life near the discharge and at a reference location away from the discharge."

This report addresses this information request described in the SWRCB's letter and as further clarified by a meeting on June 13, 2007 with Connie Anderson of the SWRCB staff.

This report provides information on the marine life in rocky intertidal and sandy beach habitats in the ASBS.

2. Rocky Intertidal Resources

The rocky intertidal habitat supports a rich and valuable resource in the Malibu ASBS. In this section, we summarize the information available about rocky intertidal resources along the Malibu coastline, with a particular focus on the Paradise Cove area (Figure 2). Paradise Cove represents a section of the coastline with relatively few discharges, and thus appears to be the best "reference" site for this section of the ASBS.

We begin by summarizing information from rocky intertidal studies conducted prior to the designation of this section of coastline as an ASBS in the next section. In Section 2.2 we present data that have been collected recently, and thus represent the current status of the area.

2.1. Historical Data

Very early information about rocky intertidal resources in southern California tends to be anecdotal or qualitative. Most often, reductions in the abundances of particular species are noted. Some of the species said to be much less common than previously are harvested by humans. For example, along sandy beaches the pismo clam was said by MacGinitie and MacGinitie (1968) to have been extremely abundant on the west coast of North America until depleted by humans. Ricketts and Calvin (1968) report that octopuses were no longer as abundant as they once had been around Los Angeles because of harvesting by humans. However, because of the anecdotal nature of most early observations, it is difficult to know the true extent of any changes that may have occurred from those times.

One of the earliest scientific studies of west coast rocky intertidal communities, which included sites along the Malibu coast, was completed by Dawson (1959, 1965), who studied the benthic algae on a series of 44 transects throughout southern California. Six of Dawson's surveys occurred within the Mugu-Latigo ASBS (Table 1). The number of algal species varied widely, from 24 at Bass Rock (Big Sycamore Canyon) to 69 at Yerba Buena Road. This wide range of species richness reflects the natural spatial variability of rocky intertidal habitats in this region, which can vary considerably in the amount of sand influence (especially how much sand burial can occur at a site), wave exposure, and rocky type.

In the 1970s, several researchers conducted detailed studies of southern California rocky intertidal habitats that included the Malibu coast. Widdowson (1971) and Thom (1976; see also Thom and Widdowson 1978, Thom 1980) repeated Dawson's study of benthic algae. They found that plant abundances and diversity generally decreased slightly between the 1956-58 and 1973-74 surveys. In 1973-74, the number of algal species at Dawson's sites (plus one new additional site at Point Dume South) ranged from 25 to 64 (Table 1). Although the range was similar, most sites in southern California had fewer algal species when sampled in 1973-74. In the Mugu-Latigo ASBS, however, this trend was less apparent. The farthest upcoast sites, Point Mugu and Bass Rock, had essentially the same number of species in both time periods. The next three sites, Yerba Buena, Arroyo Sequit, and Lechuza, had relatively high species richness in the 1950s (63-69 species), and all had fewer species in the 1970s, with Lechuza species richness declining to only 39 species. On the other hand, the final two sites, Point Dume Bay and Latigo Shores, had more species in the 1970s than the 1950s. Thus, there is no consistent pattern in how algal species richness changed, and the largest decreases in the Mugu-Latigo ASBS were not associated with any clear localized human activities that could have affected that algal community.

The surveys by Dawson, Widdowson and Thom used a consistent survey method, but they surveyed only algae and their data were largely qualitative (mainly presence/absence, although a subjective assignment of relative abundance was also made). The earliest comprehensive quantitative survey of the region was conducted by Mark Littler and his colleagues as part of a Bureau of Land Management Baseline

Survey. Littler et al. surveyed many sites throughout the southern California mainland and the California Channel Islands, including a site at Paradise Cove. Data from the Paradise Cove study are summarized in Littler (1979). The data were collected in January 1978 from quadrats arranged along two parallel transects across the intertidal zone and approximately 2 m apart. There were 52 macrophyte species and 50 invertebrate species recorded in the quadrats. An additional 23 macrophyte species and 14 invertebrate species were recorded near the quadrat areas. The species list from Littler (1979) is summarized in Table 2.

Total cover of macrophytes was 111%; note that, in contrast to the more recent data reported in Section 2.2, the methods Littler used could result in >100% cover because species were recorded in layers. The highest cover of macrophytes, 64%, was provided by blue-green algae (Table 3). Blue-green algae are inconspicuous organisms occurring as a film on rocks. The second most abundant macrophyte was the angiosperm *Phyllospadix torreyi*, which is recorded in the MARINe protocol; its cover was 31%. Other common macrophytes included *Gelidium coulteri*/*pusillum*, Ralfsiaceae, *Chondracanthus canaliculatus (=Gigartina canaliculata)*, and articulated coralline crust.

Total cover of invertebrates was 49%. For macroinvertebrates, Littler (1979) recorded 13 species that made up the majority of the cover, with the mussel *Mytilus californianus* having the most cover at 29%. The barnacles *Chthamalus fissus/dalli* occurred in the most quadrats (74% of all quadrats) and had the highest density (7,618/m^2) of any other invertebrate found at the site (Table 4). Other common invertebrate species included the snail *Littorina planaxis*, the barnacle *Balanus glandula* and the gooseneck barnacle *Pollicipes polymerus*.

Littler (1979) compared Paradise Cove to other sites they sampled in southern California. Compared to data from 1976-77, Paradise Cove had fewer species, but that was true for the other sites sampled in 1978 and was attributed by Littler to a lower sampling effort. Diversity was also relatively low at Paradise Cove, but this also was likely due to differences in sampling effort. Notably, the overall biotic cover was 1.4 times higher than the average site sampled in the previous year. Macrophyte cover was 1.2 time higher, while macroinvertebrate cover was 3 times higher than the average for other sites. Littler concluded that:

> "The Paradise Cove site is representative of most other rocky habitats in the Malibu area with its biota strongly influenced by strong seasonal wave shock and sand movement. There would appear to be less human-induced biological features at this site than at our mainland sites in Los Angeles and Orange Counties."

In some ways, the most relevant historical study is the ASBS Reconnaissance Survey Report by Morin and Harrington (1979) since it specifically focused on the ASBS. This report is very broad in scope, covering sandy beaches as well as rocky reefs, subtidal and intertidal habitats, and also considering aquatic birds and mammals and land vegetation. Much of the focus of the report was on subtidal habitats.

Although the report covers the species found in rocky intertidal habitats in the ASBS, Morin and Harrington (1979) does not provide quantitative data, nor site-specific data, such as Littler (1979), so it is not easily comparable with the data we have collected at Paradise Cove more recently. Morin and Harrington provide lists of species found in rocky intertidal areas of the ASBS (see their Appendix 5). Although this list provides a good overview of the species found in the ASBS as a whole, it includes many more species than would be expected at any one site. Morin and Harrington also provide a narrative description of common species found in different zones (tidal heights) in the intertidal (Table 5).

2.2. Recent Data

Since 1994, the Ambrose research group has monitored the rocky intertidal community at Paradise Cove (Figure 3) as part of a long-term regional monitoring program throughout central and southern California. Funding for this work was initially provided by the California Coastal Commission and then continued by the Minerals Management Service. For this report, we have extracted the data for Paradise Cove.

In addition, several other studies have been conducted in the Malibu portion of the ASBS as part of other contracts to Ambrose or other MARINe efforts. Several comprehensive surveys of all organisms at the Paradise Cove study site have been conducted, including an initial assessment of the site before it was established in 1994 and a survey in 2001 by a team of researchers from UC Santa Cruz (the "SWAT" team working under Dr. Pete Raimondi) as part of an extensive survey of MARINe and other sites throughout California. Ambrose and his group used similar methods to evaluate rocky intertidal communities at four Caltrans sediment disposal sites and two reference sites, including Latigo Point at the edge of the ASBS (Figure 4). Finally, as part of a study of human use patterns and the impacts of human activities on rocky intertidal communities, Ambrose and his research group conducted biological surveys using similar methods at ten sites, including Paradise Cove South (a different location than the long-term monitoring site; Figure 5), Little Dume (Figure 6) and Point Dume (Figure 7). We summarize these data in this report.

The data to be summarized in this report were all collected fairly recently by a single research group using consistent methods. Five different areas were sampled, with data from one of these sites covering the past 13 years, so there is excellent spatial and temporal coverage of the region. These data were not collected with the idea of studying discharge effects, but they provide a good perspective on the status of rocky intertidal resources in the ASBS.

2.2.1. Methods

MARINe Monitoring Program

The Multi-Agency Rocky Intertidal Network (MARINe) is a partnership of local, State, and Federal agencies, universities and private organizations which monitors rocky intertidal sites along the coast of California, including the islands, on a long-term basis.

It represents the largest program of its kind on the west coast. Many of the sites have been monitored consistently for 15-20 years. A standardized set of Core Protocols are used to monitor rocky intertidal habitat each fall and spring at 89 MARINe sites. These data are funded by multiple partners and are entered into a common database for analysis. Sites are spaced every 10 to 15 miles along the coast on the mainland and offshore islands. Continuous monitoring provides resource managers with early warnings of abnormal conditions, such as the discovery of the withering foot syndrome which has affected black abalone across the coast. The Biodiversity Protocol is used to map and derive a complete species list at 97 sites from Alaska to Mexico. This data collection is partly funded by a MARINe partner, PISCO, the Partnership for Interdisciplinary Study of Coastal Oceans. Target assemblage trend data from the Core Protocol, combined with comprehensive mapping data using the Biodiversity Protocol, provide an extensive amount of information about the status of rocky intertidal resources along the Pacific Coast. More information on MARINe can be found at: http://www.marine.gov/.

Core Protocol

The Core Protocol monitoring involves the sampling of intertidal species within target assemblages: areas dominated by one or more species or taxa of interest. Species within these target assemblages are monitored by a combination of photoplot quadrats, point intercept transects, transect swaths or irregular plots, and small radius circular plots. In addition, repeated photosurveys are performed at a collection of fixed photo points at each site.

Since the core monitoring data from the MARINe Paradise Cove site were collected within target assemblages rather than a random, site-wide approach, it must be understood that these data can not be interpreted to reflect the overall species abundances or cover at the site. Instead, these data provide temporal trends and abundance patterns for species within those target assemblages, and do so with increased statistical power to detect changes compared to a typical site-wide approach. The comprehensive (or biodiversity) surveys *are* intended to provide an unbiased estimate of overall species abundances at a site.

Photoplot Sampling

The cover of target species as well as other core and optional species, taxa, or substrates was sampled by photographing 5 permanent 50 x 75 cm plots per target species, then scoring point contact occurrences on the photo image. Plots were established in areas of high target species density wherever possible. Photoplots were scored from the photographs in the laboratory, supplemented by field plot sketches and notes. Prior to 2002, photoplot images involved slide photography; each 35mm slide was projected onto a grid of one hundred evenly-spaced points (10 x 10). Individual taxa beneath the points were identified and recorded. Since 2002, digital images were obtained and these were scored on a computer LCD after adding a grid of 100 points using Adobe Photoshop. Layering is not considered; the top-most layer that is attached to the substrate (i.e., not an obvious epibiont) is always scored regardless of the type of

target or core species involved. Thus, the total percent cover is constrained to 100%. Limpets, chitons, abalone, and seastars are scored "as is." For other motile invertebrates, whatever lies beneath the mobile species is scored if possible; otherwise, the point is scored as "unidentified". Data are entered into a Microsoft Access database for analysis.

Transects

The cover of surfgrass (*Phyllospadix* spp*)* is sampled by point-intercepts along 10 m long permanent transects. Three transects were established at the site in an area of high surfgrass density. Each transect is divided into 100 points distributed at 10 cm intervals. The top-layer target, core, or optional species/taxon/substrate is scored under each point. In addition, surfgrass is separately scored if it occurs beneath another species. In the latter situation, total transect cover can be greater than 100%.

Owl Limpets

The number and size distribution of owl limpets (*Lottia gigantea*) were monitored each spring and fall to follow population dynamics within 5 permanent circular plots, 1 meter in radius (3.14 m^2 area). Plots were marked with a center bolt, notched to indicate the plot number. Plots were established in areas of high density to obtain as many measurements as possible, preferably > 100 per site. A 1m length of line or tape was attached to the bolt and arced around to form the circle. Owl limpets found within that circle (including those touched by the 1 m mark) were measured with calipers to the nearest millimeter, then marked with a crayon to avoid scoring duplication. Limpets were never removed from the rock.

The number and size of seastars (primarily ochre seastars, *Pisaster ochraceus*) are monitored within irregularly-shaped plots positioned to encompass favorable habitat. Irregular plots are marked by four "corner" bolts. All ochre seastars are counted and sizes are measured from center to tip of longest ray. At Paradise Cove, these plots were established in 2002; there weren't enough data available through 2003 to warrant inclusion in this report.

Comprehensive Sampling (Biodiversity Protocols)

In 1994, as the MARINe sites in Los Angeles and Ventura Counties were being established, a "one-time" comprehensive sampling of each site was undertaken. This sampling consisted of laying out a grid of point intercept transects, swaths, and quadrats over the entire site and obtaining data on percent cover and abundance for the various species and taxa present at the site. Then, in 2001, the Coastal Biodiversity Surveys (CBS) were established to compliment our ongoing large scale monitoring program and repeat the original "one-time" surveys with increased standardization and repeatability.

As in the "one-time" surveys, topographical and species data are recorded across the entire rocky bench. In addition to obtaining species lists and data on percent cover and abundance, GPS and site elevation data are collected which enables us to create a three-dimensional fine-scale map of the intertidal bench. Each species can then be

mapped over the topography, yielding a layered Geographical Information System rendition of the species' distribution. After CBS sites were established on benches where other long term monitoring projects existed, they were extended along the entire coast of temperate North America. More information on the CBS program can be found at: http://cbsurveys.ucsc.edu/.

The essential survey methods used in the CBS program are basically the same as that used in the original "one-time" surveys (see below). In addition, the Ambrose lab has these methods in two other instances: 1) a 2001 study of several sites along the Malibu Coast, including Latigo Point (within the ASBS), for a project funded by the California Department of Transportation (CalTrans), and 2) a 2002 study of several sites along the Malibu Coast and the Palos Verdes peninsula investigating the effects of human use patterns on rocky intertidal communities. Sites on the Malibu Coast included Point Dume, Little Dume Point, and Paradise Cove South within the ASBS. The Paradise Cove South site is downcoast of our MARINe monitoring site, between our site and the Paradise Cove pier.

For each of the comprehensive surveys, a 30 meter baseline transect was established parallel to the shoreline, just above the barnacle zone (the limit of most intertidal organisms). A series of eleven transects were placed perpendicularly to the 30m baseline transect at 3-meter intervals. These extended offshore from the baseline transect to the ocean, ending at approximately the zero tide level (surfgrass zone). The length of these transects varied by site; the sampling interval along the transect was adjusted to achieve approximately 100 sampling points per transect. Point intercept data were collected at each sampling interval to obtain percent cover data. The species occupying the primary substrate at each sampling point was recorded. In certain instances, cover layers or nearest neighbor species were recorded, but these data were ancillary to and distinguished from the species occupying the primary substrate. In addition to the percent cover data, mobile invertebrate data were collected within 0.25 m^2 quadrats placed in a stratified random pattern along the point intercept transects. Three such quadrats were sampled for each transect, one each in the high, mid, and low intertidal zones. Bolts were installed along the baseline transect and at key positions along the point intercept transects to facilitate resampling. Data were managed using Microsoft Access and Excel, and graphed using Sigmaplot. For a more detailed accounting of the method used herein, see Engle (2005), and http://cbsurveys.ucsc.edu/.

2.2.2. Results

Core Monitoring

The core species, taxa, and substrate types included in the MARINe monitoring program, along with any optional species monitored at the southern California sites by the UCLA group (Ambrose Lab), are provided in Table 6. Among these core species, those present at the Paradise Cove monitoring site are distinguished in Table 6. The Paradise Cove monitoring site (Figure 8) has a diverse assemblage of species. The main portion of the site includes a large elevated rocky reef runs perpendicular to the shoreline

with a vertical rock face on the upcoast side and a sloping topography on the downcoast side (Figure 9). A dense barnacle (*Chthamalus* spp./*Balanus* spp.) zone is present on the higher and more onshore portions of this reef. Toward offshore and lower elevations, barnacles give way to a turfweed (*Endocladia muricata*) zone, followed by a dense mussel (mainly *Mytilus californianus*) zone, a turf-dominated algae zone (dominated by articulated coralline algae, filamentous red algae, and various species of coarsely branching red and foliose brown algae), and ultimately a dense surfgrass (*Phyllospadix* spp.) zone as the reef slopes offshore and toward a wide boulder field on the downcoast side (Figure 10). The surfgrass zone is extensive at the site, especially further offshore as the boulder field gradually slopes off toward the subtidal. Located in that boulder field, well seaward of its inshore edge, the surfgrass within the monitoring transects varies seasonally, with higher cover in the fall and lower cover in the spring (Figure 11). In addition, surfgrass cover has fluctuated over the years (Figure 12). After hovering around 60-80% for several years, surfgass cover declined after the fall of 1996, reached a low under 20% in the spring of 1998, and gradually increased to its original level by the fall of 2002. Turf algae and sand also showed seasonal patterns within the surfgrass transects, while the amount of uncovered rock remained consistently low except during the surfgrass decline. The influence of sand is significant at the site, primarily on the upcoast (Point Dume) side of the reef, where the sand levels can fluctuate by two or more feet seasonally and among years (see Figure 13).

The cover of barnacles within the barnacle zone has declined gradually throughout the study period from a high near 80% to a low near 60% (Figure 14). On the other hand the cover of the turfweed *Endocladia muricata* has increased somewhat (Figure 15). Two of the barnacle plots are located further inshore on a separate reef segment. Barnacle cover at these two plots has remained high; however barnacle cover in the other three plots has declined in recent years as *Endocladia* has spread higher on the reef into the barnacle zone (see Figure 16 and Figure 17).

Mussel cover within the 5 mussel plots has remained relatively stable throughout the years (Figure 18). On the other hand, anecdotal observations, supported by regular site photographs suggest that the greater mussel zone has been shifting onshore (Figure 17) and contracting within its existing habitat (Figure 19). At least in part, the contraction of the mussel zone may have been caused by a resurgence of sea stars (*Pisaster ochraceus*) that began around 2001. Prior to that time, sea stars, while present, were not common at the site. By the spring of 2002, sea stars had become more common, ultimately leading to a dense “front” of foraging seastars at the lower edge of the mussel zone (Figure 20). A set of irregular plots were established in 2002 to document these sea stars. Following plot establishment, seastar abundance peaked in the winter of 2002/2003 with nearly 300 seastars counted within the three plots; since then, sea star abundance in the plots has declined precipitously to around 50 individuals (Figure 21). The mussel zone, however, has not rebounded despite the decline of seastars. The mean size of the *P. ochraceus* remained constant throughout the period (Figure 22), suggesting immigration of mature seastars from the subtidal rather than a recruitment pulse.

The abundance of owl limpets (*Lottia gigantea*) was steady at ~40 per m^2 during the first few years of this sampling program; however, the number of owl limpets began to increase in the spring of 1998, reach a zenith around in the winter of 1999/2000, and then returned to the original levels by 2003 (Figure 23). Interestingly, the mean size of owl limpets has tended to decline over this study period (Figure 24). After increasing to a peak in the fall of 1997, the mean size of *L. gigantea* has declined to below the original levels. These data suggest a recruitment pulse that entered the local owl limpet population in 1998 causing a reduction in the mean limpet size. The influence of this apparent recruitment pulse on the local limpet population lasted at least 5 years. An example of an owl limpet plot is provided in Figure 25.

Comprehensive Sampling

Comprehensive sampling occurred at the Paradise Cove MARINe monitoring site in 1994 concurrent with the establishment of the site ("one-time" survey), and in both 2001 and 2006 as part of the Coastal Biodiversity Surveys. In addition we performed these methods at four other sites within the ASBS: 1) Paradise Cove South (2002), 2) Little Dume Point (2002), 3) Point Dume (2002), and 4) Latigo Point (2001). Listings of the species and taxa recorded in these seven comprehensive surveys are provided in Table 2. Also included in this table are the species found at the Paradise Cove MARINe monitoring site throughout all the years of sampling, as documented in the datasheets and site notes. With respect to these cumulative observations, the total number of species and taxa recorded at the Paradise Cove monitoring site was 100. During the 2001 CBS survey, 91 species/taxa were recorded while the 2006 CBS survey and the 1994 "one-time" surveys had 68 and 69 species/taxa, respectively. The lowest number was recorded at the Latigo Point site (48 species/taxa). The Point Dume site had a lower number of species/taxa than the other two sites included in the 2002 surveys.

The percent cover of the various species and taxa from these seven comprehensive sampling events are provided in Table 3. Within all of these surveys, the majority of sampling points consisted of red algae or unoccupied substrates (sand or rock). At Paradise Cove and Latigo Point, red algae comprised approximately 20-25% of the cover. At the Point Dume and Little Dume sites, the percent cover of red algae was approximately 35-40%. The dominant red algal taxa at these sites were articulated coralline algae (e.g., *Corallina* spp.), filamentous red algae (e.g., *Ceramium* spp., *Centroceras* spp., and *Polysiphonia* spp), and *Chondracanthus canaliculata*. *Endocladia muricata* was also common at the MARINe monitoring site, crustose coralline algae were common at most sites, and *Petrocelis* crust (non-coralline) had almost 20% cover at the Little Dume site. Surfgrass (*Phyllospadix* spp.) also had higher cover at Little Dume. Brown algae species were common at all sites; *Silvetia compressa* had notably high cover at Latigo Point. Barnacles and mollusc cover was moderate at all sites, but with high variability through space and time. Both taxa varied at the monitoring site among the various surveys. On the other hand, the mussel *Mytilus californianus* was higher at the monitoring site that at all the other sampling sites. This is likely due to the extensive rock reef present at the monitoring site, while the other sites were more boulder-dominated with patchy areas of higher relief. The presence of unoccupied substrates was dependent

upon the variable presence of sand at these sites. The cover of various taxa, especially ephemeral species, was likewise dependent upon fluctuating sand cover.

Mean abundance values for mobile invertebrate species among these seven comprehensive sampling events are given in Table 4. Relative to the other sites, Latigo Point had lower species richness of motile species; limpets and chitons were the primary motile species occurring at that site. Limpets, especially *Lottia digitalis* and *L. paradigitalis*, were also common at the monitoring site, as were littorine snails. The high abundance of these high intertidal species is due to the extensive reef structure at the monitoring site.

2.3. Comparison of historical and recent data

With the exception of Dawson's study from the late 1950s, the baseline information we have about the Mugu-Latigo ASBS comes from studies in the early 1970s. By this time, human activities in the Los Angeles area were varied and pervasive, and included air and water pollution, harvesting of organisms, and trampling from intertidal visitors. Even Dawson found substantial changes in the species of algae found in the 1950s compared to 50 years earlier; he was able to find less than half the species collect before 1912 by Setchell and Gardner at White's Point and Sunset Boulevard Beach. Dawson recognized that human influences such as pollution could have had an effect in the 1950s, particularly in the Los Angeles area (see Thom and Widdowson 1978), but concluded that the most striking fluctuations were due to physical factors such as sand movement and drying winds. This illustrates one challenge of any attempt to compare rocky intertidal communities over long time periods: changes due to human influences may be difficult to disentangle for natural changes in physical factors, and often there is insufficient information about either to enable a clear conclusion about the cause(s) of the change.

Thom and Widdowson (1978) concluded that human disturbance had resulted in considerable changes in algal communities between the 1950s and 1970s. Murray and Littler (1981) similarly concluded that human impact had altered the distribution and abundance of intertidal algae in southern California. The impacts of human activities likely was not uniform throughout the region, however, and Widdowson (1971) considered the stations he sampled near Point Dume and Dana Point "to enjoy natural conditions, while varying degrees of water and air pollution, and intensity of collecting activity, can be observed at the stations in between."

If Paradise Cove (since it is near Point Dume) was relatively less impacted than other Los Angeles-area sites in the 1970s, what condition is its rocky intertidal community in now? One way to evaluate this question is to compare the number of species found at Paradise Cove in the past to the number occurring there now. Although the methods differed and so the data are not perfectly comparable, the number of species reported by Littler (1979) was generally similar to those recorded more recently (Table 2). Littler found 132 different algal and invertebrate species, compared to 68 to 91 species found during fairly comparable comprehensive sampling efforts in 1994, 2001

and 2006. One important difference, however, was that Littler's list includes species collected outside of the sampling quadrats. Including only species sampled within the quadrats, Littler recorded 96 species. This is comparable to the number of species sampled in 2001, though more than sampled in 1994 or 2006. This is also more algal species (73) than recorded by Dawson, Widdowson or Thom during their surveys. Because MARINe, Littler, and Dawson/Widdowson/Thom used different methods, it is difficult to know whether there has been an actual change in species richness over the past 50 years, but these data do not support any substantial change in species richness at the Paradise Cove site.

In general, the species reported in Morin and Harrington (1979) are similar to those currently found at Paradise Cove, considering natural fluctuations in species abundances that would be expected over such a long time. There are some exceptions. One conspicuous difference is the black abalone. Morin and Harringtion report that "small black abalone, *Haliotis cracherodii*, are particularly prevalent in some crevices in the low intertidal zone." Black abalone are now essentially extinct from this section of the coast. Initially, the dramatic decrease in black abalone was apparently due to extensive harvesting; however, a withering became prevalent in the late 1980s and there are now few black abalone along the mainland coast of southern California and parts of central California (Altstatt et al. 1996).

There were some conspicuous differences between the abundance of species from Littler (1979) and the more recent data sets (Table 3, Table 4). As with species richness, the species abundance (cover or density) data are not perfectly comparable because the methods differed among the earlier and later studies. In addition, more so than with species richness, species abundances are sensitive to natural spatial variation, that is, differences from one location to another, even if the sites are separated by only a matter of meters. Therefore, it is difficult to ascribe differences in species abundances from older and newer studies to changes over time alone. With this caveat in mind, it is possible to make some general comparisons.

Some species appeared to decline at Paradise Cove over the past 20-30 years. For example, *Phyllospadix* cover was 31% in 1979 but only 3-11% at Paradise Cove in 1994-2006. As mentioned above, *Phyllospadix* cover has varied substantially seasonally and from year-to-year, so it is possible that the apparent decline in cover is part of a natural cycle. However, this is a fairly large change, and other studies (Ambrose and Smith 2004) have suggested that *Phyllospadix* is susceptible to human activities. *Phragmatopoma* also had higher cover in 1979, 4.6% compared to 0.3-1.6% more recently. This species is also known to undergo significant changes in abundance over a period of several years (*personal observation*). The turban snail *Tegula funebralis* had a density of 10 snails/m^2 in 1979 but was sampled at only 1-4 snails/m^2 since 1994.

Littler (1979) found a much higher cover of blue-green algae than shown in the more recent data. However, blue-green algae were generally not recorded by the Ambrose group or the MARINe protocol. Instead of blue-green algae, the more recent data would typically have recorded bare rock, and Littler's group would also have

recorded blue-green algae under other species (such as *Silvetia*) that would not have been recorded at all using the MARINe protocol (because it records only the top-most species). For these reasons, the higher cover of blue-green algae recorded by Littler probably does not reflect a meaningful change in species cover over time.

Some species appear to have increased in abundance since 1979. *Endocladia muricata* was not recorded by Littler. Although the 1994 comprehensive survey recorded very little *Endocladia*, later surveys recorded about 3% cover, and the monitoring data showed a substantial increase in *Endocladia* for a few years following establishment of the plots, leveling off at 50-60% cover after 1996. Thus, this species seems to have become more abundant at Paradise Cove in the past ten years. Another species that seems to have become more common at Paradise Cove is the large brown alga *Egregia menziesii*, which increased from 0.6% cover in 1979 to 1.4-2.2% cover in 2001 and 2006. The barnacle *Balanus glandula* increased from 0.2% cover in 1994, comparable to the 0.3% cover reported by Littler, to 2.7% in 2001 and 11.4% in 2006. Littler reported about 300 littorines per m^2 in 1979; littorines were not recorded in 1994, but there were about 500 littorines per m^2 in 2001 and 2006. No *Acanthinucella* were reported in 1979, but more recent surveys found 0.7-2.9/m^2 of these predatory snails. The chiton *Nutallina* was reported at 3 chitons/m^2 in 1979 but has varied from 7-11 chitons/m^2 since 1994.

On the other hand, some common or important species had relatively similar abundance in 1979 and recent data. Mussels, for example, were common in both time periods, having 29% cover in 1979 and 7-23% in 1994-2006. Although mussel cover was somewhat lower in the beginning of the recent period, it increased steadily; this increase is supported by observations made during the regular monitoring of the Paradise Cove site. *Corallina* spp. were 3% cover in 1979 and 3-6% recently. *Nucella* remained relatively constant at about 2 snails/m^2, except in 2006 when densities were 0.2 snails/m^2.

Comparison of the abundance of limpet species from 1979 to now is complicated by changes in taxonomy and different degrees of taxonomic grouping. However, some indication of overall abundance of this important grazing group can be seen from a sum of all limpets of the genus *Lottia* (except the owl limpet *Lottia gigantea*, which was clearly distinguished in all studies and has a different ecological role due to its large size). Excluding juveniles, Littler found 220 *Lottia*/ m^2. The 1994 comprehensive survey found only 16, but this was likely due to low effort to count these species. The most recent surveys did explicitly focus on determining *Lottia* density, and they found 129 in 2001 and 212 in 2006. In addition, the 2001 comprehensive survey found 14 juvenile *Lottia*/m^2. Thus, it appears that *Lottia* density has remained fairly stable since 1979.

In summary, the species lists and quantitative estimates of abundance indicate a dynamic rocky intertidal community at Paradise Cove. The overall character of the site does not appear to have changed much, although there may be less surfgrass than there was in the 1970s and one key species, black abalone, has disappeared from Paradise Cove (as it has from every other area along the southern California mainland). Another species providing important biotic structure, the California mussel, appears to have maintained a similar abundance since the 1970s. A number of invertebrate species, including

Acanthinucella and *Nutallina*, increased, but overall limpet density appeared to be similar. On balance, these changes indicate the degree of dynamism one might expect of rocky intertidal communities, and do not indicate a degrading trend.

2.4. Comparison of Paradise Cove to other areas

Rocky intertidal habitats are well known for a high degree of spatial heterogeneity, and this is true for the intertidal habitats in the Mugu-Latigo ASBS. Intertidal reefs between Point Dume and Latigo Point are inclined sandstone and soft shale reefs that are heavily bored by marine organisms (Morin and Harrington 1979). In contrast, the reefs at Point Dume itself are made of resistant ingneous breccia. In addition to being composed of different material, the reefs in the ASBS include bedrock slabs and different sizes of boulders and cobbles. Wave forces also contribute to the spatial heterogeneity of rocky intertidal habitats. Morin and Harrington (1979) pointed out that the Paradise Cove region receives the least wave surge of the ASBS because Point Dume blocks any westerly swell and there were extensive offshore kelp beds.

The impacts of human activities likely has not been uniform throughout the region, however, and Widdowson (1971) considered the stations he sampled near Point Dume and Dana Point "to enjoy natural conditions, while varying degrees of water and air pollution, and intensity of collecting activity, can be observed at the stations in between." Littler (1979) concluded that:

> "The Paradise Cove site is representative of most other rocky habitats in the Malibu area with its biota strongly influenced by strong seasonal wave shock and sand movement. There would appear to be less human-induced biological features at this site than at our mainland sites in Los Angeles and Orange Counties."

Although the Paradise Cove study area may still be relatively free of human use compared to other areas around Los Angeles, it nonetheless has a high degree of human visitation compared to other areas along the West Coast. Ambrose and Smith (2004) estimated there were 2,500 visitors per 100m of shoreline per year in the rocky intertidal habitat at Little Dume, which is close to the Paradise Cove study area and probably receives comparable use. In contrast, there were 38,000 visitors/100m of shoreline/year at Point Dume and 47,000 visitors/100m of shoreline/year at Paradise Cove South (the rocky intertidal area closest to the Paradise Cove pier and parking lot).

One indicator of human use that has been found to be useful in southern California is the size of owl limpets at a site. Owl limpets are large limpets that are commonly collected for human consumption. Sagarin et al. (2007) used MARINe data to relate owl limpet sizes at 33 mainland and island sites to accessibility to humans. On the mainland, protected sites had significantly larger median limpet sizes and a greater range of limpet sizes than unprotected mainland sites. Extensive collecting of owl limpets is possible at the Paradise Cove site because it is legal to collect owl limpets and there are no severe impediments to access, and the size distribution of owl limpets fit in a cluster of the most impacted sites. The scarcity of large owl limpets suggests that Paradise Cove

is influenced by human collectors; however, in this regard it is similar to many of the sites sampled in southern California.

Many of the species identified as typical of the Mugu-Latigo ASBS rocky intertidal habitat by Morin and Harrington (1979; Table 5) are presently common at Paradise Cove. Barnacles, California mussels, owl limpets, seastars and surf grass are among the species common enough to be selected as target species for the MARINe monitoring at Paradise Cove.

These general observations suggest that Paradise Cove supported, and continues to support, a relatively rich rocky intertidal community compared to other intertidal reefs in the Mugu-Latigo ASBS. A more quantitative comparison can be made using the comprehensive survey data that has been collected at Paradise Cove and nearby reefs. These data also indicate that Paradise Cove is a relatively rich area. There are four different sets of recent data at the Paradise Cove study site. The MARINe monitoring data have been accumulated from sampling since 1994; although this monitoring effort was not focused on developing a comprehensive species list, the total list is larger than any other sample, with a total of 100 species of algae and invertebrates. Since the number of species encountered is related to the amount of effort spent searching for them, the large number of species from the MARINe monitoring likely reflects the greater effort spent. The various comprehensive surveys (1994, 2001 and 2006) represent the same sampling effort as the nearby sites (Latigo, Paradise Cove South, Little Dume and Point Dume). The total number of species at Paradise Cove in three different years ranged from 68 to 91. In contrast, Latigo had 40 species, Paradise Cove had 78, Little Dume had 75, and Point Dume had 53. The number of species at Paradise Cove was at the upper end of this range. However, it should be remembered that all of these species are close together and thus have fairly similar physical conditions.

Another way to evaluate Paradise Cove compared to other nearby reefs is to look at how many species were found at Paradise Cove and at least one other site, found only at Paradise Cove, or found only at at least one other site. For algae, 50 species were found at Paradise Cove and elsewhere, 26 species were found only at Paradise Cove, and 4 species were found only elsewhere. (These data include the four recent data sets at Paradise Cove plus the four nearby sites.) For invertebrates, 43 species were found at Paradise Cove and elsewhere, 26 species were found only at Paradise Cove, and 8 species were found only elsewhere. By far, most species were found at Paradise Cove and elsewhere. Far more species were found only at Paradise Cove than only elsewhere. In some ways, this is not a fair comparison, since it compares four different sites with one (Paradise Cove). On the other hand, the Paradise Cove data include comprehensive surveys collect three different years plus the long-term monitoring data. On balance, these data suggest that Paradise Cove is an especially rich rocky intertidal habitat for the Malibu coastline.

Finally, Paradise Cove can be compared to other southern California sites using a statistical clustering technique. Raimondi (2006) has used the biodiversity surveys to look at the similarities among a set of MARINe sites sampled in southern California. In

this analysis, the community at Paradise Cove was most similar to the community at Alegria, a site in Santa Barbara County south of Point Conception that has little human disturbance. The other sites that clustered with Paradise Cove were Arroyo Hondo and Coal Oil Point in Santa Barbara County, and Mussel Shoals and Old Stairs in Ventura County. Interestingly, two other sites for Los Angeles County, White's Point and Point Fermin, clustered with the more southern sites in Orange and San Diego Counties.

3. Sandy Beach Resources

The Mugu-Latigo ASBS contains extensive areas of sandy beaches. Morin and Harrington (1979) estimated that 82% of the shoreline of the Mugu-Latigo ASBS consisted of sand.

Sandy beaches support infauna (animals that live within the sand) and epifauna (animals living above the sand), birds, and fish. There are also distinct plant communities associated with the strands and sand dunes that are still associated with some beaches in southern California. Although the sand community is quite rich and is critical habitat for valuable species such as shorebirds and California halibut, sandy beaches generally have not attracted as much attention as the more conspicuously rich rocky intertidal habitats. Perhaps as a result, sandy beach communities are poorly known, and there have been very few studies in the Mugu-Latigo ASBS.

3.1. Historical data

One of the earliest studies of southern California sandy beaches was conducted by Straughan (1977, 1984), but this study was not focused on the Malibu area. At around the same time, Morin and Harrington (1979) described the sandy beach communities in the Mugu-Latigo ASBS. They note that fewer organisms live in soft intertidal substrates than in rocky intertidal habitats. In addition, there were fewer organisms in the more exposed beaches, such as La Jolla Beach, Big Sycamore Beach, and Zuma Beach, than in protected beaches behind kelp beds and headlands. The portion of Paradise Cove that is protected by Point Dume had the greatest diversity and abundance of all sandy intertidal habitats in the ASBS. For example, Patterson (1974) found a relatively high diversity of crustaceans and annelids in addition to the ubiquitous sand crab (*Emerita analoga*). Morin and Harrington found the blood worm (*Euzonus*), *Emerita*, and the purple olive snail (*Olivella*) were especially abundant at Paradise Cove. They also noted that beach hoppers (*Orchestoidea* spp.) could be locally abundant wherever kelp wrack accumulated; they were not common along Zuma Beach because it was groomed daily.

Unlike tidepools, which can hold water when the tide is out, sandy beaches do not support any fish when the tide is out. They nonetheless support an important and distinct fish community, many of which forage in the surf zone or just beyond. One of the most charismatic species of sandy beaches is the grunion, a small fish that comes ashore at night to spawn and lay their eggs in the sand. Grunion only "run" (spawn) at specific beaches, but there are many areas within the Mugu-Latigo ABSB where grunion run. Morin and Harrington (1979) reported that grunion runs occasionally occurred along the Mugu Lagoon barrier beach, La Jolla and Big Sycamore Beaches, and Zuma Beach.

Sandy beaches are important habitats for numerous birds, especially shorebirds. Morin and Harrington (1979) mentioned bird use only briefly.

Marine mammals are also found in the ASBS. The California sea lion (*Zalophus californica*) and the harbor seal (*Phoca vitulina*) were known to haul out at Point Dume and Point Zero (Morin and Harrington 1979).

3.2. Recent information

Recently, Jenny Dugan and her colleagues have conducted a number of quantitative beach surveys in southern California (Dugan et al. 2000), but there have been few surveys in the ASBS and none in the Paradise Cove area. Dugan et al. (2003) did survey two sites in the ASBS (Deer Creek and Leo Carrillo) in a study of 15 beaches in Ventura and Los Angeles Counties. The number of macrofauna species as Deer Creek and Leo Carrillo was in the middle of the range for all beaches. Macrofauna abundance was very high at Deer Creek, twice as high as any other beach in the study, and third highest at Leo Carrillo. Both beaches had significant amounts of wrack, and many of the species were associated with the wrack. The most abundant and widespread species was the sand crab *Emerita analoga*. Dugan et al. also found high densities of *Euzonus mucronata*, and well as high densities of the wrack associated amphipods *Megalorchestia* spp.

According to Karen Martin (Pepperdine University, *personal communication*), who has been monitoring grunion runs, in recent years regular grunion runs with hundreds to thousands of fish have been occurring at Latigo Cove, Paradise Cove, Riviera II, Zuma Beach, Broad Beach, El Sol Beach, Leo Carrillo State Beach, County Line Beach (when it builds up enough sand in summer), and Sycamore Cove Beach. Many beaches have not been monitored sufficiently to know if there are regular grunion runs. The only sandy beach that has been regularly monitored but does not seem to have a grunion run is Westward Beach, where the beach slope is apparently too steep.

McCrary and Pierson (2002) completed intensive (monthly) sampling of bird use at 13 beaches in Ventura County, including two (Deer Creek and Leo Carrillo) in the ASBS. These beaches had 37-38 shorebirds per 1 km of shoreline, which was in the middle of the range of the 13 beaches surveyed.

3.3. Comparison of historical and recent information

With no real quantitative data from the 1970s or earlier, it is difficult to know how sandy beach communities may have changed over the past 30 years. Some species, such as the pismo clam (*Tivela*), may have become less common (MacGinitie and MacGinitie 1968). However, the most common species reported by Morin and Harrington (1979), including sand crabs, blood worms and beach hoppers, were also reported as common by Dugan et al. (2003). Morin and Harrington noted that beach hoppers were locally common where wrack was not removed. Dugan et al. expanded on that theme, showing the large proportion of the sandy beach macrofauna that were associated with wrack and demonstrating the connection between wrack and higher trophic levels such as birds.

Changes in management practices that changed the extent and frequency of wrack removal would have a large impact on the beach macrofauna; in an area such as Paradise Cove, where wrack was not removed in the 1970s and still is not removed today, it appears that the sandy beach community has not undergone a dramatic change.

It is difficult to compare information on grunion runs from the time when the ASBS was established to the present because there have not been consistent, systematic surveys conducted. Nonetheless, the recent information suggests that grunion are running at at least as many beaches as they did in the late 1970s. There is no estimate of abundance, however, so it is not known whether there are as many fish now as there were then.

3.4. Comparison of Paradise Cove to other areas

The lack of consistent, quantitative data for sandy beach communities makes it difficult to compare Paradise Cove to other areas. There are considerable differences among different beaches in the ASBS. For example, in the 1970s, Morin and Harrington (1979) reported higher diversity of macroinvertebrates on sandy beaches around Paradise Cove compared to Zuma Beach, which is just on the other side of Point Dume. Morin and Harrington attributed this to differences in physical factors (especially exposure), and also noted the influence of wrack. Dugan et al. (2003) also emphasized the influence of different physical factors and wrack. Since these differences still exist through the area of the ASBS, we expect that there will still be significant differences in the sandy beach communities on different beaches.

There are insufficient data to determine if there has been general degradation in the ASBS over the past 30 years, or whether certain sites have changed more than others. Currently, there is insufficient data to link discharges to the condition of sandy beach communities.

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5. TABLES

Table 1. Sites sampled by Dawson, Thom and Widdowson in the Mugu-Latigo ASBS and associated algal species richness.

Algal species were counted in a 4m-wide band transect running across the intertidal zone, perpendicular to the water. – indicates site was not sampled.

Site	Dawson 1956-58	Thom and Widdowson 1973-74
Point Mugu	29	29
Big Sycamore Canyon (Bass Rock)	24	25
Yerba Buena Beach	69	56
Arroyo Sequit Beach	64	55
Lechuza Point	63	39
Point Dume Bay	58	64
Point Dume South	-	39
Latigo Shore Road	52	58

Table 2. List of species sampled in different studies in the Mugu-Latigo ASBS.

Data from the different studies came from different sources as described in the text. Number in parentheses indicates number of different species in taxonomic group. Species from Littler (1979) include species sampled by the undisturbed method as well as additional species collected in the study area.

Species List	Littler (1979)	Marine Monitoring (1994-2007)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
MACROPHYTES									
GREEN ALGAE									
Chaetomorpha linum	X								
Chaetomorpha spiralis		X		X	X				
Cladophora columbiana	X	X	X	X					
Codium fragile	X	X		X				X	
Filamentous green algae		X	X						
Green algae (unidentified)		X	X						
Ulva (=Enteromorpha) intestinalis	X								
Ulva spp	X	X	X	X	X	X	X	X	X
RED ALGAE									
Articulated corallines (unspecified)		X	X			X			
Bossiella spp	X	X		X	X		X	X	
Calliarthron spp	X	X		X			X		
Callithamnion pikeanum		X		X					
Caulacanthus ustulatus		X		X	X		X		X
Centroceras clavulatum	X								
Ceramium eatonianum/sinicola	X								
Ceramium/Centroceras/Polysiphonia/ Corallophila spp		X		X	X		X	X	X

Species List	Littler (1979)	Marine Monitoring (1994-2007)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
Chondracanthus canaliculatus (=Gigartina canaliculata)	X	X		X	X	X	X	X	X
Chondria spp	X						X		X
Corallina spp		X	X	X	X		X	X	X
Corallina officinalis vs. chilensis	X								
Corallina vancouveriensis	X	X	X			X			
Cryptopleura/Hymenena spp		X		X	X		X	X	
Cryptopleura crispa	X								
Cumagloia andersonii	X								
Encrusting coralline	X (2)	X	X	X	X	X	X	X	X
Endocladia muricata	X	X	X	X	X	X		X	
Erythrocystis saccata	X								
Erythroglossum californicum (=Anisocladella pacifica)	X			X					
Dasya binghamiae					X				
Filamentous red algae		X	X			X			
Gastroclonium subarticulatum (=Gastroclonium coulteri)	X	X		X	X	X	X	X	X
Gelidium coulteri					X				
Gelidium pusillum				X	X				
Gelidium coulteri/pusillum	X								
Gelidium purpurascens	X								
Gelidium robustum	X				X				
Gelidium spp		X		X			X	X	X

Species List	Littler (1979)	Marine Monitoring (1994-2007)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
Chondracanthus spinosus (=Gigartina spinosa)	X								
Gracilariopsis papenfussii (=Gracilaria andersonii)		X		X	X		X		X
Grateloupia californica (=G. doryphora)	X			X					
Haliptilon roseum				X					
Herposiphonia plumula	X								
Hildenbrandia/Peyssonnelia spp	X			X					
Laurencia pacifica/masonii	X	X		X			X	X	X
Osmundea (=Laurencia) sinicola	X								
Laurencia subopposita	X								
Lithothrix aspergillum	X	X		X	X	X	X	X	X
Mazzaella affinis		X					X		X
Mazzaella (=Gigartina) leptorhynchos	X	X		X		X	X	X	X
Melobesia mediocris	X								
Microcladia spp							X	X	X
Microcladia coulteri	X								
Nemalion elminthoides (=N. helminthoides)	X	X							
Neorhodomela larix				X					
Nienburgia andersoniana				X					
Non-coralline crust		X				X			
Osmundea (=Laurencia) spectabilis	X	X		X			X		
Petrocelis spp		X		X	X		X	X	X

Species List	Littler (1979)	Marine Monitoring (1994-2007)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
Phycodrys setchellii	X								
Pleonosporium squarrulosum	X								
Plocamium pacificum (= P. cartilagineum)	X	X		X	X				X
Plocamium violaceum				X					
Polysiphonia spp	X (2)			X	X		X	X	
Polysiphonia acuminata	X								
Polysiphonia hendryi var. hendryi	X								
Porphyra spp		X	X	X				X	
Prionitis lanceolata	X			X				X	
Prionitis linearia	X								
Prionitis spp		X		X					
Pterocladiella capillacea	X				X	X	X		X
Pterosiphonia baileyi				X					
Pterosiphonia dendroidea	X								
Pterosiphonia dendroidea/pennata				X	X				
Pterosiphonia spp				X					
Red algae (unidentified)		X	X			X	X	X	
Red turf algae			X			X			
Rhodoglossum affine	X								
Rhodymenia pacifica	X								
Sarcodiotheca gaudichaudii	X								
Smithora naiadum	X								
Smithora sp							X	X	X

Species List	Littler (1979)	Marine Monitoring (1994-2007)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
Tiffaniella snyderiae	X				X				
BROWN ALGAE									
Brown algae (unidentified)		X	X						
Colpomenia/leathesia spp	X	X		X		X	X	X	
Cystoseira osmundacea	X	X		X		X		X	
Dictyopteris sp						X			
Dictyota spp/ Pachydictyon sp.		X		X		X	X	X	X
Dictyota flabellata	X								
Ectocarpales	X (2)	X		X					
Egregia menziesii	X	X	X	X	X	X		X	X
Eisenia arborea		X				X			
Endarachne binghamiae	X	X		X	X	X		X	
Filamentous brown algae			X			X			
Halidrys			X				X		
Macrosystis pyrifera	X								
Pachydictyon coriaceum	X								
Petalonia fascia	X								
Petrospongium (=Cylindrocarpus) sp.	X	X	X				X	X	
Pseudolithoderma nigrum		X			X		X	X	X
Ralfsiaceae	X (2)	X		X	X		X	X	X
Sargassum muticum		X	X			X	X		
Scytosiphon sp.		X	X				X	X	
Scytosiphon dotyi	X								
Scytosiphon lomentaria	X								

Species List	Littler (1979)	Marine Monitoring (1994-2007)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
Silvetia compressa (=Pelvetia fastigiata)	X	X	X				X	X	
Zonaria farlowii	X	X		X		X	X	X	X
OTHER ALGAE/PLANT									
Blue green algae	X			X					
Blue-green colony	X								
Callothrix crustacea									
Diatoms		X		X	X		X	X	X
Phyllospadix scouleri/torreyi	X	X	X	X	X	X	X	X	X
Unidentified algal slime			X						
Unidentified algal turf			X						
TOTAL MACROPHYTES	73								
MACROINVERTEBRATES									
ANEMONES									
Anthopleura elegantissima	X	X	X	X	X	X	X	X	X
Anthopleura sola		X		X	X	X	X	X	X
POLYCHAETES									
Diopatra sp.						X			
Dodecaceria fewkesi	X	X		X	X		X		X
Eupomatus gracilis	X								
Phragmatopoma californica	X	X	X	X	X	X	X	X	X
Salmacina tribranchiata	X								
Serpula vermicularis		X			X		X	X	X
Spirorbis spp	X (2)	X		X			X	X	

Species List	Littler (1979)	Marine Monitoring (1994-2007)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
MOLLUSCS									
Acanthina spirata	X								
Acanthinucella spp		X	X	X	X		X	X	X
Alia carinata	X								
Amphissa sp			X					X	
Aplysia californica	X	X					X		
Brachidontes/Septifer spp		X		X	X				
Ceratostoma nuttalli			X						
Chama sp/pseudochama sp						X	X	X	X
Conus californica			X						
Cyanoplax sp.	X		X						
Epitonium tinctum	X	X		X	X		X	X	X
Fissurella volcano	X								
Fissurella volcano/Diodora sp		X	X	X	X		X	X	
Haliotis cracherodii			X						
Hermissenda crassicornis					X				
Homalopoma sp							X		
Lacuna spp	X				X				
Lepidochitona hartwegii		X		X	X		X	X	
Lepidozona sp							X	X	
Littorina keenae		X		X	X		X	X	X
Littorina planaxis	X								
Littorina plena/scutulata		X		X	X			X	X
Littorina scutulata	X								

Species List	Littler (1979)	Marine Monitoring (1994-2007)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
Littorina spp		X	X				X	X	
Lottia austrodigitalis/digitalis		X		X	X			X	
Lottia (=Acmeae) digitalis	X								
Lottia (=Acmaea) conus	X								
Lottia gigantea	X	X	X	X	X			X	
Lottia (=Acmaea) insessa	X								
Lottia (=Acmaea) limatula	X	X		X	X		X	X	
Lottia ochracea					X				
Lottia (=Acmaea) paleacea	X								
Lottia (=Acmaea) strigatella	X								
Lottia paradigitalis/strigatella		X		X	X		X	X	X
Lottia (=Acmaea) pelta	X	X		X	X		X	X	
Lottia (=Acmaea) scabra	X								
Lottia scabra/conus		X		X	X		X	X	
Lottia scutum				X	X				
Lottia spp. (=misc. Limpets)		X	X			X	X		
Megathura crenulata		X	X						
Mopalia spp	X	X	X	X	X		X	X	X
Mytilus californianus	X	X		X	X	X	X	X	X
Mytilus spp.			X						
Mytilus galloprovincialis/trossulus (=edulis)	X				X			X	X
Norrisia norrisi		X	X						
Nucella emarginata	X								

Species List	Littler (1979)	Marine Monitoring (1994-2007)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
Nucella emarginata/ostrina		X	X	X	X				X
Nutallina fluxa/californica	X								
Nuttallina spp		X	X	X	X		X	X	X
Ocenebra circumtexta		X	X	X			X		
Odostomia nota	X								
Olivella biplicata	X								
Opalia funiculate	X								
Septifer bifurcates	X								
Septifer/Branchidontes		X	X			X	X	X	X
Serpulorbis sp.			X			X	X		X
Tegula eiseni						X			
Tegula funebralis	X	X	X	X	X		X	X	X
Tegula spp.			X						
Turbonilla kelseyi	X								
Unidentified chitons		X	X						
Unidentified mobile gastropods			X						
Vermetid gastropods			X						
ECHINODERMS									
Henricia sp			X						
Leptasterias spp		X	X		X				
Patiria miniata			X						
Pisaster ochraceus	X	X	X	X			X	X	X
Pisaster giganteus			X						
Strongylocentrotus franciscanus		X	X						

Species List	Littler (1979)	Marine Monitoring (1994-2007)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
Strongylocentrotus purpuratus	X	X	X	X		X	X	X	
CRUSTACEANS									
Balanus glandula	X	X	X	X	X		X	X	X
Balanus tintinnabulum californicus	X								
Barnacle (unspecified)						X			
Cancer antennarius		X	X				X	X	
Chthamalus spp	X (2)	X	X	X	X		X	X	X
Hemigrapsus oregonensis				X					
Pachygrapsus crassipes	X	X	X	X	X		X	X	X
Pagurus granosimanus	X			X					
Pagurus hirsutiusculus	X	X		X	X		X	X	X
Pagurus samuelis		X		X	X		X	X	
Pagurus spp.		X	X						
Petrolisthes								X	
Pollicipes polymerus	X	X	X	X	X		X	X	
Pugettia producta	X	X	X	X	X				
Tetraclita (squamosa) rubescens		X	X	X	X	X	X	X	X
Unidentified crabs			X						
ASCIDIANS									
Archidistoma psammion	X								
Didemnum carnulentum	X								
Euherdmania claviformis	X								
Ritterella aequalisiphonia	X								

Species List	Littler (1979)	Marine Monitoring (1994-2007)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
HYDROZOA									
Obelia ? sp.	X								
Sertularia spp.	X (2)								
SPONGES									
Axocielita originalis	X								
Hymeniacidon aff. sinapium	X								
Leucandra heathi	X								
Leucetta losangelensis	X								
Ophlitaspongia pennata				X					
OTHER INVERTEBRATES									
Melobesia							X	X	
Membranipora tuberculata	X								
Unidentified worms			X						
FISH									
Sculpin		X		X			X		
SUBSTRATE									
Rock		X	X	X	X	X	X	X	X
Sand		X	X	X	X	X	X	X	X
Tar		X							
TOTAL MACROINVERTEBRATES	**59**								
Total Number Present	**132**	**100**	**69**	**91**	**68**	**40**	**78**	**75**	**53**

Table 3. Cover of species sampled in different studies in the Mugu-Latigo ASBS.

Data from the different studies came from different sources as described in the text. Note: cover from Littler (1979) include layers and so can sum to more than 100%; other data add to 100%.

Species	Littler (1979)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
MACROPHYTES								
GREEN ALGAE								
Chaetomorpha spp				0.08				
Cladophora columbiana	0.1		0.23					
Codium fragile			0.08					
Ulva californica	0.3							
Ulva (=Enteromorpha) intestinalis	0.1							
Ulva spp			1.39	0.75	0.24	0.55	3.36	0.45
Total Green Algae Cover	*0.5*	*0*	*1.70*	*0.83*	*0.24*	*0.55*	*3.36*	*0.45*
RED ALGAE								
Articulated corallines (unspecified)	0.4	3.69			7.49			
Bossiella spp			0.15	0.17				
Calliarthron spp			0.31			0.09		
Caulacanthus ustulatus			0.23	0.33		0.18		
Ceramium eatonianum/sinicola	0.5							
Ceramium/Centroceras/Polysiphonia spp (filamentous red)			6.33	7.23	1.15	12.27	5.36	28.00
Chondracanthus canaliculatus (=Gigartina canaliculata)	5.3	3.91	1.39	2.49	2.19	2.82	0.73	0.18

Species	Littler (1979)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
Corallina spp	3.3	3.29	6.48	5.81	2.37	5.18		4.00
Corallina vancouveriensis bleached	0.1							
Cryptopleura/hymenena spp			0.31			0.09	0.55	
Encrusting coralline	0.2	1.64	0.46	0.42	0.71	0.55	6.18	0.36
Endocladia muricata		0.38	3.63	2.99	0.09			
Gastroclonium subarticulatum			0.15	0.25	0.03		0.18	0.09
Gelidium spp	1.5		2.39	1.25		0.36		
Gracilariopsis papenfussii (=Gracilaria andersonii)			0.69	0.08				0.45
Haliptilon roseum			0.08					
Hildenbrandia/Peyssonnelia spp	0.2		0.69					
Laurencia pacifica/masonii			0.15			0.09		0.09
Lithothrix aspergillum				1.16	1.4		2.27	1.09
Mazzaella leptorhynchos			0.15		0.03	0.18		
Mazaella spp.						0.18		
Melobesia mediocris	1.2							
Microcladia spp.						0.18		0.09
Nienburgia andersoniana			0.08					
Non-coralline crust					5.2			
Osmundea spectabilis			0.15				0.27	
Petrocelis spp				0.50			19.09	
Petrospongium (Cylindrocarpus) sp	0.2	0.13				0.09	0.09	
Polysiphonia spp	0.1							
Porphyra spp			0.08					

Species	Littler (1979)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
Prionitis spp			0.16					
Pterosiphonia spp	0.2		0.31	0.08				
Pterocladiella capillacea				0.25	0.2	0.18	3.27	
Rhodoglossum affine	0.4							
Tiffaniella snyderiae	0.3							
Red algae (unidentified)					0.03		0.09	
Red turf		4.5			2.74			
Total Red Algae Cover	*13.9*	*17.54*	*24.37*	*23.01*	*23.63*	*22.44*	*38.08*	*34.35*
BROWN ALGAE								
Brown algae (unidentified)		0.05						
Colpomenia/leathesia spp			0.23		0.11		1.18	
Dictyopteris sp					0.03			
Dictyota spp/ pachydictyon sp.			0.23		0.03	0.27		0.09
Cystoseira osmundacea					0.16			
Ectocarpales (filamentous brown)		0.08	0.62		0.07			
Egregia menziesii	0.6	0.08	2.16	1.41	0.44	1.18	1.27	0.09
Endarachne binghamiae			0.08		0.06			
Halidrys dioca						0.09	0.18	
Pseudolithoderma nigrum				0.33				
Ralfsiaceae	1.0		0.62	1.33		3.45		8.91
Sargassum muticum		0.43			2	0.36	0.73	
Scytosiphon sp.								
Silvetia compressa (=Pelvetia fastigiata)		0.54			8.23	2.00	0.18	

Species	Littler (1979)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
Zonaria farlowii			0.23		0.54	0.36	0.09	0.64
Total Brown Algae Cover	*1.6*	*1.18*	*4.17*	*3.07*	*11.67*	*7.71*	*3.63*	*9.73*
OTHER ALGAE/PLANT								
Blue green algae	63.7		0.69					
Phyllospadix scouleri/torreyi	30.6	2.59	6.1	11.30	2.61	6.82	15.00	1.91
Other macrophytes	1.0							
Unidentified algal slime		0.27						
Unidentified algal turf		0.51						
Total Other Algae/Plant	*95.3*	*3.37*	*6.79*	*11.3*	*2.61*	*6.82*	*15.00*	*1.91*
MACROINVERTEBRATES								
ANEMONES								
Anthopleura elegantissima	1.7		0.85	1.33	0.03	0.18		0.73
Anthopleura sola			5.02	2.24	1.59	2.73	2.00	0.82
Anthopleura spp		3.23						
Total Anemones	*1.7*	*3.23*	*5.87*	*3.57*	*1.62*	*2.91*	*2.00*	*1.91*
POLYCHAETES								
Diopatra sp					0.04			
Dodecaceria fewkesi	1.9		0.77	0.91			0.64	0.09
Phragmatopoma californica	4.6	1.32	0.31	1.58	6.51	4.91	3.09	0.09
Serpula vermicularis				0.08		0.09	1.82	
Total Polychaetes	*6.5*	*1.32*	*1.08*	*2.57*	*6.55*	*5.00*	*5.55*	*0.18*
MOLLUSCS								
Chama/pseudochama					0.03	0.27		
Littorina spp			0.08	0.50				

Species	Littler (1979)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
Littorina planaxis	0.1							
Lottia austrodigitalis/digitalis			0.15	0.17				
Lottia (=Acmaea) digitalis	0.1							
Lottia gigantea			0.08					
Lottia limatula				0.17		0.18		
Lottia paradigitalis/strigatella				0.25				
Lottia pelta			0.23				0.09	
Lottia scabra/conus			0.31	0.42		0.36	0.09	
Lottia (=Acmaea) scabra	0.1							
Lottia spp. (misc. Limpets)					0.07			
Mopalia spp				0.08			0.09	0.09
Mytilus californianus	29.2	6.73	10.88	22.84	0.29	1.09		
Mytilus californianus dead	0.2							
Mytilus galloprovincialis/trossulus				0.33			0.09	
Nuttallina spp				0.08				
Septifer/Branchidontes		0.46		0.08	0.03	0.27		
Septifer	0.2							
Serpulorbis sp.					0.7			
Tegula spp.					0.03		0.09	
Unidentified chitons							0.09	
Vermetid gastropods								
Total Molluscs	*29.9*	*7.19*	*11.73*	*24.92*	*1.15*	*2.17*	*0.54*	*0.09*
ECHINODERMS								
Pisaster ochraceus			0.39					

Species	Littler (1979)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
Strongylocentrotus purpuratus			0.23		0.23			
Total Echinoderms			*0.62*		*0.23*			
CRUSTACEANS								
Balanus glandula	0.3	0.24	2.7	11.05		0.18	0.27	0.09
Barnacle (unspecified)					2.13			
Chthamalus spp	8.1		8.72	2.41		1.36	1.36	0.45
Chthamalus dead	0.2							
Pachygrapsus crassipes			0.08					
Pollicipes polymerus	1.3	0.3	0.23	0.33			0.09	
Tetraclita rubescens		0.08	0.08	0.17	0.03		0.55	
Total Crustaceans	*9.9*	*0.62*	*11.81*	*13.96*	*2.43*	*1.54*	*2.25*	*0.54*
OTHER INVERTEBRATES								
Ophlitaspongia pennata			0.08					
Unidentified worms		0.13						
Other macroinvertebrates	0.6							
Total Other Invertebrates		*0.13*	*0.08*					
FISH								
Sculpin			0.08					
Total Fish			*0.08*					
SUBSTRATE								
Rock		29.04	28.32	16.78	7.11	14.82	15.82	14.27
Sand		36.39	3.16		40.73	35.82		36.73
Total Substrate		*65.43*	*31.48*	*16.78*	*47.84*	*50.64*	*15.82*	*51.00*

Table 4. Abundance of mobile invertebrate species (mean number per square meter) sampled in different studies in the Mugu-Latigo ASBS.

Data from the different studies came from different sources as described in the text.

Species	Littler Surveys (1979)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
MOLLUSCS								
Acanthinucella spp		2.12	2.92	0.73	2.67	3.03	1.70	0.24
Amphissa							0.12	
Aplysia californica								
Astrea undosa						0.36		
Conus californica		0.12						
Cyanoplax sp		1.32						
Epitonium tinctum	4		0.12	0.24		1.09	0.97	0.12
Fissurella volcano/Diodora sp		3.60	4.84	1.70	2.33	10.91	6.67	
Fissurella volcano	7							
Haliotis cracherodii								
Hermissenda crassicornis				0.12				
Homolopoma spp.							0.12	
Lacuna spp	4			0.24				
Lepidochitona hartwegii			0.60	0.73		0.12	0.48	
Lepidozona spp.						0.12	0.73	
Littorina keenae			78.55	463.03				
Littorina plena/scutulata			24.36	23.03				
Littorina planaxis	269							
Littorina scutulata	15							
Littorina spp.			410.91			0.24	11.39	0.61

Species	Littler Surveys (1979)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
Lottia conus	1							
Lottia digitalis	64							
Lottia austrodigitalis/digitalis			32.36	28.85			0.24	
Lottia gigantea	2	1.48	3.39	1.21			0.12	
Lottia insessa				0.12				
Lottia limatula	4		2.42			2.67	3.03	
Lottia ochracea				1.09				
Lottia paradigitalis/strigatella			50.30	98.30		17.33	55.64	
Lottia pelta	8		0.12	5.33		0.12	0.24	
Lottia persona				3.88				
Lottia scabra/conus			26.18	73.21		26.28	40.73	
Lottia scabra	79							
Lottia scutum			4.97	0.24				
Lottia strigatella	62							
Lottia spp (misc. Limpets)		14.52	9.68		87.67			
Lottia juveniles (little brown limpets)	1		14.20					
Mopalia spp		0.28	0.24	0.36	9.33	0.24	0.12	0.12
Norrisia norrisi		0.12						
Nucella emarginata	2	1.48	2.06	0.24				
Nuttallina spp	3	11.08	7.15	9.09		5.45	7.52	0.24
Ocenebra circumtexta		0.28	0.24			0.12		
Tegula funebralis	10	3.72	4.36	1.33	0.33	2.30	7.15	0.24
Tegula spp.					1.33		0.48	

Species	Littler Surveys (1979)	One-Time Survey (1994)	CBS Survey (Sp 2001)	CBS Survey (Sp 2006)	Latigo Point (Sp 2001)	Paradise Cove South (Sp 2002)	Little Dume (Sp 2002)	Point Dume (Sp 2002)
unidentified chitons					2.67			
unidentified mobile gastropods		0.52						
ECHINODERMS								
Hemigrapsus oregonensis			0.24					
Leptasterias spp				0.12				
Pisaster ochraceus			1.08			0.12	0.12	0.24
Strongylocentrotus franciscanus								
Strongylocentrotus purpuratus		0.40	0.24			0.73	3.88	
CRUSTACEANS								
Cancer antennarius								
Pachygrapsus crassipes	4	0.92	4.85	0.12		3.03	1.21	0.24
Pagurus hirsutiusculus	2		0.48	0.61				
Pagurus samuelis			0.61	0.12				
Pagarus spp					7.00	7.88	6.18	1.58
Petrolisthes spp.							0.12	
Pugettia spp		1.20	0.12					
OTHER INVERTEBRATES								
Other macroinvertebrates	3							

Table 5. Dominant organisms within the various intertidal zones of the Mugu-Latigo ASBS, from Morin and Harrington (1979).

Zone 1	(Uppermost Horizon) [+5.0 to 7.0 ft above MLLW]
	Littorina planaxis (eroded periwinkle) *Chthamalus fissus* (acorn barnacle) *Ligia occidentalis* (rock slater) *Lottia (=Collisella) digitalis* (fingered limpet) *Lottia (=Collisella) scabra* (rough limpet)
Zone 2	(High Intertidal) [+2.5 to 5.0 ft above MLLW]
	Balanus glandula (acorn barnacle) *Lottia gigantean* (owl limpet) *Tetraclita squamosa* (red acorn barnacle) *Nuttalina fluxa* (chiton) *Lottia (=Collisella) conus* (limpet) *Tegula funebralis* (black turban snail) *Pachygrapsus crassipes* (lined shore crab) *Ulva californica* (sea lettuce) *Ralfsia* sp. (tar spot brown algae)
Zone 3	(Middle Intertidal) [+0.0 to 2.5 ft above MLLW]
	Mytilus californianus (California mussel) *Pollicipes polymerus* (gooseneck barnacle) *Anthopleura elegantissima* (aggregating anemone) *Lithothamnium* spp. or *Lithophyllum* spp. (encrusting coralline algae) *Corallina* spp. or *Bossiella* spp. (articulated coralline algae) *Mazzaella(=Gigartina) leptorhynchos* (foliose red algae) *Mopalia muscosa* (mossy chiton) *Acanthina spirata* (toothed whelk) *Nucella (=Thais) emarginata* (dog whelk) *Pagurus samuelis* (hermit crab)
Zone 4	(Low Intertidal) [-1.6 to 0.0 ft below MLLW]
	Phragmatopoma californica (sand tube worm) *Phyllospadix torreyi* (surf grass) *Egregia menziesii* (feather-boa kelp) *Pionitis* sp. (foliaceous red algae) *Pseudochama exogyra* (reversed chama) *Serpulorbis squamigerus* (worm snail) *Penitella penita* (flat-tipped paddock or boring clam) *Pisaster ochraceus* (ochre star) *Euherdmania claviformis* (sand club anemone)

Table 6. Core species monitored by the Multi-Agency Rocky Intertidal Network (MARINe) including which species are present at the Paradise Cove monitoring site.

Taxonomic Groupings and Core Species Monitored by MARINe	Present at Paradise Cove Monitoring Site? (X)
GREEN ALGAE	
Cladophora columbiana	
Ulva/Enteromorpha	X
Other Green Algae (any greens not listed above)*	X
BROWN ALGAE	
Egregia menziezii (Boa Kelp)	X
Eisenia arborea	X
Endarachne/Petalonia	X
Fucus gardneri (= F. distichus)(Northern Rockweed)	
Halidrys dioica/Cystoseira spp	
Hedephyllum sessile (Sea Cabbage)	
Hesperophycus californicus (= H. harveyanus)(Olive Rockweed)	
Pelvetiopsis limitata (Dwarf Rockweed)	
Postelsia palmaeformis (Northern Sea Palm)	
Sargassum muticum	X
Scytosiphon spp	X
Silvetia compressa (= Pelvetia fastigiata)(Golden Rockweed)	X
Colpomenia peregrina	X
Dictyota spp/Pachydictyon coreacium	X
Zonaria spp.	X
Other Brown Algae (any browns not listed above)*	X
RED ALGAE	
Chondracanthus canaliculatus (= Gigartina canaliculata)	X
Gastroclonium subarticulatum	X
Gelidium spp.	X
Endocladia muricata (Turfweed)	X
Mastocarpus papillatus (blade)(Turkish Washcloth)	X
Mazzaella affinis (= Rhodoglossum affine)	X
Mazzaella spp.(= Iridaea spp)(Iridescent Weed)	
Neorhodomela larix (Black Pine)	
Porphyra sp	X
Caulacanthus ustulatus	
Articulated Corallines (Erect Corallines)	X
Crustose Corallines (Encrusting Corallines)	X
Filamentous red algae	X
Other Red Algae (any reds not listed above)*	X

Taxonomic Groupings and Core Species Monitored by MARINe	Present at Paradise Cove Monitoring Site?
ALGAE/PLANTS	
Phyllospadix scouleri/torreyi (Surfgrass)	X
Non-Coralline Crusts (reds and browns)	X
Other Plant/Algae*	
ANEMONES	
Anthopleura elegantissima/sola (Green Anemone)	X
POLYCHAETE WORMS	
Phragmatopoma californica	X
MOLLUSCS	
Acanthina spp	
Fissurella volcano	X
Haliotis cracherodii (Black Abalone)	
Katharina tunicata	
Lepidochitona hartwegii	
Littorina spp	X
Lottia gigantea (Owl Limpet)	X
Mopalia spp	X
Mytilus californianus (California Mussel)	X
Nucella emarginata	X
Nucella canaliculata	
Nuttalina spp	X
Ocenebra circumtexta	
Tegula brunnea	
Tegula funebralis	X
Tegula gallina	
Tegula spp	
Limpets	X
Large Limpets > 15mm (excluding L. gigantea)	X
Medium Limpets 5-15mm	X
Small Limpets < 5mm	X
Chitons	X

Taxonomic Groupings and Core Species Monitored by MARINe	Present at Paradise Cove Monitoring Site?
Other Barnacles (any barnacles not listed above)*	
ECHINODERMS	
Pisaster ochraceus (Ochre Star)	X
Henricia spp	
Strongylocentrotus purpuratus	X
CRUSTACEANS	
Balanus glandula (Northern Barnacle)	
Chthamalus dalli/fissus & Balanus glandula (White Barnacle)	X
Ligia occidentalis	
Pachygrapsis crassipes	X
Pagurus spp	X
Pollicipes polymerus (Goose Barnacle)	X
Semibalanus cariosus (Thatched Barnacle)	
Tetraclita rubescens (Pink Barnacle)	
INVERTEBRATES	
Other Invertebrates (Other Animals) (any inverts not listed above)*	X
SUBSTRATES	
Rock (Bare Rock)	X
Sand	X
Tar	X

6. FIGURES

Figure 1. Aerial; view of the Malibu Coast Area of Special Biological Concern (Mugu Lagoon to Latigo Point.

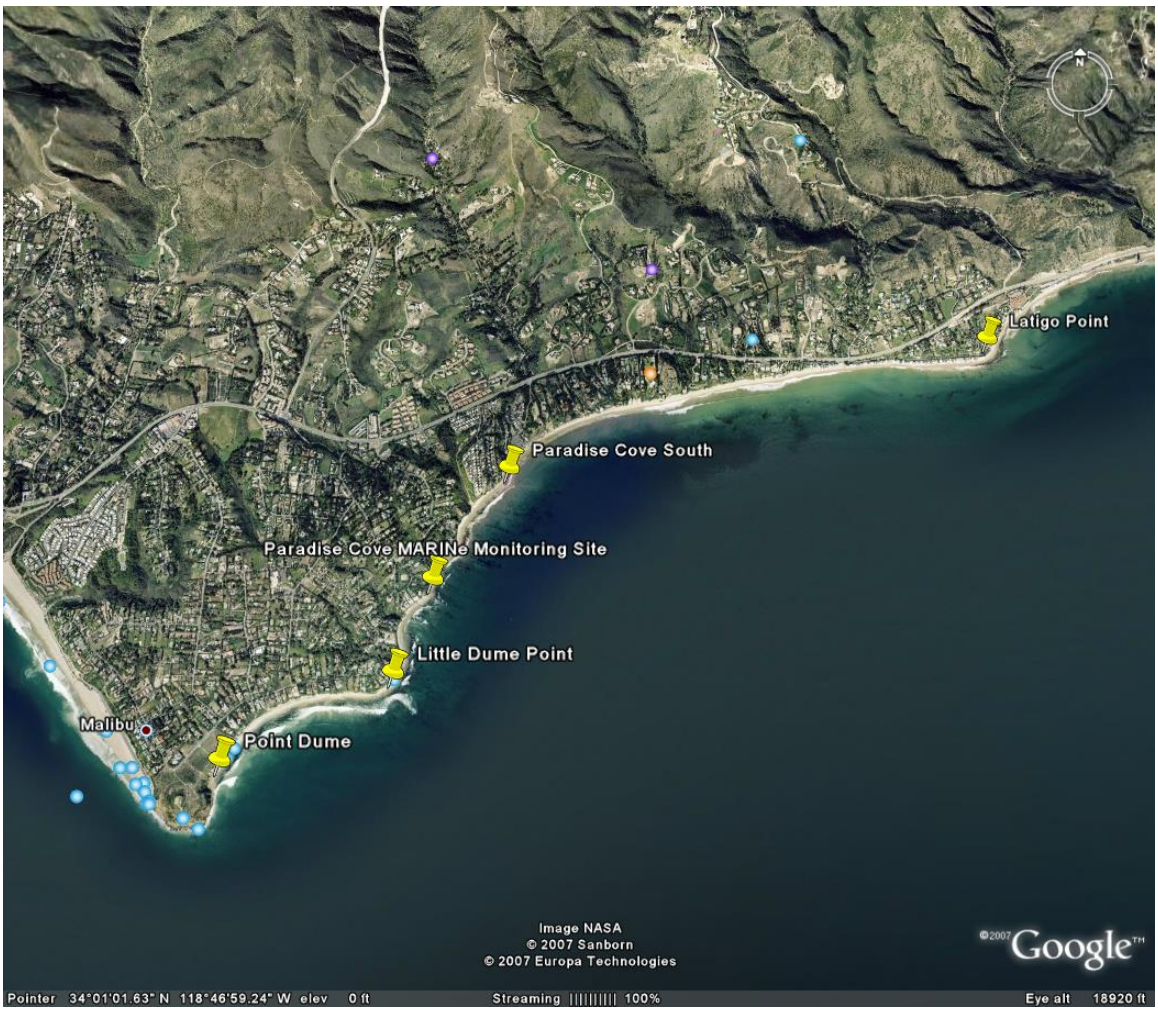

Figure 2. Aerial view of Point Dume to Latigo Point.

Markers indicate locations of study sites discussed in this report.

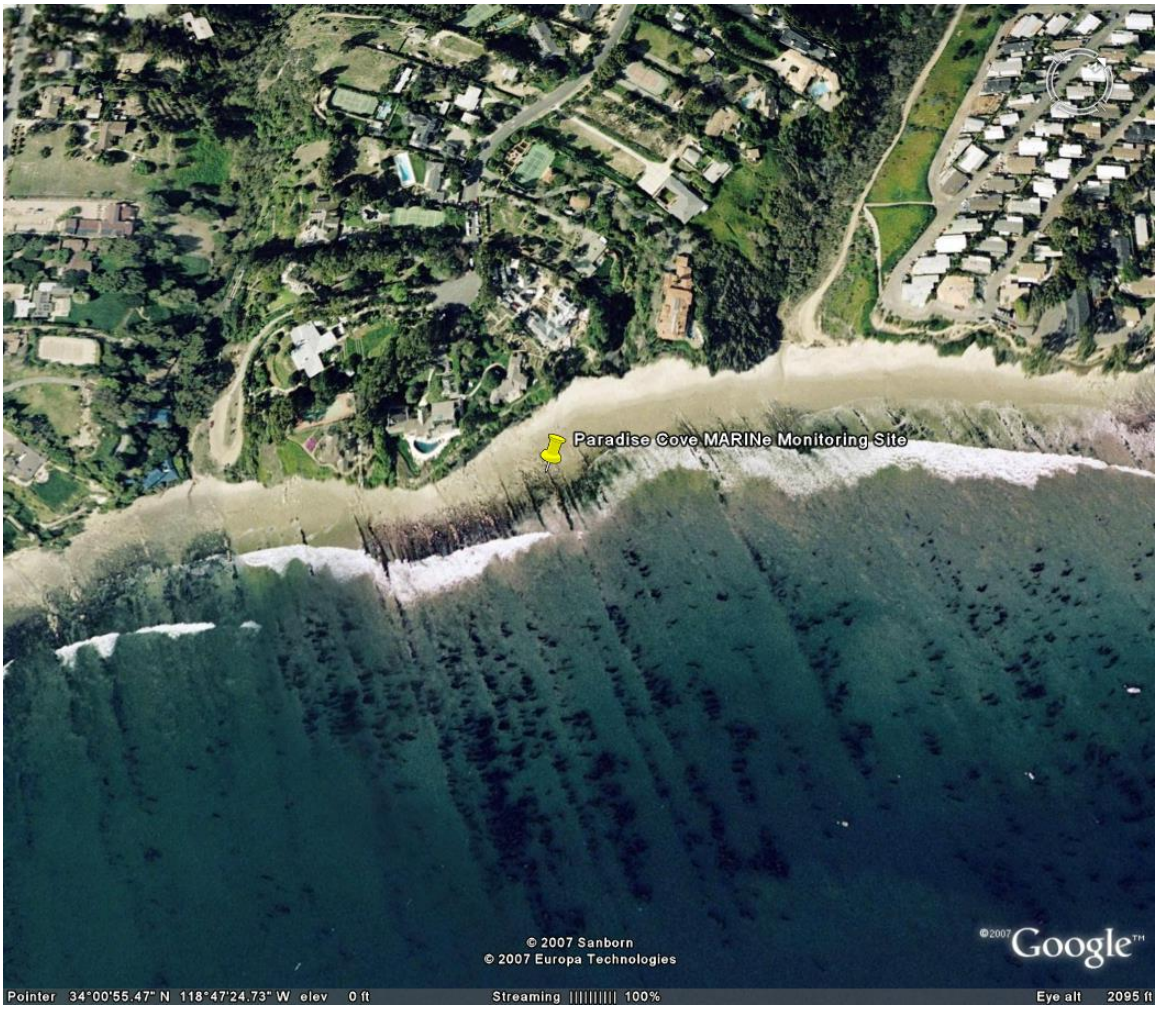

Figure 3. Aerial view of the Paradise Cove MARINe monitoring site.

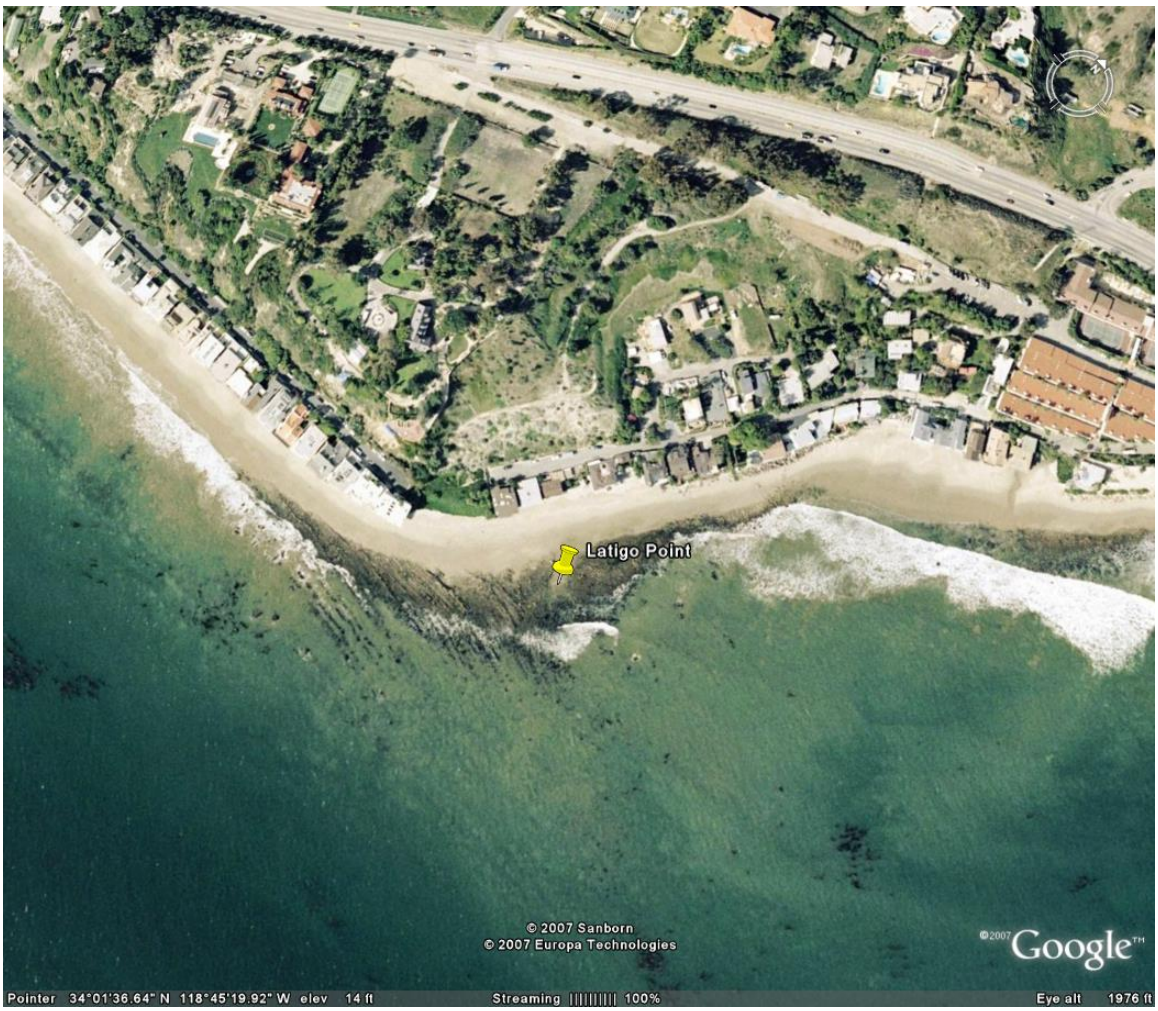

Figure 4. Aerial view of the Latigo Point study site.

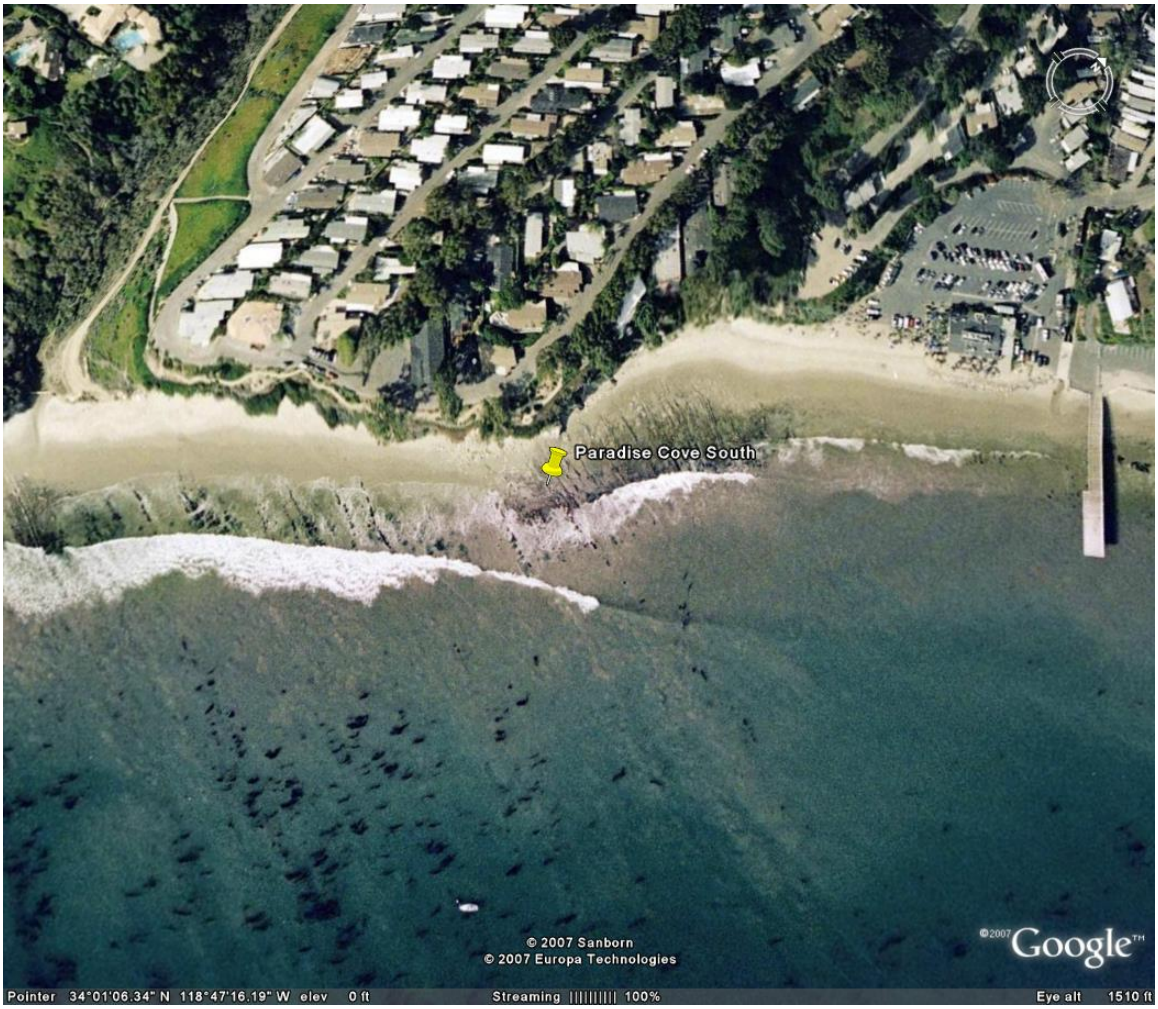

Figure 5. Aerial view of the Paradise Cove South study site.

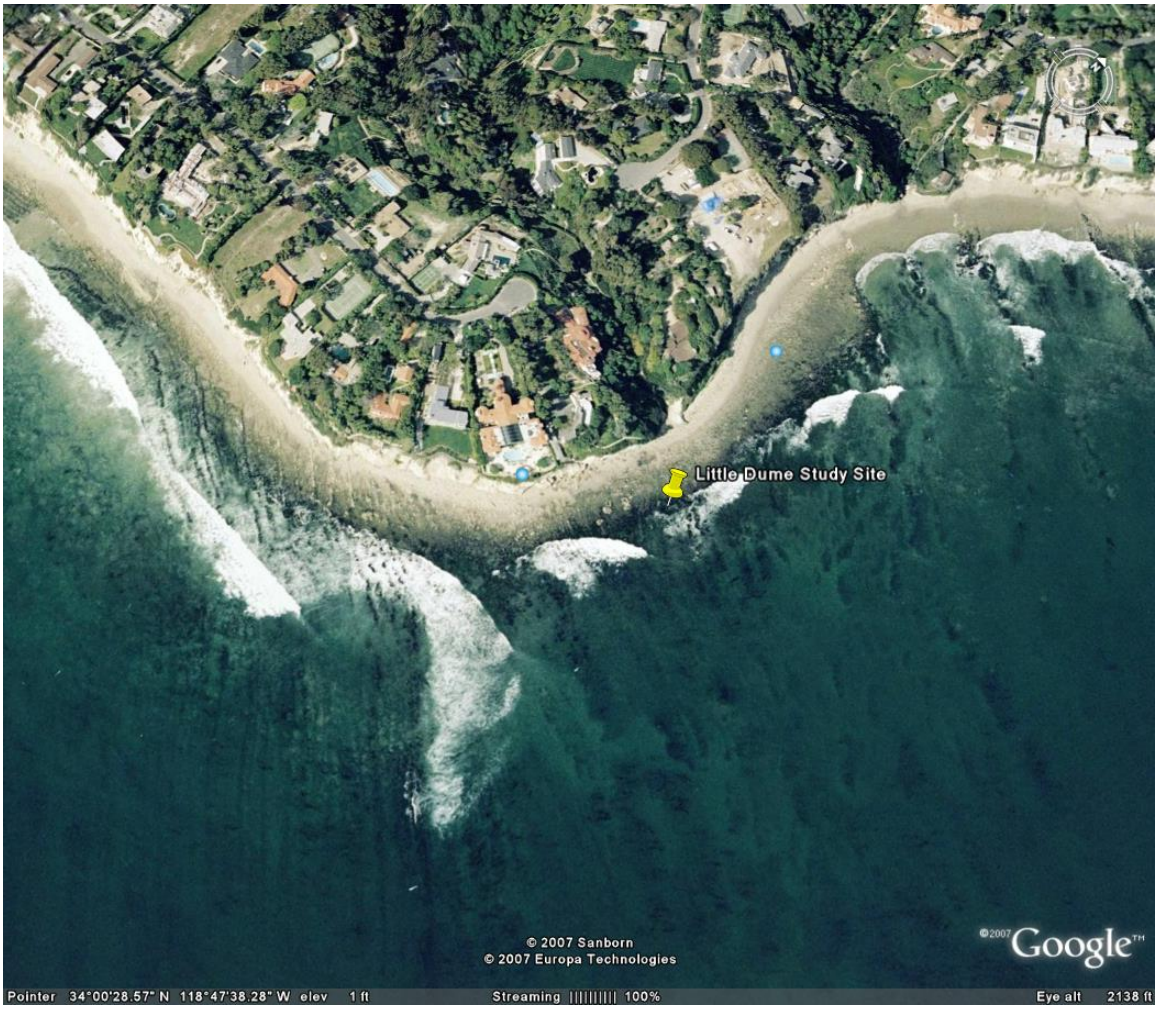

Figure 6. Aerial view of the Little Dume study site.

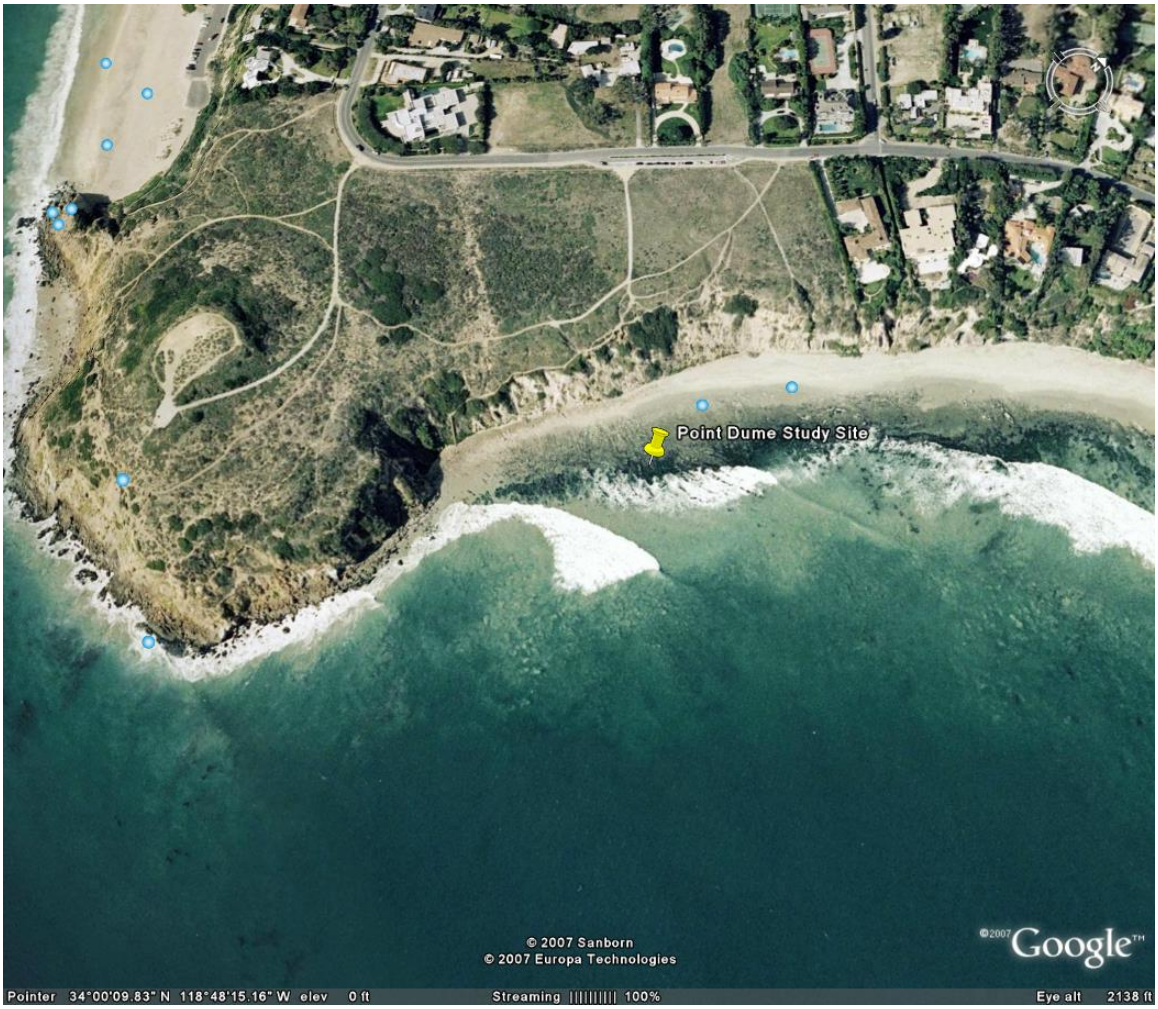

Figure 7. Aerial view of the Point Dume study site.

Figure 8. MARINe monitoring site at Paradise Cove.

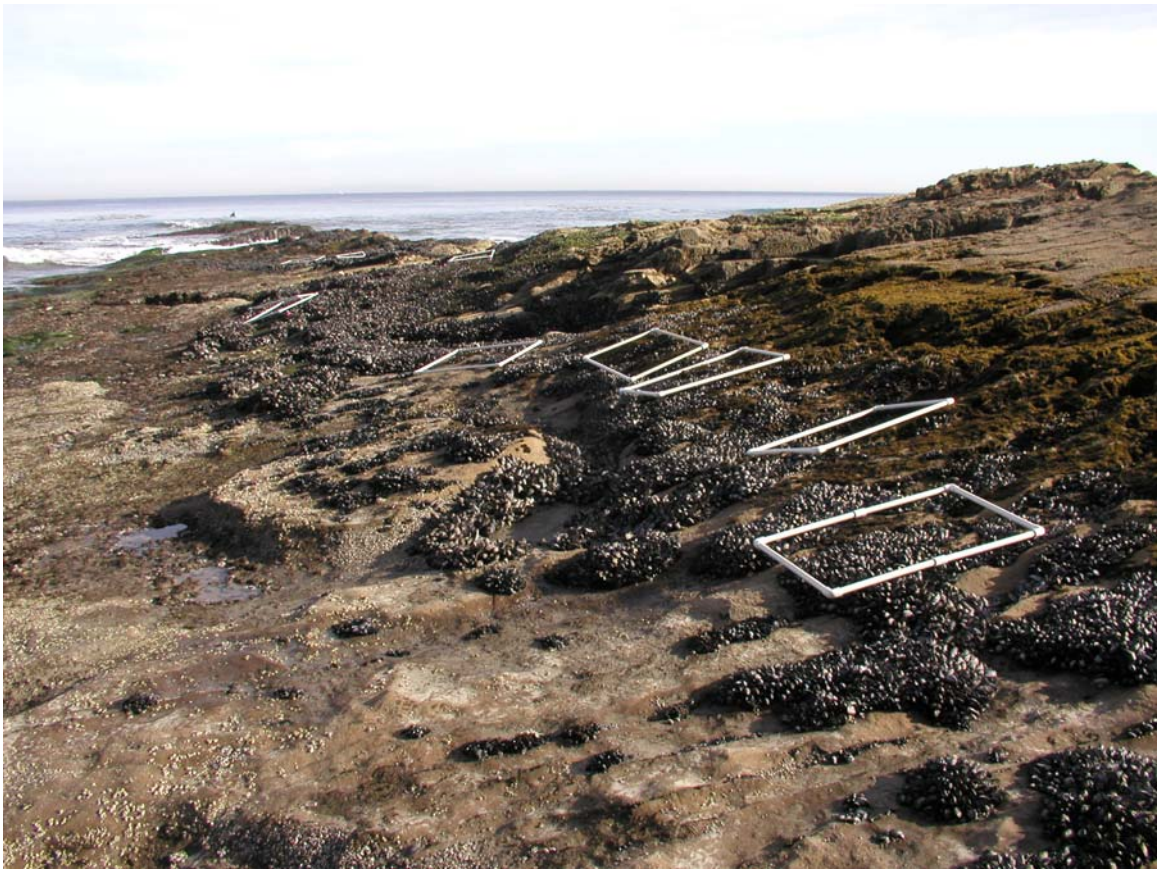

Figure 9. Primary monitoring reef at Paradise Cove.

Figure 10. Boulder field and surgrass (*Phyllospadix* sp.) zone monitored at Paradise Cove.

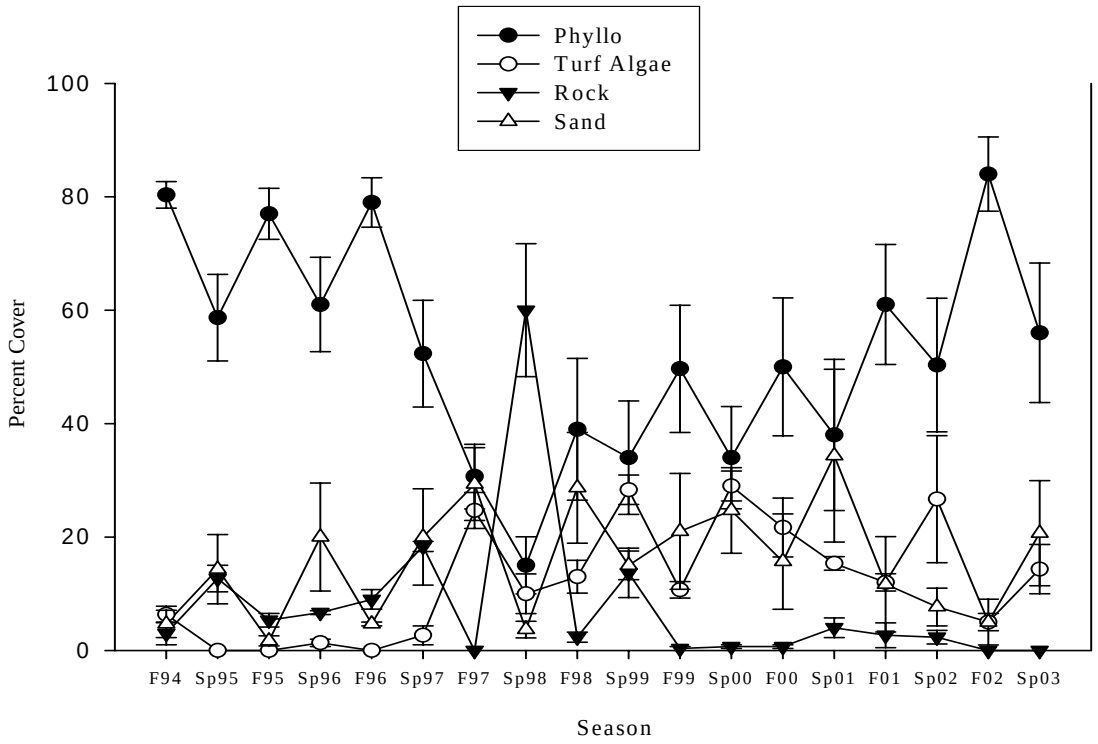

Figure 11 Percent cover of *Phyllospadix* spp., turf algae, rock, and sand collected at the Paradise Cove MARINe monitoring site (1994-2003).

Data were collected in the spring and fall along 10 meter long point intercept transects (100 points total) which were established within the *Phyllospadix* zone.

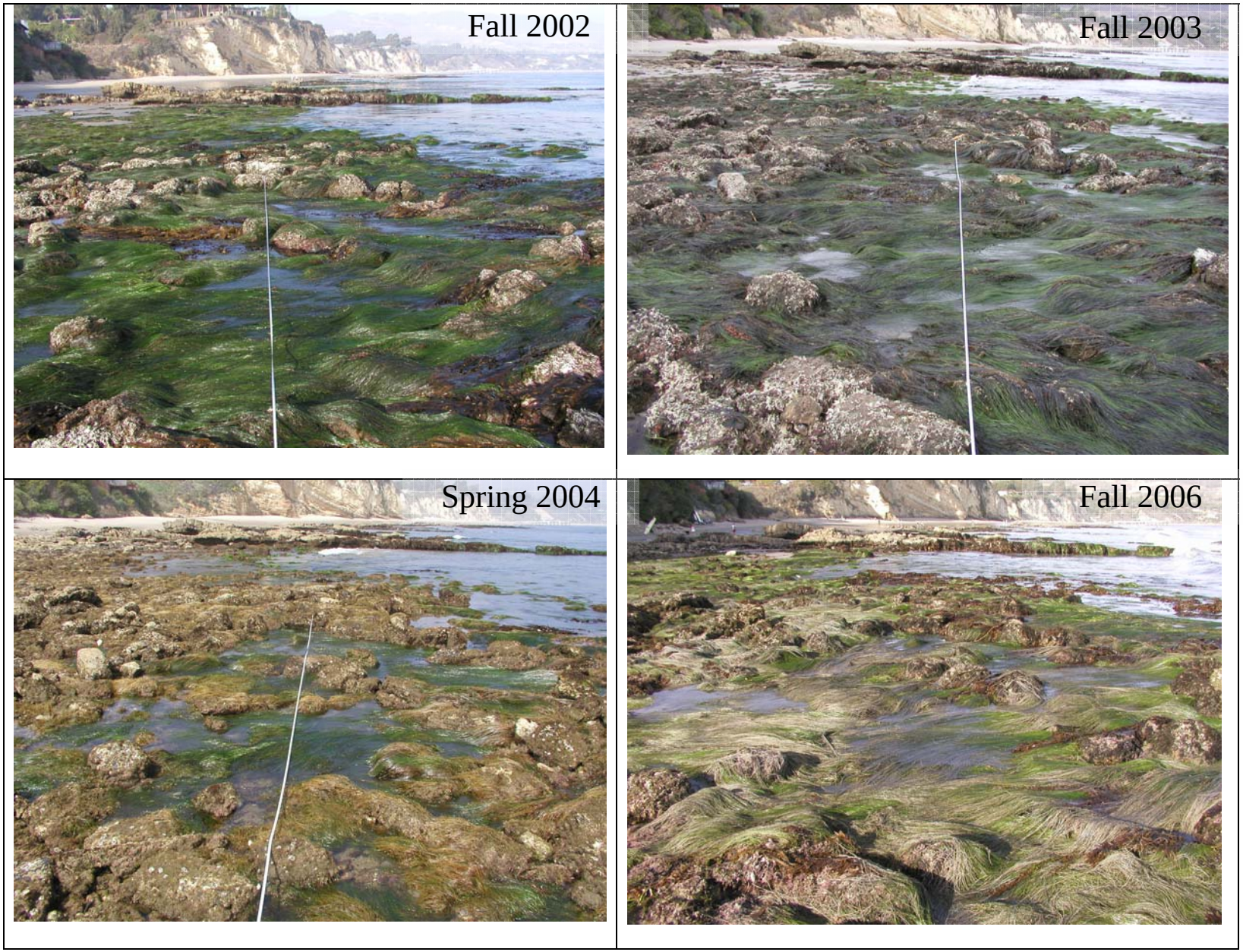

Figure 12. Close up of the Phyllospadix area over time.

Figure 13. Panoramic view of one portion of the Paradise Cove MARINe monitoring site

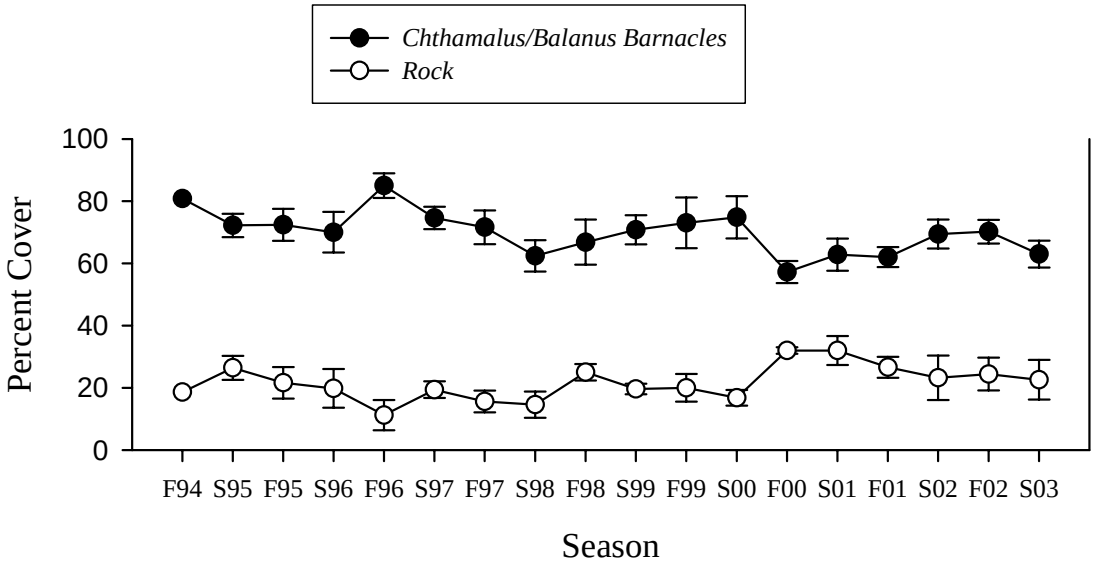

Figure 14. Percent cover of barnacles and rock collected within barnacle (*Chthamalus* spp./*Balanus* spp.) plots at the Paradise Cove MARINe monitoring site (1994-2003).

Data were collected in the spring and fall within 50cm X 75cm photoplots; percent cover estimates were obtained by scoring the species present at each of 100 evenly spaced points projected onto the photoplot images.

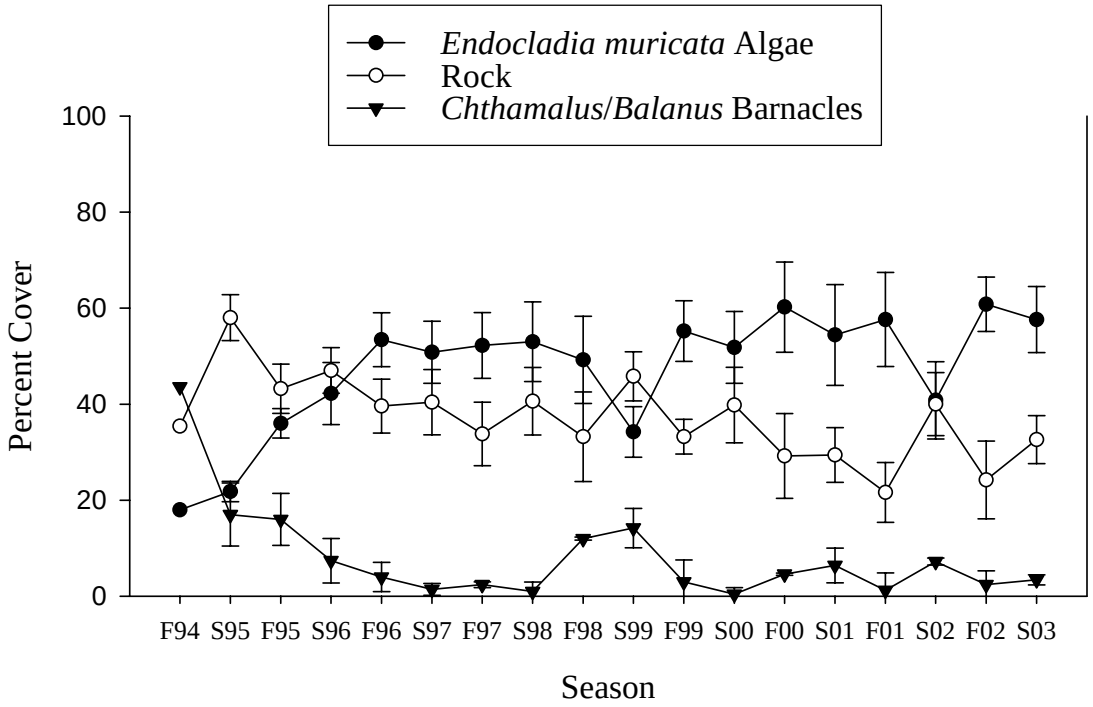

Figure 15. Percent cover of barnacles, turfweed, and rock collected within turfweed (Endocladia muricata) plots at the Paradise Cove MARINe monitoring site (1994-2003).

Data were collected in the spring and fall within 50cm X 75cm photoplots; percent cover estimates were obtained by scoring the species present at each of 100 evenly spaced points projected onto the photoplot images.

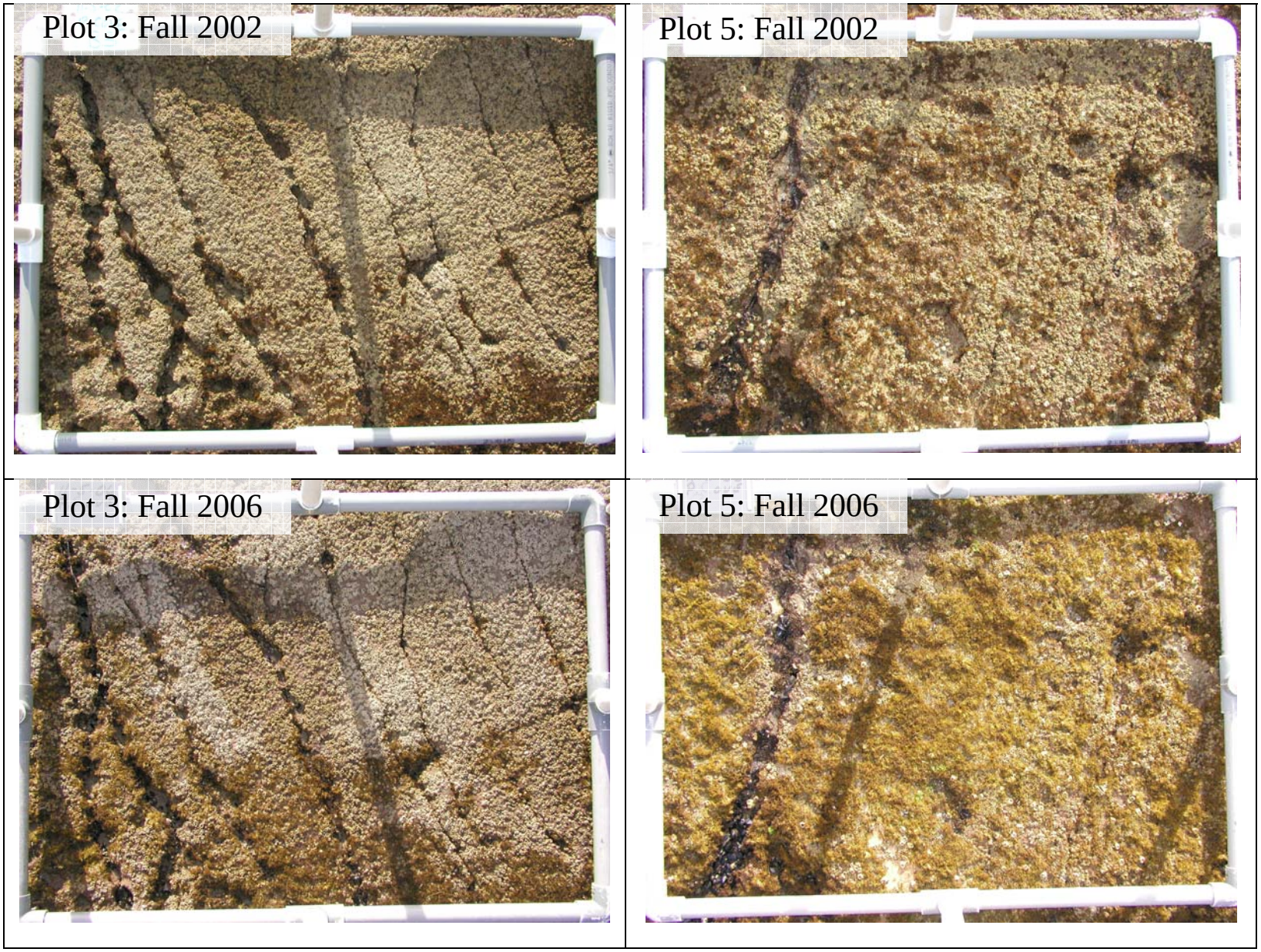

Figure 16. Close up of the barnacle area over time showing the encroachment of *Endocladia muricata*.

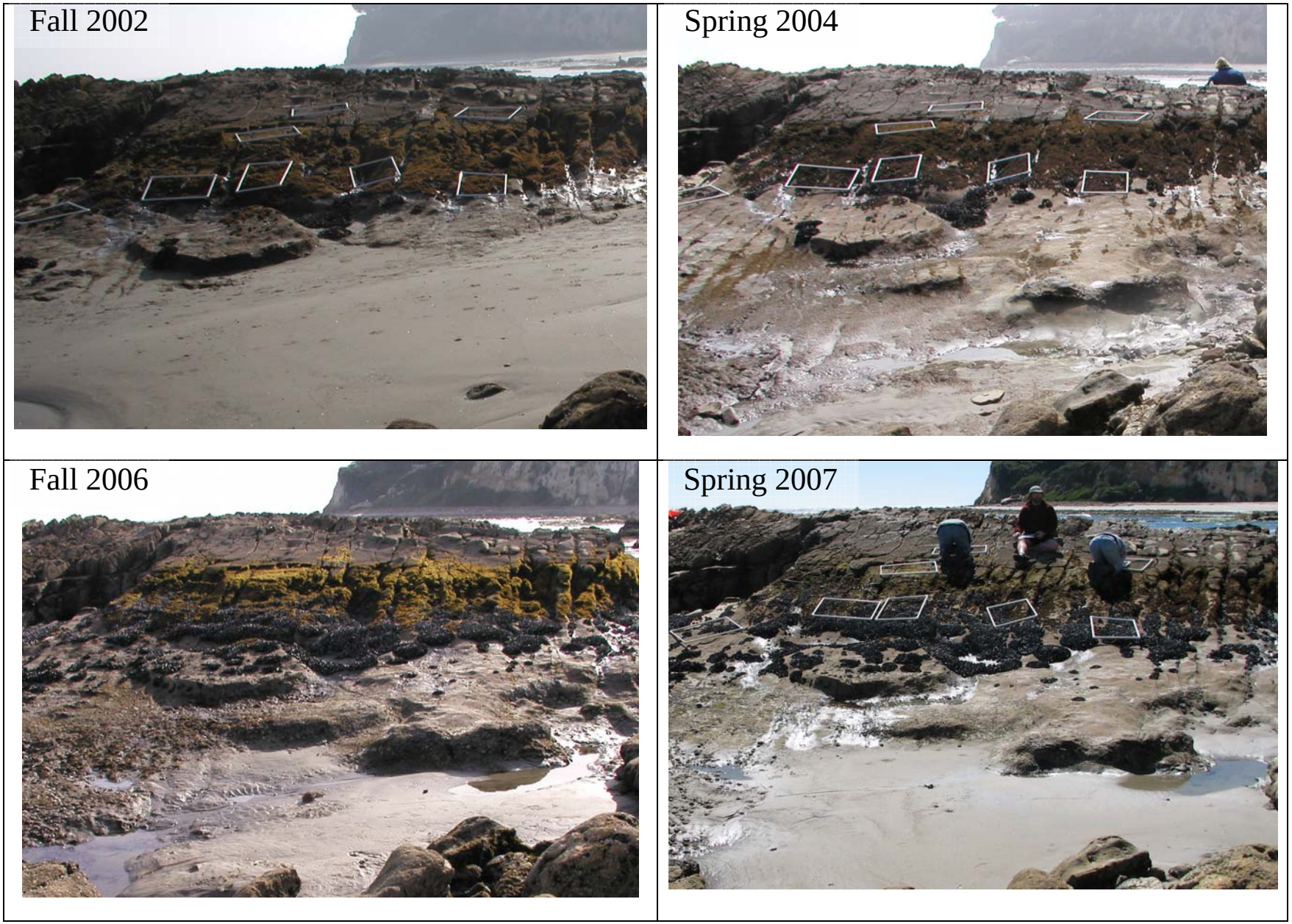

Figure 17. Changes in the *Endocladia muricata* zone over time (note increase in mussel cover).

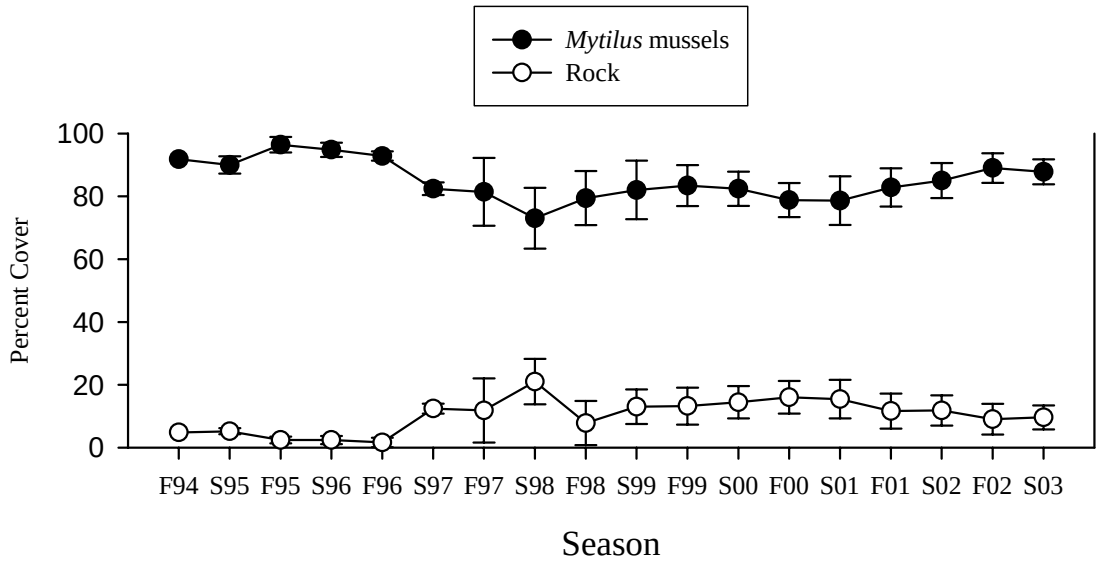

Figure 18. Percent cover of mussels and rock collected within mussel (*Mytilus* spp.) plots at the Paradise Cove MARINe monitoring site (1994-2003).

Data were collected in the spring and fall within 50cm X 75cm photoplots; percent cover estimates were obtained by scoring the species present at each of 100 evenly spaced points projected onto the photoplot images.

Figure 19. Changes in the mussel zone over time (note fixed quadrat position).

Figure 20. Seastar feeding front at the Paradise Cove MARINe monitoring site (Fall 2003).

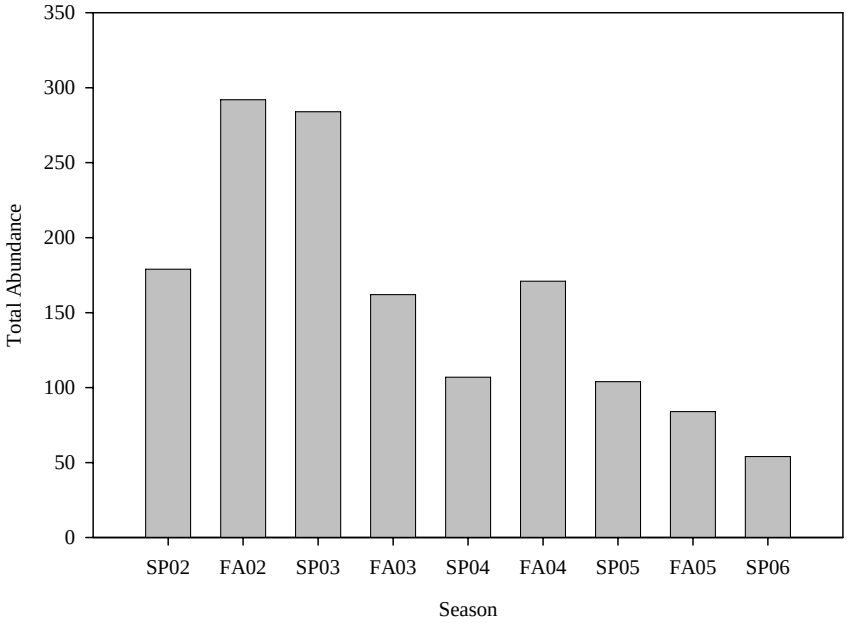

Figure 21. Abundance of seastars (Pisaster *ochraceus*) within sampling plots at the Paradise Cove MARINe monitoring site.

Seastars were counted in the spring and fall within three contiguous irregular plots which were established along the offshore portion of the main sampling reef.

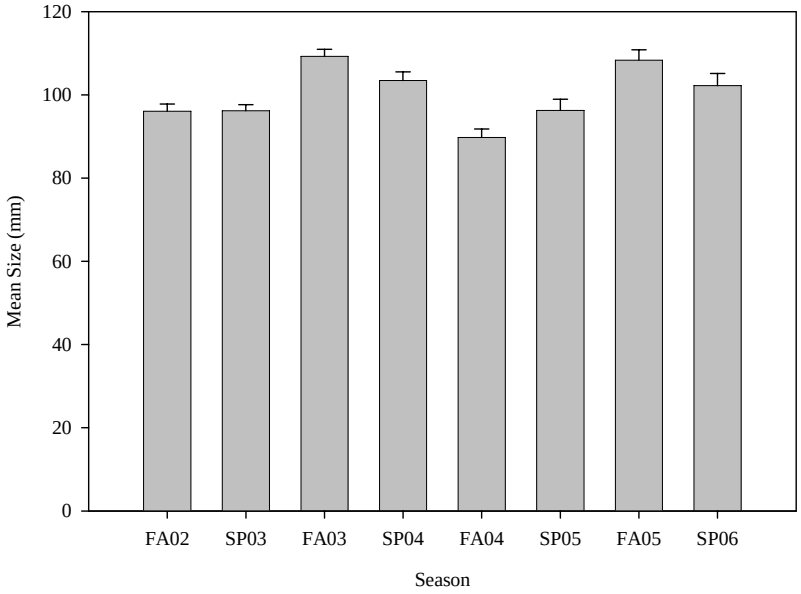

Figure 22. Mean size of seastars (*Pisaster ochraceus*) at the Paradise Cove MARINe monitoring site.

Data were collected in the spring and fall by measuring with calipers all *Pisaster ochraceus* (from the center to the end of the longest ray) all seastars within the three sampling plots.

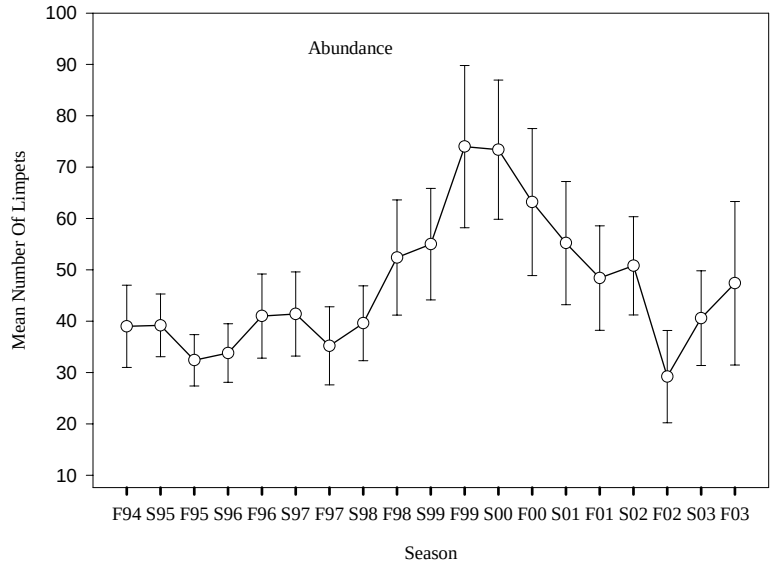

Figure 23. Abundance of owl limpets (*Lottia gigantea*) at the Paradise Cove MARINe monitoring site.

Data were collected in the spring and fall by counting all *Lottia gigantea* within 1 meter radius circular plots which were established in high quality habitat.

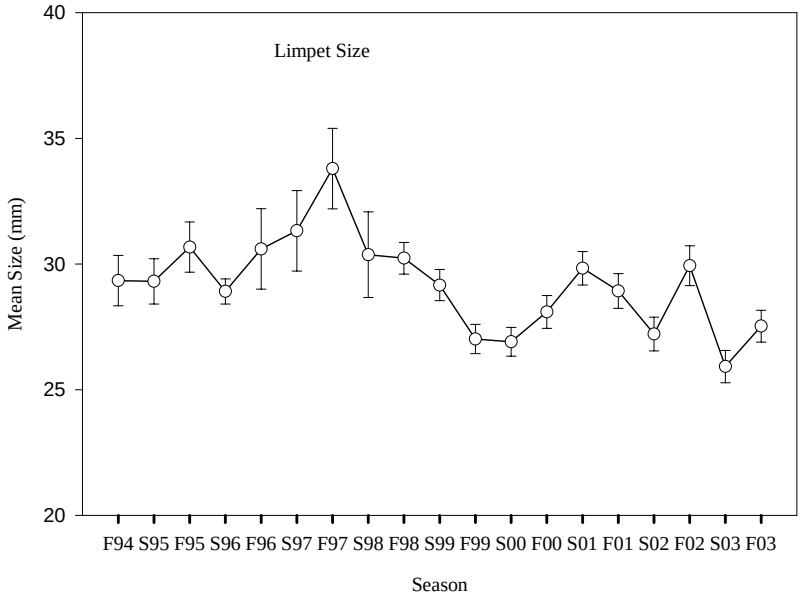

Figure 24. Mean size of owl limpets (*Lottia gigantea*) at the Paradise Cove MARINe monitoring site.

Data were collected in the spring and fall by measuring with calipers all *Lottia gigantea* within 1 meter radius circular plots which were established in high quality habitat.

Figure 25. Example of an owl limpet (*Lottia giganteaa*) circular plot at the Paradise Cove MARINe monitoring site.

Owl limpets are counted and measured within 1-meter radius circular plots with calipers. Within this image (Fall 2003) the central bolt for one of these plots is visible, as are several owl limpets.

CURRICULUM VITAE

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EDUCATION

Ph.D. 1982 University of California, Los Angeles.
B.S. 1975 University of California, Irvine.

PROFESSIONAL EXPERIENCE

1998-present Director
Environmental Science and Engineering Program, UCLA

2000-present Professor
Department of Environmental Health Sciences
University of California, Los Angeles, CA 90095-1772

1992-2000 Associate Professor
Department of Environmental Health Sciences
University of California, Los Angeles, CA 90095-1772

1985-1991 Assistant Research Biologist
Marine Science Institute
University of California, Santa Barbara, CA 93106

1983-1984 Postdoctoral Fellow
Department of Biological Sciences
Simon Fraser University, Burnaby, B.C., Canada V5A 1S6

RESEARCH

Major Research Interests

- Restoration ecology, especially for coastal marine and estuarine environments
- Ecology of coastal wetlands and estuaries
- Long-term ecological monitoring
- Development and scientific evaluation of mitigation techniques
- Development of techniques for assessing habitat value and ecosystem integrity
- Ecology of artificial and natural reefs
- Marine ecology
- Interface between environmental biology and resource management policy

Research Grants and Contracts, R.F. Ambrose

Total contract and grant funding as Principal Investigator exceeding $7.1 million 1985-2006. Funding as co-investigator exceeding $9.5 million.

Funding sources include:
California Coastal Commission
California Department of Fish and Game, Office of Spill Prevention and Response
California Department of Transportation
California State Coastal Conservancy
California State Lands Commission
California State Water Resources Control Board
City of Malibu
County of Santa Barbara
Environmental Defense
Las Virgenes Municipal Water District
Los Angeles Regional Water Quality Control Board
Marine Review Committee, Inc.
Minerals Management Service
National Science Foundation
Santa Monica Bay Restoration Commission
Southern California Coastal Water Research Project
Southern California Educational Initiative
Sweetwater Reservoir Organization
UC Center for Water Resources
UC Marine Council
UC Pacific Rim Research Program
UC Santa Barbara Coatal Marine Institute (Minerals Management Service)
UC Toxic Substances Research and Teaching Program
UC Toxic Substances Research and Teaching Program - Coastal Toxicology Component
U.S. Environmental Protection Agency
U.S. Navy

Scientific Expeditions and Research Locales

- Research along California coast, including Channel Islands (Anacapa Island, Santa Barbara Island, Santa Catalina Island, Santa Cruz Island, San Miguel Island, San Nicolas Island).
- U.C. Berkeley Gump Marine Laboratory, Moorea, French Polynesia, 1996.
- Heron Island Research Station, Great Barrier Reef, Australia.
- West Indies Laboratory, St. Croix, U.S. Virgin Islands, 1981. (Including a week-long mission in the undersea laboratory HYDROLAB.)
- Laboratoire Arago, Banyuls-sur-Mer, France, on the Mediterranean, 1980.
- Scripps Institute of Oceanography Expedition, Baja California, 1977. (Co-Organizer)
- Other field experience: Baja California, British Columbia, Alaska.

TEACHING

Courses Taught

Coastal Processes and Management (UCSB Environmental Studies 134) - 1991

Applied Ecology (UCLA Environmental Health Sciences 212) - 1993-2006

Environmental Science and Engineering Problems Course (UCLA Environmental Science and Engineering 400 A, 400B, 400C) - 1993-2006

Environmental Science and Engineering Problems Course Workshop (UCLA Environmental Science and Engineering 410 B) - 1995-97

Graduate Seminar in Ecotoxicology (UCLA Environmental Health Sciences 203) with M. Collins - 1995-2006

Graduate Seminar in Coastal Ecology and Management (UCLA Environmental Health Sciences 206) – 2000-2004

Fundamentals of Environmental Health Sciences (Ecology Module) (UCLA Environmental Health Sciences 200B) – 1999-2006

Experimental Approaches to Problems in Coastal Toxicology (UC Davis PTX 230) – Summer 1999-2005

Doctoral Committees - Chair - Ph. D. Degree

Current Students

Robert Gilbert
Steven Lee
Demian Willette

Graduates

Michelle Anghera, 2004. "Detecting Contaminant Impacts to the Benthic Community in a Coastal Wetland." (current employer: Weston Solutions)

Gretchen Coffman, 2007. "Factors influencing invasion of Giant Reed (*Arundo donax*) in riparian ecosystems of Mediterranean-type climates." (current employer: URS Corporation)

W. Mark Hanna, 2003 (Civil and Environmental Engineering, co-chair with J. Dracup). "Real-time Adaptive Wetland Water Quality Management." (current employer: Los Angeles Department of Water and Power)

Travis Longcore, 1999 (Geography, co-chair with M. Savage). "Terrestrial Arthropods as Indicators of Restoration Success in Coastal Sage Scrub." (current employer: UCLA)

Jayson Smith, 2005 (Ecology and Evolutionary Biology [EEB], co-chair with P. Fong). "Factors Affecting Geographic Patterns and Long-Term Change of Mussel Abundances (*Mytilus californianus* Conrad) and Bed-Associated Community Composition along the California Coast" (current employer: California State University, Fullerton)

Irene Tetreault, 2006. "The effects of marine reserves on fish inhabiting temperate rocky reefs."

Doctoral Committees – Chair - D.Env. Degree

Current Students

Matthew Buffleben (co-chair with Stan Trimble, Geography) (current employer: North Coast Regional Water Quality Control Board)

Melissa Evanson (current employer: Golder Associates)

Cori Farrar (co-chair with Linwood Pendleton) (current employer: U.S. Army Corps of Engineers)

Felicia Federico (current employer : Geosyntec)
Amy Hensley
Laurie Ikuta (current employer: U.S. Army Corps of Engineers)
Stacey Jensen (current employer: U.S. Army Corps of Engineers)
Jennifer Liebeler (current employer: Chevron)
Forrest Vanderbilt (current employer: U.S. Army Corps of Engineers)

Graduates

Joshua Burnam (co-chair with Tony Orme, Geography), 2004. "Impacts of Low Water Crossings on Aquatic Resources under the U.S. Army Corps of Engineers Nationwide Permit Program" (current employer: Anchor Environmental)

Jae Chung, 2006. "Cumulative Impacts to Riparian Wetlands in the Aliso Creek and San Juan Creek Watersheds" (current employer: U.S. Army Corps of Engineers)

Alice Kwan, 1996. "Evaluation of a Decision Making Method Utilizing Spatial, Stakeholder, and Multi-Attribute Analyses: Application to a Conflict between Habitat Preservation and Development" (current employer: Hong Kong Airport Authority)

Erik Larsen, 2006. "Delineation and Assessment of Riparian Habitat in California - Regulatory and Ecological Implications" (current employer: URS Corporation)

Jonathan Lilien, 2001. "Cumulative Impacts to Riparian Habitat in the Malibu Creek Watershed" (current employer: Chevron)

Cindy Lin, 2002. "Effects of Landscape Modification on Stream Ecology and Structure in a Mixed-Use Watershed in Mediterranean Southern California" (current employer: U.S. Environmental Protection Agency)

Shelley Luce, 2003. "Urbanization and Aquatic Ecosystem Health in Malibu Creek, California: Impacts on Periphyton, Benthic Macroinvertebrates, and Environmental Policy" (current employer: Santa Monica Bay Restoration Commission)

Spencer MacNeil, 2001. "Hydrogeomorphic Assessment of Aliso Creek Watershed Streams: Developing a Foundation for Holistic Permitting and Management" (current employer: Aspen Environmental)

Douglas Meffert, 1996. "The Effectiveness of the Coastal Wetlands Planning, Protection and Restoration Act in Achieving Louisiana's Coastal Restoration Objectives" (current employer: Tulane University)

Whitman Miller, 2001. "Assessing the Importance of Biological Attributes for Invasion Success: Easter Oyster (*Crassostrea virginica*) Introductions and Associated Molluscan Invasions of Pacific and Atlantic Coastal Systems" (current employer: Smithsonian Environmental Research Center)

Monique Myers, 2003. "Coral Reef Monitoring for Management Purposes and the Effect of Marine Protected Areas on Benthic Communities on the Great Barrier Reef" (current employer: University of California Sea Grant and Cooperative Extension)

Petra Pless, 2001. "Technical and Environmental Assessment of Thermal Insulation Materials from Bast Fiber Crops" (current employer: Lesos Consulting)

Chuck Rairdan, 1998. "Regional Restoration Goals for Wetland Resources in the Greater Los Angeles Drainage Area: A Landscape-Level Comparison of Recent Historic and Current Conditions Using Geographic Information Systems" (current employer: U.S. Army Corps of Engineers)

Sarah Rothenberg (co-chair with Jenny Jay, Civil and Environmental Engineering), 2007. "Mercury Cycling in a Coastal Estuary: Implications for Total Maximum Daily Loads."

Ben Schwegler, 1999. "Engineering Ecosystems: an Ecosystem Function, Ecosystem Service Model for the Analysis of Private Sector Development Opportunities" (current employer: Disney Imagineering)

Arent (Barry) Schuyler, 1996. "The Risks of Marine Traffic and Oil Operations in the Santa Barbara Channel and the Santa Maria Basin"
Craig Shuman, 2003. "The Marine Aquarium Trade in the Phillippines: Balancing Ecological Impacts with Livelihood Opportunities" (current employer: Reef Check Foundation)
Eric Stein, 1995. "Assessment of the Cumulative Impacts of Section 404 Clean Water Act Permitting on the Ecology of the Santa Margarita, Ca. Watershed" (current employer: Southern California Coastal Water Research Project)
Mark Sudol, 1996. "Success of Riparian Mitigation as Compensation for Impacts due to Permits Issued through Section 404 of the Clean Water Act in Orange County, California" (current employer: U.S. Army Corps of Engineers)
Dan Swenson, 2005. "Habitat Loss, Cumulative Impacts, and the Clean Water Act Section 404 Program: A Spatial Analysis" (current employer: U.S. Army Corps of Engineers)
Matthew Vandersande, 2006. "Regulation of non-wetland riparian areas in the arid and semi-arid southwest: Section 404 of the Clean Water Act, bank stabilization, and a policy recommendation" (current employer: U.S. Army Corps of Engineers)
Vada Yoon, 2006. "Quantification of Natural Contributions During Wet and Dry Weather in Southern California" (current employer: Southern California Coastal Water Research Project)

Master's Students – Chair - M.S. Degree

Current Students

Janel Marie Augello
John Prokup

Graduates

Shanti Abichandani, 2007
Tamira Cohen, 1995
Lesley Dobalian, 1999
John Howe, 2001
Laurie Ikuta, 2002
Sharon Landau, 1996
Lena Maun, 2002
Whitman Miller (co-chair with Dr. R.R. Vance, Biology), 1994
Shannon Pankratz, 2003
Glen Sias, 2007
Terry Young, 2005

Postdoctoral Scholars

Peter Raimondi (1991-92)
Kevin Lafferty (1993-04)
Monique Myers (2004)
Raphael Sagarin (2004-06)

PROFESSIONAL ACTIVITIES

Consultant to many government agencies, including Channel Islands National Park, Channel Islands National Marine Sanctuary, California Coastal Commission, California State Coastal

Conservancy, Cities of Chula Vista, Carlsbad and Malibu, National Oceanic and Atmospheric Administration, Santa Monica Bay Restoration Commission, Southern California Wetlands Recovery Project (a partnership of state and federal agencies with wetlands responsibilities), and the Multi-Agency Rocky Intertidal Network (MARINE.

Consulting services to a variety of private companies and non-profit organizations, including Woodward-Clyde Consultants, MEC Analytical Systems, Aspen Environmental Group, Geosyntec Consultants, the Pacific Ocean Conservation Network, Ballona Wetlands Foundation, Malibu Lagoon Technical Advisory Committee (established by Heal the Bay/California State Coastal Conservancy).

Presented numerous papers (contributed and invited) and posters at regional, national and international scientific meetings.

Numerous interviews for newspaper, radio and television, including interviews with the Los Angeles Times, Santa Barbara News-Press, Malibu Times, LA Daily News, Thousand Oaks Star, Sacramento Bee, Orange County Register, Long Beach Press-Telegram, Ventura County Star, *Science* Magazine, KPCC/Public Radio, PBS/KCET.

Presented testimony to many commissions and panels, including the California Coastal Commission, California Senate Committee on Energy and Public Utilities, California Regional Water Quality Control Board, San Diego and Los Angeles Regions, California Legislative Oversight Committee on the California Ocean Resources Management Plan, California Senate Committee on Natural Resources and Wildlife, Malibu City Council, California Assembly Water, Parks and Wildlife Committee, and the California Energy Commission.

Memberships in Professional Associations include the Ecological Society of America, Estuarine Research Federation, Society for Conservation Biology, Society for Ecological Restoration, Society of Wetland Scientists, Southern California Academy of Scientists, Western Society of Naturalists

PUBLICATIONS

A. PEER-REVIEWED PAPERS

Published

1. Ambrose, R.F. and T.E. Meehan. 1977. Aggressive behavior of *Perognathus parvus* and *Peromyscus maniculatus*. Journal of Mammalogy 58: 665-668.

2. Meehan, T.E., P.W. Rundel, R. Ambrose, G. Baker and A. Rappoport. 1977. The influence of intensive selective browsing by pocket mice (*Perognathus*) on the spatial distribution of *Polygala deserticum* in Baja California. American Midland Naturalist 97: 489-495.

3. Ambrose, R.F. 1981. Observations on the embryonic development and early post-embryonic behavior of *Octopus bimaculatus* (Mollusca: Cephalopoda). Veliger 24: 139-146.

4. Ambrose, R.F. and B.V. Nelson. 1982. Inhibition of giant kelp recruitment by an introduced brown alga. Botanica Marina 25: 265-267.

5. Ambrose, R.F. 1982. Shelter utilization by the molluscan cephalopod *Octopus bimaculatus*. Marine Ecology Progress Series 7: 67-73.

6. Ambrose, R.F. and B.V. Nelson. 1983. Predation by *Octopus vulgaris* in the Mediterranean. P.S.Z.N. I: Marine Ecology 4: 251-261.

7. Ambrose, R.F. 1983. Midden formation by octopuses: the role of biotic and abiotic factors. Marine Behaviour and Physiology 10: 137-144.

8. Hartwick, E.B., R.F. Ambrose and S.M.C. Robinson. 1984. Den utilization and movements of tagged *Octopus dofleini*. Marine Behaviour and Physiology 11: 95-110.

9. Hartwick, E.B., R.F. Ambrose and S.M.C. Robinson. 1984. Dynamics of shallow-water populations of *Octopus dofleini*. Marine Biology 82: 65-72.

10. Ambrose, R.F. 1984. Food preferences, prey availability and the diet of *Octopus bimaculatus* Verrill. Journal of Experimental Marine Biology and Ecology 77: 29-44.

11. Ambrose, R.F. 1986. Effects of octopus predation on motile invertebrates in a rocky subtidal community. Marine Ecology Progress Series 30: 261-273.

12. Coyer, J.A., J.M. Engle, R.F. Ambrose and B.V. Nelson. 1987. Utilization of purple and red sea urchins (*Strongylocentrotus purpuratus* Stimpson and *S. franciscanus* Agassiz) as food by the white sea urchin (*Lytechinus anamesus* Clark) in the field and laboratory. Journal of Experimental Marine Biology and Ecology 105: 21-38.

13. Ambrose, R.F., B.J. Leighton and E.B. Hartwick. 1988. Characterization of boreholes by *Octopus dofleini* (Wulker) in the bivalve *Saxidomus giganteus* (Deshayes). Journal of Zoology (London) 214: 491-503.

14. Hartwick, E.B., S.M.C. Robinson, R.F. Ambrose, D. Trotter and M. Walsh. 1988. Inshore-offshore comparison of *Octopus dofleini* with special reference to abundance, growth and condition during winter. Malacologia 29: 57-68.

15. Ambrose, R.F. 1988. Population dynamics of *Octopus bimaculatus*: influence of life history patterns, synchronous reproduction, and recruitment. Malacologia 29: 23-39.

16. Ambrose, R.F. and S.L. Swarbrick. 1989. Comparison of fish assemblages on artificial and natural reefs off the coast of Southern California. Bulletin of Marine Science 44: 718-733.

17. Ambrose, R.F. and T.W. Anderson. 1990. The influence of an artificial reef on the surrounding infaunal community. Marine Biology 107: 41-52.

18. Holbrook, S.J., R.J. Schmitt and R.F. Ambrose. 1990. Biogenic habitat structure and characteristics of temperate reef fish assemblages. Australian Journal of Ecology 15: 489-503. (Also published in: Ecology of Temperate Reefs, ed. by M.J. Keough, G. Quinn and A. King. Blackwell Scientific Publications, Melbourne.)

19. Coyer, J.A., R.F. Ambrose, J.M. Engle and J.C. Carroll. 1993. Interactions between corals and algae on a temperate zone rocky reef: mediation by sea urchins. Journal of Experimental Marine Biology and Ecology 167: 21-37.

20. Ambrose, R.F., J.A. Coyer, J.M. Engle and B.V. Nelson. 1993. Changes in urchin and kelp densities at Anacapa Island, California. In: F.G. Hochberg, ed. Third California Islands Symposium: Recent Advances in Research on the California Islands. Santa Barbara Museum of Natural History, Santa Barbara, CA. pp. 199-209.

21. Ambrose, R.F. 1994. Mitigating the effects of a coastal power plant on a kelp forest community: Rationale and requirements for an artificial reef. Bulletin of Marine Science 55 (2): 694-708.

22. Johnson, T.D., A.M. Barnett, E.E. DeMartini, L.L. Craft, R.F. Ambrose and L.J. Purcell. 1994. Fish production and habitat utilization of a southern California artificial reef. Bulletin of Marine Science 55 (2): 709-723.

23. DeMartini, E.E., A.M. Barnett, T.D. Johnson and R.F. Ambrose. 1994. Growth and production estimates for biomass-dominant fishes on a southern California artificial reef. Bulletin of Marine Science 55 (2): 484-500.

24. Holbrook, S.J., S.L. Swarbrick, R.J. Schmitt and R.F. Ambrose. 1994. Reef architecture and reef fish: correlates of population densities with attributes of subtidal rocky environments. pp. 99-106 in Battershill, C.M. et al. (eds.) "Proceedings of the Second International Temperate Reef Symposium", 7-10 January 1992, Auckland, New Zealand. NIWA Marine, Wellington. 252 pp.

25. Altstatt, J.A., R.F. Ambrose, J.M. Engle, P.L. Haaker, K.D. Lafferty and P.T. Raimondi. 1996. Recent declines of black abalone *Haliotis cracherodii* on the mainland coast of central California. Marine Ecology Progress Series 142: 185-192.

26. M.A. Palmer, R.F. Ambrose and N.L. Poff. 1997. Ecological theory and community restoration ecology. Restoration Ecology 5: 291-300.

27. Stein, E.D. and R.F. Ambrose. 1998. Cumulative impacts of Section 404 Clean Water Act permitting on the riparian habitat of the Santa Margarita, CA watershed. Wetlands 18: 379-392.

28. Stein, E.D. and R.F. Ambrose. 1998. A rapid impact assessment method for use in a regulatory context. Wetlands 18: 393-408.

29. Ambrose, R.F. and D. Meffert. 1999. Fish assemblage dynamics in Malibu Lagoon, a small hydrologically altered estuary in southern California. Wetlands 19(2): 327-340.

30. Lafferty, K.D., C.C. Swift and R.F. Ambrose. 1999. Post flood persistence and recolonization of endangered tidewater goby populations. North American Journal of Fisheries Management 19: 618-622.

31. Lafferty, K., C. Swift and R.F. Ambrose. 1999. Extirpation and recovery of local populations of the endangered tidewater goby, *Eucyclogobius newberryi*. Conservation Biology 13: 1447-1453.

32. Murray, S.N., R.F. Ambrose, J.A. Bohnsack, L.W. Botsford, M.H. Carr, G.E. Davis, P.K. Dayton, D. Gotshall, D.R. Gunderson, M.A. Hixon, J. Lubchenco, M. Mangel, A. MacCall, D.A. McArdle, J.C. Ogden, J. Roughgarden, R.M. Starr, M.J. Tegner and M.M. Yoklavich. 1999. No-take reserve networks: Protection for fishery populations and marine ecosystems. Fisheries 24: 11-25.

33. Miller, A.W. and R.F. Ambrose. 2000. Optimum sampling of patchy distributions: Comparison of different sampling designs in rocky intertidal habitats. Marine Ecology Progress Series 196: 1-14.

34. Stein, E.D., F. Tabatabai and R.F. Ambrose. 2000. Wetland mitigation banking: a framework for crediting and debiting. Environmental Management 26: 233-250.

35. Ambrose, R.F. 2000. Wetland mitigation in the United States: Assessing the success of mitigation policies. Wetlands (Australia) 19: 1-27.

36. Moeller, A., R.F. Ambrose and S.S.Que Hee. 2001. A comparison of techniques for preparing fish fillet for ICP-AES multielemental analysis and the microwave digestion of whole fish. Food Additives and Contaminants 18: 19-29.

37. Cohen, T., S.S. Que Hee and R.F. Ambrose. 2001. Comparison of trace metal concentrations in fish and invertebrates in three Southern California wetlands. Marine Pollution Bulletin 42: 224-232.

38. Boyer, K.E., P. Fong, R.R. Vance and R.F. Ambrose. 2001. *Salicornia virginica* in a southern California salt marsh: seasonal patterns and a nutrient enrichment experiment. Wetlands 21 (3): 315-326.

39. Stein, E.D. and R.F. Ambrose. 2001. Landscape-scale analysis and management of cumulative impacts to riparian ecosystems: Past, present and future. Journal of American Water Resources Association 37 (6): 1597-1614.

40. Downs, T. and R. Ambrose. 2001. Syntropic ecotoxicology: a heuristic model for understanding the vulnerability of ecological systems to stress. Ecosystem Health 7: 266-283.

41. Sudol, M.F. and R.F. Ambrose. 2002. The Clean Water Act and habitat replacement: Evaluation of mitigation sites in Orange County, California. Environmental Management 30: 727-734.

42. Raimondi P., M. Wilson, R. Ambrose, J. Engle and T. Minchinton. 2002. Continued declines of black abalone along the coast of California: Are mass mortalities related to El Niño events? Marine Ecology Progress Series 242: 143-152.

43. Moeller, A., S.D. MacNeil, R.F. Ambrose and S.S. Que Hee. 2003. Elements in fish of Malibu Creek and Malibu Lagoon near Los Angeles, California. Marine Pollution Bulletin 46: 424-429.

44. Forrester, G.E., B.I. Fredericks, D. Gerdeman, B. Evans, M.A. Steele, K. Zayed, L.E. Schweitzer, I.H. Suffet, R.R. Vance and R.F. Ambrose. 2003. Correspondence between field-measured growth rates of fish from several California estuaries and the inferred toxicity of multiple sediment contaminants. Marine Environmental Research 56: 423-442.

45. Vance, R.R., R.F. Ambrose, S.S. Anderson, S. MacNeil, T. McPherson, I. Beers and T.W. Keeney. 2003. Effects of sewage sludge on the growth of potted salt marsh plants exposed to natural tidal inundation. Restoration Ecology 11: 155-167.

46. Shuman, C.S. and R.F. Ambrose. 2003. A comparison of remote sensing and ground-based methods for monitoring wetland restoration success. Restoration Ecology 11: 325-333.

47. Page, H.M., S. Schroeter, D. Reed, R.F. Ambrose, J. Callaway and J. Dixon. 2003. An inexpensive method to identify the elevation of tidally inundated habitat in coastal wetlands. Bulletin of the Southern California Academy of Sciences 102: 130-142.

48. Shuman, C.S., G. Hodgson, and R.F. Ambrose. 2004. Managing the Marine Aquarium Trade: Is Eco-Certification the Answer? Environmental Conservation 31(4): 339-348.

49. Shuman, C.S., G. Hodgson, and R.F. Ambrose. 2005. Population Impacts of Collecting Sea Anemones and Anemone fish for the Marine Aquarium Trade in the Philippines. Coral Reefs 24: 564-573.

50. Lin, C.J. and R.F. Ambrose. 2005. Relations between Fish Assemblages and Urbanization in Southern California Coastal Streams. In: Brown, L.R., R.H. Gray, R.M. Hughes and M. Meador, eds. Effects of Urbanization on Stream Ecosystems. American Fisheries Society, Maryland. 423 pp. (American Fisheries Society Symposium 47: 229–238.)

51. Reed, D.C., S.C. Schroeter, D. Huang, T.W. Anderson, and R.F. Ambrose. 2006. Quantitative Assessment of Different Artificial Reef Designs in Mitigating Losses to Kelp Forest Fishes. Bulletin of Marine Science 78: 133-150.

52. Evanson, M. and R.F. Ambrose. 2006. Sources and growth dynamics of fecal indicator bacteria in a coastal wetland system and potential impacts to adjacent waters. Water Research 40: 475-486.

53. Smith, J.R., R.F. Ambrose, and P. Fong. 2006. Dramatic declines in mussel bed community diversity: Response to climate change? Ecology 87: 1153-1161.

54. Smith, J.R., R.F. Ambrose, and P. Fong. 2006. Long-term change in mussel (*Mytilus californianus* Conrad) populations along the wave-exposed coast of California. Marine Biology 149: 537-545.

55. Armitage, A.R., K.E. Boyer, R.R. Vance, and R.F. Ambrose. 2006. Restoring assemblages of salt marsh halophytes in the presence of a rapidly colonizing dominant species. Wetlands 26: 667-676.

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B. OTHER PUBLICATIONS AND REPORTS

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Wildlife Rescue and Education Services

EXHIBIT "A"

SERVICES OFFERED

MARINE MAMMAL

1. 24-hour emergency response
2. Transport of animals to licensed facilities as needed

MARINE BIRD RESPONSE

1. 24-hour emergency response
2. Transport of animals to licensed facilities as needed
3. Medical and rehabilitative care as needed

TERRESTRIAL MAMMAL AND BIRD RESPONSE

1. 24-hour emergency response
2. Transport of animals to licensed facilities as needed
3. Medical and rehabilitative care as needed

MISCELLANEOUS

1. 24-hour hotline with informational tutorials
2. Rattlesnake relocation
3. Wildlife pest advice
4. Oil spill response (overseen by California Department of Fish and Game, Office of Spill Prevention and Response, and Oiled Wildlife Care Network)
5. Public outreach

EXHIBIT "B"

CALIFORNIA WILDLIFE CENTER SERVICE PROCEDURES

The following procedures are limited in scope. California Wildlife Center (CWC) will operate with the highest level of professionalism and respect for the welfare of animals and humans.

MARINE MAMMAL RESCUE

1. Distressed marine mammal reports are received by Los Angeles County Animal Care and Control in Agoura and CWC (emergency voice mail line). CWC will work cooperatively with Animal Control regarding these calls.

2. Upon receipt of a call regarding a distressed marine mammal, the CWC Coordinator will commence assembling a rescue response team. Volunteers assigned to the rescue team will be properly trained (must attend a preliminary rescue training session prior to any rescue involvement).

3. Teams will be dispatched on an as available basis. Marine mammals do come onto beaches to rest and sun. The condition of the marine mammal will be ascertained. If the animal is severely dehydrated or lacerated or generally considered in need of emergency care, then a rescue will be performed and the animal will be transported to the nearest certified care center. If the animal is deemed to be a danger to the public or domestic animals, CWC will take all necessary actions to address and control the situation according to NMFS protocols and guidelines, including but not limited to posting of special regulation signs warning people to keep an appropriate distance from the beached mammal. In most cases, animals will return to the ocean without assistance. An animal that does not exhibit signs of sickness or injury will be observed for a forty-eight (48) hour period, during which time, if physical conditions change, a rescue would be initiated.

4. Cetacean beaching will always be responded to as an emergency and will be given the highest level of priority. A dolphin or whale beached alive means that the animal is near death. CWC will cooperate with Los Angeles County Fire Department Lifeguard Division with regard to transporting stranded cetaceans.

5. Reports will be kept on all responses and, when requested or mandated, be forwarded to the proper authorities.

MARINE AND MOUNTAIN BIRD RESCUE

1. Calls will be received through the CWC response line. Los Angeles County Animal Care and Control may forward calls to the CWC Rescue Coordinator.

2. When responding to entanglement (i.e. fish hooks, fishing line, netting), the animal will be untangled and, if possible, released on site. In most other cases, the bird will be taken to the CWC staff veterinarian, treated and released or transported to the preferred certified care facility.

3. Reports will be kept on all responses and, when requested or mandated, be forwarded to the proper authorities.

MOUNTAIN MAMMALS - BABIES - REPTILES

1. When handling mountain mammals, CWC will adhere to all State and Federal requirements pertaining to the retrieval and release of wildlife. Additionally, CWC will cooperate with Los Angeles County Animal Control and California Department of Fish and Game regarding responses to these calls.

2. When regulations allow, animals will be transported to a rehabilitation facility.

3. Snakes will be retrieved by trained volunteers and released in unpopulated areas.

John H. Prescott Grant
Semi-Annual Progress Report
For the Period 12/01/06 to 05/31/07

TO: Michelle Ordono, Program Officer
NMFS Marine Mammal Health & Stranding Response Program

RE: Award Number: NA06NMF4390136
Award Period: 06/01/06 – 05/31/07
Total Funding: $124,954 ($87,698 Federal / $37,256 Match)

Recipient: City of Malibu / California Wildlife Center

Project Title: Advancement of Marine Mammal Stranding Response for the City of Malibu Coastline

During the December 1, 2006 – May 31, 2007 Prescott Grant period, the City of Malibu, through its sub grantee California Wildlife Center, has:

- Responded to 177 stranding reports and rescued 58 marine mammals: 36 California Sea Lions, 21 Northern Elephant Seals and 1 Pacific Harbor Seal. Collected 12 skin tissue samples for submission to the Marine Mammal & Sea Turtle Molecular Genetics Sample Archive administered by Southwest Fisheries Science Center (see attachment 1).

- Provided marine mammal natural history information to countless individuals prior to, during and following marine response activities. These "on-the-beach" discussions are extremely valuable in directly providing species-specific natural history, rescue response and rehabilitation process information to a large number of Malibu residents and the general public. Specific educational opportunities, such as our "Whale Watch" sessions were continued based on their success in previous reporting periods. Additional educational opportunities were identified through participation in Leo Carrillo State Parks "Fireside Chat" programs. Marine Mammal Rescue Training sessions were conducted.

- Provided the Marine Mammal Coordinator (MMC) and Assistant Marine Mammal Coordinator (AMMC) with professional enrichment and training.

- The employment of AMMC Tristen Joy was terminated by the California Wildlife Center effective May 30, 2007 for disciplinary reasons. Recruitment of a permanent replacement for this position is underway.

Chronology for the Period 12/01/06 to 05/31/07

December 2006

Responded to 11 stranding calls. Picked up and transported 5 California Sea Lions and 1 Northern Elephant Seal to the Marine Mammal Care Center at Fort MacArthur.

Administrative:

- Completion and submission of our Prescott Semi-Annual report for the time period of June 1, 2006 through November 30, 2006.
- Required monthly NMFS reporting completed.

General Activities:

- Marine Mammal Coordinator participated as a reviewer in the 2007/2008 Prescott Grant Technical Review held in Atlanta, GA.
- Refurbishment and repair of capture nets.

Public Outreach / Education:

- Recruitment process for Spring and Summer 2007 Internship positions was initiated.
- Marine Mammal Staff organized and completed several individual beach clean-up sessions with Marine Mammal Volunteers.

January 2007

Responded to 18 stranding calls. Picked up and transported 1 California Sea Lion and 1 Northern Elephant Seal to the Marine Mammal Care Center at Fort MacArthur.

Administrative:

- Emergency Vehicle Placards renewed with Los Angeles County Sheriff's Department.
- Annual renewal of beach access key cards completed.
- Required monthly NMFS reporting completed.

General Activities:

- Set-up and revision of California Wildlife Center's 2007 Marine Mammal Intake database.
- Review of 2006 Marine Mammal Intake Database to ensure all records are complete.

Public Outreach / Education:

- Review and revision of Marine Mammal Volunteer Rescue training materials, including update of multimedia presentation.
- Marine mammal educational article submitted by Marine Mammal Staff for internal volunteer newsletter "CWC Chat" (see attachment 3a).
- Supplemental educational signage created for Northern Elephant Seals and Pacific Harbor Seals to be used in addition to traditional "Do Not Disturb" signs for animals placed on watch (see attachment 4a & 4b)

February 2007

Responded to 6 stranding calls. Picked up and transported 2 California Sea Lions to the Marine Mammal Care Center at Fort MacArthur. Collected skin tissue samples from 1 California Sea Lion and 1 Long-beaked Common Dolphin for submission to Southwest Fisheries Science Centers molecular genetics sample archive.

Administrative:

- Marine Mammal staffing adjustments were made in accordance with Prescott budget, allowing for 1 full-time MMC and 1 full-time AMMC.
- Required monthly NMFS reporting completed.

General Activities:

- Marine Mammal Staff attended Southwest Regional Stranding Conference in San Diego, California. California Wildlife Center's stranding data was presented by MMC.
- Necropsy conducted on a fresh-dead Long-beaked Common Dolphin (gross examination only). Skull collected for education program.

Public Outreach / Education:

- Marine Mammal Volunteer Rescue Training session conducted. Training covered natural history and identification of marine mammals, rescue safety, rescue techniques and protocols.
- Marine mammal educational article submitted by Marine Mammal Staff for internal volunteer newsletter "CWC Chat" (see attachment 3b).
- Marine Mammal Staff organized and completed several public "Whale Watch" sessions from the overlook on the Point Dume headlands. Individuals were provided with marine mammal information brochures as well as guided natural history discussion regarding animals present in the area. Binocular stations were set up for public use.
- Spring and Summer Internship interviews conducted with 1 candidate selected for the Summer Internship. There were no applications received for the Spring Internship session.
- Marine Mammal Staff organized and completed several individual beach clean-up sessions with Marine Mammal Volunteers.

March 2007

Responded to 28 stranding calls. Picked up and transported 1 California Sea Lion and 10 Northern Elephant Seals to the Marine Mammal Care Center at Fort MacArthur. Collected skin tissue samples from 4 California Sea Lions, 1 Pacific Harbor Seal, and 1 Cuvier's Beaked Whale for submission to Southwest Fisheries Science Centers molecular genetics sample archive.

Administrative:

- Budgeting reallocation of $2,000 from "Salaries/Wages" into "Equipment" category (see attachment 2a & 2b). This reallocation enabled us to purchase a -20 C freezer and centrifuge sampling tubes in order to collect and store blood/body fluids from California Sea Lions for investigation of domoic acid toxicity per our recent collaborative agreement with the Department of Biological Sciences at the University of Southern California.
- Confirmation of stranding response boundaries received from NMFS to include the area south of Pt. Mugu Navel Base (southern Ventura County) through Coastline Drive in Malibu.
- Required monthly NMFS reporting completed.

General Activities:

- Renovation of animal transport crates with "quick-release" doors.

Public Outreach / Education:

- Development of an educational "Marine Mammal Rescue in Malibu" multimedia presentation for outreach event speaking engagements.
- MMC and AMMC attended and presented the "Marine Mammal Rescue in Malibu" presentation at the Leo Carrillo State Beach Fireside Chat program.
- Marine Mammal Staff organized and completed several public "Whale Watch" sessions from the overlook on the Point Dume headlands. Individuals were provided with marine mammal information brochures as well as guided natural history discussion regarding animals present in the area. Binocular stations were set up for public use.
- Marine mammal educational article submitted by Marine Mammal Staff for internal volunteer newsletter "CWC Chat" (see attachment 3c).

April 2007

Responded to 70 stranding calls. Picked up and transported 18 California Sea Lion and 8 Northern Elephant Seals to the Marine Mammal Care Center at Fort MacArthur. Collected skin tissue samples from 2 California Sea Lions for submission to Southwest Fisheries Science Centers molecular genetics sample archive. Pick-up and transport of 1 Long-beaked Common Dolphin from Pt. Mugu Navel Base to the Santa Barbara Natural History Museum.

Administrative:

- Prescott Quarterly Federal Cash Transaction Report prepared and submitted.
- Required monthly NMFS reporting completed.
- Glenda Singer, previous Executive Director and PI, resigned her position with California Wildlife Center effective 03/31/07. Victoria Harris, Vice President & Treasurer will assume the responsibilities of Principal Investigator for this project effective April 1, 2007.
- Submission of FY06 Prescott Grant no-cost extension request through October 31, 2007.

General Activities:

- Prep and mailing of skin tissue samples to Southwest Fisheries Science Center.

Public Outreach / Education:

- Marine Mammal Volunteer Rescue Training session conducted. Training covered natural history and identification of marine mammals, rescue safety, rescue techniques and protocols.
- Marine Mammal Staff organized and completed several individual beach clean-up sessions with Marine Mammal Volunteers.
- Marine Mammal Staff participated in California Wildlife Center's Semi-Annual Open House, providing educational displays and information regarding marine mammals to more than 200 visitors.
- Marine Mammal Staff organized and completed several public "Whale Watch" sessions from the overlook on the Point Dume headlands. Individuals were provided with marine mammal information brochures as well as guided natural

history discussion regarding animals present in the area. Binocular stations were set up for public use.

May 2007

Responded to 44 stranding calls. Picked up and transported 9 California Sea Lions, 1 Northern Elephant Seal, 1 Pacific Harbor Seal and 1 expired Long-beaked Common Dolphin to the Marine Mammal Care Center at Fort MacArthur. Collected skin tissue samples from 1 California Sea Lion and 1 Northern Elephant Seal for submission to Southwest Fisheries Science Centers molecular genetics sample archive.

Administrative:

- AMMC Tristen Joy's employment with California Wildlife Center was terminated effective May 30, 2007. Recruitment for a permanent replacement for this position is currently underway. On a temporary basis, Danielle Rowely, a CWC Hospital Technician staff member and Marine Mammal Response Volunteer has agreed to provide marine mammal response coverage 1.5 days per week until a permanent replacement can be identified (see attachment 5).
- Required monthly NMFS reporting completed.

Public Outreach / Education:

- Summer Marine Mammal Internship Program began with 1 individual successfully completing the interview process. Individualized Marine Mammal Rescue Training session conducted.
- MMC and AMMC attended and presented the "Marine Mammal Rescue in Malibu" presentation at the Leo Carrillo State Beach Fireside Chat program.
- Marine Mammal Volunteer Rescue Training session conducted. Training covered natural history and identification of marine mammals, rescue safety, rescue techniques and protocols.
- Marine Mammal Staff organized and completed several public "Whale Watch" sessions from the overlook on the Point Dume headlands. Individuals were provided with marine mammal information brochures as well as guided natural history discussion regarding animals present in the area. Binocular stations were set up for public use.

ATTACHMENTS:

1. Stranding Intake Data December 1, 2006 through May 31, 2007
2. a. Prescott Funds Budget Detail December 1, 2006 through May 31, 2007
   b. Prescott Funds Revised Budget Description FY06
3. "CWC Chat – A Monthly Volunteer Newsletter" Marine Mammal Staff Educational Articles
   a. January, 2007
   b. February, 2007
   c. March, 2007
4. Supplemental Signage
   a. Pacific Harbor Seal
   b. Northern Elephant Seal
5. Resume – Danielle Rowley

Marine Mammal Intake
December 1 - December 31, 2006

Date	Name of Beach	Type of Animal	Animal Status	Action	Tissue Samples Taken
12/3/2006	Zuma Beach	CSL	Live	Transferred to MMCC	☐
12/11/2006	Esconidido Beach	CSL	Live	Transferred to MMCC	☐
12/21/2006	Westward Beach	NES	Live	Transferred to MMCC	☐
12/29/2006	Carbon Beach	CSL	Live	Relocated	☐
12/28/2006	Big Dume Cove	CSL	Live	Transferred to MMCC	☐
12/30/2006	Leo Carillo	CSL	Live	Transferred to MMCC	☐
12/17/2006	Las Flores	CSL	Live	Transferred to MMCC	☐
12/17/2006	Big Dume Cove	Unknown	GOA	RTW	☐
12/17/2006	La Costa	CSL	Live	RTW	☐
12/17/2006	Amarillo Beach	CSL	Live	RTW	☐
12/31/2006	Escondido Beach	NES	Live	Placed on Watch	☐

CSL: California Sea Lion
NES: Northern Elephant Seal
NFS: Northern Fur Seal
DOA: Animal Dead on Arrival
GOA: Animal Gone on Arrival
RTW: Animal Returned to Water
MMCC: Marine Mammal Care Center Ft. MacArthur

Marine Mammal Intake
January 1, 2007 - May 31, 2007

Date	Name of Beach	Type of Animal	Animal Status	Action	Tissue Samples Taken
1/1/2007	Las Tunas	CSL	Live	Transferred to MMCC	☐
1/9/2007	Westward	CSL	Live	RTW	☐
1/10/2007	Las Flores	NES	Live	Placed on Watch	☐
1/14/2007	Carbon	Unknown	GOA	None	☐
1/15/2007	Surfrider	HS	Live	None	☐
1/15/2007	Surfrider	CSL	Live	Left on Site	☐
1/19/2007	El Matador State Beach	Unknown	GOA	None	☐
1/20/2007	Las Flores	Unknown	GOA	None	☐
1/20/2007	Carbon	NES	Live	Placed on Watch	☐
1/21/2007	Carbon	CSL	GOA	None	☐
1/23/2007	Carbon	Unknown	GOA	None	☐
1/23/2007	Zuma	NES	Live	Transferred to MMCC	☐
1/26/2007	Big Rock	Unknown	GOA	None	☐
1/27/2007	Las Positas	Unknown	Live	Referred	☐
1/27/2007	Las Flores	Unknown	GOA	None	☐
1/28/2007	Las Flores	Unknown	GOA	None	☐
1/31/2007	Countyline	CSL	Live	Transferred to MMCC	☐
1/31/2007	Leo Carrillo	Unknown	GOA	None	☐
2/6/2007	Big Rock	CSL	DOA	Left on Site	☑
2/8/2007	Las Tunas	CSL	Live	Placed on Watch	☐
2/13/2007	Carbon	CSL	Live	Transferred to MMCC	☐
2/16/2007	Point Dume	Unknown	GOA	None	☐
2/22/2007	Countyline	D. capensis	DOA	Transferred to CWC	☑
2/25/2007	Pirate's Cove	CSL	Live	Transferred to MMCC	☐
3/1/2007	Westward	CSL	Live	Placed on Watch	☐
3/4/2007	Leo Carrillo	HS	DOA	Left on Site	☑
3/8/2007	Leo Carrillo	NES	Live	Transferred to MMCC	☐

CSL: California Sea Lion
NES: Northern Elephant Seal
NFS: Northern Fur Seal
DOA: Animal Dead on Arrival
GOA: Animal Gone on Arrival
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Date	Name of Beach	Type of Animal	Animal Status	Action	Tissue Samples Taken
3/10/2007	Carbon	Z. cavirostris	DOA	Left on Site	☑
3/11/2007	Dan Blocker	CSL	Live	RTW	☐
3/11/2007	Escondido	NES	Live	Transferred to MMCC	☐
3/11/2007	Paradise Cove	NES	Live	Transferred to MMCC	☐
3/13/2007	Broad Beach	Unknown	GOA	None	☐
3/13/2007	Las Flores	Unknown	Live	RTW	☐
3/14/2007	Broad Beach	CSL	Live	Transferred to MMCC	☐
3/15/2007	Leo Carrillo	NES	Live	Transferred to MMCC	☐
3/16/2007	Leo Carillo	NES	Live	Transferred to MMCC	☐
3/18/2007	Broad Beach	CSL	DOA	Left on Site	☑
3/22/2007	Broad Beach	NES	Live	Transferred to MMCC	☐
3/23/2007	Las Flores	NES	GOA	Placed on Watch	☐
3/24/2007	Leo Carillo	CSL	Dead	Left on Site	☑
3/24/2007	Broad Beach	NES	Live	Transferred to MMCC	☐
3/24/2007	Escondido	NES	Live	Transferred to MMCC	☐
3/24/2007	Broad Beach	CSL	Dead	Left on Site	☑
3/24/2007	Broad Beach	CSL	Dead	Left on Site	☑
3/26/2007	Paradise Cove	Unknown	GOA	None	☐
3/26/2007	Sycamore Cove	NES	GOA	Placed on Watch	☐
3/28/2007	El Matador	NES	Live	Transferred to MMCC	☐
3/30/2007	Broad Beach	Unknown	GOA	None	☐
3/31/2007	Point Dume	NES	Live	Transferred to MMCC	☐
3/31/2007	El Matador	CSL	GOA	Placed on Watch	☐
3/31/2007	Broad Beach	Unknown	GOA	None	☐
3/31/2007	Deer Creek	Unknown	GOA	None	☐
4/1/2007	Malibu Beach	NES	Live	Transferred to MMCC	☐
4/1/2007	El Pescador	Unknown	Live	RTW	☐
4/1/2007	Las Floras Beach	NES	Live	Transferred to MMCC	☐
4/2/2007	Countyline Beach	NES	GOA	Placed on Watch	☐
4/2/2007	Countyline Beach	NES	Live	Transferred to MMCC	☐

CSL: California Sea Lion
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DOA: Animal Dead on Arrival
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MMCC: Marine Mammal Care Center Ft. MacArthur

Date	Name of Beach	Type of Animal	Animal Status	Action	Tissue Samples Taken
4/2/2007	Westward Beach	CSL	GOA	None	☐
4/3/2007	Escondido	Unknown	GOA	None	☐
4/3/2007	Big Rock	NES	Live	Transferred to MMCC	☐
4/3/2007	Countyline Beach	NES	live	Transferred to MMCC	☐
4/5/2007	Malibu Beach	Unknown	GOA	None	☐
4/6/2007	Malibu Beach	CSL	Live	Transferred to MMCC	☐
4/7/2007	Big Dume	Unknown	GOA	None	☐
4/9/2007	Las Tunas	CSL	DOA	Left on Site	☑
4/9/2007	Malibu Beach	Unknown	GOA	None	☐
4/9/2007	Countyline Beach	Unknown	GOA	RTW	☐
4/11/2007	Leo Carrillo	HS	DOA	Left on Site	☐
4/13/2007	Leo Carrillo	NES	Live	RTW	☐
4/13/2007	Malibu Beach	Unknown	GOA	None	☐
4/14/2007	Pt. Mugu	NES	Live	Transferred to MMCC	☐
4/15/2007	Carbon Beach	Unknown	GOA	None	☐
4/15/2007	La Piedra	Unknown	GOA	None	☐
4/15/2007	Leo Carrillo	Unknown	GOA	None	☐
4/15/2007	El Matador	CSL	GOA	None	☐
4/15/2007	Escondido	NES	Live	RTW	☐
4/15/2007	Countyline	CSL	Live	Transferred to MMCC	☐
4/16/2007	Paradise Cove	NES	Live	Transferred to MMCC	☐
4/16/2007	Countyline	CSL	Live	RTW	☐
4/17/2007	Big Rock	CSL	Live	Transferred to MMCC	☐
4/18/2007	Broad Beach	CSL	Live	RTW	☐
4/18/2007	Big Dume	D. capensis	GOA	None	☐
4/18/2007	Leo Carrillo	CSL	Live	Transferred to MMCC	☐
4/18/2007	Zuma Beach	Unknown	GOA	None	☐
4/19/2007	Paradise Cove	CSL	Live	RTW	☐
4/20/2007	Zuma	CSL	Live	Transferred to MMCC	☐
4/20/2007	Broad Beach	CSL	Live	Transferred to MMCC	☐

CSL: California Sea Lion
NES: Northern Elephant Seal
NFS: Northern Fur Seal
DOA: Animal Dead on Arrival
GOA: Animal Gone on Arrival
RTW: Animal Returned to Water
MMCC: Marine Mammal Care Center Ft. MacArthur

Date	Name of Beach	Type of Animal	Animal Status	Action	Tissue Samples Taken
4/20/2007	Zuma	CSL	Live	Transferred to MMCC	☐
4/20/2007	Leo Carrillo	Unknown	GOA	None	☐
4/20/2007	Westward	CSL	Live	RTW	☐
4/20/2007	Broad Beach	Unknown	GOA	None	☐
4/21/2007	El Matador	CSL	Live	None	☐
4/21/2007	Zuma Beach	CSL	Live	RTW	☐
4/21/2007	Nicholas Canyon	CSL	Live	RTW	☐
4/21/2007	Malibu Beach	CSL	Live	Transferred to MMCC	☐
4/22/2007	Zuma	CSL	Live	Transferred to MMCC	☐
4/22/2007	Little Dume Cove	CSL	Live	Transferred to MMCC	☐
4/22/2007	Broad Beach	CSL	Live	Transferred to MMCC	☐
4/22/2007	Big Dume	NES	Live	RTW	☐
4/22/2007	Leo Carrillo	Unknown	GOA	None	☐
4/22/2007	Thornhill Broome	Unknown		None	☐
4/24/2007	El Matador	CSL	Live	Transferred to MMCC	☐
4/24/2007	La Costa	NES	Live	RTW	☐
4/25/2007	El Matador	CSL	Live	RTW	☐
4/25/2007	Little dume	NES	Live	Transferred to MMCC	☐
4/26/2007	Westward Beach	CSL	Live	RTW	☐
4/26/2007	Countyline	CSL	Live	Transferred to MMCC	☐
4/26/2007	Westward	CSL	Live	RTW	☐
4/27/2007	Point Dume	Unknown	GOA	None	☐
4/27/2007	Escondido	CSL	Live	RTW	☐
4/27/2007	Deer Creek	CSL	Live	Transferred to MMCC	☐
4/28/2007	Malibu Beach	Unknown	GOA	None	☐
4/28/2007	Leo Carrillo	CSL	Live	RTW	☐
4/28/2007	Countyline	CSL	Live	Transferred to MMCC	☐
4/28/2007	Big Rock	CSL	Live	Transferred to MMCC	☐
4/28/2007	Pt. Dume	CSL	Live	Transferred to MMCC	☐
4/28/2007	Leo Carrillo	Unknown	GOA	None	☐

CSL: California Sea Lion
NES: Northern Elephant Seal
NFS: Northern Fur Seal
DOA: Animal Dead on Arrival
GOA: Animal Gone on Arrival
RTW: Animal Returned to Water
MMCC: Marine Mammal Care Center Ft. MacArthur

Date	Name of Beach	Type of Animal	Animal Status	Action	Tissue Samples Taken
4/29/2007	Malibu Beach	CSL	Live	RTW	☐
4/29/2007	Topanga	Unknown	GOA	None	☐
4/29/2007	Malibu Beach	CSL	Live	RTW	☐
4/30/2007	Carbon	CSL	Live	Transferred to MMCC	☐
4/30/2007	Zuma Beach	CSL	DOA	Left on Site	☑
5/1/2007	Pt. Dume	Unknown	GOA	None	☐
5/1/2007	Malibu Beach	CSL	Live	RTW	☐
5/1/2007	Latigo	CSL	Live	Transferred to MMCC	☐
5/2/2007	Big Rock	NES	Live	RTW	☐
5/4/2007	Zuma	Unknown	GOA	None	☐
5/4/2007	Zuma	CSL	Live	RTW	☐
5/4/2007	Pt. Mugu	Unknown	Live	RTW	☐
5/4/2007	Surfrider	CSL	Live	RTW	☐
5/4/2007	Malibu Beach	Unknown	Live	RTW	☐
5/5/2007	Staircases	Unknown	GOA	None	☐
5/5/2007	Pt. Dume	CSL	Live	Transferred to MMCC	☐
5/6/2007	Nicholas Canyon	Unknown	GOA	None	☐
5/6/2007	Zuma	CSL	Live	Transferred to MMCC	☐
5/7/2007	El Matador	CSL	Live	Transferred to MMCC	☐
5/11/2007	Dan Blocker	Unknown	GOA	None	☐
5/12/2007	Topanga County Beach	CSL	Live	RTW	☐
5/12/2007	Carbon	Unknown	GOA	None	☐
5/12/2007	Westward	CSL	Live	RTW	☐
5/12/2007	Pirate's Cove	CSL	Live	RTW	☐
5/13/2007	El Matador	Unknown	GOA	None	☐
5/13/2007	South beach	CSL	Live	Transferred to MMCC	☐
5/13/2007	Broad Beach	Unknown	GOA	None	☐
5/13/2007	Las Flores	NES	Live	RTW	☐
5/13/2007	Westward	D. capensis	DOA	Transferred to MMCC	☐
5/13/2007	Carbon	CSL	Live	RTW	☐

CSL: California Sea Lion
NES: Northern Elephant Seal
NFS: Northern Fur Seal
DOA: Animal Dead on Arrival
GOA: Animal Gone on Arrival
RTW: Animal Returned to Water
MMCC: Marine Mammal Care Center Ft. MacArthur

Date	Name of Beach	Type of Animal	Animal Status	Action	Tissue Samples Taken
5/15/2007	Big Rock	CSL	Live	RTW	☐
5/15/2007	Zuma	CSL	Live	Transferred to MMCC	☐
5/16/2007	Puerco	CSL	Live	RTW	☐
5/18/2007	Leo Carrillo	NES	Live	Transferred to MMCC	☐
5/19/2007	Zuma	CSL	Live	Transferred to MMCC	☐
5/19/2007	Big Rock	CSL	Live	RTW	☐
5/20/2007	El Matador	CSL	DOA	Left on Site	☐
5/21/2007	Countyline	CSL	DOA	Left on Site	☑
5/21/2007	El Pescador	HS	Live	Transferred to MMCC	☐
5/21/2007	Big Rock	CSL	Live	RTW	☐
5/22/2007	Zuma	CSL	Live	RTW	☐
5/23/2007	Sycamore Cove	CSL	Live	RTW	☐
5/25/2007	Surfrider	NES	DOA	Left on Site	☑
5/25/2007	Surfrider	CSL	Live	RTW	☐
5/26/2007	Latigo	Unknown	GOA	None	☐
5/27/2007	Westward	CSL	Live	Transferred to MMCC	☐
5/27/2007	Surfrider	CSL	Live	Transferred to MMCC	☐
5/28/2007	Zuma	CSL	GOA	None	☐
5/29/2007	Big Dume	NES	Live	RTW	☐

CSL: California Sea Lion
NES: Northern Elephant Seal
NFS: Northern Fur Seal
DOA: Animal Dead on Arrival
GOA: Animal Gone on Arrival
RTW: Animal Returned to Water
MMCC: Marine Mammal Care Center Ft. MacArthur

Marine Receiving Water Data

This material in this section responds to the request for *"[a]n assessment of all available historical data on discharge volume, chemical and physical constituents, toxicity, and indicator bacteria in the runoff and in the ambient marine water of the ASBS. At a minimum, the information must include the measurement of a representative sample within the last two years or the upcoming storm season (runoff and adjacent marine receiving water) during a storm event for each of the following constituents: total Ocean Plan metals; polynuclear aromatic hydrocarbons (PAHs); oil and grease; ammonia nitrogen; acute toxicity for a marine species; critical life stage (chronic) toxicity for three marine species; indicator bacteria including total coliform, fecal coliform (or E. coli), and enterococcus."*

The City has not collected water quality data for storm water discharges into the ASBS, nor was any such monitoring required by the City's NPDES permit. To assist with the understanding of this area and develop the best management practices, as discussed with SWRCB staff, the City has entered into a contract with a consulting laboratory to perform sampling in the receiving waters at locations approved by SWRCB staff. The City collaborated with a local researcher, Richard F. Ambrose, PhD, to assure the sample locations would best represent the conditions of the ASBS within the City at a rocky intertidal reference site and sandy beach receiving waters sites. The scope of work for the contract with the consulting laboratory is included for reference. The samples were taken on July 25th and are currently under analysis at the laboratory. The final analyses and reports will be submitted as soon as they are available. The City has provided a placeholder in this section for the final reports.

The City may determine that analyzing samples during the wet-weather period is beneficial. In anticipation, the consulting laboratory recorded the GPS coordinates and has taken photos of the sample locations in anticipation of the wet-weather sampling event.

A watershed map with the locations of the current compliance monitoring points for the Santa Monica Bay Beaches Bacteria TMDL is included here. This monitoring data will be submitted at a later date and is to be inserted into this section. The City has provided a placeholder in this section for the data. The data indirectly measures bacteria levels when sampling occurs on days with wet weather. Although it is generally believed that bacteria concentrations are elevated during wet weather conditions, the bacteria concentrations are not anticipated to have a significant effect on the ASBS.

CalTrans performed water quality monitoring analyses for stormwater discharges to many of the coastline ASBS. This included ASBS #24. A wide range of constituents was analyzed for three storms during 2005-2006 storm season. The Coordinated Shoreline Monitoring Plan and the CalTrans Water Quality Monitoring data have been submitted to the Board by the County of Los Angeles in connection with its exception request.

Scope of Work

Areas of Special Biological Significance Monitoring

Sampling and Laboratory Services for City of Malibu Area of Special Biological Significance (ASBS) Pre-Exception Monitoring

The scope of work for this project, the Malibu ASBS Pre-Exception Monitoring Program (Monitoring Program), includes collection of marine water samples; laboratory analysis; compliance with all required quality assurance measures; and preparation and transmittal of data reports.

All sampling activities and lab work for the project must be compliant with the State Water Resources Control Board's Surface Water Ambient Monitoring Program (SWAMP) Quality Assurance Project Plan. Quality assurance and quality control protocols and records must be available upon request. Pertinent laboratory staff will review the Monitoring and Quality Assurance Project Plans and will be available to answer technical questions in regards to the Monitoring Program. Transmitting of data to the City will occur in a timely manner.

I. Sampling service

It is anticipated that sampling services provided by the lab would be needed for approximately one day. All sample points can be accessed from three locations along Pacific Coast Highway in the City of Malibu within a driving distance of approximately two to three miles.

Additional sampling locations and events may be requested as necessary.

II. The following parameters will be analyzed at three sites (Attachment No. 1), one time sampling event.

Representative samples of the following constituents shall be taken and analyzed:
a. total Ocean Plan metals (in seawater) including:

Aluminum (Al)
Antimony (Sb)
Arsenic (As)
Beryllium (Be)
Cadmium (Cd)
Chromium (Cr)
Cobalt (Co)
Copper (Cu)
Iron (Fe)
Lead (Pb)
Manganese (Mn)
Molybdenum (Mo)
Nickel (Ni)

Selenium (Se)
Silver (Ag)
Thallium (Tl)
Tin (Sn)
Titanium (Ti)
Vanadium (V)
Zinc (Zn)

Total Mercury in Seawater

b. polynuclear aromatic hydrocarbons (PAHs)
c. oil and grease
d. ammonia nitrogen
e. acute toxicity for a marine species (2 dilutions)
f. critical life stage (chronic) toxicity for three marine species (2 dilutions)
g. indicator bacteria including total coliform, fecal coliform (or *E. coli*), and enterococcus (3 dilutions).

The applicable Ocean Plan detection limits and other applicable monitoring requirements must be adhered to in performing this work.

Additional parameter analysis may be requested as necessary.

* Acute results need to be analyzed separately and not calculated from the chronic tests.
** The three species utilized for acute and chronic toxicity testing will be topsmelt, giant kelp, purple urchin, or other species approved for marine water in the California Ocean Plan.

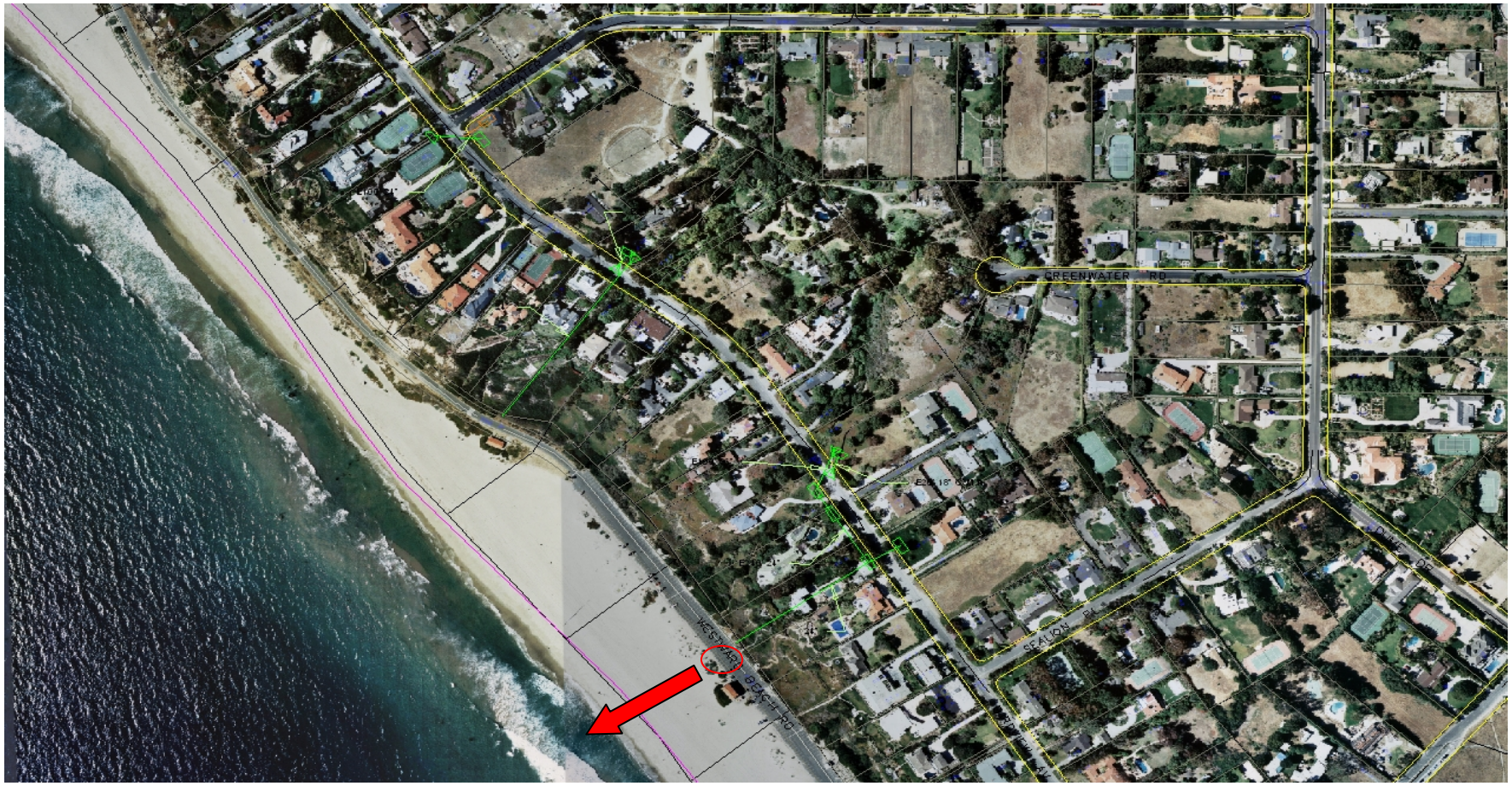
Malibu ASBS Sampling Location 1

- Broad Beach- Sandy Beach Location
- Drain Identification Number: SCCWRP MUG 232 (Santa Monica Baykeeper SAD 908)
- Dry weather grab sample taken July 25, 2007

Attachment No. 1

Malibu ASBS Sampling Location 2

- Westward Beach- Sandy Beach Location
- Drain Identification Number: SCCWRP MUG 430 (Santa Monica Baykeeper SAD 1120)
- Dry weather grab sample taken July 25, 2007



Attachment No. 1

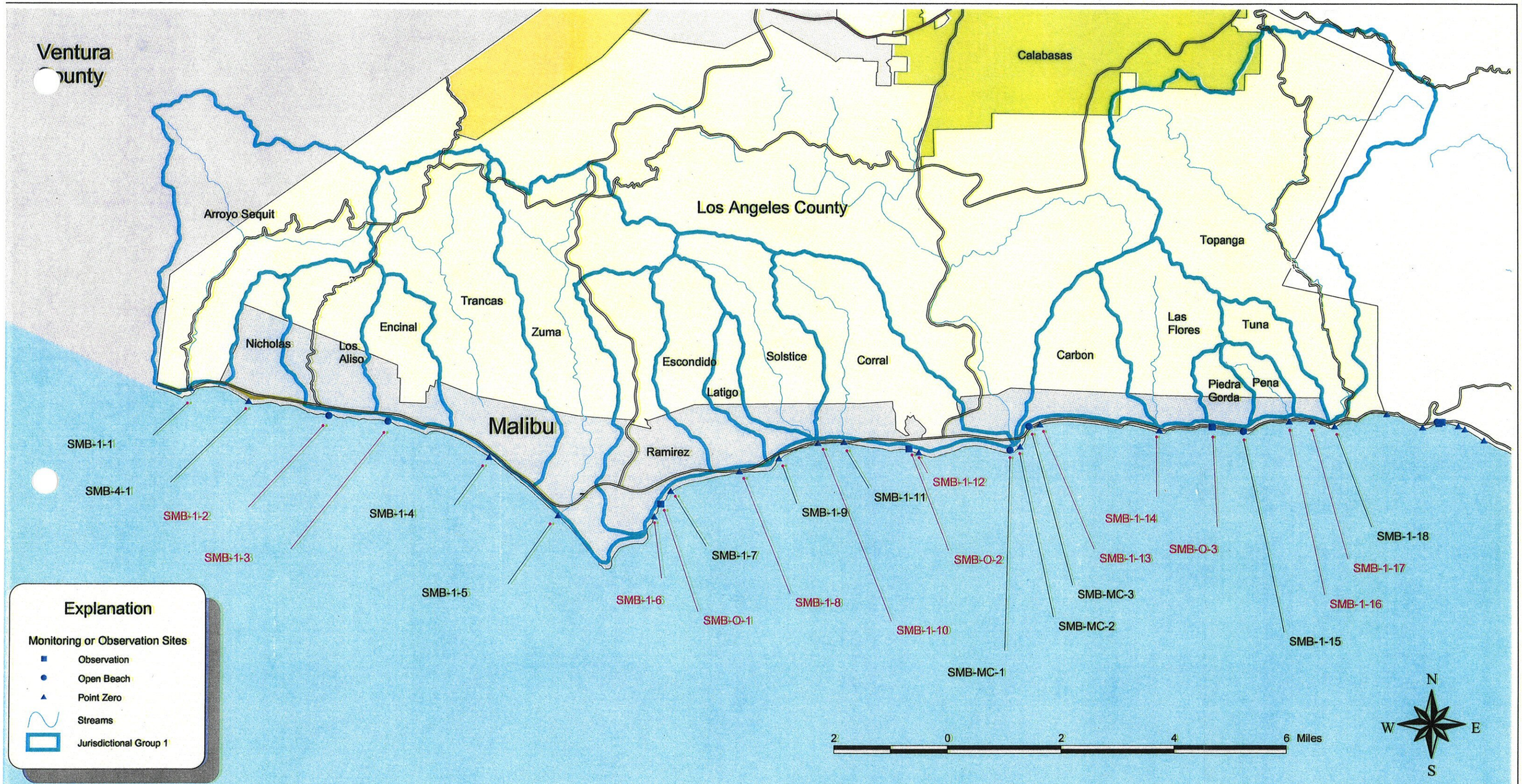
Malibu ASBS Sampling Location 3

- Paradise Cove- Reference Site- Rocky intertidal
- Drain Identification for location referencing- between SCCWRP MUG 375 and MUG 386
- Dry weather grab sample taken July 25, 2007

Attachment No. 1

Marine Receiving Water and Reference Sites Dry-Weather Monitoring Data

Historical Data



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Santa Monica Bay Beaches Bacteria TMDLs

Compliance Monitoring and Dry-Weather Flow Observation Locations for Jurisdictional Groups 1, 4, and 9

Watershed Characterization

The material in this section responds to the request for "[a] *characterization of the watershed areas draining to the ASBS in terms of land use, population density, and percentage of impervious surface. If there is land under your jurisdiction where pesticides or herbicides are applied, provide a listing of such treatments in terms of the chemicals and application rates."* The following narrative is a characterization of the watershed areas in the City; a list of drainage facilities identified by the City and corresponding maps are included in this section.

The City of Malibu lies in the North Santa Monica Bay Watershed which includes 15 additional subwatersheds in the City limits and the Malibu Creek Watershed which all drain to the Santa Monica Bay. Malibu extends approximately 21 miles from an unincorporated section of Los Angeles County close to the Ventura County Line on the west to Topanga Canyon Boulevard on the east. Inland, the City's boundary includes portions of the coastal terrace and slopes of the Santa Monica Mountains. The shoreline along the City of Malibu Coastal Zone contains sandy beaches, bluff backed crescent coves, and rocky headlands. The inland portion generally contains the major canyons and watersheds of the mountain range. The canyons constitute the natural drainages that run down toward the Pacific from the mountain peaks, located both within and outside of the unincorporated Los Angeles County Santa Monica Mountains Coastal Zone and the interior valleys.

The marine, canyon, and watershed environment westward of Malibu Canyon Road to the Ventura County line is in a relatively undisturbed state. The slopes and hillsides are dominated by coastal sage scrub and chaparral vegetation and large areas of riparian habitat in the canyons. Along the coast, kelp beds are found, providing habitat for many species of sea life. The natural environment from the Civic Center eastward has suffered some biological degradation. Grading and development eliminated some native hillside vegetation in some areas, portions of creeks have been channelized, and kelp beds have largely diminished or disappeared but reef and rock zones still provide habitat for many species of fish.

More than 15% of the total land in Malibu is public open space. 1869.9 acres of open space are used for public recreation, including regional parks, local parks, beach parks and general public open space. Local and regional parks make up 743.7 acres of the open space in Malibu. Vacant, undeveloped private land comprises 60.4% of all land in the City (7578.3 acres), most of which is in its natural state containing tree, brush, shrub and grassland vegetation. With a majority of the land in Malibu still sitting as undeveloped open space, it is evident that the general character of the land has changed little since 1974, when the Area of Special Biological Significance was first designated.

The public open space in Malibu is owned and maintained by a variety of federal, state and local agencies including the National Park Service, Los Angeles County Beaches and Harbors, California Department of Parks and Recreation, the City of Malibu and the Santa Monica Mountains Conservancy. For example, the National Park Service owns

over 5700 acres in the Zuma and Trancas Canyons and also maintains the 556 acres of Solstice Canyon Park and 16.1 acres of Corral Canyon Park, which are owned by the Santa Monica Mountains Conservancy.

The 21 miles of the Malibu coastline are open to the public. 11.7 miles of the coastline in Malibu fall within the ASBS No. 24. Broad sandy beaches at Leo Carrillo, Nicholas Canyon, Zuma, Westward, Point Dume, Surfrider and other beaches provide recreational opportunities to the public. Small, public pocket beaches backed by high bluffs provide more secluded and natural beach environments in the City's western portion.

The City has residential uses and limited commercial uses along the Pacific Coast Highway from Topanga to Point Dume. The Malibu Civic Center, located at the base of Malibu Canyon, and Point Dume Plaza contain the commercial uses. The balance of the City generally consists of residentially zoned lots in small clusters of approximately 10,000 square feet to an acre in size, mid-sized parcels of two, five, and ten acres and large parcels exceeding twenty acres on the coastal slopes throughout the City up to 300 acres in the extreme western portion of the City. There are no areas known to the City where herbicides or pesticides are used.

The portion of the watershed adjacent to ASBS No. 24 that is within the city limits is from Latigo Point to the northern boundary of the City. The adjacent land is comprised of primarily open-space and undeveloped land, with some low-density and moderate density residential development, three schools and four small commercial/retail centers. The population in the entire watershed is low and concentrated northeast of the City near Agoura Hills and along the coast.

In the watershed, stormwater is conveyed to the ocean principally by natural streams, intermittent streams and gullies. The City has identified twenty-two drains in the portion of the City that sits adjacent to the ASBS. (see drain identification spreadsheet and maps immediately following). The City of Malibu maintains the catch basins on these drains, but continues to research ultimate legal ownership and responsibility for these drains and some small drains from private residences and businesses that may potentially discharge into the ASBS.

The following information includes a report prepared by Dr. Michael Stenstrom for the City "Estimating Pesticide Discharge from the City of Malibu" and a report on the methodology used to prepare it. This report provides flow estimates based on land use and uses those rates to calculate pesticide discharge rates.

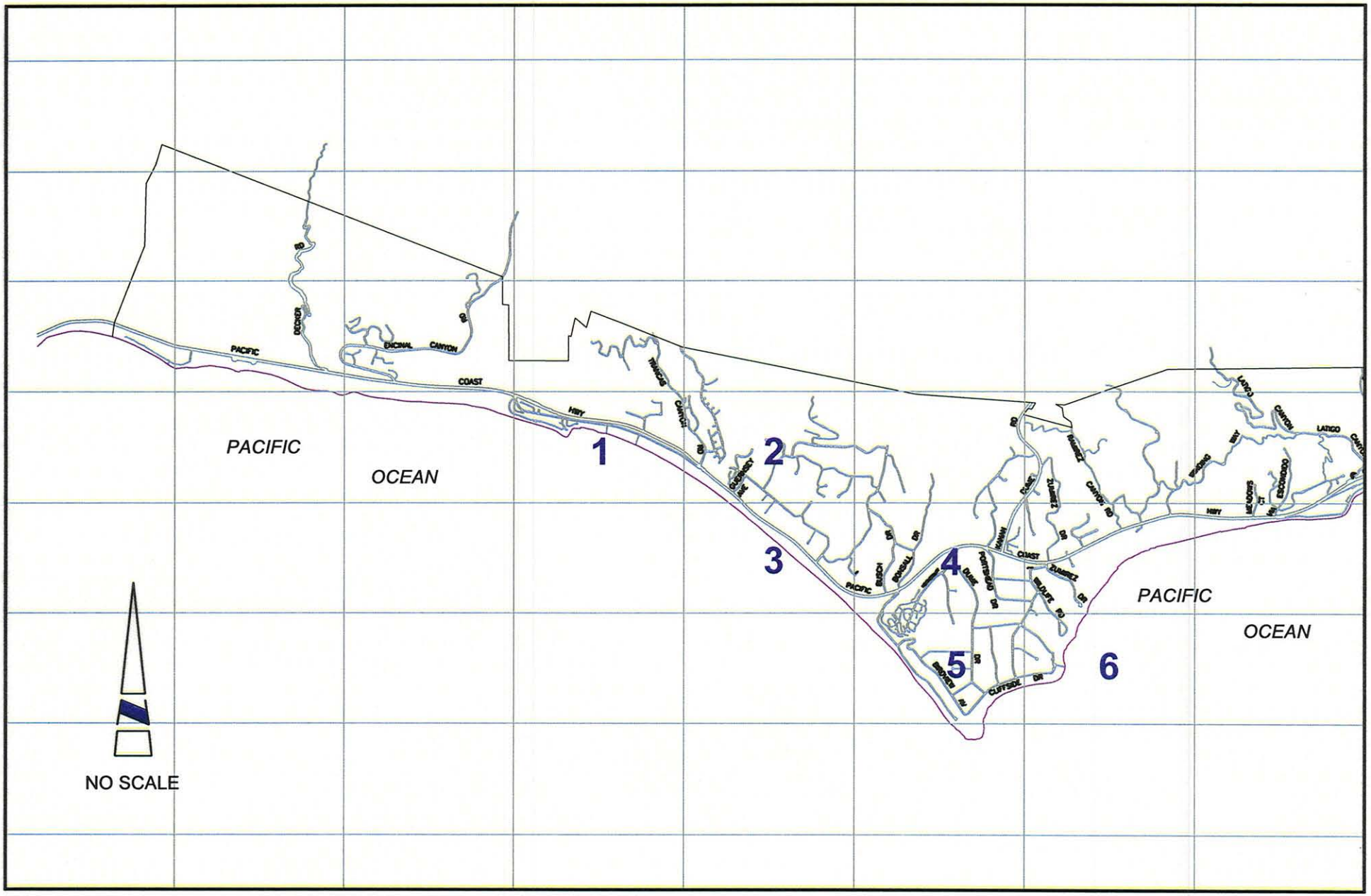
Also included are a population map of the City, a map of "Erosion Potential in ASBS 24" prepared by Caltrans, and the "North Santa Monica Bay Watersheds Green Map" prepared by the Malibu Creek Advisory Council.

The population map shows relatively low population in the portion of the watershed adjacent to ASBS No. 24 that is within the city limits. Most of the area is fewer than 100

people per square mile and increases to between 1,000.1 and 5,000 people per square mile at Point Dume.

The Caltrans map shows large portions of land to be either moderate incidence of erosion potential or in an area with landslide hazards, and a pocket of high susceptibility with moderate incidence of erosion potential.

The “Green Map” is a useful resource for the community prepared as a part of the “Living Lightly in our Watersheds: A Guide for Residents of the Santa Monica Mountains.” An important feature to point out is the amount of open space designated as parkland, both within and surrounding the City.

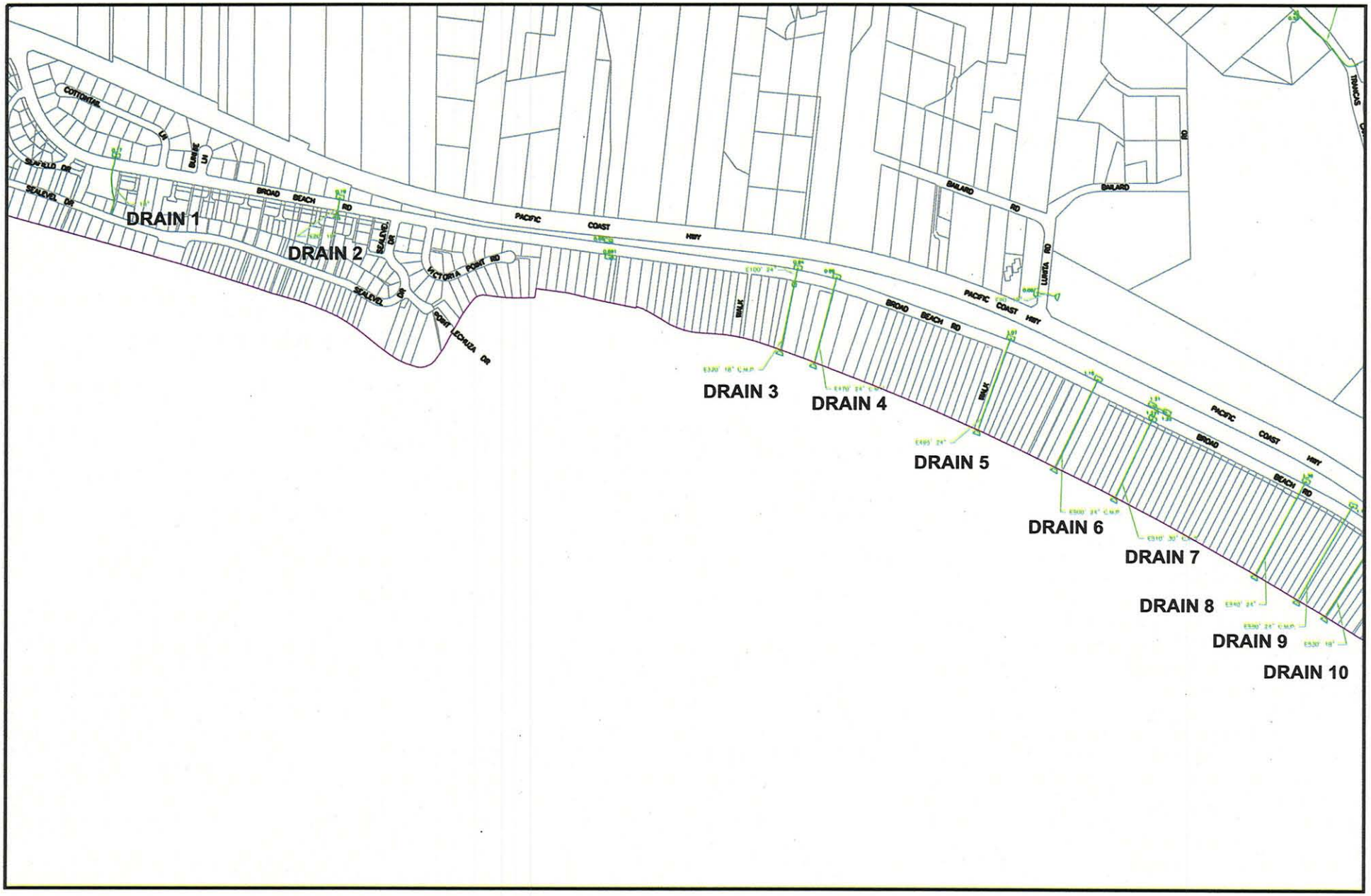


City of Malibu

Index Sheet

AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE

Identified Storm Drain Facilities

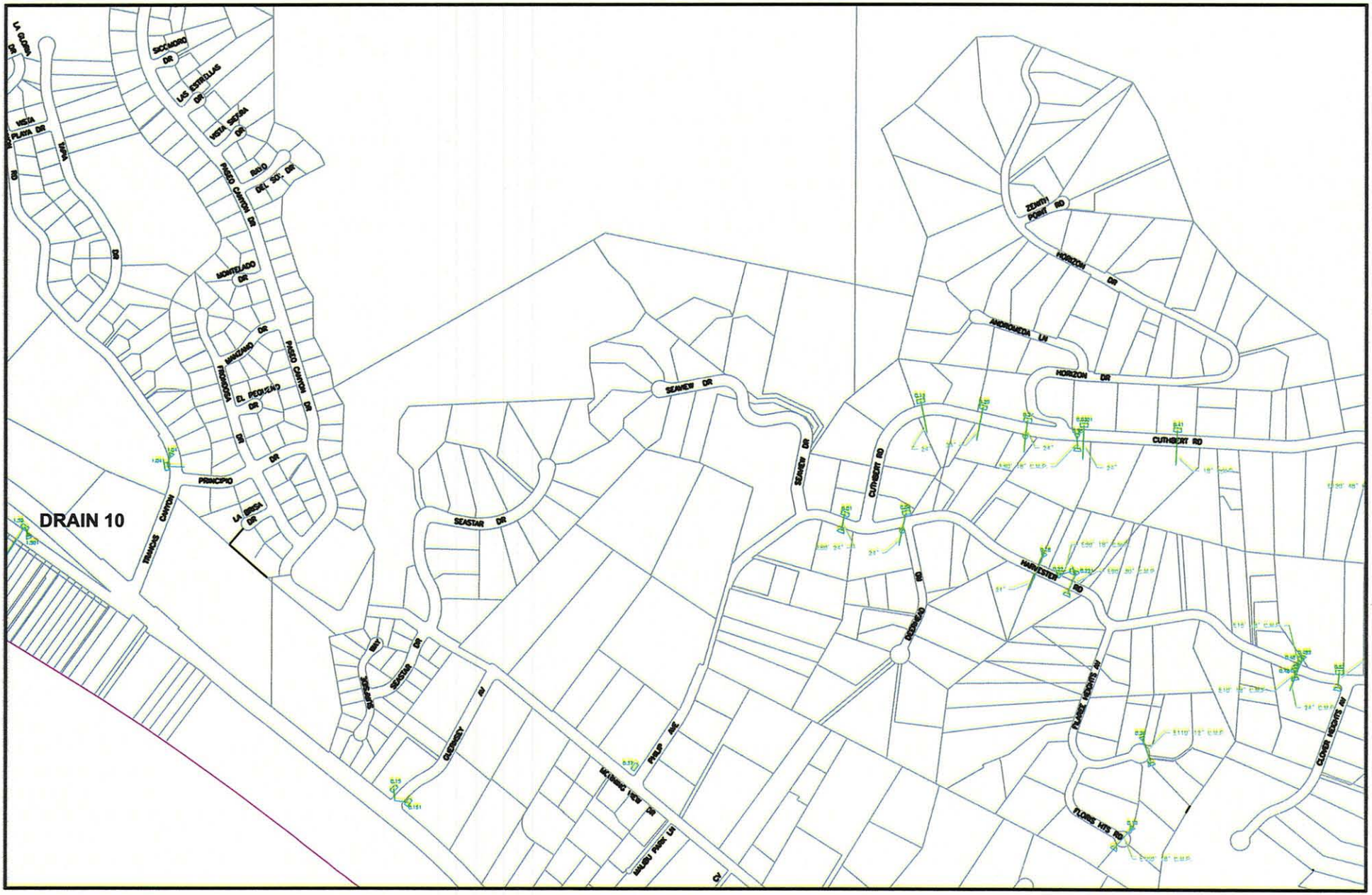


City of Malibu

AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE

Sheet 1

Identified Storm Drain Facilities

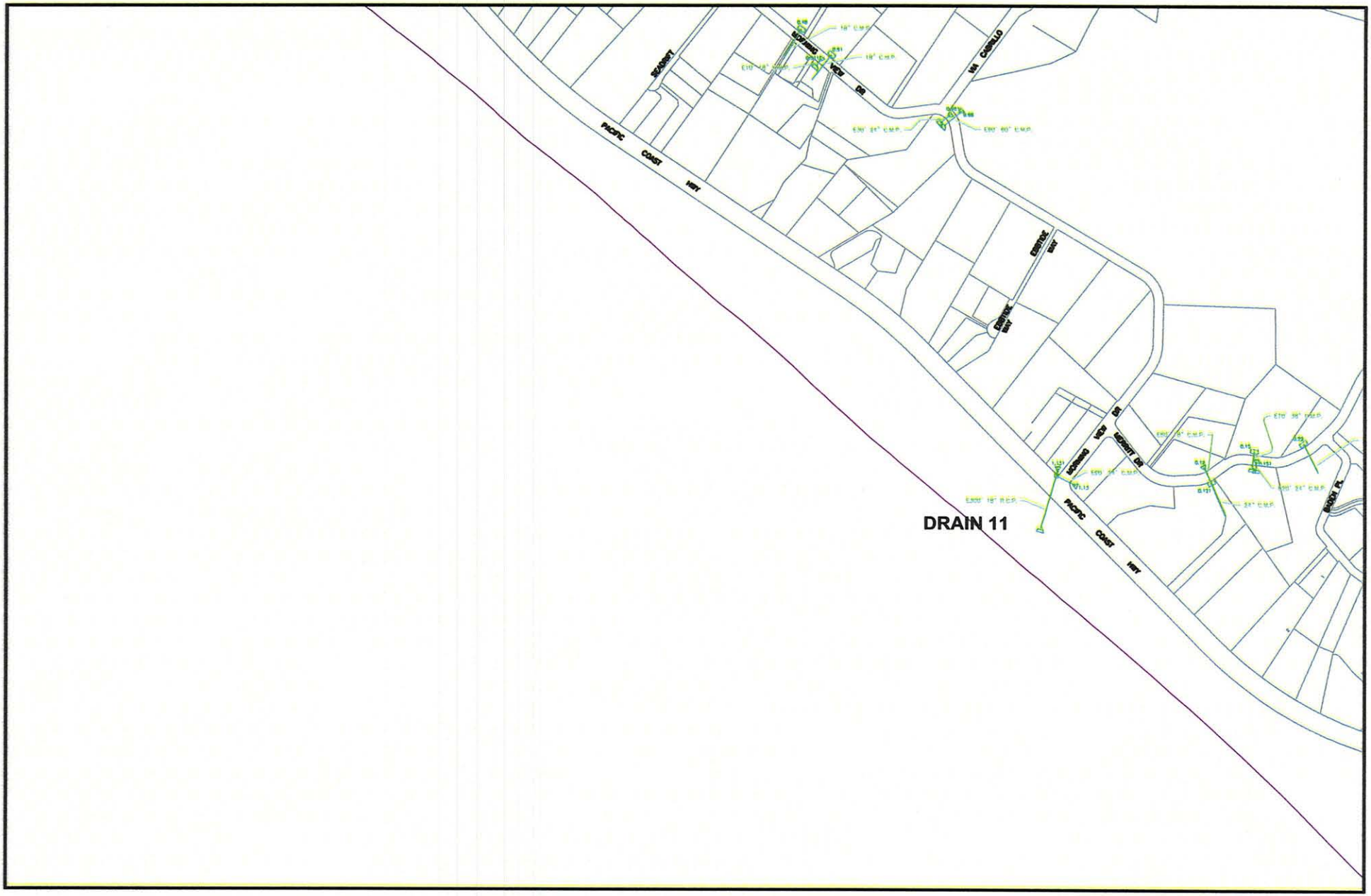


City of Malibu

AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE

Sheet 2

Identified Storm Drain Facilities



City of Malibu

AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE

Sheet 3

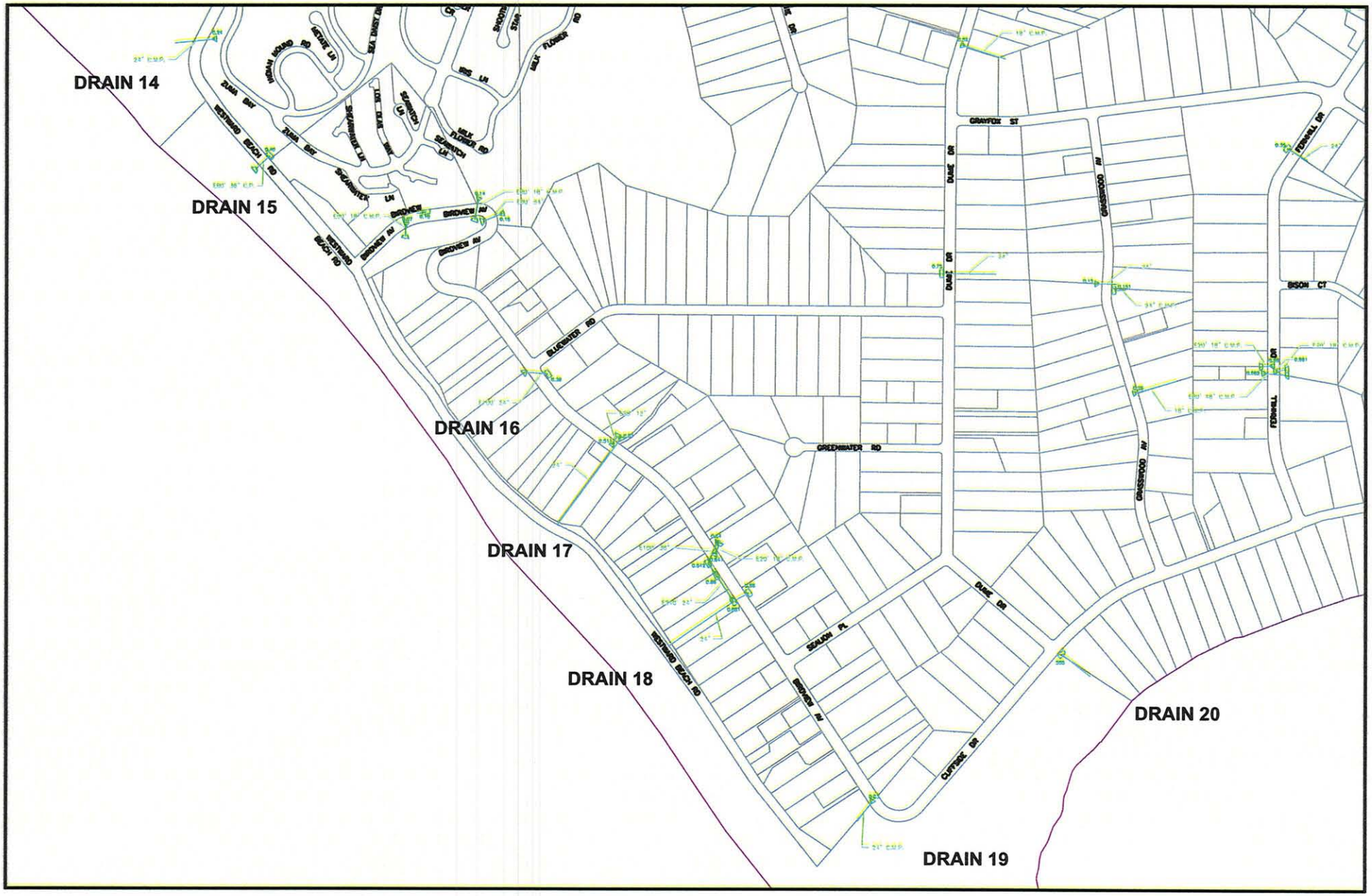
Identified Storm Drain Facilities

City of Malibu

AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE

Sheet 4

Identified Storm Drain Facilities

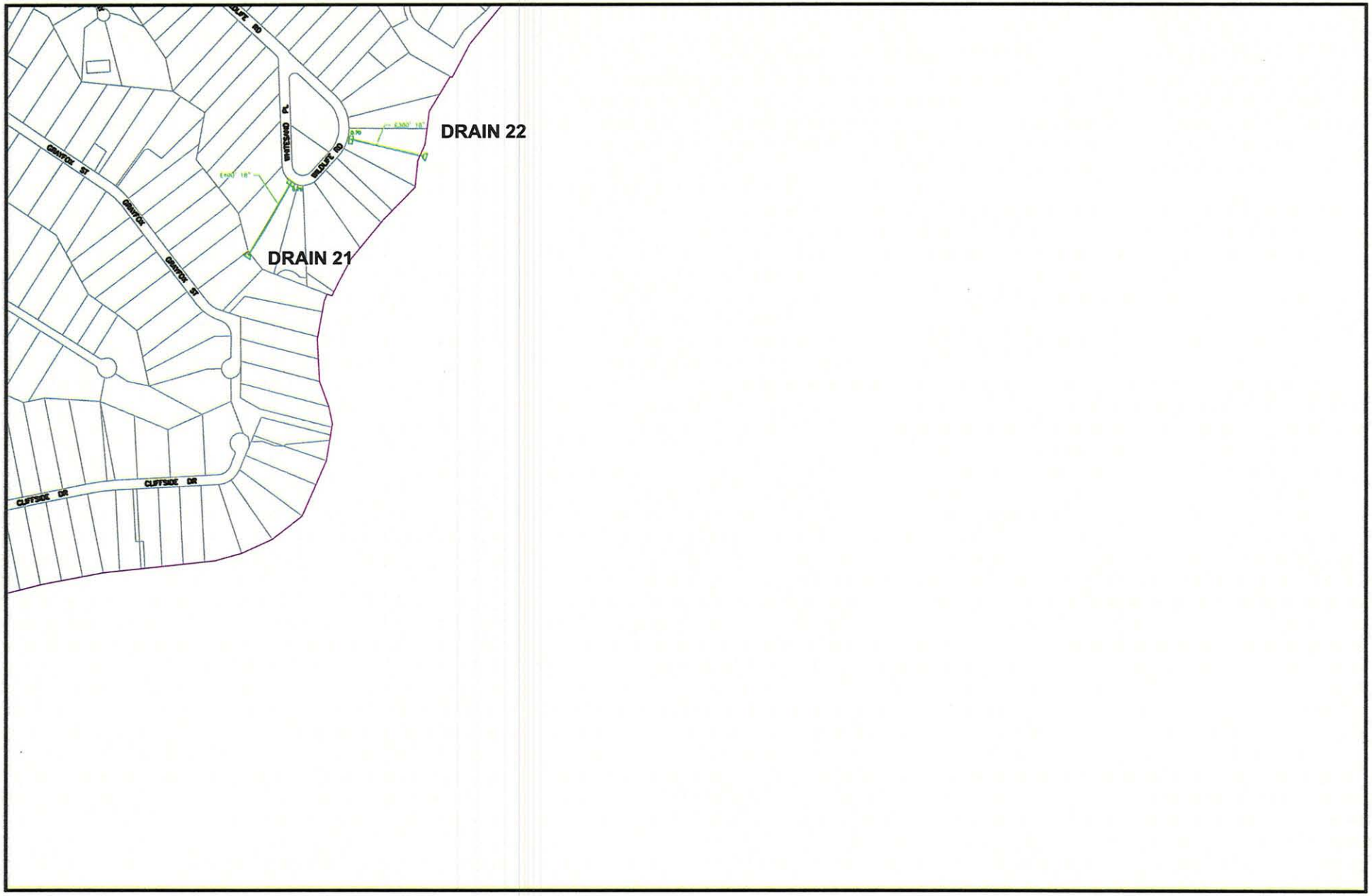


City of Malibu

AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE

Sheet 5

Identified Storm Drain Facilities



City of Malibu

AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE

Sheet 6

Identified Storm Drain Facilities

M I C H A E L K. S T E N S T R O M, P h . D . , P . E .
C O N S U L T I N G E N G I N E E R

3032 Motor Ave.
Los Angeles, CA 90064
(310) 876-3799
(310) 876-3798 (FAX)
stenstro@seas.ucla.edu

P.O. Box 24894
Los Angeles, CA 90024
(310) 825-1408
(310) 206-5476 (FAX)
www.seas.ucla.edu/stenstro

July 25

Estimating Pesticide Discharge from the City of Malibu

I. Methodology

Stormwater runoff is difficult to monitor because it is released from many small drains. This poses a problem because the drains may be inaccessible or even unknown. Also some drains will not flow during small rainfall events but may produce significant runoff for major events. The costs of stormwater sampling may be several to hundreds of times greater to monitor that an equal or larger mass of runoff from point sources.

To overcome these difficulties, mass loading models have been developed. These models have been used by government agencies ranging from the US EPA to small cities, to develop or respond to Total Maximum Daily Loads (TMDLs), rank best management practices (BMPs), reduce impacts of development, developing monitoring plans and other purposes.

The authors' earliest work on these landuse models was in 1984 (Stenstrom, et al., 1984) for a small watershed in Richmond California, to quantify oil and grease pollution and rank BMPs for its mitigation. In the 1990s the author applied this technique to the entire Ballona Creek Watershed (Stenstrom and Strecker, 1993). More recently the technique has been used to estimate mass emissions for the City of Los Angeles and has been incorporated into BMP ranking tools, such as the tool developed by Psomas and associates and Geosyntec Consultants (both with offices in Los Angeles). Wong et al (1997) has described the method in detail and a PDF of this paper is attached. Other examples of the use of this method can be cited, if needed.

The method is called the "empirical spreadsheet" method because it is based on empirical hydrology concepts and because the results can be managed in a spreadsheet, which allows analysis without programming skills.

The pollutant load is calculated as follows:

$$PL = EMC \; RC \; RainFall \; Area \; CF \qquad (1)$$

Where

PL	= pollutant load (mass/day)
EMC	= event mean concentration (mg/L or μm/L or ng/L)
RC	= runoff coefficient (dimensionless, ranging from 0 to 1.0)
Rainfall	= rainfall depth (inches or mm)
Area	= Area of the watershed (acres, $m^{2,}$ etc).
CF	= Conversion factor to create consistent units

Equation 1 is applied for each landuse in the watershed. The EMCs and RCs are unique to each landuse and are shown later. The rainfall depth can be expressed by storm or seasonally or yearly, as desired. For example, if the annual pollutant loads are desired, then the rainfall should be the yearly rainfall.

This method assumes that average RCs and EMCs are appropriate. This assumption most appropriate for longer periods, such as seasonal or yearly periods. If the method is applied over very short periods between rain events (a few days between rains, for example) then the values of RCs and EMCs should be adjusted. In the later case, the annual loadings were calculated using average annual rainfall which is approximately 19 inches for this area.

II Landuse Data

To use equation 1, landuse data is required. Human activity changes the runoff from landuse. If the land is paved, RC approaches 1.0. If a landuse has heavy pollutant load, such as a parking lot were crankcase drippings are allowed to accumulate, the EMCs will be higher.

The Southern California Association of Governments (SCAG) has compiled landuse data in the greater LA region and this includes Malibu. The SCAG data are collected for a range of purposes required by local governments, and environmental modeling in only one. Therefore the large range of categories must be refined to a smaller set, in so far as possible based upon consistent, environmentally meaningful definitions. Table 1 shows the landuse classifications, RCs, areas and runoff volumes. Figures 1 and 2 show the modeled areas with colors delineating the various landuses.

Table 1. Landuse, Areas and Imperviousness, and Runoff Volumes for Malibu

LU	LU05	LU05code	Area	Imperviousness	RC	Runoff Volume
			sq. meter	%		cubic meter
SFR	High-Density Single Family Residential	1111	10,263,317	42	0.44	2,159,541
	Low-Density Single Family Residential	1112				
	Rural Residential, Low-Density	1152				
MFR	Duplexes, Triplexes and 2-or 3-Unit Condominiums and Townhouses	1122	273,808	68	0.64	85,098
	Low-Rise Apartments, Condominiums, and Townhouses	1123				
	Medium-Rise Apartments and Condominiums	1124				
Mobile	Trailer Parks and Mobile Home Courts, High-Density	1131	343,357	68	0.64	106,714
Commercial	Low- and Medium-Rise Major Office Use	1211	131,124	92	0.84	52,903
	Retail Centers (Non-Strip With Contiguous Interconnected Off-Streets	1222				
	Modern Strip Development	1223				
	Commercial Storage	1231				
	Hotels and Motels	1233				
Public	Government Offices	1241	253,920	80	0.74	90,681
	Fire Stations	1243				
	Religious Facilities	1245				
	Elementary Schools	1262				
	Senior High Schools	1264				
Utilities	Water Storage Facilities	1434	57,149	91	0.83	22,836
	Improved Flood Waterways and Structures	1437				
Transportation			0	80	0.74	0
Open	Developed Local Parks and Recreation	1821	21,928,896	0	0.10	1,058,289
	Undeveloped Local Parks and Recreation	1822				
	Undeveloped Regional Parks and Recreation	1832				
	Wildlife Preserves and Sanctuaries	1850				
	Beach Parks	1870				
	Other Open Space and Recreation	1880				
	Vacant Undifferentiated	3100				
	Vacant With Limited Improvements	3300				
	Beaches (Vacant)	3400				
Agriculture	Orchards and Vineyards	2200				
	Nurseries	2300				
	Horse Ranches	2700				
Other	Under Construction	1700	143,816	74	0.69	48,267
Total			**33,395,388**	**0**	**0.00**	**3,624,328**

The conclusion from Table 1 is that 3,600,000 m^3/yr or 128,000,000 ft^3/yr of runoff is produced from the various areas in Malibu. Note that Table 1 (LU column) shows the reduced landuse categories: single family residential (SFR), multifamily residential (MFR), mobile homes, commercial, public, utilities, open, agricultural and other. The various subcategories are shown in the LU05 column. Note that transportation, which corresponds to freeways, trains tracks, etc. are not included since they are not part of the City of Malibu's responsibly (e.g., Caltrans for the Pacific Coast Highway). Local roads are included in the adjacent landuses.

III Pesticide Discharge Rates

The information in Table 1 represents a portion of Equation 1. The EMCs need to be applied. Table 1 is useful because it applies to all pollutants (i.e., the information in Table 1 is the same for all pollutants. If the EMCs are applied to the volumes produced in Table 1 (Runoff Volume column) the pollutant loads can be calculated. The only requirement is that the EMC or a reasonable assumption for the EMC must be known for each landuse (LU). Table 2 shows the best estimates for pesticide concentrations. These estimates are from the SCCWRP annual reports and represent measurements of pesticides in Los Angeles area, according to the landuses shown. Note that the units are ng/L or parts per trillion.

Table 2. Best Available Estimates for Diazinon and Other Pesticides EMCs

Pesticides	Units	SF Residential	MF Residential	Mixed Residential	Retail/ Commercial	Public	Light Industrial	Transportation	Vacant	Other
Diazinon	ng/L	81	121	101	247	247	89		1101	148
New Pesticide	ng/L	40	121	80	247	247	89		1101	137

When these EMCs are applied to the runoff volumes shown in Table 1 shows the estimated discharges of pesticides. The total, yearly emission for Diazinon is 1.4 kg/yr and 1.3 kg/yr for other pesticides

The accuracy of these estimates is a function of the accuracy of the EMCs. If the EMCs change the emissions will also change. The model, as shown in Equation 1, is linear. This means that if a revised estimate becomes available for the pesticide EMC for a particular landuse, then the discharge can be ratioed up or down by the ratio of the new EMC to the EMC shown in Table 2.

Table 3. Estimates of Diasinon and other Pesticide Emissions

LU	Diazinon	Other Pesticides
	kg/year	kg/year
SFR	0.175	0.086
MFR	0.010	0.010
Mobile	0.011	0.009
Commercial	0.013	0.013
Public	0.022	0.022
Utilities	0.002	0.002
Transportation	0.000	0.000
Open	1.165	1.165
Agriculture		
Other	0.007	0.007
Total	**1.4**	**1.3**

IV Futher Work

The estimates provided in Table 3 can be improved through local monitoring to obtain site-specific estimates. It should be noted that obtaining sufficient data to obtain precise EMC will require significant effort. A number of storms will need to be monitored and the analytical detection limits will be challenging. Before such a monitoring program is initiated, it would be wise to coordinate efforts with other agencies and cities. Combing effort with others to obtain a greater number of samples at a few number of similar locations, corresponding to well defined landuses, is a better approach.

Further refining can also be obtained by overlaying the drainage areas (not known at this time) with the coverages created in this effort. In this way the discharge from individual storm drains can be estimate.

V Conclusion

Pesticide discharges from the City of Malibu via stormwater is approximately 2.7 kg per year. These estimates are based on a yearly rainfall of 19 inches and pesticide concentrations typical of the Los Angeles area. This also assumes that there are no illegal discharges or dumping, which cannot be modeled. The approximate contribution is 40% of the mass from the area Nicolas to Trancas and 60% from Zuma to Escondido.

Michael K. Stenstrom, Ph.D., PE, BCEE

VI References

1. Stenstrom, M. K., G.S. Silverman and T.A. Bursztynsky, “Oil and Grease in Urban Stormwaters,” *Journal of the Environmental Engineering Division*, ASCE, Vol. 110, No. 1, pp 58-72, February 1984.
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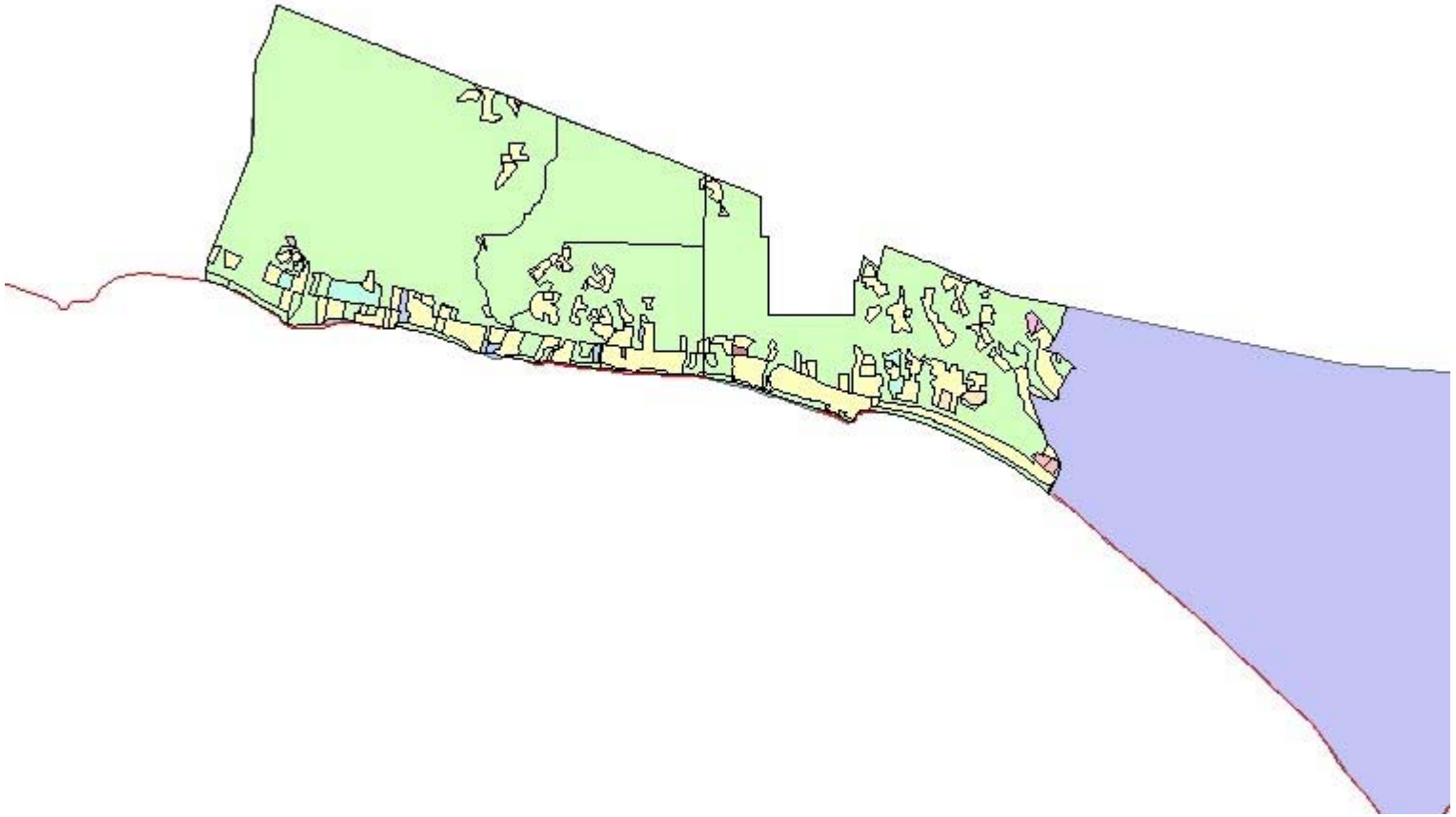

Figure 1. Landuse Map from Nicholas to Trancas

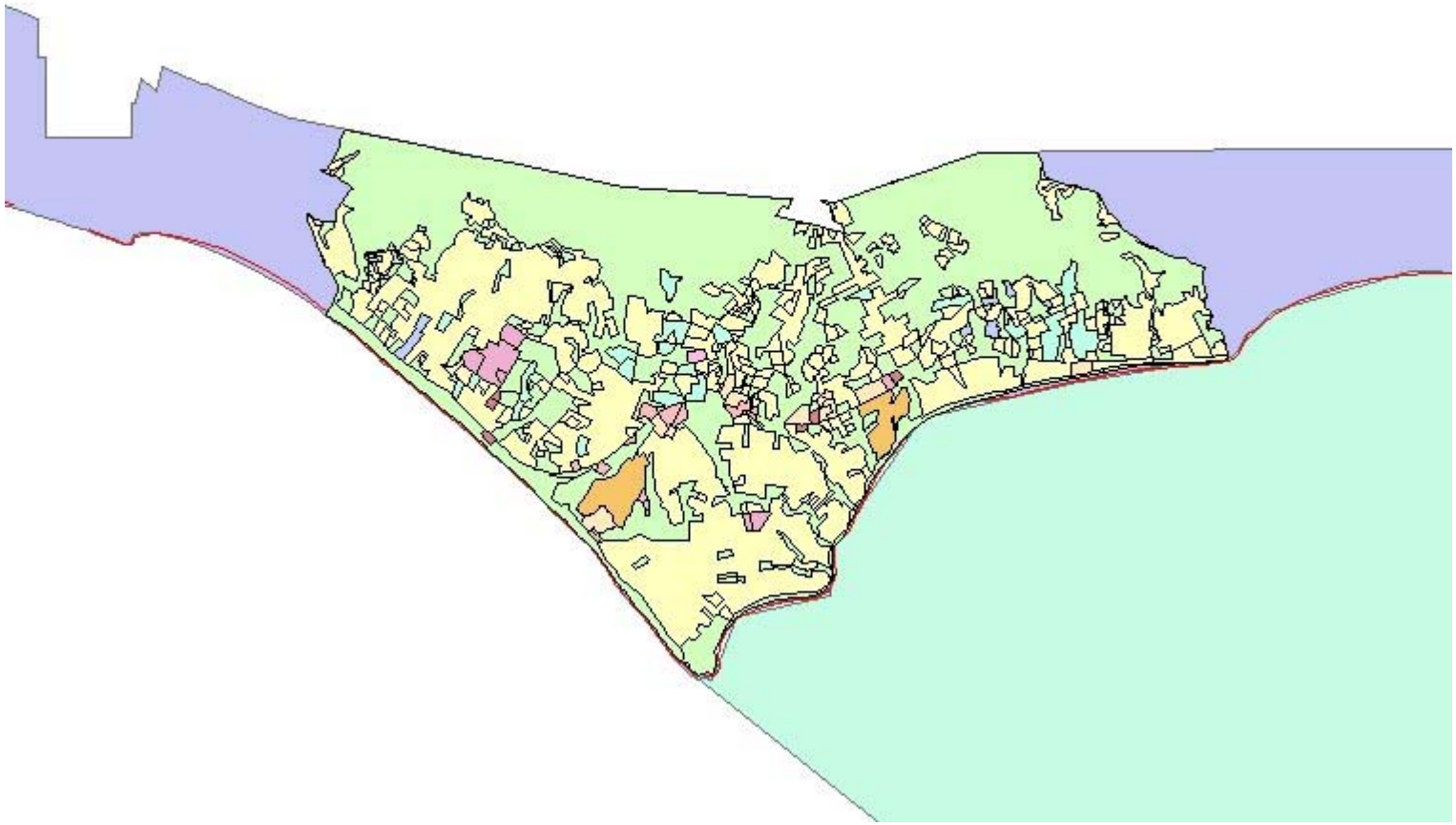

Figure 2. Landuse Map from Zuma to Escondido

GIS TO ESTIMATE STORM-WATER POLLUTANT MASS LOADINGS

By Kenneth M. Wong,[1] Eric W. Strecker,[2] Associate Member, ASCE, and Michael K. Stenstrom,[3] Member, ASCE

ABSTRACT: In order to develop a monitoring program for the Santa Monica Bay, Calif., watershed, a land-use runoff model was developed using a geographic information system (GIS) coupled with an empirical runoff model. The GIS/model has simple data requirements as compared to more complex models that require routing information; and it is useful for predicting receiving-water loading on an annual basis or for single-storm events. Its approach can also be used to graphically present model results in simple and intuitive ways that provide better insight to managers and planners in evaluating pollution sources and control strategies. The GIS/model was used to locate monitoring stations in the most economical way. The model predictions can be used to improve the evaluation of best management practices to control pollutant discharges. Receiving-water pollutant contributions from point and nonpoint sources can be compared to develop more economical strategies for overall pollutant minimization.

INTRODUCTION

In many locations nonpoint sources of water pollution have been recognized as being of greater importance than point sources. This is due in part to the continuing efforts to reduce pollution from point sources (e.g., increasing treatment requirements for both municipal and industrial wastewaters) over the past two decades (NOAA 1991), as well as recognition that nonpoint sources, such as storm water, may contain harmful toxic contaminants (Lau et al. 1993, Bay et al. 1996). Other studies have also shown nonpoint sources to be the major cause of surface water quality degradation in many areas of the United States, surpassing pollutant loadings to receiving waters from point sources such as treated municipal and industrial wastewaters (Gilliland and Baxter-Potter 1987; Driscoll et al. 1990; National 1990).

Pollution from treated wastewater discharges through the two major outfalls from the City of Los Angeles's Hyperion and Los Angeles County's Joint Water Pollution Control plants has decreased by more than an order of magnitude during the past 20 years. As a result nonpoint sources now contribute an increased fraction of the total pollutant mass to Santa Monica Bay (SMB). Treatment-plant expansion is currently under way to provide full secondary treatment for the foreseeable future. In addition, with a Los Angeles County population estimated at more than 9,000,000 in 1993, there is an increasing probability for pollutants to be discharged to the receiving water through spills, illicit dumping, atmospheric fallout, storm-water runoff from increased paving, storm-water conveyance, and activities such as automobile use and maintenance.

Nonpoint pollution processes such as storm-water runoff are inherently difficult to model due to their stochastic nature in both time and space domains (Corbitt 1989). Furthermore, nonpoint source pollution modeling generally requires organizing and processing large amounts of spatially referenced data that is either not feasible or difficult to implement without the aid of computer automation.

Geographic information system (GIS) technology has matured over the last 10 years and has gained widespread acceptance as a valuable tool because of its ability to carry out complex spatial operations and to link spatial and descriptive information (Sabins 1997; Marsalek 1991). Ventura and Kim (1993) used an urban water quality model, source loading and management model (SLAMM), and coupled it with a vector-based GIS to estimate the pollutant loadings of each land-use polygon in their studied sewershed. Gilliland and Baxter-Potter (1987) demonstrated the application of a GIS to predict nonpoint source pollution potential from agricultural sources. Other studies have also shown the application of a GIS to either predict or estimate the pollutant loads from agricultural sources (Engel et al. 1993; Heidtke and Auer 1993; Xu et al. 1993). The GIS facilitates the handling of voluminous quantities of data, which have impeded traditional modeling approaches, and allows the fine discretization of watershed data that is required for detailed analysis. The example presented in this paper is for a greater and more complex site with more parameters than previously used.

The goal of this study is to estimate the annual pollutants emission to SMB so that catchments with the largest contribution of each pollutant can be identified and prioritized for developing a monitoring program and applying best management practices (BMPs). An empirical model generally does not require an extensive data-gathering effort to model the annual events; in addition, the relatively large area of the SMB watershed makes a vector-based GIS particularly well suited as a back-end database management tool to handle both the spatial and attribute database. Therefore, an empirical model coupled with a vector GIS was used in this investigation. A physical process model could also be used in this study, but the data and time requirements are prohibitive and not required to achieve the stated goals. There are certain advantages of using a raster-based GIS, but they are not significant at the limited detail and precision of this work.

An empirical urban runoff model is described in this paper. After briefly discussing the model structure, the implementation of a GIS with the model and its application to the SMB watershed are discussed in detail. The mass emission rates from different size subbasins in the watershed are presented. This information was used to develop a monitoring program to estimate mass emissions to SMB (Stenstrom and Strecker 1993b). Two hypothetical scenarios are shown to illustrate the utility of the GIS/model in predicting the impact of BMPs. Finally, a summary and conclusion are presented based on the model's predictions, along with their implications for future management of the SMB watershed.

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METHODOLOGY

The modeling procedure is divided into two parts. The first part is an empirical runoff model—described previously by Stenstrom et al. (1984) and Stenstrom and Strecker (1993a)—which uses data on local rainfall, land-use, drainage, and local and national water quality to estimate pollutant loadings to the receiving waters. The second part involves the implementation of a vector GIS, which is utilized as a back-end database management tool and spatially interfaces the empirical urban runoff model. Fig. 1 is an overview of the modeling process.

Watershed Description

SMB, shown in Fig. 2, is a major receiving water for one of the largest population centers in the United States. It is bounded on the northwest by Point Dume and on the southeast by Palos Verdes Point, a linear distance of about 60 km. The bay extends from the shoreline of Los Angeles and the adjacent cities of Santa Monica, El Segundo, Redondo Beach, and Malibu westward to water depths greater than 500 m. The total area of the SMB watershed as defined by Fig. 2 is 1,072 km^2, of which 464 km^2 are urban areas and the remainder are either classified as nonurban (open, parks, etc.) or unknown areas (less than 0.2%). The bay serves 9,000,000 people as a major recreational resource, providing fishing, boating, and swimming activities. The watershed contains the largest commercial center on the West Coast for manufacturing, aerospace, and petrochemical industries (NOAA 1991). In addition, Los Angeles International Airport (LAX) in El Segundo is one of the busiest airports in the nation, with hundreds of flights daily directly over the SMB watershed. The opportunities for pollutants to be discharged to the bay from local drainage systems or aerial fallout are great.

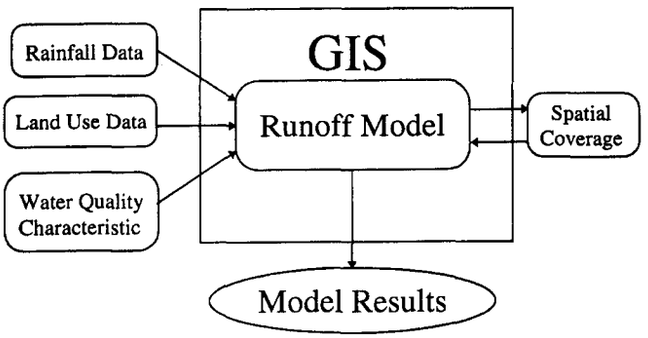

FIG. 1. Overview of Modeling Process

Land Use

Three sets of land-use data from the Southern California Association of Governments (SCAG) were used in this study. They were interpreted and derived from aerial photographs taken in 1987, 1990, and 1993. The original goal of using these three data sets was to compare the pollutant loading results caused by urbanization. Due to limited growth over the six-year period, and to improved interpretation from aerial photography, very few changes in the data sets due to growth were found. Therefore, only the most recent (1993) land-use data were utilized. The land-use definitions and descriptions in this study are a slightly modified version of Anderson land-use classification (Anderson et al. 1976), where level II classification (which represents land-use categories by two-digit codes) is used to describe the predominant geographic attributes of the watershed. The eight land-use categories utilized in this study are shown in Table 1. The minimum level of accuracy in identifying land-use and land-cover categories from remote sensing data should be at least 85%, as stated by Anderson et al. (1976). Therefore, a minimum of 85% accuracy of the two land-use data sets shown in Table 1 was assumed in this study.

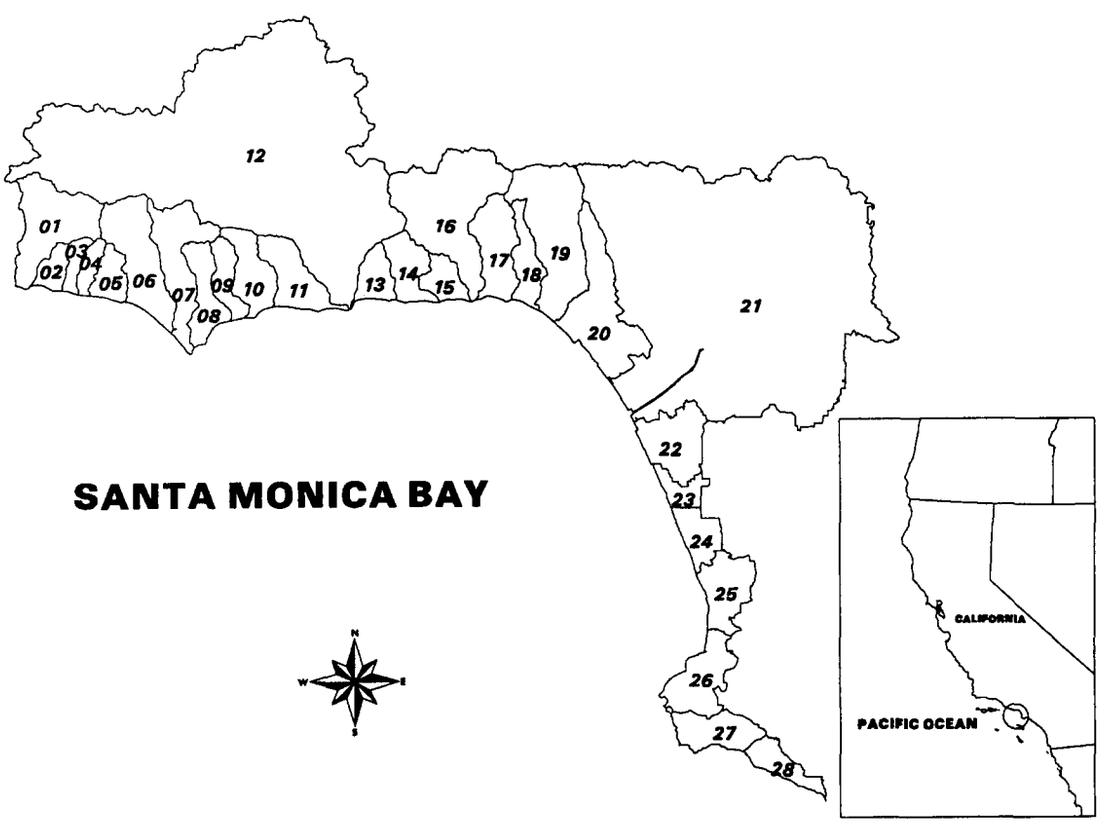

FIG. 2. Santa Monica Bay Watershed and Subbasin Boundaries

TABLE 1. Land-Use Characteristics[a]

Land-use category (1)	Impervious surface area[b] (%) (2)	Runoff coefficient[c] (3)
Single-family	42	0.39
Multiple-family	68	0.58
Commercial	92	0.74
Public	80	0.66
Light industrial	91	0.74
Other urban	80	0.66
Open	0	0.10
Unknown	65	0.56

[a]Adopted from Stenstrom and Strecker (1993a).
[b]Based on Los Angeles County Department of Public Works, NPDES Permit No. CA0061654, Attachment 1, Santa Monica Bay Drainage Basin, drainage area characterization.
[c]Estimates based on percent imperviousness and runoff coefficient relationship given in Driscoll et al. (1990).

An important characteristic of land use is the expected storm-water runoff rate. Previous investigators, through analysis of a large set of rainfall-runoff data from many studies on urban areas and highways, have shown that the runoff coefficient, RV (defined as the overall average ratio of runoff to rainfall), is highly correlated to impervious surface area (IMP) (EPA 1983; Driscoll et al. 1990). This assumption was adopted in this study and is shown as

$$RV = 0.007\ IMP + 0.1 \quad (1)$$

where IMP is expressed as a percentage. In this study the IMP percentage for a given land-use category area was based upon the SMB drainage area characteristics (Los Angeles County Department of Public Works, Alhambra, Calif.). The Driscoll et al. (1990) relationship between the IMP and RV in (1) was used to determine the value of the runoff coefficient for each land-use type. The values of IMP and RV utilized for the eight land-use categories modeled in this study are shown in Table 1. The GIS is used to implement the foregoing procedures and will be discussed in more detail in the later sections. Subsequently, after the determination of runoff coefficients for each catchment, annual average storm runoff volume can then be estimated for the whole watershed using the equations discussed in the next paragraph.

Rainfall

Rainfall data have been collected from 10 gauges in the watershed over a 42-yr period, including at the LAX gauge station. The Synoptic Rainfall Analysis Program (SYNOP) (Woodward-Clyde Consultants, Inc. 1989) was used to compute the mean, standard deviation, and the coefficient of variation for all of the rainfall-event statistics. To facilitate the modeling process, rainfall correction factors (CF) were derived from both the 50-yr, 24-h rainfall and the 1990–91 seasonal total isohyetal map. These were used in conjunction with the average storm rainfall (ASRF) at the LAX rain gauge station to scale the rainfall for each catchment to reflect spatial variations within the watershed. Based on the rational method (Viessman et al. 1989), annual average storm runoff volumes (ASV) for each catchment were then calculated by multiplying the CF, the ASRF at LAX, the area, and the runoff coefficient (RV) as shown in the next equation. The annual average storm runoff (AASV) of each catchment was calculated by multiplying ASV from the next equation and the average number of storms per year (NSTORM) as shown in the one following it. Since this study was only concerned with rainfall events that produce runoff, all those of less than 2.5 mm were discarded from the statistical analysis. For the SMB watershed, the average time between storms varies from 198 to 258 h (8 to 11 d) during the wet season. The coefficient of variation of the time between storms ranges from 1.10 to 1.36 in the rainfall records of 10 selected rain gauges in the SMB watershed (Stenstrom and Strecker 1993a). Therefore, NSTORM is approximately equal to 16 storm events in each wet season. The average storm rainfall and the annual average storm runoff were calculated as follows:

$$ASV_i = RV \cdot AREA \cdot CF \cdot ASRF_{LAX} \quad (2)$$

$$AASV_i = ASV_i \cdot NSTORM \quad (3)$$

where ASRF is expressed in meters (m); AASV in cubic meters per year (m^3/yr); ASV in cubic meters (m^3); and NSTORM in [$year^{-1}$]; and where AREA = area of catchment i (m^2). The GIS/model can be used for different periods or for single events.

Water Quality

Eleven water-quality parameters are of concern to urban nonpoint source runoff and were modeled in this study. They are: total suspended solids (TSS), biochemical oxygen demand (BOD), chemical oxygen demand (COD), nitrite and nitrate (NO23), Total Keldahl nitrogen (TKN), total phosphorus (TP), soluble phosphorus (SP), total copper (Cu), total lead (Pb), Total zinc (Zn), and total oil and grease (O&G).

These parameters were chosen for their general tendency to be indicators of problems in urban runoff, and because sufficient data were available from national and/or local data to estimate land-use contributions.

To use the empirical model it is necessary to know the site median event mean concentration (EMC) of each pollutant for each land-use type. To determine the EMCs for different land uses, all agencies that monitor storm-water discharge to SMB were surveyed. No one agency has this responsibility and 15 sources of data were found that were collected from 47 monitoring locations for a variety of water quality parameters. A total of 43,015 data points were collected. Unfortunately, much of the data were not particularly useful since they were collected by different agencies using different methodologies for varying purposes.

Most of the water quality data were grab samples that represent instantaneous values of pollutant concentrations. In most cases a single instantaneous value cannot be used to represent average conditions; furthermore, it does not describe the variability of the pollutant concentrations (Wanielista and Yousef 1993). In addition, much of the data were collected during dry weather conditions and are not useful for assessing storm-water pollutant discharges. To improve estimates of site median EMCs, the SMB data were compared to the EPA's Nationwide Urban Runoff Program (NURP) database, which were composite samples collected from known land uses (Driscoll et al. 1990). A comparison of the appropriate subset of the water quality data collected in the SMB watershed to the corresponding NURP data showed that the SMB watershed concentrations are generally much higher, and median SMB concentrations approximate 90th percentile NURP concentrations (Stenstrom and Strecker 1993a). The higher concentrations may occur because of the reduced rainfall of the SMB watershed, as compared to NURP sites, as well as from potentially larger urbanization in the Los Angeles area. No O&G data were collected in the NURP study, and O&G concentrations were estimated from previous findings by Stenstrom et al. (1984), Fam et al. (1987), and Silverman, et al. (1988).

Previous researchers have shown the variable EMCs in storm-water runoff from urban areas can be adequately described by a lognormal distribution (Driscoll et al. 1990). If

the EMCs are lognormally distributed, site median EMCs can be transformed to the mean runoff event concentrations (ME), using

$$ME = SM\sqrt{1 + COV^2} \quad (4)$$

where SM = site median EMC (mg/L); ME = event mean concentration (mg/L); and COV = coefficient of variation. A typical value for the COV of pollutant concentrations is 0.71 for urban areas (Driscoll et al. 1990). Therefore, event mean concentration is approximately 23% greater than the site median EMC. The estimated annual loading for individual pollutants (APL) is expressed as:

$$APL_i = AASV \cdot ME_i \cdot CF \quad (5)$$

where APL = annual pollutant loadings (kg/yr); ME = event mean concentration (mg/L); CF = conversion factor for runoff volume to liters; and i = pollutant i.

GIS IMPLEMENTATION

A UNIX-based GIS, ARC-INFO 7.0.4 (*ARC/INFO* 1992) was used for the GIS on an IBM RISC/6000 POWERstation Model 550E. The database for this GIS/model consists of three spatial coverages: a land-use coverage, a subbasin coverage, and a catchment coverage. All three coverages were available in ARC-INFO native format, and were originally developed by scanning U.S. Geological Survey (USGS) maps with drainage data provided by the Los Angeles County Department of Public Works. The land-use, subbasin, and catchment coverages are related with rainfall and runoff attribute data to form an integrated GIS/model to estimate the pollutant loadings from the watershed. Land-use polygons are adopted as the smallest unit for analysis. These three spatial coverages have the following general characteristics: Subbasin coverage (BA) contains 28 polygons; catchment coverage (CA) contains 500 polygons within the 28 BA polygons; 1993 land-use coverage (LU93) contains 6,498 polygons within the 500 polygons of CA.

Fig. 3 shows the distribution of land-use pattern in the SMB watershed in 1993. Tables 2 and 3 illustrate the land-use pattern of LU93 land-use coverage and the land use by subbasins, respectively. Open, single-family, and multiple-family are predominant land uses, accounting for close to 85% of the total land use in the SMB watershed. The majority of the open and single/multiple family land uses are located in subbasin 12 (Malibu drainage) and subbasin 21 (Ballona Creek drainage), respectively.

Fig. 2 shows the distribution of 28 subbasins in the SMB watershed. The subbasins are lumped into three major regions and are categorized in the following way: subbasins 1–19 make up the North Bay; subbasins 20–22 make up the West Los Angeles; and subbasins 23–28 make up the South Bay.

The GIS modeling work can be divided into three main steps. The first is to link the land-use coverage with rainfall and runoff coefficient information [(1)–(3)], and also to link CA with the corresponding rainfall correction factor (CF), which is used to reflect the spatial variation of rainfall pattern. The second step is to the overlay BA with the two new coverages created in the first step to form the final coverage, which will be used to estimate the pollutant loadings. The last

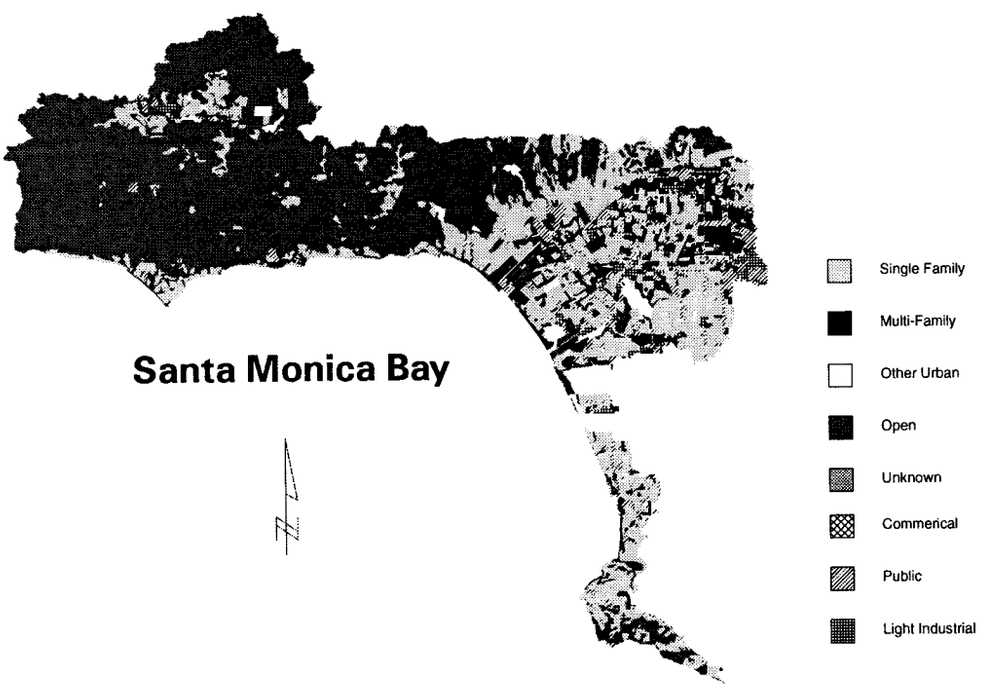

FIG. 3. Land-Use Pattern in SMB Watershed (Based on 1993 Land-Use Data)

TABLE 2. Areal Distribution of Land-Use Coverage

Land-use coverage (1)	Land-Use Area [ha (% of total)]								
	Unknown (2)	Single-family (3)	Multiple-family (4)	Commercial (5)	Public (6)	Light industrial (7)	Other urban (8)	Open (9)	Total (10)
LU93	9 (0.01)	26,102 (24.4)	8,070 (7.5)	4,902 (4.6)	2,526 (2.4)	2,213 (2.1)	2,845 (2.7)	60,509 (56.5)	107,178 (100)

TABLE 3. Land-Use Distribution in 28 Subbasins (Based on LU93)

Subbasin (1)	Land-Use Area (%)								Total area (ha) (10)
	Single-family (2)	Multiple-family (3)	Commercial (4)	Public (5)	Light industrial (6)	Other urban (7)	Open (8)	Unknown (9)	
1	1	0	0	0	0	0	98	0	2,915
2	3	0	0	0	0	0	97	0	578
3	11	1	0	0	0	0	88	0	449
4	8	0	0	0	0	0	92	0	477
5	9	0	0	0	0	0	91	0	815
6	9	0	0	1	0	0	89	0	2,777
7	9	1	0	0	0	0	88	0	2,469
8	21	2	0	0	0	0	76	0	1,371
9	10	0	0	0	0	1	88	0	902
10	5	1	0	0	0	0	94	0	1,525
11	4	1	1	4	0	0	90	0	1,741
12	9	2	1	1	0	2	85	0	28,444
13	11	1	1	0	0	0	86	0	912
14	12	2	0	0	0	0	86	0	1,281
15	3	0	0	0	0	0	96	1	837
16	10	0	0	0	0	0	90	0	5,102
17	12	2	0	1	0	2	83	0	2,016
18	23	3	1	2	0	2	69	0	1,149
19	21	1	0	1	0	0	77	0	4,266
20	41	22	11	4	4	3	16	0	3,622
21	42	17	11	5	4	3	18	0	33,692
22	26	6	3	5	1	41	19	0	2,037
23	6	5	7	0	62	13	7	0	665
24	64	12	9	6	1	1	7	0	1,103
25	52	21	8	9	1	2	7	0	1,750
26	67	5	2	3	0	1	22	0	1,993
27	37	3	2	2	1	3	53	0	1,521
28	45	4	1	5	0	0	45	0	948

step is to link the 11 water quality characteristics [(4)] with the final coverage.

There are two basic ways of linking an attribute table to a table of geographic records. A relational join command is used to perform the relational join operation, which expands the geographic file to permanently include the attribute file. A relate operation temporarily links the attribute file with the geographic file in which the two links are separately stored. There are advantages to each method that depend on the data storage requirements, the speed of the computer, and other miscellaneous factors (*ARC/INFO* 1992). Since there are only four equations (variables) needed to link with LU93 and CA spatial coverages, and also because join operations are generally faster to manipulate than relate operations, the relational join is used in the first step. The first "join" operation is a "one to many" relationship (one land-use or runoff coefficient is related to many different polygons) between the land-use coverage and the runoff coefficient attribute table [(1)]. The second "join" operation is a "one to one" relationship between the catchment coverage and the rainfall correction factor attribute table.

After the superimposing the land-use, catchment, and subbasin coverages, (2)–(5) can then be implemented in the GIS/model. This process is a union, which creates an output coverage by overlaying the three spatial coverages. All polygons and attributes from these three spatial coverages are combined and preserved at the output coverage. The order of the union operation is important because all duplicate parameters except the one in the first input coverage are deleted. Therefore, the spatial union operation between the land-use coverage and the catchment coverage must precede the operation between the output coverage and the subbasin coverage in order to preserve the variable "AREA" of the land-use coverage. The variable "AREA" of LU93 represents the "AREA" term in (2) and (3). Fig. 4 depicts the overall spatial union operations of the second step.

The estimated pollutant loading formula from (5) is then linked with the resultant output coverage (or table) to calculate the 11 pollutant loadings from each catchment polygon and also from each subbasin polygon. This process is facilitated if the GIS has built-in statistics commands. The following two equations are used to estimate the pollutant loadings from catchment i (C_i) in subbasins j and j (B_j), respectively:

$$C_i = \sum_{k=1}^{8} \sum_{n=1}^{N} \mathrm{AASV}_{n,k,i} \cdot \mathrm{ME}_{n,k,i} \cdot \mathrm{G} \tag{6}$$

$$B_j = \sum_{i=1}^{M} C_i \tag{7}$$

where AASV = average annual storm volume (m^3/yr); ME = event mean concentration (mg/L); G = conversion factor [($m^3 \cdot$mg/L to kg) $\times$ 10^{-3}]; C_i = estimated annual pollutant loading of catchment i (kg/yr); B_j = estimated annual pollutant loading of subbasin j (kg/yr); N = total number of land-use polygons with land-use type k within catchment i; M = total number of catchment polygons within subbasin j; k = land-use type; and n = land use polygon n within the catchment i.

RESULTS

The GIS/model was used to determine the areas (basins) and land uses producing the most polluted runoff. The annual pollutant loadings and the annual unit pollutant loadings from each land-use category are shown in Tables 4 and 5, respectively. In Table 4 the annual pollutant loadings for each land use are in metric tons per year (t/yr), whereas in Table 5 the annual unit pollutant loadings for each land use are in metric tons per hectare per year (t/ha/yr), which are calculated by normalizing for the different land-use areas. As shown in Table 4, the single-family land use produces the highest loading of

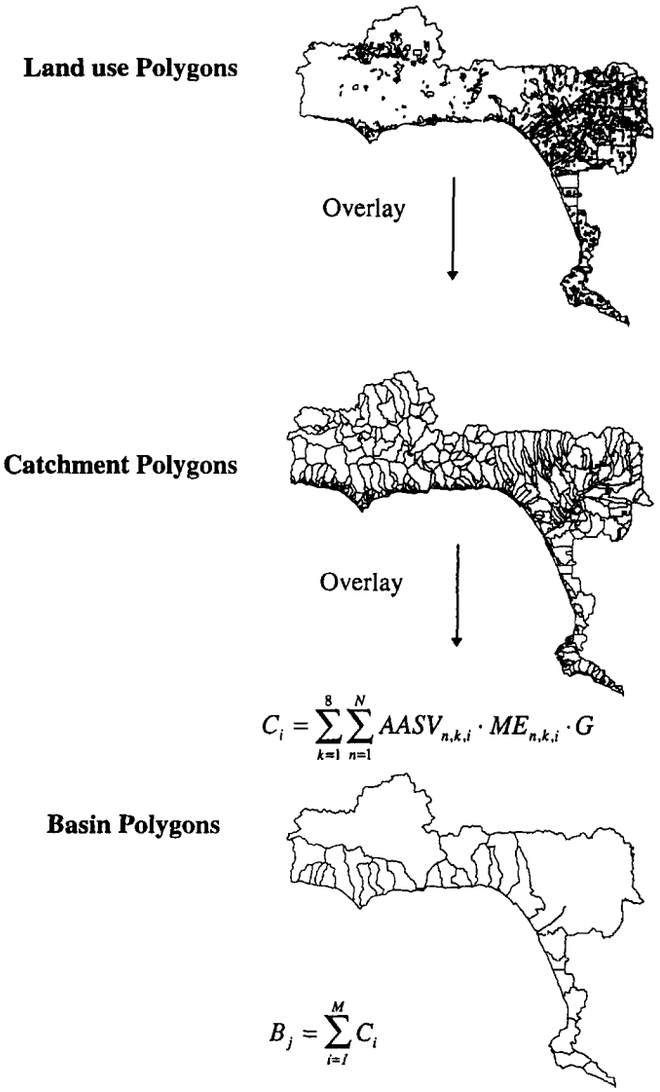

FIG. 4. Spatial Union Operation Using GIS and Nonpoint Source Modeling: (a) Land-Use Polygons; (b) Catchment Polygons; (c) Basin Polygons

all pollutants among all land uses except for open, which has a higher TSS load. This results because the single-family and open land uses together account for more than 80% of the total area (see Table 2). Table 4 shows the oil and grease contributions from commercial, public, and light industrial areas, which are approximately 46% of the total oil and grease emissions, even though the overall area size accounts for only 9% of the total area in SMB watershed (see Table 2). The normalized land-use loadings in Table 5 show commercial, public, and light industrial areas have the highest per unit area contributions. High loadings can be produced from relatively small areas within the watershed. Oil and grease runoff is strongly correlated with land use, resulting in a large variation in emission rates (Fam et al. 1987).

It is not possible to calibrate the GIS/model because data are not available. (One of the purposes of this project was to develop the GIS/model in order to develop a monitoring program.) The only estimates for discharge to the bay were performed by the Southern California Association of Governments (SCAG) (1988), and only for subbasins 12 and 21. A detailed comparison was presented by Stenstrom and Strecker (1993a), but is too lengthy to repeat here; however, the comparisons were generally good, considering the challenging nature of monitoring wet weather pollutant flow. For subbasin 21, which is highly developed, the model generally predicted higher emissions for six contaminants and a higher flow rate than estimated by SCAG; the model averaged 83% higher. For subbasin 12, which contains a large fraction of open or undeveloped land, the model's predictions were 32% lower than SCAG's estimates for the same pollutants. Emissions (or lead were quite different between the model and SCAG's estimates, which may be due to total versus dissolved measurement differences. The writers consider this is good agreement. One possible source of the differences is that the model is calibrated using water quality data collected over the 1972–91 period, as opposed to a single year.

Fig. 5 shows the annual and unit pollutant loadings from the 28 subbasins in the watershed. For all 11 pollutants, the Ballona Creek drainage (subbasin 21), which drains the greater part of the Los Angeles metropolitan area, shows the highest loadings, followed by the Malibu drainage (subbasin 12). The remaining 26 subbasin watersheds only contribute 35% of the total loading. Subbasin 21 shows the largest percentage loadings of oil and grease. These observations are explained by the land use and the total areas in subbasin 21, as shown in Table 3. This subbasin includes four major Interstate freeways, networks of complicated transportation systems, and a heavy concentration of multifamily residences and other miscellaneous urban structures. Freeways and major roads are lumped into the "other urban" land-use category.) The unit pollutant loadings were highest for subbasin 23, followed closely by subbasins 21, 20, and 22. This is expected because of their high proportions of industrial areas, utility facilities, and other urbanized areas. These subbasins also have the highest loadings and unit loadings of oil and grease. The ability to rank pollutant emissions will be useful if problems associated with specific pollutants are identified in the bay. The GIS/model results are a starting point to look for ways of reducing emissions.

The GIS/model results were used to design a monitoring program (Stenstrom and Strecker 1993b) that has become the structure for the Los Angeles County Department of Public Works monitoring program for the areas draining into Santa

TABLE 4. Annual Pollutant Loadings for Each Land Use (Based on LU93)

Land use (1)	Annual Pollutant Loadings (T/yr) TSS (2)	BOD_5 (3)	COD (4)	TP (5)	SP (6)	TKN (7)	NO23 (8)	Total Cu (9)	Total Pb (10)	Total Zn (11)	O&G (12)
Single-family	12,316	722	5,946	36	11	183	79	4	15	15	127
Multiple-family	3,985	285	2,467	12	2	46	19	2	8	7	417
Commercial	2,683	209	1,342	6	3	30	18	1	3	10	328
Public	1,215	94	607	3	1	13	8	0	2	5	148
Light industrial	1,127	88	564	3	1	13	8	0	1	4	138
Other urban	1,603	114	992	5	1	18	8	1	3	3	168
Open	14,383	59	2,789	15	4	82	43	2	4	13	0
Unknown	0	0	0	0	0	0	0	0	0	0	0

TABLE 5. Unit Pollutant Loadings for Each Land Use (Based on LU93)

Land use (1)	Annual Unit Pollutant Loadings (t/ha/yr)										
	TSS (2)	BOD_5 (3)	COD (4)	TP (5)	SP (6)	TKN (7)	NO23 (8)	Total Cu (9)	Total Pb (10)	Total Zn (11)	O&G (12)
Single-family	5.E-01	3.E-02	2.E-01	1.E-03	4.E-04	7.E-03	3.E-03	2.E-04	6.E-04	6.E-04	5.E-03
Multiple-family	5.E-01	4.E-02	3.E-01	1.E-03	3.E-04	6.E-03	2.E-03	2.E-04	1.E-03	9.E-04	5.E-02
Commercial	5.E-01	4.E-02	3.E-01	1.E-03	5.E-04	6.E-03	4.E-03	2.E-04	7.E-04	2.E-03	7.E-02
Public	5.E-01	4.E-02	2.E-01	1.E-03	5.E-04	5.E-03	3.E-03	2.E-04	6.E-04	2.E-03	6.E-02
Light industrial	5.E-01	4.E-02	3.E-01	1.E-03	5.E-04	6.E-03	3.E-03	2.E-04	6.E-04	2.E-03	6.E-02
Other urban	6.E-01	4.E-02	3.E-01	2.E-03	3.E-04	6.E-03	3.E-03	3.E-04	1.E-03	1.E-03	6.E-02
Open	2.E-01	1.E-03	5.E-02	3.E-04	7.E-05	1.E--3	7.E-04	3.E-05	7.E-05	2.E-04	0.E+00
Unknown	9.E+00	7.E-01	6.E+00	3.E-02	6.E-03	1.E-01	5.E-02	5.E-03	2.E-02	2.E-02	1.E+00

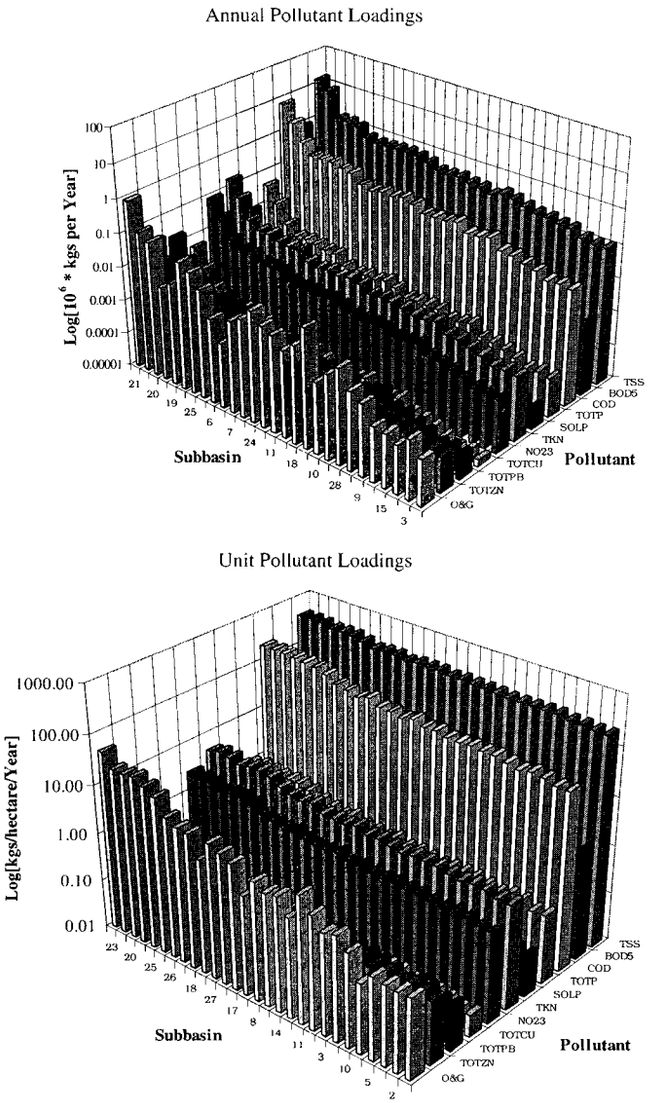

FIG. 5. Pollutant Loadings for 28 Subbasins (Based on 1993 Land-Use Coverage): (a) Annual Pollutant Loadings; (b) Unit Pollutant Loadings

Monica Bay. Using the GIS/model it is easy to position monitoring stations at locations that will sample a minimum fraction of the runoff. For example, selecting subbasins 12 and 21 will sample approximately 65% of the total runoff, based upon flow rate. It is also possible to select monitoring locations based upon other criteria, such as the anticipated mass loadings of some particular pollutant. Another possibility is to use the GIS/model to select small land parcels that are predominately composed of single land uses. In this way, stations are selected to be used to collect data for additional model calibration and validation. For the SMB monitoring program, the five subbasins with the greatest emissions were initially selected as mass emission stations. These included subbasins 12 and 21. A similarly sized group was selected as land-use stations. The results of this monitoring program will eventually become available for model verification and additional model development.

To illustrate the potential uses of the GIS/model for stormwater management, the following two hypothetical scenarios are used as examples. Scenario one uses subbasin 12 (Thousand Oaks drainage) to illustrate the impact of land-use changes on the pollutant annual discharges. Subbasin 12, as shown in Table 3, has 85% open land use. By transforming 20% of the open land-use category to other land-use categories, such as single-family and multifamily, the increase in annual pollutant emissions can be calculated; the results are shown in Table 6. These are potential changes that might occur with increasing population. From Table 6 the pollutant O&G shows a larger increase in the annual loading and a wider range of the percent annual loading increases among the six hypothetical land-use transformations. The smallest and largest increases in the annual loadings impacted from the hypothetical land-use transformation are the single-family and other urban land uses, respectively. The commercial and light industrial land uses also receive significant increases in the annual loadings.

In scenario two we use the GIS/model to illustrate the impact of BMPs on the annual discharge to SMB. The GIS/model can be programmed to predict the impact of BMPs, and two hypothetical BMPs are tested: a campaign to reduce the amount of fertilizer used on lawns of single- and multiple-family housing, and a control program to reduce the oil and grease discharge into the storm drains on commercial and industrial land uses. Both BMPs assume that a 50% reduction in site mean concentration occurs because of the best management practice. For simplicity we assume that 100% of the nitrate in the urban runoff from these land uses is from fertilizer use. Table 7 shows that a 50% reduction in residential fertilizer use (or a 50% reduction in event mean concentration of nitrite and nitrate) reduces annual NO23 emission by approximately 28%. As for the second BMP, a 50% reduction in the amount of oil and grease discharge (or a 50% reduction in event mean concentration of oil and grease) results in close to 14% reduction in the annual O&G discharge. Table 7 also shows the most significant and the least significant subbasin impacted from the two given hypothetical BMPs. Subbasin 21 (Ballona Creek drainage) shows the largest reduction in both the annual NO23 and O&G discharge. Subbasins 1 and 4 (Malibu drainage) show no significant reduction in the annual O&G and NO23 emission, respectively.

The technique shown in these two hypothetical cases may be valuable for city planners and others to mitigate the growth in nonpoint pollution due to the land-use changes. It should also be useful for government agencies to determine the impact and cost/benefit of different proposed BMPs. Such anal-

TABLE 6. Scenario One: Annual Pollutant Loadings in Subbasin 12

Pollutant (1)	ANNUAL LOADINGS OF SUBBASIN 12 (t/yr)						
		20% of Open Land Use Is Transformed to Following Land Uses					
	Open (2)	Single-family (3)	Multifamily (4)	Commercial (5)	Public (6)	Light industrial (7)	Other urban (8)
TSS	8,520	10,038	10,195	10,499	10,145	10,469	10,609
BOD_5	191	340	356	427	400	425	415
COD	2,497	3,532	3,994	3,809	3,631	3,794	4,250
TP	14	20	21	20	19	20	22
SP	4	6	5	7	6	7	6
TKN	68	102	95	97	93	97	99
NO23	33	2	3	3	3	3	3
Total Cu	2	8	11	9	8	9	12
Total Pb	5	12	14	21	20	21	15
Total Zn	10	47	13	51	48	51	45
O&G	138	145	415	501	458	498	458

TABLE 7. Scenario Two: Annual NO23 and O&G Loadings (t/yr)

Pollutant (1)	Santa Monica Bay		Most Significant Subbasin		Least Significant Subbasin	
	Before (2)	After (3)	Before (4)	After (5)	Before (6)	After (7)
NO23[a]	182	133	87[b]	59[b]	0.41[c]	0.38[c]
O&G[a]	1,336	1,103	869[b]	699[b]	0[d]	0[d]

[a]Assumption: 50% reduction in mean events concentration of NO23 and O&G.
[b]Subbasin 21.
[c]Subbasin 2.
[d]Subbasins 1, 3, 4, 5, 9, 15.

TABLE 8. Comparison of Model Predictions with Annual Emissions from Hyperion Treatment Plant

Parameter (1)	Model (1993)[a] (2)	Hyperion (1992)[b] (3)	Total load[c] (4)	D_NPS[d] (%) (5)
TSS	37,000	19,000	56,000	66
BOD	1,600	41,000	42,600	4
TP	80	2,500	2,580	3
NO23	180	132[e]	312	58
Cu	10	16	26	39
Pb	37	1	38	97
Zn	57	35	92	62
O&G	1,300	5,900	7,200	18

Note: Units are all in t/yr.
[a]Based on 1993 land-use data.
[b]Using 1992 annual average data.
[c]Total load = total annual emission of the model and the Hyperion Wastewater Treatment Plant.
[d]D_NPS = model emission (nonpoint source) as a percentage of total load.
[e]Using the nitrate nitrogen (NO_3-N) only.

ysis will help in the development of an optimum stormwater pollution control strategy.

To illustrate the significance of nonpoint source pollution, annual emission data from the Hyperion Wastewater Treatment Plant of the City of Los Angeles (Santa Monica Bay Restoration Project 1993) are compared with the model results. The Hyperion plant and a petroleum oil refinery are the only facilities that have National Pollution Discharge Elimination System (NPDES) permits to discharge into Santa Monica Bay. Hyperion has more than 100 times the flow rate of the refinery, which has an activated sludge plant for effluent treatment. For the purpose of this example, we assume that Hyperion represents 100% of the point source pollution to Santa Monica Bay. Both Hyperion and nonpoint sources are presented in Table 8, which shows the range of differences of the annual emissions. The nonpoint source contribution (column 5) for some pollutants, such as total phosphorus (TP), is quite low (3%). For other pollutants, such as lead, the nonpoint sources are the major sources (97%). In 1993 Hyperion was only capable of treating approximately 50% of the flow to full secondary standards. When construction of the new facilities are completed, and 100% secondary treatment is possible, the relative point source contribution will be much less. This suggests that if further reductions in pollution to Santa Monica Bay are required, nonpoint sources should be evaluated first. Also, the Hyperion plant discharges through a long outfall, and the dilution further reduces its impact. The storm drains discharge in close human contact at the beach or surf, which probably increases their impact.

CONCLUSIONS

In this study we have shown the feasibility of imbedding an urban runoff model into a GIS to estimate the annual pollutant loadings to the SMB watershed. The overall framework takes advantage of the built-in relational database management technology of the GIS to construct an accurate and detailed database. This database depicts the watershed geographic attributes and relates them using the urban runoff model. Critical and sensitive areas of varying sizes within the watershed can be accurately located by using the built-in graphical display capability of the GIS. This integration of a nonpoint source model and a GIS offers a powerful tool to assist watershed managers in developing control strategies to improve water quality within local drainage systems. It also allows the managers to evaluate impacts of various BMPs with given hypothetical conditions.

Many factors need to be considered in evaluating stormwater management alternatives, and cost-effectiveness is a paramount factor. Cost-effectiveness is generally measured by either reduction in specific pollutants or mass removal at least cost. For stormwater measures, costs are generally site specific, which may depend on land cost, availability of funds, and many other factors. The methodology presented in this paper can be further extended by integrating nonpoint source computer models and optimization techniques into the GIS. Within this framework, alternative storm-water management methods can be simulated for specific critical areas in determining the least cost combination of water quality control alternatives.

ACKNOWLEDGMENTS

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APPENDIX II. NOTATION

The following symbols are used in this paper:

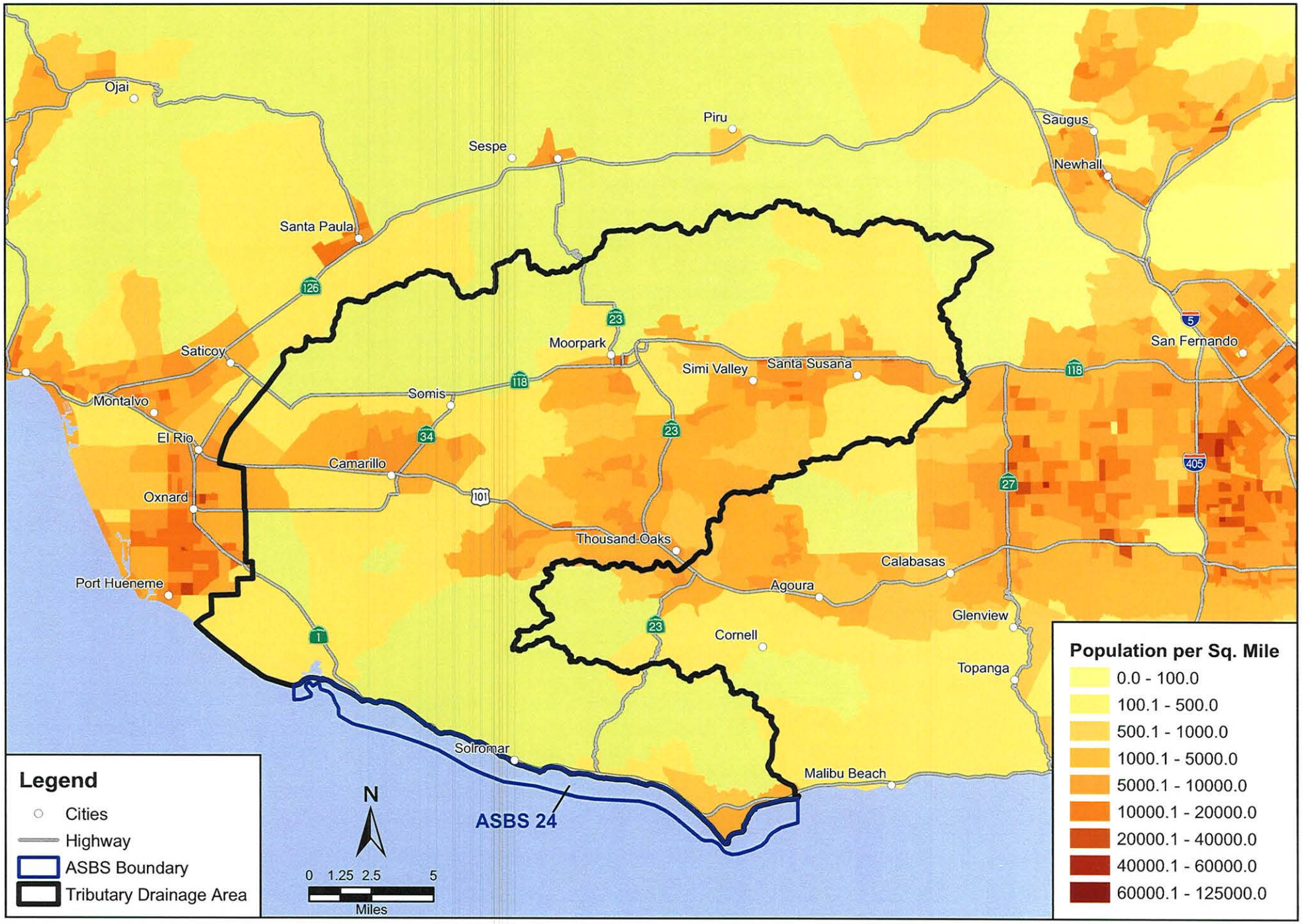
AASV = average annual storm volume (m^3/yr);
APL = annual pollutant loadings;
$AREA_i$ = area of catchment i within subbasin j (ha);
ASRF = average storm rainfall;
ASV = average storm runoff volumes;
B_j = estimated annual pollutant loading of subbasin j (kg/yr);
C_i = estimated annual pollutant loading of catchment i (kg/yr);
CF = conversion factor for runoff volume to liters;
COV = coefficient of variation;
EMC = event mean concentration;
G = conversion factor for runoff volume to liters [$m^3 \cdot mg/L$ to kg) $\times 10^{-3}$];
IMP = impervious area (expressed as percentage);
k = land-use type;
M = total number of catchment polygons within subbasin j;
ME = event mean concentration (mg/L);
N = total number of land-use polygons with land-use type k within catchment i;
n = land-use polygon n within catchment i;
RV = runoff coefficient; and
SM = site median EMC (mg/L).

Area of Special Biological Significance #24 Mugu Lagoon - Latigo Point
Identified Facilities in the City of Malibu**

Identified Facilities	SCCWRP ID	Santa Monica Baykeeper ID	Size	Commingled Caltrans	Location
DRAIN 1	MUG193		18"	Probably	BB West of Cottontail
DRAIN 2	--		18"	Yes	BB West of Sea Level
DRAIN 3	--		18"	No	BB East of Beach Access
DRAIN 4	MUG223		30"	No	
DRAIN 5	MUG224		24"	No	BB at Beach Access
DRAIN 6	MUG225		24"	Yes	BB
DRAIN 7	--		30"	Yes	BB
DRAIN 8	--		24"	No	BB
DRAIN 9	MUG232	SAD 900	24"	Yes	BB - City Sampling Site
DRAIN 10	MUG233		18"	Yes	BB
DRAIN 11	MUG359		18"	No	Morning View to Zuma Beach
DRAIN 12	--		36"	Yes	Westward Beach & PCH
DRAIN 13	--		30"	No	Zuma Bay to Westward Beach Road to Zuma Creek
DRAIN 14	--		24"	No	South of Zuma Bay to Westward Beach Road to Zuma Creek
DRAIN 15	--		36"	No	Drainage from Zuma Bay Villas to Westward Beach
DRAIN 16	--		24"	No	Bluewater to Birdview to vegetated gully
DRAIN 17	MUG404		24"	No	Birdview to Westward Beach Road to Westward Beach
DRAIN 18	MUG430	SAD 1120	36"	No	Birdview Collection to Westward Beach Road to Westward Beach - City Sampling site
DRAIN 19	--		24"	No	Birdview to vegetated gully
DRAIN 20	--		24"	No	Young-Silver Dume Drive - Cliffside Drive to Big Dume Cove
DRAIN 21	MUG386		18"	No	Whitesand Place to vegetated gully
DRAIN 22	MUG378		18"	No	Wildlife Road to Little Dume Cove

Reference Site	Paradise Cove tidepools between 6988 & 6982 Wildlife Road residences on the bluff above the beach. These tidepools are between Paradise Cove and Little Dume Cove.

**These drains are those that have been identified as possibly discharging in the ASBS. The City of Malibu maintains the catch basins and continues to research ultimate responsibility for these drains.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Newhall
Santa Paula
126
23
5
Moorpark
San Fernando
Saticoy
Simi Valley
Santa Susana
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Somis
Montalvo
El Rio
34
23
Camarillo
405
27
Oxnard
101
Thousand Oaks
Calabasas
Port Hueneme
Agoura
Glenview
23
Cornell
1
Topanga
Solromar
Malibu Beach
ASBS 24
Legend
Cities
Highway
ASBS Boundary
Tributary Drainage Area
N
0 1.25 2.5 5
Miles
Population per Sq. Mile
0.0 - 100.0
100.1 - 500.0
500.1 - 1000.0
1000.1 - 5000.0
5000.1 - 10000.0
10000.1 - 20000.0
20000.1 - 40000.0
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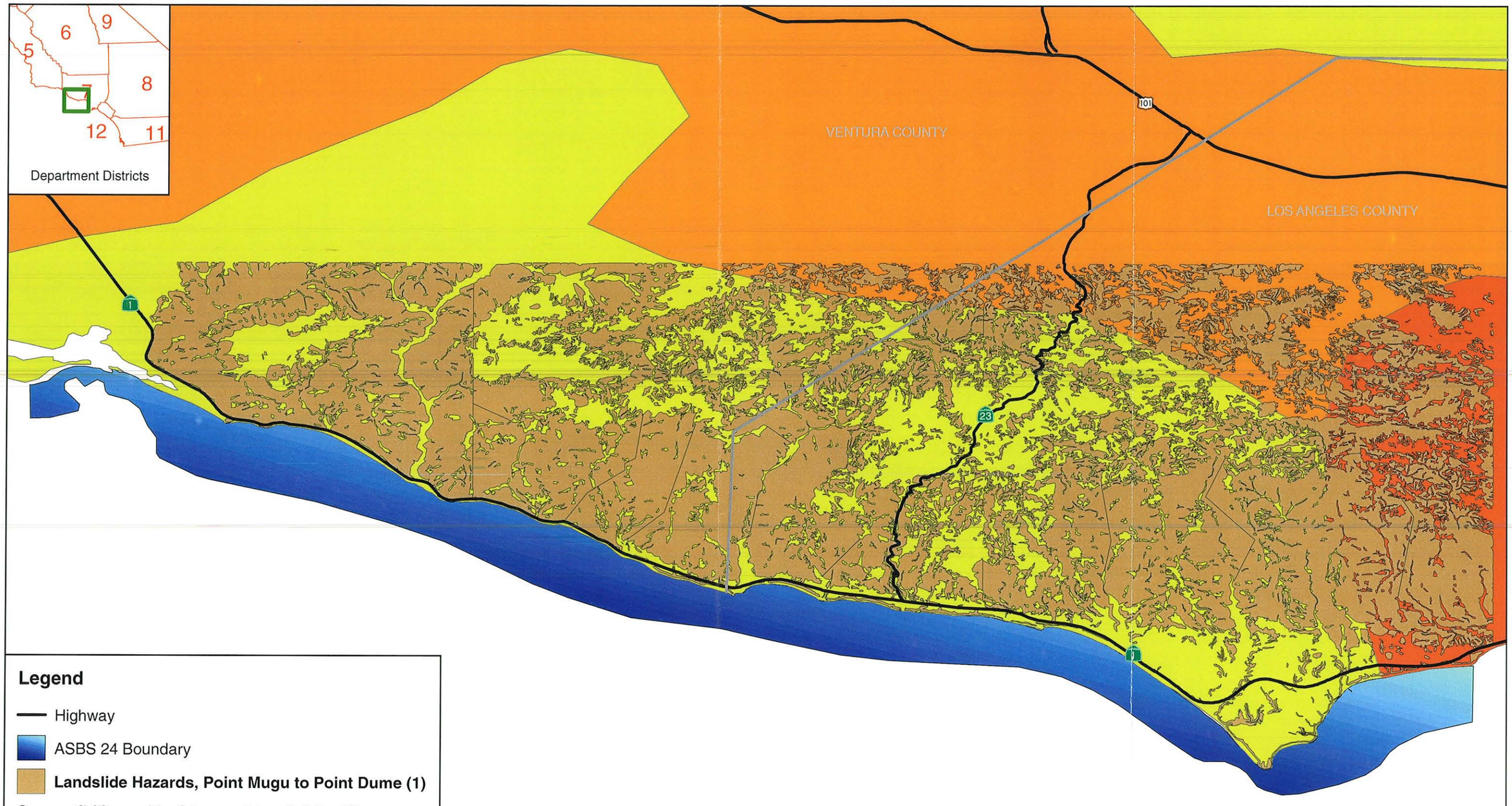

Legend

- Highway
- ASBS 24 Boundary
- **Landslide Hazards, Point Mugu to Point Dume (1)**

Susceptibility and Incidence of Landslides (2)

- Moderate susceptibility/low incidence
- Moderate incidence
- Low incidence
- High incidence
- High susceptibility/moderate incidence

(1) Source: State of California, Department of Conservation, Division of Mines and Geology. "Seismic Hazard Zones, Point Mugu, Triunfo Pass, and Point Dume Quadrangles". February 7, 2002.

(2) Source: U.S. Department of the Interior, U.S. Geological Survey. "Landslide Overview of the Conterminous US-National Landslide Hazards Map." September 26, 1997.

Susceptibility not indicated where same or lower than incidence. Susceptibility to landsliding was defined as the probable degree of response of [the areal] rocks and soils to natural or artificial cutting or loading of slopes, or to anomalously high precipitation. High, moderate, and low susceptibility are delimited by the same percentages used in classifying the incidence of landsliding. Some generalization was necessary at this scale, and several small areas of high incidence and susceptibility were slightly exaggerated.

N

0 1 2 4

Miles

Caltrans

Erosion Potential In ASBS 24

a Map of our watersheds

Thousand Oaks
Lake Bard
Santa Monica Mountains National Recreation Area Headquarters
101 Freeway
Lake Sherwood
Westlake Blvd
Westlake
Westlake Village
Agoura Hills
Lake Lindero
Las Virgenes Reservoir
Triunfo Creek
Ventura County
Los Angeles County
Los Angeles
Chatsworth Nature Preserve
Palo Comado Creek
Chesebro Creek
Medea Creek
Topanga Canyon Blvd
California Native Plant Society
Hidden Hills
Calabasas Landfill
Las Virgenes Creek
Las Virgenes Municipal Water District
Rancho Las Virgenes Composting Facility
Calabasas
Mountains Restoration Trust
Kanan Dume Rd
Malibou Lake
Mulholland Hwy
California State Parks Local Office
Las Virgenes Rd
Cold Creek
Tapia Water Reclamation Facility
Rindge Dam
Malibu Canyon Rd
Malibu Creek
Resource Conservation District of the Santa Monica Mountains
Topanga Canyon Blvd
Encinal Canyon Rd
Trancas Canyon
Zuma Canyon
Kanan Dume Rd
Decker Canyon Rd
Arroyo Sequit Canyon
Sequit Point
Leo Carrillo
El Pescador
La Piedra
El Matador
Santa Monica Mountains Conservancy
Pacific Coast Hwy
Corral Beach
Malibu Lagoon
Surfrider Beach
Topanga Lagoon
Topanga Beach
Zuma Beach
Zuma Lagoon
Westward Beach
Pt. Dume
Escondido Beach
Malibu
N
Miles
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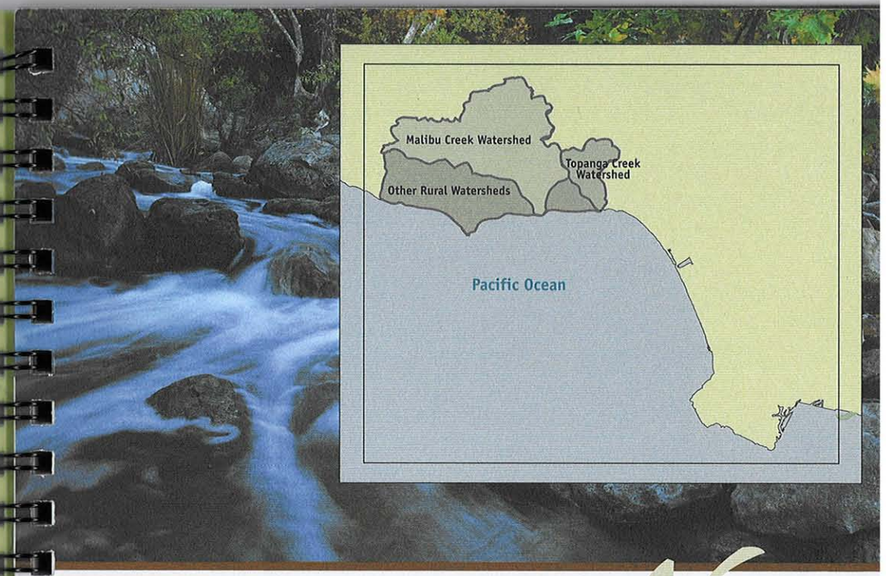

Above: Sycamores along Malibu Creek

North Santa Monica Bay Watersheds Green Map

- Water District
- Water Reclamation Facility
- Composting Facility
- Farmers' Market
- Environmental Organizations and Agencies
- Rindge Dam
- Existing and Potential Wildlife Linkages
- Feature Road
- Los Angeles/Ventura County Line
- Watershed Boundaries
- Creeks
- Parkland
- Landfill
- Incorporated Cities
- Unincorporated Areas Within Los Angeles and Ventura Counties
- Last Grizzly Bear Sighting 1853

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Treatment Processes and Best Management Practices (BMPs)

The material in this section responds to the request for "[a] *description of current treatment processes, pollution controls, and/or best management practices currently used or planned (with a schedule for implementation).*"

Since incorporation on March 28, 1991, the City has consistently implemented programs designed to protect natural resources and improve the quality of the water and the environment. The following spreadsheet includes an overview of the City's water quality ordinances, programs, and projects as they relate to ASBS #24. It also includes the start date of the programs and anticipated date of completion, if applicable. Many current clean water programs and projects were not included in this section if the action has no direct effect on the ASBS.

This section is organized by Lead Agency, Type of BMP, and Start Date. Some programs listed are implemented by another Lead Agency and not directly by the City. The City of Malibu collaborates with and/or supports these other agencies in their efforts.

Where noted in this section, the corresponding documents discussed in this section can be found in the Appendices at the back of this package.

	Title	Malibu Environmental Programs- Best Management Practices and Studies Descriptions	Start Time	End Time	Lead Agency	BMP Type
1	**Public Agency Activities- Street Maintenance: Storm Drain/Culvert Facilities Maintenance**	Public Agency Activities- Street Maintenance: contract for annual and post-storm inspection and cleaning of storm drain facilities. This service ensures that litter, debris and pollutants are removed to prevent them getting into the local waterways and impacting beneficial uses.	March-91	Ongoing	City of Malibu	Non-Structural
2	**Public Agency Activities- Street Maintenance: Curb and Gutter Cleaning and Repair**	Public Agency Activities- Street Maintenance: contract for annual curb and gutter cleaning and repair. This service ensures proper functioning of drainage facilities.	March-91	Ongoing	City of Malibu	Non-Structural
3	**City Ordinance and Municipal Code- Water Conservation**	City Ordinance and Municipal Code- Water Conservation Ordinance (No. 46) M.M.C. Chapter 9.20. This ordinance recognized the severe drought conditions and enacted an emergency conservation plan so resources would be available to the public for beneficial use and that waste or unreasonable use or unreasonable methods of use of this important resource be prevented. A favorable consequence of this implementation is that incidental residential runoff is reduced. See appendix.	December-91	Ongoing	City of Malibu	Non-Structural
4	**City Ordinance and Municipal Code- Grading And Storm Water Standards**	City Ordinance and Municipal Code- Urgency Amendment to the Excavation Grading Standards of the Building Code, Establishing Storm Water Management Standards, and Amending the Malibu Municipal Code (M.M.C.) Ordinance No. 51U. This ordinance prevented the issuance of any building permits for construction without submitting a plan which is found in compliance with the Clean Water Act of 1987 by controlling discharges of construction debris and preventing discharge of materials other than storm water into the storm drain. See appendix.	January-92	Ongoing	City of Malibu	Non-Structural
5	**City Ordinance and Municipal Code- Water Conservation Landscaping Requirements**	City Ordinance and Municipal Code- Water Conservation Landscaping Requirements Ordinance No. 96, M.M.C. Chapter 17.44. This section sets forth regulations for designing and installing water efficient landscapes in new projects to conserve water and minimize runoff. See appendix.	September-93	Ongoing	City of Malibu	Non-Structural
6	**City of Malibu General Plan**	City of Malibu General Plan- This plan outlines the goals, objectives and implementation measures to protect various natural resources and water quality in coastal streams and ocean. See appendix for information on how to view this document.	November-95	Ongoing	City of Malibu	Non-Structural
7	**City Ordinance and Municipal Code- Regulating Storm Water and Urban Runoff Pollution**	City Ordinance and Municipal Code- Regulating Storm Water and Urban Runoff Pollution Ordinance No. 157. The purpose of this ordinance is to ensure the future health, safety and general welfare of the citizens of the city and the water quality of the receiving waters of the Santa Monica Bay. See appendix.	December-96	Ongoing	City of Malibu	Non-Structural
8	**Malibu Quarterly Environmental Newsletter**	Public Information & Participation Programs - Malibu Recreation Guide and Program Quarterly Newsletter is sent to residents and includes articles relating to the Clean Water Program and Solid Waste Program. The City takes the opportunity to give reminders to the community about hove to prevent pollution and reduce waste, as well as local event opportunities. See "Alternatives Analysis" section for more information regarding this newsletter.	January-00	Ongoing	City of Malibu	Non-Structural
9	**Solid Waste Management Program**	Solid Waste Management Program was formed to comply with AB 939 (California Integrated Waste Management Act of 1989) and implement source reduction of solid waste including recycling, composting, environmentally safe transport and land disposal. This includes: City programs for safe disposal of household hazardous waste; used oil collection/recycling events; waste management education; Solid Waste Hauler permitting; Christmas tree recycling; brush clearance/green waste recycling events; bulky item collection; construction and demolition debris recycling; and electronic and universal waste disposal.	April-01	Ongoing	City of Malibu	Non-Structural

	Title	Malibu Environmental Programs- Best Management Practices and Studies Descriptions	Start Time	End Time	Lead Agency	BMP Type
10	**Wastewater Management Program**	Wastewater Management Program (WMP) was implemented to comply with State and Federal regulations regarding onsite wastewater treatment systems (OWTS). A web-based data management tool was created to provide oversight of 6,000 OWTS. Inspection and maintenance practices were set-up to eliminate any failing systems. It includes ongoing public outreach and education campaigns.	October-01	Ongoing	City of Malibu	Non-Structural
11	**Industrial & Commercial Inspection Program**	Industrial & Commercial Inspection Program. While this is a requirement of the NPDES permit, the City has taken a proactive approach and conducts inspections annually rather than the required two inspections per five year permit cycle. Goals of inspections include compliance verification, enforcement as needed, and public education regarding storm water and urban runoff issues, recycling, and various City environmental quality efforts (such as the ban of expanded polystyrene packaging).	December-01	Ongoing	City of Malibu	Non-Structural
12	**Illicit Connection/Illicit Discharge Elimination Program**	Illicit Connection/Illicit Discharge Elimination Program. Various City departments coordinate efforts to cease and eliminate pollution by illicit connections and discharges to the storm water system. The City has an active education, response and enforcement program.	December-01	Ongoing	City of Malibu	Non-Structural
13	**City Ordinance and Municipal Code- Storm Water and Urban Runoff Amendment**	City Ordinance and Municipal Code- Amending the Storm Water and Urban Runoff Pollution Control Ordinance to Provide Storm Water Pollution Control for Planning and Construction of New Development and Redevelopment Projects Ordinance No. 219, M.M.C. Chapter 13.04.050. This ordinance sets forth requirements which were intended to ensure compliance with the storm water mitigation methods prescribed in the Standard Urban Storm Water Mitigation Plan (SUSMP) approved by the Los Angeles Regional Water Quality Control Board. See appendix.	December-01	Ongoing	City of Malibu	Non-Structural
14	**Public Agency Activities- Street Maintenance: City Street Sweeping Contract**	Public Agency Activities- Street Maintenance: contract for sweeping for public streets in City. Street sweeping is a requirement of the NPDES permit and is intended to remove litter, debris, and pollutants from the roadways thus preventing them from getting into local waterways. It occurs 2-3 times a month depending on the area of the City.	June-02	Ongoing	City of Malibu	Non-Structural
15	**City Ordinance and Municipal Code- Prohibiting Discharges**	City Ordinance and Municipal Code- Public Peace and Welfare, Offenses Against Property: Causing or permitting certain substances to flow onto highways or into drainage channels prohibited, M.M.C. Chapter 9.08.060. See appendix.	July-91	Ongoing	City of Malibu	Non-Structural
16	**City of Malibu Local Coastal Program**	City of Malibu Local Coastal Program, as certified by the California Coastal Commission, includes the Land Use Plan (LUP) and Local Implementation Plan (LIP) that details many environmental quality and protection standards, objectives, and implementation measures for new development and redevelopment projects. See appendix for information on how to view this document.	September-02	Ongoing	City of Malibu	Non-Structural
17	**CA Plumbing Code Amended for Onsite Wastewater Treatment Systems (OWTS)**	City Ordinance and Municipal Code- Adoption by Reference LA County Code 28 Incorporating the CA Plumbing Code to Require Operating Permits for Residential and Commercial Facilities to use OWTS Ordinance No. 242, M.M.C. Chapter 15.12. See appendix.	October-02	Ongoing	City of Malibu	Non-Structural
18	**Santa Monica Bay Restoration Commission Septic System Management Plan**	Implementation of the Santa Monica Bay Restoration Project (now Commission) Septic System Management Plan. Clean Beaches Initiative (CBI) grant was awarded to the City for the WMP to collect all relevant data for all OWTS in the City of Malibu to be shared with the RWQCB: Integrated Wastewater Management Information System (IWIMS).	December-02	Ongoing	City of Malibu	Non-Structural
19	**City Ordinance and Municipal Code- Smoking at Beaches Ban**	City Ordinance and Municipal Code- Prohibiting Smoking on City Beaches Ordinance No. 265, M.M.C. Chapter 12.05.035. See appendix.	May-04	Ongoing	City of Malibu	Non-Structural
20	**City Ordinance and Municipal Code- Storm Water and Discharge Control**	City Ordinance and Municipal Code- Storm Water and Discharge Control Ordinance No. 264, M.M.C. Chapter 13.04. See appendix.	May-04	Ongoing	City of Malibu	Non-Structural

	Title	Malibu Environmental Programs- Best Management Practices and Studies Descriptions	Start Time	End Time	Lead Agency	BMP Type
21	**RWQCB Onsite Wastewater Treatment System MOU**	Regional Water Quality Control Board MOU to implement programs to assure protection of water of the State of California, specifically related to the permitting of OWTS. See appendix.	August-04	Ongoing	City of Malibu	Non-Structural
22	**City Ordinance and Municipal Code- Expanded Polystyrene Packaging Ban**	City Ordinance and Municipal Code- Public Peace and Welfare Ordinance No. 286, M.M.C. Chapter 9.24 Ban on Expanded Polystyrene Food Packaging. This ordinance was passed to reduce sources of marine debris polluting local waters. See appendix.	September-05	Ongoing	City of Malibu	Non-Structural
23	**Public Agency Activities- Street Maintenance: City Street and Pacific Coast Highway (PCH) Sweeping Contract**	Public Agency Activities- Street Maintenance: Contract for sweeping public streets in City amended to include sweeping PCH and public streets in the City. Street sweeping is a requirement of the NPDES permit and is intended to remove litter, debris, and pollutants from the roadways thus preventing them from getting into local waterways. It occurs 2-3 times a month depending on the area of the City.	March-06	Ongoing	City of Malibu	Non-Structural
24	**City of Malibu Clean Water Program and Clean Water Team**	Public Information & Participation Programs- The City's Clean Water Program and Team were formed with the ultimate goal of reducing or eliminating dry weather flow to the City's storm drains. It includes education of the businesses, residents and visitors of water quality issues and BMPs and encourages participating in the team. It is the overlying program that manages regulatory compliance (ex. NPDES, TMDLs, etc.), education, training, inspections and incidents response, and public agency activities. Outreach is provided on the City's website, at public speaking events, on local cable station, community events, and distributed materials.	January-07	Ongoing	City of Malibu	Non-Structural
25	**Malibu Current Quarterly Environmental News**	Public Information & Participation Programs -*Malibu Current* Environmental Quarterly Newsletter to all Malibu residences and businesses. See appendix.	April-07	Ongoing	City of Malibu	Non-Structural
26	**Public Agency Activities- Street Maintenance: Trash Collection**	Public Agency Activities- Street Maintenance: The City performed a needs study and subsequent implementation of placing trash receptacles at bus stops and high use areas along the Pacific Coast Highway and City streets. The refuse is collected regularly to prevent littering and any additional debris from getting into local water ways and drains.	August-07	Ongoing	City of Malibu	Non-Structural
27	**Paradise Cove Storm water Treatment Facility**	Paradise Cove Stormwater Treatment Facility Project - The City was awarded a CBI grant to redesign and construct an upgraded treatment system for Ramirez Canyon Creek to eliminate bacteria from the discharge to ocean at Paradise Cove during dry weather and potentially some wet weather.	June-07	September-09	City of Malibu	Structural
28	**Storm samples during the 2007/2008**	Measurement of representative storm sample during the 2007/2008 season of adjacent marine receiving waters at 2 drain facilities in the City and 1 reference site at Paradise Cove. For more information, see "Beneficial Uses and Marine Life" Section of this package.	December-07	April-08	City of Malibu	Study
29	**Wildlife and Marine Rescue Services**	The City has had a contract with the California Wildlife Center (CWC) since April 1996 to provide wildlife rescue services and was later amended to include marine mammal rescue services. In 2003 the City, in partnership with the CWC, applied for and received a John H. Prescott Marine Mammal Rescue Assistance Grant (Prescott Grant), administered by the National Oceanic and Atmospheric Administration (NOAA). Wild Rescue is a secondary responder. Public outreach and education are also a part of the grant. For more information in the most recent grant progress report, see "Beneficial Uses and Marine Life" Section of this package.	April-96	Ongoing	City of Malibu and California Wildlife Center	Non-Structural
30	**Malibu Chamber of Commerce Wallflower EcoFest**	Public Information & Participation Programs- Malibu Chamber of Commerce Environmental Committee in coordination with the City will hold the *WallFlower EcoFest* with displays, speakers, and vendors promoting sustainability including water conservation, recycling, organic food and products, low impact development and green building messages.	October-07	October-07	Chamber of Commerce and City of Malibu	Non-Structural

	Title	Malibu Environmental Programs- Best Management Practices and Studies Descriptions	Start Time	End Time	Lead Agency	BMP Type
31	**Malibu Chamber of Commerce Environmental Committee and Zero Impact Malibu group (ZIM)**	Public Information & Participation Programs- the City is an active participant in the Malibu Chamber of Commerce Environmental Committee and Zero Impact Malibu group (ZIM) which aims to provide education and learning opportunities and recognition to local businesses and community through events, awards, workshops, and outreach campaigns.	September-03	Ongoing	Chamber of Commerce and City of Malibu	Non-Structural
32	**Greater Los Angeles County Integrated Regional Water Management Group**	Greater Los Angeles County Integrated Regional Water Management Plan (IRWMP) Group formed to apply for implementation grants from Proposition 50, Chapter 8 program. The North Santa Monica Bay Watersheds Group formed for the planning grant and later merged with 4 other sub-regions into one IRWMP Group. The plan was adopted December 2006.	November-05	Ongoing	City of Malibu and Greater Los County Stakeholders	Non-Structural
33	**Living Lightly in Our Watersheds**	Public Information & Participation Programs - The City participated with the Resource Conservation District of the Santa Monica Mountains in the development and distribution of the*Living Lightly in Our Watersheds: A Guide for Residents of the Santa Monica Bay Watersheds. This guide* distributed to all Malibu residences and businesses.	July-03	June-05	City of Malibu and Malibu Creek Watershed Council	Non-Structural
34	**Living Lightly in Our Watersheds - revised**	Public Information & Participation Programs - The City participated with the Resource Conservation District of the Santa Monica Mountains in the revision and distribution of the*Living Lightly in Our Watersheds: A Guide for Residents of the Santa Monica Bay Watersheds. Guide* distributed to all Malibu residences and businesses - Revised. It can be viewed or downloaded at www.malibuwatershed.org.	July-05	Ongoing	City of Malibu and Malibu Creek Watershed Council	Non-Structural
35	**North Santa Monica Bay Watersheds Integrated Regional Water Management Group**	North Santa Monica Bay Watersheds (NSMBW) Integrated Regional Water Management Group formed to apply for planning and implementation grants in the Proposition 50, Chapter 8 grant program. City of Malibu was the lead but the SMBRC was the applicant for Planning grant for fiscal reasons.	September-03	October-05	City of Malibu, Other NSMBW Agencies, and Nonprofits	Non-Structural
36	**Regional Watershed Implementation Plan**	Regional Watershed Implementation Plan (RWIP) - Collaboration of stakeholders to address water quality regulations in North Santa Monica Bay Watersheds.	November-05	Ongoing	Los Angeles County	Non-Structural
37	**Source ID Study of Ramirez and Escondido Creek**	North Santa Monica Bay Bacteria Source Identification Study of Ramirez and Escondido Creeks. The City is a participant and serves on the Technical Advisory Committee to develop a methodology to track sources of bacteria indicators.	March-07	April-08	Los Angeles County - SCCWRP	Study
38	**Municipal Storm Water National Pollutant Discharge Elimination System (NPDES) Permit**	Municipal Storm Water National Pollutant Discharge Elimination System (NPDES) Permit. Los Angeles County is the Principal Permittee and the City is 1 of 84 additional Permittees. Includes various programs to eliminate sources of pollution to local waters to the best extent practicable by implementing a suite of programs and BMPs including development planning and construction standards and inspections, training, monitoring, public agency activities, industrial/commercial inspections, and public education. Some of these programs and BMPs are detailed further in this spreadsheet.	December-01	Ongoing (due for renewal)	Los Angeles County and permittees	Non-Structural
39	**NPDES Permit Report of Waste Discharge**	NPDES Permit Report of Waste Discharge (ROWD)- The renewal application for the Municipal Storm Water NPDES permit was submitted June 2006. It proposes improvements to the permit that include changes to monitoring, reporting and outreach activities. The County has led as principal permittee with representation from the 84 additional permittees.	June-06	Upon issuance of new permit	Los Angeles County and permittees	Non-Structural
40	**Santa Monica Bay Beaches Bacteria TMDL**	Santa Monica Bay Beaches Bacteria TMDL - Implementation includes an early monitoring program, a Coordinated Shoreline Monitoring Plan with regular monitoring of 9 sites within the City boundaries of the ASBS and 1 in the Unincorporated County (23 sample sites in the City total), and adoption of a Wet Weather Implementation Plan to eliminate exceedances of bacteria above contact recreation standards in local waters, but specifically Santa Monica Bay Beaches.	April-04	Ongoing	Los Angeles County, City of Malibu & Caltrans	Study

	Title	Malibu Environmental Programs- Best Management Practices and Studies Descriptions	Start Time	End Time	Lead Agency	BMP Type
41	**Water District #29 Tiered Water Rates based on Increased Usage**	Los Angeles County Water District 29 has implemented tiered water rates based on increased usage to encourage water conservation and reduce water waste to provide economic incentive to reduce landscape irrigation runoff.	March-07	Ongoing	Los Angeles County Water District #29	Non-Structural
42	**Clean Water Act and Our Backyards Video**	Public Information & Participation Programs- The Clean Water Act and Our Backyards Video produced locally and playing on cable, and at local events and trainings. Gives an overview of how routine activities can affect water quality, BMPs to prevent pollution, and an explanation of TMDLs.	February-06	Ongoing	Malibu Creek Watershed Council	Non-Structural
43	**Marine Habitat Study of Santa Monica Bay**	Collaborate with southern California bight partners to identify key types of marine habitats and develop a master list of species of concern for Santa Monica Bay & the southern California bight that will be revised as needed based on new information.	January-07	July-08	SMBRC	Study
44	**Marine Habitat Gaps in Santa Monica Bay**	Compare existing data with the lists of key habitats and species of concern and identify information gaps and study needs.	January-07	July-08	SMBRC	Study
45	**Santa Monica Bay Comprehensive Monitoring Program**	Santa Monica Bay Comprehensive Monitoring Program. Expansion of existing monitoring programs to include five major habitats: pelagic ecosystem, soft bottom ecosystem, hard bottom ecosystem, rocky and sandy intertidal and wetlands. This program is seeking funding.	June-07	June-11	SMBRC	Study
46	**Santa Monica Bay Marine Habitats and Living Resources Inventory**	The Santa Monica Bay Marine Habitats and Living Resources Inventory (Inventory) will undergo a literature review to identify gaps in existing studies of habitats and species in the region, and the subsequent update. Upon update of the Inventory, data summary reports from the Inventory by site location, habitat type, and taxa will be compiled and generated.	July-07	February-08	SMBRC	Study
47	**Santa Monica Bay Spatial Database**	A spatial database will be developed compatible with existing Department of Fish and Game (DFG) databases (namely the geographic information system (GIS) for the central coast MPAs), and it will be populated with existing information by locating and acquiring data in Santa Monica Bay.	July-07	July-08	SMBRC	Study
48	**Evaluate Data Collected in Santa Monica Bay**	There will be an evaluation of data collected under existing monitoring protocols used throughout Santa Monica Bay to determine their applicability in the Marine Life Protection Act (MLPA) process.	July-07	February-08	SMBRC	Study
49	**Santa Monica Bay Regulations Review**	Review available gap analyses of federal and state resource protection regulations affecting Santa Monica Bay and conduct an analysis of local resource protection regulations to identify gaps (e.g. spatial extent, species, type of limits, etc.)	July-07	December-08	SMBRC	Study
50	**Assessment of Subtidal Rocky-Reef Resources in Santa Monica Bay**	Assessment of Subtidal Rocky-Reef Resources in Santa Monica Bay including Malibu ASBS to Ventura County line: determine current status of algal, invertebrate, and fish communities; provide baseline info on condition of subtidal rocky reef habitat, establish monitoring program to track changes over time the condition of subtidal rocky reef habitat in accordance with the SM Bay Comprehensive Monitoring Program.	September-07	March-09	SMBRC	Study
51	**Oceanographic Information for Trend Analysis in Santa Monica Bay.**	In collaboration with the Southern California Coastal Ocean Observing System (SCCOOS), collect and compile historical physical and biological oceanographic information for trend analysis in Santa Monica Bay.	October-07	July-08	SMBRC	Study
52	**Ocean Friendly Garden Program**	Ocean Friendly Garden Program targeted to residences and businesses in the ASBS to promote water conservation and eliminate non-point source pollution from landscaping: weather-based irrigation controller rebates, workshops and training, and demonstration gardens. See "Alternatives Analysis" section for more infomation regarding this program.	September-07	September-10	West Basin Municipal Water District	Non-Structural

Alternatives Analysis

Alternatives to an Exception: Stormwater Diversion and Infiltration

The complete diversion of stormwater is an alternative that could alleviate discharge into the ASBS. However, this alternative is likely to prove impractical to implement. Furthermore, this is an area of geologic instability and the option of infiltration will have to be analyzed in light of the area's geology. In addition, storms greater than the design storm could still potentially result in a discharge to ASBS. Similarly, increasing infiltration rates may reduce discharge of stormwater into the ASBS; however, the infiltration areas would also have limitations for many of the larger storm events. Therefore, if any stormwater discharge is regarded as waste, the City of Malibu would need an exception to the storm water ban regardless because all flows cannot be contained during high-intensity storm events.

The impacts of the diversion and infiltration alternatives would have to be analyzed. Because no feasible alternative to discharging is available at this time, the City has identified the following actions that will reduce the impact of such discharge.

Actions that Reduce Impact of an Exception

The City of Malibu has taken an aggressive and comprehensive approach to improving water quality. (See "Treatment Processes and Best Management Practices," *supra*). These activities include many public information and participation programs, construction of three stormwater treatment facilities (one presently in operating in the Civic Center, and two scheduled to be built in Marie Canyon and Paradise Cove respectively), scheduled implementation of water monitoring programs and adoption and enforcement of development standards, land use regulations, construction regulations and other Best Management Practices aimed at reducing discharges and eliminating erosion.

In addition to the City's proactive methods of improving the water quality, the following alternatives to discharge into the ASBS may be evaluated for feasibility and determination of the impacts of such alternatives if implemented:

- construction of additional stormwater detention basins;
- alteration of municipal facilities;
- public information and participation;
- partnerships

Construction of Additional Stormwater Detention Basins

The second phase of the Legacy Park project is construction of stormwater detention basins to trap stormwater on site, which will in turn be used for irrigation in the park and surrounding areas. A possible way to mitigate the alleged discharge into the ASBS is construction of additional stormwater detention basins in other areas where stormwater

may drain into the ASBS. This alternative would first require a feasibility study to determine if any other parcels exist in the City where stormwater could be trapped effectively in detention basins to prevent wet weather discharges into the ASBS.

The high property values in Malibu hinder the possibility of property acquisition for these purposes, however, the City continues to explore opportunities for property acquisition through development agreements and other voluntary mechanisms.

Alteration of Municipal Facilities

The City can conduct site surveys to evaluate whether any municipal facilities could be altered to reduce or eliminate dry weather and low-flow wet weather discharges into the Malibu ASBS. Malibu is interested in competing for Proposition 84 ASBS funding if there are locations where modifications, diversions or infiltration opportunities can be designed and implemented.

The greater Los Angeles County regions are collaborating to develop an Integrated Regional Water Management Plan that focuses on water resources management and establishes regional priorities. The City has included some conceptual proposals for modifications to some ASBS storm drains in the Greater Los Angeles Integrated Regional Water Management Plan. The City is active in the IRWMP efforts and is eager to see these conceptual proposals come to fruition.

Public Information and Participation

Small drains from private residences and businesses may discharge dry weather non-stormwater discharges into the ASBS. The Malibu Local Coastal Program Land Use Plan has a specific action plan for residential, commercial and construction sites aimed at protecting water quality. (See Malibu LCP Land Use Plan Section 3.94 *et seq*) For example, all new development is sited and designed to protect water quality and minimize impacts to coastal waters. New development must not result in the degradation of the water quality of groundwater basins or coastal surface waters including the ocean. Urban runoffs and pollutants must not be discharged or deposited such that they adversely impact groundwater, the ocean coastal streams or wetlands, consistent with the requirements of the Los Angeles Regional NPDES Permit and the Ocean Plan. Malibu's Plumbing Code and Zoning Code also apply and implement specific water quality protection measures to new construction.

The City has undertaken a code enforcement effort to prevent illegal draining of pools, carwashing and other water activities can also result in runoff discharge into the ASBS. The first alternative is to implement a periodic and extensive public education campaign to educate residences about drainage and the effect private drains have on the ASBS and throughout the Santa Monica Bay. This type of educational program has been successful with the City's brush clearance program. The City can offer information on voluntary

retrofitting for the private drains and information on permeable surface options for retrofitting hardscape to reduce runoff where practical. The City's efforts to enforce specific activities prohibited in the City, such as smoking on the beaches and pool draining, will follow public evaluation.

The public information can be provided in the City's quarterly water quality newsletter, *The Malibu Current.* (see examples of the *Current* immediately following this analysis). The citywide mailing of the *Current* and the Malibu Parks and Recreation Guide are power public information tools, targeting more than 9000 households and businesses in Malibu. The City can also send out letters to residents specifically addressing these issues and post this information on the City's website and at all public facilities. Public awareness is the first step in addressing private drainage concerns.

To aid enforcement, the City could implement a program to allow for reporting of illicit discharges from private drains.

Partnerships

The City is working with Water District No. 29, the City's potable water retail provider, to identify sites that are potentially causing runoff from wasteful landscaping practices. Once a potential runoff site is identified, the City and the Water District can notify the property owner and work with the owner to eliminate such hazardous practices.

The City is also working with West Basin Municipal Water District, the City's water retail wholesaler, to implement its Ocean Friendly Garden Program in cooperation with the Surfrider Foundation. West Basin MWD has been awarded more than $500,000 for the Garden Program, which includes a rebate incentive for replacing wasteful irrigation controllers with weather based controllers that significantly save water and reduce run-off. The Garden Program also supports classes and demonstrations for residents and business owners to learn how to create "ocean friendly" gardens.

The City is researching available grant money that can be used towards implementing water quality programs and policies that will create identifiable improvements in water quality. We are open to partnering with governmental, environmental, and private agencies in order to promote and implement clean water practices.

Malibu Current

Quarterly Newsletters with
Clean Water Program reminders

Malibu Current
Fulfilling Dreams—Leaving Legacies
Issue 2 • Volume 1 • April 2007

Saving Without Sacrifice

Ever heard the story about the butterfly that flicked its wings in the Amazon and caused a thunderstorm on the other side of the world? That's what saving water can mean – a small act that leads to tremendous results.

The California Friendly campaign, begun by Metropolitan Water District and the Family of Southern California Water Agencies in 2003, was designed to show that saving water is easy and can be done without sacrifice.

Most of us are as blissfully unaware as that butterfly about the bigger picture when we adjust our sprinklers to the changing weather, use native plants, or buy a high-efficiency clothes washer. But the benefits extend well beyond our water bill. Saving water reduces run-off and pollution into the ocean. It saves energy. It cuts back on green waste. It ensures a water supply for the next generation.

Log on to **bewaterwise.com** to learn about water-saving tips and money-saving rebates available to you. And this spring, look for the California Friendly label on plants and products at stores near you.

What's In Your Backyard?

As a Malibu resident, you know you live in one of the world's most beautiful coastal areas. You have walked Malibu's sandy beaches, fished off of the pier, sailed up the coast or watched a brilliant sunset over the ocean. You have seen a fantastic array of marine creatures and aquatic plants up close while in the water or maybe you enjoyed these treasures from the shore. You are aware that this area is special. But did you know this area is also ecologically significant – and so vulnerable to damage – that the State has designated some of it as an Area of Special Biological Significance (ASBS)? The State Water Resources Control Board created ASBSs where discharge of pollutants is not allowed in order to help maintain high water quality within some of the most diverse sections of California's coast. Malibu's ASBS, one of 34 in the state, stretches from Latigo Point westward to Point Mugu. While our entire coast is precious and to be preserved, it is especially important to ensure that your activities do not impact this protected area. The City asks your help in stopping incidental urban runoff from your property that may carry pollutants to creeks or the ocean. For more information about clean water, visit the Environmental Programs section of the Public Works Department page on the City's website at www.ci.malibu.ca.us.

SENATOR SHEILA KUEHL flips the switch on the City's new Stormwater Treatment Facility at a ribbon cutting ceremony February 2, 2007. The $5.8 million facility will process up to 1400 gallons per minute of stormwater runoff in the Civic Center area, greatly improving water quality in Malibu Creek, Malibu Lagoon and Surfrider Beach.

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West Basin Offers Rewards
Celebrate Earth Day

3 Edison Does Its Part
Blessing of Legacy Park

4 Important Numbers
Environmental Tip

What's Polluting the North Santa Monica Bay?

On March 28, the County of Los Angeles, with the support of the City of Malibu, began sampling water from beach, creek and storm drains in the North Santa Monica Bay in a study known as the North Santa Monica Bay Bacteria Source Investigation.

The study will look into sources and potential health risks associated with elevated bacteria levels at Escondido Beach and Paradise Cove. It is not a study of the City's tap water supply.

Where does the bacteria come from?
High bacteria levels can stem from any combination of sources, including household pets, horses, septic systems, wildlife and shorebirds. The study is being conducted to determine the bacteria source(s) and develop ways to prevent bacteria from reaching our local beaches.

What will happen during the study?
The study will be conducted in several phases and is expected to be completed by Fall 2008. During the first 10-week period, researchers will collect water samples from 27 beach, creek and storm drain locations. The samples will be sent to an independent laboratory for testing. In later phases, researchers will determine whether bacteria found are from anthropogenic (human-related) sources or from native wildlife.

Questions regarding the North Santa Monica Bay Bacteria Source Investigation can be directed to Nathan Stevenson at (626) 458-4368 or by e-mail to nstevenson@dpw.lacounty.gov. Additional information is available on the study website at www.NSMBwaterquality.org.

Celebrate Earth Day… Every Day!

On April 22, 1970, 20 million people across America celebrated the first Earth Day as a time of realization that the activities of humans were affecting the planet in some shocking ways. This led to the enactment of some of our country's most important environmental laws, including the creation of the Environmental Protection Agency (EPA) and an amended Clean Air Act, which set national air quality, auto emission and anti-pollution standards. The Clean Water Act, passed by Congress in 1972, limited raw sewage and other pollutants from flowing into rivers, lakes and streams, resulting in an increase from only 36% of U.S. stream miles being deemed safe for such uses as fishing and swimming to the 60% level we enjoy today.

This year, Malibu is a co-sponsor with the Mountains Restoration Trust, the City of Calabasas and the Las Virgenes MWD of the *Streams to Seas Family Fun Day* on Saturday, April 28. This Earth Day celebration will feature environmental and wildlife education and activities for all ages. For more information, visit www.mountainstrust.org or call (818) 591-1701 ext. 186.

Earth Day is a time to celebrate gains and create new visions for environmental progress. Earth Day – and every day – is a time to act to protect our planet.

West Basin MWD Rewards Residents and Businesses for Conserving Water

West Basin Municipal Water District provides many opportunities for residents and businesses in Southern California to save water, protect the local environment… and save money!

Did you know that water use in restrooms accounts for more than 40% of total water consumption in most non-residential facilities? West Basin's Complete Restroom Retrofit Program aims to reduce indoor water use in small businesses and public facilities. The program provides free devices and installation of waterfree urinals, high-efficiency toilets and automatic faucets that help conserve water, save money and lessen the load to the septic system. This is a first-come, first-served program and funding is limited. Call (310) 540-3002 or visit www.westbasin.org/commercial for more information on this program and other commercial rates.

West Basin also offers three water conservation rebate programs for residents: you can receive a $100 rebate for the purchase of an approved residential high-efficiency clothes washer that can save you money on water, electricity and detergent. Residents can also receive a $50 rebate for the purchase of an ultra-low flush toilet or $150 for a high-efficiency toilet. These toilets use 1.2-1.6 gallons per flush, as compared to older models that can use up to 7 gallons per flush. For information on qualifying products, visit www.westbasin.org/residential.

Want to extend your water conservation to include the outdoors? West Basin will launch its Large Landscape Water Conservation/Runoff Reduction Program this summer. Visit **www.bewaterwise.com** for program information, water-saving tips and residential rebates for outdoor water use.

Edison Does Its Part to Help Customers Conserve

Since 1911, Southern California Edison has been performing efficiency tests of customers' water pumping systems - free of charge. The program has evolved to incorporate the latest in fluid flow and electronics measurement instrumentation to test thousands of pumps annually. SCE's free pump test offers these valuable advantages:

- Increased energy efficiency
- Reduced costs
- Improved system reliability

EDISON INTERNATIONAL®

Residential and business customers can take other steps to conserve electricity as temperatures soar. Start with these easy steps to reduce energy costs, improve comfort and allow you to do your part to conserve valuable resources:

- Set air conditioning thermostats at the highest comfortable setting. A setting of 78°F, rather than 70°F, could cut your energy costs by as much as 30% in addition to conserving electricity supplies.
- Clean or replace your air conditioner filter regularly to help it run more effectively.
- Use a portable or ceiling fan to circulate air and make a breeze. Fans cost less to run and use less energy than air conditioners.
- Close drapes and shades to keep direct sunlight out and lower your cooling costs.
- Replace incandescent bulbs with compact fluorescents. These come in various shapes and sizes that fit regular, screw-in lamps and light fixtures, can last up to 10x as long as old-fashioned bulbs and produce less heat while using only a quarter of the electricity.
- Consider unplugging consumer electronics when not in use. (Even when turned off, CD players in the U.S. consume enough energy in one year to power the Las Vegas Strip for six months.)
- Use nonessential appliances, such as clothes washers and dryers, during off-peak hours (before noon or after 6:00 pm).
- Run swimming pool equipment for the minimum amount of time and during off-peak hours (before noon or after 6:00 pm).
- Insulate hot water piping from the water heater to the wall or ceiling pipe penetration. Wrap the tank in an insulating blanket if the water heater's energy factor is less than 0.59. Remember to follow the installation instructions.

City Commemorates Community Generosity at Blessing of Legacy Park Site

On February 25, the City Council hosted a celebration at the Legacy Park site to express its gratitude for the community's generosity. Highlighted by a Land Blessing and Appreciation Ceremony led by Chumash Spiritual Advisor Alan Salazar and Chumash dancers, the event also featured messages of gratitude and inspiration from Rabbi Levi Kunin of Chabad of Malibu, Father Bill Kerze of Our Lady of Malibu Catholic Church, and Reader Masami Hansen of First Church of Christ Scientist.

In 2005, nearly 1000 private donors contributed $2.5 million in only four months to help acquire the land. The first private donor, Malibu environmentalist Mary Frampton, was honored in a posthumous tribute as exemplifying the generosity and commitment of Malibu residents, civic and business organizations, environmental groups, friends, and government who banded together and raised $25 million for the purchase of the Legacy Park site.

Join the City of Malibu in building a legacy in the heart of Malibu. Help the City's cutting-edge concept transform into a central park that produces far-reaching environmental rewards.

www.malibulegacy.org

The City of Malibu's commitment to protect water quality and restore and preserve natural habitats is reflected in its environmental projects and programs. This edition of *Malibu Current* features vital information on how we all can protect and improve our natural resources and the world around us. The City thanks its partners in environmental awareness for providing articles for this issue: West Basin Municipal Water District, Southern California Edison and the County of Los Angeles Department of Public Works. Special recognition goes to the Metropolitan Water District of Southern California for sponsoring this publication with a grant award from its Community Partnering Program.

visit
www.ci.malibu.ca.us

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Jim Thorsen, City Manager	x226
Lisa Pope, City Clerk	x228
Robert Brager, Public Works Director/ City Engineer	x247
Vic Peterson, Community Development Director	x251
Bob Stallings, Parks & Recreation Director	x225
Reva Feldman, Administrative Services Director	x224

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Sharon Barovsky sbarovsky@ci.malibu.ca.us	310.456.6077
Ken Kearsley kkearsley@ci.malibu.ca.us	310.457.7101
Andy Stern astern@ci.malibu.ca.us	310.457.1723

Other Useful Numbers

Malibu-Lost Hills Sheriff's Station	310.456.6652
Fire Department Division Headquarters	310.317.1802
Road Conditions Hotline	310.456.9982
Weather and Surf Conditions	310.457.9701

Bu's Tip: Be Water Wise – It Saves You Money While You Save the Earth!

Look around your house and see where you can reduce your family's water usage.

- **Shorten showers** – one or two minutes less could save up to 700 gallons per month.
- **Fix leaks** in your faucets, pipes and sprinkler system – save 20 gallons a day for every leak you stop.
- **Run only full loads** in your dishwasher and washing machine and save 300-800 gallons a month.

For more helpful tips, visit **www.bewaterwise.com.**

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Malibu Current

Fulfilling Dreams—Leaving Legacies

Issue 1 • Volume 1 • January 2007

Malibu Legacy Park Project Reaches Next Milestone

The "Future home of Malibu Legacy Park" sign on Pacific Coast Highway celebrates the culmination of a long-held dream and the successful citywide effort to raise $25-million to purchase 20 acres at Webb Way in central Malibu. Now the Malibu Legacy Park Project has reached a new milestone as the planning and design phase for an environmental oasis in the heart of the City shifts into high gear.

Artist's concept of Malibu Legacy Park looking south along Pacific Coast Highway.

One year ago, Malibu residents, civic and business organizations, environmental groups, visitors, government agencies, and the City banded together and raised millions of dollars to acquire one of Malibu's most talked-about and sought-after parcels. The City's purchase also preserved 15 acres of coveted vacant land to realize a once-in-a-lifetime environmental protection and quality-of-life opportunity.

In October, City staff and the recently-hired consulting team entered the next phase of the multi-year Legacy Park project and set planning, pre-design, permitting, and Environmental Impact Report preparations into motion. Outreach for community input will begin by April.

Park improvements are expected to cost at least $10-$12 million. Public agency fundraising efforts are underway to help underwrite the improvements. When the private donor campaign resumes in early 2007, residents, businesses, and friends of Malibu will have another opportunity to "fulfill a dream and leave a legacy."

Malibu Legacy Park is more than a park: It's a major component of a complex environmental cleaning machine, which will reduce pollution in Malibu Creek, Malibu Lagoon, and the world-famous Surfrider Beach.

The environmental cleaning machine's "engine" is the newly-constructed Malibu Stormwater Treatment Facility on Civic Center Way, set to open in February 2007 (see page 2). The facility's by-product, highly-treated stormwater that meets stringent clean water standards, will irrigate the park when landscaping is completed.

Join the City of Malibu in building a legacy in the heart of Malibu. Help the City's cutting-edge concept transform into a central park that produces far-reaching environmental rewards.
www.malibulegacy.org

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Paradise Cove

3 LNG
Las Flores
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Bluffs Park

4 Important Numbers
Environmental Tip

New Stormwater Treatment Facility Powers Clean Water Efforts

The City's new Civic Center Stormwater Treatment Facility promises to help fulfill its commitment to reducing both the amount of bacteriological contamination entering Malibu Lagoon and Surfrider Beach, and the number of beach postings and closures. The City will host a ribbon cutting ceremony on Friday, February 2.

The stormwater filtration and disinfection facility, located on the north side of Civic Center Way, west of Cross Creek Road, will provide filtration and disinfection of dry-weather flows and first-flush runoff. The $5.8 million facility is the "engine" in the City's ambitious, environmentally-driven Malibu Legacy Park Project (see front page article).

It took seven months to construct the pump stations and all related piping at the Cross Creek drain, Malibu Road drain, and the central treatment facility site. The Stormwater Treatment Facility will process up to 1,400 gallons per minute of stormwater runoff from the Civic Center Way/Cross Creek area. The runoff will be pumped from Civic Center Way, Cross Creek Road, and the Malibu Road storm drains to the treatment facility where it will be disinfected through ozone treatment to meet U.S. Environmental Protection Agency water quality requirements for recreational contact.

The City will re-use the treated stormwater for landscaping in the Civic Center area during low flow periods until the park site is developed. After Legacy Park is developed, the dry and wet weather treated stormwater will be used for park irrigation.

The State Water Resources Control Board awarded the City two, $2 million grants from its Clean Beaches Initiative grant program for the project. The City also received $1 million from the Santa Monica Bay Restoration Commission/State Coastal Conservancy and $500,000 from the California Integrated Waste Management Board. The City contributed $300,000 from its General Fund.

Returning Paradise to Paradise Cove

Beachgoers are one step closer to finding paradise in Paradise Cove again.

In cooperation with Santa Monica Baykeeper, the City of Malibu was awarded $920,000 from the State Water Resources Control Board's Clean Beaches Initiative grant program to design and construct a stormwater treatment and disinfection facility on Ramirez Creek at Paradise Cove. Construction is expected to begin this summer.

Two years ago, the City collaborated with the Los Angeles County Department of Public Works, which conducted an Early Monitoring Program along the North Santa Monica Bay shoreline. The goal was to evaluate water quality at locations where historical sampling data were lacking and to identify and prioritize locations with chronic bacteria problems so that targeted treatment strategies could be devised. Based on the findings, Paradise Cove, as part of the Ramirez Canyon watershed, was one of two Malibu areas determined to deserve immediate attention.

An experimental project, with temporary, rented equipment operated by the Kissel Co., and monitored by Santa Monica Baykeeper, proved successful and showed that improvements to the water quality at Paradise Cove were possible.

The newly-funded stormwater facility, designed to remove bacteria from dry and some wet-weather flows before reaching the ocean, is expected to protect and restore the coastal water quality at Paradise Cove, thus reducing and eliminating postings and closures, which have been caused by bacterial contamination.

Just Say "Stop"

The real threat the Liquefied Natural Gas (LNG) deepwater ports pose to the environment, public safety, tourism and property values in Malibu and neighboring areas has driven the City's nearly three-year effort against the projected 14-story-high, three football fields-long project. The City Council appropriated $50,000 to the legal fight against the proposed LNG project. The City is also an active member of the Statewide LNG Environmental Stakeholder Working Group. The battle hasn't been won yet. You can join the Virtual March Against the LNG Project on the City's website at www.ci.malibu.ca.us.

Clearing the Creek for Steelhead Trout

It's been half a century since steelhead trout were found in Solstice Creek in Corral Canyon. Man-made obstacles impeded the steelhead trout's natural migration from the ocean, and the fish disappeared. Now the City is participating in a multi-agency effort with the State Fish and Game Department, National Park Service, California Conservation Corps, and Heal the Bay aimed at opening the way for the steelheads' return.

The City, which is responsible for clearing the passage within its boundaries for the steelhead trout, will remove a concrete box structure that supports the Corral Canyon bridge at Solstice Creek.

The $1,020,000 project, partially funded through a $637,000 grant from the State Fish and Game Department, includes rebuilding the bridge with new structural supports and then restoring the creekbed to its natural state. The two-month project is slated to begin in late spring.

Home Run Scored for Malibu's Youth

Malibu youth celebrated the City's acquisition of the sports fields and Michael Landon Center at Bluffs Park in November. State Parks Director Ruth Coleman and State Assemblymember Fran Pavley, joined Mayor Ken Kearsley, Mayor Pro Tem Jeff Jennings, and Councilmembers Sharon Barovsky, Andy Stern, and Pamela Conley Ulich as members of Malibu's sports groups helped cut the ribbon at a special ceremony.

Mayor Kearsley called Bluffs Park, "the people's park." Councilmember Barovsky, who was mayor when the agreement was made, said the acquisition of the Bluffs ballfields "wiped away years of uncertainty and secured the park's future for generations to come."

Since 2001, the City of Malibu has committed more than $35 million from its General Fund, private donations and grant funds to implement clean water strategies along its 21–mile coastline.

Las Flores Creek Goes Back to Nature

The City has set an aggressive time schedule for the restoration of Las Flores Creek to a more natural riparian environment and the development of a creekside park. Construction of the project, which also will reduce slide and flood dangers, is expected to begin this summer.

The nearly $3.9 million Las Flores Creek Restoration and Park Development project is being funded through grants totaling about $2.4 million, with City matching funds covering the balance. Recently, the California State Resources Agency awarded the City $925,000 in Gateway Project funds for both restoration and park development.

Las Flores Creek Park will include children's play areas, viewing benches, and trails along the length of the park, as well as interpretive signage related to the creek and riparian environment.

The creek project will stabilize a linear half-mile of creek bank and re-contour the land to allow the creek bed to widen out to reduce scour of the stream bed and embankments. The design calls for protection of native vegetation and specimen sycamore trees and removal of non-native, invasive plant species to re-create a natural creek area and enhanced habitat for fish and wildlife.

The multi-million dollar City project was initially awarded $555,000 in 2001 from the State of California Department of Water Resources Urban Streams Restoration Program for design and construction, and in 2005, another $280,000 from the program for construction. Also in 2005, the Wildlife Conservation Board Riparian Habitat Conservation Program awarded the City $600,000 for creek and habitat restoration.

visit
www.ci.malibu.ca.us

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Environmental and Community Development Director, Victor Peterson	x251
Parks & Recreation Director, Bob Stallings	x225
Finance Director, Reva Feldman	x224

Comments/Suggestions

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Malibu-Lost Hills Sheriff's Station	310.456.6652
Fire Department: Battalion 5	310.456.2513
Road Conditions Hotline	310.456.9982
Weather and Surf Conditions	310.457.9701

Bu's Tip: Water only what your plants need

Poorly functioning sprinklers and over-watered landscapes waste water and increase the number of pollutants flowing into storm drains. Garden chemicals become part of the urban runoff mix that winds its way through streets, gutters and storm drains before polluting the ocean. Most water is wasted in your garden in months prior to or just after the rainy season when intermittent rains occur and you water plants that do not need the water or do not adjust or maintain the irrigation system. Be sure to contact your local water provider Los Angeles County Waterworks District Water Conservation Specialist at (626) 300-3364 or conservewater@ladpw.org for more information and potential incentives available to Malibu residents and businesses.

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Example of Inter-Agency Partnership

Ocean Friendly Gardening Tips

WATER WISELY: From 30 to 70 percent of your household's water is used outdoors. Water early in the morning to reduce evaporation. Use sprinklers less on overcast days and never when it rains.

GET SMART: Install a "smart timer" on your sprinkler system. These timers can dramatically reduce water use based on weather and soil moisture. Check with your water supplier for possible rebates.

GO NATIVE: Use native or climate-adapted plants and grasses - and adjust your watering to take advantage of the less-thirsty plants.

LITTLE AT A TIME: You don't have to replace your entire lawn, just areas not regularly used. Santa Barbara daisy and thyme are just a two of the substitutes for grass.

SWEEP IT: Instead of blowing or hosing leaves and clippings, sweeping is better for the ocean. Don't forget to get the gutters in front of your house.

ECO PEST CONTROL: Instead of pesticides and herbicides, ask your nursery about plants that attract beneficial insects and non-toxic home remedies to rid the garden of existing problems.

HEAP IT ON: Put a layer of mulch around trees and plants. Chunks of bark, peat moss or gravel slow evaporation.

FILL IT IN: Rills and gullies are signs of fast-moving water and erosion. Fill in these crevices with rock and then identify the sources of water to stop or slow the flow.

BE CREATIVE: A garden responds to energy and creativity - like surfing, the more fun you have, the better your time and results will be.

To learn more, visit: www.bewaterwise.com

It Takes All of Us

The largest source of water pollution cannot be traced to any one point – it's all of us. Pollutants "runoff" our streets, neighborhoods and landscapes. Fortunately, reducing our impact is easy to do.

Whenever water leaves a property it has the ability to take pollutants with it. Fertilizers, pesticides and oil are easily picked up by the power of water. While this runoff is greatest during rain storms, urban runoff occurs all year round as a result of improper irrigation, washing cars, and hosing down driveways.

Runoff from residential landscapes affects the quality of our oceans and the quality of our lives. The sediment in water reduces clarity; nutrients increase algae populations and red tides; bacteria close beaches; debris can choke and suffocate aquatic species; and pesticides picked up off a landscape can poison fish consumed by humans – all of which degrade the natural beauty, and our enjoyment, of the ocean.

The good news is that you can help bring back healthy coasts and oceans though CPR® – Conservation, Permeability and Retention. It is a way for all of us to design and maintain our gardens so that we can reduce urban runoff – and the pollutants that go with it.

CPR® breathes life into the coast.

Our Mission

The Surfrider Foundation is a non-profit environmental organization dedicated to the protection and enjoyment of the world's oceans, waves and beaches, for all people, through conservation, activism, research and education.

We are a grassroots organization with local chapters nationwide. These community-based chapters, with their ability to act locally, are our greatest strength. Our success depends on active volunteers, members and donors.

There are a variety of ways to become involved with the Surfrider Foundation and its efforts:

- ***Visit our website at www.surfrider.org;***
- ***Attend a local chapter meeting and get involved;***
- ***Become a member, receive our nationally recognized newsletter Making Waves, and keep abreast of all chapter activities.***

Surfrider Foundation

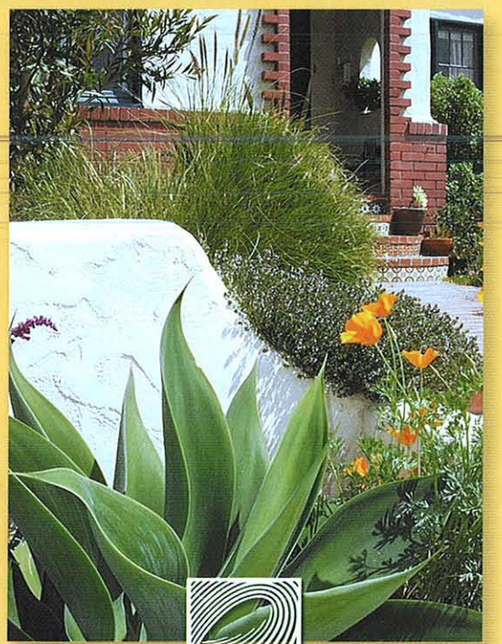
P.O. Box 6010, San Clemente, CA 92674-6010

www.surfrider.org

Surfrider Foundation's

Ocean Friendly Gardens

A Guide to Gardening for Cleaner Waves and Coasts



Surfrider Foundation

Apply CPR© To Your Landscape

CPR© is a method of gardening that protects coastal waters. It is a technique that not only reduces residential runoff, but also helps purify the water that does leave. CPR© revolves around Conservation, Permeability and Retention.

Conservation

Conserving the use of water, fertilizers and pesticides can reduce and improve runoff. Using less water creates a drier landscape, allowing it to hold more rainwater. Applying fewer fertilizers and pesticides, and/or using non-toxic alternatives, improves the condition of the water that does run off a landscape. Restricting grass to the living areas, planting with a diverse range of plants, and selecting plants adapted to the climate are all conservation-orientated design strategies.

Permeability

A landscape's ability to slow and hold water is related to the amount of permeability. Any increase in the amount of permeable surfaces, however small it may seem, will reduce the amount of runoff. Permeability is increased by changing surface materials, such as substituting concrete areas with brick, stone, or decomposed granite. Creating an irregular ground surface will also improve permeability by putting obstacles in water's path.

Retention

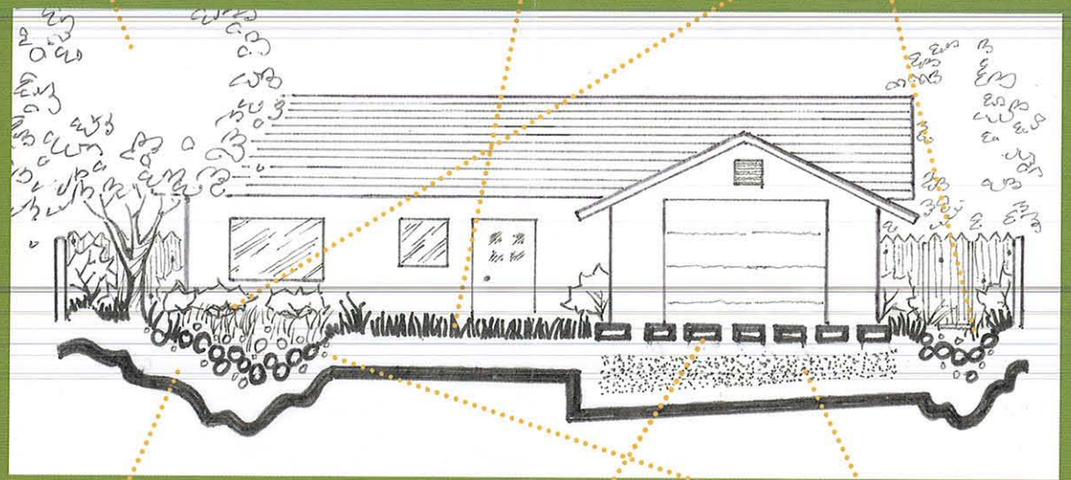
For either infiltration or use, retention involves strategies that help landscapes collect water. Bioretention basins and infiltration trenches are commonly constructed devices for rainwater collection and eventual infiltration. A rooftop, rainwater collection system, designed to capture and store water, is another example of retention.

Conservation

PLANT A TREE: Trees can slow wind and water erosion, regulate temperatures – and once established many trees do not require supplemental water.

USE GRASS SPARINGLY: While grass may beautify a yard, and there is no substitute for playing on grass, keeping it green takes a lot of water and treatment. Use grass to extend the living areas, but nowhere else. Substitute drought-resistant ground cover and native species everywhere else.

DIVERSIFY & GROUP YOUR PLANTS: Using a wide range of plants in a garden will deter pests and lower the need for fertilizers. Group your plants by water needs and adjust your watering cycles in those zones.



CREATE CONTOURS: As good for aesthetics as it is for the ocean, an irregular ground surface will capture more water and allow it to slowly seep into the soil.

PERMEATE WITH PAVERS: Instead of solid concrete, use spaced pavers with gravel or other permeable material. Driveways, patios and walkways are all good candidates.

DIG DEEP: An infiltration basin is typically the lowest point in a garden and designed to capture and retain rainwater, allowing it to infiltrate.

Permeability

Retention

CPR© breathes life into the coast

The pictures above and on the cover are examples of Ocean Friendly Gardens after CPR©.

Compliance History

This section provides the requested brief overview of the "*[c]ompliance history for drainages into the ASBS, including any spills or upset events that resulted in the discharge of toxic or otherwise prohibited substances, including untreated or partially treated wastewater.*"

The City of Malibu is a rural residential community along the coast of the North Santa Monica Bay. A description of the City's population and land uses is available in the "Watershed Characterization" section of this package, *supra*. The more densely developed commercial areas are concentrated from the eastern City boundary along the Pacific Coast Highway westward to Point Dume. No industrial facilities exist in the area of the City adjacent to ASBS #24.

The City is not serviced by a centralized wastewater treatment facility or municipal sanitary sewer system. Wastewater from residential and commercial properties within the City generally is treated by individual septic systems (onsite wastewater treatment systems/OWTS) and occasionally by small, isolated private or publicly owned wastewater "package plant." There are approximately 6,000 OWTS's and 5 "package plants" in the City. None of these systems has an effluent outfall at the ocean. Sewage disposal is contained onsite with no discharges to the ocean or adjacent water bodies.

All of these systems are required meet Waste Discharge Requirements (WDR) or a waiver from WDR. The City has the oversight of residential and small commercial facilities and the Los Angeles Regional Water Quality Control Board oversees larger installations and commercial facilities.

The City has an effective response protocol for sewage spills and other illicit discharges when they are observed by or reported to the City. The City is the process of upgrading and consolidating spill and illicit discharge record keeping. Part of the planned improvements to the response protocol and record keeping procedures will be a public outreach campaign to increase timely notification to the City as a spill or illicit discharge is occurring so that it can be timely investigated, abated, and documented. Property owners are also being educated about spills in order to ultimately prevent such incidents. Sewage spills at the Paradise Cove Mobile Home Park have been reported and the issue is being resolved through construction of a new wastewater treatment system. The system is currently in the final stages of construction, The City is not the regulatory authority over this facility.

Overall, the volume of any given spill in the City is very small at fewer than 200 gallons maximum total per incident with the majority of the spill being contained onsite and abated. Furthermore, the City has no records a major toxic spill within the City of Malibu or specifically the area adjacent to ASBS #24.

Public Interest

This section addresses the request for "*[d]ocumentation that shows the public interest will be served by granting the exception.*"

The public interest will be served by granting the exception requested by the City. The historical and recent studies of the marine life in the ASBS, the City's significant efforts at improving the water quality generally and specifically maintaining natural conditions in and around the ASBS, the predominantly undeveloped nature of the land draining into the area, and the present lack of a feasible alternative together establish that granting of this exception is a reasonable implementation of the Ocean Plan. Granting an exception will not result in any significant degradation of the ASBS and promotes the public interest by accommodating the City without harm to the environment or frustration to the goals of the Ocean Plan. This application for an exception to the Ocean Plan is just one part of the City's overall effort to work cooperatively with the regulatory agencies to meet the clean water goals set for Southern California.

Dr. Ambrose's report in the "Beneficial Uses and Marine Life" section indicates that the marine environment has not been significantly changed in the three decades since the State Water Resources Control Board designated this area to be of special biological significance. For example, Dr. Ambrose reports, "the species reported in Morin and Harington (1979) are similar to those currently found at Paradise Cove, considering natural fluctuations in species abundances that would be expected over such a long time." *See* Ambrose, Summary of Biological Resources at 11. Mussel cover has also remained relatively stable over the years and the abundance of owl limpets remained steady and actually was reported to increase around 1998. *Id*. at 9. From this data, we can conclude that any stormwater that may drain into the ASBS has not significantly harmed the marine environment. The City has no plans to increase the number of drains and is actively pursuing strategies to assure that the existing drains are properly managed. Thus, granting the exception to the Ocean Plan will not be detrimental to the health of the marine environment.

Further, as presented in the "Treatment Processes and Best Management Practices" section of this package, the City has taken reasonable steps to mitigate the impacts on the ASBS, to reduce pollutants that may drain into this environmentally sensitive area and to educate the public about water quality issues. The City has also, in good faith, presented a plan for monitoring the water in the ASBS and will be continuing its effort to reduce potential drainage into the ASBS.

It is in the public's best interest for the City of Malibu to continue to use its resources towards improvement of the water quality. By granting this exception and keeping the City of Malibu in compliance with the Ocean Plan, City resources can be directed towards seeking out grant money for additional water quality programs, monitoring the water in the ASBS and implementing new water quality programs to mitigate impacts and reduce pollutants in the water.

The City's land use regulations and building restrictions effectively regulate residential and commercial development in the area adjacent to the ASBS. However, the land adjacent to the ASBS is comprised of primarily open-space and undeveloped land. The population in the entire Malibu Creek Watershed is low and concentrated northeast of the City near Agoura Hills and along the coast. In the watershed, stormwater is conveyed to the ocean principally by natural streams, intermittent streams and gullies. As a result, the City has limited control over stormwater runoff into the ocean in these areas. While the City is committed to continue to explore the wisdom of and options for managing these natural drainage courses, a reasonable application of the Ocean Plan suggests that the City is eligible for an exception for such "discharges" given that they are a natural occurrence not created by the City.

Additionally, the City has been unable to identify a feasible alternative to eliminate stormwater runoff from the predominantly undeveloped land. Diversion of stormwater from the entire ASBS appears to be technically infeasible at this time, is cost prohibitive and may create geological hazards (and, of course, landslides may produce additional degradation of the ASBS). By requesting this exception, the City is asking the State Water Resources Control Board to acknowledge the realties of compliance with the Ocean Plan where all stormwater is defined as "waste" and the City is attempting to engage in a cooperative effort to establish a workable program for protection of the ASBS. The City believes that this effort best serves the public interest.

APPENDICES

The following documents are referred to in the "Treatment Processes and BMPs" section of this packet and are provided here as supplemental resources:

1) Malibu Municipal Code (M.M.C.) Chapter 9.08.060. Offenses Against Property

2) City of Malibu Ordinance No. 46. (M.M.C. Chapter 9.20) Water Conservation

3) City of Malibu Ordinance No. 51U. Urgency Amendment to the Excavation Grading Standards of the Building Code, Establishing Stormwater Management Standards, and Amending the M.M.C.

4) City of Malibu Ordinance No. 96. (M.M.C. Chapter 17.44) Water Conservation Landscaping Requirements

5) City of Malibu Ordinance No. 157. Regulating Stormwater and Urban Runoff Pollution

6) City of Malibu Ordinance No. 219. Amending the Stormwater and Urban Runoff Pollution Control Ordinance to Provide Stormwater Pollution Control for Planning and Construction of New Development and Redevelopment Projects

7) City of Malibu Ordinance No. 242. (M.M.C. 15.12) Incorporating the California Plumbing Code to Require Operating Permits for Residential and Commercial Facilities to Use Onsite Wastewater Treatment Systems

8) City of Malibu Ordinance No. 264. (M.M.C. Chapter 13.04) Stormwater and Discharge Control

9) City of Malibu Ordinance No. 265. (M.M.C. Chapter 12.05.035) Prohibiting Smoking on City Beaches

10) City of Malibu Ordinance No. 286. (M.M.C. Chapter 9.24) Ban on Expanded Polystyrene Food Packaging

11) Memorandum of Understanding between California Regional Water Quality Control Board, Los Angeles Region, and City of Malibu Regarding Onsite Wastewater Treatment Systems

NOTE: The Malibu General Plan and Local Coastal Program are available on the City website at www.ci.malibu.ca.us.

M.M.C. Chapter 9.08.060

Offenses Against Property

ARTICLE IV

PUBLIC PEACE

CHAPTER 1

PROHIBITED CONDUCT; OFFENSES;
LOITERING BY CRIMINAL STREET GANGS

4.1.00. Smoking Prohibited.

It shall be unlawful to smoke in the meeting place of the City Council or any commission, board or committee of the City during any meeting thereof, including any recess. For the purpose of this section, "smoking" shall mean inhaling, exhaling, burning, or carrying any lighted cigarette, cigar, pipe or other plant or weed or equipment for the smoking thereof.

4.1.01. Removing or Defacing Official Notices Prohibited.

No person shall intentionally deface, tear down, obliterate or destroy any copy, transcript or extract of or from any ordinance of the City which shall be posted in, on or along any highway or other public place, or any proclamation, advertisement or notice set up or posted at any place by authority of any ordinance or law before the expiration of the time in which such proclamation, advertisement or notice was to remain set up or posted.

4.1.02. Paint in Aerosol Cans -- When Prohibited.

No person shall carry any aerosol can of paint less than six (6) ounces net weight of contents into or upon any City-owned building, grounds, park or other facility without the permission of the City officer in charge, unless such aerosol can is sealed or completely enclosed in a sealed container. For the purposes of this Section, a public street is not a City-owned facility.

4.1.03. Drinking in Public Prohibited.

No person shall consume any beer, wine or other intoxicating beverage on any public street, sidewalk, alley, highway or parking lot open to the public.

4.1.04. Sitting or Lying on Public Ways.

A. No person shall sit, lie or sleep in or upon any public highway, green belt, median island, alley, sidewalk, crosswalk or other public place or way open for pedestrian or vehicular travel or appurtenant thereto.

B. The provisions of this Section do not prohibit a person from sitting upon a public

highway, green belt, median island, alley, sidewalk, crosswalk or other public place if:

1. Necessitated by the physical disability of such person; or

2. Such person is viewing a legally conducted parade; or

3. Such person is seated on a bench lawfully installed for such purpose.

4.1.05. Obstructing Entrances.

No person shall loiter, stand or sit in or at the entrance to any church, hall, theater, motion picture theater or place of public assemblage, or any establishment, retail store, restaurant, office building or other place into which the public is invited, in a manner which obstructs such entrance.

4.1.06. Leaving Merchandise or Other Property in Public Ways -- When Prohibited.

No person shall leave or permit to remain on any public highway, alley, sidewalk, crosswalk or other public way open for pedestrian travel any merchandise, baggage or other article of personal property except trash collection receptacles placed in accordance with law, nor shall any person allow trees, shrubs, or any other form of vegetation to encroach from private property onto or above any public highway, street, alley, sidewalk, crosswalk, or any other public way open for pedestrian or vehicular travel so as to interfere or impede with pedestrian or vehicular travel, or to obstruct from view traffic signs in the public way, or reduce traffic visibility.

4.1.07. Permitting Certain Substances to Flow Onto Highways or Into Drainage Channels Prohibited.

No person, shall deposit, turn, drain or divert, or permit by seepage, overflow or otherwise, any mud, rotary mud, sand, water, oil or liquid of petroleum content into or upon any public street, drainage ditch, storm drain, or flood control channel owned or operated by any public agency.

4.1.08. Gates Outward Over Highways; Construction and Maintenance Prohibited.

No person shall construct or maintain any gate in any fence which opens outward or remains opened outward over any portion of any public street or sidewalk. Violation of this Section is an infraction and shall be punishable as provided in Section 1200(B) of this Code.

4.1.09. Noisy Hawking and Advertising Prohibited.

No person on a street or sidewalk, or in any doorway or entrance set back less than ten (10') feet from the front property line, shall make or cause to be made in any manner any loud or raucous noise for the purpose of advertising, announcing or calling attention to any goods, wares or merchandise, or to any show, exhibition, entertainment or event.

4.1.10. Littering Prohibited.

No person shall deposit or throw any paper or other litter or trash on any public highway or sidewalk or on any private property without the consent of the owner or person in lawful possession thereof.

4.1.11. Reserved. (Ord. 161, 5/12/97)

4.1.12. Reserved. (Ord. 161, 5/12/97)

4.1.13. Carrying Knives and Daggers in Plain View Prohibited.

A. No person shall carry in plain view on his or her person any knife having a blade of three (3) or more inches in length; any spring-blade, switch-blade or snap-blade knife; any knife whose blade is automatically released by a spring mechanism or other mechanical device; any ice pick or similar sharp stabbing tool; any straight-edge razor; or any razor blade fitted to a handle.

B. The foregoing restrictions shall not be deemed to prohibit the carrying of ordinary tools or equipment for use in a lawful occupation or for the purpose of lawful recreation.

4.1.14. Discharging Firearms; Restrictions Generally.

No person shall shoot, fire or discharge, nor cause nor permit to be shot, fired or discharged, any rifle, shotgun, pistol, revolver or other firearm in the general direction and within one-half (1/2) mile of any house, camp, or other place of human habitation, or in the general direction and within one-half (1/2) mile of any public highway, road, street, way, park, or premises.

4.1.15. Shooting Arrows or Other Missiles; Restrictions.

No person shall shoot, fire or discharge, nor cause nor permit to be shot, fired or discharged, any arrow or other missile or rocket in the general direction and within four hundred (400) yards of any house, camp, or other place of human habitation or any public highway, road, street, way, park, or premises.

4.1.16. Broadhead Arrows; Furnishing to Minors Under 13.

No person shall sell, give away or in any way furnish to any minor who is under the age of thirteen (13) years any broadhead arrow.

4.1.17. Furnishing to Minor Under 15 Restricted.

No person shall sell, give away, or in any way furnish to any minor who is thirteen (13) years of age or over and under fifteen (15) years of age any broadhead arrow, unless such person first obtains the written consent thereto of his or her parents or legal guardian.

City of Malibu Ordinance No. 46
M.M.C. Chapter 9.20

Water Conservation

ORDINANCE NO. 46

AN ORDINANCE OF THE CITY OF MALIBU AMENDING THE EMERGENCY WATER CONSERVATION PLAN AND AMENDING THE MALIBU MUNICIPAL CODE

THE CITY COUNCIL OF THE CITY OF MALIBU DOES ORDAIN:

Section 1. The Malibu Municipal Code is amended by adding Chapter 6 to Article IV to read as follows:

4601. Findings. California is now in the fifth year of a severe drought. Watersheds across the state, and particularly in the Southern California area, are critically dry, with streamflows at less than 50 percent of normal levels. Reservoirs are dangerously low in many watersheds. Due to such drought conditions, the public welfare requires that the water resources available to the City be put to the maximum beneficial use and that waste or unreasonable use or unreasonable methods of use be prevented and that conservation of such water be exercised in the best interests of the City. Such facts require immediate implementation of an Emergency Water Conservation Plan.

4602. Regulation of Irrigation Practices.

A. Except as provided in paragraph B below, no person shall water any lawn or do or permit any landscape irrigation with potable water except between the hours of 8:00 p.m. and 8:00 a.m. The foregoing restriction does not apply to parks, school grounds, recreational fields, agricultural users, commercial nurseries/landscape contractors, irrigation of livestock and propagation beds, and irrigation with reclaimed water.

B. Lawn watering and landscape irrigation is permitted at any time if a hand-held hose equipped with a positive shut-off nozzle, a hand-held faucet-filled bucket of five gallons or less, or a drip irrigation system is used.

C. No person shall allow water to run off landscape areas onto adjacent property, adjoining streets, sidewalks, or other paved areas due to incorrectly directed or maintained sprinklers or excessive watering.

D. No potable water shall be used for earth work, grading or road construction. Such earth work, grading or road construction shall be reduced to a level which can be sustained entirely by available reclaimed water.

4603. Regulation of Exterior Washing Practices.

A. No person shall wash or permit the washing of buildings, facilities, equipment, autos, trucks, trailers, boats, airplanes and other types of mobile equipment except where a hand-held hose equipped with a positive shut-off nozzle for quick rinses is used. Whenever possible, such as when washing vehicles, a bucket wash is required.

B. Washing of vehicles is permitted at any time on the immediate premises of a commercial car wash.

C. No person shall hose water or wash down sidewalks, driveways, parking areas, tennis courts, patios or other paved areas except to alleviate immediate fire, sanitation or health hazards.

4604. Regulation of Water for Ornamental or Recreational Uses.

A. No person shall fill or permit to be filled any swimming pool, wading pool, or spa, except adding water to top off swimming pools and spas is permitted.

B. No person shall use water to clean, fill, or maintain levels in ponds, decorative fountains or artificial lakes unless such water is part of a recycling system.

4605. Regulation of Miscellaneous Uses.

A. No person shall use water from fire hydrants except authorized public safety personnel for fire fighting and public welfare activities.

B. No flushing of water mains shall be permitted except as necessary to protect the public health.

C. No restaurant, hotel, cafe, cafeteria or other public place where food is sold, served or offered for sale shall serve drinking water to any customer unless specifically requested by such a customer.

4606. Prohibition of Leaking Plumbing Facilities. No owner of any indoor or outdoor plumbing fixture within the City of Malibu shall permit water to leak from such fixture.

4607. Violations - Penalty. Violation of any of the provisions of this Chapter shall be deemed an infraction and shall be punishable as provided in Section 1200B of this Code.

PASSED, APPROVED and ADOPTED this 3rd day of December, 1991.

MAYOR

ATTEST:

CITY CLERK

I CERTIFY THAT THE FOREGOING ORDINANCE NO. 46 was passed and adopted by the City Council of the City of Malibu at the regular meeting thereof held on the 3rd day of December, by the following vote:

AYES:	5	COUNCILMEMBERS:	Caggiano, Keller, Van Horn, Wan, Zeitsoff
NOES:	0	COUNCILMEMBERS:	
ABSENT:		COUNCILMEMBERS:	
ABSTAIN:		COUNCILMEMBERS:	

City Clerk

City of Malibu Ordinance No. 51U

Urgency Amendment to the Excavation Grading Standards of the Building Code, Establishing Stormwater Management Standards, and Amending the M.M.C.

ORDINANCE NO. 51 U

AN ORDINANCE OF THE CITY OF MALIBU AMENDING THE EXCAVATION AND GRADING STANDARDS OF THE BUILDING CODE, ESTABLISHING STORM WATER MANAGEMENT STANDARDS, AMENDING THE MALIBU MUNICIPAL CODE AND DECLARING THE URGENCY THEREOF

THE CITY COUNCIL OF THE CITY OF MALIBU DOES HEREBY ORDAIN AS FOLLOWS:

The Malibu Municipal Code is hereby amended with a new Chapter 1 to Article VIII to read as follows:

SECTIONS

Section (1): Construction Debris Control
Section (2): Reduction of Erosion on Manufactured Slopes
Section (3): Definitions
Section (4): Permits Required
Section (5): Storm Water Management Report
Section (6): Permit Limitation and Conditions
Section (7): Storm Water Management
Section (8): Storm Damage Precautions, Incomplete Work
Section (9): Import and Export of Earth Materials
Section (10): Erosion Control
Section (11): Fills
Section (12): Drainage
Section (13): Slope Protection
Section (14): Water Quality Management
Section (15): Regular Grading Requirements
Section (16): Urgency Determination

SECTION 1. Article VIII, Chapter 1 of the Municipal Code is amended by adding a Section 8105 to read:

8105. **Section 301 Amended.** Section 301 of the Building Code is amended by adding a new paragraph (c) to read:

301(c) **Construction Debris Control.** No building permit shall be issued for construction of any kind unless plans for controlling discharges of construction debris have been submitted and found to be in compliance with the Clean Water Act of 1987, by preventing discharge of any material other than storm runoff into the storm drain. The Building Official may allow exceptions to the no discharge requirement only when on-site containment is not possible, and only when containment can be obtained within the public right-of-way. The permittee shall, nonetheless, comply fully with the erosion control guidelines set forth in Chapter 70 of the Building Code.

SECTION 2. Article VIII, Chapter 1 of the Municipal Code is amended by adding a Section 8106 to read:

8106. **Section 2903 Amended.** Section 2903(a) of the Building Code is amended by adding thereto the following:

Reduction of erosion shall be incorporated into the design of all manufactured slopes and plans and methods for such reduction shall be submitted with grading plans.

SECTION 3. Article VIII, Chapter 1 of the Municipal Code is amended by adding a Section 8107 to read:

8107. **Section 7002 Amended.** Section 7002 of the Building Code is amended by adding the following definitions in their appropriate alphabetical place:

APPLICANT shall mean any person applying for or who has been granted a permit to proceed with the work. The applicant must be a qualified representative of the owner of the property where work is being performed.

CLEARING, BRUSHING and GRUBBING shall mean the removal of vegetation (grass, brush, trees, and similar plant types) by mechanical means.

DEVELOPMENT OR DEVELOPMENT ACTIVITY shall mean the alteration, construction, installation, demolition or removal of a structure, impervious surface or drainage facility; or clearing, scraping, grubbing, killing or otherwise removing the vegetation from a site; or adding, removing, exposing, excavating, leveling, grading, digging, burrowing, dumping, pil'ng, dredging or otherwise significantly disturbing the soil, mud, sand or rock of a site.

DRAINAGE SYSTEM shall mean all facilities used for the movement of storm water through and from a drainage area and consists of any and all of the following conduits and appurtenant features: canals, channels, ditches, flumes, culverts, streets, etc. It also includes all watercourses, waterbodies and wetlands.

DRY DETENTION shall mean detention provided by a pond or basin that normally has a dry bottom except during, and up to 14 days after, a rainfall event.

EROSION shall mean the wearing or washing away of soil by the action for water.

IMPERVIOUS SURFACE shall mean a surface which has been compacted or covered with a layer of material so that it is highly resistant to infiltration by water. Impervious surfaces can include compacted clay, as well as most conventionally surfaced streets, roofs, sidewalks, parking lots, and other similar surfaces.

NATURAL FLOW PATTERN shall mean the rate, volume, and direction of the surface or groundwater flow occurring under natural conditions for any given area.

OPEN DITCH shall mean a permanent, designed waterway, shaped and lined with appropriate vegetation or structural material to safely convey storm water runoff.

OWNER shall mean the person in whom is vested the fee, ownership, dominion, or title of property (i.e., the proprietor). This term may also include a tenant, if chargeable under his lease for the maintenance of the property, and any agent of the owner or tenant including a developer.

POSITIVE OUTLET shall mean a discharge from a basin via overland flow, artificial waterway, natural waterway, or pipe.

RATE shall mean volume per unit of time.

RECEIVING BODIES OF WATER, RECEIVING WATERS shall mean any waterbodies, watercourses, and wetlands into which surface waters flow.

RECHARGE shall mean the inflow of water into an aquifer which meets state aquifer and water quality requirements.

RETENTION OR TO RETAIN shall mean the prevention of, or to prevent, the discharge, directly or indirectly, of a given volume of storm water runoff into surface waters.

RIVERINE FLOOD HAZARD AREA shall mean a floodplain area associated with stormwater, rather than tidal, flooding.

SEDIMENT shall mean solid material, whether mineral or organic, that is in suspension, is being transported, or has been moved from its site of origin by water.

SEDIMENTATION FACILITY shall mean any structure or area which is designed to hold runoff water until suspended sediments have settled.

STORM WATER MANAGEMENT SYSTEM/FACILITIES shall refer to the designed/constructed features of the property which collect, convey, channel, store, inhibit, or divert the movement of storm water.

WETLANDS shall mean land with fresh water marshes, swamps, bogs, wet woodlands and any previous wetlands that have dried temporarily due to drought conditions.

SECTION 4. Article VIII, Chapter 1 of the Municipal Code is amended by adding a Section 8108 to read:

8108. **Section 7003 Amended.** Section 7003 of the Building Code is amended to read:

No person shall (1) perform any clearing, brushing, grubbing, excavation or grading for any purpose, (2) construct any storm water management system or structure, or change the size of any storm water management system, (3) construct, reconstruct or add to any existing storm water management system, (4) alter shorelines or banks of bodies of water, (5) increase the impervious area of any parcel of land, or (6) use natural or man-made bodies for storm water management purposes without first obtaining a grading permit as provided herein.

EXCEPTION: A grading permit shall not be required for:

1. An excavation which is less than 3 feet in depth below the existing ground surface.

2. A fill not intended to support structures and which does not obstruct a drainage course if such fill (a) is placed on natural grade that has a slope not steeper than five horizontal to one vertical (5:1) and is less than 1 foot deep, or (b) is less than 3 feet in depth at its deepest point, measured vertically upward from natural grade to the surface of the fill, and does not exceed 50 cubic yards, or (c) does not exceed 20 cubic yards on any one lot.

3. An excavation below finish grade for basements and footings of structures authorized by a valid building permit or trench excavations for the purpose of installing underground utilities.

4. Grading within property dedicated or used for cemetery purposes where such grading is more than 100 feet from the property line and is not intended to support structures. No permit shall be required for the excavation or filling of graves at any location within such property.

5. The depositing of rubbish or other material at any refuse-disposal facility operated under a permit granted according to the terms of Division 4, entitled "Solid Waste", of Title 20 of the Los Angeles County Code.

6. An excavation, fill, and/or measures approved by the Soil Conservation District or cooperative agency of the Department of Agriculture. However, if the Conservation Plan is not implemented according to its terms, this exemption shall be void.

SECTION 5. Article VIII, Chapter 1 of the Municipal Code is amended by adding a Section 8109 to read:

8109. **Section 7005 Amended.** Section 7005 of the Building Code is amended by adding a new paragraph 15 to subsection (b) and a new subsection (h) thereto to read:

(b) 15. Provide a complete Storm Water Management system design packet in compliance with the requirements of Section 7010 of the Building Code. The packet shall include detailed proposed site survey as it relates to drainage topography and drainage structures and engineering hydrologic and hydraulic calculations to support the design of drainage and permanent/temporary erosion control devices.

(h) **Storm Water Management Report.** The building official shall require a storm water management report with the plan submittal. Such report shall include data supporting the design of temporary and permanent erosion control systems, storm drainage and detention facilities. The report shall also address various on-site and off-site design considerations, including building runoff containment systems, related to storm water quality management. Detailed requirements are set forth in Section 7010 of the Building Code.

SECTION 6. Article VIII, Chapter 1 of the Municipal Code is amended by adding a Section 8110 to read:

8110. **Section 7006 Amended.** Section 7006(c)3 of the Building Code is amended to read:

3. Adequate provisions shall be made for drainage and erosion control in accordance with the requirements of Section 7010 of the Building Code.

SECTION 7. Article VIII, Chapter 1 of the Municipal Code is amended by adding a Section 8111 to rea .

8111. **Section 7010 Amended.** Section 7010 of the Building Code is amended in its entirety to read:

Storm Water Management - Section 7010

(a) **General.** It is expressly the purpose of this Section to provide for and promote the health, safety, and welfare of the general public. Reference is made to attached Exhibit A titled Storm Water Management Standard Plates. The standard plates shall be utilized by the permittee in the design of permanent/temporary storm water management systems. The Standards established by the Section are intended to represent the minimum design standards for clearing, grading, erosion control work and site design as it relates to the water quality of storm water runoff from the site. Compliance with the Building Code does not relieve the designer of the responsibility to apply sound professional judgment to protect the health, safety, and welfare of the general public. Additionally, since these are minimum standards, special site conditions and environmental constraints may require a greater level of protection than would normally be required under the Building Code. The designer must apply these standards bearing in mind these constraints.

Conditions may change after clearing, gr: ding, or construction has started due to unforeseen conditions. Design elements of the proposed project may have to be changed to comply with the conditions of any permits, codes and regulations, or these standards.

The primary objective of this section is the control of water quality, including erosion, at its source as a means of controlling water pollution, flooding, and habitat damage downstream. Typical examples of techniques for source control are limiting to cleared areas (especially on steep terrain or adjacent to other sensitive areas), seasonal limits on work, mulching, hydroseeding or covering cleared areas as soon as work has finished, detention and setting basins, wet ponds, control of land use in sensitive areas, establishment and maintenance of setbacks and buffer areas and implementation of hydraulic devices to control site runoff water quality (i.e., sand/oil separators, percolation facilities).

Secondary containment measures must be provided to backup the above measures in case of failure. These backup measures include desilting ponds and sediment traps, filter fencing and straw bales, catch basin filtration, and management plans. One method cannot be relied on without the other - both are mandatory to protect property, lives and habitat.

(b) **Seasonal Limitations.** No grading permit shall be issued for work to be commenced between October 1 of any year and April 15 of the following calendar year, unless the plans for such work include details of protective measures, as may be necessary to protect adjoining public and private property and downstream receiving waters from damage by erosion, flooding or the deposition of mud or debris which may originate from the site or result from such grading operations. The provisions outlined above also applies to any project in which grading or site alteration work will be performed during the time frame described but where the grading permit is issued prior to October 1.

As identified in Building Code Section 7010 (e) herein, temporary erosion control measures are separated into two classifications:

1. Seasonal control measures.

2. Mandatory year-round control measures.

Regardless of the date of issuance of a permit, the permittee shall maintain certain minimum erosion control measures at all times as required by Item 2 above.

If grading is begun prior to November 1, all seasonal protective measures shall be installed prior to November 1. If grading is begun on or after November 1, all protective measures shall be installed before grading is begun. All protective measures shall be maintained in good working order during the required implementation periods outlined herein unless their removal at an earlier date is agreed to by the Building Official.

Where a grading permit is issued and the work is commenced after April 15 and before October 1 of any year and the plans for such work do not include details of the seasonal control measures described in this Section 7010, and it appears that the grading and installation of the permanent drainage and water quality control devices as authorized by the permit will not be completed prior to November 1, then on or before October 1 the owner of the site on which the grading is being performed shall file or cause to be filed with the building official revised plans which include details of the protective measures described in and in all other respects follow the provisions of Section 7010. The revised plans

required by this section shall be accompanied by an application for plan-checking services and plan-checking fees equal in amount to 10 percent of the original grading permit fee.

When land alteration activities are interrupted by heavy rain, operations shall not be resumed until Building Official determines that erosion control facilities are operating satisfactorily.

Land alteration activities near sensitive areas, including slopes, wetlands, flood plains, or riparian corridors shall be subject to limitations proposed by the building official or other affected agencies. Permits from other agencies in addition to the City of Malibu may be required by law for such work. It is the responsibility of the developer to obtain such permits prior to beginning work and to see that all applicable regulations are complied with at all times during the course of the work.

(c) **Preservation of Existing Landscaping.** Existing vegetation shall be preserved per the project map conditions, and all applicable regulations restricting removal of vegetation shall apply. Preservation of existing vegetation in order to control erosion and to preserve an area's character and quality of the environment shall be considered during the grading plan review. All excavations and fills in the proximity of trees and shrubs shall be kept outside the dripline of said trees and shrubs.

Site design shall maximize the preservation of:

1. Healthy trees which can remain healthy in the (proposed) surrounding environment.

2. The overstory (vegetation over ten feet in height), particularly where it forms a continuous canopy.

3. All native vegetation, particularly the brush (vegetation from one to four feet in height), understory (vegetation four feet to ten feet in height), and overstory, within any erosion prone area.

4. Native vegetation on the site perimeter which may serve as a screen to or from adjoining property or roadways. Enhancement of such screening vegetation should also be considered.

5. Native vegetation in required buffer zones for streams, wetlands and floodplains or other protected areas as defined by the Building Official.

6. Vegetation which functions as a medium for filtration of sheet flow runoff or has other water quality control functions.

No disturbance, fill or excavation shall be allowed within ten trunk diameters of the trunk of any tree to be preserved or retained. Trunk diameter shall be measured at four feet above existing grade.

In the case of grading work around any oak tree located on the site, the developer shall comply with all provisions of the City's Oak Tree Ordinance, including preparation of a detailed report on the tree condition and preservation measures recommended by the oak tree consultant.

(d) **Vegetation Restoration.** Vegetation restoration may be accomplished with, but need not be limited to, a combination of the following methods:

1. Temporary Seeding - Temporary seeding, sodding, or other protection may be required at the discretion of the building official on areas of disturbed soil which are exposed for more than seven days. This applies even if the area will be subject to regrading or subsequent construction. Temporary seeding shall be provided for all disturbed land areas to be left exposed for more than seven days unless other temporary erosion control measures are authorized by the building official. Temporary seeding shall be performed in such a manner so as to stabilize the soil, reduce downstream damage from sediment and runoff.

A. Site Preparation - Prior to seeding, other necessary erosion control measures such as sedimentation ponds, diversions, berms, dikes, level spreaders, grade stabilization structures, etc. shall be installed.

B. Soil Amendments - All soil amendments shall be appropriate to existing soil and climate conditions.

C. Seedbed Preparation - When an area which is to be temporarily seeded has been recently loosened to the extent that an adequate seedbed exists, no additional treatment shall be required. The area must be appropriately prepared prior to seeding.

D. Seeding - Seed shall be applied uniformly using a cyclone seeder, drill, cultipacker seeder, or hydraulic seeder. When a hydraulic seeder is used, the slurry shall include both seed and fertilizer with mulch being optional. Seed mixes shall be subject to the approval of the building official.

E. Mulching - When seeding is to be accomplished on sites having adverse soil conditions, sloping topography, and/or when the seeding is to be accomplished during less than optimal seasons (as determined by the Engineer), mulch material shall be applied to the seeded area in accordance with the standards outlined in this Section.

2. Permanent Seeding - Permanent seeding shall be required for areas of disturbed soil which are subject to erosion and for which the building official determines a permanent, long-lived vegetative cover is needed. Permanent seeding shall be performed in such a manner as to stabilize the soil, reduce damage to downstream areas from sediment and stormwater runoff, improve wildlife habitat linkages, and to enhance the aesthetic quality of the area. Permanent seeding shall consist of grasses, legumes, wild flowers, other approved vegetation, or a mixture of the preceding vegetation types compatible with wildlife habitat linkages. If permanent seeding is used in lieu of temporary seeding for erosion control, the permanent seeding shall be applied within seven days after exposing or disturbing the soil.

A. Topsoil - Strong consideration should be given to salvaging topsoil existing onsite: topsoil may also be imported from outside the project area only if necessary to augment on-site soil. Topsoil salvaged from the site should meet the specifications as set forth below. Field analysis for textural classification of topsoil will normally be acceptable unless other means of analysis is required by the Building Official.

(i) Material Specifications - Topsoil shall be the original top layer of a soil profile formed under natural conditions, technically defined as the "A" horizon by the Soil Conservation Society of America. It shall consist of a natural friable loam, sandy loam, silt loam, sandy clay loam or other soil texture as approved. It shall be reasonably free of refuse, noxious weeds, subsoil, stiff clay, hard lumps, stumps, roots, brush, stones or other litter or similar objects larger than 1 1/2 inches in diameter. It shall have demonstrated by evidence of healthy vegetation growing or having grown on it, prior to stripping, that it is reasonably well-drained and does not contain substances toxic to plant life.

(ii) Soil Testing - Testing of topsoil that is from an unknown or questionable source should be evaluated by a recognized laboratory for residual organic content of not less than 1.5 percent by weight is required. If pH value is less than 6.0, lime shall be applied and incorporated with the topsoil to adjust the pH to 6.5 or higher. Topsoil containing soluble salts greater than 500 parts per million shall not be used.

(iii) Sterilization - No sod or seed shall be placed on soil which has been treated with soil sterilants until sufficient time has elapsed to permit dissipation of toxic materials.

(iv) Grading - The topsoil shall be evenly distributed and shall be a minimum depth of 2 inches on 3:1 or steeper slopes and 4 inches on flatter slopes. Spreading shall be performed in such a manner that sodding or seeding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from topsoiling or other operations shall be corrected in order to prevent the formation of depressions or water pockets. Topsoil shall not be placed while in a muddy condition, when the subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading, proposed sodding, or seeding.

(v) Stockpiling - Material to be stockpiled shall be placed in a manner and location so as to not be subject to erosion or other disturbance. Material to be left more than seven days shall be covered with plastic tarp or mulched per this Section.

B. Site Preparation - Prior to placement of topsoil and prior to seeding, other necessary erosion control measures such as sedimentation ponds, diversions, berms, dikes, level spreaders, grade stabilization structures, etc. shall be installed.

C. Seedbed Preparation - When the topsoil in the area to be permanently seeded has recently been loosened to the extent that an adequate seedbed exists, no additional treatment shall be required. Flat areas and slopes up to and including grades of three horizontal to one (3:1) vertical shall be loose and friable to a minimum depth of three (3) inches prior to seeding. Slopes greater than three to one (3:1) shall have the top one (1) to three (3) inches of soil loose and friable prior to seeding. When necessary, the top layer of soil shall be loosened by raking, dicing or other acceptable means prior to seeding.

D. Soil Amendments - Lime and fertilizer should be applied in accordance with soils testing results. In lieu of soil test results, apply (2) tons ground agricultural limestone and 600 pounds 10-20-20 fertilizer, or equivalent per acre before seeding. Apply narrow or disc lime and 10-20-20 or equivalent fertilizer uniformly into the soil to minimum depth of (3) inches on slopes less than three to one (3:1). On slopes or greater than three to one (3:1) grade, the lime fertilizer shall be worked in as directed. On sloping land, final tillage operations should be on the contour. No attempt should be made to drag any disced area to make the soil surface very smooth after dicing. At time of seeding apply 400 pounds 38-0-0 ureaform fertilizer and 500 pounds 10-20-20, or equivalent fertilizer per acre. Incorporate into soil on slopes less than three to one (3:1).

E. Seeding - Seed shall be applied uniformly using a cyclone seeder, drill, cultipacker seeder, or hydraulic seeder. The slurry shall include seed, fertilizer, and mulch. Seed shall be applied to a firm seedbed moist to a depth of 1/4 inch on a clay soils and 1/2 inch on sandy soils, when using other than hydraulic seeding methods.

F. Mulching - When required by plan specification or by the Engineer, mulch materials shall be applied immediately after seeding (when hydraulic seeding, slurry shall include mulch). Mulch materials shall be unrotted small grain straw (@ 1 1/2 to 2 tons/acre), wood chips 3.4 to 1 1/2 inch in diameter (@ 50 to 70 cubic yards/acre or 1/2 to 1 1/2 inches deep), hydraulic seeding type wood cellulose (typically @ 1200 pounds/acre), or approved equal. Mulch materials shall be relatively free of all weeds and shall be free of prohibited noxious weeds. Mulch shall be spread uniformly by hand or mechanically.

G. Mulch Anchoring - When required by plan specification or by the Building Official, mulch anchoring shall be accomplished immediately after mulch placement. This anchoring shall be accomplished by one or more of the following methods:

(i) Peg and Twine - Eight (8) inch to ten (10) inch wooden pegs shall be driven into within two (2) or three (3) inches of the soil surface every four (4) feet in all directions so as to form a square pattern. Stakes may be driven before or after mulch application. Mulch shall be secured to the soil surface by stretching twine between pegs in an "X" within a square pattern.

(ii) Nylon/Paper Weave - the woven material shall be placed perpendicular to the contours and stapled in place using twelve (12) inch high carbon iron staples placed at approximately 2.5 staples per square yard of material.

(iii) Mulch Anchoring Tool - A tractor-drawn implement designed to punch and anchor mulch into the surface to a depth of two (2) inches shall be used. The mulch anchoring tool should be drawn parallel with the contours of any slope. This practice is limited to slopes upon which the equipment can safety operate.

(iv) Vegetable Gum Binders - Vegetable gum based mulch binders may be used to stabilize the mulch upon approval of the building Authority.

(v) Erosion Control and Revegetation Mat - Commercially available vinyl monofilament matrix-type matting resistant to environmental and chemical degradation (Mira mat or equivalent) may be used in conjunction with hydroseeding or other seeding methods. Install as shown in Drawing No. 4C-56. This method may be used on slopes of up to one to one (1:1) where no rilling occurs.

3. Sodding - Sodding may be required to stabilize the soil, reducing damage from sediment and runoff to downstream areas where exposed soils have a potential for causing on-site or offsite environmental damage and a quick, permanent, cover is necessary. Sodding may also be required during seasons when seed mulch will not germinate. Typical conditions requiring sodding are in or adjacent to swales and in permanent open stormwater detention facilities.

A. Site Preparation - Fertilizer and lime applications should be determined by soils tests. Under unusual circumstances where time considerations do not allow for complete soils tests, fertilizer and lime may be applied in amounts shown under (iii) and (iv) below. Use of fertilizers and other chemicals may be limited adjacent to streams and other surface water courses.

(i) Prior to sodding, the ground surface shall be cleared of all vegetation, trash, debris, roots, brush, wire, grade stakes and all other objects that interfere with planting, fertilizing, cultivating and maintenance operations. Topsoil shall remain to the extent that is practical. Excessive topsoil removal shall require importation of replacement topsoil.

(ii) Exposed soil shall be tilled to a minimum depth of six (6) inches.

(iii) Where the soil is acid or composed of heavy clays, ground agricultural limestone shall be spread at the rate of 75 pounds per 1,000 square feet. In all soils the required lime and 30 pounds of 5-10-5 or equivalent fertilizer per 1,000 square feet shall be uniformly applied using a mechanical spreader and mixed into the top three (3) inches of soil during final tillage operations.

(iv) Slow release nitrogen at the rate of 3.5 pounds N/1,000 square feet shall be applied to the prepared soil just prior to sod installation. This material shall be approximately 1/3 immediately available and 2/3 water insoluble nitrogen. Urea formaldehyde (UF) and isobutylidene urea (IBDU) meet these standards.

B. Materials and methods - Sod shall meet the following specifications:

(i) Sod shall be machine cut at a uniform soil thickness of 3/4 inch, plus or minus 1/4 inch, at the time of cutting. Measurement for thickness shall exclude top growth and thatch.

(ii) Standard size sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended vertically from a firm grasp on the upper 10% of the section.

(iii) Individual pieces of sod shall be cut to the supplier's width and length. Maximum allowable deviation from standard widths and lengths shall be 5%. Broken pads and torn or uneven ends are not acceptable.

(iv) Sod shall not be harvested or transplanted when moisture content (excessively dry or wet) may adversely affect its survival.

(v) Sod shall be harvested, delivered and installed within a period of 36 hours.

C. Installation.

(i) During periods of excessively high temperature and/or extremely dry weather, the soil shall be lightly irrigated immediately prior to laying the sod. Potable water shall not be used for this purpose.

(ii) The first row of sod shall be laid in a straight line with subsequent rows placed parallel to and tightly wedged against each other. Lateral joints shall be staggered to promote uniform growth and strength. Ensure that sod is not stretched or overlapped and that all joints are butted tightly together in order to prevent voids which would cause air drying of the roots.

(iii) On sloping areas where erosion may be a problem, sod shall be laid with the long edges parallel to the contour and with staggered joints. Securing of sod may be required by tamping, rolling, pegging, stapling, or other methods deemed appropriate by the Building Official.

(iv) As sodding is completed in any one section, the entire area shall be rolled or tamped to insure solid, unbroken contact of the roots with the soil surface. Sod shall be watered immediately after rolling or tamping until the underside of the new sod pad and soil surface below the sod are thoroughly wet. The operations of laying, tamping and irrigation for any piece of sod shall be completed within (8) hours.

(v) When sod is to be installed in or adjacent to drainage channels where anticipated flows could displace the sod, it shall be laid perpendicular to the flow direction and stapled and covered with utility mesh or jute mesh using 12 inch, high carbon iron staples with approximately 2.5 staples per square yard of sodded area.

D. Maintenance. Sod shall be maintained by watering, fertilizing or other means necessary to promote survival. Sod not surviving shall be replaced.

4. Sprigging - Sprigging may be used as an alternative planting method to seeding or sodding and is particularly useful in establishing hybrid Bermudas and some bent grasses. Site preparation, topsoil and seedbed preparation shall be as for seeding. Sprigs or stolons shall be uniformly broadcast at a rate of 30 bushels per acre for slopes of five to one (5:1) or less and 40 bushels per acre for slopes of greater than five to one (5:1). Sprigs or stolons shall be mulched as per Section 7010 (d) 2.F. above. When broadcast by hydraulic methods sprigs and stolons should be broadcast with 500 pounds of mulch per acre and capped with an additional 1400 pounds of mulch per acre.

5. Other Vegetation Restoration - Other planting may be required by this Section of the Building Code in order to restore vegetation, permanently stabilize slopes, control erosion and enhance wildlife habitat.

A. Planting methods shall be used that will assure that:

(i) The plants are planted as shown on the approved plan.

(ii) The plants are kept moist, fresh, and protected from wind and sun to prevent mortality before planting. Plants shall be transported in such a manner that sufficient mud and/or water is available to the roots until actual planting unless the roots have been clay dipped for moisture protection, in which case the roots may be wrapped in wet burlap until planted instead of being carried in a bucket.

(iii) The plants are planted at approximately the same depth as they were growing in the nursery; i.e., the root collar should be at ground level unless otherwise specified on the approved plans.

(iv) The plants are planted erect.

(v) The plant roots are spread carefully in a natural position in the planting hole.

(vi) The plant roots are completely covered with soil.

(vii) The plant is securely planted with the soil firmly packed around the roots. It may be necessary to stake plants for support and such staking details should be shown on the approved plans.

(viii) The plants are to be thoroughly watered the day they are planted. All excess material excavated during planting shall be used as a cup for water retention.

(ix) The plants shall be provided with an appropriate mulch or the establishment of grasses and legumes for temporary erosion and sedimentation control until they can become established.

(x) The seedlings are protected from future fire and equipment damage. Domestic animal grazing is prohibited in the planted area.

(xi) The plants not planted within 24 hours after delivery shall be "heeled in" in a moist earth trench. Bundles shall be opened and plants separated. Plants shall be placed singularly in the trench with the roots spread in a natural position. Seedlings may be layered in the trench, but the roots for each layer of seedlings must be immediately covered with most, pulverized earth or moist sawdust. Trees in the heeled-in trench should be watered at intervals to prevent drying until they are planted.

(xii) The plant species to be planted must be adapted to the site.

(xiii) Planting stock must be healthy and free of insect and disease pests.

(xiv) The root system is to be well developed, fibrous, and kept moist until planted.

B. Such planting may consist of:

(i) Shrubs, Vines and Perennials - Planting of some shrubs, vines and perennials may be necessary in order to restore vegetation to an acceptable level as required by the Building Official.

(ii) Trees - General vegetation restoration, stream rehabilitation, and stormwater detention pond landscaping may require tree planting as determined by the Building Official.

(iii) Barriers - In providing vegetation restoration, it may be required that plant barriers be implemented to restrict access to stormwater detention areas.

(iv) Wet Soils Plants - Vegetation restoration adjacent to streams, following watercourses, and within open stormwater detention facilities require plants which will survive in wet soils.

(v) Aquatic Plants - Stream, pond, and wetland vegetation restoration requires plants which can survive in an aquatic environment.

(vi) Maintenance - Watering, remulching, and fertilizing may be required on new planting during the period of establishment. Planting failing to accomplish their purpose and/or failing to survive for a period of one year shall be restocked.

(vii) Fertilization Near Surface Water Courses - Fertilizing and other use of chemicals may be limited by the building official when deemed to be near enough to surface water to adversely impact the aquatic environment.

The Building Official shall consult with the City Biologist to develop a list of approved planting types. Native, drought resistant plants shall be used wherever feasible. Types of planting installed shall be determined on a case by case basis from the list of approved planting types. Prior to the issuance of a grading permit, the permittee shall submit a complete list of plant types, including botanic names for review by the building official.

(e) **Temporary Erosion/Water Quality Control.**

1. Prior to any clearing and grading of any land development, devices for interception of all runoff from the cleared area shall be installed. Said interception shall preclude discharging silt-laden runoff from the proposed land development to downstream properties to the maximum extent possible with the best available technology. Said interception shall cause all silt-laden runoff to be conveyed by open swale or other means to whatever temporary facility is necessary or required to remove silt from said runoff prior to discharge to downstream properties (see Part 5 below). Sequence of work shall be specified on the plans.

2. Care shall be taken so as to deposit no material from sites of land alteration activity onto public rights-of-way and/or adjoining properties. If such depositions occur, it shall be the responsibility of the Permittee to immediately remove such material from public right-of-way and adjoining properties, and restore to the original conditions.

3. Since site conditions may change rapidly during construction due to construction activity, weather, and other factors, it should be anticipated that the erosion control measures on the approved plan may become ineffective. Under special conditions, measures additional to those showing on the plan may be required by the Building Official in order to control erosion and sedimentation when such special conditions occur.

4. The following shall be carried as general notes on the Temporary Erosion/Water Quality Control Plan:

A. All construction shall be in accordance with the City of Malibu's Development Standards, Malibu Municipal Code, Permit Conditions, and all other applicable codes, ordinances, standards and policies.

B. The temporary erosion control system shall be installed prior to all other construction.

C. Where possible, maintain natural vegetation for erosion and siltation control.

D. As construction progresses and seasonal conditions dictate, more siltation control facilities may be required to ensure complete siltation control. Therefore during the course of construction, it shall be the obligation and responsibility of the permittee to address any new conditions that may be created by his activities and to provide additional facilities over and above the minimum requirements as may be needed to achieve the performance standards required by the grading permit.

E. All disturbed land areas unworked for seven (7) days or more shall be protected from erosion by hydroseeding with a mix or by a method approved by the building official. If required due to weather, timing, or site conditions, the hydroseeding shall be supplemented by mulching with straw a minimum of 1 inch thick and stapling jute or utility mesh over the mulch.

G. Prior to occupancy of the building, the permanent storm drainage system shall be adequately cleaned to the satisfaction of the building official.

H. The Permittee shall be responsible for preventing water pollution due to construction materials, methods or equipment. All exposed aggregate concrete shall be installed and constructed so that no wash water enters the storm drainage system. The contractor shall provide a separate area, a minimum of 200 square feet in size, for washing of concrete trucks. This area shall also be isolated so that no water enters the storm drainage system." All washed concrete shall be contained and removed to a suitable dump site.

5. General Methods of Temporary Erosion and Sedimentation Controls - The types of controls below shall be utilized in such combination as is necessary to achieve the level of erosion control required by the Building Code and meet water quality objectives. Temporary erosion control facilities shall be periodically inspected and maintenance performed in order to ensure their proper functioning as required by the approved erosion and sedimentation control management plan.

A. Temporary Siltation/Sedimentation Ponds are basins created by construction of a barrier or by excavating a basin or by a combination of both (see Drawing Nos. 1, 2, 3 and 4).

Temporary siltation/sedimentation ponds or equivalent treatment methods shall be required for all land alteration operations in order to detain runoff waters and trap sediment from erodible areas thus protecting properties, drainage ways, and streams below the installation from damage by excessive sedimentation and debris deposition. The temporary pond requirement may be waived, at the discretion of the Building Official, for areas of land disturbance less than 6,000 square feet where potential damage is limited to the cleared site as long as runoff from all such areas is filtered or treated to the satisfaction of the Permit Authority prior to discharge from the site.

Temporary ponds shall be designed to the following standards:

(i) The dam or barrier forming the pond shall be located to provide for maximum volume capacity for trapping sediment behind the structure as well as for greatest ease of clean out. Typical dams and barriers are shown in Drawing Nos. 2, 3 and 4.

(ii) Siltation ponds shall provide a minimum of one foot below the outfall elevation for storage. Sediment storage volumes shall be sized to contain the volumes derived from calculations in (iii) below.

(iii) Desilting pond volumes shall be determined based on the detention time needed to achieve the water quality objectives for the project based on the soil types and hydrologic conditions on the site. A "20-year" runoff volume shall be used for design.

(iv) Interior sides of the siltation pond shall be no steeper than three feet horizontal to one foot vertical.

(v) An outfall consisting of a vertical pipe or box type riser joined by a water tight connection to a pipe which extends through the barrier or dam forming the pond shall be provided. See Drawing Nos. 2, 3 and 4. The outfall shall have the capacity to discharge the ten year frequency peak flow with eight (8) in. diameter being the minimum outfall pipe size. Use the Rational Method, or other appropriate model for analysis and sizing of all temporary drainage structures and facilities.

(vi) The crest elevation of the riser shall be a minimum of one foot below the lowest elevation of the barrier or dam forming the temporary pond providing a minimum one foot of free-board.

(vii) The anti-vortex device and trash rack shall be securely installed on the top of the outfall riser. An anti-vortex device shall consist of a rigid vertical plate firmly attached to the riser and oriented to the centerline of the dam, having the following dimensions: length = diameter of the riser plus 12 inches; height = diameter of the outfall pipe (see Drawing No. 5). Another approved device is the concentric cover trash rack which also functions as an anti-vortex device (see Drawing No. 6).

(viii) The bottom of the riser shall be attached to a minimum one foot high base or sufficient mass so as to prevent riser flotation.

(ix) Conveyance to the pond shall be by means of sod-lined swales or channels. Straw bale or equal filters shall be placed evenly with one filter for each two feet of vertical drop. Channels shall be kept clear of sediment and filters shall be replaced as necessary. Sediment and filter material shall not be disposed of in any area where they could re-enter the drainage system or streams. Channel width shall contain flows at all times.

(x) A gravel filter consisting of washed gravel or quarry rock having less than 2% fines shall be placed around the perforated riser.

(xi) Discharge from the siltation pond shall be to a sod or rock lined waterway (see Drawing No. 7) and shall pass through a filter fabric fence (see Drawing No. 8) immediately prior to discharge from the site.

(xii) Sand filtration may be incorporated into the pond design as shown in Drawing Nos. 25 and 26. Length of the filter shall be sized according to a modified version of the Darcy Formula where

$$L = \frac{Q}{K\,i\,W}$$

In this formula L is the length of filter, Q is the runoff rate for a design storm in the area tributary to the pond, W is the trench width, K is the permeability rate of the filter media in (ft/hr) determined by measurement of the material used, and i is the hydraulic gradient in (ft/ft). For a conservative result, i can be assumed as a constant of unity. More sophisticated methods such as consideration of changing head or flow net analysis may also be used to size the filter.

(xiii) Interior surfaces of the desilting pond shall be stabilized where required to prevent erosion of the pond bottom and sides. Care shall be taken in design and operation of the pond to minimize disturbance of settled material.

B. Check Dams and Berms may be incorporated into the erosion control facilities as follows:

(i) Strawbales (staked in place) may be used as energy dissipating drop structures, flow direction control structures and/or dams to create ponding in swales. See Drawing Nos. 1, 4 and 9.

(ii) Rock berms may be used as filtering devices, flow control direction devices and/or energy dissipators. Rock berms shall consist of washed gravel or quarry rock having less than 2% fines. See Drawing No. 10.

(iii) Earth berms may be used to control flow direction and prevent silt-laden water from discharging into adjacent properties and/or public rights-of-way. Acceptable earth berms are the temporary diversion dike (Drawing No. 11) and the temporary perimeter dike (Drawing No. 12). All exposed slopes on berms shall be protected from erosion by the methods in this Section as applicable.

C. Natural/Synthetic Matting Erosion Control Measures may be incorporated into the erosion control facilities as follows:

(i) Natural and/or restoration vegetation shall be preserved whenever possible to maintain erosion control.

(ii) Mulches, such as straw, may be utilized on temporary road surfaces or exposed areas as necessary during inclement weather conditions to maintain erosion control. On steep slopes, it may be necessary to hold mulch in place with utility mesh or equal material. Utility netting shall be a 1" x 2" mesh held in place with 12 inch high carbon iron staples. See Drawing No. 13.

(iii) Impervious Covers such as plastic sheeting may be used on embankments and disturbed surfaces to control erosion during inclement weather conditions. Plastic sheeting shall be stapled to the ground or held in place with tires and/or rocks.

(iv) Pervious covers such as jute matting, nylon/paper weave, matrix-type soil reinforcement matting, or other approved material may be used on embankments and disturbed surfaces to control erosion during inclement weather conditions and to protect topsoil and seed during seeding/restoration operations. See Section 7010(d) for materials and methods specifications for jute matting and paper/nylon weave.

D. Filtering Devices such as filter fabric fences shall be used to filter runoff prior to discharge from site. See Drawing No. 8. Approved filter fabrics are celanese fiber, polyvinyl chloride woven cloth, reinforced chlorosulfinated polyethylene cloth, clorinated polyethylene woven cloth, or approved equal. Woven drainage fabric equivalent to a US Std. Sieve of 70-100 shall be installed in existing storm drain inlet grates whenever the possibility is present of silt-laden runoff entering the inlets from the construction site. Fabrics shall be replaced whenever clogged.

E. Intercepting Ditches are recommended, whenever possible, to be located across future building sites to preserve natural vegetation. Intercepting ditches outside of future building sites should meander to avoid trees. See Drawing No. 14.

F. Cut-off Trenches are recommended to dissipate drainage into the natural on-site vegetation. However, drainage from disturbed areas must be directed into a siltation pond prior to leaving the property under permit.

G. Temporary Level Spreaders may be used to intercept and divert concentrated runoff to a stabilized outlet area on-site such as an area of well established erosion resistant vegetation. This structure is constructed at zero grade across the slope and converts the flow of stormwater to a sheet flow at the outlet. See Drawing No. 15.

H. Flexible Down Drains may be utilized as temporary structures to protect open slopes and shall be constructed of flared end sections connected by plastic sheet tubing, heavy duty fabric, or nonperforated corrugated plastic pipe. See Drawing No. 16.

I. A Gradient Terrace is an earth embankment or ridge designed so that the tip of the constructed ridge is no lower at any point than the design elevation of the water surface at the outlet under design flow and is installed so as to intercept surface runoff and convey it to a stable outlet at a non-erosive velocity.

The terrace cross section should be proportioned to fit the land slope and shall have enough capacity to handle the peak runoff expected from a ten-year frequency storm without overtopping. Maximum channel grades shall be 0.6 feet per 100 feet in length. The ridge height should include a reasonable settlement factor and shall have a minimum top width of three feet at the design height. The minimum cross-sectional area of the terrace channel shall be eight square feet for land slopes of five percent or less, seven square feet for slopes from five to eight percent, and six square feet for slopes steeper than eight percent. See Drawing No. 17.

J. A Swirl Concentrator is a device used to separate solids from runoff. The device may be utilized to remove silt from construction site runoff prior to discharge and may be required by the Building Official. See Drawing No. 18.

K. A Temporary Construction Entrance is a rock stabilized temporary entrance pad and shall be constructed at points where traffic will be entering or leaving a construction site from or onto public right-of-way. Rock stabilizing material shall consist of a poorly graded rock greater than 1" but no greater than 1 1/2". The pad shall be of sufficient length and width to eliminate transportation of mud and sediment from the construction area onto the public right-of-way by motor vehicles or by runoff, but under no circumstances shall it be less wide than the ingress/egress at the right-of-way nor less than 50 feet long. The stabilized construction entrance shall be a minimum thickness of eight inches and constructed of material approved by the Building Official. The entrance shall be maintained to the satisfaction of the Building Official. (See Drawing No. 19). When site conditions are such that the temporary entrance pad fails to perform as required, all vehicles exiting the site shall have their tires and wheels cleaned by sweeping, brushing, or washing prior to entering public right-of-way. All washing shall be done on an area draining to an approved erosion control facility.

L. Interception and Pump-Back Systems to collect runoff from cleared and graded portions of a site and pump to discharge as sheet flow through undisturbed portions of the site shall be designed on a case-by-case basis as required by the Building Official to achieve water quality objectives. Pump discharge shall be sited to not cause flooding, erosion, or other damage to adjacent properties.

M. Chemical or Physical Treatment Plants - The use of portable chemical or physical treatment plants may be necessary to meet water quality objectives. Examples of such types of treatment would be swirl concentrators or flocculation plants. Sizing of these plants shall be determined on a case-by-case basis.

6. Erosion Control Practices During Roadway and Parking Lot Construction - In addition to those erosion control methods described above, the additional erosion control measures below may be necessary to protect the installed storm drainage system and/or downstream systems and shall be utilized in such combination as is necessary to achieve the requirements of the Building Code. Erosion control facilities shall be periodically inspected and maintenance performed in order to insure their proper functioning.

A. Sediment Traps are structures of limited capacity designed to create a temporary siltation pond/filter around storm drain inlets or at points where silt-laden storm water is discharged. Periodic maintenance is crucial to the proper functioning of sediment traps. Examples of typical sediment trap installations are the sand bag type (Drawing No. 20), the gravel filter/pond type (Drawing No. 21), and the gabon type (Drawing No. 22).

B. Interceptor Dikes are temporary berms of compacted soil or gravel constructed across disturbed rights-of-way. Interceptor dikes shall be designed and constructed so as to reduce erosion by intercepting storm water and diverting it to stabilized outlets such as siltation/sedimentation ponds or areas of well established vegetation. See Drawing No. 23.

7. Miscellaneous Practices - There are other construction practices which must be observed during land alteration operations in order to make erosion and sediment control measures effective:

A. Construction field offices, storage yards and shop yards should be located where erosion and sediment hazards are slight. Where this is not possible the necessary erosion control practices must be applied.

B. During dry weather conditions when dust may become a problem, dust suppressors shall be applied.

C. Fording of streams with machinery is not an acceptable construction practice. Temporary bridges or culverts shall be used where stream crossings are unavoidable.

D. Utilization of borrow areas where pollution from the borrow operation is inevitable shall be avoided.

E. All elements of the drainage system, including storm drains, streams, and wetlands, shall be protected from chemicals, fuel, lubricants, sewage, or other pollutants during ' ınd alteration operations.

F. Placement of fill in drainage ways or floodplains is prohibited.

G. Use of the drainage system for disposal of any waste products, pollutants, or contaminants whatsoever is strictly prohibited.

(f) **Permanent Erosion/Water Quality Controls**

1. General. A storm water management system shall be designed to provide for detention/retention; pollution abatement; recharge, where possible; and protection from flooding. The City storm water management perspective includes the control of both the water quantity discharging from the site and storm water quality.

Permanent drainage and storm water detention facilities shall be provided on all property improvements within the City of Malibu in accordance with the Standards for the following types of development:

A. All subdivisions creating new building lots.

B. All developments creating new impervious surfaces.

C. Remodeling to buildings or structures of a commercial development shall be subject to a review by the building official to determine if additional drainage facilities are required.

D. The construction of new building or a multiple building commercial development on a single parcel of property where the square footage of the new building or structure exceeds twenty percent of the sum of the square footage of all other buildings on the parcel.

E. Developments entailing construction which would change the point of discharge of surface waters, discharge surface waters at a higher velocity than that of the pre-construction discharge rate, or tend to add to pollution of surface waters.

F. Construction or reconstruction of public or private roadways.

G. Developments entailing construction in or adjacent to any existing stream or surface water course including intermittent streams.

H. Developments requiring construction adjacent to the 100 year floodplain of any stream. All new developments shall be required to explore the use of recharge facilities. It shall be the responsibility of the permittee to determine if the site and soil conditions allow the use of recharge facilities.

2. Requirements

A. All development activities shall make provisions for drainage pursuant to the requirements of Malibu Municipal Code and those set forth in the Building Code.

B. These standards are intended to supplement the Los Angeles County Flood Control District standard designs.

C. Plans for said storm drainage and detention facilities shall be prepared by a registered Civil Engineer currently licensed by the State of California and qualified by experience and education in the fields of hydraulics, hydrology, or a closely related field. Said plans shall be submitted to the appropriate agency for review and approval by the building official prior to issuance of permits for construction. Any revisions to the approved plans shall be submitted to, and approved by, the Building Official prior to construction of those elements of the approved plan for which revision is requested.

D. All drainage system elements shall provide for adequate maintenance and accessibility at all times. No storm drainage system elements shall be located within ten feet of (unless otherwise approved by building official) or underneath any structure and the system shall be designed to eliminate interference with underground utilities and from conditions which exceed design loads for any pipe or other structural elements.

E. All aspects of public health and safety must be carefully reviewed in every drainage control system plan. Protective measures are often necessary and shall be required whenever deemed appropriate by the building official. The protective measures themselves shall be designed so as not to constitute hazards or nuisances.

F. The designer must consider system reliability in terms of layout, specification of materials and method of installation, and the influence of other activities in the area both during and after construction.

G. The use of the site should be evaluated to determine if hazardous materials or other pollutants are likely to be present, and if extraordinary design considerations are necessary.

H. The visual impact and other potential problems (mosquito breeding, smell, etc.) must be considered. Concerns will vary with the site environment, but aesthetics should always be of concern to the designer.

I. Drainage originating within the envelope of a structure as defined by the Uniform Building Code shall be discharged to an approved sewage/greywater disposal system. No drainage originating inside of a structure shall be connected to the storm drains or surface water system.

J. Offsite improvements may be required if on-site controls are insufficient to mitigate impacts due to flooding, erosion, sedimentation, pollution, or habitat degradation.

K. Permittee shall meet all applicable federal, state and local water quality standards prior to discharge to any wetland, stream or ocean.

L. Prior to occupancy of any single phase of a phased development, storm drainage facilities shall be completed and operational to provide runoff control, detention, and water quality treatment for the phase for which occupancy is requested.

3. Runoff Control

A. Allowable Release Rate. Allowable runoff from the project site shall be limited to the pre-development peak runoff. Peak runoff rate shall be computed using Rational Method Hydrology as modified by Los Angeles County Flood Control District, or other appropriate models.

B. Sizing of Control

(i) Where sharp edged circular orifices are used for discharge restriction, flow shall be calculated by the formula $Q = Ac\ (2gH)^{1/2}$ and "c" = 0.62. "H" shall be the vertical distance between the maximum water surface and the outfall invert in feet. "D" shall be the diameter of the restrictor plate orifice, in inches.

The derived equation:

$$D = \frac{6.07\ (Q^{1/2})}{H^{1/4}}$$

shall be used in sizing the control orifice.

The control orifice size from the above equation shall be rounded to the nearest lower 1/8 inch and shall be specified as a "drilled" orifice to achieve the circular and sharp edged qualities required. See Drawing No. 31.

(ii) For control of release from open ponds and swales with low-head designs, a sharp-crested V-notch or rectangular weir with overflow and a hood for debris control may be used. This design is most effective in conjunction with wet detention ponds.

The weir shall be sized according to Eq. (5-13) of the Handbook of Hydraulics by E.F. Brater and H.W. King, 6th Edition, published by McGraw-Hill.

$$\text{Discharge, } Q = C_1 \tan \phi/2\ H^{2.5}$$

for a v-notch weir where ϕ is the angle subtended by the notch, H is the head above the apex of the notch and C_1 is a coefficient obtained from Figure 5-4 of the cited reference. The overflow shall be sized to pass runoff from a "100 year" storm. For a rectangular sharp crested weir, the discharge shall be calculated by using an equation of the form

$$Q = CLH^{3/2}$$

as outlined in Chapter 5 of the above-cited reference, Eq. (5-10).

(iii) Where the allowable release rate from the detention system exceeds 1 cfs, or for sites meeting the criteria of Section 3.A.(ii) herein, a multiple orifice control shall be used having orifices at two different elevations, with the lower orifice being sized to pass the "2-year" release rate, and the upper orifice being sized to pass the "10-year" release rate. Overflow elevation shall be set at the elevation necessary to achieve the "100-year" storage volume. In this case, the diameter of the lower orifice becomes

$$\text{Diameter in inches} = \frac{6.07\,(Q^{1/2})}{(H_2)^{1/4}}$$

Where H_2 is the elevation difference between the outfall invert and the "2-year" water surface level in the detention facility. Q is the allowable "2-year" release rate. (See Drawing Nos. 32, 33 and 34.)

(iv) Offsite stormwater flows passing through the site shall be conveyed by a hydraulically adequate conveyance system. Appropriate easements shall be provided. The conveyance system shall bypass the detention system wherever possible, except where a multiple orifice restrictor is used. All conveyance and detention systems shall be compatible with connecting offsite elements. In the case of an open stream conveyance passing through a site, outfall elevations for the onsite system shall be above the "100 year" flood level of the stream. In the case of a major trunk conveyance system, outfall elevations for the on-site system shall be above the hydraulic grade line elevation for "100 year" flows. The use of pumped systems or backflow preventors is not an appropriate means of preventing flooding on private property due to backwater conditions.

4. Design Storm (Minimum)

Facility	Design Storm Frequency
Canals, ditches, swales or culverts for drainage	10 Year
Detention/Retention Structures with a positive outlet (detain runoff volume difference between undeveloped and developed).	100 Year
Houses/Buildings First floor elevation must be a min. of 12" above the 100-Year Flood Elevation	100 Year
Recharge Facilities	10 Year

All storm drain facilities not identified above shall be designed in accordance with the Los Angeles County Flood Control District minimum standards.

The design frequency for major drainage systems may be increased if deemed necessary by the Building Official or Flood Control District to protect upstream or downstream properties or to comply with other regulations.

5. Design Standards. The minimum design standards included herein are intended to supplement existing County design standards. Compliance with these standards in no way relieves the designer from compliance with other applicable design standards.

A. Detention/Retention Facilities

(i) Sizing - The storage requirement performance criteria is given below. In calculating the storage volume provided, do not include "dead storage" in "wet ponds", i.e. that volume of water which must be assumed to be present in the detention system at the commencement of the design storm. Any volume at a level below that of the outfall invert must be presumed to be dead storage, e.g. catchments.

a. For sites where the allowable release rate can be determined by the method in Section 3.A.(i) herein, the storage volume shall be determined as follows:

One (1) inch coverage of water is required to be stored for the area which is impervious. (Compacted areas surfaced with gravel or other material area are assumed to be impervious.) This is easily calculated by dividing the square footage of impervious area by 12, which expresses storage required for the impervious area in cubic feet.

Because of unknown infiltration conditions, storage may be required for pervious as well as impervious areas.

The storage required is 0.5 inches coverage of water for the pervious surface area. This is calculated by dividing the square footage of pervious area by 24, which expresses the storage required for the pervious area in cubic feet.

Total storage volume required is obtained by multiplying the sum of the contributions from pervious and impervious areas by 1.3. Expressed in equation form:

$$V_T = (V_1 + V_p) \times 1.3$$

where V_T = Total storage volume required in cubic feet

V_1 = Impervious contribution = $\frac{\text{Area of Impervious Surface (sq. ft.)}}{12/_{ft.}}$

and V_p = Pervious contribution = $\frac{\text{Area of Impervious Surface (sq. ft.)}}{24/_{ft.}}$

b. For sites where the allowable release rate is determined by the method in Section 3.A.(ii) herein, the volume of storage shall be determined by the difference in runoff volumes vs. allowable release volumes as calculated by the modeling.

c. Subdivisions. Required storage requirements for a development shall be calculated based on the proposed development impervious surface area.

(ii) Controlled Overflow Requirements - All detention storage facilities shall include a provision for control of overflows, and suitable data shall be provided to support the design. Under no circumstances shall the overflow be overland to public right-of-way or over private property not being developed under the permit without written permission. Open detention ponds other than those in parking lots shall require a minimum of two controlled emergency overflows - one in the control structure and one located in the engineered berm or parking area. Overflows shall be located at least 1.00 foot below the lowest habitable finished floor elevation.

(iii) Detention Storage Facility Requirements - Detention facilities shall be open basins or ponds, roof top storage, parking lot ponding or underground storage (pipe/chamber) where adequate treatment is provided, or combinations of any of the above.

a. Parking Lot Ponds.

Parking lot ponding shall be used only where other types of detention facilities cannot be used due to site constraints.

(1) Maximum water depth of the low point of parking lot retention facilities shall be one (1) foot.

(2) Slopes on all parking lot surface ponds shall not exceed 7% in areas designed for vehicular traffic.

(3) All parking lot ponds shall be designed and constructed in such a manner so as to provide a freeboard of at least 3 inches. In other words, the maximum water elevation shall be 0.25 feet lower than all devices designed to contain the ponding.

(4) A minimum of 10% of the volume of water to be detained on the surface of a parking lot shall be stored underground and/or in a pond other than on a parking surface. Storage facilities shall be at a lower elevation than the parking lot to fill prior to any parking lot ponding taking place.

(5) The maximum water surface and overflow elevation in a parking lot pond shall be at least one foot below the lowest habitable finished floor elevation of buildings within the proximity of the pond. Under no circumstances shall ponds or other detention facilities be designed so that system failure would cause flooding in any habitable building area.

No parking lot ponding shall be allowed under a habitable structure. Whenever the possibility of accidental flooding of an underground parking facility or other uninhabited building area exists, care shall be taken to floodproof electrical equipment areas and other building appurtenances with overflow and/or pump systems being provided to drain such a flooded facility. Pump systems shall be duplex with an auxiliary power source. Pump systems shall only be used for backup to a gravity drained detention system.

(6) When parking lot ponding is utilized, a note shall be included on the plan stating: "Grading is critical to functioning of detention system and the dimensions and elevations shown on the plan shall be strictly followed."

(7) Parking lot ponds may be utilized, only when soils report indicate that underlying soils are stable or can be made stable and when the proposed parking lot ponding area will not be subject to settlement.

(8) Parking lot pond design volumes shall be shown on the plans and the pond volume inspected prior to paving (a note to this effect shall be shown on the plans). "As Built" pond volume shall be shown on the engineered "As Built" plans.

(9) Where curbing is used to contain a parking lot pond that curbing shall be full depth vertical curb. The use of extruded curbing bonded to the pavement shall not be allowed around the perimeter of any parking lot pond.

(10) No parking lot ponds shall be located within the primary ingress/egress portions of a site. Parking lot ponding shall be so designed that at maximum water level a minimum eleven foot wide emergency vehicle lane to the buildings will remain unflooded under all conditions, including system overflow condition.

(11) All parking lot ponds shall include special provisions to reduce water quality impacts of flooding contaminated areas. These may include, but need not be limited to, corrugated plate separators, long vegetated swale conveyance away from the control structure, or other types of water quality treatment.

(12) See Drawing Nos. 35 and 36 for typical parking lot ponding sketches.

b. Open surface ponds shall be used in preference to closed detention systems.

(1) Slopes on all interiors of surface ponds shall not exceed three f et horizontal to one foot vertical (3:1) for all detention ponds in residential plats. Ponds in commercial developments which are to remain under private ownership and maintenance shall have at least one interior slope not exceeding three feet horizontal to one foot vertical (3:1). All other sides with slopes exceeding three to one (3:1) shall be retaining walls designed by a licensed structural engineer. The use of rockeries on detention pond interiors shall not be permitted. Interior pond sides with a three to one (3:1) slope or less shall be stabilized and vegetated with sod or an appropriate mulch and seed mixture.

(2) The bottom of all ponds less than three feet deep shall have six feet as a minimum dimension. The bottom of all ponds three feet or more deep shall have 15 feet as a minimum dimension. Maximum water depth in all ponds shall be five feet.

(3) Ponds suited to multiple use are strongly encouraged. Examples of multiple uses are sport courts, play areas, neighborhood parks, and picnic areas. Such ponds may be designed with engineered retaining walls (with slopes exceeding three to one (3:1) only as approved by the Building Official on a case by case basis.

(4) All ponds shall have a landscape plan and shall be landscaped with vegetation so as to provide slope stability and pleasant appearance by utilizing sodding, seeding, and planting of trees and shrubbery, etc. Landscape materials and the maintenance thereof shall be fully compatible with use as a detention facility. Under no circumstances shall use of easily floatable or erodible materials be permitted in pond interiors. Landscape materials shall be selected for water quality enhancement potential.

(5) Maintenance of surface ponds in commercial developments shall be the responsibility of the property owner or Property Owner's Association. Maintenance of surface pond landscaping in single family residential areas shall be the responsibility of the adjacent property owners or homeowners association except in the case of multiple use ponds or other ponds dedicated and accepted for maintenance by the City. Maintenance of landscaping and facilities of multiple use ponds in single family residential developments shall be the responsibility of the homeowners association unless accepted for maintenance by the City.

(6) Containment berms for all detention ponds other than those in parking lots shall have a minimum of one foot of freeboard above the maximum design water surface.

(7) All constructed and graded retention/detention ponds shall be sloped no flatter than 0.01 ft./ft. (1%) towards the outlet(s), for drainage.

EXCEPTION: This requirement need not apply to naturally occurring ponds or wetlands, which are utilized for storm water detention.

(8) The use of detention ponds having a permanent standing water area may be required for removal of certain types of pollutants if the impact of pollutant loading on adjacent waterways is deemed significant by the Building Official. Multiple-stage ponds may be required to provide better pollutant trap efficiency.

(9) Use of "flow through" detention ponds is encouraged due to their potential water quality benefits. All "flow through" detention ponds shall have a well defined low flow channel to contain runoff of lesser storms. Any low flow channel shall be designed so as to enhance the pond landscaping and overall pond appearance. Plantings shall be used to provide water quality enhancement. Ponds shall be designed to minimize "short circuiting" of the flow through the use of appropriately designed baffles.

(10) Outlets of all detention ponds shall be provided with suitable debris barriers or trash racks designed to protect the outlet from blockage or plugging.

(11) The maximum design water depth in all detention ponds shall be five feet.

(12) The design volume of detention ponds shall be shown on the plan and the pond volume shall be inspected by the building official prior to landscaping. A note to this effect shall be shown on the plans.

(13) Storm retention/detention ponds may be utilized as Interim Drainage Facilities if cleaned following completion of paving and if approved by the building official.

(14) See Drawing No. 37 for a typical surface pond sketch.

c. Embankments

(1) Any embankment for a detention pond must be approved by a qualified geotechnical engineer and the building official. The minimum top width of this berm shall be 15 feet, unless otherwise approved by a qualified, licensed engineer and the building official. A geotechnical engineer experienced in soils mechanics, shall inspect and certify the construction of any such berm. All embankments shall comply with the Los Angeles County Flood Control District, Debris Dams and Basins Design Manual. The applicant shall comply with all other agencies' requirements prior to approval by the building official.

(2) Any embankment less than 3 feet, including 1 foot of freeboard, in depth forming one or more sides of a retention/detention pond shall have a minimum 6 foot wide berm with a back slope not to exceed two horizontal to one vertical (2:1) unless otherwise approved by the Engineer and designed by and with construction being certified by a geotechnical engineer.

d. Access

(1) All detention pond control structures to be maintained by the City not abutting a public right of way shall be accessible to the City for maintenance and operation. Access shall be provided in dedicated tracts and shall accommodate Cit, maintenance vehicles.

(2) A vehicular access ramp must be provided to the bottom of the retention/detention pond when the bottom width of the pond is 20 feet or greater and/or when the height of the pond interior wall exceeds five feet. The access grade into the proposed retention/detention pond shall be no steeper than ten feet horizontal to one foot vertical (10:1).

e. Enclosed Detention Systems

(1) Maintenance of detention system in private commercial developments or single family lots shall be the responsibility of the property owner.

(2) Adequate access to enclosed detention systems shall be required with access structures at each end of the facility and vehicular access to those structures suitable for travel by a factor, jet-rodder, or other commonly used maintenance equipment. See Drawing Nos. 38 and 39.

(3) All enclosed detention facilities constructed above ground shall be provided with suitable visual screening as per these Standards and the City's Zoning Ordinance.

f. Rooftop Detention systems

(1) The maximum allowable depth of any rooftop detention facility shall be two (2) inches.

(2) All rooftop detention facilities shall be provided with overflow scupper drains at the maximum water surface elevation.

(3) Roof drain ring general information data:

- Roof drain ring is placed around standard roof drain installations.

- Roof drain ring shall be furnished with set(s) of holes as per requirements. See Tables 2 and 3 below.
- Number of hole sets is to be based on storage requirement, allowable rate or release, and water depth at inlet.
- Minimum spacing between holes to be 2 inches on center.
- Height of ring to be determined by roof slope and storage required with two (2) inches being the maximum allowable height.
- A set of holes refers to one-half round and full round above it as depicted in Drawing Nos. 40 and 41.

Allowable Release Rate and Storage Requirement for Rooftop Detention Facilities:

TABLE 2

ROOF AREA (S.F.)	STORAGE REQ'D (CF)	ALLOWABLE RELEASE RATE (CFS)
1,000	83	.0046
2,000	166	.0092
3,000	250	.0138
4,000	333	.0184
6,000	500	.0275
8,000	667	.0367
10,000	833	.0459
14,000	1167	.0643
18,000	1500	.0826
22,000	1833	.1010
26,000	2167	.1190
30,000	2500	.1377
36,000	3000	.1653
42,000	3500	.1928
50,000	4167	.2297

TABLE 3

WATER DEPTH AT INLET (INCHES)	DISCHARGE CAPACITY THRU SET OF HOLES PER RING (CFS)							
	1	2	4	6	8	10	12	14
1.5	.0022	.0044	.0088	.0132	.0176	.022	.0264	.0308
2.0	.0046	.0092	.0180	.0276	.0368	.462	.0552	.0644
2.5	.0114	.0228	.0456	.0684	.0912	.114	.1368	.1596
3.0	.0137	.0274	.0548	.0822	.1096	.137	.1644	.1918

(4) All roof drain leaders inside building walls shall be continuously marked "storm drain only" in 2 inch high letters contrasting with the pipe surface. Marking shall be clearly visible at all times until installation of interior wall materials.

B. Oil/Sand Separators. Whenever paved parking is provided for more than 10 vehicles, or any paved parking or access roadway provided within one quarter mile of any open waterway or stream, an oil/sand separation device shall be installed by the Developer. Drawing Nos. 28, and 29 or 30 depict typical devices acceptable to the City. It shall be located at a point where it can be easily maintained and where it will intercept floating contaminants flowing off road right-of-way, parking lots and other sources of pollutants. Selection and sizing of oil/sand separation device type shall be subject to approval of the Building Official and shall include the maximum use of vegetative or other natural filtration means possible. Effluent discharged from any oil removal treatment device to the storm sewer or surface water system shall contain less than 10 parts per million total oil and be in compliance with applicable State and Federal regulations for discharge to storm drains or surface waters.

(i) This information is recommended for use as a guide in the design of oil separation facilities. It is only intended as a guide in that each installation must be designed for the specific oil component and flow rate receiving treatment.

(ii) Oil/Sand separator devices or systems discharging to a storm water system or directly to a waterway must operate in accordance with the best available technology. All oil/sand separator systems are subject to the review and approval of the Building Official.

(iii) All stormwater must enter the separator through inlet pipe.

(iv) Separator should be covered with removable sections. Access and inspection covers, weighing not more than 30 lbs. and with suitable hand holds, are to be provided directly above inspection "tee" and oil/grit collection compartment.

(v) Stormwater sources containing both detergents and oil contamination shall be routed through a separation oil separator from stormwater containing oily contamination only.

(vi) Uncontaminated waters and stormwater runoff shall not be discharged to separator, unless specified in the initial design.

(vii) Any pump mechanism shall be installed downstream of separator to eliminate oil emulsification.

(viii) Allowable materials for construction are as follows:

Tank - concrete, steel plate, fiberglass
Baffles - concrete, steel plate, impervious wood
Piping - cast iron, steel, plastic

(ix) The property owner assumes full responsibility and liability for property maintenance and operation of the oil separator, unless the separator is a part of a publicly-operated drainage system.

(x) Access to the separator shall be maintained free for inspection at all times.

(xi) Property owner inspection of the oil accumulation and effluent water should be conducted at least once per week. It is recommended that a permanent schedule for separator inspection and maintenance be posted adjacent to the separator and that employees sign and date it as required.

(xii) Oil accumulation in the oil separation compartment shall not exceed three inches at any time.

(xiii) The effluent shut-off valve is to be closed during oil removal, grit removal and water re-filling operations.

(xiv) Following oil removal, separator shall be backfilled with clean water to prevent oil carry-over to clear well.

(xv) Waste oil accumulations removed from the separator shall be disposed of other than to the ground surface, storm drains, or streams.

(xvi) Design of a separator facility should be based upon flows from an approved detention system over the area interpreted. The separator must be designed with a depth to width ratio of between 0.3 and 0.5.

C. Recharge Facilities

(i) Recharge facilities will be acceptable on lands where soils and subsurface conditions are favorable. Given the known unstable condition of the local geology, the City requires a detailed and conclusive geologic and soils study be performed by a registered geologist and geotechnical engineer for each development. The study shall contain a recommendation as to whether or not recharge is feasible on the proposed site(s). The study must include an element addressing any and all impacts (adverse or otherwise) which are expected to occur both upstream and downstream of the recharge facilities. It is critical that sediment be filtered or trapped before entering any recharge facility. Although noted to be relatively successful at removing fine particulates and soluble pollutants, recharge facilities will prematurally clog if sediment is not removed from the storm runoff before entering the facility.

(ii) Typical recharge facilities may include, but are not limited to:

a. Infiltration Trenches

b. Median Strip Design

c. Underground Trenches

d. Dry Wells

e. Under Swale Systems

SECTION 8. Article VIII, Chapter 1 of the Municipal Code is amended by adding a Section 8112 to read:

8112. **Section 7011 Deleted.** Section 7011 of the Building Code is deleted in its entirety.

SECTION 9. Article VIII, Chapter 1 of the Municipal Code is amended by adding a Section 8113 thereto to read:

8113. **Section 7014 Amended.** Section 7014(a) of the Building Code is amended by adding a new paragraph 4 thereto to read:

4. The erosion control measures required in Section 7010 of the Building Code shall be implemented.

SECTION 10. Article VIII, Chapter 1 of the Municipal Code is amended by adding a Section 8114 to read:

8114. **Section 7015 Amended.** Section 7015 of the Building Code is amended by adding thereto a new subsection (c) to read:

(c) **Erosion Control.** Erosion control measures shall be utilized as required by Section 7010 of the Building Code.

SECTION 11. Article VIII, Chapter 1 of the Municipal Code is amended by adding a Section 8115 to read:

8115. **Section 7016 Amended.** Section 7016 of the Building Code is amended by adding thereto a new subsection (i) to read:

(i) **Erosion Control.** Erosion control measures shall be utilized as required by Section 7010 of the Building Code.

SECTION 12. Article VIII, Chapter 1 of the Municipal Code is amended by adding a Section 8116 to read:

8116. **Section 7018 Amended.** Section 7018 of the Building Code is amended by adding a new paragraph to subsection (a), amending subsection (b) in its entirety and adding a sentence to subsection (f) to read:

(a) * * *

Drainage system designs shall be prepared in accordance with applicable County Flood Control District standards, and the requirements of this section and Section 7010 of the Building Code. The sediment and water quality control system shall be incorporated into the site drainage system.

(b) **Disposal.** Drainage facilities shall be designed to carry surface water runoff to the nearest sediment and water quality control systems. Discharge from the control facilities shall drain to the nearest practical street, storm drain, or natural watercourse approved by the Building Official or other appropriate governmental agency as a safe place to deposit such waters.

(f) * * *

Overflow protection designs for water quality management devices shall comply with Section 7010 of the Building Code.

SECTION 13. Article VIII, Chapter 1 of the Municipal Code is amended by adding a Section 8117 to read:

8117. **Section 7019 Amended.** Section 7019 of the Building Code is amended by changing the section title to read:

Slope Protection

SECTION 14. Article VIII, Chapter 1 of the Municipal Code is amended by adding a Section 8118 to read:

8118. **Section 7020 Amended.** Section 7020 of the Building Code is amended by adding thereto a new subsection (h) to read:

(h) **Water Quality Management.** Prior to the design of any site improvements requiring storm water quality management drainage systems, the Design Engineer shall prepare all necessary design reports, plans and investigations as required by Section 7010 of the Building Code. The Design Engineer and the Field Engineer shall verify in writing to the Building Official that the storm water management drainage system is installed and functioning properly.

SECTION 15. Article VIII, Chapter 1 of the Municipal Code is amended by adding a new Section 8119 to read:

8119. **Section 7021 Amended.** Section 7021 of the Building Code is amended by adding a new sentence to subsection (b) and adding a new subsection (g) to read:

(b) * * *

The Field Engineer shall also submit a statement to the Building Official that the water quality management system was constructed in accordance with the approved plans.

(g) **Design Engineer.** At the completion of site construction and prior to occupancy, the Design Engineer shall provide the Building Official with a statement that the water quality management system is constructed and is operating in accordance with approved plans.

SECTION 16.

A. The City Council hereby finds that the purpose of this Ordinance is to protect the quality of water resources by prohibiting discharges of materials into the storm drain system. Its purpose is to prevent practices that cause environmental impact. Accordingly, this ordinance has no adverse significant effect on the environment for the purposes of the California Environmental Quality Act. It is therefore exempt from CEQA pursuant to Title 14 of the California Code of Regulations Section 15061(b)(3).

B. The purpose of this ordinance is to establish new standards to govern storm water runoff in order to protect the City's and the region's water resources. It is the intention of the City Council that this ordinance take effect prior to the release of any new projects exempted under the City's moratorium ordinance so that those projects will be required to comply with these new standards. The public health, safety and welfare requires that this ordinance be in place prior to the time that building permits are issued for Tier II projects under Ordinance No. 44 and that the requirements of this ordinance be applied to those new single family residences. In the absence of immediate effectiveness, building permits will issue for projects without the environmental protections contemplated by this ordinance and necessary to assure that those projects will be consistent with the General Plan presently being prepared by the City. Therefore, this is any urgency ordinance and shall take effect immediately.

PASSED, APPROVED and ADOPTED this 21st day of January, 1992.

Mayor for TEB

ATTEST:

City Clerk

I CERTIFY THAT THE FOREGOING ORDINANCE NO. 51U was passed and adopted by the City Council of the City of Malibu at the regular meeting thereof held on the 21st day of January, 1992 by the following vote:

AYES:	5	COUNCILMEMBERS:	Caggiano, Keller, Van Horn, Wan, Zeitsoff
NOES:	0	COUNCILMEMBERS:	
ABSENT:	____	COUNCILMEMBERS:	
ABSTAIN:	____	COUNCILMEMBERS:	

City Clerk

IMA524.ORD

EXHIBIT "A"

STORM WATER MANAGEMENT

STANDARD PLATES

INDEX

Plate	Description
01	Typical temporary erosion control
02	Sketch of sediment basin
03	Temporary earth drain structure
04	Strawdale dam-forms siltation pond
05	Trash rack anti-vortex device
06	Trash rack an anti-vortex device alternative
07	Waterway outlet
08	Silt fences
09	Straw bale dam
10	Temporary gravel filter structure
11	Top of slope diversion dike
12	Temporary perimeter dike
13	Utility mesh (netting)
14	Interceptor ditch
15	Temporary level spreader
16	Temporary down drainage structure
17	Gradient terrace cross section
18	Swirl concentrator
19	Temporary Construction Entrance
20	Erosion control sand bags at catch basin
21	Temporary sediment trap at storm drain inlet
22	Temporary sediment trap at curb inlet
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24	Rock retaining wall in cut section
25	Sand filter for dry ponds
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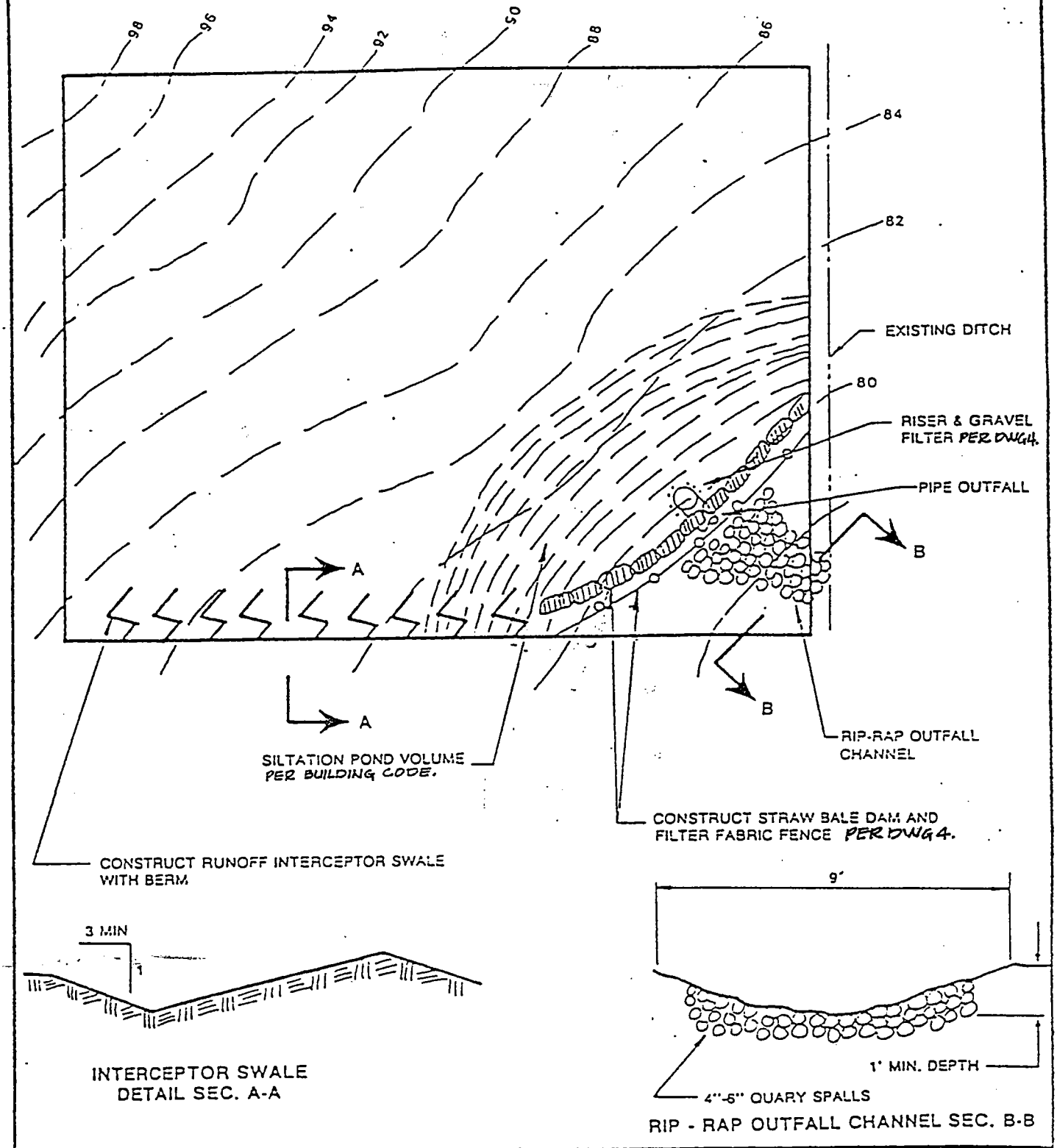
28	Baffle type oil/water separator-A
29	Baffle type oil/water separator-B
30	Schematic of typical coalescing plate oil/water separator
31	Flow restrictor/control device catch basin
32	Multiple orifice restrictor - Type A
33	Multiple orifice restrictor - Type B
34	Multiple orifice restrictor metering plate detail
35	Typical parking lot ponding in basin overflow
36	Typical parking lot ponding in surface overflow
37	Typical detention pond profile and plan sketch

(Exhibit "A", continued)

Plate	Description
38	Typical closed detention pipe
39	Typical detention chamber
40	Typical rooftop detention
41	Rooftop restrictor device
42	Grass-lined swale
43	Swale sediment trap inlet
44	Matrix-type soil reinforcement matting installation
45	V-notch weir installation



CITY OF MALIBU

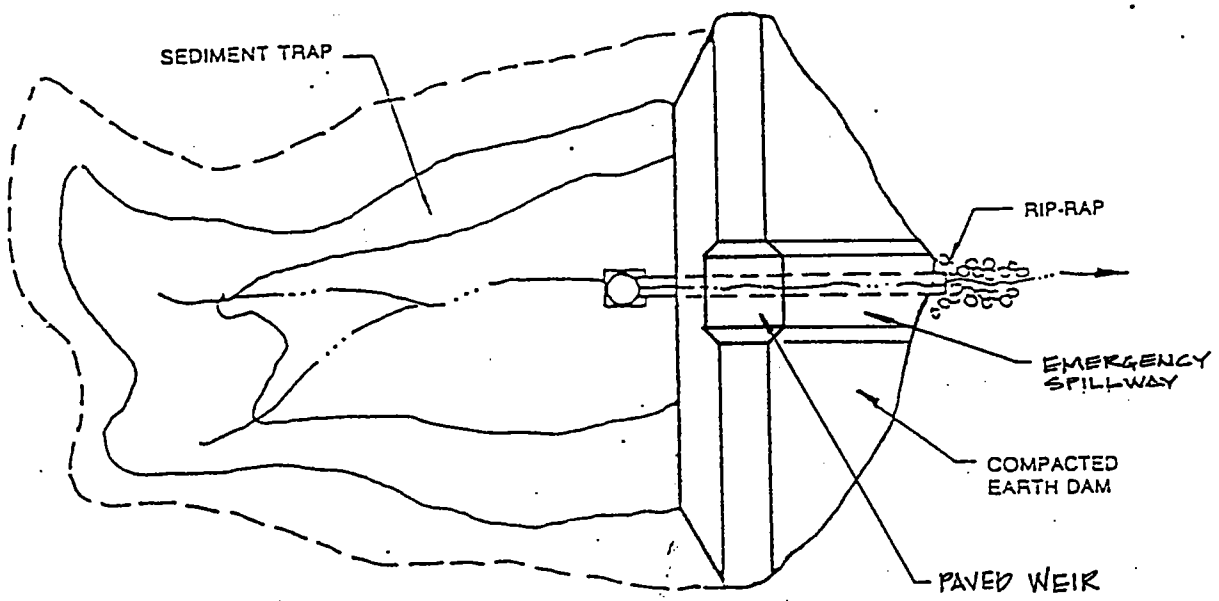
NO SCALE

TITLE

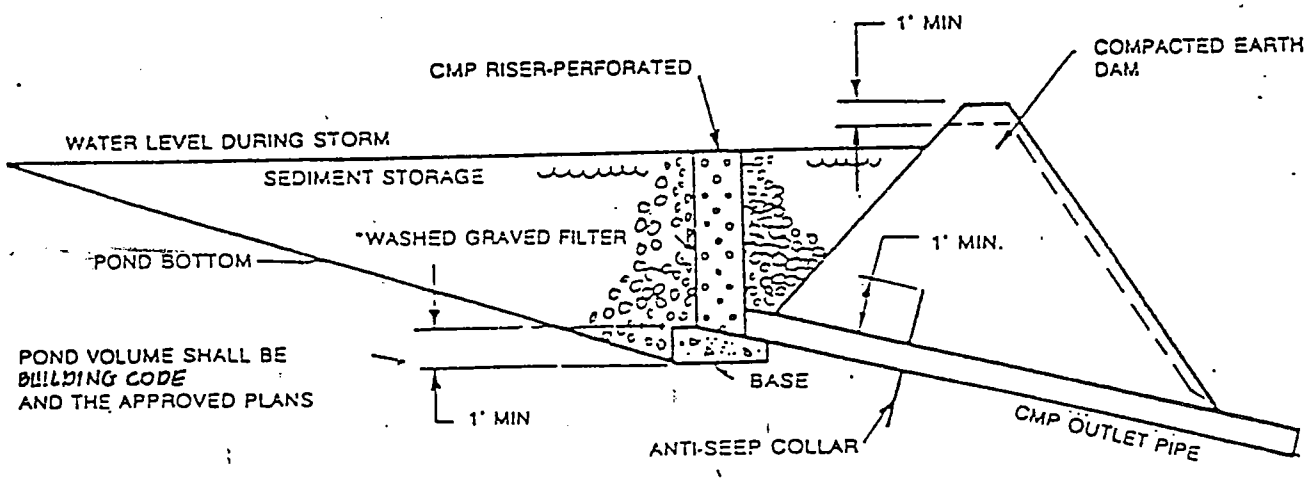
TYPICAL TEMPORARY EROSION CONTROL

NO. 01

REV. DATE _____



PLAN



SECTION

*MAY BE HELD IN PLACE WITH WIRE MESH

CITY OF MALIBU

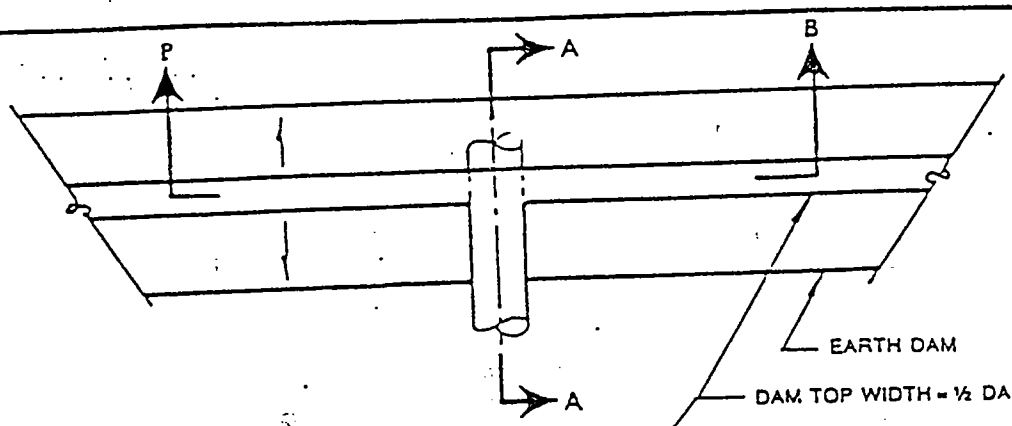
NO SCALE

TITLE

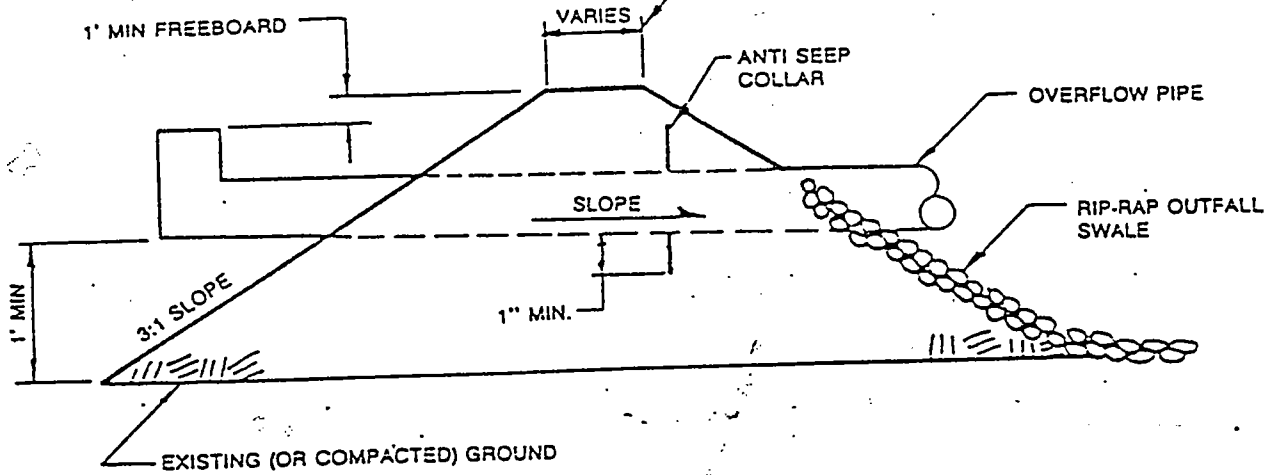
SKETCH OF SEDIMENT BASIN

NO. 02

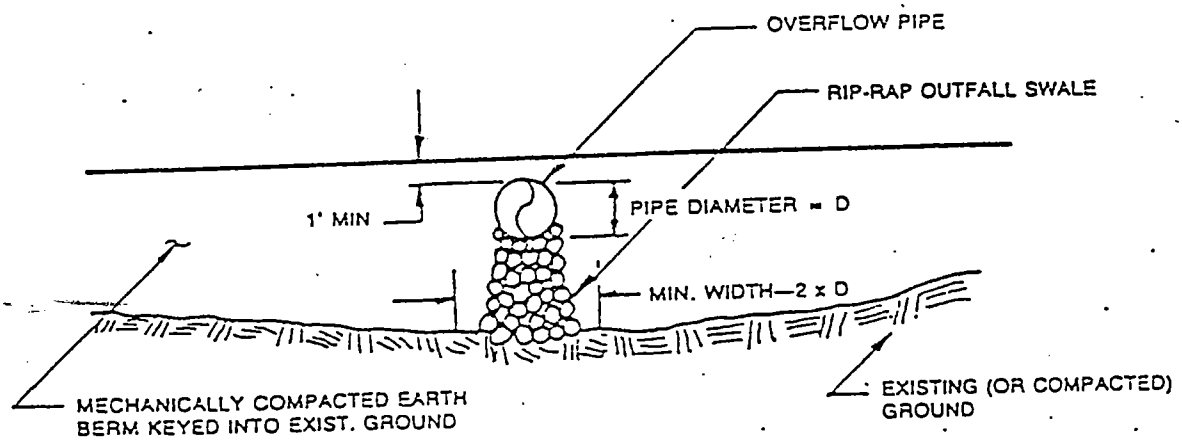
REV. DATE _____



PLAN



A-A



SEC. B-B

NOTE: OUTFALL TO PASS THROUGH FILTER PRIOR TO EXITING SITE

CITY OF MALIBU

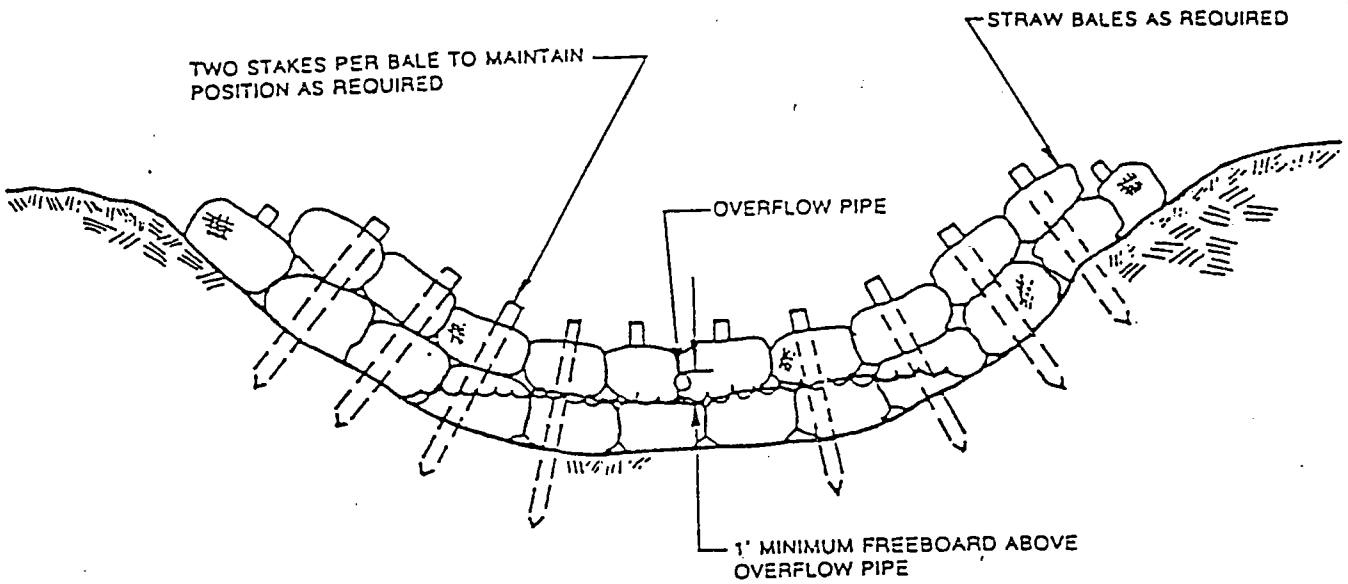
NO SCALE

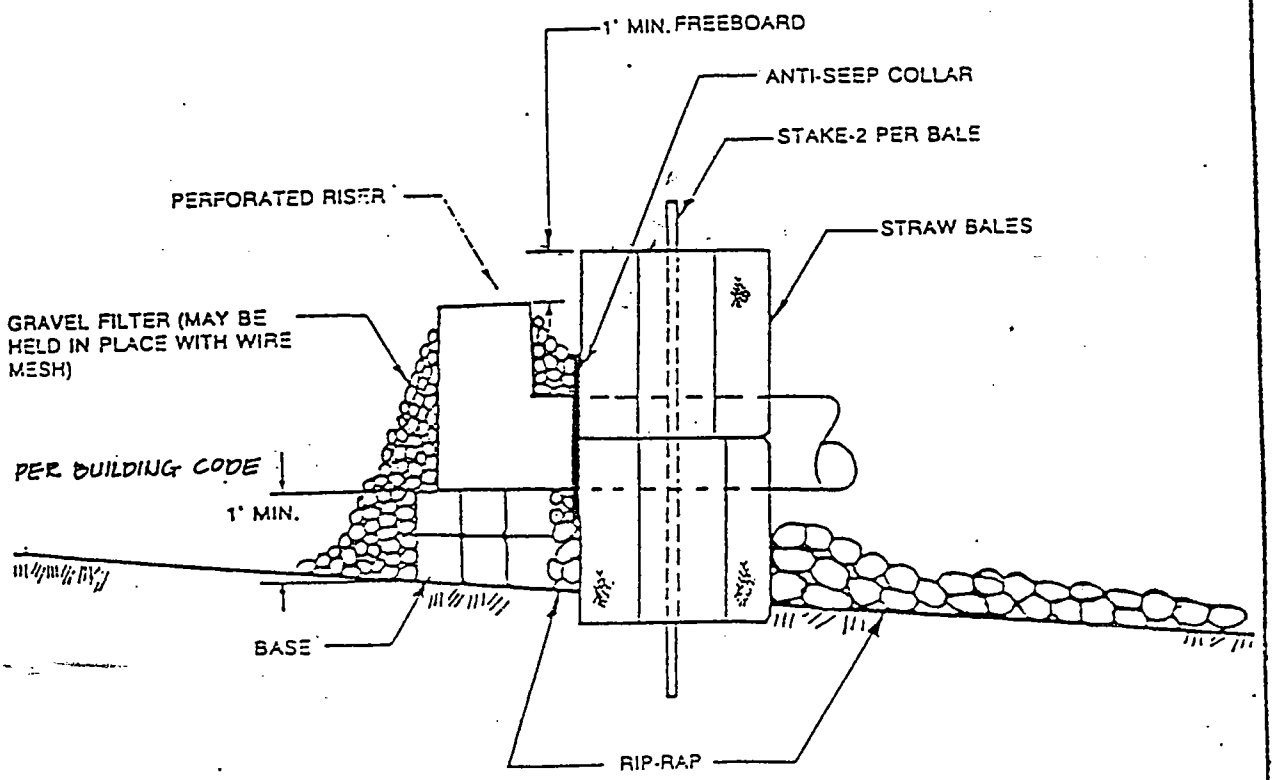
TITLE

TEMPORARY EARTH DAM STRUCTURE

NO. 03

REV. DATE





NOTE:
OMIT PIPE, RISER, AND BASE WHEN USED AS DROP STRUCTURE OR CHECK DAM

CITY OF MALIBU

NO SCALE

TITLE

STRAWBALE DAM-FORMS SILTATION POND

NO. 04

REV. DATE

REV. DATE _____

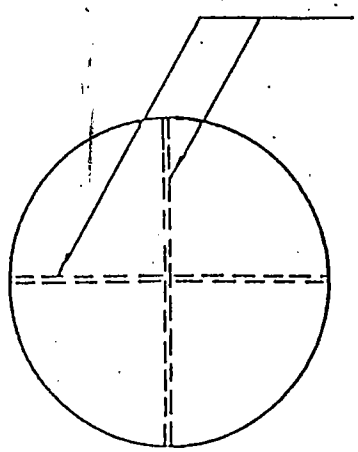
CITY OF MALIBU

TITLE

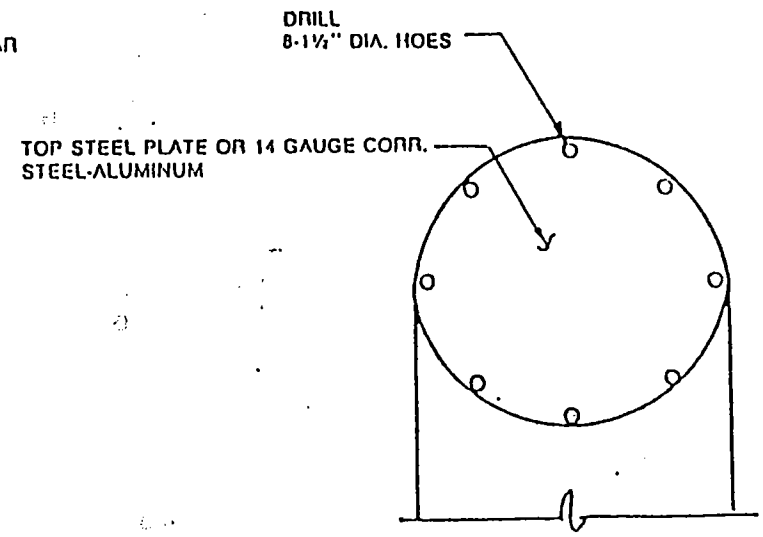
TRASH RACK ANTI-VORTEX DEVICE

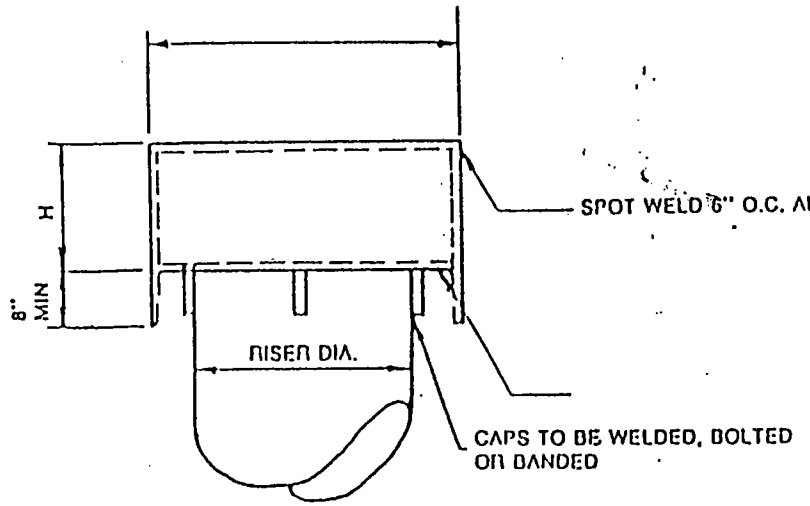
NO SCALE

NO. 05

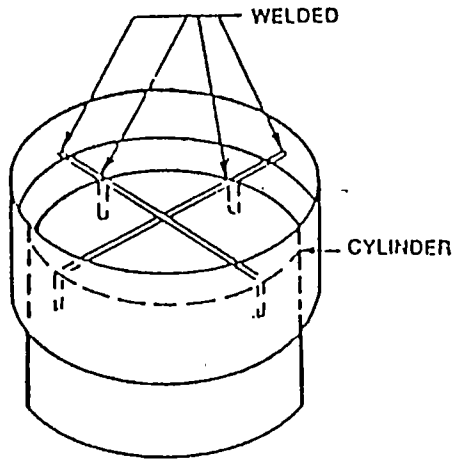


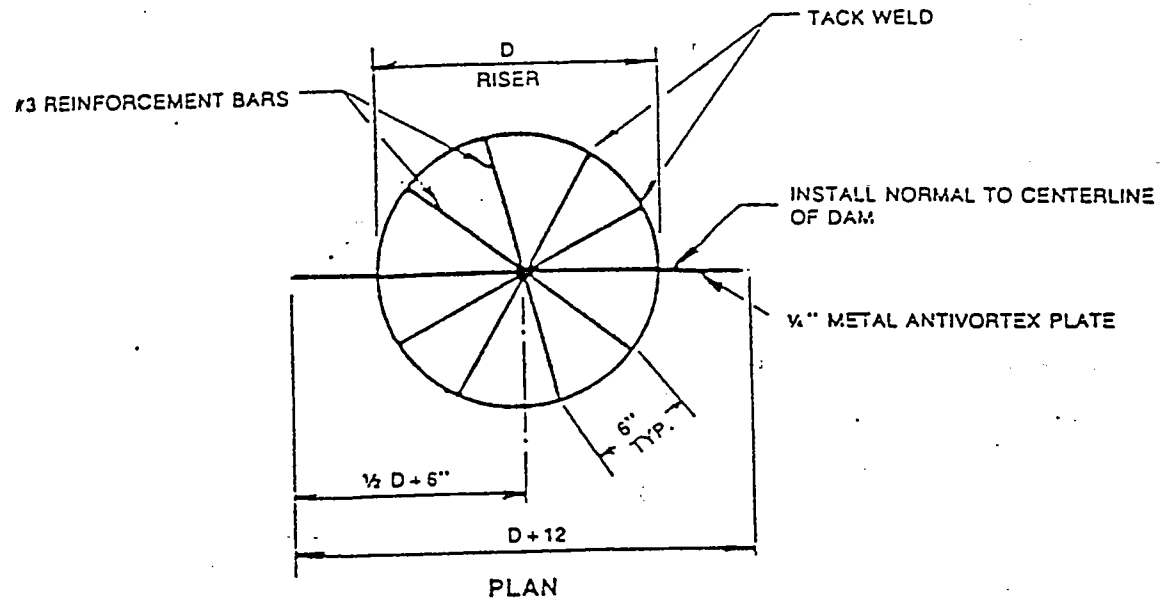
PLAN



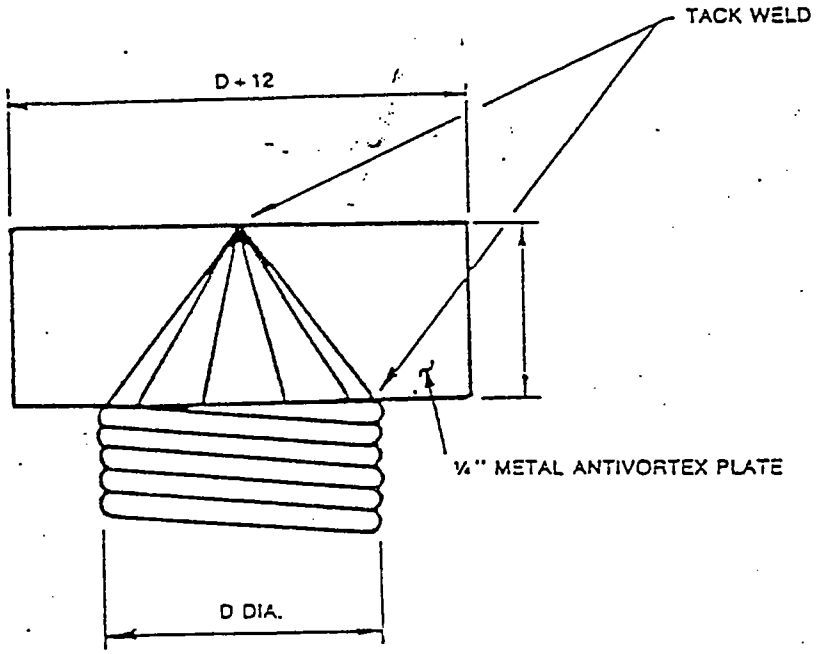


ELEVATION





PLAN



SECTION

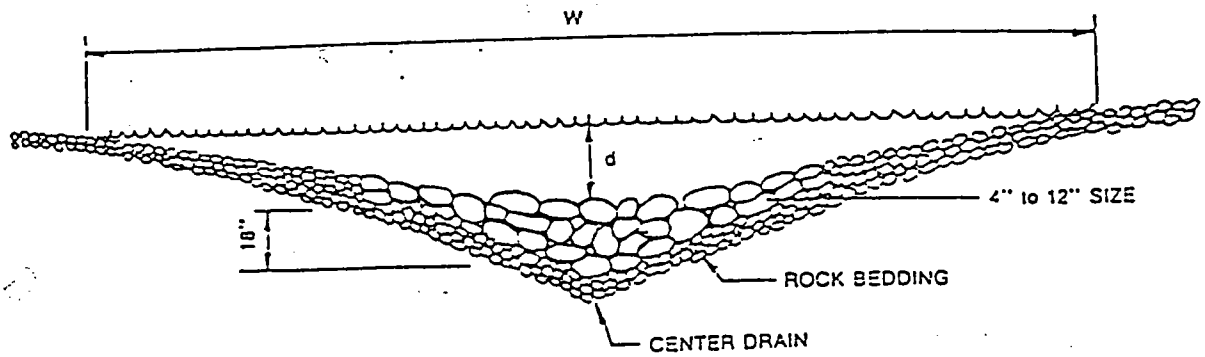
CITY OF MALIBU

NO SCALE

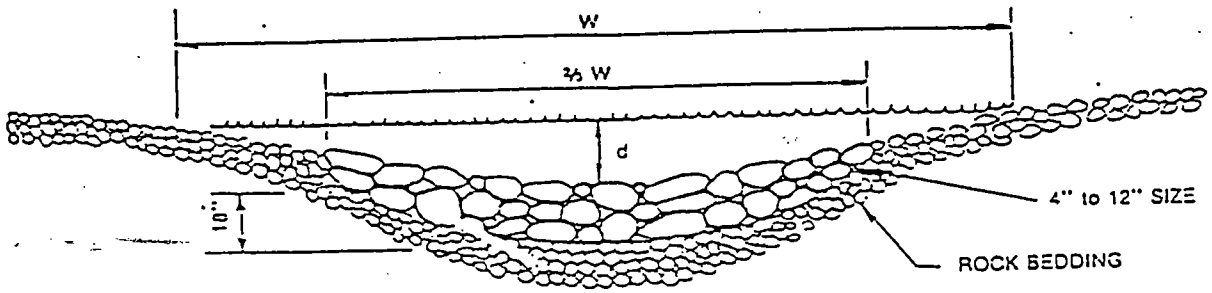
TITLE TRASH RACK AND ANTI-VORTEX DEVICE ALTERNATIVE

NO. 06

REV. DATE _____



WATERWAY WITH VEE SECTION



WATERWAY WITH ROCK CENTER DRAIN
ROUNDED SECTION

CITY OF
MALIBU

NO SCALE

TITLE

WATERWAY OUTLET

NO. 07

REV. DATE _____

REV. DATE

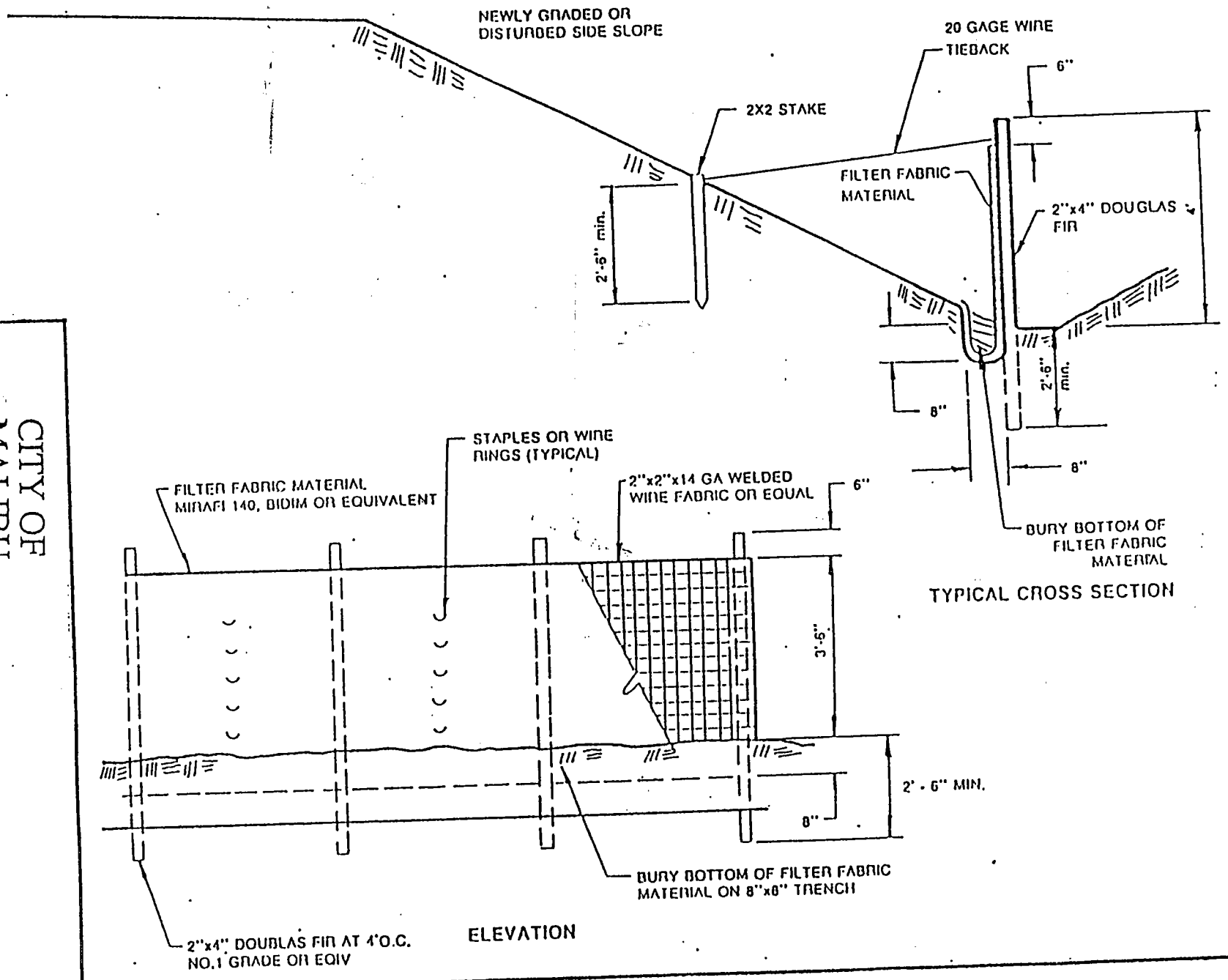
CITY OF MALIBU

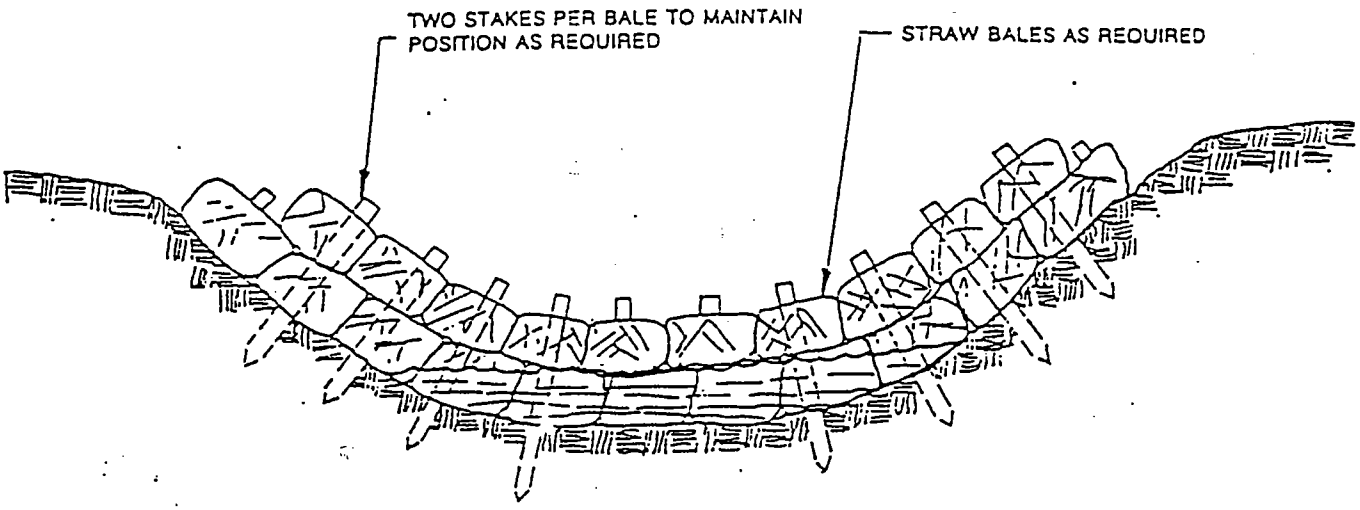
TITLE

SILT FENCES

NO. 08

NO SCALE





1. WHERE POSSIBLE, MAINTAIN NATURAL VEGETATION FOR SILT CONTROL - MULCH OR ROCK EXPOSED AREAS.
2. TEMPORARY SILTATION AND DETENTION PONDS TO BE CONSTRUCTED BY PLACING STRAW BALES OR FILTER FABRIC FENCES ACROSS SWALES OR EXCAVATION SILTATION PONDS UTILIZING FILTER SYSTEM PRIOR TO DISCHARGE. PONDS SHALL BE CONSTRUCTED SO AS TO PROVIDE VOLUME REQUIRED BY BUILDING CODE AND THE APPROVED PLANS.

3. ALL TEMPORARY SILTATION AND DETENTION PONDS SHALL BE MAINTAINED IN A SATISFACTORY CONDITION UNTIL SUCH TIME THAT CLEARING AND/OR CONSTRUCTION IS COMPLETED AND THE PERMANENT DRAINAGE FACILITIES ARE OPERATIONAL AND ALL EROSION POTENTIAL IS PAST.

4. RETURN SILTATION CONTROL AREAS TO ORIGINAL GROUND CONDITIONS.

5. RIP-RAP BASE (BOTH SIDES) OF BALES OR OUTFALL CHANNEL FOR EROSION CONTROL, AS REQUIRED.

6. APPROVAL OF THIS PLAN DOES NOT CONSTITUTE AN APPROVAL OF DESIGN, SIZE NOR LOCATION OF PIPES, RESTRICTORS, CHANNELS OR RETENTION FACILITIES; BUT IS AN APPROVAL OF TEMPORARY SEDIMENTATION CONTROL PLAN ONLY.

CITY OF MALIBU

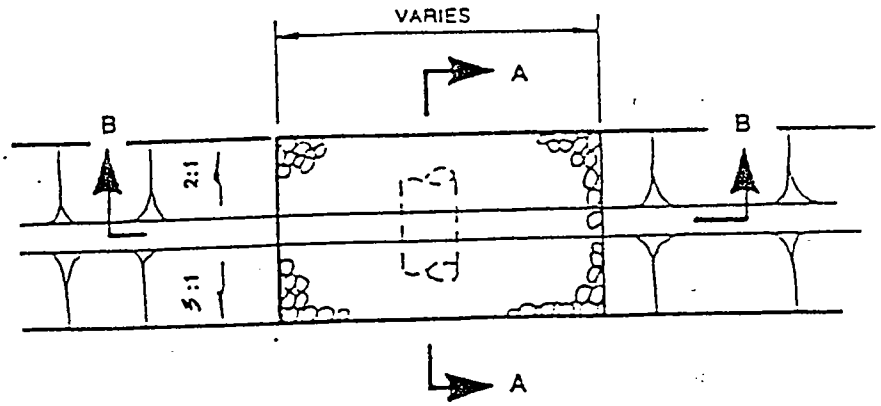
NO SCALE

TITLE

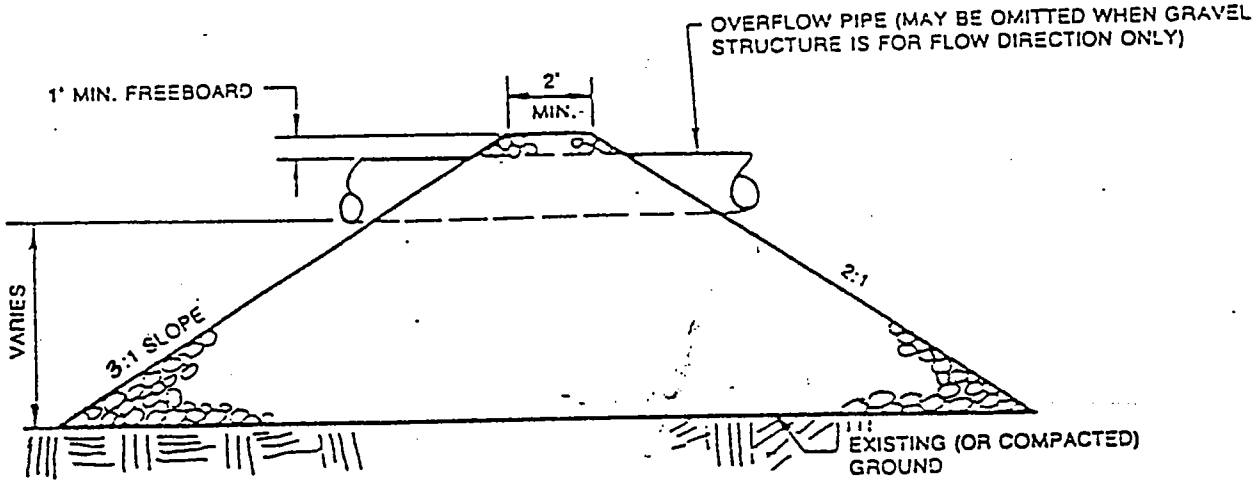
STRAW BALE DAM

NO. 09

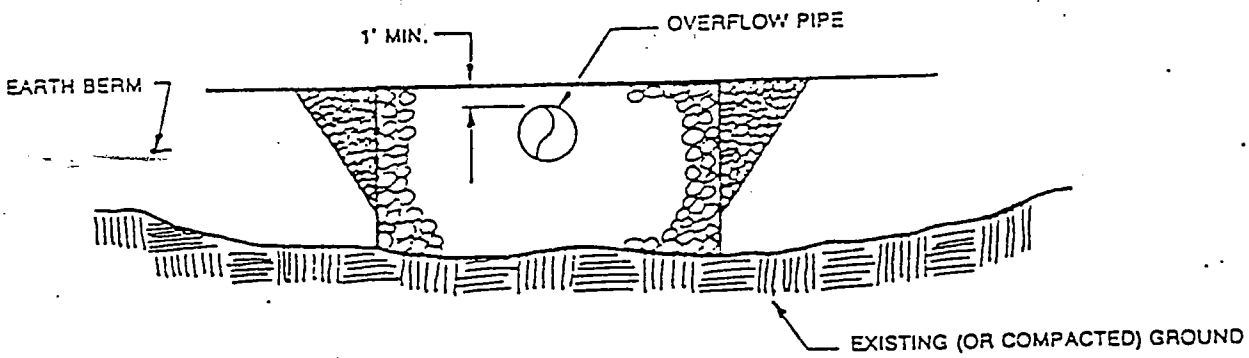
REV. DATE _____



PLAN



SECTION A-A



SECTION B-B

GRAVEL SHALL CONSIST OF WASHED GRAVEL OR QUARRY ROCK AND SHALL HAVE LESS THAN 2% FINES.

CITY OF MALIBU

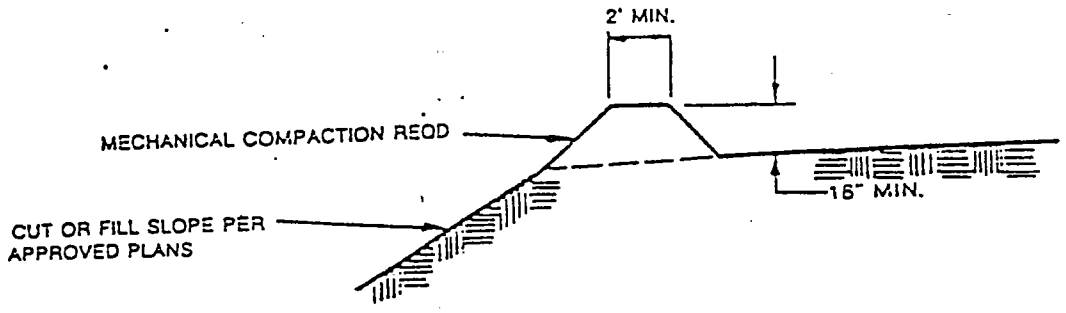
NO SCALE

TITLE

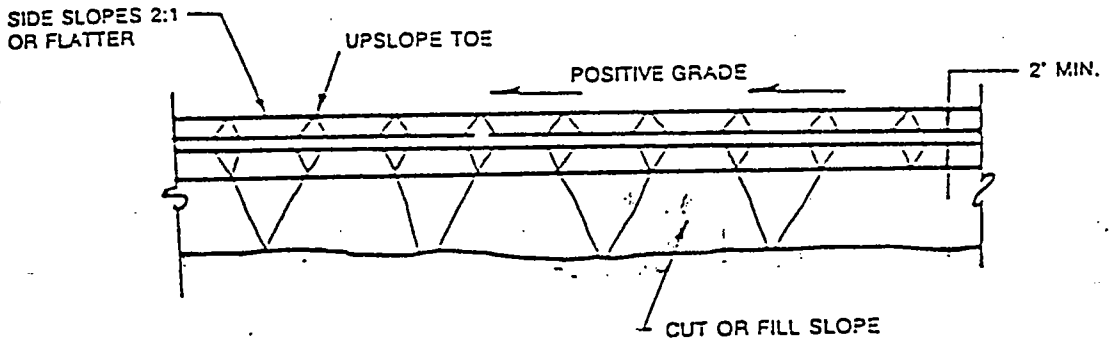
TEMPORARY GRAVEL FILTER STRUCTURE

NO. 10

REV. DATE _____



CROSS SECTION



PLAN VIEW

CITY OF
MALIBU

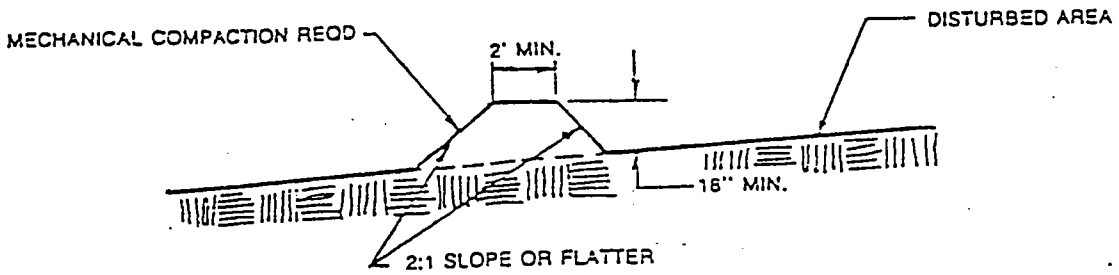
NO SCALE

TITLE

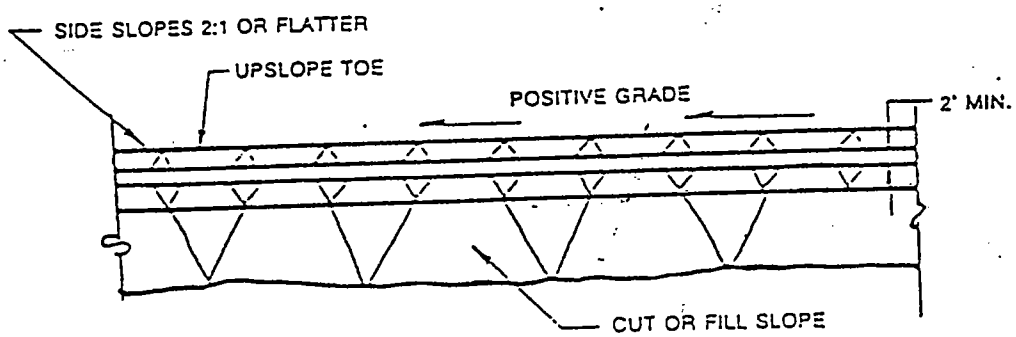
TOP OF SLOPE
DIVERSION DIKE

NO. 11

REV. DATE _____



CROSS SECTION



PLAN VIEW

CITY OF MALIBU

NO SCALE

TITLE

TEMPORARY PERIMETER DIKE

NO. 12

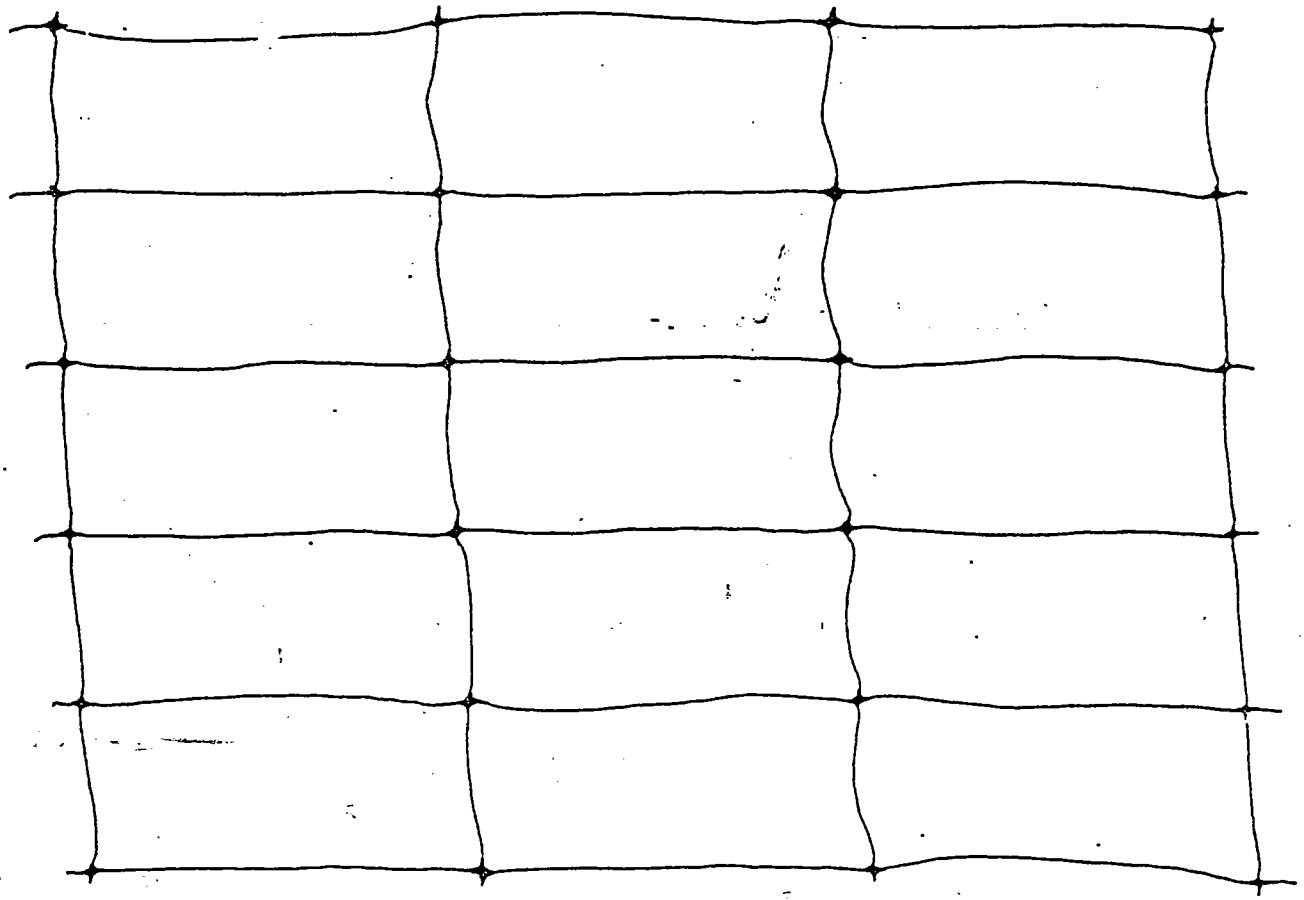
REV. DATE _____

UTILITY NETTING

SPECIFICATION SHEET

1 INCH x 2 INCHES

GRID SIZE	1 INCH x 2 INCHES
MATERIAL	20 MIL EXTRUDED & FORMED POLYPROPYLENE-U.V. INHIBITED
COLOR	YELLOW GREEN
WEIGHT	42 SQ. YARD PER POUND
LIFE EXPECTANCY	2-3 YEARS DIRECT SUNLIGHT
SIZES	TO SPECIFICATION
LENGTH	TO SPECIFICATION



STAPLING MAY BE REQUIRED

CITY OF MALIBU

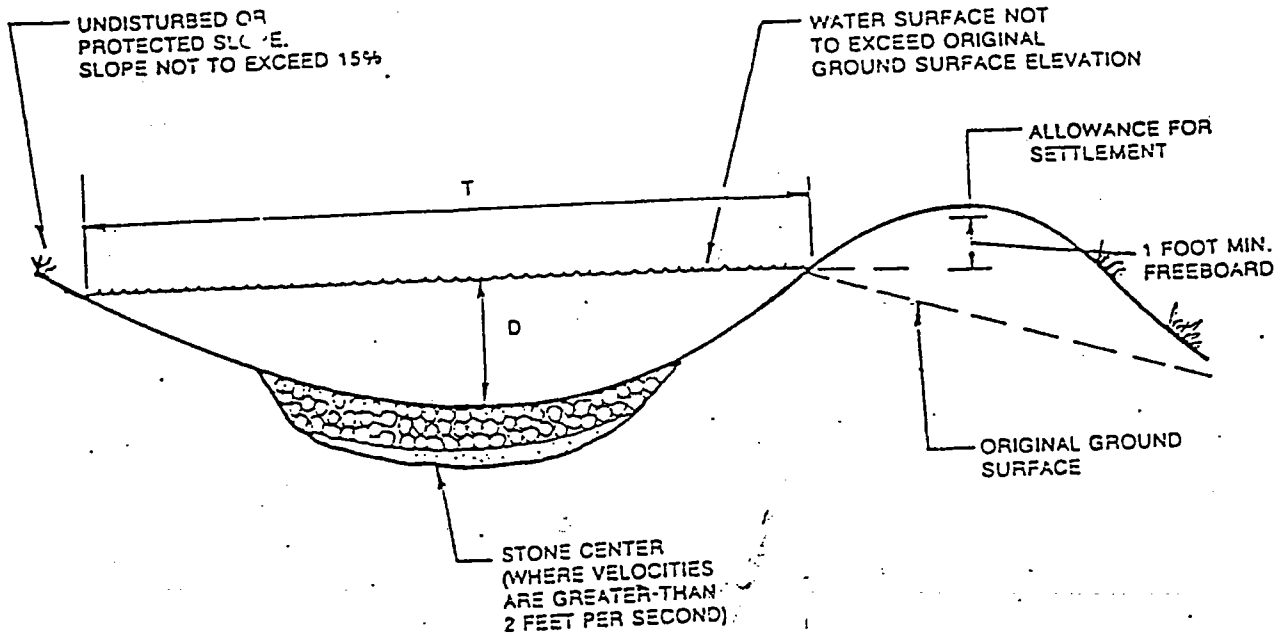
NO SCALE

TITLE

UTILITY MESH(NETTING)

NO. 13

REV. DATE _____



T = TOP WIDTH

D = DEPTH

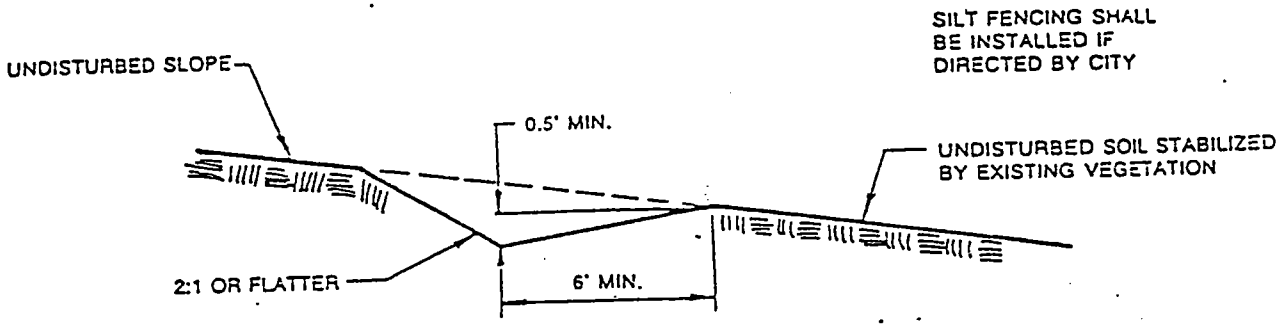
CITY OF MALIBU

NO SCALE

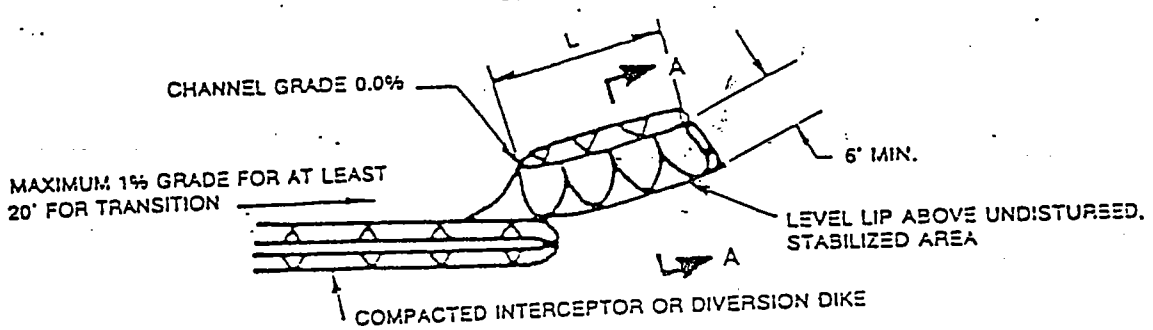
TITLE INTERCEPTOR DITCH

NO. 14

REV. DATE



SECTION A-A



PLAN VIEW

TABLE 1

TRISUTARY AREA	MINIMUM LENGTH ("L" IN FEET)
UP TO 1 Ac.	15
1 to 2 Ac.	20
2 to 3 Ac.	26
3 to 4 Ac.	36
4 to 5 Ac.	44

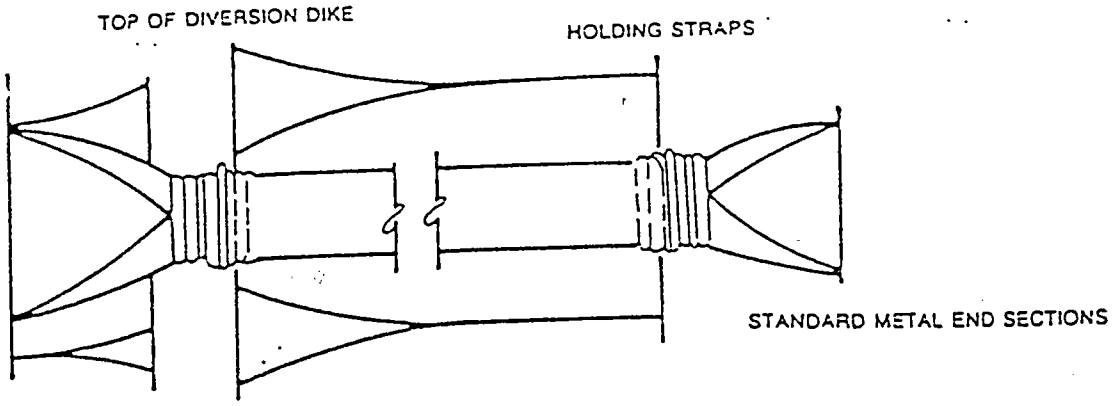
CITY OF MALIBU

NO SCALE

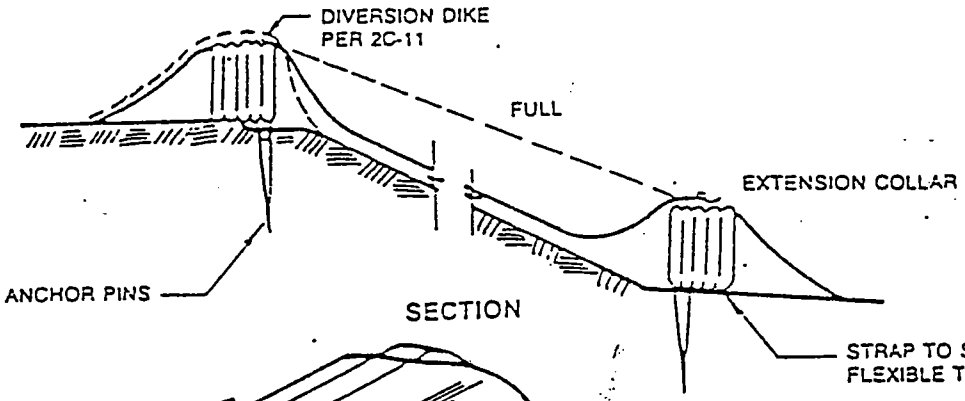
TITLE TEMPORARY LEVEL SPREADER

NO. 15

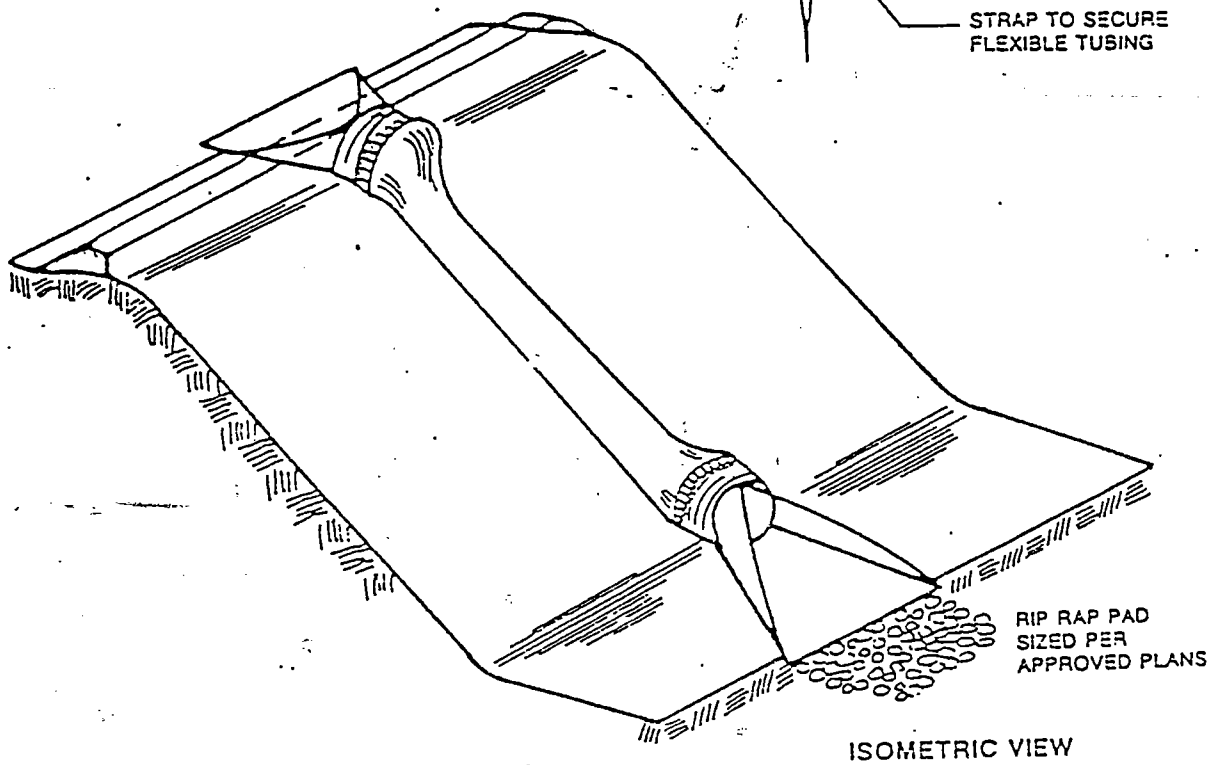
REV. DATE _____



PLAN



SECTION



ISOMETRIC VIEW

TUBING SHALL BE CONSTRUCTED FROM PLASTIC SHEET TUBING, HEAVY DUTY FABRIC, OR NON-PERFORATED CORRUGATED PLASTIC PIPE.

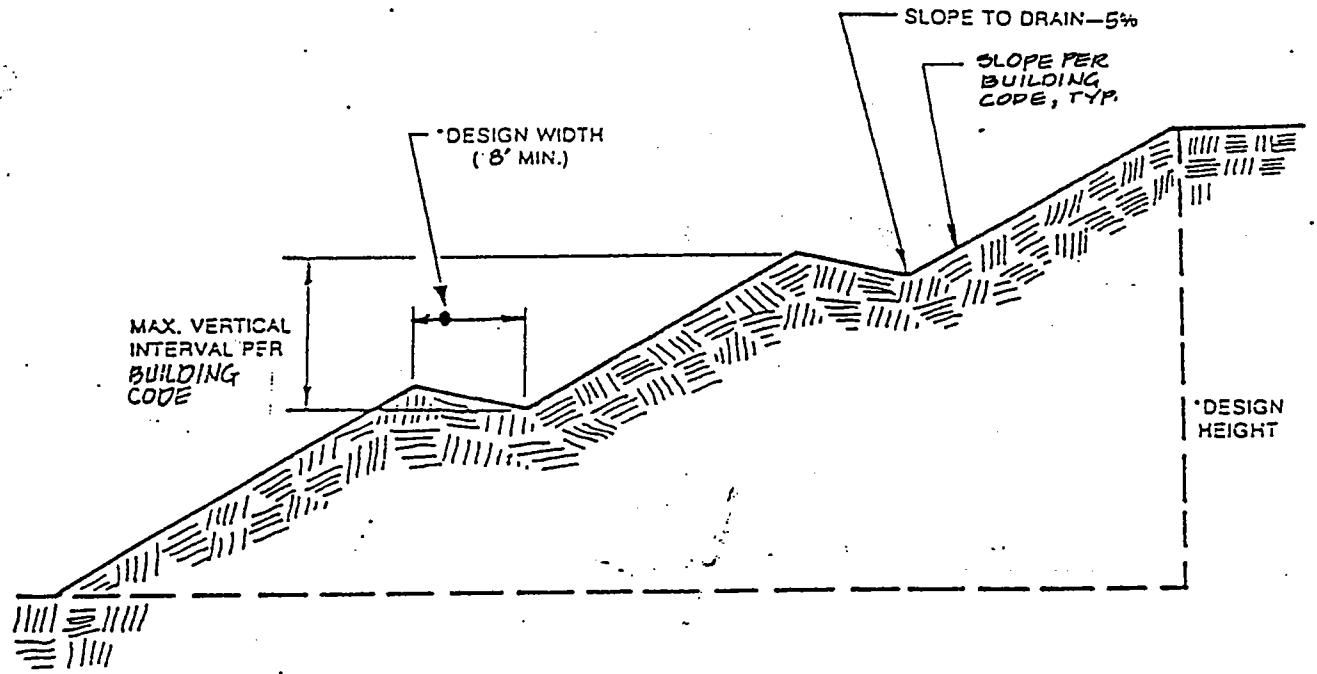
CITY OF MALIBU

NO SCALE

TITLE TEMPORARY DOWNDRAINAGE STRUCTURE

NO. 16

REV. DATE _____



CITY OF MALIBU

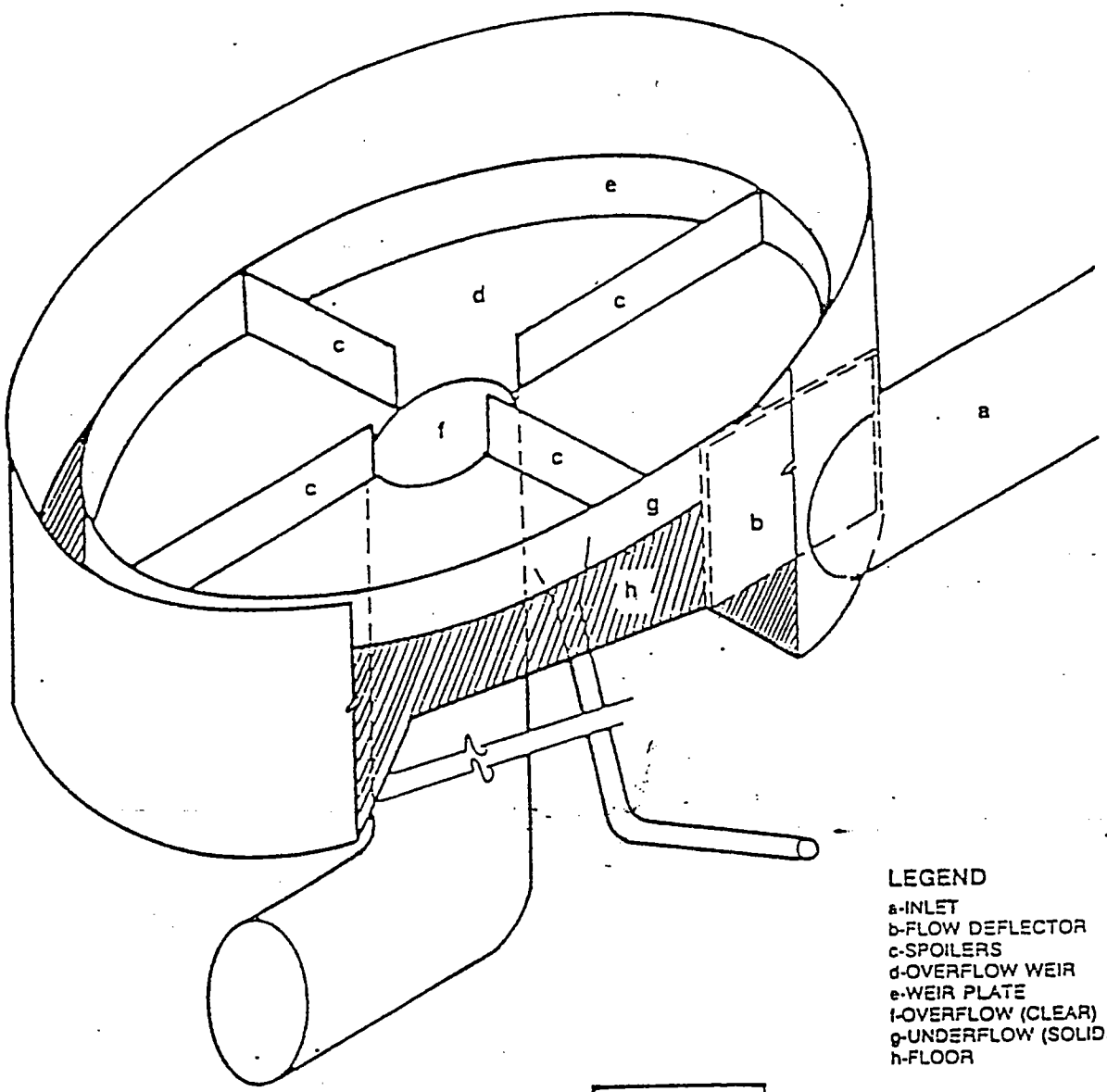
NO SCALE

TITLE

GRADIENT TERRACE CROSS SECTION

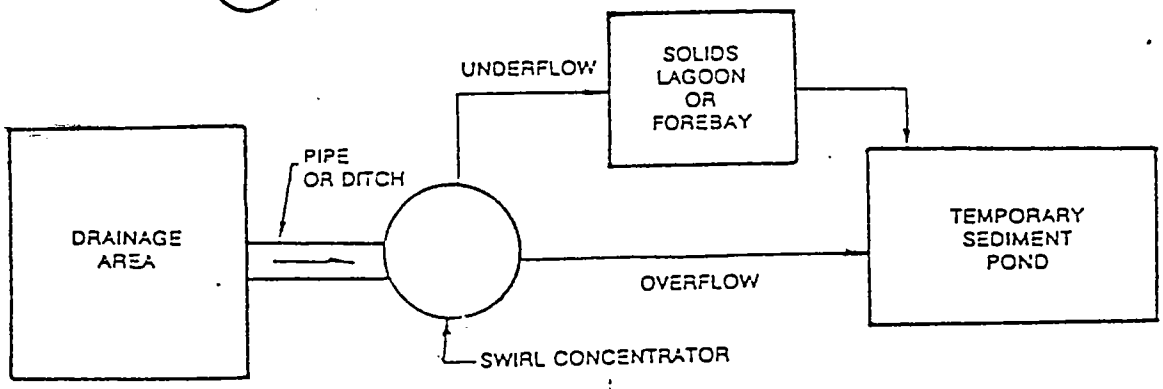
NO. 17

REV. DATE _____



LEGEND

a-INLET
b-FLOW DEFLECTOR
c-SPOILERS
d-OVERFLOW WEIR
e-WEIR PLATE
f-OVERFLOW (CLEAR)
g-UNDERFLOW (SOLIDS)
h-FLOOR



A WEIR-TO-CHAMBER DIAMETER RATIO OF 2:3 WILL PRODUCE THE OPTIMUM CLARIFICATION EFFICIENCY IN THE SWIRL CLARIFICATION DEVICE.

AN INLET PIPE-TO-CHAMBER DIAMETER RATIO OF 1:6 WILL PRODUCE EFFECTIVE GRIT SOLIDS REMOVAL EFFICIENCIES FOR LOW, INTERMEDIATE AND HIGH RATES OF EROSION RUN-OFF DISCHARGES.

CITY OF MALIBU

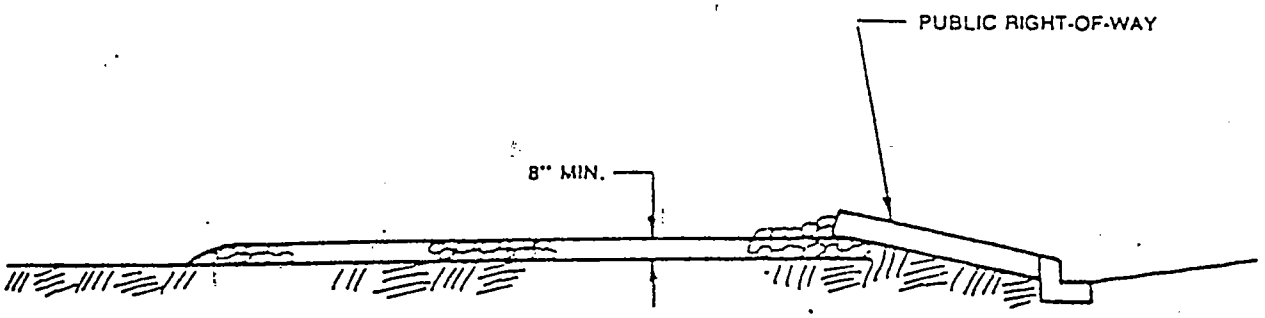
NO SCALE

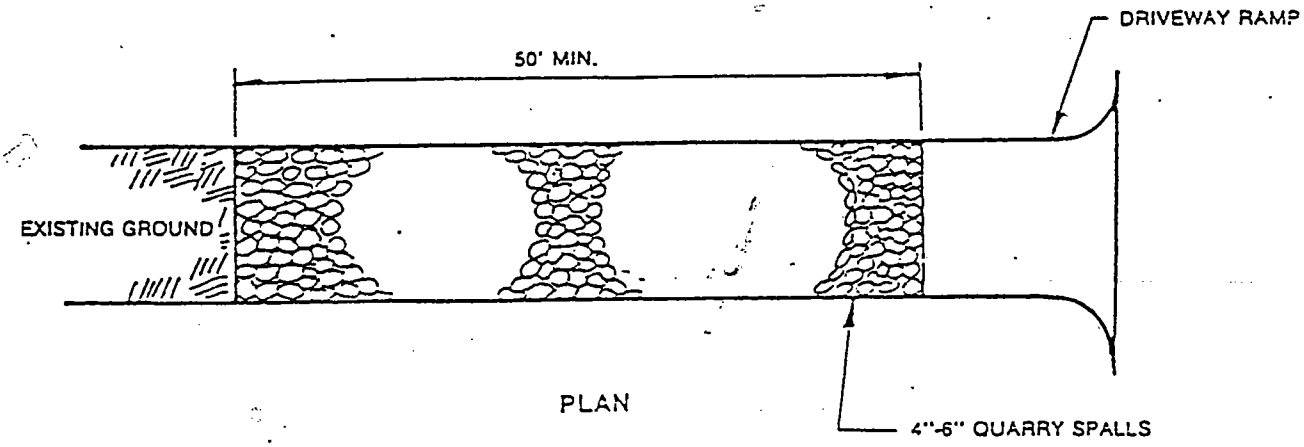
TITLE

SWIRL CONCENTRATOR

NO. 18

REV. DATE _____





PLAN

PERIODIC TOP DRESSING TO RESTORE ORIGINAL CONDITION SHALL BE DONE AS DIRECTED BY CITY.

CITY OF MALIBU

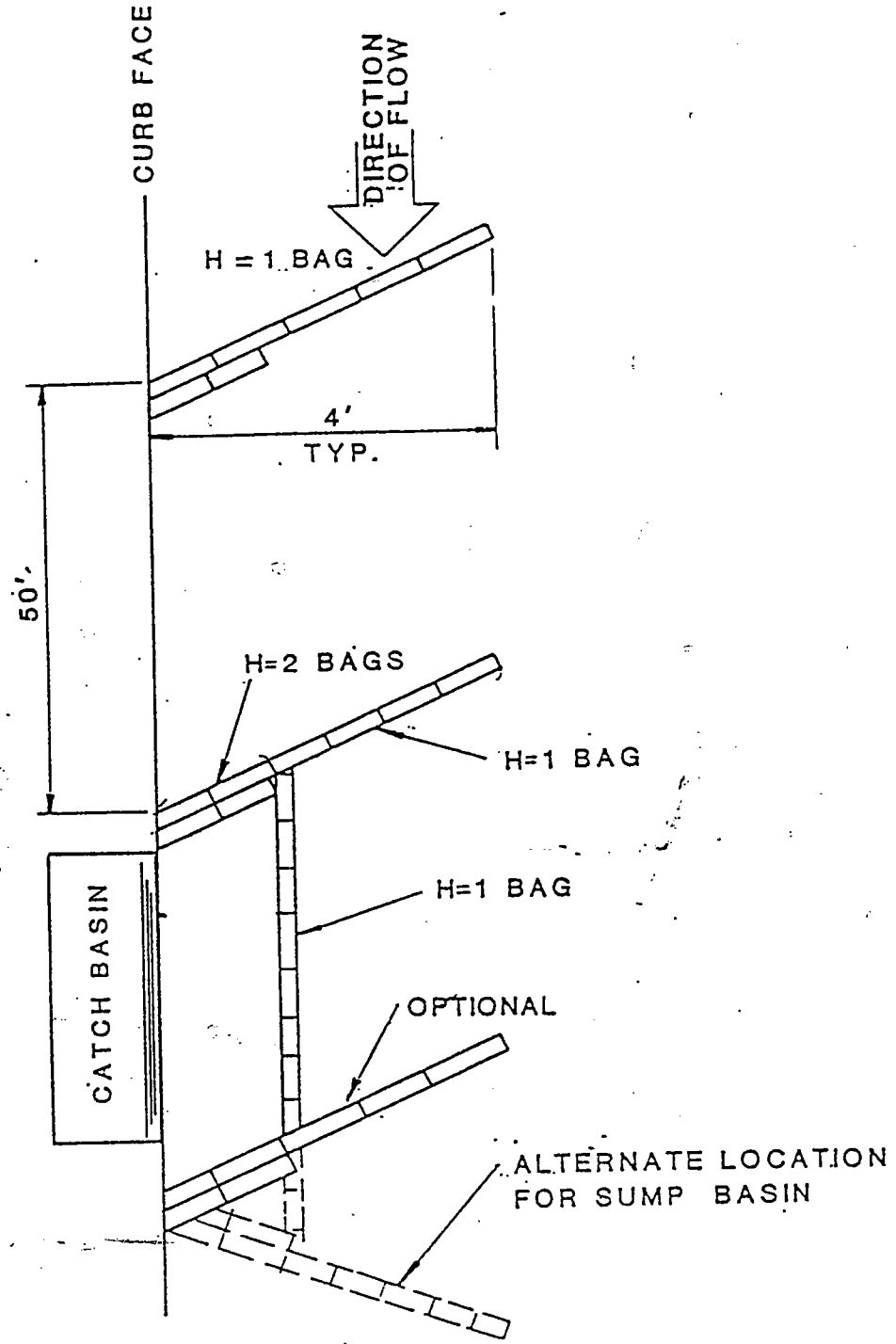
NO SCALE

TITLE

TEMPORARY CONSTRUCTION ENTRANCE

NO. 19

REV. DATE _____



SAND BAGS SHALL BE PAINTED WHITE WITH GLASS BEADS ADDED PRIOR TO SETTING.

CITY OF MALIBU

NO SCALE

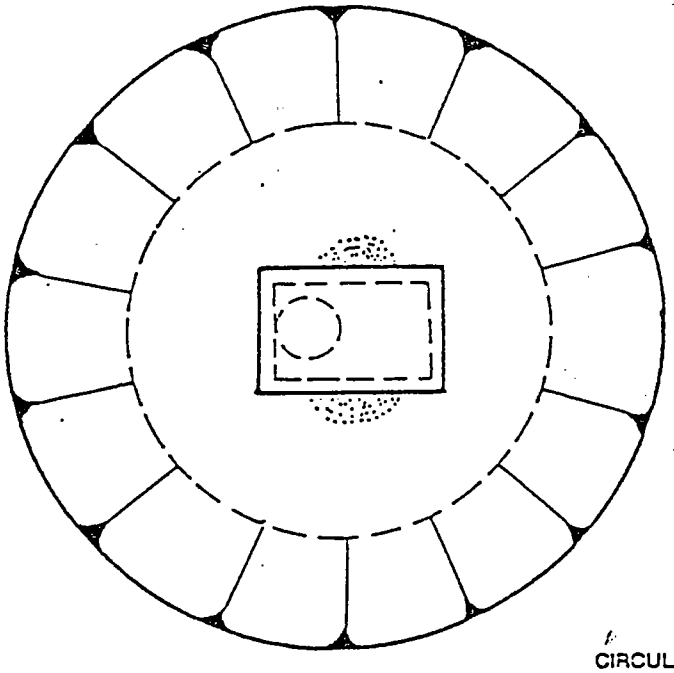
TITLE EROSION CONTROL

SAND BAGS @ CATCH BASIN

NO. 20

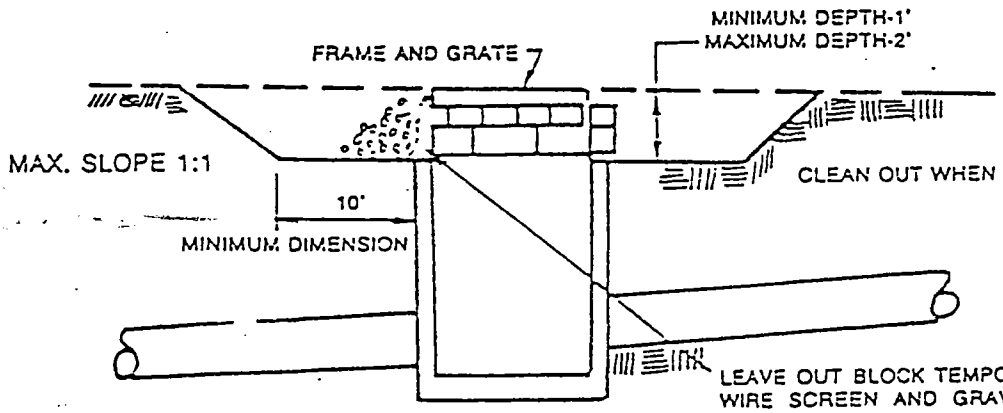
REV. DATE _____

PROTECT INLETS DURING CONSTRUCTION. KEEP SEDIMENT OUT OF THE STORMDRAINAGE SYSTEM! USE HALF-CIRCLE BEHIND CURB INLETS DURING STREET CONSTRUCTION. MODIFY PROTECTION AS CONSTRUCTION PROGRESSES.



PLAN

CIRCULAR SHAPE IS NOT ESSENTIAL-VARY SHALPE TO FIT DRAINAGE AREA AND TERRAIN. OBSERVE TO CHECK TRAP EFFICIENCY AND MODIFY AS NECESSARY TO INSURE SATISFACTION TRAPPING OF SEDIMENT. CAN BE ADAPTED TO THRU-CURB INLET.



SECTION

CITY OF MALIBU

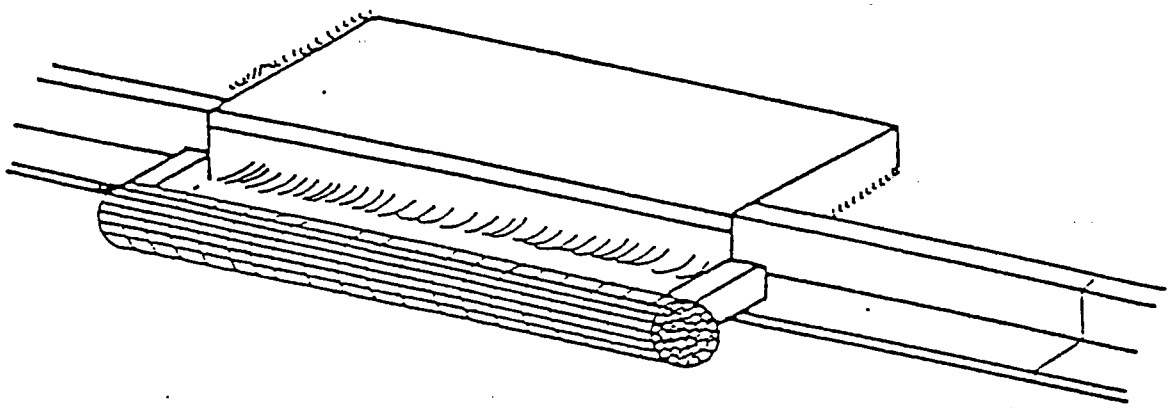
NO SCALE

TITLE

TEMPORARY SEDIMENT TRAP AT STORM DRAIN INLET

NO. 21

REV. DATE _____



SPACER BLOCK, ROLL OF 12½ GAUGE WELDED FENCE, 2"x2" MESH, 6"-10" DIAMETER FILLED WITH 3" ROCK

EASILY MADE AND PLACED ON SITE
EASY TO CLEAN
CAN BE MOVED AND RE-USED

HELPS PREVENT STORM DRAIN FROM BECOMING CLOGGED WITH SILT DURING CONSTRUCTION

HELPS PREVENT SILT FROM GETTING IN STREAM

CAN BE ADAPTED TO STANDARD INLET

MINI-GABIONS FOR INLET PROTECTION (USE DURING STREET CONSTRUCTION)

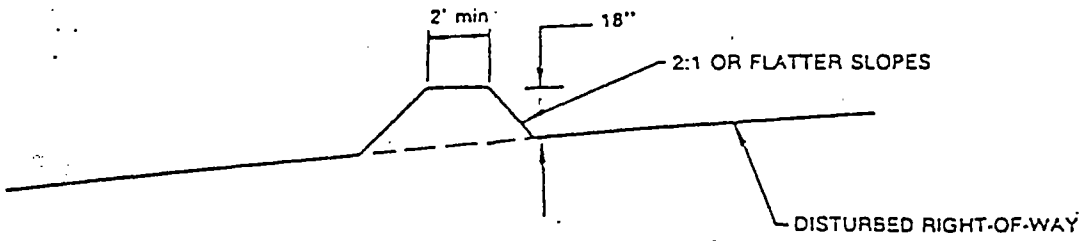
CITY OF MALIBU

NO SCALE

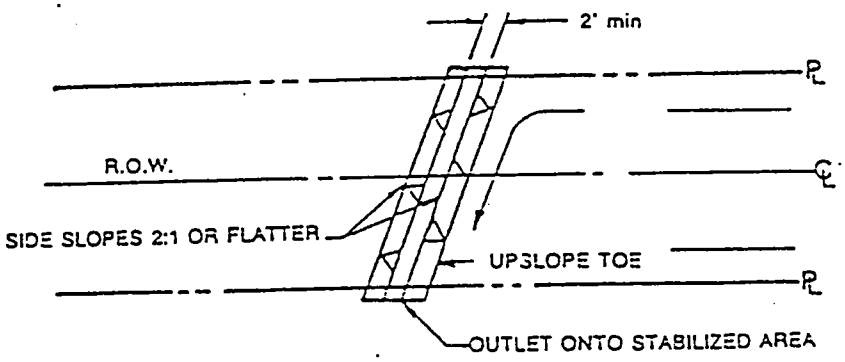
TITLE TEMPORARY SEDIMENT TRAP AT CURB INLET

NO. 22

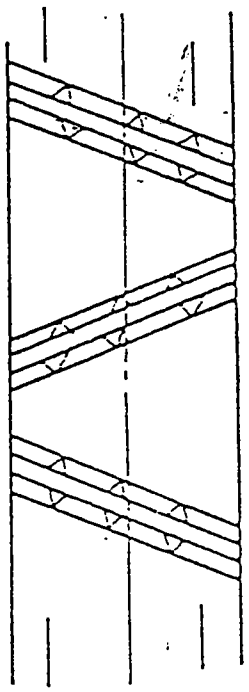
REV. DATE _____



CROSS SECTION



PLAN VIEW



STAGGERED PATTERN

CITY OF MALIBU

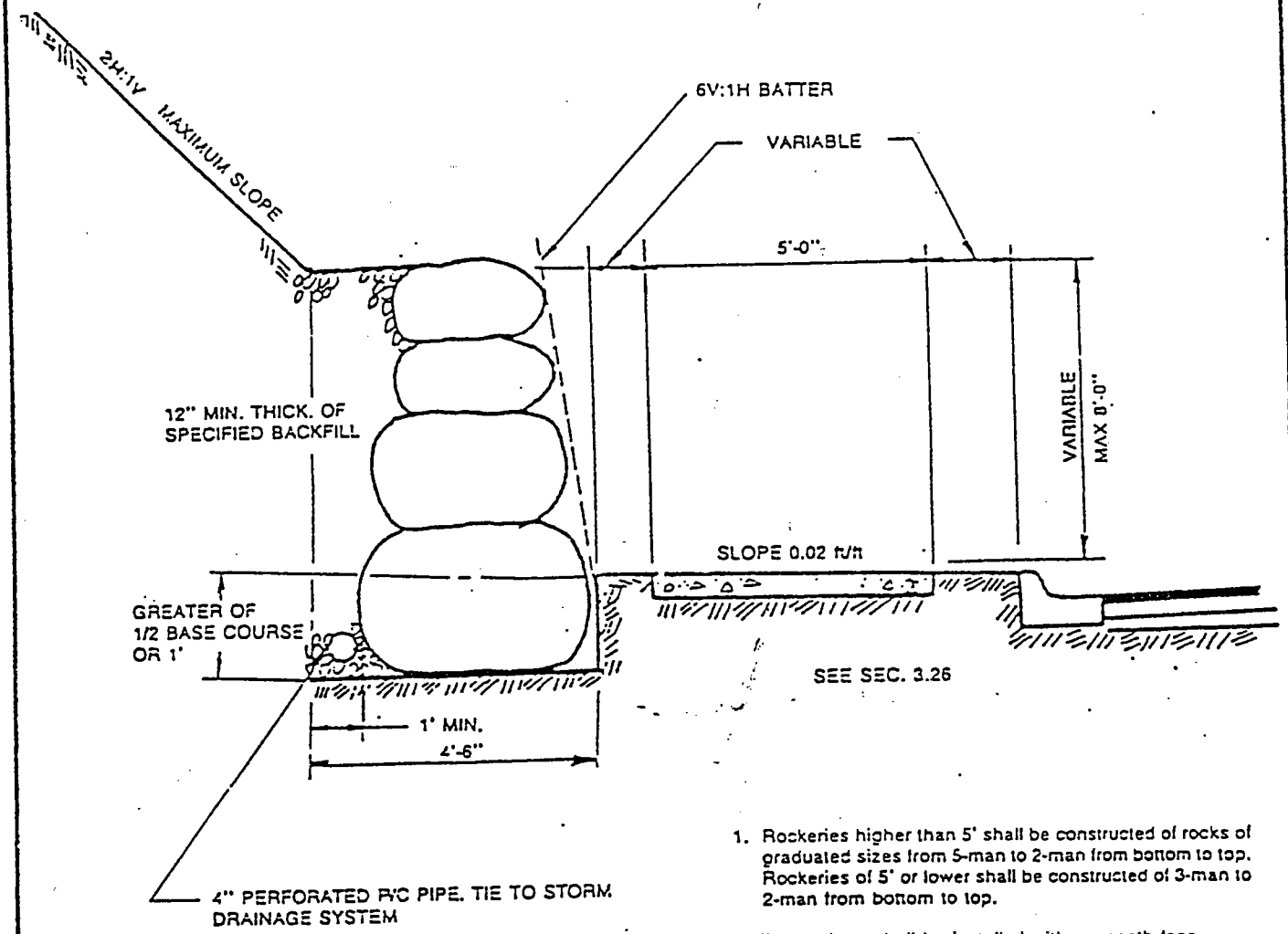
NO SCALE

TITLE

TEMPORARY INTERCEPTOR DIKE

NO. 23

REV. DATE _____



1. Rockeries higher than 5' shall be constructed of rocks of graduated sizes from 5-man to 2-man from bottom to top. Rockeries of 5' or lower shall be constructed of 3-man to 2-man from bottom to top.
2. The rockery shall be installed with a smooth face.
3. The long dimension of the rocks shall extend into the earth to provide maximum stability.
4. The rock shall be placed so as to lock into two rocks in the lower tier.
5. Call for inspection prior to base course being placed (for verification of rockery hieght, foundation material and rock size).
6. Design varying from those indicated shall carry the seal of a civil engineer experienced in soil mechanics.
7. Backfill with a minimum of one cubic foot of 4"-6" quarry spall for each foot of height and length.

CITY OF MALIBU

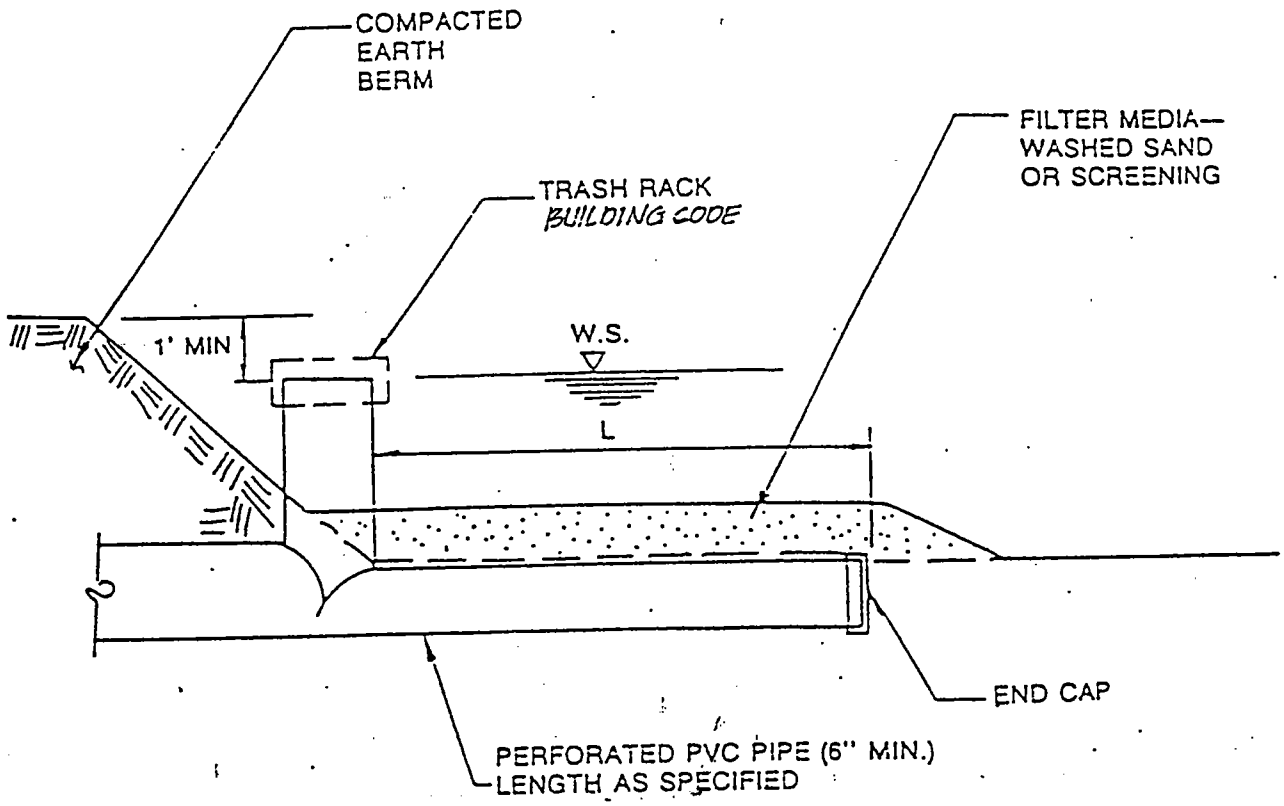
NO SCALE

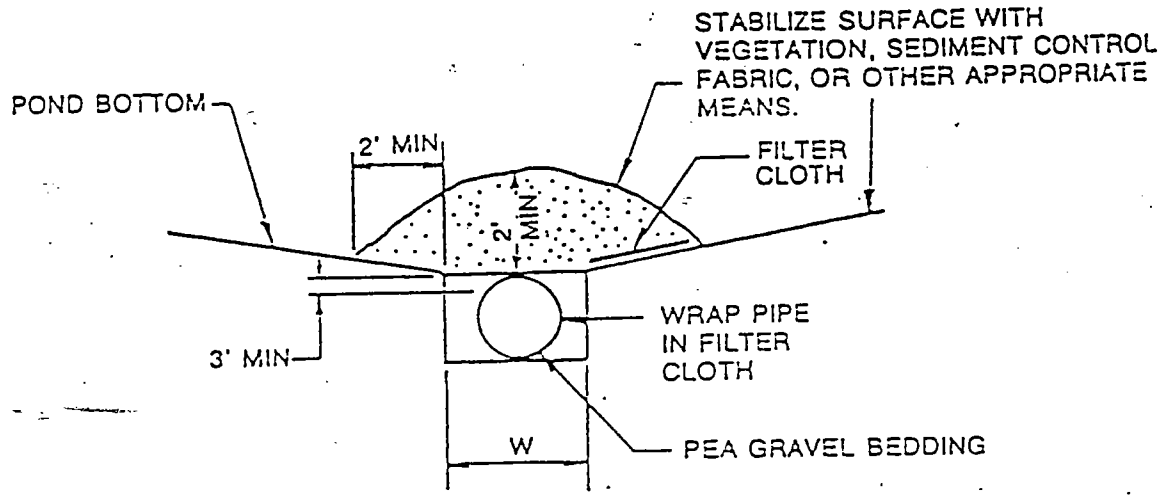
TITLE

ROCK RETAINING WALL IN CUT SECTION

NO. 24

REV. DATE _____





NOTES:

1. SAND BAGS MAY BE USED AS AN ALTERNATE MEDIA.
2. REPLACE FILTER MEDIA AND FILTER CLOTH WHEN CLOGGED.

REV. DATE _____

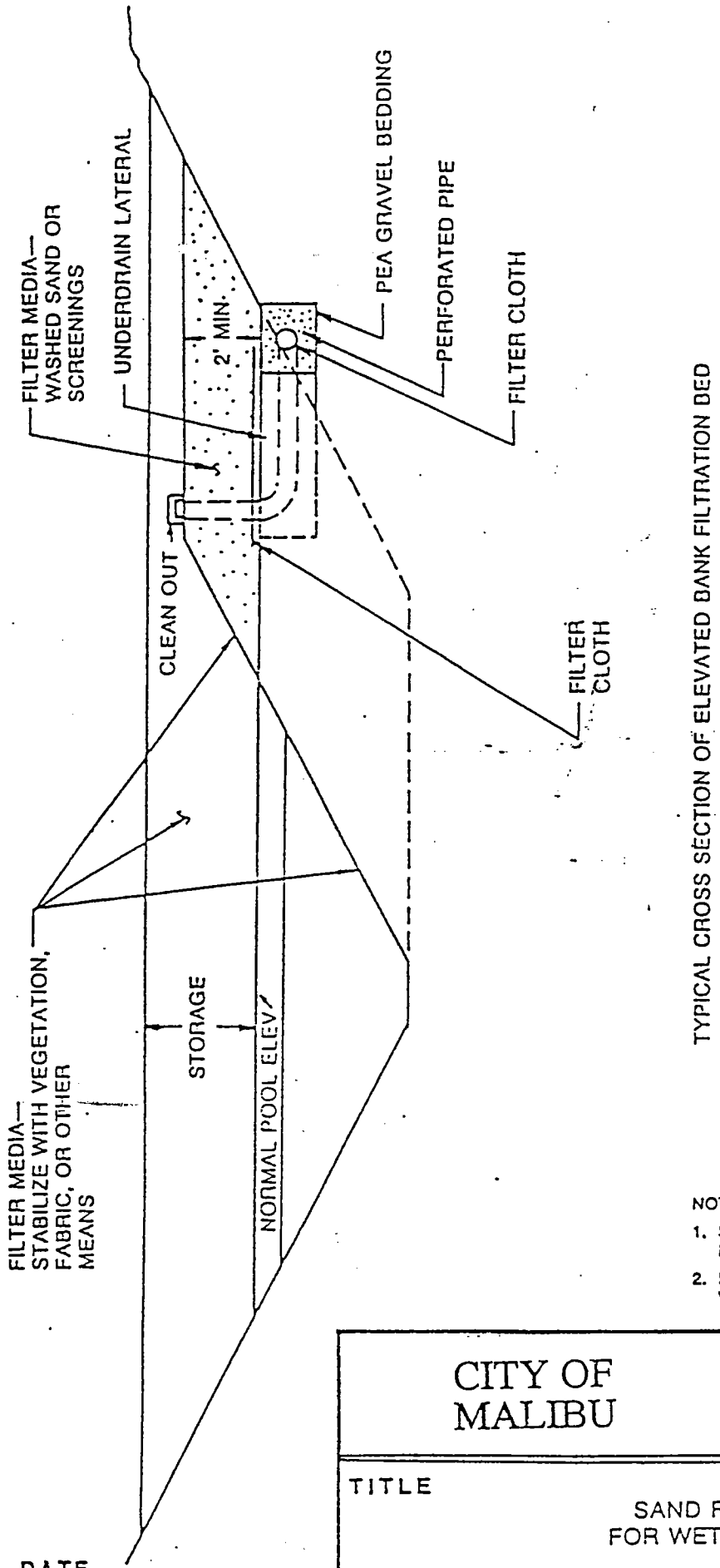
CITY OF
MALIBU

NO SCALE

TITLE

SAND FILTER FOR DRY PONDS

NO. 25



TYPICAL CROSS SECTION OF ELEVATED BANK FILTRATION BED

NOTES:

1. SAND BAGS MAY BE USED AS AN ALTERNATE FILTER MEDIA.
2. REPLACE FILTER MEDIA AND CLOTH WHEN CLOGGED.

CITY OF MALIBU

NO SCALE

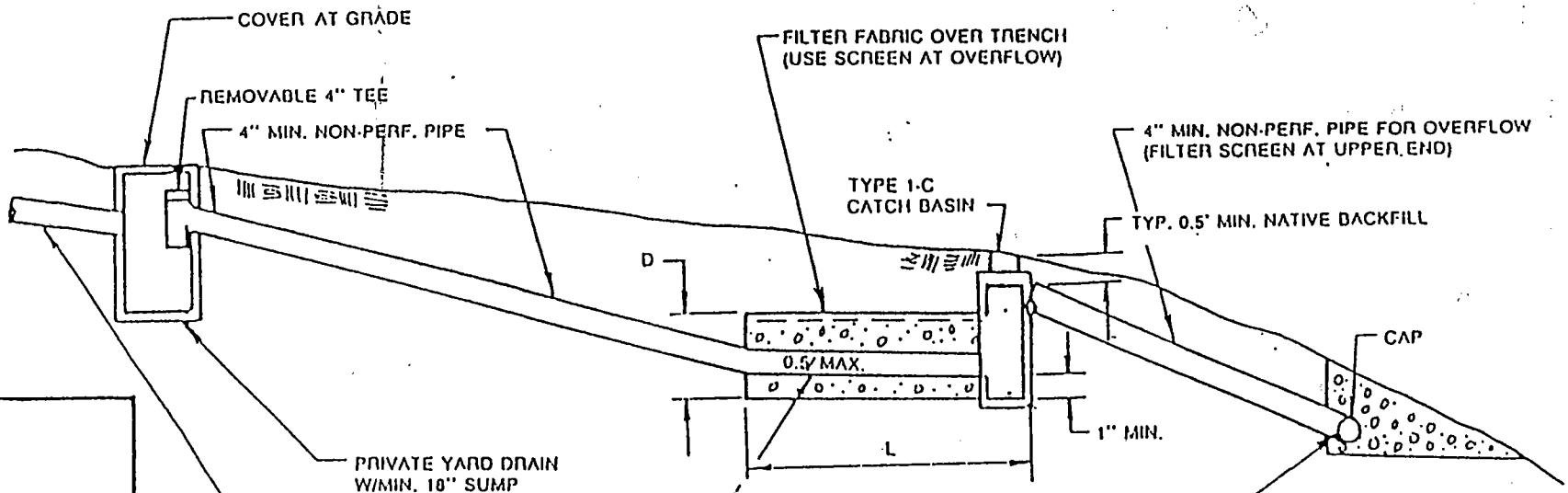
TITLE

SAND FILTER FOR WET PONDS

NO. 26

REV. DATE _____

REV. DATE _____



OVERFLOW TO CONVEYANCE SYSTEM OR TO DISPERSAL TRENCH (4" MIN. TEE W/5' PERF. PIPE PROJECTING ON BOTH SIDES IN SPECIFIED WASHED GRAVEL). DISPERSAL TRENCH SHALL BE USED ONLY WITH WRITTEN PERMISSION FROM THE BUILDING OFFICIAL.

A GEOTECHNICAL REPORT SHALL BE REQUIRED TO DEMONSTRATE NO ADVERSE IMPACT ON SLOPE STABILITY FOR ALL PROPOSED DRYWELLS.

SIZING OF TRENCH

SELECT DIMENSIONS L, W & D
SO THAT

$$LxW + D(L+W) = \frac{\text{IMPERVIOUS AREA}}{4 \times \text{INFILTRATION RATE}}$$

MAXIMUM IMPERVIOUS AREA
ALLOWABLE = 3,000 SQUARE FEET

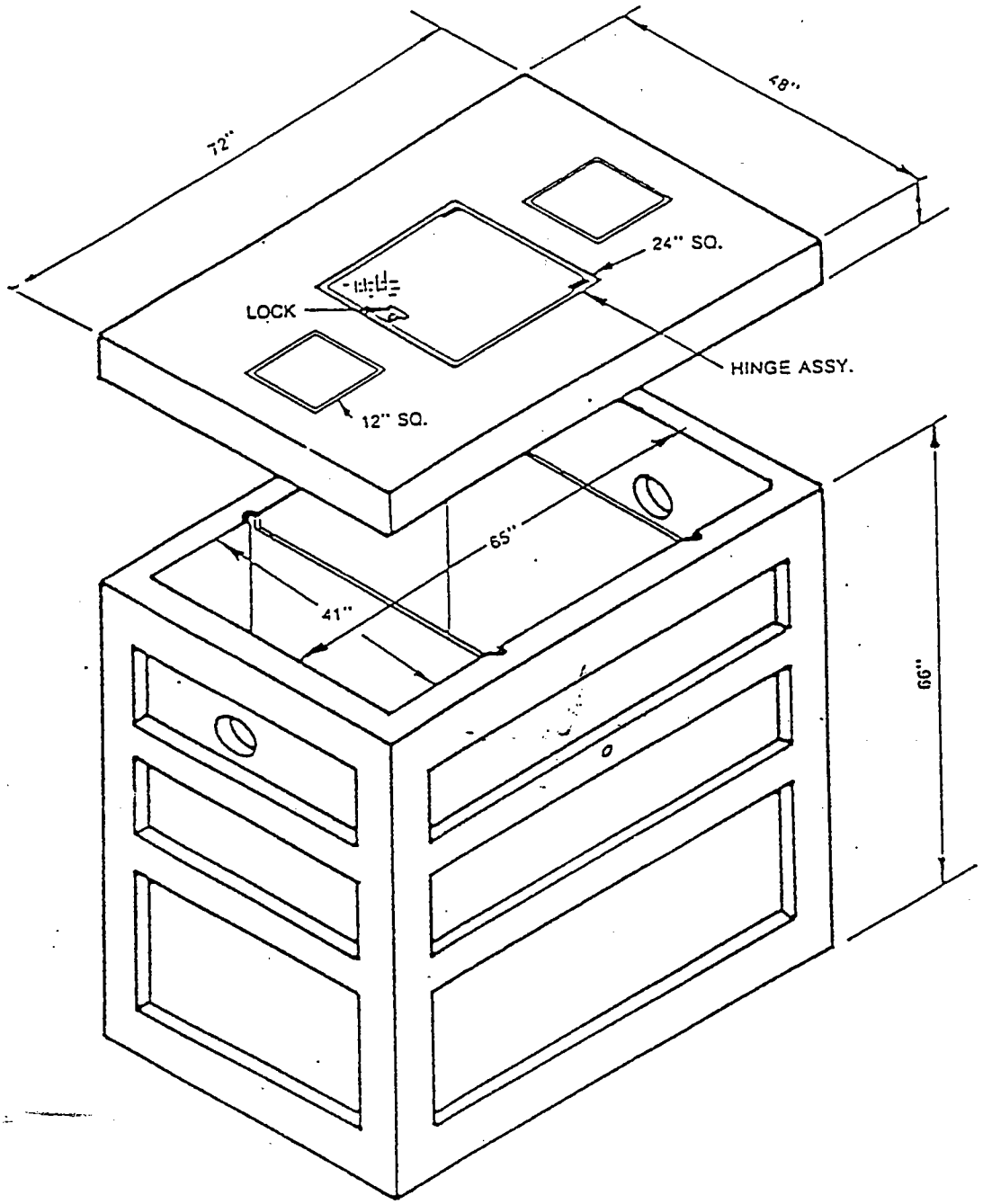
CITY OF
MALIBU

NO SCALE

TITLE

INDIVIDUAL LOT/ROOF DRAIN
DRYWELL SKETCH

NO. 27



CITY OF MALIBU

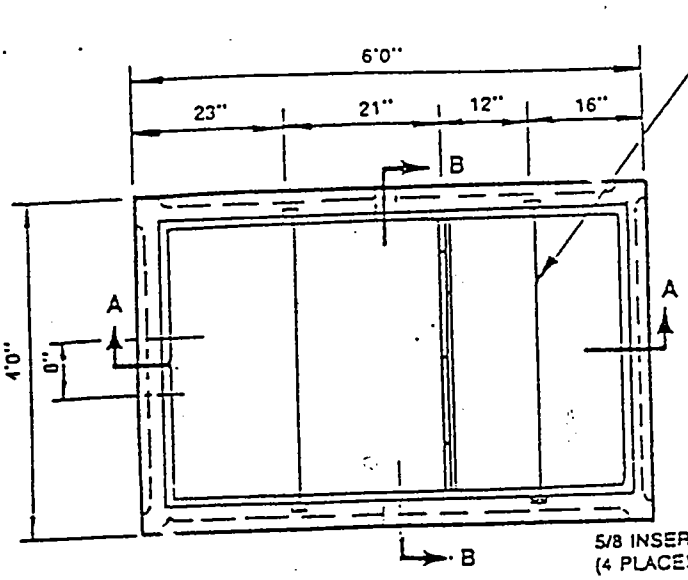
NO SCALE

TITLE

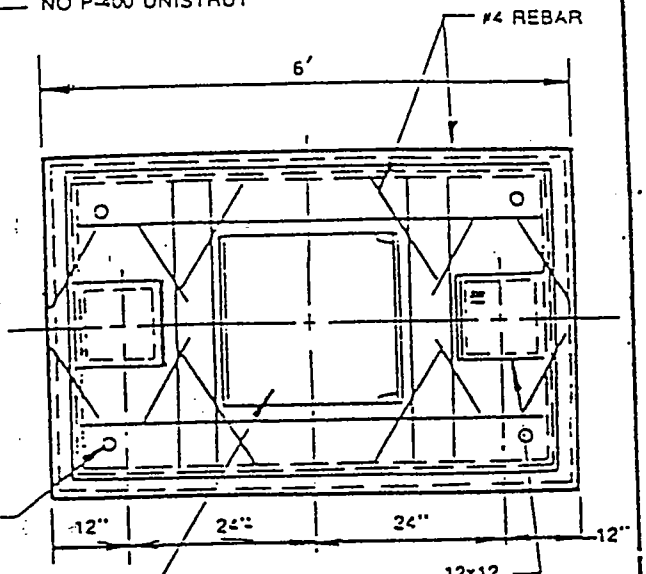
BAFFLE TYPE OIL/ WATER SEPARATOR-A

NO. 28

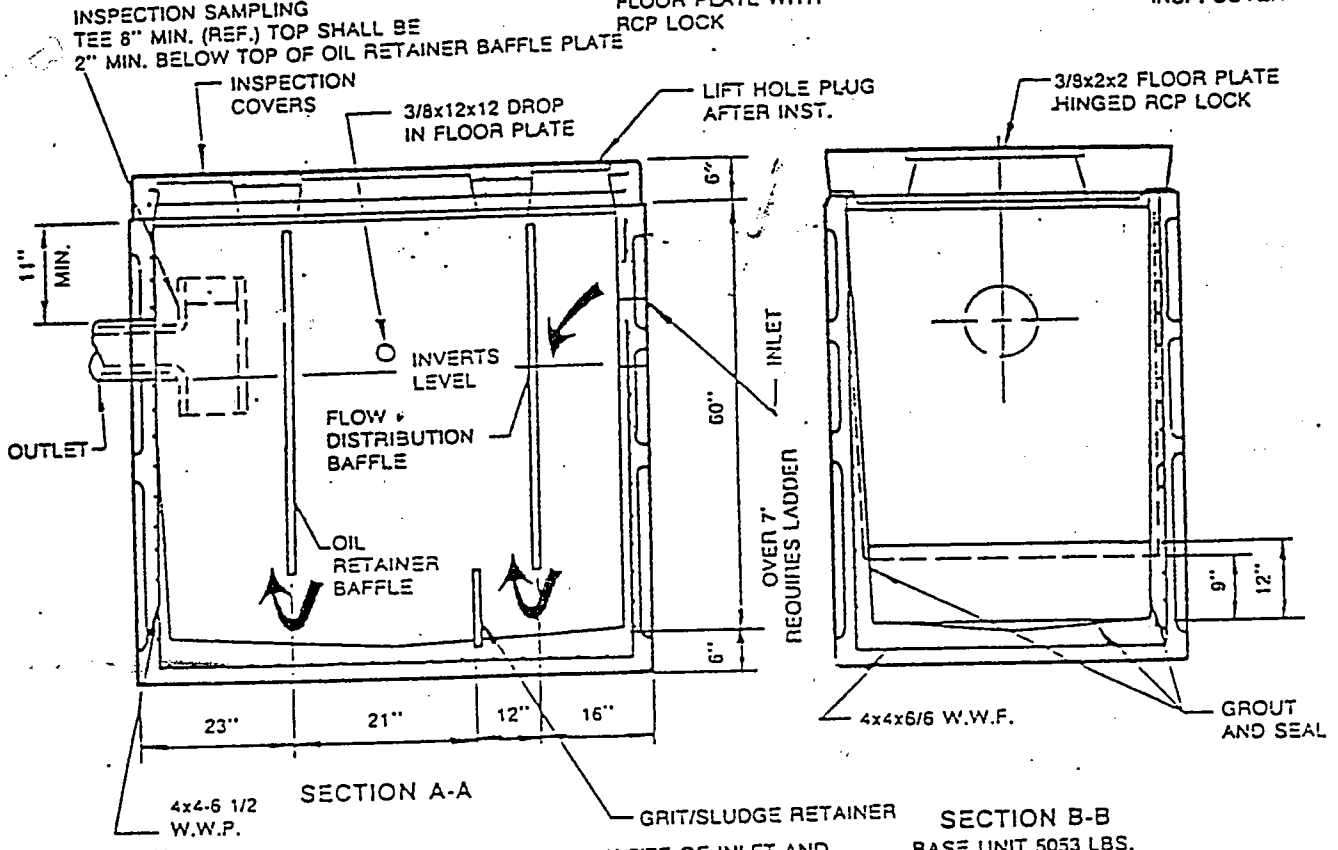
REV. DATE _____



PLAN OF BASE UNIT



COVER-H-20 LOAD



SECTION A-A

SECTION B-B

MAX SIZE OF INLET AND OUTLET PIPE SHALL BE 12"

BASE UNIT 5053 LBS.
COVER 1450 LBS.

GENERAL NOTES

CONCRETE
MINIMUM 28 DAY COMPRESSIVE STRENGTH FC 4000 PSI DESIGN IN ACCORDANCE WITH NO 52563 "MINIMUM" REQUIREMENTS FOR THIN SECTION PRECAST CONCRETE CONSTRUCTION. REINFORCEMENT DEFORMED BARS IN ACCORDANCE WITH ASTM A 615 65 GRADE 40, WELDED WIRE FABRIC IN ACCORDANCE WITH ASTM A82-65 & A155-69.

DESIGN LOADS AASHO-H-20 GALVANIZING ALL FABRICATED STEEL ITEMS, EXCEPT REINFORCING, TO BE HOT DIPPED GALVANIZED AFTER FABRICATION, CONFORMING TO SPECIFICATIONS ASTM A384, A385 & A123 W/ASPHALT TREATMENT / COATING.

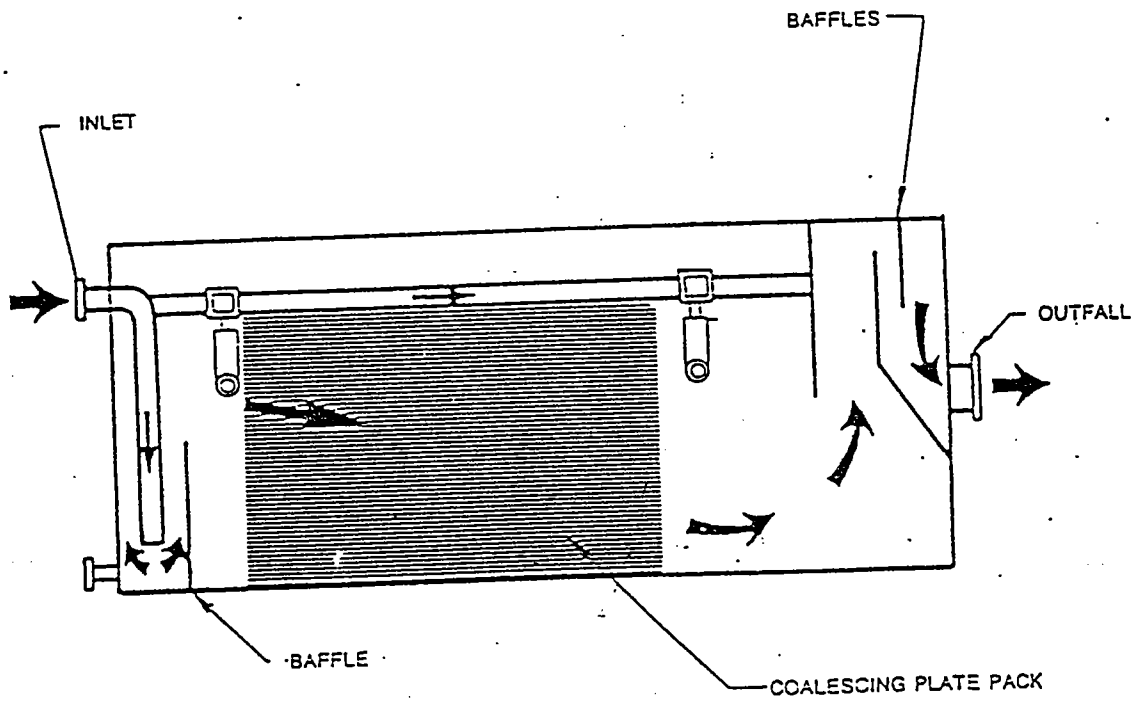
CITY OF MALIBU

NO SCALE

TITLE

BAFFLE TYPE OIL/ WATER SEPARATOR-B

NO. 29

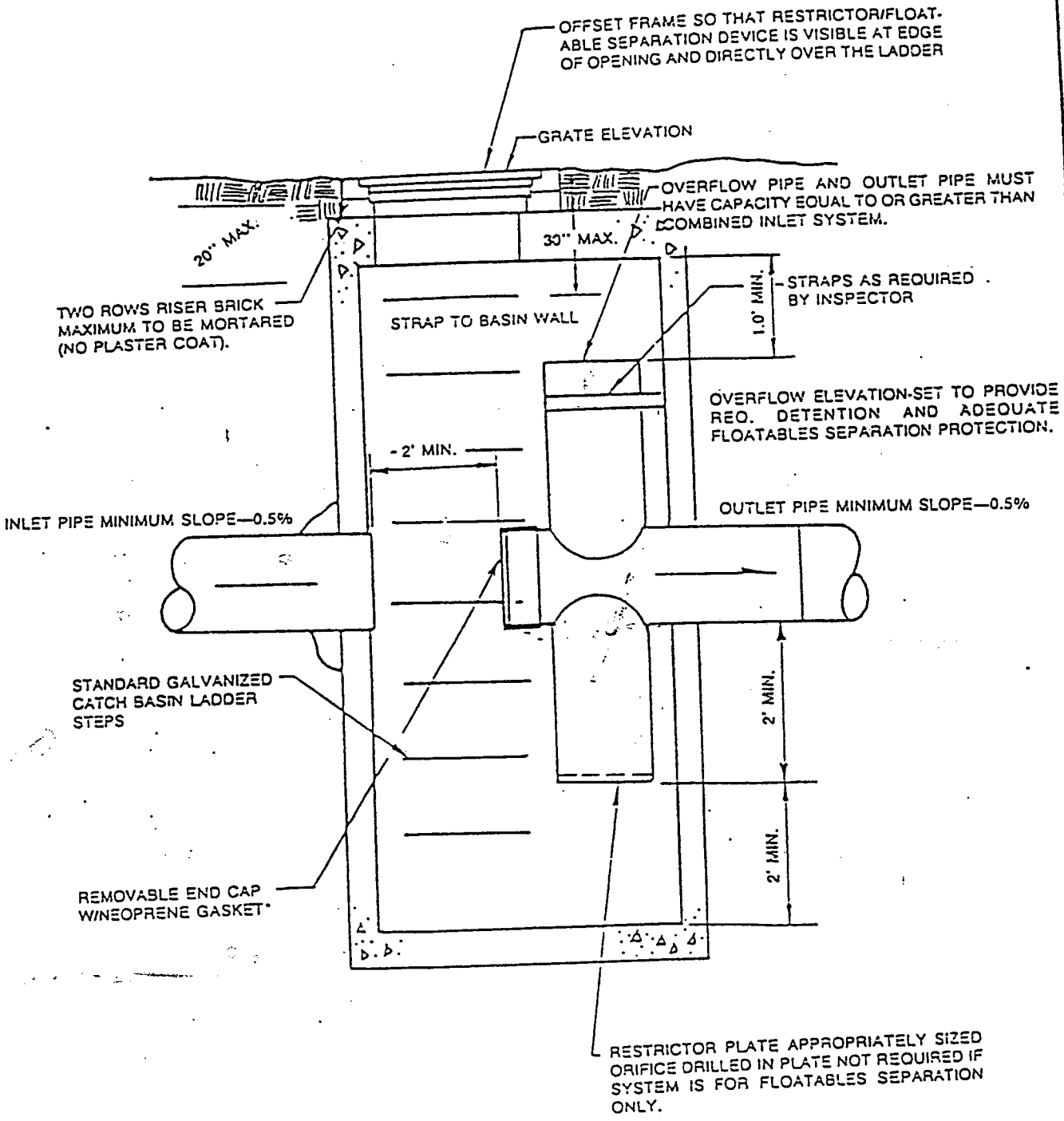


CITY OF MALIBU

NO SCALE

TITLE SCHEMATIC OF TYPICAL COALESCING PLATE OIL/ WATER SEPARATOR NO. 30

REV. DATE _____



TYPE II CATCH BASIN OR LARGER IF REQUIRED.
NOTE: TRAFFIC SAFE STRUCTURE WITH MINIMUM I.D. 42" (EG. UTILITY VAULT) MAY BE SUBSTITUTED FOR TYPE II CATCH BASIN.

NOTE: ALL METAL PARTS AND SURFACES MUST BE MADE OF CORROSION RESISTANT MATERIAL OR GALVANIZED. COMPLETE CORROSION PROTECTION MUST BE ASSURED.

REV. DATE _____

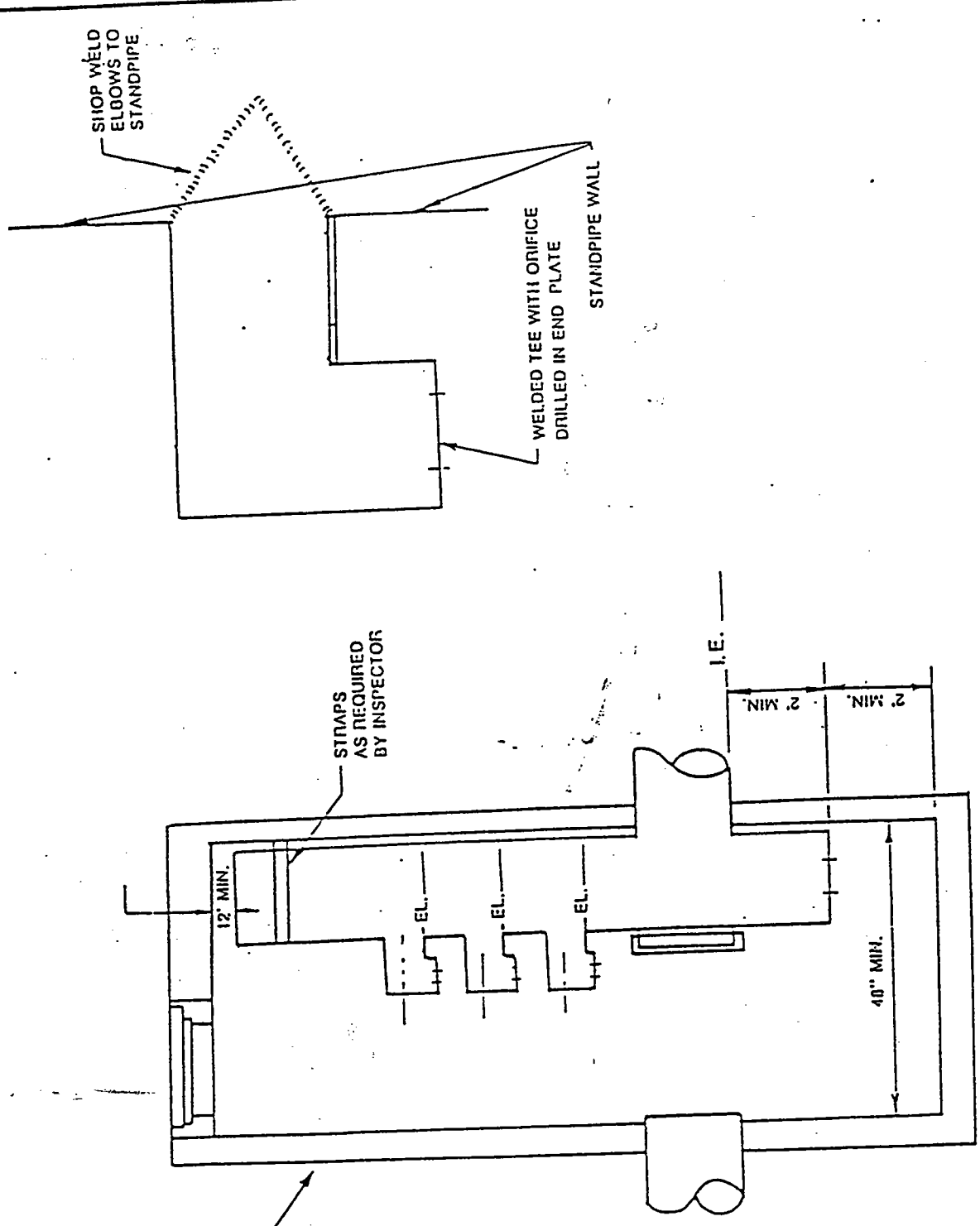
CITY OF MALIBU

NO SCALE

TITLE

FLOW RESTRICTOR/ CONTROL DEVICE CATCH BASIN

NO. 31



CITY OF MALIBU

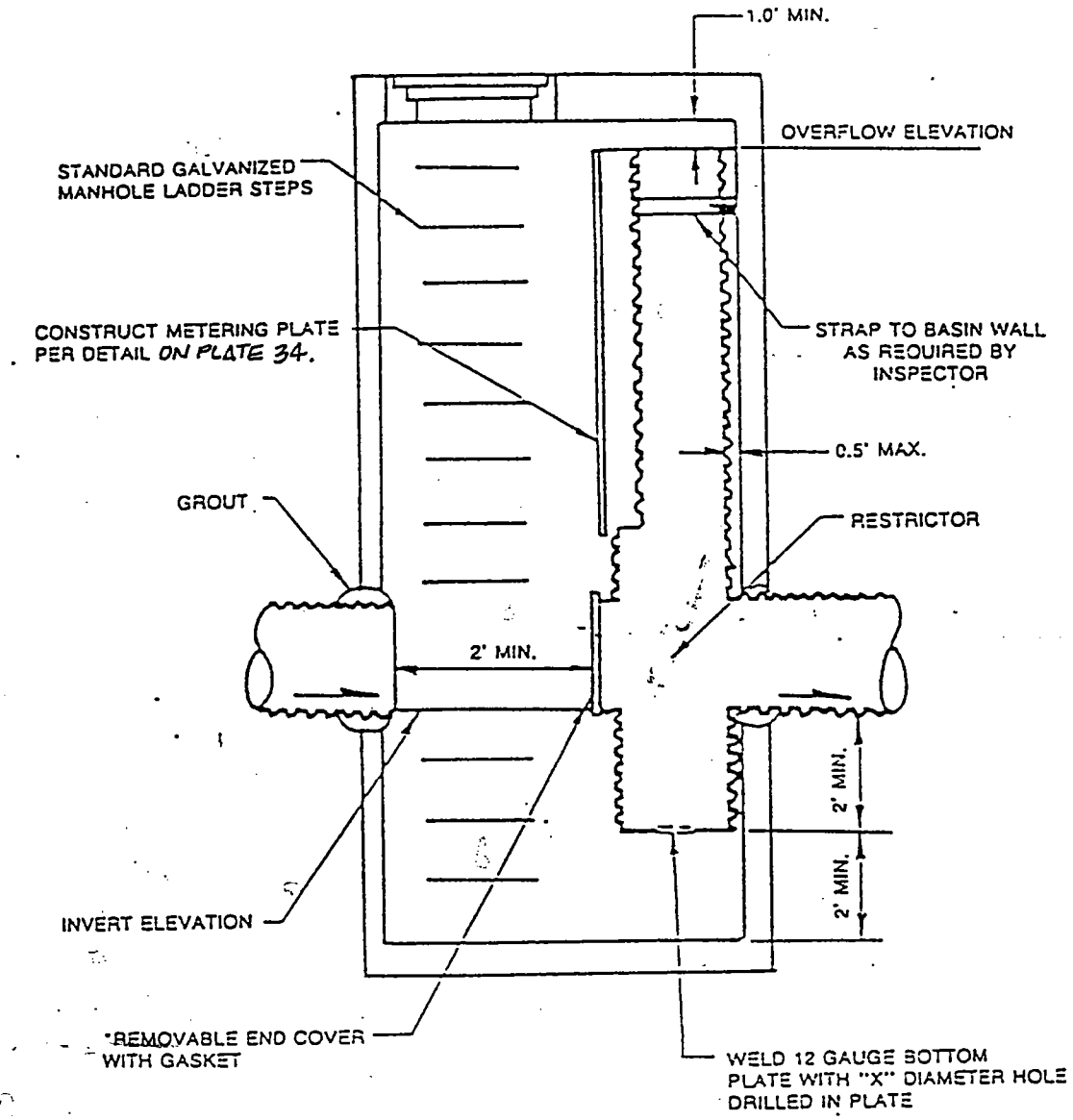
NO SCALE

TITLE

MULTIPLE ORIFICE RESTRICTOR—TYPE A

NO. 32

REV. DATE



*NOTE: SCREW TYPE SHEAR GATE W/BRONZE SEATS REQUIRED FOR ALL SYSTEMS TO BE MAINTAINED BY CITY (SEE DRAWING NO. 42).

NOTE: ALL METAL PARTS AND SURFACES MUST BE MADE OF CORROSION RESISTANT MATERIALS OR GALVANIZED. COMPLETE CORROSION PROTECTION MUST BE ASSURED.

REV. DATE _____

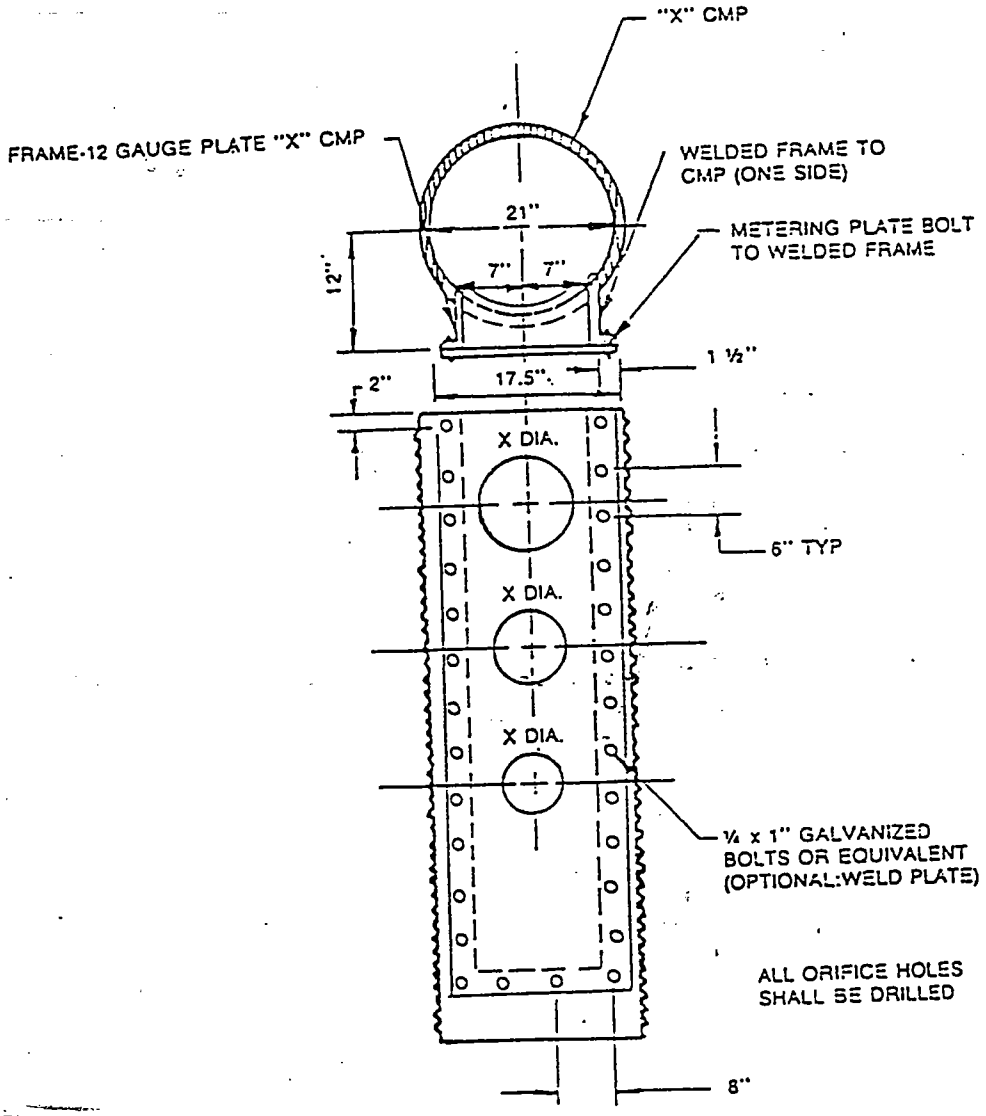
CITY OF MALIBU

NO SCALE

TITLE

MULTIPLE ORIFICE RESTRICTOR—TYPE B

NO. 33



METERING PLATE DETAIL

NOTE: ALL METAL PARTS AND SURFACES MUST BE MADE OF CORROSION RESISTANT MATERIALS OR GALVANIZED. COMPLETE CORROSION PROTECTION MUST BE ASSURED.

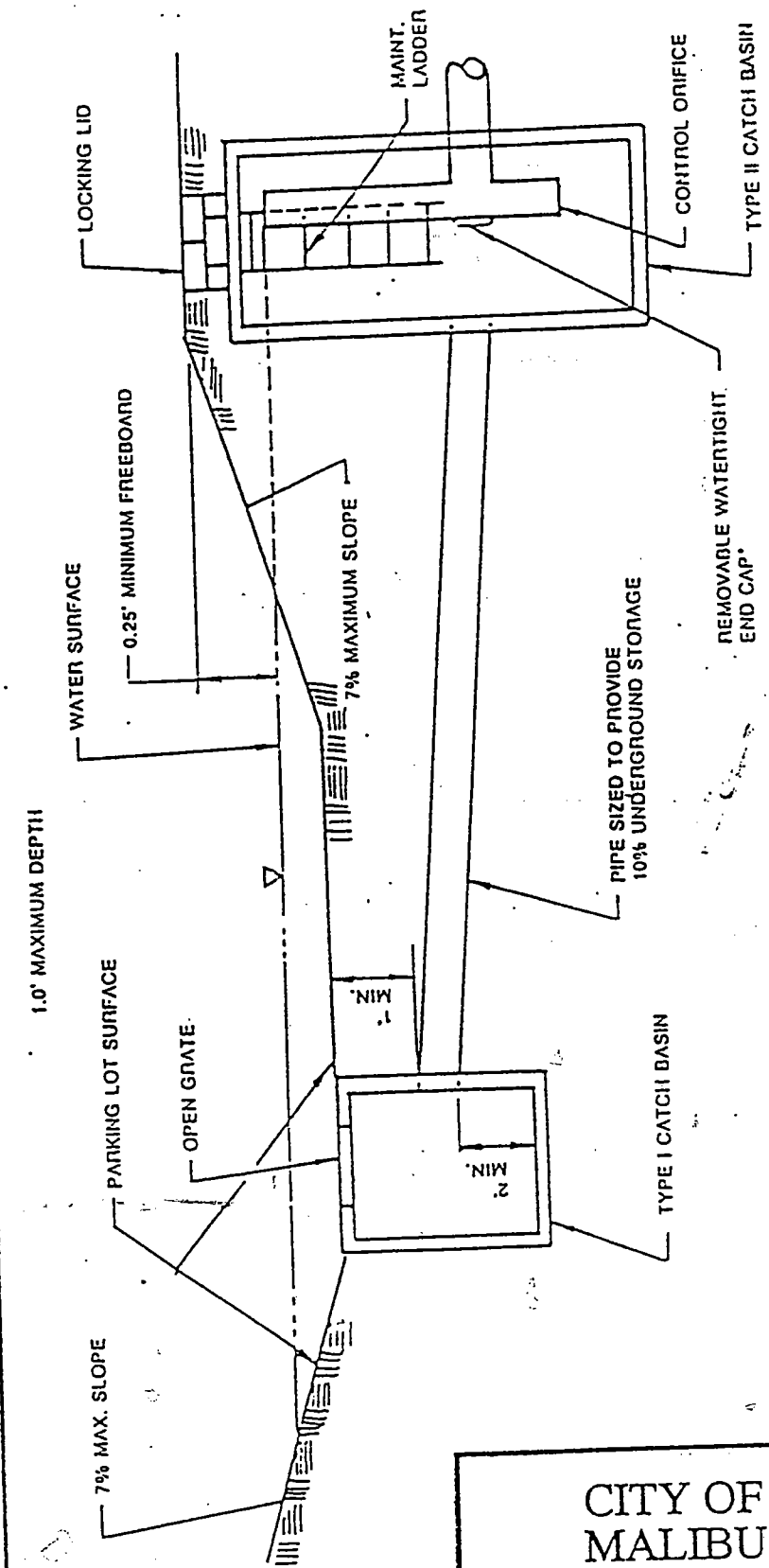
CITY OF MALIBU

NO SCALE

TITLE MULTIPLE ORIFICE RESTRICTOR METERING PLATE DETAIL

NO. 34

REV. DATE _____



*NOTE: SCREW TYPE SHEAR GATE W/BRONZE SEATS REQD. FOR ALL SYSTEMS TO BE MAINTAINED BY CITY (SEE DRAWING NO. 42).

CITY OF MALIBU

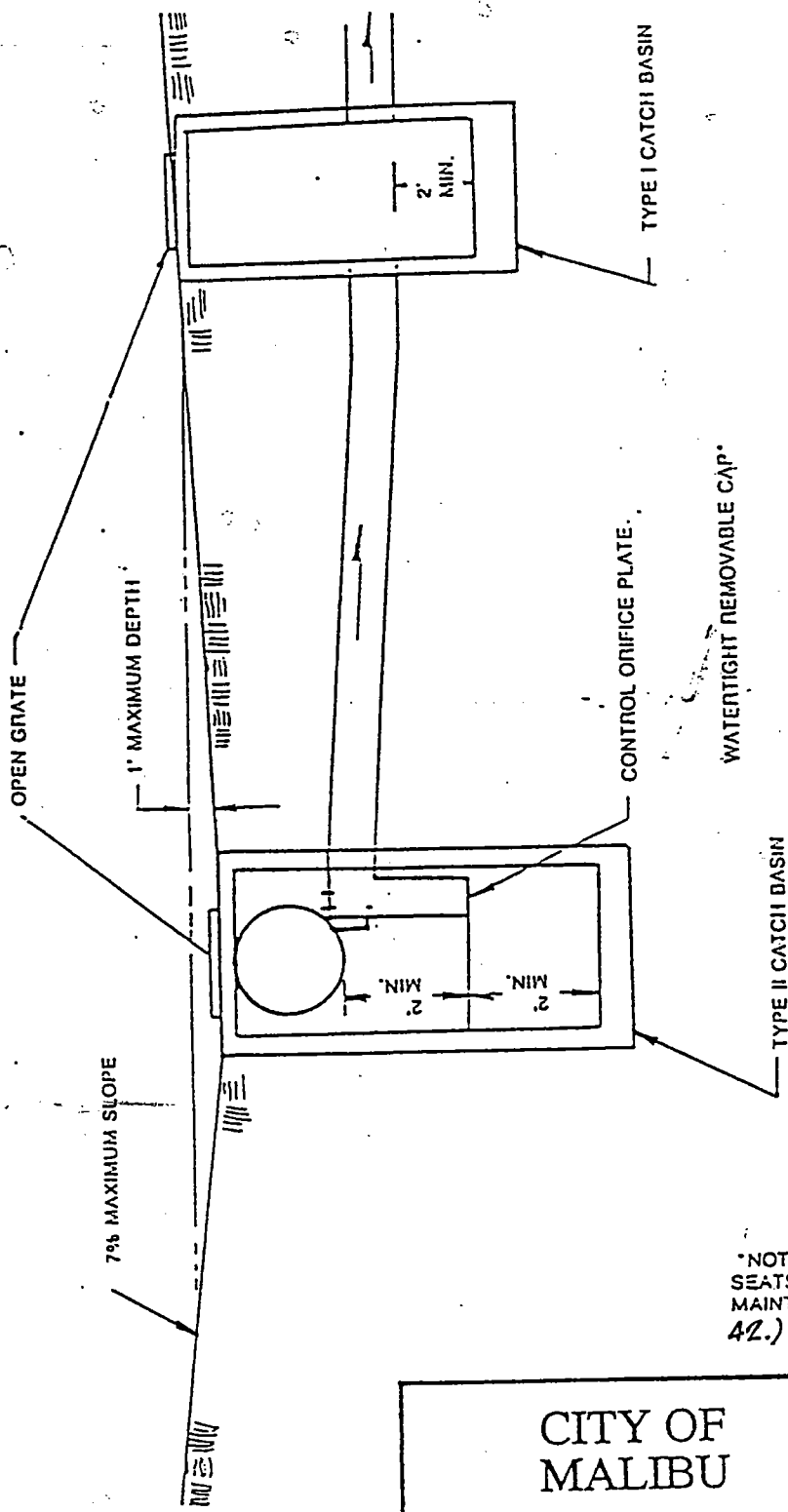
NO SCALE

TITLE

TYPICAL PARKING LOT PONDING IN BASIN OVERFLOW

NO. 35

REV. DATE _____



*NOTE: SCREW TYPE SHEAR GATE W/BRONZE SEATS REQUIRED FOR ALL SYSTEMS TO BE MAINTAINED BY CITY (SEE DRAWING NO. 42.)

CITY OF MALIBU

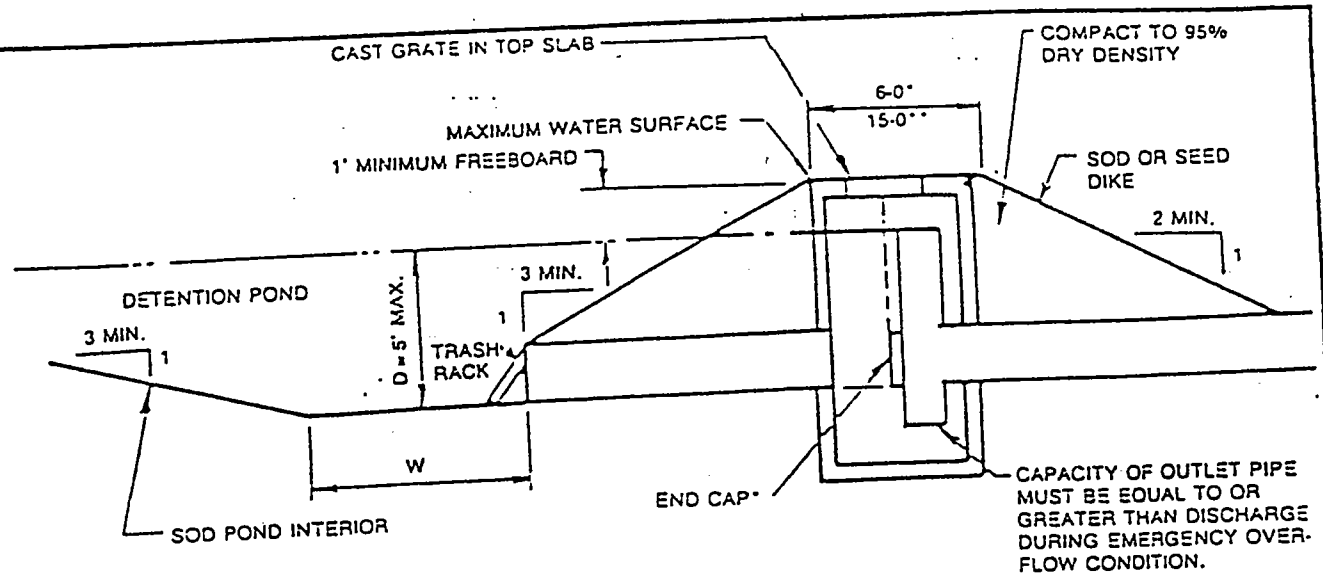
NO SCALE

TITLE

TYPICAL PARKING LOT PONDING SURFACE OVERFLOW OPENING

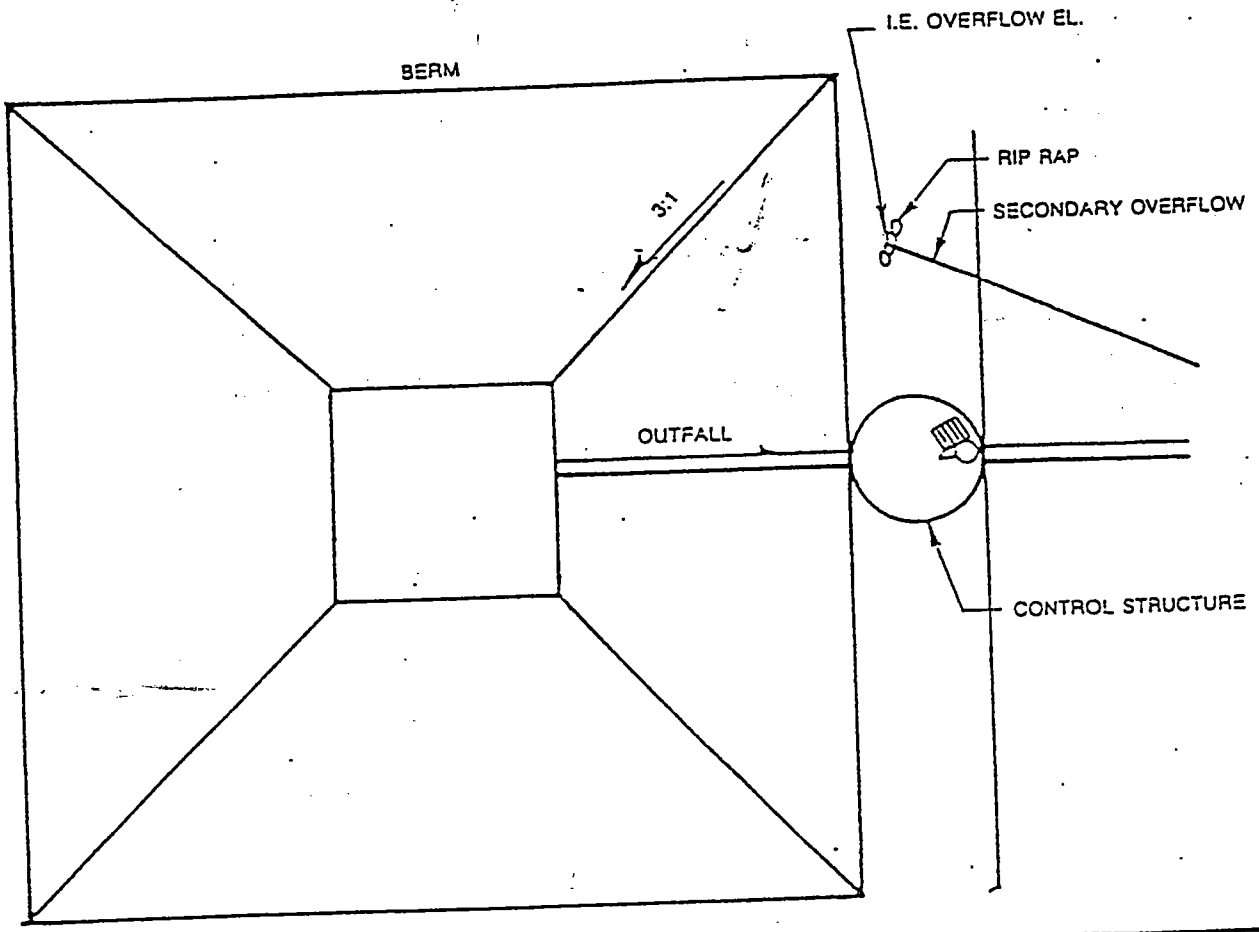
NO. 36

REV. DATE



SECTION

*SCREW TYPE SHEAR GATE W/BRONZE SEATS REQUIRED FOR ALL SYSTEMS TO BE MAINTAINED BY CITY (SEE DRAWING NO 42)



*6" MINIMUM WHEN D LESS THAN 3'

**15' MINIMUM WHEN D GREATER THAN 3'

CITY OF MALIBU

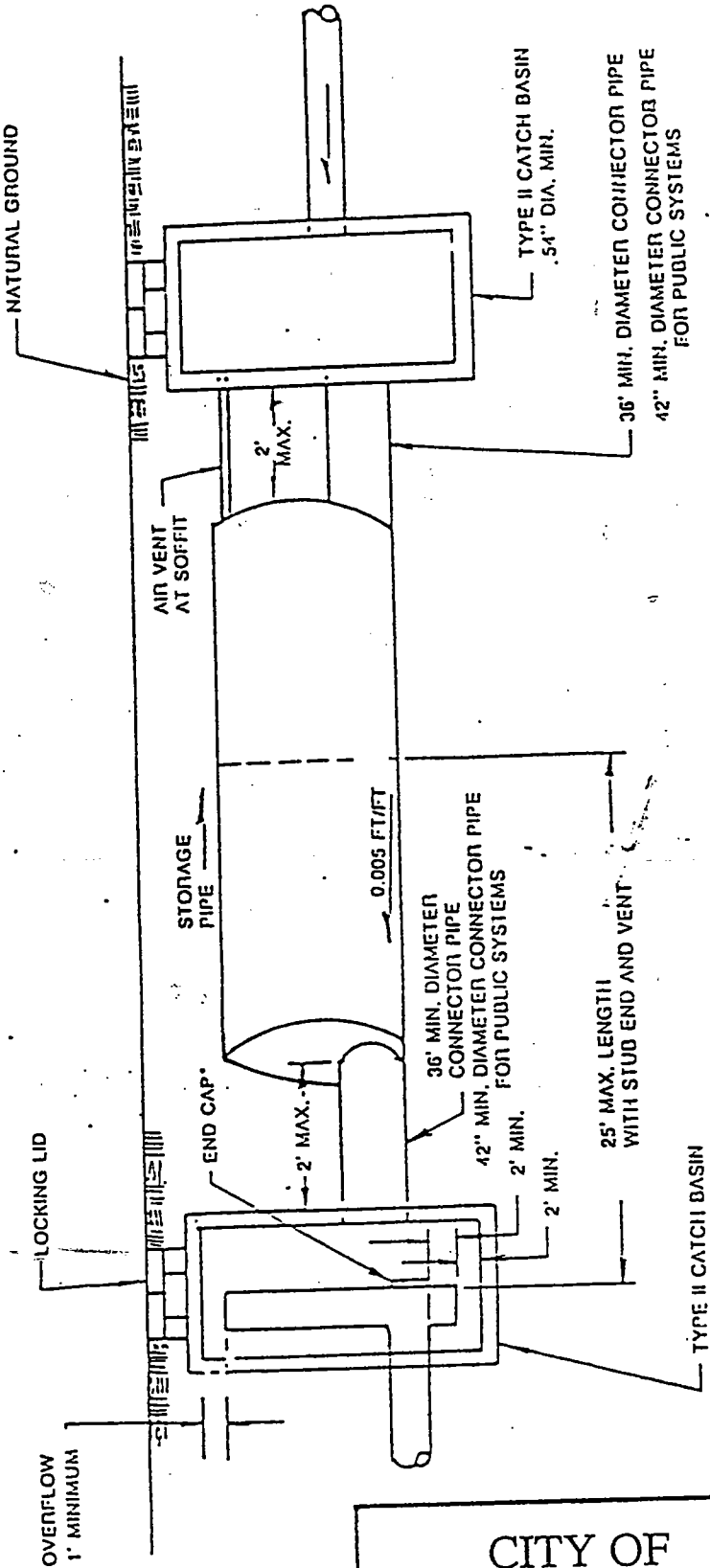
NO SCALE

TITLE

TYPICAL DETENTION POND PROFILE & PLAN SKETCH

NO. 37

REV. DATE _____



CITY OF MALIBU

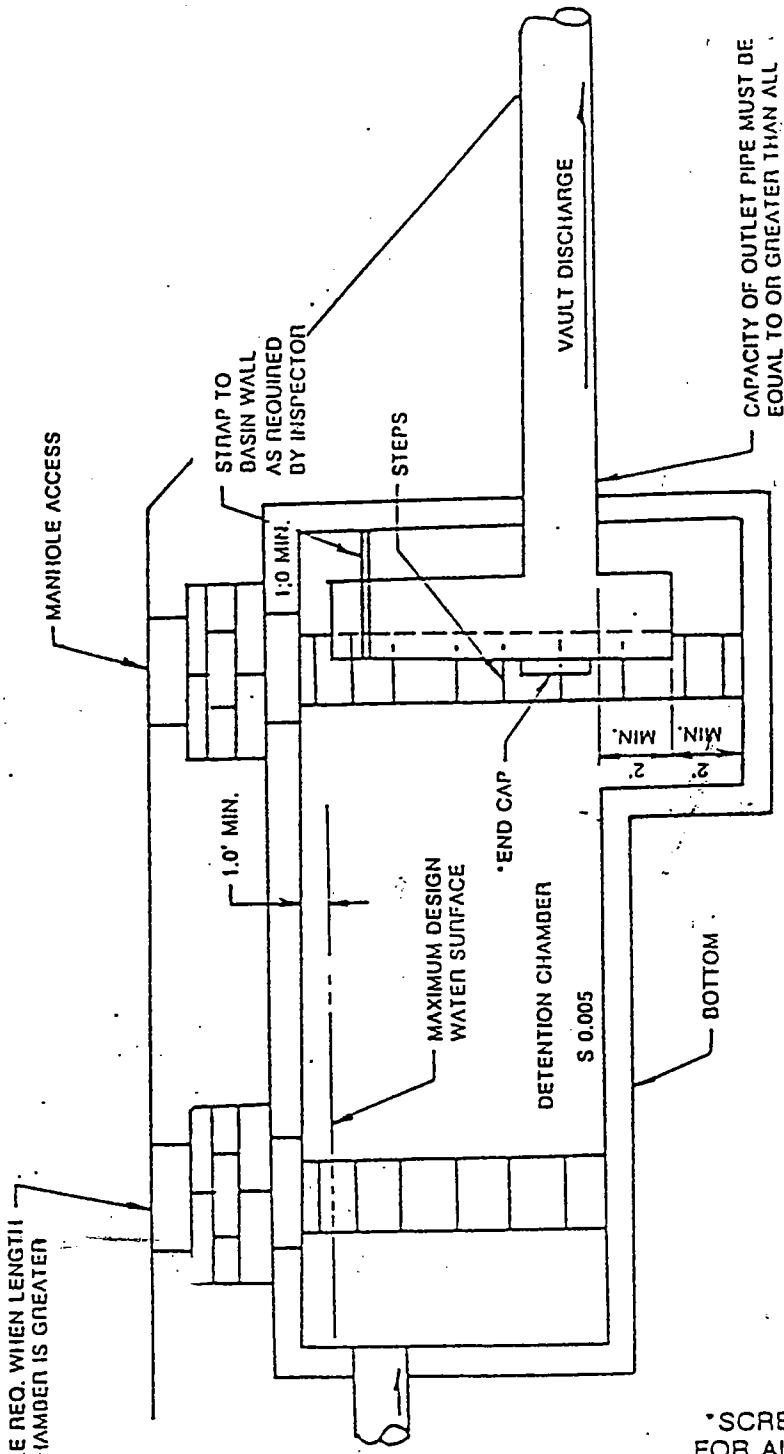
NO SCALE

TITLE

TYPICAL CLOSED DETENTION PIPE

NO. 38

REV. DATE



*SCREW-TYPE SHEAR GATE REQUIRED FOR ALL SYSTEMS TO BE MAINTAINED BY THE CITY (SEE DRAWING NO. 42.)

CITY OF MALIBU

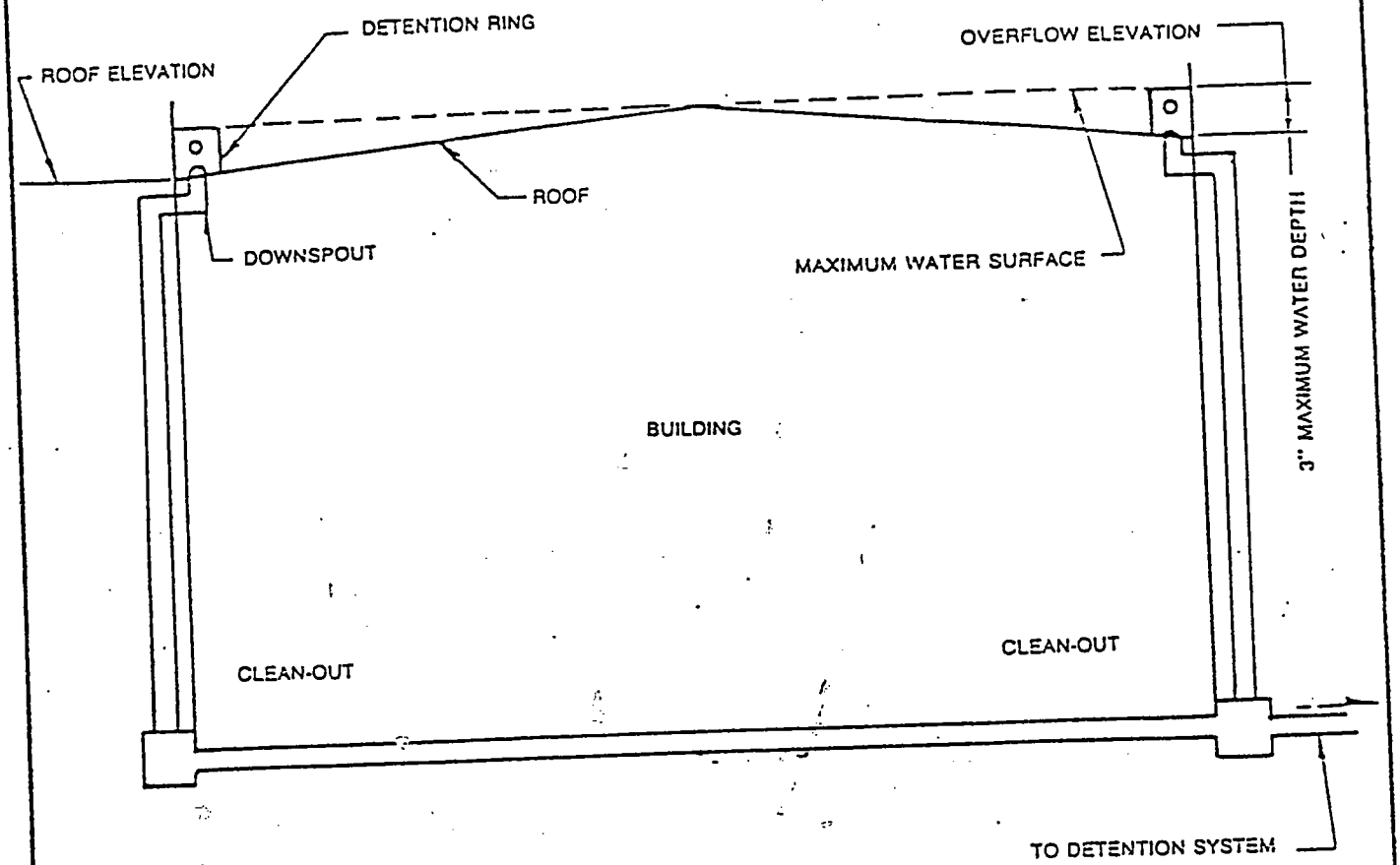
NO SCALE

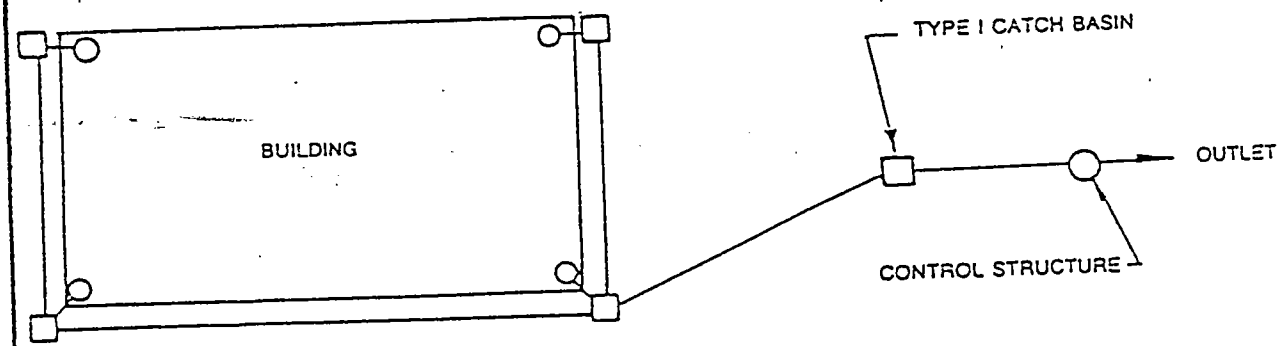
TITLE

TYPICAL DETENTION CHAMBER

NO. 39

REV. DATE _____





CITY OF MALIBU

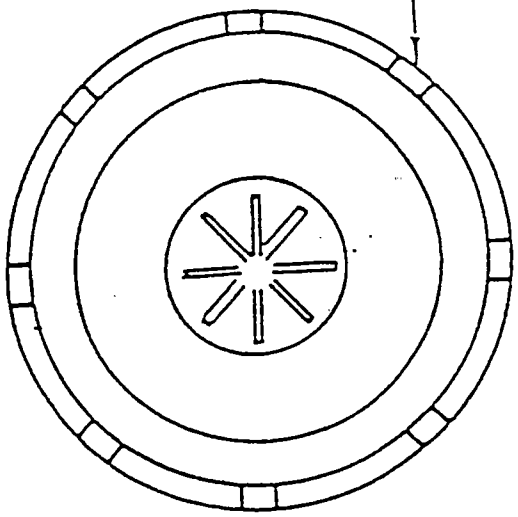
NO SCALE

TITLE

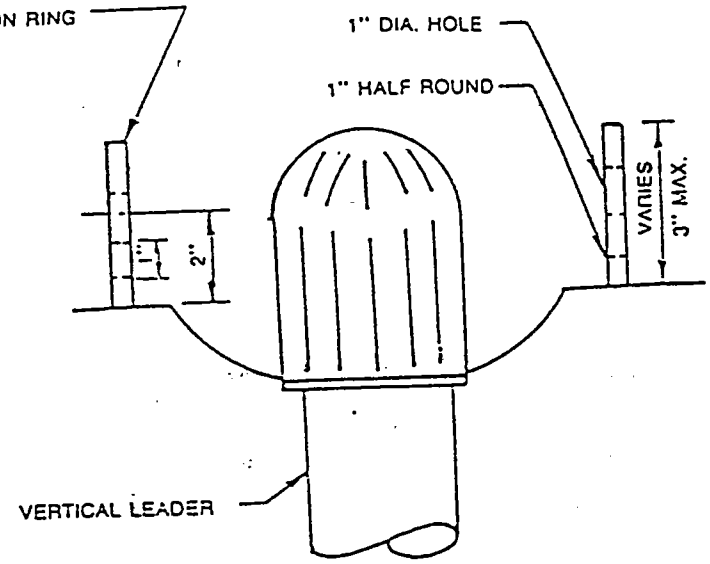
TYPICAL ROOFTOP DETENTION

NO. 40

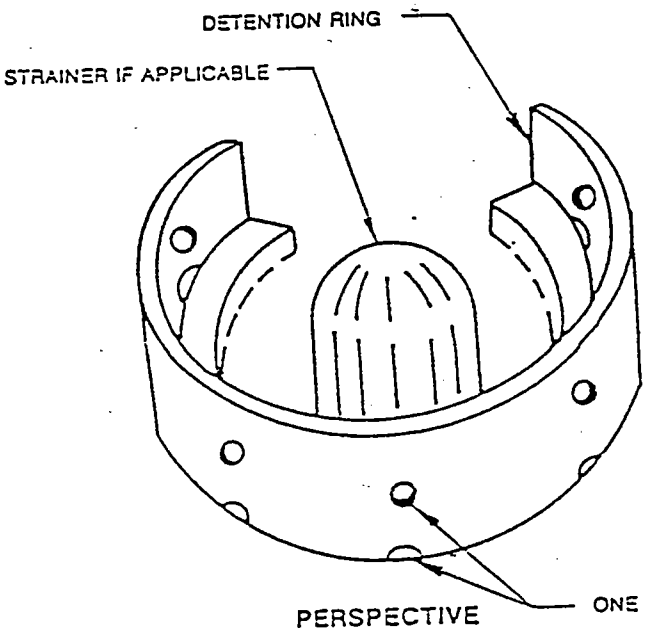
REV. DATE _____



PLAN



SECTION



PERSPECTIVE

CITY OF MALIBU

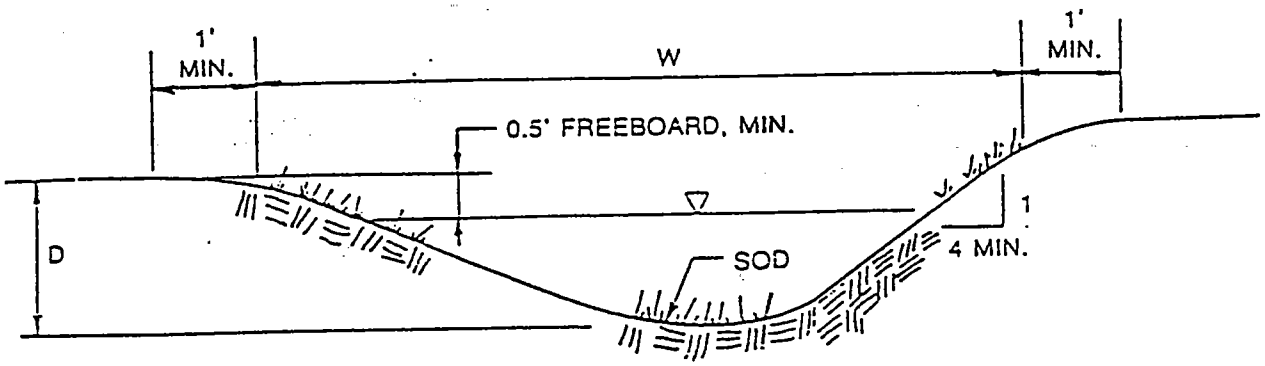
NO SCALE

TITLE

ROOFTOP RESTRICTOR DEVICE

NO. 41

REV. DATE _____



TYPICAL SECTION

NOTES:

1. D, W SIZED PER SECTION 4.B.03.M. OF THE STANDARDS.
2. SOD SHALL BE STAPLED IN PLACE
3. ROUND ALL CORNERS FOR EASE OF MOWING.
4. MAXIMUM DESIGN VELOCITY SHALL BE 4 F.D.S. VELOCITY MAY BE CONTROLLED BY CHECK DAMS OR OTHER DEVICES.
5. LOCATE ALL SEDIMENT TRAPS FOR EASE OF MAINTENANCE.
6. REMOVE SEDIMENT WHEN A MAXIMUM OF 6 INCHES IS DEPOSITED AT ANY POINT.
7. MATRIX-TYPE SOIL REINFORCEMENT MATTING MAY BE SUBSTITUTED ON PRIOR WRITTEN APPROVAL OF THE STORM AND SURFACE WATER UTILITY.

CITY OF MALIBU

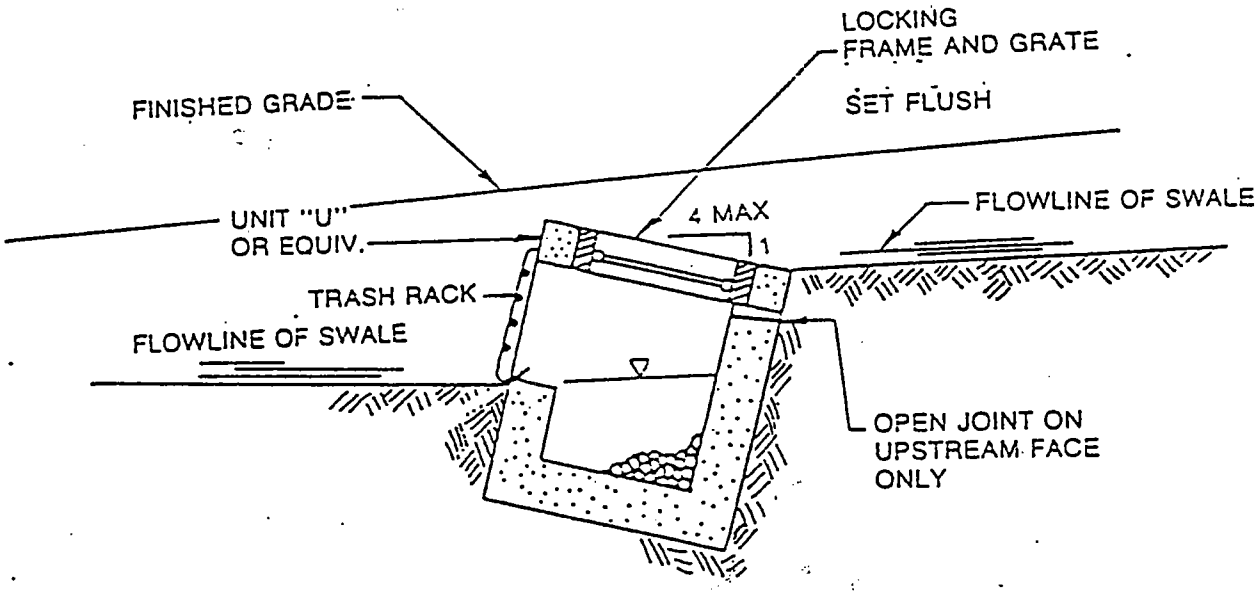
NO SCALE

TITLE

GRASS-LINED SWALE

NO. 42

REV. DATE _____



NOTES:

1. SEDIMENT TRAPS SHALL BE LOCATED AT UPSTREAM END OF SWALE ADJACENT TO UNDEVELOPED LAND OR IMMEDIATELY DOWNSTREAM OF ANY AREA PRONE TO EROSION.
2. LOCATE SEDIMENT TRAPS FOR CONVENIENT MAINTENANCE ACCESS NEAR ROADS OR ACCESS EASEMENTS.

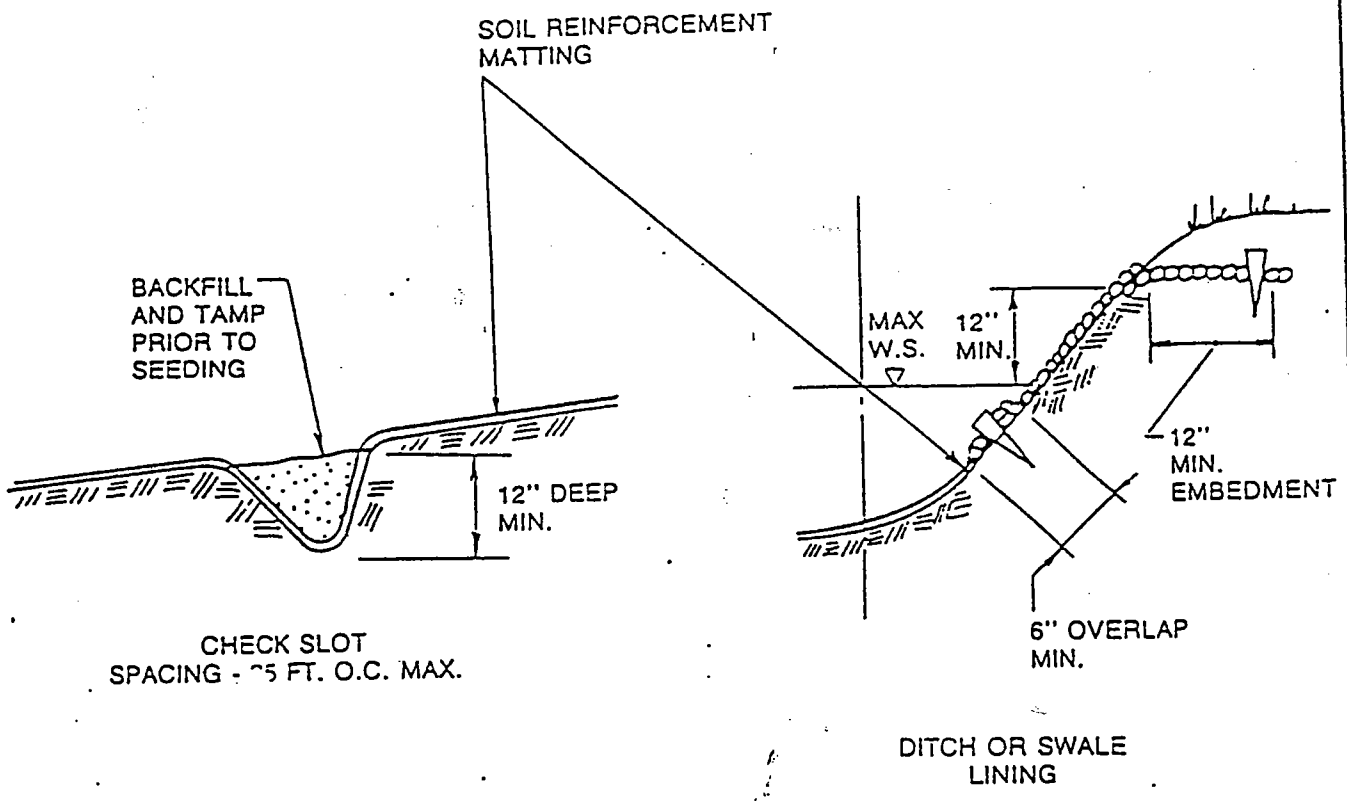
REV. DATE _____

CITY OF MALIBU

NO SCALE

TITLE SWALE SEDIMENT TRAP INLET

NO. 43



NOTES:

1. STAKE WITH 10" MIN. WOOD SURVEY STAKES, 3 FEET ON CENTER.
2. EMBED MAT AT TOP OF DITCH AND UPSTREAM AND DOWNSTREAM ENDS, 12 INCH MIN. EMBEDMENT.
3. STARTING AT UPPER END, LAY MATTING LONGITUDINALLY, PEAKED SIDE DOWN, STAKING UPSTREAM AND DOWNSTREAM TRENCHES. STRETCH 5% BEFORE STAKING.
4. BACKFILL CHECK SLOTS AND TERMINAL TRENCHES PRIOR TO SEEDING.
5. MAINTAIN DIVERSION UNTIL GERMINATION AND SPROUTING OF SEED MIX.
6. DISTRIBUTE SEED MIX NO. 9 AT 64 LB. PER ACRE (WITHOUT CELLULOSE MULCH)
7. OVERLAP ROLLS, 36 INCHES MINIMUM.
8. MAXIMUM CHANNEL DESIGN VELOCITIES 5 F.P.S. (=0.035, DEPTH = 1.2PT.)
9. TO BE USED ONLY WHERE SUBSOIL WILL SUPPORT GERMINATION AND GROWTH.

CITY OF MALIBU

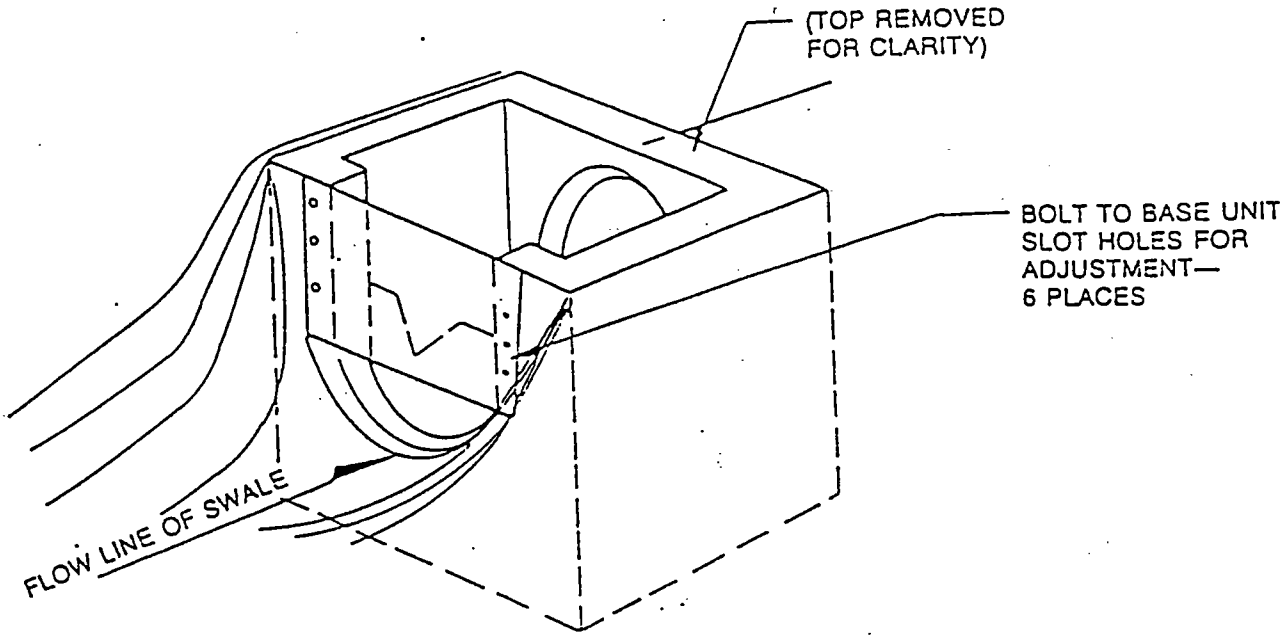
NO SCALE

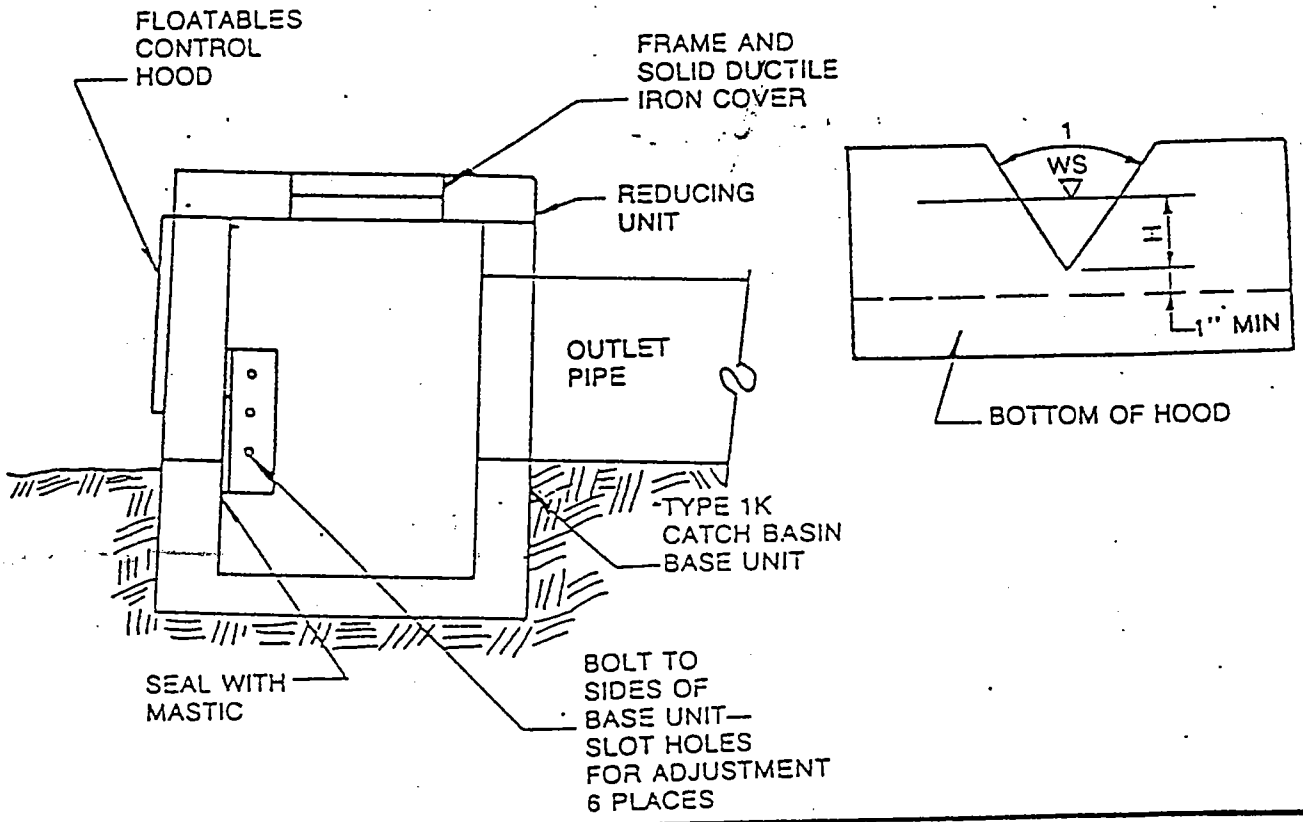
TITLE

MATRIX-TYPE
SOIL REINFORCEMENT
MATTING INSTALLATION

NO. 44

REV. DATE _____





CITY OF MALIBU

NO SCALE

NOTES:

STEEL PLATE SHALL BE TREATMENT 1 COATED OR EQUAL.

REV. DATE _____

TITLE.

V-NOTCH WEIR INSTALLATION

NO. 45

City of Malibu Ordinance No. 96

M.M.C. Chapter 17.44

Water Conservation
Landscaping Requirements

ORDINANCE NO. 96

AN ORDINANCE OF THE CITY OF MALIBU ESTABLISHING WATER CONSERVATION LANDSCAPING REQUIREMENTS AND AMENDING THE MALIBU MUNICIPAL CODE

THE CITY COUNCIL OF THE CITY OF MALIBU DOES ORDAIN AS FOLLOWS:

Section 1. Article IX, Chapter 9300 is amended by adding thereto a new Section 9310 to read:

9310. Water Conservation Landscaping

Scope. This section sets forth regulations for designing and installing water efficient landscapes in new projects. This section shall not apply to homeowner provided landscaping at single-family residences, City property or any district, Board, agency, or other entity's property under the control and jurisdiction of the City.

A. Definitions. For the purpose of this section, the definitions have the meaning set forth below:

Anti-Drain (Check Valve) means a valve located under a sprinkler head to hold water in the system so it minimizes drainage from the lower elevation sprinkler heads.

Application Rate means the depth of water applied to a given area, usually measured in inches per hour.

Applied Water means the portion of water supplied by the irrigation system to the landscape.

Automatic Controller means a mechanical or solid state timer, capable of operating valve stations to set the days and length of time of a water application.

Backflow Prevention Device means a safety device used to prevent pollution or contamination of the water supply due to the reverse flow of water from the irrigation system.

Billing Unit means 100 cubic feet of water (748 gallons) and is the unit of volume of water used by the Los angeles County Waterworks Districts as a basis for charging its customers.

Conversion Factor (0.62) means a number that converts the maximum applied water allowance from acre-inches per acre to gallons per square foot per year. The conversion factor is calculated as follows:

- 7.48 gallons = 1 cubic foot
- 7.48 gallons = 12 inches-foot^3/foot
- inches-feet^2 = 7.48/12 = 0.62 gallons

To convert gallons to 100-cubic feet, another common billing unit for water, divide gallons by 748 (748 gallons = 100-cubic feet).

Distribution Uniformity means uniformity of water application by the irrigation system as defined by the Irrigation Auditor Handbook.

Ecological Restoration Project means a project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.

Emitter means drip irrigation fittings that deliver water slowly from the system to the soil.

Established Landscape means the point at which plants in the landscape have developed roots into the soil adjacent to the root ball.

Establishment Period means the first year after installing the plant in the landscape.

Estimated Applied Water Use means the portion of the Estimated Total Water Use that is derived from applied water.

The Estimated Applied Water Use shall not exceed the Maximum Applied Water Allowance. The Estimated Applied Water Use may be the sum of water recommended through the irrigation schedules, as described in Section 9310D7.

Estimated Total Water Use means the annual total amount of water estimated to be needed to keep the plants in the landscaped area healthy. It is based upon such factors as the local evapotranspiration rate, the size of the landscaped area,

the types of plants, and the efficiency of the irrigation system, as described in Section 9310D3.

ET Adjustment Factor means a factor of 0.8, that, when applied to reference evapotranspiration, adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape.

A combined plant mix with a site-wide plant factor average of 0.5 is the basis of the point factor portion of this calculation. The allowable minimum irrigation efficiency for purposes of the ET Adjustment Factor is not less than 0.625. Therefore, the ET adjustment Factor = (0.5/0.625) = (0.8).

Evapotranspiration Rate means the quantity of water evaporated from adjacent soil surfaces and transpired by plants during a specified time.

Flow Control System or Device means a system or device that can detect and automatically shut off an irrigation system or line when a predetermined excessive amount of flow of water is detected within the system or line.

Flow Rate means the rate at which water flows through pipes and valves (gallons per minute or cubic feet per second).

Hydrozone means a portion of the landscape area having plants with similar water needs that are served by a valve or set of valves with the same schedule. A hydrozone may be irrigated or non-irrigated. For example, a naturalized area planted with native vegetation that will not need supplemental irrigation once established as a non-irrigation hydrozone.

Infiltration Rate means the rate of water entry into the soil expressed as a depth of water per unit of time (inches per hour).

Irrigation Efficiency means the measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. The minimum irrigation efficiency for the purposes of this ordinance is 0.625. Greater irrigation efficiency can be expected from well designed and maintained systems.

Landscape Irrigation Audit means a process to perform site inspections, evaluate irrigation systems, and develop efficient irrigation schedules according to the standards of the Landscape Irrigation Auditor Handbook.

Landscape Irrigation Auditor Handbook means handbook prepared by the Water Conservation Office of the Department of Water Resources of the State of California.

Landscaped Area means the entire parcel less the building footprint, driveways, non-irrigated portions of parking lots, hardscapes, such as decks and patios, and other non-porous areas. Water features are included in the calculations of the landscaped area.

Lateral Line means the water delivery pipeline that supplies water to the emitters or sprinklers from the valve.

Main Line means the pressurized pipeline that delivers water from the water source to the valve or outlet.

Maximum Applied Water Allowance means, for design purposes, the upper limit of annual applied water for the established landscaped area as specified in Section 9310D2. It is based upon the area's reference evapotranspiration, the ET Adjustment Factor, and the size of the landscaped area.

Mulch means any material such as leaves, bark, straw, or other materials left loose and applied to the soil surface to reduce evaporation.

Operating Pressure means the pressure at which a system of sprinklers is designed to operate, usually indicating the pressure required at the base of a sprinkler.

Overhead Sprinkler Irrigation System means an irrigation system with a high flow rate (e.g., a system using pop-ups, impulse sprinklers, rotors, etc.).

Overspray means water that is delivered beyond the landscaped area, wetting pavements, walks, structures, or other non-landscaped areas.

Plant Factor means a factor that when multiplied by reference evapotranspiration, estimates the amount of water used by plants. For purposes of this section, the average plant factor of very low water-using plants ranges from less then 0.1, for the low water-using plants the range is 0.1 to 0.4, for average water-using plants the range is 0.4 to 0.6, and for high water-using plants the range is 0.6 to 0.9.

Rain Sensing Override Device means a device that automatically shuts off the irrigation system when it rains.

Recreational Area means an area of active play or recreation, such as sports fields, school yards, picnic grounds, or other areas with intense foot traffic.

Recycled Water means treated, reclaimed, or recycled waste water of a quality suitable for nonpotable uses, such as landscape irrigation, but not intended for human consumption.

Reference Evapotranspiration or ETo means a standard measurement of environmental parameters, which affect the water use of plants. ETo is given in inches per day, month, or year and is an estimate of the evapotranspiration of a large field of 4- to 7-inch tall, cool-season grass that is well watered. Reference evapotranspiration is used as the basis of determining the Maximum Applied Water Allowances so that regional differences in climate can be accommodated.

Rehabilitated Landscaping means any re-landscaping project over 2,500 square feet. Replacing and rehabilitating irrigation systems only is not considered rehabilitating landscape.

Runoff means water that is not absorbed by the soil of landscape to which it is applied and flows from the area. For example, runoff may result from water that is applied at too great a rate (application rate exceeds infiltration rate) or when there is a severe slope.

Soil Moisture Sensing Device means a device that measures the amount of water in the soil.

Soil Texture means the classification of soil based on the percentage of sand, silt, and clay in the soil.

Sprinkler Head means a device that sprays water through a nozzle.

Static Water Pressure means the pipeline or municipal water supply pressure when water is not flowing.

Station means an area served by one valve or by a set of valves that operate simultaneously.

Sub-Meter is a meter provided by one owner to measure water flow used for irrigation only.

Tree means a large woody plant with one or several dominant trunk(s), usually 10′ or more in height at maturity.

Turf means a surface layer of earth containing mowed grass with its roots. Annual bluegrass, Kentucky bluegrass, Perennial ryegrass, Red fescue, and Tall fescue are cool-season grasses. Bermuda grass, Kikuyu grass, Seashore paspalum, St. Augustine grass, Zoysia grass, and Buffalo grass are warm-season grasses.

Valve means a device used to control the flow of water in the irrigation system.

Water Conservation Concept Statement means a one-page checklist and a narrative summary of the project as shown in Section 9310D1.

B. Applicable Provisions for New or Rehabilitated Landscaping

Permit Required. A person shall not perform any new or rehabilitated landscaping for public agency projects, private development projects, or developer installed landscaping in single-family or multi-family residential projects, without first obtaining a landscape permit from the Building Official. A separate permit shall be obtained for each site.

Exceptions: A landscape permit shall not be required for:

1. Homeowner provided landscaping at single-family residences.

2. Registered historical sites.

3. Ecological restoration projects that do not require a permanent irrigation system.

4. Any project with a cumulative landscaped area less than 2,500 square feet.

C. Landscape Permit Requirements

1. Application. To obtain a landscape permit, the applicant shall first file an application in writing on a form furnished for such purpose. Every such application shall:

   a. Describe the land on which the proposed landscaping is to be performed by lot, block, tract, and street address or by similar description sufficient to readily identify and definitely locate the site.

   b. State the name and address of the owner of said land, the persons who are to perform the work, and the persons' qualifications to perform such work.

   c. State the use of the land.

   d. State the source of water to provide irrigation to the landscape project.

   e. State the area of the new or rehabilitated landscaping.

   f. Include a complete landscape documentation package as required in Section 9310C2.

   g. Be signed by the applicant or his authorized agent, who may be required to submit evidence of such authority.

2. Landscape Documentation Package Contents. With each application for a landscape permit and when required by the Building Official for enforcement of any provisions of this Code, three sets of the Landscape Documentation Package shall be submitted. Except as

waived by the Building Official, each Landscape Documentation Package shall include the following elements, which are further described in Section 9310D:

a. Water Conservation Concept Statement.
b. Calculation of the Maximum Applied Water Allowance.
c. Calculation of the Estimated Applied Water Use.
d. Calculation of the Estimated Total Water Use.
e. Landscape Design Plan.
f. Irrigation Design Plan.
g. Irrigation Schedules.
h. Maintenance Schedule.
i. Grading Design Plan.
j. Soil Analysis.
k. Certificate of Substantial Conformance (to be submitted after installation of the project).

3. Approved Landscape Documentation Package Distribution. A copy of the approved Landscape Documentation Package shall be provided to the property owner or site manager along with the approved landscape and irrigation drawings and any other information normally forwarded to the property owner or site manager.

D. Elements of Landscape Documentation Package

1. Water Conservation Concept Statement. Each Landscape Documentation Package shall include a cover sheet, referred to as the Water Conservation Concept Statement. It serves as a checklist to verify that the elements of the Landscaped Documentation Package have been completed and as a narrative summary of the project. The Water Conservation Concept Statement shall contain the following:

a. Project site.
b. Designers project identification number.
c. Project location.
d. Landscape permit number.
e. Landscape architect/contractor.
f. Statement preparer.
g. Preparer's address.

h. Preparer's telephone number.

i. A statement indicating the project submittal contains the information listed in Section 9310C2.

j. A brief description of the planning and design actions that are intended to achieve conservation and efficiency in water use.

2. The Maximum Applied Water Allowance.

a. A project's Maximum Applied Water. Allowance shall be calculated using the following formula:

- MAWA = (43) (0.8) (LA) (0.62)

Any portion of the landscaped area which is irrigated by a City approved greywater system shall be considered exempt in the calculation of the Maximum Applied Water Allowance.

b. Portions of landscaped areas in public and private projects, such as parks, playgrounds, sports fields, or school yards, where turf provides a playing surface or serves other recreational purposes, may require a higher Maximum Applied Water Allowance than general landscaping. A statement shall be included with the landscape design plan, designating areas to be used for such purposes, and a Maximum Applied Water Allowance shall be calculated based on the following formulas:

1) For recreational areas using warm season grass.

MAWA = (43) (0.96) (LA) (0.62)

2) For recreational areas using cool season grass.

MAWA = (43) (1.28) (LA) (0.62)

Where:

MAWA = Maximum Applied Water Allowance (gallons per year)

ETo = (43)

0.96 = ET Adjustment Factor based on plant factor (0.6/irrigation efficiency (0.625).

1.28 = ET Adjustment Factor based on plant factor (0.8)/irrigation efficiency (0.625).

3. Estimated Total Water Use.

A calculation of the Total Estimated Water Use shall be submitted as part of the Landscape Documentation Package. The Estimated Total Water Use may be calculated from the following formula:

The Estimated Total Water Use for the entire landscaped area equals the sum of the Estimated Water Use of all hydrozones in that landscaped area.

$$\text{EWU (hydrozone)} = \frac{(43)(PF)(HA)(.62)}{.625}$$

EWU (hydrozone) = Estimated Water Use (gallons per year)

ETo = (43)

PF = Plant Factor (see below)

HA = Hydrozone Area (square feet)

(.62) = Conversation Factor

IE = (.625)

Each hydrozone group should be restricted to the following values of Plant Factors (PF) in calculating the

Estimated Water Use (EWU). The group zones are as follows:

High	.7
Moderate	.5
Low	.3
Very Low	.1
Water Bodies	1.1

The "Very Low" category is assigned plant species that do not require irrigation during the summer months during normal rainfall years. However, during drought conditions, some irrigation may be necessary. Irrigation Efficiency (IE) shall not be less than 0.625. Greater irrigation efficiency can be achieved using more efficient irrigation systems, such as a drip irrigation system and the IE value used to calculate the EWU maybe varied accordingly.

4. Estimated Applied Water Use.

   a. The Estimated Applied Water Use shall not exceed the Maximum Applied Water Allowance over a 1-year period.

   b. A calculation of the Estimated Applied Water Use shall be submitted with the Landscape Documentation Package. It may be calculated by summing the amount of water recommended in the irrigation schedule. It shall be calculated on a monthly basis and on an annual basis for comparison with the maximum applied water allowance.

5. Landscape Design Plan. A landscape design plan, prepared by a person qualified to perform this work under the Business and Professions Code, shall be submitted as part of the Landscape Documentation Package.

   a. Plant Selection and Grouping.

      (1) Any plants may be used in the landscape, providing the Estimated Applied Water

Use and the Estimated total Water Use do not exceed the Maximum Applied Water Allowance and that the plants meet the specifications set forth in 2, 3, 4, 5, 6, 7, 8, and 9 below.

(2) Plants having similar water use should be grouped together in distinct hydrozones. Each hydrozone should have plants with similar water requirements, soils, topography, solar exposures, and other significant site aspects that affect plant growth.

(3) Plants shall be selected appropriately based upon their adaptability to the climatic, geologic, and topographical conditions of the site. Protection and preservation of native species and natural areas is encouraged. The planting of at least one tree is required for every 1,000 square feet of landscaped area unless it is inconsistent with other provisions of the Malibu Municipal Code.

(4) Fire prevention needs shall be addressed in areas that are fire prone as determined by the Forester and Fire Warden. Landscaping and landscape maintenance, including brush removal must be in accordance with Division VII of the Fire Code. Information about fire prone areas and appropriate landscaping for fire safety is available from the California State Department of Forestry. The Landscape Plan shall identify fuel management zones to reduce fire hazard.

(5) Slope erosion needs shall be addressed in accordance with the provisions in Section 7019 of the City of Malibu Building Code.

(6) Plants that have been identified as invasive exotics by the City of Malibu may not be used in the landscape.

(7) Plant materials and siting of those materials must conform to all applicable City standards and regulations for protection of public and private views and shall not block significant public or private views at maturity.

(8) Plant materials shall be size appropriate in relation to the site and structures such that at maturity they will not create future excessive greenwaste.

(9) Native trees and plant communities shall be identified and preserved to the maximum extent feasible.

b. Water Features. Recirculating water shall be used for decorative water features.

c. Landscape Design Plan Specifications. The landscape design plan shall be drawn on the latest project base plans (grading or building plans) at a scale that accurately and clearly identifies the following to the satisfaction of the Building Official.

(1) Designation and location of hydrozones.

(2) Landscape materials, trees, shrubs, ground cover, turf, and other vegetation for each hydrozone. Planting symbols shall be clearly drawn and plants labeled by botanical name, common name, container size, spacing, and quantities of each group of plans indicated.

(3) Property lines and street names.

(4) Streets, driveways, walkways, and other paved areas.

(5) Pools, ponds, water features, fences, and retaining walls.

(6) Existing and proposed buildings and minor and major structures, including floor elevations, if applicable.

(7) Site topography showing existing and proposed drainage gradient or slope contours, drainage devices, applicable spot elevations of finish grade and finish surfaces as shown on the grading design plan in Section 9310D9.

(8) Natural feature including, but not limited to, rock outcropping, existing protected and non-protected trees with a trunk diameter 8" or greater, shrubs that will remain.

(9) Tree staking, plant installation, soil preparation details based on the soil analysis described in Section 9310D10, and any other applicable planting and installation details.

(10) A calculation of the total landscaped area.

(11) Designation of recreational areas.

6. Irrigation Design Plan. An irrigation design plan meeting the following requirements shall be submitted as part of the Landscape Documentation Package.

a. Irrigation Design Criteria. The irrigation design of a site shall contain, but not be limited to, the following water-saving measures:

(1) All irrigation systems shall be designed to avoid surface runoff, low-head drainage, overspray, or other similar conditions where flows onto adjacent property, non-irrigation areas, walks, roadway, or structures.

(2) Irrigation zones should be within one hydrozone, as defined in Section 9310D5a(2), in order to provide the most efficient water use.

(3) Irrigation system design flows shall meet peak irrigation requirements of the plant material.

(4) Irrigation systems shall be designed to apply water uniformly over the irrigated area.

(5) Sprinkler spacing should not exceed manufacturer's recommendations.

(6) Special attention shall be given to avoid erosion due to runoff on slopes and to avoid overspray in planted areas with a width of less than 4′.

(7) Overhead sprinkler irrigation systems are not permitted in median strips less than 4′ wide.

b. Required Equipment. The following equipment must be part of an irrigation system:

(1) Water Meters and submeters. Separate landscape water or submeters shall be installed for all projects, except for projects less than 5,000 square feet. If the project irrigation water source is not from a water purveyor, the owner must provide and maintain a submeter to measure the amount of irrigation water use. If the project irrigation water source is from a water purveyor, the water purveyor must provide a water meter or the owner must provide a submeter to measure irrigation water use as required by this Code. The owner provided submeter for measuring irrigation water usage shall meet either AWWA Standard

C700, C701, C702, C704, and be protected against corrosion or freezing, if necessary.

(2) Controllers. Automatic control systems shall be required for all irrigation systems and must be able to accommodate all aspects of the design.

(3) Valves. Plants that require different amounts of water shall be located in different hydrozones and irrigated by separate valves. If one valve is used for a given area, only plants with similar water use shall be used in that area.

(4) Anti-Drain (Check) Valves. Anti-drain (check) valves shall be installed in strategic points to minimize or prevent low-head drainage.

(5) Sprinkler Heads. Heads and emitters shall have consistent application rates within each control valve circuit. Sprinkler heads shall be selected for proper area coverage, application rate, operating pressure, adjustment capability, and ease of maintenance.

(6) Rain Sensing Override Devices. Rain sensing override devices shall be required on all irrigation systems.

(7) Soil Moisture Sensing Devices. It is recommended that soil moisture sensing devices be considered where appropriate.

(8) Flow Control Systems or Devices. Flow control systems or devices shall be provided for all irrigation systems and at major valves to irrigation lines serving slopes steeper than five horizontal to one vertical unless it can be demonstrated to the satisfaction of the Building Official that

should a line rupture, serious erosion will not occur.

c. Recycled Water.

For those sites where the installation of reclaimed water systems is feasible and meets all regulatory requirements, recycled water irrigation systems (dual distribution systems) shall be installed to allow for the current and future use of reclaimed water and shall be designed and operated in accordance with local and state codes.

d. Irrigation Design Plan Specifications. The irrigation design plan shall be drawn on the latest project base plans (building and grading). It should be separate from, but use the same format as, the landscape design plan. The scale shall be the same as that used for the landscape design plan described in Section 9310D5c. The irrigation design plan shall accurately and clearly identify:

(1) Location of point of connection to and size of separate water meters or submeters for the landscaped area when applicable.

(2) Location, type, and size of all components of the irrigation systems, including automatic controllers, main and lateral lines, valves, sprinklers heads, moisture sensing devices, rain switches, quick couplers, and backflow prevention devices.

(3) Static water pressure at the point of connection to the public water supply or other water source.

(4) Flow rate (gallons per minute), application rate (inches per hour), and design

operating pressure (psi) for each separate irrigation station.

(5) Recycled water irrigation systems as specified in Section 9310D6c.

(6) The installed irrigation system serving turf areas must achieve a minimum distribution uniformity of:

75 percent for areas of one acre or more;

65 percent for areas less than one acre but greater than 5,000 square feet; and

55 percent for areas less than 5,000 square feet.

7. Irrigation Schedules. Irrigation schedules, meeting the following requirements, shall be submitted as part of the Landscape Documentation Package.

a. An annual irrigation program with monthly irrigation schedules shall be required for the plant establishment period, for the established landscape, and for any temporarily irrigated areas.

b. The irrigation schedule shall:

(1) Include run time (in minutes per cycle), suggested number of cycles per day, and daily frequency of irrigation of each station; and

(2) Provide the amount of applied water (in hundred cubic feet, gallons, or in whatever billing units the local water purveyor uses) recommended on a monthly and annual basis.

c. The total amount of water of the project shall include water designated in the Estimated Total Water Use calculations plus water needed for

any water features, which shall be considered as a high water using hydrozone.

d. Recreational areas designated in the landscape design plan shall be highlighted and the irrigation schedule shall indicate if any additional water is needed above the required for general landscaping.

e. Whenever possible, irrigation scheduling shall incorporate the use of evapotranspiration data such as those from the California Irrigation Management Information System (CIMIS) weather stations to apply the appropriate levels of water or different climates.

f. Whenever possible, landscape irrigation shall be scheduled at night to avoid irrigating during times of high wind or high temperature.

8. Maintenance Schedules. A regular maintenance schedule meeting the following requirements shall be submitted as part of the Landscape Documentation Package:

a. Landscapes shall be maintained to ensure water efficiency. A regular maintenance schedule shall include, but not be limited to, checking, adjusting, and repairing irrigation equipment; resetting the automatic controller; aerating and dethatching turf areas; replenishing mulch; fertilizing; pruning; and weeding in all landscaped areas.

b. Whenever possible, repair of irrigation equipment shall be done with the originally specified materials or their equivalents.

9. Grading Design Plan. Grading design plans meeting the following requirements shall be submitted as part of the Landscape Documentation Package.

a. If a grading design plan is subject to the provisions of Chapter 70 of the City of Malibu

Building Code, it shall have a grading permit and be drawn to the satisfaction of the Building Official. Grading design plans not required to have a grading permit under Chapter 70 shall be a part of the landscape permit. All grading design plans shall be separate from, but use the same format as, the landscape design plan.

b. The grading design plan shall indicate finished configurations (contours) and elevations of the landscaped area, in accordance with Chapter 70 of the City of Malibu Building Code and the requirements of Subsection 9310D5c7.

10. Soils Analysis.

a. A soil analysis, including the following information shall be submitted as part of the Landscape Documentation Package:

(1) Determination of soil texture, indicating the percentage of organic matter.

(2) An approximate soil infiltration rate (either measured or derived from soil texture/infiltration rate tables). A range of infiltration rates should be noted where appropriate.

(3) Measure of pH and total soluble salts.

b. The beneficial use of mulch is encouraged to reduce evapotranspiration in areas where heavy erosion of mulch will not occur. The Landscape Documentation Package shall recommend maximum mulch depths.

c. The provisions of this chapter shall not impact the stability of Compacted Fills or cut slopes prepared under the provisions of Chapter 70 of the City of Malibu Building Code.

11. Certificate of Substantial Conformance.

a. Upon completing the installation of the landscaping, the irrigation system, an irrigation system flow test shall be performed to verify irrigation system performance prior to approval of the Certificate of Substantial Conformance. This test shall be conducted by a qualified individual, as determined by the Building Official, using the Landscape Irrigation Auditor Handbook, as referenced in Subsection 9310A.

b. Either the contractor and a licensed landscape architect, other licensed, registered, or certified professional under the Business and Professions Code in a related field shall conduct the final field observations and shall provide a Certificate of Substantial Conformance to the City. The certificate shall specifically indicate that plants were installed as specified, that the irrigation system was installed as designed, and that an irrigation audit has been performed, along with a list of any observed deficiencies.

c. Certification shall be accomplished by completing a Certificate of Substantial Conformance and delivering it to the Building Official to the retail water supplier, and to the property owner. Such form, which shall be provided by the City, shall contain the following:

(1) Project site.
(2) Project identification.
(3) Project location.
(4) Landscape permit number.
(5) Submittal date.
(6) Certification that required project has been submitted.
(7) Name of Water Purveyor and/or location of all sub-meters.
(8) Verification upon post-installation inspection that:

a) Plants were installed as specified.

b) The irrigation system was installed and is operating as designed with a dual distribution system for recycled water and minimal runoff or overspray.

c) A Landscape Irrigation Audit was performed.

(9) Verification that the project submittal package and a copy of this certification has been provided to owner/manager.

(10) Other comments.

(11) A statement, signed by the contractor, stating: "I/we certify that work has been installed in accordance with the contract documents."

(12) A statement, signed by a licensed, registered, or certified professional stating: "I/we certify that based upon periodic site observations, the work is in substantial conformance with Section 9310 of the Zone Code and that the planting and irrigation installation conform with the approved plans and specifications."

(13) A statement, signed by the property owner, stating: "I/we certify that I/we have received all of the contract documents and that it is our responsibility to see that the project is maintained in accordance with the contract documents."

E. Public Education

1. Publications

a. The Building Official shall provide information to applicants, owners, and managers of all new, single-family residential homes regarding the

design, installation, and maintenance of water efficient landscapes.

b. Information about the efficient use of landscape water shall be provided to water users throughout the community.

c. To further assist permit applicants to comply with the provisions of this code, the City shall develop and provide Landscape and Irrigation Guidelines.

2. Model Homes. Model homes shall be landscaped consistent with the provisions of this ordinance. At least one model home that is landscaped in each project consisting of two or more homes shall demonstrate, via signs and information, the principles of water efficient landscapes described in this ordinance.

a. Signs shall be used to identify the model as an example of a water efficient landscape, featuring elements such as hydrozones, irrigation equipment, and other elements which contribute to the overall water efficient theme.

b. Information shall be provided about designing, installing, and maintaining water efficient landscapes.

3. Demonstration Projects. The City will encourage applicants to apply as demonstration projects for water efficient landscaping. Such demonstration projects will be used to encourage public participation and support of water efficient landscaping. When approved by the Building Official, all required permit fees shall be waived for a demonstration project. Demonstration projects required for model homes are not eligible for the permit fee waiver.

F. Maintaining Existing Water Landscapes

1. Water Management. All existing landscaped areas within the City in which water is provided to irrigate, including green belts, common areas, multi-family

housing, schools, businesses, parks, and publicly-owned landscapes are encouraged to have a landscape irrigation audit at least once every 5 years.

2. Water Waste Prevention. No person shall waste water through inefficient and inappropriate landscape irrigation by allowing runoff, low-head drainage, over spray, or other similar conditions where water flows onto adjacent areas not part of the irrigated area such as adjacent property, non-irrigated areas, walks, roadways, or structures.

3. City Cost Recovery. All sites subject to an audit, pursuant to Section 9310F4, shall be assessed on their property tax bill an amount as established by resolution of the City Council per metering point per year for each meter that provides water or the site's irrigation. Such assessment shall be made available to the Building Official for enforcing this section.

4. Purveyor Cost Recovery. The water purveyor may recover from the customer the cost for providing water consumption records to the Building Official as required by Section 9310F4.

5. Prohibitions.

   a. There shall be no cumulative clearance of native vegetation in excess of 500 square feet, except as required by the Fire Department to protect existing structures or as approved by the Building Official.

PASSED, APPROVED AND ADOPTED this 13th day of September, 1993.

Carolyn Van Horn
Mayor

ATTEST:

Joy Freeman
Deputy City Clerk

JMG:lss
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I CERTIFY THAT THE FOREGOING ORDINANCE NO. 96 was passed and adopted by the City Council of the City of Malibu at the regular meeting thereof held on the 13th day of September, 1993 by the following vote:

AYES:	5	COUNCILMEMBERS: Harlow, House, Keller, Kramer, Van Horn
NOES:	0	
ABSENT:	0	
ABSTAIN:	0	

Tory Freeman
Deputy City Clerk

City of Malibu Ordinance No. 157

Regulating Stormwater and Urban Runoff Pollution

ORDINANCE NO. 157

AN ORDINANCE OF THE CITY OF MALIBU REGULATING STORM WATER AND URBAN RUNOFF POLLUTION AND AMENDING THE MALIBU MUNICIPAL CODE

THE CITY COUNCIL OF THE CITY OF MALIBU DOES ORDAIN AS FOLLOWS:

Section 1. Article V of the Malibu Municipal Code is hereby amended by adding thereto a new Chapter 4 to read as follows:

"CHAPTER 4

STORM WATER AND URBAN RUNOFF POLLUTION CONTROL

5400. Title.

This Chapter shall be known as the "City of Malibu Storm Water Management and Discharge Control Ordinance."

5401. Findings.

A. The federal Clean Water Act (33 U.S.C. § 1251, et seq.) provides for the regulation and reduction of pollutants discharged into the waters of the United States by extending National Pollutant Discharge Elimination System (hereinafter "NPDES") requirements to storm water and urban runoff discharge into municipal storm drain systems.

B. Storm water and urban runoff flows from individual properties into streets or natural watercourses, then through storm drains passing into the Santa Monica Bay.

C. The City of Malibu is a co-permittee under the "Waste Discharge Requirements for Municipal Storm Water and Urban Runoff Discharges within the County of Los Angeles," issued by the California Regional Water Quality Control Board- Los Angeles Region," (Order No. 96-054), dated July 15, 1996, which also serves as a NPDES Permit under the Federal Clean Water Act (NPDES No. CAS614001), as well as Waste Discharge Requirements under California law [the "Municipal NPDES Permit"], and, as a co-permittee under the Municipal NPDES Permit, the City is required to adopt ordinances and implement procedures with respect to the entry of Non-Storm Water Discharges into the Municipal Separate Storm Sewer System.

D. Part 1, Section I of the Municipal NPDES Permit requires the City effectively to prohibit Non-Storm Water Discharges from within its boundaries, into that portion of the Municipal Separate Storm Sewer System (MS4) which it owns or operates and into watercourses,

except where such discharges are: (1) In compliance with a separate individual or general NPDES permit; or (2) Identified and in compliance with Part 2.II.C (Non-Storm Water Discharges) of the Municipal NPDES Permit; or (3) Discharges originating from federal, state or other facilities which the City is preempted from regulating, and further provides that compliance with the terms of the Municipal NPDES Permit through the development and implementation of the programs described in the Municipal NPDES Permit will constitute compliance with the Discharge Prohibition therein.

E. Part 2, Section I.E of the Municipal NPDES Permit requires the City to demonstrate by November 28, 1996 that it possesses the legal authority necessary to control discharges to and from those portions of the MS4 over which it has jurisdiction, so as to comply with the Municipal NPDES Permit and specifically to prohibit certain discharges identified in the Municipal NPDES Permit.

F. The Municipal NPDES Permit contemplates the development of a Countywide Storm Water Management Plan (CSWMP) and then a Watershed Management Area Plan ("WMAP"), in which the City will participate, which will in turn require the development and the implementation of programs for, among other things, the elimination of illicit connections and illicit discharges, development planning, development construction, and public information and education requirements, and which may require the later adoption of additional legal authority to implement such programs as they are developed by the Permittees and approved by the Regional Board.

G. In order to control, in a cost-effective manner, the quantity and quality of storm water and urban runoff to the maximum extent practicable, the adoption of reasonable regulations, as set forth herein, is essential.

5402. Purpose and Intent.

A. The purpose of this Chapter is to ensure the future health, safety and general welfare of the citizens of the City and the water quality of the receiving waters of the Santa Monica Bay:

1. Reducing pollutants in storm water discharges to the maximum extent practicable;

2. Regulating illicit connections and illicit discharges and thereby reducing the level of contamination of storm water and urban runoff into the MS4; and

3. Regulating Non-Storm Water Discharges to the MS4.

B. The intent of this Chapter is to protect and enhance the quality of watercourses, water bodies,

and wetlands within the City in a manner consistent with the federal Clean Water Act, the California Porter-Cologne Water Quality Control Act and the Municipal NPDES Permit.

C. This Chapter is also intended to provide the City with the legal authority necessary to control discharges to and from those portions of the MS4 over which it has jurisdiction as required by the Municipal NPDES Permit, and thereby fully and timely comply with the terms of the Municipal NPDES Permit while the CSWMP and the WMAP are being developed by the Permittees under the Municipal NPDES Permit, and in contemplation of the subsequent amendment of this Chapter or adoption by the City of additional provisions of this Chapter to implement the subsequently adopted CSWMP and WMAP, or other programs developed under the Municipal NPDES Permit.

5403. Definitions.

Except as specifically provided herein, any term used in this Chapter shall have the same meaning as that term is defined in the Municipal NPDES Permit, or if it is not specifically defined in the Municipal NPDES Permit, then as such term is defined in the federal Clean Water Act, as amended, and/or the regulations promulgated thereunder. The following words and phrases shall have the following meanings when used in this Chapter:

"AREA SUSCEPTIBLE TO RUNOFF" means any surface directly exposed to precipitation or in the path of storm water runoff or urban runoff which path leads off the parcel on which the surface is located.

"AUTHORIZED ENFORCEMENT OFFICER" means the City Manager or his or her designee.

"BEST MANAGEMENT PRACTICES (BMP'S)" means activities, practices, facilities, and/or procedures that when implemented to their maximum efficiency will prevent or reduce pollutants in discharges. Examples of BMP's may include public education and outreach, proper planning of development projects, proper clean out of catch basin inlets, and proper sludge or waste handling and disposal, among others.

"CITY" means the City of Malibu.

"GOOD HOUSEKEEPING PRACTICES" means common practices related to the storage, use, or cleanup of materials, performed in a manner that minimizes the discharge of pollutants. Examples include, but are not limited to, purchasing only the quantity of materials to be used at a given time, use of alternative and less environmentally harmful products, cleaning up spills and leaks, and storing materials in a manner that will contain any leaks or spills.

"ILLICIT CONNECTION" means any human-made conveyance that is connected to the storm drain system without a permit, excluding roof-drains and other connections intended to remove storm water from residential properties. Examples include channels, pipelines, conduits, inlets, or outlets that are connected directly to the storm drain system.

"ILLICIT DISCHARGE" means any discharge to the storm drain system that is prohibited under local, state or federal statutes, ordinances, codes or regulations. This includes all Non-Storm Water Discharges except discharges pursuant to a separate NPDES permit and discharges that are exempted or conditionally exempted in accordance with Section II of the Municipal NPDES Permit.

"MATERIAL" means any substance including, but not limited to: garbage and debris; lawn clippings, leaves, and other vegetation; biological and fecal waste; sediment and sludge; oil and grease; gasoline; paints, solvents, cleaners, and any fluid or solid containing chemicals.

"MUNICIPAL NPDES PERMIT" means the "Waste Discharge Requirements for Municipal Storm Water and Urban Runoff Discharges Within the County of Los Angeles" (Order No. 96-054), dated July 15, 1996, issued by the California Regional Water Quality Control Board-Los Angeles Region, and any successor permit to that permit.

"MUNICIPAL SEPARATE STORM SEWER SYSTEM" or "MS4" or "STORM DRAIN SYSTEM" means streets, gutters, conduits, natural or artificial drains, channels and watercourses, or other facilities that are owned, operated, maintained or controlled by the City and used for the purpose of collecting, storing, transporting, or disposing of storm water.

"NON-STORM WATER DISCHARGE" means any discharge to an MS4 that is not composed entirely of storm water.

"NPDES PERMIT" means any waste discharge requirements issued by the Regional Board or the State Water Resources Control Board as an NPDES Permit pursuant to Water Code §§ 13370 (other than the Municipal NPDES Permit).

"POLLUTANT" means those "pollutants" defined in Section 502(6) of the federal Clean Water Act (33 U.S.C. § 1362(6)), or incorporated into California Water Code § 13373. Examples of pollutants include, but are not limited to the following:

- Commercial and industrial waste (such as fuels, solvents, detergents, plastic pellets, hazardous substances, fertilizers, pesticides, slag, ash, and sludge);

- Metals such as cadmium, lead, zinc, copper, silver, nickel, chromium; and non-metals such as phosphorus and arsenic;

- Petroleum hydrocarbons (such as fuels, lubricants, surfactants, waste oils, solvents, coolants and grease);

- Excessive eroded soils, sediment and particulate materials in amounts which may adversely affect the beneficial use of the receiving waters, flora or fauna of the State;

- Human wastes such as septic effluent or gray water discharge;

- Animal wastes (such as discharge from confinement facilities, kennels, pens, recreational facilities, stables, and show facilities);

- Substances having characteristics such as pH less than 6 or greater than 9, or unusual coloration or turbidity, or excessive levels of fecal coliform, or fecal streptococcus, or enterococcus;

The term "Pollutant" shall not include uncontaminated storm water, potable water or reclaimed water generated by a lawfully permitted water treatment facility.

The term "Pollutant" also shall not include any substance identified in this definition, if through compliance with the Best Management Practices available, the discharge of such substance has been reduced or eliminated to the maximum extent practicable. In an enforcement action, the burden shall be on the person who is the subject of such action to establish the reduction or elimination of the discharge to the maximum extent practicable through compliance with the Best Management Practices available.

"REGIONAL BOARD" means the California Regional Water Quality Control Board-Los Angeles Region.

"STORM WATER MANAGEMENT PLAN" means a plan which shall be required in connection with any new development for the purposes of ; construction erosion control, runoff detention to control runoff rate to predevelopment levels, and runoff retention or other treatment measures to prevent dry-weather pollution from entering the storm drain system.

"STORM WATER RUNOFF" means that part of precipitation (rainfall or snowmelt) which travels via flow across a surface to the MS4 or receiving waters from impervious, semi-pervious or pervious surfaces. When all other factors are equal, runoff increases as the perviousness of a surface decreases.

"URBAN RUNOFF" means surface water flow produced by non-storm water resulting from residential, commercial, and industrial activities involving the use of potable and non-potable water.

5404. Construction and Application.
This Chapter shall be construed to assure consistency with the requirements of the federal Clean Water Act and acts amendatory thereof or supplementary thereto, applicable implementing regulations, and the Municipal NPDES Permit, and any amendment, revision or reissuance thereof.

5405. Prohibited Activities.

A. Illicit Discharges and Connections. It is prohibited to commence, establish, use, maintain, or continue any Illicit Connections to the MS4 or any Illicit Discharges to the MS4. This prohibition against Illicit Connections applies to the use, maintenance, or continuation of any Illicit Connection, whether that connection was established prior to or after the effective date of this Chapter.

B. Littering. It is prohibited to deposit any refuse, rubbish, garbage, or any other discarded or abandoned objects or material in or upon any public or private property so that the same might enter the MS4. Refuse, rubbish or garbage intended for regular solid waste pick up and disposal shall be deposited in containers, bags or other appropriate receptacles and placed in designated locations in accordance with Article V, Chapter 2 of this Code. No person shall throw or deposit litter in any body of water within the City that connects with the MS4, including fountains, ponds, lakes, or streams.

C. Disposal of Landscape Debris. It is prohibited to intentionally dispose of leaves, dirt, or other landscape debris into the MS4; provided, however, that non-industrial and non-commercial activities which incidentally wash leaves, dirt, or other landscape debris into the MS4, such as the hosing of sidewalks pursuant to Section 4704 (C) of this Code, and the non-commercial hand-washing of cars, shall be excluded from this prohibition.

D. Non-Storm Water Discharges. The following Non-Storm Water Discharges into the MS4 are prohibited unless in compliance with a separate NPDES permit or pursuant to a discharge exemption by the Regional Board, the Regional Board's Executive Officer, or the State Water Resources Control Board:

1. The discharge of untreated wash waters to the MS4 when gas stations, auto repair garages, or other type of automotive service facilities are cleaned;

2. The discharge of untreated wastewater to the MS4 from mobile auto washing, steam cleaning, mobile carpet cleaning, and other such mobile commercial and industrial operations;

3. To the maximum extent practicable, discharges to the MS4 from areas where repair

of machinery and equipment, including motor vehicles, which are visibly leaking oil, fluid or antifreeze, is undertaken;

4. Discharges of untreated runoff to the MS4 from storage areas of materials containing grease, oil, or other hazardous substances, and uncovered receptacles containing hazardous materials;

5. Discharges of commercial/ municipal swimming pool filter backwash to the MS4, and pool discharges of any kind that are not dechlorinated;

6. Discharges of untreated runoff from the washing of toxic materials from paved or unpaved areas to the MS4; provided, however, that non-industrial and non-commercial activities which incidentally generate urban runoff, such as the hosing of sidewalks pursuant to Section 4704 (C) of this Code, and the non-commercial hand-washing of cars, shall be excluded from this prohibition;

7. To the maximum extent practicable, discharges to the MS4 from washing impervious surfaces in industrial/commercial areas which results in a discharge of untreated runoff to the MS4, unless specifically required by State's, or the City's, or Los Angeles County's health and safety codes, or permitted under a separate NPDES permit;

8. Discharges from the washing out of concrete trucks into the MS4;

9. Discharges to the MS4 of any pesticide, fungicide, or herbicide, banned by the USEPA or the California Department of Pesticide Regulation; or

10. The disposal of hazardous wastes where such disposal causes or threatens to cause a direct or indirect discharge to the MS4.

E. Discharges in Violation of the Municipal NPDES Permit. Any discharge that would result in or contribute to a violation of the Municipal NPDES Permit, either separately or in combination with other discharges, is prohibited. Liability for any such discharge shall be the responsibility of the person(s) causing or responsible for the discharge, and such person(s) shall defend, indemnify and hold harmless the City from all losses, liabilities, claims, or causes of actions in any administrative or judicial action relating to such discharge.

5406. Exempted Discharges, Conditionally Exempted Discharges, or Designated Discharges.

Discharges from those activities specifically identified in, or pursuant to, Part 2, Section II.C of the

Municipal NPDES Permit as being Exempted Discharges, Conditionally Exempted Discharges, or Designated Discharges shall not be considered a violation of this Chapter, provided that any applicable BMP's developed pursuant to the Municipal NPDES Permit are implemented to minimize any adverse impacts from such identified sources.

5407. Good Housekeeping Provisions.

Owners and occupants of property within the City shall comply with the following requirements:

A. Chemical and Human Waste. No person shall leave, deposit, discharge, dump, or otherwise expose any chemical, human, or septic waste to precipitation in an area where a discharge to City streets or the MS4 may or does occur.

B. Use of Water. Runoff of water used for irrigation purposes shall be minimized to the maximum extent practicable. Runoff of water from the permitted washing down of paved areas shall be minimized to the maximum extent practicable.

C. Storage of Materials, Machinery, and Equipment. Machinery or equipment that is to be repaired or maintained in areas susceptible to or exposed to runoff, shall be placed in a manner so that leaks, spills and other maintenance-related pollutants are not discharged to the MS4.

D. Removal and Disposal of Debris from Industrial/Commercial Motor Vehicle Parking Lots. Industrial/commercial motor vehicle parking lots with more than twenty-five (25) parking spaces that are located in areas potentially exposed to storm water shall be swept regularly or other equally effective measures shall be utilized to remove debris from such parking lots.

E. Food Wastes. Food wastes generated by non-residential food service and food distribution sources shall be properly disposed of and in a manner so such wastes are not discharged to the MS4.

F. Best Management Practices. Best Management Practices shall be used in areas susceptible to runoff for the removal and lawful disposal of all pollutants.

5408. Requirements for Industrial/Commercial and Construction Activities.

Each industrial discharger, discharger associated with construction activity, or other discharger described in any general storm water permit addressing such discharges, as may be issued by the U.S. Environmental Protection Agency, the State Water Resources Control Board, and the Regional Board shall comply with all requirements of such permit. Each discharger identified in an individual

NPDES Permit shall comply with and undertake all activities required by such permit. Proof of compliance with any such permit may be required in a form acceptable to the Authorized Enforcement Officer prior to the issuance of any grading, building or occupancy permits, or any other type of permit or license issued by the City.

5409. Storm Water Management Plan for New Development.

A. Prior to issuance of a building permit for any new development (on undeveloped land) or final map approval for any subdivision of property the applicant shall be required to have approval of a Storm Water Management Plan from the Department of Public Works and the Department of Environmental and Building Safety.

B. The Stormwater Management Plan shall incorporate the following elements:

1. Construction Erosion Control - as required under Article VIII, Chapter 1, Section 7010 - Building Regulations of this Code.

2. Storm drainage improvement measures to mitigate any offsite/downstream negative impacts due the proposed development. This includes, but not limited to;

a) Mitigating increased runoff rate due to new impervious surfaces through on-site detention such that peak runoff rate after development does not exceed the peak runoff of the site before development for the 100 year clear flow storm event (note; Q/100 is calculated using the Caltrans Nomograph for converting to any frequency, from the Caltrans "Hydraulic Design and Procedures Manual"). The detention basin/facility is to be designed to provide attenuation and released in stages through orifices for 2-year, 10-year and 100-year flow rates, and the required storage volume of the basin/facility is to be based upon 1-inch of rainfall over the proposed impermeable surfaces plus 1/2-inch of rainfall over the permeable surfaces. All on-site drainage devices, including pipe, channel, and/or street & gutter, shall be sized to cumulatively convey a 100 year clear flow storm event to the detention facility, or;

b) Demonstrating by submission of hydrology/hydraulic report by a registered engineer that determines entire downstream storm drain conveyance devices (from project site to the ocean outlet) are adequate for 25-year storm event, or;

c) Constructing necessary off-site storm drain improvements to satisfy (b)

above, or;

d) Other measures accomplishing the goal of mitigating all offsite/downstream impacts.

3. Storm drain pollution prevention measures including all construction elements and Best Management Practices (BMP's) to address the following goals in connection with both construction and long-term operation of the site;

a) Maximize, to the extent practicable, the percentage of permeable surfaces in order to allow more percolation of runoff into the ground,

b) Maximize, to the extent practicable, retention of dry-weather runoff on-site to allow percolation into the ground, or installation of other treatment measures thereby preventing pollutants from entering the storm drain system.

C. The City's evaluation of the Storm Water Management Plan will ascertain how well the proposed plan meets the combined objectives set forth above. In addition, the City will analyze the watershed characteristics and land uses, and estimate water quality requirements for each project. Each plan will be evaluated on its own merits according to the particular characteristics of the project and the site to be developed.

D. The Storm Water Management Plan shall be approved or disapproved by the Director of Public Works and the Director of Building and Safety (or their designees) within twenty-one (21) calendar days following submittal. If the plan is disapproved, the reasons for disapproval shall be given in writing to the applicant.

E. Full or partial waivers of compliance with this Section may be obtained for development sites where it can be adequately demonstrated that the accomplishment of these storm drain management measures is an economic and/or physical impossibility due to the particular configuration of the site or due to irreconcilable conflicts with other City requirements. Requests for waivers must be approved, in writing, by the Planning Department, the Public Works Department, and the Environmental and Building Safety Department.

F. The applicant is required to comply with the approved Storm Water Management Plan.

5410. Enforcement.

A. Violations Deemed a Public Nuisance.

1. Any condition caused or permitted to exist in violation of any of the provisions of this Chapter is hereby determined to be a threat to the public health, safety and welfare, is declared and deemed a public nuisance and may be abated or restored by any authorized enforcement officer, and a civil or criminal action to abate, enjoin or otherwise compel the cessation of such nuisance may be brought on behalf of the City by the City Attorney.

2. The cost of such abatement and restoration shall be borne by the owner of the property and the cost thereof shall be invoiced to the owner of the property, as provided by law or ordinance for the recovery of nuisance abatement costs.

3. If any violation of this Chapter constitutes a seasonal and recurrent nuisance, the City Manager shall so declare. The failure of any person to take appropriate annual precautions to prevent such violations after written notice of a determination under this paragraph shall constitute a public nuisance and a violation of this Chapter.

B. Concealment. Causing, permitting, aiding, abetting, or concealing a violation of any provision of this Chapter shall constitute a violation of such provision.

C. Civil Actions. In addition to any other remedies provided in this section, any violation of this Chapter may be enforced by civil action brought by the City. In any such action, the City may seek, as appropriate, any or all of the following remedies:

1. A temporary and/or permanent injunction.

2. Assessment of the violator for the costs of any investigation, inspection, or monitoring survey which led to the establishment of the violation, and for the reasonable costs of preparing and bringing legal action under this subsection.

3. Costs incurred in removing, correcting, or terminating the adverse effects resulting from violation.

4. Compensatory damages for loss or destruction to water quality, wildlife, fish and aquatic life.

D. Administrative Enforcement Powers. In addition to the other enforcement powers and

remedies established by this Chapter, the authorized enforcement officer has the authority to issue a cease and desist order to require remediation of any existing or potential violation of this Chapter. When an authorized enforcement officer finds that a violation of this Chapter has taken place or is likely to take place, the officer may issue an order to cease and desist such action and direct that those persons not complying shall: (i) comply with the requirement, (ii) comply with a time schedule for compliance, and (iii) take appropriate remedial or preventive action to prevent the violation from recurring.

E. Penalties. Violation of this Chapter shall be punishable as a misdemeanor, punishable as set forth in Section 1200(a) of this Code. Each day that a violation continues shall constitute a separate offense.

F. Permit Revocation. To the extent the City makes a provision of this Chapter or any identified BMP a condition of approval to the issuance of a permit or license, any person in violation of such condition is subject to the permit revocation procedures set forth in this Code.

G. Remedies. Remedies specified in this Chapter are in addition to and do not supersede or limit any and all other remedies, civil or criminal. The remedies provided for herein shall be cumulative and not exclusive.

5411. No Taking.

The provisions of this Chapter shall not be construed or operate to deprive any property owner of substantially all of the market value of such owner's property or otherwise constitute an unconstitutional taking without compensation."

Section 2. Severability.

If any section, subsection, sentence, clause, portion, or phrase of this Ordinance is for any reason held to be invalid or unconstitutional by a decision of any court of any competent jurisdiction, such decision shall not affect the validity of the remaining sections, subsections, sentences, clauses, portions, or phrases of this Ordinance. The City Council hereby declares that it would have passed this Ordinance and each and every section, subsection, sentence, clause, portion, or phrase without regard to whether any other section, subsection, sentence, clause, portion, or phrase of the Ordinance would be subsequently declared invalid or unconstitutional.

PASSED, APPROVED AND ADOPTED this 9th day of December, 1996.

JOHN HARLOW, MAYOR

ATTEST:

LISA POPE, Deputy City Clerk
(Seal)

I CERTIFY THAT THE FOREGOING ORDINANCE NO. 157 was passed and adopted by the City Council of the City of Malibu at the regular meeting thereof held on the 9th day of December, 1996 by the following vote:

AYES:	5	Councilmembers:	House, Keller, Van Horn, Jennings, Harlow
NOES:	0		
ABSENT:	0		
ABSTAIN:	0		

Lisa Pope, Deputy City Clerk
(seal)

City of Malibu Ordinance No. 219

Amending the Stormwater and Urban Runoff Pollution Control Ordinance to Provide Stormwater Pollution Control for Planning and Construction of New Development and Redevelopment Projects

ORDINANCE NO. 219

AN ORDINANCE OF THE CITY OF MALIBU AMENDING THE STORM WATER AND URBAN RUNOFF POLLUTION CONTROL ORDINANCE TO PROVIDE STORM WATER POLLUTION CONTROL FOR PLANNING AND CONSTRUCTION OF NEW DEVELOPMENT AND REDEVELOPMENT PROJECTS AND AMENDING THE MALIBU MUNICIPAL CODE

THE CITY COUNCIL OF THE CITY OF MALIBU DOES HEREBY ORDAIN AS FOLLOWS:

Section 1. Section 5.4.01 of Article 5, Chapter 4 of the Malibu Municipal Code is hereby amended by adding thereto a new subparagraph H to read as follows:

"H. This Chapter also sets forth requirements for the construction and operation of certain "Commercial Development," "New Development" and "Redevelopment" and other projects (as further defined herein) which are intended to ensure compliance with the storm water mitigation measures prescribed in the current version of the Standard Urban Storm Water Mitigation Plan (SUSMP) approved by the Regional Water Quality Control Board-Los Angeles Region, and on file in the office of the City Clerk of this City. This Chapter authorizes the Authorized Enforcement Officer to define and adopt applicable Best Management Practices and other storm water pollution control measures, to grant waivers from SUSMP requirements, as provided herein, to cite infractions and to impose fines pursuant to this Chapter. Except as otherwise provided herein, the Authorized Enforcement Officer shall administer, implement and enforce the provisions of this section."

Section 2. The first (preamble) paragraph of Section 5.4.03 of Article 5, Chapter 4 of the Malibu Municipal Code is hereby amended to read as follows:

"Except as specifically provided herein, any term used in this Chapter shall be defined as that term as defined in the current Municipal NPDES Permit, or in the current version of the Standard Urban Storm Water Mitigation Plan ("SUSMP") approved by the Regional Water Quality Control Board-Los Angeles Region, or if it is not specifically defined in either the Municipal NPDES Permit or the SUSMP, then as such term is defined in the Federal Clean Water Act, as amended, and/or the regulations promulgated thereunder. If the definition of any term contained in this ordinance conflicts with the definition of the same term in the current version of the SUSMP, then the definition contained in the SUSMP shall govern. The following words and phrases shall have the following meanings when used in this Chapter:"

Section 3. Paragraph 3 of Section 5.4.03 of Article 5, Chapter 4 of the Malibu Municipal Code defining the term "Best Management Practices" is hereby amended to read as follows:

"Best Management Practices (BMP's)" means activities, practices, facilities, and/or procedures that when implemented to their maximum efficiency will prevent or reduce pollutants in discharges and any program, technology, process, siting criteria, operational methods or measures, or engineered systems, which when implemented prevent, control, remove, or reduce pollution. Examples of BMP's may include public education and outreach, proper planning of development projects, proper cleaning of catch basin inlets, and proper sludge- or waste-handling and disposal, as well as storm water treatment and detention facilities (see Structural BMP's), among others."

Section 4. Section 5.4.03 of Article 5, Chapter 4 of the Malibu Municipal Code is hereby amended to add the following new definitions in appropriate alphabetical sequence:

""Automotive Repair Shop" means a facility that is categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539 (as amended).

"Commercial Development" means any development on private land that is not heavy industrial or residential. The category includes, but is not limited to: hospitals, laboratories and other medical facilities, educational institutions, recreational facilities, plant nurseries, multi-apartment buildings, car wash facilities, mini-malls and other business complexes, shopping malls, hotels, office buildings, public warehouses and other light industrial complexes.

"Discretionary project" is defined in the same manner as Section 15357 of the Guidelines For Implementation Of The California Environmental Quality Act contained in Title 14 of the California Code Of Regulations, as amended, and means a project which requires the exercise of judgment or deliberation when the City decides to approve or disapprove a particular activity, as distinguished from situations where the City merely has to determine whether there has been conformity with applicable statutes, ordinances, or regulations.

"Greater than (>) 9 unit home subdivision" means any subdivision being developed for 10 or more single-family or multi-family dwelling units.

"Hillside" means property located in an area with known erosive soil conditions, where the development contemplates grading on any natural slope that is twenty-five percent (25%) or greater.

"Infiltration" means the downward entry of water into the surface of the soil.

"New Development" means land disturbing activities; structural development, including construction or installation of a building or structure, creation of impervious surfaces; and land subdivision.

"One Hundred Thousand (100,000) Square Foot Commercial Development" means any Commercial Development that creates at least one hundred thousand (100,000) square feet of impermeable area, including parking areas.

"Parking Lot" means land area or a facility for the temporary parking or storage of motor vehicles used personally, for business or for commerce with a lot size of five thousand (5,000) square feet or more, or with twenty-five (25) or more parking spaces.

"Redevelopment" means, on an already developed site, the creation or addition of at least five thousand (5,000) square feet of impervious surfaces, as such term is defined in the current version of the SUSMP approved by the Regional Board. Redevelopment includes, but is not limited to the following activities that meet the minimum standards set forth in this definition: (1) the expansion of a building footprint or addition or replacement of a structure; (2) structural development, including an increase in gross floor area and/or exterior construction or remodeling; (3) replacement of impervious surface that is not part of a routine maintenance activity and (4) land disturbing activities related to structural or impervious surfaces.

"Restaurant" means a stand-alone facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption. (SIC code 5812).

"Retail Gasoline Outlet" means any facility engaged in selling gasoline and lubricating oils.

"Source Control BMP" means any schedule of activities, prohibition of practices, maintenance procedures, managerial practices or operational practices that aim to prevent storm water pollution by reducing the potential for contamination at the source of pollution.

"Standard Urban Storm Water Mitigation Plan" or "SUSMP" means the current version of the Standard Urban Storm Water Mitigation Plan approved by the Regional Board, and on file in the office of the City Clerk of this City, and the NPDES Permit models that have been approved by the Executive Officer of the Regional Board for implementation to control storm water pollution from New Development and Redevelopment or any project specifically identified in Section 15.56.095.

"Structural BMP" means any structural facility designed and constructed to mitigate the adverse impacts of storm water and urban runoff pollution (e.g. canopy, structural enclosure). Structural BMP's may include both Treatment Control BMP's and Source Control BMP's.

"Treatment" means the application of engineered systems that use physical, chemical, or biological processes to remove pollutants. Such processes include, but are not limited to, filtration, gravity settling, media adsorption, biodegradation, biological uptake, chemical oxidation and UV radiation.

"Treatment Control BMP" means any engineered system designed to remove pollutants by simple gravity settling of particulate pollutants, filtration, biological uptake, media adsorption or any other physical, biological, or chemical process. "

Section 5. Article 5, Chapter 4 of the Malibu Municipal Code is amended by adding thereto a new Section 5.4.09.5 to read as follows:

"5.4.09.5 Standard Urban Storm Water Mitigation Plan ("SUSMP") Requirements for New Development and Redevelopment Projects .

a. Projects Requiring a SUSMP. The following projects for New Development and Redevelopment, if subject to Discretionary Project approval in the Zoning Ordinance of the City, shall require a Storm Water Mitigation Plan which complies with the most recent SUSMP:

1. Single-Family Hillside Residences;

2. Commercial developments in excess of One Hundred Thousand (100,000) Square Feet;

3. Automotive Repair Shops;

4. Restaurants;

5. Retail Gasoline Outlets;

6. Greater than (>) 9 unit home subdivision; and

7. Parking lots of five thousand (5,000) square feet or more or with twenty-five (25) or more parking spaces and potentially exposed to storm water runoff.

b. Incorporation of SUSMP into Project Plans. An applicant for a New Development or a Redevelopment Project identified in paragraph a of this Section shall incorporate into the applicant's project plans a Storm Water Mitigation Plan which includes those Best Management Practices necessary to control storm water pollution from construction activities and facility operations, as set forth in the SUSMP applicable to the applicant's project. Structural or Treatment Control BMP's set forth in project plans shall meet the design standards set forth in the SUSMP; provided, however, Restaurants with a developed land area of less than 5,000 square feet and Retail Gasoline Outlets do not have to meet the Structural or Treatment Control BMP design standards set forth in the SUSMP. If a project applicant has included or is required to include Structural or Treatment Control BMP's in project plans, the applicant shall provide verification of maintenance provisions. The verification shall include the applicant's signed

statement, as part of its project application, accepting responsibility for all structural and treatment control BMP maintenance until such time, if any, the property is transferred.

c. Issuance of Discretionary Permits. No Discretionary permit may be issued for any New Development or Redevelopment Project identified in paragraph a. of this Section until the Authorized Enforcement Officer confirms that either (1) the project plans comply with the applicable SUSMP requirements, or (2) compliance with the applicable SUSMP requirements is impracticable for one or more of the reasons set forth in paragraph e regarding issuance of waivers. Where a Redevelopment project results in an increase of less than fifty percent (50%) of the impervious surfaces of a previously existing development, and the existing development did not require a SUSMP at the time the last Discretionary approval was granted by the City, the Design Standards set forth in the SUSMP will apply only to the addition, and not to the entire development.

d. Issuance of Certificates of Occupancy. As a condition for issuing a Certificate of Occupancy for New Development or Redevelopment Project identified in paragraph a. of this Section, the Authorized Enforcement Officer shall require facility operators and/or owners to build all the storm water pollution control Best Management Practices and Structural or Treatment Control BMP's that are shown on the approved project plans and to submit a signed Certification Statement stating that the site and all Structural or Treatment Control BMP's will be maintained in compliance with the SUSMP and other applicable regulatory requirements.

e. Granting of Waiver. The Authorized Enforcement Officer shall have the authority to grant a waiver to a Development or Redevelopment Project from the requirements of the SUSMP, if impracticability for a specific property can be established by the project applicant. A waiver of impracticability may be granted only when all Structural or Treatment Control BMP's have been considered and rejected as infeasible. Recognized situations of impracticability are limited to the following, unless approved by the Regional Board:

1. Extreme limitations of space for treatment on a Redevelopment project;

2. Unfavorable or unstable soil conditions at a site to attempt infiltration; and

3. Risk of ground water contamination because a known unconfined aquifer lies beneath the land surface or an existing or potential underground source of drinking water is less than ten (10) feet from the soil surface.

f. Transfer of Properties Subject to Requirement for Maintenance of Structural and Treatment Control BMP's.

1. The transfer or lease of a property subject to a requirement for maintenance of Structural and Treatment Control BMP's shall include conditions requiring the transferee and its successors and assigns to either (a) assume responsibility for maintenance of any existing Structural or Treatment Control BMP or (b) to replace an existing Structural or Treatment Control BMP with new control measures or BMP's meeting the then current standards of the City and the SUSMP. Such requirement shall be included in any sale or lease agreement or deed for such property. The condition of transfer shall include a provision that the successor property owner or lessee conduct maintenance inspections of all Structural or Treatment Control BMP's at least once a year and retain proof of inspection.

2. For residential properties where the Structural or Treatment Control BMP's are located within a common area which will be maintained by a homeowner's association, language regarding the responsibility for maintenance shall be included in the project's conditions, covenants and restrictions (CC&R's). Printed educational materials will be required to accompany the first deed transfer to highlight the existence of the requirement and to provide information on what storm water management facilities are present, signs that maintenance is needed, and how the necessary maintenance can be performed. The transfer of this information shall also be required with any subsequent sale of the property.

3. If Structural or Treatment Control BMP's are located within an area proposed for dedication to a public agency, they will be the responsibility of the developer until the dedication is accepted.

g. CEQA. Provisions of this section shall be complimentary to, and shall not replace, any applicable requirements for storm water mitigation required under the California Environmental Quality Act."

Section 6. Section 5.4.10(A) of Title15, Chapter 15.56 of the Malibu Municipal Code is amended to read as follows:

"1. Any condition caused or permitted to exist in violation of

a. Any of the provisions of this Chapter; or

b. Any failure to comply with any applicable requirement of either the SUSMP or an approved Storm Water Mitigation Plan with respect to a property; or

c. Any false certification or verification, or any failure to comply with a certification or verification provided by a project applicant or the

applicant's successor in interest; or

d. Any failure to properly operate and maintain any Structural or Treatment Control BMP on a property in accordance with an approved Storm Water Mitigation Plan or the SUSMP,

is hereby determined to be a threat to the public health, safety and welfare, is declared and deemed a public nuisance, and may be abated or restored by any Authorized Enforcement Officer, and a civil or criminal action to abate, enjoin or otherwise compel the cessation of such nuisance may be brought by the City Attorney."

Section 7. If any section, subsection, sentence, clause, portion, or phrase of this Ordinance is for any reason held to be invalid or unconstitutional by a decision of any court of any competent jurisdiction, such decision shall not affect the validity of the remaining sections, subsections, sentences, clauses, portions, or phrases of this Ordinance. The City Council hereby declares that it would have passed this Ordinance and each and every section, subsection, sentence, clause, portion, or phrase without regard to whether any other section, subsection, sentence, clause, portion, or phrase of the Ordinance would be subsequently declared invalid or unconstitutional.

PASSED, APPROVED AND ADOPTED this 12th day of February, 2001.

MAYOR THOMAS J.D. HASSE

ATTEST:

VIRGINIA BLOOM, CITY CLERK

I CERTIFY THAT THE FOREGOING ORDINANCE NO. 219 was introduced at the regular City Council meeting of January 22nd, 2001 and passed, approved and adopted by the City Council at the regular meeting thereof held on the 12th day of February, 2001, by the following vote:

AYES:	5	Councilmembers: Jennings, Kearsley, Barovsky, House and Hasse
NOES:	0	
ABSENT:	0	
ABSTAIN:	0	

VIRGINIA BLOOM, City Clerk

City of Malibu Ordinance No. 242

M.M.C. Chapter 15.12

Incorporating the California Plumbing Code to Require Operating Permits for Residential and Commercial Facilities to Use Onsite Wastewater Treatment Systems

ORDINANCE NO. 242

AN ORDINANCE OF THE CITY OF MALIBU ADOPTING BY REFERENCE TITLE 26 OF THE LOS ANGELES COUNTY CODE, INCORPORATING THE CALIFORNIA BUILDING CODE, 2001 EDITION; TITLE 27 OF THE LOS ANGELES COUNTY CODE, INCORPORATING THE CALIFORNIA ELECTRICAL CODE, 2001 EDITION; TITLE 28 OF THE LOS ANGELES COUNTY CODE, INCORPORATING THE CALIFORNIA PLUMBING CODE, 2001 EDITION; TITLE 29 OF THE LOS ANGELES COUNTY CODE, INCORPORATING THE CALIFORNIA MECHANICAL CODE, 2001 EDITION; AND TITLE 32 OF THE LOS ANGELES COUNTY CODE, INCORPORATING THE CALIFORNIA FIRE CODE, 2001 EDITION; MAKING AMENDMENTS TO SAID CODES AND DECLARING THE URGENCY THEREOF

THE CITY COUNCIL OF THE CITY OF MALIBU DOES ORDAIN AS FOLLOWS:

Section 1. Section 15.04.010 of the City of Malibu Municipal Code is hereby amended to read as follows:

15.04.010 Adoption of Building Code.

Except as hereinafter provided, Title 26, Building Code, of the Los Angeles County Code, as amended and in effect on November 01, 2002, adopting the California Building Code, 2001 Edition (Part 2 of Title 24 of the California Code of Regulations), including Subsections 101.17 through 101.17.16 of Chapter 1; Chapters 2 through 35; and Appendix Chapters 3, Division II; 4, Division II; 9; 12; 15; 16; and 31; is hereby incorporated herein by reference as if fully set forth below, and shall be known and may be cited as the Building Code of the City of Malibu.

The provisions of the Building Code applying to dwellings, lodging houses, congregate residences, hotels, motels, apartment houses, convents, monasteries or other uses classified by the building code as a group occupancy and including Chapters 1, 2, 3, 4 and 98 and 99 shall constitute and may be cited as the Housing Code of the City of Malibu.

In the event of any conflict between provisions of the California Building Code, 2001 Edition, Title 26 of the Los Angeles County Code, or any amendment to the Building Code contained in the Malibu Municipal Code, the provision contained in the later listed document shall control.

A copy of Title 26 of the Los Angeles County Code and the California Building Code, 2001 Edition, have been deposited in the office of the City Clerk of the City of Malibu and shall be at all times maintained by the City Clerk for use and examination by the public.

Section 2. Section 15.04.040 is hereby amended Malibu Municipal Code to read as follows:

15.04.040 Violation - Penalty

Every person violating any provision of Title 26 Los Angeles Building Code and appendices, adopted by reference by Section 15.04.010, or of any permit or license granted thereunder, or any rules or regulations promulgated pursuant thereto, is guilty of a misdemeanor. Upon conviction thereof he or she shall be punishable by a fine not to exceed one thousand dollars or imprisonment not to exceed six months, or by both such fine and imprisonment. The imposition of such penalty for any violation shall not excuse the violation or permit it to continue. Each day that a violation occurs shall constitute a separate offense.

Section 3. Section 15.04.050 is hereby added to the City of Malibu Municipal code to read as follows:

15.04.050 Amendments to Building Code

Notwithstanding the provisions of Section 15.04.010 of this Chapter, Title 26 Los Angeles County Building Code is amended to read as follows:

Section 103.5 is hereby amended to read as follows:

103.5 Costs.

Any person that violates any provision of this code shall be responsible for the costs of any and all Code enforcement actions taken by the building official in response to such violations. These costs shall be based on the amounts specified in Table 1-F.

All other fees are as established by the current City of Malibu fee schedule. Where no fee is established by the City of Malibu fee schedule, the Los Angeles County Code fee schedule shall apply.

Section 105.1.1 is amended to read as follows:

105.1.1 General.

Unless otherwise provided for below, in order to conduct the hearings provided for in this code and also to determine the suitability of alternate materials and types of construction and to provide for reasonable interpretations of the provisions of this code, there shall be a building board of appeals consisting of five members who are qualified by experience and training to pass upon matters pertaining to building construction. The building official shall be an *ex officio*-member and shall act as secretary to the board. The

members of the building board of appeals shall be appointed by the Board of Supervisors and shall hold office at its pleasure. The building board of appeals shall adopt reasonable rules and regulations for conducting its investigations. The board shall establish that the approval for alternate materials and the modifications granted for individual cases are in conformity with the intent and purpose of this code and that such alternate material, modification or method of work offered is at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability, safety and sanitation and does not lessen any fire-protection requirements or any degree of structural integrity. The building board of appeals shall document all decisions and findings in writing to the building official with a duplicate copy to the applicant, and the board may recommend to the Board of Supervisors such new legislation as is consistent therewith.

Section 105.3 is hereby deleted in its entirety.

Section 105.4 is hereby amended to read as follows:

105.4 Code Enforcement Appeals Board.

In order to conduct the hearings provided for in Government Code Section 54988, there shall be a code enforcement appeals board. The code enforcement appeals board shall be comprised of the same five members and alternates as the building board of appeals. The building official shall be an ex officio nonvoting member and act as secretary.

Section 105.6 is hereby deleted in its entirety.

Section 106.1.1 is hereby added to read as follows

106.1.1 Parking Lots

A plan review and permit shall be required for the surfacing, resurfacing, replacement, reconfiguration and striping of parking lots and parking structures serving commercial and multifamily occupancies.

Any of the aforementioned activities in or on existing parking lots must comply with current zoning. National Pollution Discharge Elimination Systems (N.P.D.E.S.) and accessibility requirements as required by applicable codes and standards.

Fees determined by the current fee schedule.

Section 106.3 is hereby amended to read as follows:

106.3 Work Exempted.

A building permit shall not be required for the following:

1. One-story detached accessory buildings used as tool and storage sheds, playhouses and similar uses, provided the projected roof area does not exceed 120 square feet.
2. Fences and walls not over 6 feet (1829 mm) in height.
3. Steel tanks supported on a foundation not more than two feet (610 mm) above grade when the height does not exceed 11/2 times the diameter.
4. Gantry cranes and similar equipment.
5. Retaining walls that retain not over 4 feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge or impounding a Class I, II, or III-A liquids.
6. Bridges not involving buildings.
7. Motion picture, television and theater stage sets and scenery, except when used as a building.
8. Radio and television antennae towers which do not exceed 45 feet (13 716 mm) in height and ground support dish antennas not exceeding 15 feet (4572 mm) in height above finished grade in any position.
9. Light standards which do not exceed 30 feet (9144 mm) in height.
10. Flagpoles not erected upon a building and not more than 15 feet (4572 mm) high.
11. A tree house provided that:

11.1. It does not exceed 64 square feet (5.94 m^2) in area nor 8 feet (2438 mm) in height from floor to roof.

11.2. The ceiling height as established by door height or plate line does not exceed 6 feet (1829mm).

12. Canopies or awnings attached to a Group R or M Occupancy and extending not more than 54 inches (1372 mm) from the exterior wall of the building.
13. Sheds, office or storage buildings, and other structures incidental to and work authorized by a valid grading or building permit. Such structures must be removed upon expiration of the permit or completion of the work covered by the permit.
14. Oil derricks.
15. Platforms, walks and driveways not more than 30 inches (762 mm) above grade and not over any basement or story below.
16. Prefabricated swimming pools accessory to a Group R, Division 3 Occupancy in which the pool walls are entirely above the adjacent grade and if the capacity does not exceed 5,000 gallons (18 927 L).

17. Playground equipment.

Unless otherwise exempted, separate plumbing, electrical and mechanical permits will be required for the above-exempted items.

Exemption from the permit requirements of this Code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of other laws or ordinances.

Section 106.4.1.1 is hereby amended to read as follows:

106.4.1.1 Expiration of Application (Plan Check).

Applications for building, grading, landscape and relocation building permits for which no permit is issued within one year following the date of application shall expire by limitation. Plans and specifications previously submitted may thereafter be returned to the applicant or destroyed by the building official. The building official may extend the time for action by the applicant for a period not exceeding 180 days beyond the initial one year limit upon written request by the applicant showing that circumstances beyond the control of the applicant have prevented action from being taken and upon the payment of an extension fee per current City of Malibu fee schedule. No permit application shall be extended more than once.

Once an application and any extension thereof have expired, the applicant shall resubmit plans and specifications and pay a new plan checking or review of fee.

Section 107.9 is hereby deleted in its entirety.

Section 107.13 is hereby amended to read as follows:

Section 107.13 Investigation Fee for Work without Permit.

The payment of the investigation fee shall not exempt any person from compliance with all other provisions of this code nor from any penalty prescribed by law.

Section 108.1.1.2 is hereby added to read as follows

Section 108.1.1.2 Occupancy Inspection

All existing commercial occupancies are required to apply for an occupancy inspection prior to occupancy of a building or tenant space by a new owner or occupant.

Upon successful completion of the occupancy inspection the Building Official shall

issue a new certificate of occupancy to the building or tenant space as required in Section 109 of the California Building Code.

The certificate of occupancy issued will remain valid and in effect until a change of occupant occurs or is revoked for cause by the Administrative Authority or as required by this code.

Fees determined by the current fee schedule.

Section 108.4.2 is hereby amended to read as follows:

Section 108.4.2 Foundation inspection.

Inspection shall be made after excavations for footings is complete and any required reinforcing steel is in place. For concrete foundations, any required forms shall be in place prior to inspection. All materials for the foundation shall be on the job site; however, where concrete is ready mixed in accordance with approved nationally recognized standards, the concrete need not be on the job site. Where the foundation is to be constructed of approved treated wood, additional inspections may be required by the building official. Required set back and pad elevations shall be established by survey prior to approval by the Administrative Authority.

Section 108.4.6 is hereby amended to read as follows:

Section 108.4.6 Final inspection.

Inspection shall be made after finish grading is approved and the building is completed and ready for occupancy and all other required agency approvals have been obtained.

Section 111 is amended to read as follows:

Section 111 Engineering Geology and Soils Engineering Reports

The building official may require an engineering geology or soils engineering report, or both, where in the building official's opinion, such reports are essential for the evaluation of the safety of the site. The engineering geology or soils engineering report or both shall be prepared in accordance with the City's "Guidelines for the Preparation of Engineering Geologic and Geotechnical Engineering Reports" (February 2002) and shall contain a finding regarding the safety of the building site for the proposed structure against hazard from landslide, settlement or slippage and a finding regarding the effect that the proposed building or grading construction will have on the geotechnical stability of property outside of the building site. Any engineering geology report shall be prepared by a certified engineering geologist licensed by the State of California. Any soils engineering report shall

be prepared by a civil engineer registered in the State of California, experienced in the field of soil mechanics, such as a soils engineer. When both an engineering geology and soils engineering report are required for the evaluation of the safety of a building site, the two reports shall be coordinated before submission to the Administrative Authority.

Section 1702 is hereby amended to read as follows:

Section 1702 Structural Observation

Structural observation shall be provided in Seismic Zone 3 or 4 when one of the following conditions exists:

1. The structure is defined in Table 16-K as Occupancy Category 1, 2 or 3,
2. The structure is required to comply with Section 403,
3. The structure is in Seismic Zone 4, *Na* as set forth in Table 16-S is greater than one, and a lateral design is required for the entire structure,
   EXCEPTION: One and two-story Group R Division 3 and Group U occupancies
4. When so designated by the architect or engineer of record, or
5. When such observation is specifically required by the Administrative Authority.

Section 2320.5.1 is hereby amended to read as follows:

Section 2320.5.1.1 Braced wall lines.

Buildings shall be provided with exterior and interior braced wall lines. Spacing shall not exceed 25 feet (7620 mm) on center in both the longitudinal and transverse directions in each story.

EXCEPTION; In one and two-story Group R, Division 3 buildings, interior braced wall line spacing may be increased to not more then 34 feet (10363 mm) on center in order to accommodate one single room per dwelling unit not exceeding 900 square feet (83.61 square meters). The building official may require additional braced walls to contain braced panels when this exception is used.

Section 3310.1 of Appendix Chapter 33 is hereby deleted in its entirety.

Section 3310.2 of Appendix Chapter 33 is hereby deleted in its entirety.

Section 3. Section 15.08.010 of the City of Malibu Municipal Code is hereby amended to read as follows:

15.08.010 Adoption of Electrical Code.

Except as hereinafter provided, Title 27, Electrical Code, of the Los Angeles County Code, as amended and in effect on November 01, 2002, adopting the California Electrical Code, 2001 Edition (Part 3 of Title 24 of the California Code of Regulations) is hereby incorporated herein by reference as if fully set forth below, and shall be known and may be cited as the Building Code of the City of Malibu.

In the event of any conflict between provisions of the California Electrical Code, 2001 Edition, Title 27 of the Los Angeles County Code, or any amendment to the Building Code contained in the Malibu Municipal Code, the provision contained in the later listed document shall control.

A copy of Title 27 of the Los Angeles County Code and the California Electrical Code, 2001 Edition, have been deposited in the office of the City Clerk of the City of Malibu and shall be at all times maintained by the City Clerk for use and examination by the public.

Section 4. Section 15.08.030 of the Malibu Municipal Code is amended to read as follows:

15.08.30 Violation-Penalty.

Every person violating any provision of the Title 26 Los Angeles County Electrical Code and appendices, adopted by reference by Section 15.08.010, or of any permit or license granted thereunder, or any rules or regulations promulgated pursuant thereto, is guilty of a misdemeanor. Upon conviction thereof he or she shall be punishable by a fine not to exceed one thousand dollars or imprisonment not to exceed six months, or by both such fine and imprisonment. The imposition of such penalty for any violation shall not excuse the violation or permit it to continue. Each day that a violation occurs shall constitute a separate offense.

Section 5. Section 15.12 010(Plumbing Code) of Title 15 (Building and Construction) the City of the Malibu Municipal Code is hereby amended to read as follows:

15.12.010 Adoption of Plumbing Code.

Except as hereinafter provided, Title 28, Plumbing Code, of the Los Angeles County Code, as amended and in effect on November 01, 2002, adopting the California Plumbing Code, 2001 Edition (Part 5 of Title 24 of the California Code of Regulations), is hereby incorporated herein by reference as if fully set forth below, and shall be known and may be cited as the Plumbing Code of the City of Malibu.

In the event of any conflict between provisions of the California Plumbing

Code, 2001 Edition, Title 28 of the Los Angeles County Code, or any amendment to the Building Code contained in the Malibu Municipal Code, the provision contained in the later listed document shall control.

A copy of Title 28 of the Los Angeles County Code and the California Plumbing Code, 2001 Edition, have been deposited in the office of the City Clerk of the City of Malibu and shall be at all times maintained by the City Clerk for use and examination by the public.

Section 6. Section 15.12.030 of the City Malibu Municipal Code is amended to read as follows:

15.12.030 Violation –Penalty.

Every person violating any provision of the Title 28 Los Angeles County Plumbing Code and appendices, adopted by reference by Section 15.12.010, or of any permit or license granted thereunder, or any rules or regulations promulgated pursuant thereto, is guilty of a misdemeanor. Upon conviction thereof he or she shall be punishable by a fine not to exceed one thousand dollars or imprisonment not to exceed six months, or by both such fine and imprisonment. The imposition of such penalty for any violation shall not excuse the violation or permit it to continue. Each day that a violation occurs shall constitute a separate offense.

Section 7. Section 15.12.050 of the Malibu Municipal Code is hereby amended to read as follows:

15.12.050 Amendment to Plumbing Code

Notwithstanding the provisions of Section 15.12.010 of this chapter, the Title 28 Los Angeles County Plumbing Code is amended to read as follows:

Section 103.5.2.1 is hereby added to read as follows:

Section 103.5.2.1 Operating Permits.

As of January 1, 2003 all applicants applying for new construction and residential additions, served by an onsite wastewater treatment system, shall be required to apply for and be issued an Operating Permit in addition to any permits required for the installation of an onsite wastewater treatment system. Operating Permits shall be required in addition to any permits required for the replacement or renovation of existing onsite wastewater treatment systems.

The Operating Permit shall be issued to the owner of the property. In the event of the sale of the property a new Operating Permit shall be applied for by the new owner within 30 days of the finalization of the sale of the property.

Homeowners associations will be considered the owner of the property for condominiums and townhouses for the purpose of enforcement of this code.

Existing commercial and multifamily occupancies shall apply for an Operating Permit through the Malibu Building Safety Department prior to January 1, 2004 or as required by the Administrative Authority due to the proximity of the system to surface waters, history of failure, inadequate groundwater separation, inadequate soil conditions, hazardous geologic conditions or other conditions that may cause the system to negatively impact the health and safety of the community or the environment.

All on site wastewater treatment systems serving commercial and multifamily occupancies are subject to specific or general wastewater discharge requirements/ permits as established and issued by the Los Angeles Regional Water Quality Control Board.

The level of management required by conditions of the Operating Permit will be established by the Administrative Authority based on the type of system and the level of risk to the public health and safety and the environment by the system.

Section 103.5.2.2 is hereby added to read as follows

Section 103.5.2.2 Renewal of Operating Permits

Operating Permits for commercial and multifamily occupancies shall be required to be renewed every two years from the date of initial issuance or as ordered by the Administrative Authority. Operating Permits for single family residential occupancies utilizing alternative systems shall be renewed every three years or upon the sale of the property. Operating Permits for single family residential occupancies utilizing conventional systems shall be renewed every five years or upon the sale of the property. The Administrative Authority may waive the requirement for renewal of a permit at the sale of a property if an Operating Permit was issued not more than 12 months from the date of property transfer.

Section 103.5.2.3 is hereby added to read as follows:

Section 103.5.2.3 Fees.

Fees for Operating Permits and renewal of Operating Permits shall be as set forth in the current fee schedule as approved by the City Council.

Section 103.5.2.4 is hereby added to read as follows:

Section 103.5.2.4 Revocation of Operating Permit.

After an administrative hearing, the Administrative Authority may revoke or suspend an Operating Permit for failure on the part of the permit holder to meet the conditions of the permit or when the occupant is deemed to be in violation of the

requirements of the Los Angeles County Health Department or the Los Angeles Regional Water Quality Control Board or this code.

Section 103.5.2.5 is hereby added to read as follows:

Section 103.5.2.5 Appeals.

The permitee may appeal the revocation or suspension of the Operating Permit by the Administrative Authority to the Building Board of Appeals in conformance with Section 109 of the Building Code.

Section 103.5.6.4 is hereby added to read as follows

Section 103.5.6.4 Approval for Onsite Wastewater Treatment System Inspectors: As of January 1, 2003

1. Onsite wastewater treatment system inspectors who perform inspection in the City of Malibu shall be a California Certified Engineering Geologist, a California Registered Professional Geotechnical Engineer, a California Registered Civil Engineer, a California Registered Environmental Health Specialist, a California Licensed Contractor (with an A or C-42 license), who have attended training provided, or authorized by the City of Malibu; and who have passed an examination prepared, and administered by the City of Malibu, or an agent authorized by the City of Malibu, to qualify as an approved onsite wastewater treatment systems inspector pursuant to this code.
2. The City of Malibu may approve onsite wastewater treatment system inspectors who attend training provided, or authorized by the City of Malibu, and who pass a standard examination prepared, and administered by the City of Malibu, or an agent authorized by the City of Malibu. Said examination shall be designed to establish the fitness of the applicant for certification to assess the condition and function of onsite wastewater treatment systems, and to determine whether maintenance, including repair, or replacement of system components, is necessary.
3. The passing score for the examination shall be 75% correct answers to all questions posed. Any person who is denied approval as an onsite wastewater treatment system inspector based on his, or her failure to pass the examination given by the City of Malibu may request, and is entitled to receive, a written statement of the City of Malibu's basis for denial.
4. The City of Malibu shall maintain a list of all approved onsite wastewater treatment system inspectors. The list shall be available for inspection, or examination by any person. A copy of the list may be obtained by any person upon request.
5. The City of Malibu may revoke, or suspend the approval, and/or registration of an onsite wastewater treatment system inspector after

opportunity for an administrative hearing when it determines that the onsite wastewater treatment system inspector has falsified, or fraudulently altered a system inspection report, or misrepresented, or fails to provide a copy of an inspection report to the Administrative Authority of the results of an inspection preformed by the onsite wastewater treatment system inspector.

6. It shall be a violation of this code for any person to falsify, misrepresent or fraudulently alter a system inspection report, or the result of an inspection.
7. Onsite wastewater treatment system inspectors shall submit the results of the inspection on a System Inspection Report form approved by the City of Malibu together with the signed statement at the bottom of the form attesting that the inspection has been performed, and any recommendations regarding upgrade, repair or maintenance of the onsite wastewater treatment system made by the system inspector in the form were made consistent with the system inspector's training, expertise and experience in the maintenance and proper functioning of the onsite wastewater treatment systems and in accordance to the requirements of this code.

Section 103.5.6.5 is hereby added to read as follows:

Section 103.5.6.5 Criteria for Inspection.

The Administrative Authority shall establish reasonable guidelines for the inspection of existing systems to be as non-intrusive as possible, to avoid damage to the system, and any unnecessary disturbance of the surrounding soil area, which is related to the treatment process.

Section 203 is hereby amended by added the following:

Alternative System – An onsite wastewater treatment system providing enhanced sewage effluent treatment, secondary or better.

Section 206 is amended by adding the following:

Disinfection – To treat by means of a chemical, physical or other process such as cholorination, ozonation, application of ultraviolet light or sterilization designed to eliminate pathogenic organisms and producing an effluent of 200 MPN/100 mL fecal coliform or less and 104 MPN/100 mL enterococcus or less.

Section 221 is amended by adding the following:

Secondary Treatment – The processing of sewage effluent by means of a treatment device which renders a sewage effluent of 30 mg/L biochemical oxygen demand or less, 30 mg/L total suspended solids or less and 15 mg/L oil and grease or less.

Section 222 is amended by adding the following:

Tertiary Treatment – The processing of sewage effluent by means of a treatment device which renders a sewage effluent of 30 mg/L biochemical oxygen demand or less, 30 mg/L total suspended solids or less, 15 mg/L oil and grease or less, 200 MPN/100 mL fecal coliform or less and 104 MPH/100 mL enterococcus or less.

Section 710.0 is hereby amended as follows:

All such pumps and receiving tanks shall be automatically discharged. All sumps shall be provided with pumps or ejectors of the duplex type, simplex pumps are prohibited, and shall be so arranged to function alternately with each pump or ejector cycle, and to function independently in case of overload or mechanical failure. The lowest inlet shall have a minimum clearance of two (2) inches for the high water "starting" level of the sump.

Section 710.9.2 is hereby added as follows:

All such sump and receiving tanks shall be equipped with an automatic alarm system. The alarm system shall be activated upon failure of either pumps or ejectors, whether independently or simultaneously. The alarm shall emit an audible alarm, which can be detected from any location within the building and immediately outside the building served by such sumps and receiving tanks. The Administrative Authority may approve other alarm systems, which provide equivalent enunciation of failure of the pumps or ejectors.

Subsection K1 (c), and (f) of Appendix K of the 2001 California Plumbing Code/Title 28 Los Angeles County Plumbing Code, is amended to read as follows:

(C)Disposal systems shall be designed to utilize the most porous or absorptive portions of the soil formation. Where the ground water level extends to within 12 feet (3658 mm) or less of the ground surface or where the upper soil is porous and the underlying stratum is impervious rock or impervious soil, a septic tank and disposal field system shall be installed

(F)No onsite wastewater treatment system, or part thereof, shall be located in any other property other than the property which is the site of the building or structure served by such onsite wastewater treatment system; nor shall any onsite wastewater treatment system or part thereof be located at any point having less than the minimum distances indicated in Table K-1.

Nothing contained in this Code shall be construed to prohibit the use of all or part of another property for a onsite wastewater treatment system or part thereof, where secondary sewage effluent treatment, or better, is provided, when proper cause, transfer of ownership, or change of boundary not in violation of other requirements has been first established to the satisfaction of the Administrative Authority. The instrument recording such action shall constitute an agreement with the Administrative Authority which shall

clearly state and show that the areas so joined or used shall be maintained as a unit during the time they are so used. Such agreement shall be recorded in the office of the County Recorder as part of the conditions of ownership of said properties, and shall be binding on all heirs, successors, and assigns to such properties. A copy of the instrument recording such proceedings shall be filed with the Administrative Authority.

Subsection K1 (j), and (k) of Appendix K of the 2001 California Plumbing Code/Title 28 Los Angeles County Plumbing Code is added to read as follows:

(J) Commercial buildings and multiple family dwellings to be constructed, or remodeled, after the effective date of this section shall have a onsite wastewater treatment system which provides tertiary sewage effluent treatment as defined by the Administrative Authority, prior to final sewage effluent disposal, unless otherwise approved by the Administrative Authority.

(K) Commercial buildings and multiple family dwellings served by an existing onsite wastewater treatment system which is to be replaced, renovated, or repaired, after the effective date of this section shall have a onsite wastewater treatment system which provides tertiary sewage effluent treatment as defined by the Administrative Authority, prior to final sewage effluent disposal, unless otherwise approved by the Administrative Authority.

Section K2 of Appendix K of the 2001 California Plumbing Code/Title 28 Los Angeles Plumbing Code, is amended to read as follows:

The liquid capacity of all septic tanks shall conform to Tables K-2 and K-3 as determined by the number of bedrooms or apartment units in dwelling occupancies ~~and~~ or the estimated waste/sewage design flow rate or the number of plumbing fixture units as determined from Table 7-3, whichever is greater.

Section K3 and Subsection K3 (3), (4), and (5) of Appendix K of the 2001 California Plumbing Code/Title 28 Los Angeles Plumbing Code, is amended to read as follows:

The minimum effective absorption area in disposal fields in square feet (m^2), and in seepage pits in square feet (m^2) of side wall, shall be predicated on the required septic tank capacity in gallons (liters) and/or estimated waste/sewage flow rate, which ever is greater, and shall be as follows:

(3) No excavation for a leach line or leach bed shall extend within five (5) feet (1524 mm) of ground water nor to a depth where sewage may contaminate the underground water stratum.

Exception: When approved by the Administrative Authority, this separation distance may be reduced. The applicant shall supply evidence of ground water depth to the satisfaction of the Administrative Authority.

(4) The minimum effective absorption area in any seepage pit shall be calculated as the excavation sidewall area below the inlet exclusive of any hardpan, rock, clay, or other impervious formations.

The minimum required area of porous formation shall be provided in one or more seepage pits. No excavation shall extend within ten (10) feet (3038 mm) of ground_water nor to a depth where sewage may contaminate underground water stratum.

Exception: When approved by the Administrative Authority, this separation distance may be reduced. The applicant shall supply evidence of ground water depth to the satisfaction of the Administrative Authority.

(5) Leaching chambers shall be sized on the bottom absorption area (nominal until width) in square feet

Subsections K4 (a), (b), and (c) of Appendix K of the 2001 California Plumbing Code/Title 28 Los Angeles Plumbing Code,, is amended to read as follows:

(c) The construction dimensions of the subsurface sewage effluent disposal area of a onsite wastewater treatment system shall be based on soils analysis and/or percolation tests. Soils analysis shall be conducted by a licensed soils engineer and the results expressed in United States Department of Agriculture classification terminology. Percolation tests shall be conducted by a licensed geologist, a licensed soils engineer, a licensed civil engineer, or a California Registered Environmental Health Specialist.

When a percolation test is required, no onsite wastewater treatment system shall be permitted to serve a building if that test shows the absorption capacity of the soil is less than 0.83 gallons per square foot (33.8 L/m) per 24 hours.

Subsection K5 (e), (l), (m) (2), (m) (3), and (n) of Appendix K of the 2001 California Plumbing Code/Title 28 Los Angeles Plumbing Code is amended to read as follows:

(c) Access to each septic tank shall be provided by at least two (2) manholes twenty (20) inches (508 mm) in minimum diameter. One (1) access manhole shall be located over the inlet and one (1) access manhole shall be located over the outlet. Wherever a first compartment exceeds twelve (12) feet (3658 mm) in length, an additional manhole shall be provided over the baffle wall.

(l) Septic tanks shall have the required manholes accessible by extending the manhole openings to grade in a manner acceptable to the Administrative Authority.

(m) Materials

(3) Alternate Materials

(i) Septic tanks constructed of alternate materials may be approved by the Administrative Authority when complying with approved applicable standards.

(ii) Wooden septic tanks are prohibited.

(14) Prefabricated Septic Tanks

(2) Independent laboratory tests and engineering calculations certifying the tank capacity and structural stability shall be provided as required by the Administrative Authority.

Subsections K6 (a), (b), (c), (d), (h), and (i) of Appendix K of the 2001 California Plumbing Code/Title 28 Los Angeles Plumbing Code is amended to read as follows:

Distribution lines shall be constructed of perforated ABS pipe, perforated PVC pipe, or other materials approved by the Administrative Authority, provided that sufficient openings are available for distribution of the effluent into the trench area.

(1) Before placing filter material or drain lines in a prepared excavation, all smeared or compacted surfaces shall be removed by raking to a depth of one (1`) inch (25.4 mm) and the loose material removed. Clean stone, gravel, slag, or similar material acceptable to the Administrative Authority, varying in size from three fourths (3/4) inch to two and one-half (2-1/2) inches (19.1 mm to 64 mm) shall be placed in the trench to the depth and grade required by this section. Drain pipe shall be placed on the filter material in an approved manner. The drain lines shall then be covered with filter material to the minimum depth required by this section and this covered with material approved by the Administrative Authority to prevent closure of voids with earth backfill. No earth backfill shall be placed over the filter material until after inspection and acceptance.

Exception: Listed or approved plastic leaching chambers may be used in lieu of pipe and filter material. Chamber installations shall follow the rules for disposal fields, where applicable, and shall conform to manufacturer=s installation instructions.

(2) A grade board staked in the trench to the depth of filter material shall be utilized when distribution line is constructed of material which will not maintain alignment without continuous support.

(d) When seepage pits are used in combination with disposal fields, the filter material in the trenches shall terminate at least five (5) feet (1524 mm) from the seepage pit excavation

(h) Automatic siphons or dosing tanks shall be installed when required or as permitted by the Administrative Authority

(l) Distribution drain lines in leaching beds shall not be more than six (6) feet (1829 mm) apart on centers, and no part of the perimeter of the leaching bed shall be more than

three (3) feet (914 mm) from a distribution line. The terminal ends of all disposal fields and trenches shall have an inspection riser constructed of minimum eight (8) inch white PVC. The rise is to be extended to grade and shall terminate in an approved, accessible screw type cover approved by Administrative Authority. The riser shall also extend to the bottom of the disposal field, and shall have one half (1/2) inch holes spaced at four (4) inches on center within the disposal area.

(12) Disposal fields shall be constructed as follows:

	Minimum	Maximum
Number of drain lines per field	1	---
Length of each line	---	100 ft. (30480 mm)
Bottom width of trench	18 in. (457 mm)	36 in. (914) mm
Spacing of lines, center-to-center	~~6 ft. (1829 mm)~~	6 ft. (1829 mm)
Depth of earth cover of lines (preferred B 18 in. (457 mm)	12 in. (305 mm)	---
Grade of lines	level	3 in./100 ft. (25 mm/m)
Filter material under drain lines	12 in. (305 mm)	36 in. (914 mm)
Filter material over drain lines	2 in. (51 mm)	---

Minimum spacing between trenches or leaching beds shall be four (4) feet (1219 mm) plus two (2) feet (610 mm) for each additional foot (305 mm) of depth in excess of one (1) foot (305 mm) below the bottom of the drain line. Disposal fields, trenches, and leaching beds shall not be paved over or covered by concrete or any material that can reduce or inhibit any possible evaporation of sewer effluent accept as approved by the Administrative Authority.

Subsections K7(b), (c), (d), (e), (f), (h), and (i) of Appendix K of the 2001 California Plumbing Code/Title 28 Los Angeles County Plumbing Code is amended to read as follows:

(b) Multiple seepage pits installations shall be served through an approved distribution box. Distribution boxes shall have their locations permanently marked with a steel post, concrete marker or other durable material. Additionally, each distribution box shall have an inspection riser of white PVC or concrete of at least eight (8) inches in diameter. The inspection riser shall allow inspection access to the distribution box. Each riser shall terminate with an approved screw type cap.

(c) Each seepage pit shall be circular in shape and shall have an excavated diameter of not less than four (4) feet (1219 mm. Approval shall be obtained prior to construction for any pit having an excavated diameter greater than six (6) feet (1829).

Seepage pits may be constructed in one of two ways:

(1) An eight (8) inch (204 mm) white, or other similar approved color, sewer pipe of

approved material shall be installed true and plumb in the center of the seepage pit

excavation extending from the bottom of the seepage pit excavation to the inlet depth. The sewer pipe shall have one (1) inch (25.5 mm) holes drill each 120 degrees of the sewer pipe circumference at twelve (12) inch (306 mm) intervals on center minimum for the entire length of the sewer pipe to the inlet depth. The sewer pipe shall then extend watertight to grade and shall be capped with an approved screw type, accessible cap. The void between the sewer pipe and the seepage pit excavation shall then be filled with clean stone, gravel, or similar filter material acceptable to the Administrative Authority, varying in size from the three-fourths (3/4) inch to two and one-half (2-1/2) inches (19.1 mm to 64 mm).

(2) Pre-cast concrete circular sections approved by the Administrative Authority may be used. The void between the pre-cast circular sections and the seepage pit excavation shall have a minimum of six (6) inches (152 mm) of clean three-fourths (3/4) inch (19.1) gravel or rock filter material. An approved type one or two piece reinforced concrete slab cover shall be installed on top of the pre-cast concrete circular sections. Each such cover shall have twenty-five hundred (2500) pounds per square inch (17238 kPa) minimum compressive strength, shall be not less than five (5) inches (127 mm) thick and shall be designed to support an earth load of not less than four hundred (400) pounds per square foot (19.2 kPa). Each such cover shall be provided with an eight (8) inch (204 mm) minimum inspection hole and shall be coated on the underside with an approved bituminous or other nonpermeable protective compound. An eight (8) inch (204 mm) white, or similar approved color, sewer pipe of approved material shall be installed true and plumb extending watertight from the cover inspection hole to grade and shall be capped with an approved accessible cap.

(e) Each seepage pit shall have a minimum sidewall (not including the arch) of ten (10) feet (3048 mm) below the inlet.

(f) The top of the cover shall be at least eighteen (18) inches (457 mm) below the surface of the ground.

(g) An approved vented inlet fitting shall be provided in every seepage pit so arranged as to prevent the inflow from damaging the sidewall.

Section K8 of Appendix K of the 2001 California Plumbing Code/Title 28 Los Angeles County Plumbing Code is deleted in its entirety.

Section K 9 Commercial or Industrial Special Liquid Waste Disposal

Subsection K9(c), and (d) of Appendix K of the 2001 California Plumbing Code/Los Angeles County Plumbing Code, is amended to read as follows:

(c) A sampling box shall be installed when required by the Administrative Authority.

(d) Interceptors shall be of approved design and be of not less than two (2) compartments unless otherwise approved by the Administrative Authority. Structural requirements shall be in compliance with the applicable subparts of Section K 5 of this

appendix.

Subsections K10 (a) (3) of Appendix K of the 2001 California Plumbing Code/Title 28 Los Angeles Plumbing Code is amended to read as follows:

(1) Inspection

(3) Septic tanks and other primary systems shall be installed as required by the Administrative Authority.

Subsection K11(d) of Appendix K of the 2001 California Plumbing Code , is amended to read as follows:

(4) No person owning or controlling any cesspool, septic tank, or seepage pit on the premises or private property of such person or in any public street, alley, or other public property shall fail, refuse, or neglect to comply with the provisions of this section.

Section K12 of Appendix K of the 2001 California Plumbing Code/Title 28 Los Angeles Plumbing Code is amended to read as follows:

The Administrative Authority, may require any or all of the following information before a permit is issued for a onsite wastewater treatment system, or at any time during the construction thereof.

Subsections K12(a), (b), and (c) of Appendix K of the 2001 California Plumbing Code/Title 28 Los Angeles Plumbing Code shall be retained unamended following the above amendment.

Section K13 of Appendix K of the2001 California Plumbing Code/Title 28 Los Angeles Plumbing Code is added to read as follows:

The Administrative Authority shall require the following before a permit is issued for any new or reconstructed onsite wastewater treatment system on any parcel adjacent to the Pacific Ocean:

(a) Buildings permitted to be constructed, or remodeled, on beachfront property shall have adequate and properly designed bulkheads, or other approved structural protection from wave action for all portions of the onsite wastewater treatment system. All approved Coastal Engineering Reports shall also be required to determine the need and extent of this protection.

(b) Owners or possessors of real property with buildings constructed on beachfront property with an existing onsite wastewater treatment system to be renovated, or repaired, shall have adequate and properly designed bulkheads, or other approved structural protection from wave action, as provided by the Administrative Authority, for all portions of

the onsite wastewater treatment system. An approved Coastal Engineering Report shall also be required to determine the need and extent of this protection.

(c) Owners or possessors of real property with buildings constructed on beachfront property with an existing onsite wastewater treatment system damaged by storm, tide, or wave action shall have adequate and properly designed bulkheads, or other approved structural protection from wave action for all portions of the onsite wastewater treatment system. An approved Coastal Engineering Report shall also be required to determine the need and extent of this protection.

(d) Issuance of Permit. Upon review of the application and compliance with all of the requirements contained in this section and all other applicable laws, rules, and regulations, the Administrative Authority shall issue a permit for the installation of bulkheads, or other protective structures required, imposing those conditions and restrictions necessary, and setting a time limit for the completion of the installation of bulkheads, or other protective structures required.

(e) Noncompliance and Right of Entry

(1) Upon expiration of the time limit established in the permit, including such additional time as may have been granted by the Administrative Authority upon further application, if the installation of the bulkheads, or other protective structures required, has not been accomplished, the Administrative Authority may take all reasonable actions to install the bulkheads, or other protective structures required, upon the real property for which the permit was issued. The Administrative Authority shall have the right of entry upon the owner=s or possessor=s real property to the extent necessary to effect the installation.

A failure, refusal, or neglect of the owner or possessor of the real property to comply with the provisions of the permit for the installation of the bulkhead, or other protective structures required, within the period of time set by the Administrative Authority shall be considered a violation of this section, subjecting the owner or possessor of the real property to the penalties and remedies provided in this Code.

(2) The actual cost incurred by the Administrative Authority in taking the above action, including the cost of equipment, labor (including the cost of City of Malibu consultants and employees), administrative, and other indirect costs shall be charge assessed against the real property benefited, and shall by added to the annual property taxes next levied upon the real property and shall constitute a lien upon the real property in the same manner and to the same extent as does the tax lien securing the annual real property taxes, and may be collected and enforced in the same manner as secured ad valorem property taxes.

Table K-1 of Appendix K of the 2001 California Plumbing Code/Title 28 Los Angeles County Plumbing Code is amended to read as follows:

TABLE K-1
Location of Sewage Disposal System

Minimum Horizontal Distance In Clear Required From:	Building Sewer	Septic Tank	Disposal Field	Seepage Pit or Cesspool
Buildings or structures[1]	2 feet (610 mm)	5 feet (1524 mm)	8 feet (2438mm)	8 feet (2438 mm)
Property line adjoining private property	Clear[2]	5 feet (1524 mm)	5 feet (1524 mm)	8 feet (2438 mm)
Water supply wells	50 feet[3] (15240 mm)	50 feet (15240 mm)	100 feet (30.5 m)	150 feet (45.7 m)
Streams and Lakes	50 feet (15240 mm)	50 feet (15240 mm)	50 feet (15240 mm)	100 feet (30.5 m)
Trees	--	10 feet (3048 mm)	--	10 feet (3048 mm)
Seepage pits or cesspools	--	5 feet (1524 mm)	5 feet (1524 mm)	12 feet (3658 mm)
Disposal field	--	5 feet (1524 mm)	4 feet[4] (1219 mm)	5 feet (1524 mm)
On site domestic water service line	1 foot[5] (305 mm)	5 feet (1524 mm)	5 feet (1524 mm)	5 feet (1524 mm)
Distribution box	--	--	5 feet (1524 mm)	5 feet (1524 mm)
Pressure public water main	10 feet[6] (3048 mm)	10 feet (3048 mm)	10 feet (3048 mm)	10 feet (3048 mm)

Note:
When disposal fields and/or seepage pits are installed in sloping ground, the minimum horizontal distance between any part of the leaching system and ground surface shall be fifteen (15) feet (4572 mm).

1. Including porches and steps, whether covered or uncovered, breezeways, roofed porte-cocheres, roofed patios, carports, covered walks, covered driveways and similar
   structures or appurtenances.
2. See also Section 313.3 of the Uniform Plumbing Code.
3. All drainage piping shall clear domestic water supply wells by at least fifty (50) feet (15240 mm). This distance may be reduced to

not less than twenty-five (25) feet
(7620 mm) when the drainage piping is constructed of materials approved for use within a building.

4. Plus two (2) feet (610 mm) for each additional (f) foot (305 mm) of depth in excess of one (1) foot (305 mm) below the bottom of the drain line. (See also Section K6).
5. See Section 720.0 of the Uniform Plumbing Code.
6. For parallel construction B For crossings, approval by the Health Department shall be required.
~~7. These minimum clear horizontal distances shall also apply between disposal field, seepage pits, and the ocean moon higher tide.~~

Table K-2 of Appendix K of the 2001 California Plumbing Code/Title 28 Los Angeles Plumbing Code, is amended to read as follows:

TABLE K-2
Capacity of Septic Tanks *

Single Family Dwellings ** Number of Bedrooms	Multiple Dwelling Units or Apartments B One Bedroom Each	~~Other Uses:~~ Maximum Fixture Units Served per Table 7-3	Minimum Septic Tank Capacity in Gallons	(liters)
~~1 or 2~~		15	750	(2838)
~~3~~		20	1000	(3785)
4	~~2 units~~	25	1200	(4542)
~~5 or 6~~ 1 to 6	~~3~~ 2 or 3 units	33	1500	(5678)
	4	45	2000	(7570)
	5	55	2250	(8516)
	6	60	2500	(9463)
	7	70	2750	(10,409)
	8	80	3000	(11,355)
	9	90	3250	(12,301)
	10	100	3500	(13,248)

Extra bedroom, 150 gallons (568 liters) each.
Extra dwelling units over 10, 250 gallons (946 liters) each.
Extra fixture units over 100, 25 gallons (95 liters) per fixture unit.

* Note: Septic tank sizes in this table include sludge storage capacity and the connection of domestic food waste disposal units without further volume increase.

** Applies to mobile homes not installed in a mobile home park.

Table K-3 of Appendix K of the 2001 California Plumbing Code/Title 28 Los Angeles Plumbing Code is amended to read as follows:

TABLE K-3
Estimated Waste/Sewage Flow Rates

Because of the many variable encountered, it is not possible to set absolute values for waste/sewage flow rates for all situations. The designer should evaluate each situation and, if figures in this table need modification, they should be made with the concurrence of the Administrative Authority.

Type of Occupancy	Unit Gallons (liters) Per Day
1. Airport	15 (56.8) per employee 5 (18.9) per passenger
2. Auto Washers	Check with equipment manufacturer
3. Bowling Alleys (snack bar only)	75 (283.9) per lane
4. Camps:	
Campground with central comfort station	35 (132.5) per person
Campground with flush toilets, no showers	25 (94.6) per person
Day camps (no meals served)	15 (56.8) per person
Summer and seasonal	50 (189.3) per person
5. Churches (Sanctuary)	5 (18.9) per seat
with kitchen waste	7 (26.5) per seat
6. Dance Halls	5 (18.9) per person
7. Factories	
No showers	25 (94.6) per employee
With showers	35 (132.5) per employee
Cafeteria, add	5 (18.9) per employee
8. Hospitals	250 (946.3) per bed
Kitchen waste only	25 (94.6) per bed
Laundry waste only	40 (151.4) per bed
9. Hotels (no kitchen waste)	60 (227.1) per bed (2 person)

Type of Occupancy	Unit Gallons (liters) Per Day
10. Institutions (Resident)	75 (283.9) per person
Nursing Home	125 (473.1) per person
Rest Home	125 (473.1) per person
11. Laundries, self-service	300 per machine
~~(minimum 10 hours per day)~~	~~50 (189.3) per wash cycle~~
Commercial	Per manufacturer=s specifications
12. Motel	50 (189.3) per bed space
with kitchen	60 (227.1) per bed space
13. Office	20 (75.7) per employee
14. Parks B mobile homes	~~250 (946.3) per space~~
Picnic parks (toilets only)	20 (75.7) per parking space
Recreational vehicles -	
without water hookup	75 (283.9) per space
with water and sewer hookup	100 (378.5) per space
15. Restaurants B Cafeteria	~~20 (75.7)~~ 50 (189.3) per ~~employee~~ seat
Toilet	~~7 (26.5) per customer~~
~~kitchen waste~~	~~6 (22.7) per meal~~
~~add for garbage disposal~~	~~1 (3.8) per meal~~
~~add for cocktail lounge~~	~~2 (7.5) per customer~~
~~kitchen waste~~	
~~disposal service~~	~~2 (7.6) per meal~~
16. Schools B Staff and office	20 (75.7) per person
Elementary students	15 (56.8) per person
Intermediate and High	20 (75.7) per student
with gym and showers, add	5 (18.9) per student
with cafeteria, add	3 (11.4) per student
Boarding, total waste	100 (378.5) per person
17. Service stations, toilets	1000 (378.5) for 1st bay
	500 (1892.5) for each additional bay
Recreational vehicle dump station	750
18. Stores	20 (75.7) per employee
Public restrooms, add	1 per 10 sq. ft. (4.1/m^2) of floor space
19. Swimming pools, public	10 (37.9) per person

Theaters, auditoriums	5(18.9) per seat
Drive-in	10 (37.9) per space

(a) Recommended Design Criteria. Sewage Disposal Systems sized using the estimated waste/sewage flow rates should be calculated as follows:

(1) Waste/sewage flow, up to 1500 gallons/day (5677.5 L/day
Flow x 1.5=septic tank size
(2) Waste/sewage flow, over 1500 gallons/day (5677.5 L/day
Flow x 0.75 + 1125= septic tank size
(3) Secondary system shall be sized for total flow per 24 hours.

(b) Also see Section K2 of this appendix.

Table K-4 of Appendix K of the 2001 California Plumbing Code/Title 28 Los Angeles Plumbing Code is amended to read as follows:

TABLE K-4
DESIGN CRITERIA OF FIVE TYPICAL SOILS

Type of Soil	Required sq. ft. of leaching area/100 gals. (m^2/L	Maximum absorption capacity in gals./sq. ft. of leaching area for a 24 hr. period (L/m^2)
1. Coarse sand or gravel	20 (0.005)	5.0 (203.7)
2. Fine sand	25 (0.006)	4.0 (162.9)
3. Sandy loam ~~or sandy clay~~	40 (0.010)	2.5 (101.8)
4. Sandy clay	60 (0.015)	1.66 (67.9)
5. Clay with considerable sand or gravel	90 (0.022)	1.1 (44.8)
6. Clay with small amount of sand or gravel	120 (0.030)	0.83 (32.8)

Table K-5 Maximum Septic Tank Size

Table K-5 of Appendix K of the2001 California Plumbing Code/Title 28 Los Angeles Plumbing Code is deleted in its entirety.

Section 8. Section 15.16.010 of the City of Malibu Municipal Code is hereby amended to read as follows:

15.16.010 Adoption of Mechanical Code.

Except as hereinafter provided, Title 29, Mechanical Code, of the Los Angeles County Code, as amended and in effect on November 01, 2002, adopting the California Mechanical Code, 2001 Edition (Part 4 of Title 24 of the California Code of Regulations the Mechanical Code of the City of Malibu.

In the event of any conflict between provisions of the California Mechanical Code, 2001 Edition, Title 29 of the Los Angeles County Code, or any amendment to the Mechanical Code contained in the Malibu Municipal Code, the provision contained in the later listed document shall control.

A copy of Title 29 of the Los Angeles County Code and the California Building Code, 2001 Edition, have been deposited in the office of the City Clerk of the City of Malibu and shall be at all times maintained by the City Clerk for use and examination by the public.

Section 9. Section 15.16.030 of the City of Malibu Municipal Code is hereby amended to read as follows:

15.16.030 Violations- Penalty

Every person violating any provision of the Title 29 Los Angeles County Mechanical Code and appendices, adopted by reference by '15.16.010, or of any permit or license granted thereunder, or any rules or regulations promulgated pursuant thereto, is guilty of a misdemeanor. Upon conviction thereof he or she shall be punishable by a fine not to exceed one thousand dollars or imprisonment not to exceed six months, or by both such fine and imprisonment. The imposition of such penalty for any violation shall not excuse the violation or permit it to continue. Each day that a violation occurs shall constitute a separate offense.

Section 10. Chapter 8.12 (Fire Code) of Title 8 of the City of Malibu Municipal Code is amended to read as follows:

8.12.010 Adoption of Fire Code.

Except as hereinafter provided, Title 32, Fire Code, of the Los Angeles County Code, as amended and in effect on November 01, 2002, adopting the California Fire Code, 2001 Edition (Part 9 of Title 24 of the California Code of Regulations) is hereby incorporated herein by reference as if fully set forth below, and shall be known and may be cited as the Fire Code of the City of Malibu.

In the event of any conflict between provisions of the California Building Code, 2001 Edition, Title 26 of the Los Angeles County Code, or any amendment to the Building Code contained in the Malibu Municipal Code, the provision contained in the later listed document shall control.

A copy of Title 32 of the Los Angeles Fire Code and the California Fire Code, 2001 Edition, have been deposited in the office of the City Clerk of the City of Malibu and shall be at all times maintained by the City Clerk for use and examination by the public.

Section 11 Section 8.12.020 of the Malibu Municipal Code is hereby amended to read as follows:

8.12.020 Violation - Penalty

Every person violating any provision of the Title 32 Los Angeles County Fire Code and appendices, adopted by reference by Section 8.12.020, or of any permit or license granted thereunder, or any rules or regulations promulgated pursuant thereto, is guilty of a misdemeanor. Upon conviction thereof he or she shall be punishable by a fine not to exceed one thousand dollars or imprisonment not to exceed six months, or by both such fine and imprisonment. The imposition of such penalty for any violation shall not excuse the violation or permit it to continue. Each day that a violation occurs shall constitute a separate offense.

Section 12. The City Council hereby makes each finding of reasonable necessity for modifications as stated separately for each such modification as identified in Los Angeles County Titles 26, 27, 28, 29,and 32. These modifications to the California Building Standards Code, incorporating the uniform codes are reasonably necessary due to the local climatic, geological and topographical conditions.

In particular, the modifications to these codes are reasonable necessary because of the local climate which is characterized by hot, dry summers, followed by Santa Ana winds and heavy winter rains which make structures particularly vulnerable to rapidly spreading wind-driven fires. Furthermore, much of the City is located among sloping, hilly areas creating hazardous building conditions. There are active landslips and mapped earthquake faults throughout the City. The terrain and climate make Malibu a natural high fire hazard area. The methods and materials of construction must be regulated as a result of these conditions.

Section 13. Severability. Should any section, subsection, clause, or provision of this Ordinance for any reason be held to be invalid or unconstitutional, such invalidity or unconstitutionality shall not affect the validity or constitutionality of the remaining portions of this Ordinance; it being hereby expressly declared that this Ordinance, and each section, subsection, sentence, clause, and phrase hereof would have been prepared, proposed, approved, and ratified irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared invalid or unconstitutional.

Section 14. This Ordinance has been determined to be exempt from the California Environmental Quality Act pursuant to State Guidelines Section 15061 (b)(3) as a project that has no potential for causing a significant effect on the environment.

Section 15. The City Clerk shall cause this Ordinance to be processed according to law.

Section 16. The City Clerk shall file a certified copy of this Ordinance with the California Building Standards Commission.

Section 17. Certification. The City Clerk shall certify the adoption of this Ordinance.

APPROVED and ADOPTED this 28th day of October 2002.

Mayor Jennings

ATTEST:

Lisa Pope
LISA POPE, City Clerk

APPROVED AS TO FORM:

Christi Hogin
CHRISTI HOGIN, City Attorney

I CERTIFY THAT THE FOREGOING ORDINANCE NO 242 was passed and adopted at the regular City Council meeting of October 28, 2002, by the following vote:

AYES:	5	Councilmembers: Barovsky, House , Stern, Kearsley, Jennings
NOES:	0	
ABSTAIN:	0	
ABSENT:	0	

Lisa Pope
LISA POPE, City Clerk
(seal)

City of Malibu Ordinance No. 264
M.M.C. Chapter 13.04

Stormwater and Discharge Control

ORDINANCE NO. 264

AN ORDINANCE OF THE CITY OF MALIBU AMENDING THE MALIBU MUNICIPAL CODE TITLE 13, CHAPTER 13.04, STORM WATER MANAGEMENT AND DISCHARGE CONTROL ORDINANCE

The City Council of the City of Malibu does hereby ordain as follows:

Section 1. Section 13.04.040 of the Malibu Municipal Code is hereby amended to amend the definition of "Planning Priority Projects" to read as follows:

"Planning Priority Projects" mean those projects that are required to incorporate appropriate storm water mitigation measures into the design plan for their respective project, including:

1. Ten (10) or more unit homes (includes single family homes, multifamily homes, condominiums, and apartments);

2. Industrial/commercial development that disturbs one acre or more of surface area;

3. Automotive service facilities (SIC 5013, 5014, 5541, 7532-7534, and 7536-7539);

4. Retail gasoline outlets;

5. Restaurants (SIC 5812);

6. Parking lots Five Thousand (5,000) square feet or more of surface area or with 25 or more parking spaces;

7. Redevelopment projects in subject categories that meet Redevelopment thresholds;

8. Projects located in or directly adjacent to or discharging directly to an ESA, which meet the thresholds described herein; and

9. Those projects that require the implementation of a site-specific plan to mitigate post-development storm water for new development not requiring a SUSMP but which may potentially have adverse impacts on post-development storm water quality, and where the following project characteristics exist:

(a) Vehicle or equipment fueling areas;

(b) Vehicle or equipment maintenance areas, including washing and repair;

(c) Commercial or industrial waste handling or storage;

(d) Outdoor handling or storage of hazardous materials;

(e) Outdoor manufacturing areas;

(f) Outdoor food handling or processing;

(g) Outdoor animal care, confinement, or slaughter; or

(h) Outdoor horticulture activities."

Section 2. Section 13.04.110 (A) of the Malibu Municipal Code is hereby amended to read as follows:

"A. Projects Requiring a SUSMP. The following projects for New Development and Redevelopment, if subject to Discretionary Project approval in the Zoning Ordinance of the City, shall require a Storm Water Mitigation Plan that complies with the most recent SUSMP and the current Municipal NPDES Permit:

1. Ten or more unit homes (includes developments of single family homes, condominiums and apartments);

2. Industrial/commercial development that disturbs one acre or more of surface area;

3. Automotive Service facilities (SIC 5013, 5014, 5542, 7532-7534 and 7536-7539);

4. Retail gasoline outlets;

5. Restaurants (SIC 5812);

6. Parking lots Five Thousand (5,000) square feet or more of surface area or with twenty-five (25) or more parking spaces;

7. Redevelopment projects in subject categories that meet Redevelopment thresholds;

8. Any New Development or Redevelopment project located in or directly adjacent to or discharging directly into an Environmentally Sensitive Area (as defined herein), where the development will:

    i. Discharge storm water and urban runoff that is likely to impact a sensitive biological species or habitat; and

    ii. Create 2,500 square feet or more of impervious surface area."

Section 3. The City Clerk shall certify the adoption of this ordinance.

PASSED, APPROVED AND ADOPTED this 24th day of May, 2004

Sharon Barovsky
SHARON BAROVSKY, Mayor

ATTEST:

Lisa Pope
LISA POPE, City Clerk

APPROVED AS TO FORM:

Christi Hogin by LP
CHRISTI HOGIN, City Attorney

I CERTIFY THAT THE FOREGOING ORDINANCE NO. 264 was passed and adopted at the adjourned regular City Council meeting of May 24, 2004, by the following vote:

AYES:	5	Councilmembers:	Jennings, Kearsley, Conley Ulich, Stern, Barovsky
NOES:	0		
ABSTAIN:	0		
ABSENT:	0		

Lisa Pope
LISA POPE, City Clerk
(seal)

City of Malibu Ordinance No. 265
M.M.C. Chapter 12.05.035

Prohibiting Smoking on City Beaches

ORDINANCE NO. 265

AN ORDINANCE OF THE CITY OF MALIBU PROHIBITING SMOKING ON CITY BEACHES

The City Council of the City of Malibu does ordain as follows:

Section 1. Title 12, Chapter 12.08 of the Malibu Municipal Code is amended by adding thereto a new section, 12.08.035, to read as follows:

12.08.035. Smoking Prohibited on Beaches

Notwithstanding the provisions of Section 12.08.020(A), it is unlawful to smoke on any public beach or any area of the Malibu Pier not designated for smoking within the City of Malibu. For the purpose of this section, "smoking" means inhaling, exhaling, burning, or carrying any lighted cigarette, cigar or pipe. For the purpose of this section, beach shall not include parking lots or roadways.

Section 2. The City Clerk shall certify the adoption of this ordinance.

PASSED, APPROVED AND ADOPTED this 24th day of May, 2004.

SHARON BAROVSKY, Mayor

ATTEST:

LISA POPE, City Clerk

APPROVED AS TO FORM:

CHRISTI HOGIN, City Attorney

I CERTIFY THAT THE FOREGOING ORDINANCE NO. 265 was passed and adopted at the regular City Council meeting of May 24, 2004, by the following vote:

AYES:	5	Councilmembers:	Jennings, Kearsley, Conley Ulich, Stern, Barovsky
NOES:	0		
ABSTAIN:	0		
ABSENT:	0		

LISA POPE, City Clerk
(seal)

City of Malibu Ordinance No. 286

M.M.C. Chapter 9.24

Ban on Expanded Polystyrene Food Packaging

ORDINANCE NO. 286

AN ORDINANCE OF THE CITY OF MALIBU AMENDING CHAPTER 9.24 OF THE MALIBU MUNCIPAL CODE BANNING EXPANDED POLYSTYRENE FOOD PACKAGING AND REPEALING ORDINANCE NO. 276

The City Council of the City of Malibu does ordain as follows:

Section 1. Title 9, Chapter 9.24 of the Malibu Municipal Code is hereby amended to read as follows:

"Chapter 9.24 Ban on Expanded Polystyrene Food Packaging"

Section 9.24.010 Definitions

For purposes of this chapter, the following terms shall have the following meanings:

"Customer" means any person obtaining food or beverages from a restaurant or retail food vendor.

"Expanded Polystyrene" means and includes blown polystyrene and expanded and extruded foams (sometimes incorrectly called Styrofoam®, a Dow Chemical Co. trademarked form of polystyrene foam insulation) which are thermoplastic petrochemical materials utilizing a styrene monomer and processed by any number of techniques including, but not limited to, fusion of polymer spheres (expandable bead polystyrene), injection molding, foam molding, and extrusion-blow molding (extruded foam polystyrene). Expanded Polystyrene is generally used to make cups, bowls, plates, trays, clamshell containers, meat trays and egg cartons. For the purposes of this chapter, the term "polystyrene" shall not include clear polystyrene known as "oriented polystyrene."

"Food Packager" means any person, located within the City of Malibu, who places meat, eggs, baked products, or other food in packaging materials for the purpose of retail sale of those products.

"Food Packaging" means all bags, sacks, wrapping, containers, bowls, plates, trays, cartons, cups, straws and lids which are made from Expanded Polystyrene, on or in which any foods or beverages are placed or packaged on a restaurant's or retail food vendor's premises.

"Food Vendor" means any restaurant or retail food vendor.

"Non-Profit Food Provider" means a recognized tax exempt organization which provides food as a part of its services.

"Person" means any natural person, firm, corporation, partnership, or other organization or group however organized.

"Prepared Food" means food or beverages which are served on the Food Vendor's premises and are prepared on the Food Vendor's premises or within the City of Malibu by packaging, cooking, chopping, slicing, mixing, brewing, freezing or squeezing. Prepared Food does not include any uncooked meat or eggs. Prepared Food may be eaten either on or off the premises.

"Restaurant" means any establishment located within the City of Malibu, selling Prepared Food to be eaten by customers. Restaurant includes a sidewalk food vendor.

"Retail Food Vendor", "Vendor" means any store, shop, sales outlet or other establishment, including a grocery store or a delicatessen, located within the City of Malibu, which provides Prepared Food.

9.24.020 Food Packaging Prohibitions.

A. No Restaurant, Food Packager, Retail Food Vendor, Vendor or Non-Profit Food Provider shall provide Prepared Food to its customers in any Food Packaging that utilizes Expanded Polystyrene.

B. The City of Malibu shall prohibit the use of Expanded Polystyrene Food Packaging at all City facilities. The City of Malibu shall not purchase or acquire Expanded Polystyrene Food Packaging.

C. The use or distribution of Expanded Polystyrene Food Packaging at special events sponsored or co-sponsored by the City of Malibu shall be prohibited. This prohibition shall apply to the event organizers, agents of the event organizers, event Food Vendors and any other party (including non-profit organizations) who enter into an agreement with one or more of the co-sponsors of the event to sell Prepared Food at the event or otherwise provide an event-related service.

D. All facility rental agreements for any City-owned property or facility shall include a provision requiring contracting parties to assume responsibility for preventing the utilization and/or distribution of Expanded Polystyrene Food Packaging at the associated function. The facility rental agreement shall indicate that the violating contractor's security deposit will be forfeited if the Parks and Recreation Director, or his/her designee, determines that Expanded Polystyrene Food Packaging was utilized in violation of the rental agreement.

9.24.030 Exceptions.

A. Food items packaged outside the boundaries of the City of Malibu are exempt from the provisions of this chapter.

B. The City Council, or its appointee, may exempt a Food Vendor, Food Packager or Non-Profit Food Provider from the requirements of this Code for a one year period, upon showing by the applicant that the conditions of this Code would cause undue hardship. The phrase undue hardship, shall be construed to include, but not be limited to:

1. Situations where there are no acceptable alternatives to Expanded Polystyrene Food Packaging for reasons which are unique to the Vendor, Packager or Non-Profit Provider;

2. Situations where compliance with the requirements of this Code would deprive a person of a legally protected right.

C. Coolers and ice chests made of Expanded Polystyrene are exempt from the provisions of this chapter.

D. Food Packaging required to be purchased under a contract entered into one year prior to the effective date of this chapter is exempt from the provisions of this chapter. This exemption will apply up to one year from the effective date of this chapter.

9.24.040 Enforcement and Notice of Violations.

A. The City Manager or his/her designee shall have primary responsibility for enforcement of this chapter. The City Manager or his/her designee is authorized to promulgate regulations and to take any and all other actions reasonable and necessary to enforce this chapter, including, but not limited to, inspecting any Vendor's premises to verify compliance.

B. Anyone violating or failing to comply with any of the requirements of this chapter shall be guilty of an infraction punishable pursuant to Malibu Municipal Code Chapter 1.16.010.B.

C. The City Attorney may seek legal, injunctive, or other equitable relief to enforce this chapter.

D. The remedies and penalties provided in this section are cumulative and not exclusive of one another.

9.24.050 Severability.

If any part or provision of this Code or the application thereof to any person or circumstances is held invalid, the remainder of the Code, including the application of such part or provision to other persons or circumstances, shall not be affected thereby and shall continue in full force and effect. To this end, provisions of this Code are severable.

Section 2. The City Council hereby repeals Ordinance No. 276.

Section 3. The City Clerk shall certify the adoption of this ordinance.

PASSED, APPROVED AND ADOPTED this 12th day of September, 2005.

ANDY STERN, Mayor

ATTEST:

LISA POPE, City Clerk

APPROVED AS TO FORM:

CHRISTI HOGIN, City Attorney

I CERTIFY THAT THE FOREGOING ORDINANCE NO. 286 was passed and adopted at the regular City Council meeting of September 12, 2005, by the following vote:

AYES:	4	Councilmembers:	Barovsky, Conley Ulich, Kearsley, Stern
NOES:	1	Councilmember:	Jennings
ABSTAIN:	0		
ABSENT:	0		

LISA POPE, City Clerk
(seal)

Memorandum of Understanding between California Regional Water Quality Control Board, Los Angeles Region, and City of Malibu

Onsite Wastewater Treatment Systems

Effective Date: 9-17-04

MEMORANDUM OF UNDERSTANDING
BETWEEN
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION
AND
CITY OF MALIBU

REGARDING ONSITE WASTEWATER TREATMENT SYSTEMS

I. BACKGROUND

Section 13260 of the California Water Code (CWC) requires any person discharging waste or proposing to discharge waste that may affect waters of the State, except to a community sewer system, to file a report of waste discharge with the local California regional water quality control board which has jurisdiction over the discharge. In accordance with section 13260 of the CWC, the California Regional Water Quality Control Board, Los Angeles Region, hereafter referred to as the Regional Board, issues waste discharge requirements (WDRs) to dischargers covering specific waste discharges or types of waste discharge, including discharges from onsite wastewater treatment systems.

Section 13269 of the CWC authorizes a regional board to waive the requirement for a report of waste discharge or waive the need for the regional board to issue WDRs where such waiver is consistent with any applicable state or regional water quality control plans and is in the public interest.

Sections 13290 and 13291 of the CWC require the State Water Resources Control Board to establish statewide standards for the regulation of onsite wastewater treatment systems and authorize the Regional Board to delegate implementation of these standards to a Qualified Local Agency (QLA).

In 1952, the Regional Board adopted Order 52-4, which waived the requirement of homeowners to obtain WDRs for residential septic systems in the Region. According to section 13269 of the CWC, the Regional Board must review and renew these waivers by June 30, 2004. The waivers may not exceed five years in duration and may be terminated by the State Board or Regional Board at any time.

Onsite wastewater treatment systems have been used as a form of wastewater disposal for many decades. Currently, the number of individual residential systems in the Region (Ventura and Los Angeles Counties) exceeds 100,000. In many instances, the discharge from these systems does not adversely affect the beneficial uses of groundwater or surface water quality.

In some areas, the distance between the leach field or seepage pit and the groundwater may not be sufficient to provide adequate treatment of wastes discharged to onsite wastewater treatment systems. In some cases, the proximity of these systems to surface water bodies may result in surface water contamination from inadequately treated wastes. In other instances, the areal density and cumulative effects of numerous systems may result in inadequate waste treatment. Additional factors may also impede the effectiveness of these systems and create conditions that adversely affect water quality.

II. DESIGNATION AND AGREEMENT

The Regional Board designates the City of Malibu as the QLA for the implementation of applicable siting, permitting, construction, inspection, monitoring, and performance requirements for certain onsite wastewater treatment systems within the City of Malibu's jurisdiction as detailed in section I.V. of this MOU. This MOU establishes *City of Malibu Ordinance No. 242* hereafter referred to as the Code, as the legal document governing applicable siting, permitting, construction, inspection, monitoring, and performance requirements for certain onsite wastewater treatment systems within the City of Malibu's jurisdiction as detailed in section IV. of this MOU. The City of Malibu as QLA, agrees to enforce all applicable provisions of the Code pursuant to the provisions of this MOU. The City of Malibu agrees to amend the Code within the timeframe established in this MOU to revise provisions for the siting, permitting, construction, inspection, monitoring, and performance requirements for onsite wastewater treatment systems to be substantially equivalent to any statewide standards adopted pursuant to CWC sections 13290 and 13291. Additionally, until statewide standards are adopted pursuant to CWC sections 13290 and 13291, the City of Malibu agrees to take interim measures as noted below to increase the effectiveness of its permitting program to address water quality concerns.

III. PURPOSE

It is the joint goal of the City of Malibu and the Regional Board to protect water quality and public health. This MOU is intended to assist in the creation of a partnership between the City of Malibu and the Regional Board to provide protection of water quality and public health in areas where onsite wastewater treatment systems are utilized. This MOU satisfies the requirements of section 13269 of the CWC and enables the Regional Board to issue waivers of WDRs for those onsite sewage treatment systems regulated by the City of Malibu as detailed in this document.

IV. APPLICABILITY

1. This MOU is applicable for all onsite wastewater treatment systems within the City of Malibu's jurisdiction.

2. The City of Malibu shall have lead responsibility for onsite wastewater treatment systems that:
   a. generate 20,000 gallons per day or less, and
   b. generate domestic or similar waste that is disposed of below the ground surface, and
   c. discharge waste from single family residential structures not covered under item #3.b. below, or
   d. discharge waste from non-food related commercial facilities that generate 2000 gallons per day or less.

   Except that the Regional Board shall become lead agency on a specific project upon agreement by the City of Malibu and the Regional Board.

3. The Regional Board shall have lead responsibility for onsite wastewater treatment systems that:
   a. generate over 20,000 gallons per day, or

b. discharge wastes from residential developments of more than two homes, or
c. discharge wastes from multifamily residential facilities, or
d. discharge wastes from commercial facilities that generate over 2,000 gallons per day, or
e. dispose of sewage containing any industrial waste, or
f. are proposed to utilize above ground dispersal or storage of sewage effluent.

V. GENERAL PROVISIONS

City of Malibu Responsibility:

1. The City of Malibu shall enforce all applicable Code requirements for the siting, design, approval, installation, operation, maintenance, and monitoring of onsite wastewater treatment systems within the City of Malibu's jurisdiction.

2. The City of Malibu shall amend the Code within six months of the effective date of any statewide standards adopted pursuant to sections 13290 and 13291of the CWC, if necessary, in order to retain lead agency status over onsite wastewater treatment systems identified in section IV.2.

3. The City of Malibu shall immediately begin an inventory of all onsite residential wastewater treatment systems within the City of Malibu's jurisdiction[1]. The inventory shall be completed in one (1) year, unless extended by the Executive Officer.

   The inventory shall include:

   - The total number of existing onsite wastewater treatment systems under the City of Malibu's jurisdiction.
   - The location of each existing onsite wastewater treatment system, by street address, by parcel number, GPS location, or intersection.
   - The estimated depth to groundwater from each existing onsite wastewater treatment system. Regional groundwater data may be used to estimate depth to groundwater for individual onsite wastewater treatment systems.
   - The distance of the nearest point of any part of the onsite wastewater treatment system to any stream, channel, or other watercourse or water body. If exact location of the onsite wastewater treatment system is unknown, the City of Malibu shall provide the distance between the nearest point of the property boundary to any stream, channel, or other watercourse or water body.

4. The City of Malibu shall ensure that there is a local mechanism in place to notify the Regional Board within 30 days of receiving proposals to use onsite wastewater treatment systems that fall under the Regional Board's responsibility as outlined in Section IV. Item #3.

[1] The City of Malibu shall obtain the required information based on a review of City of Malibu permitting records, Assessor records, through point of sale transactions, and by other means that do not require the City of Malibu to gain access to private property.

5. The City of Malibu may review and act upon requests for exceptions to the Code requirements provided such exceptions will not violate any statewide standards adopted pursuant to CWC sections 13290-13291.7 and are consistent with the protocol for exceptions detailed in the Code. The City of Malibu shall forward any exceptions requested to the Code requirements that would violate any statewide standards adopted pursuant to CWC sections 13290-13291.7 to the Regional Board for Regional Board action.

6. The City of Malibu shall issue permits for the commercial systems specified in section IV.2.d. in accordance with Regional Board Order No. 01-031 in order to retain lead agency status for these systems.

Regional Board Responsibility:

1. The Regional Board shall conduct an evaluation of the City of Malibu at least once every five years to ensure the onsite wastewater treatment system program is in conformance with any statewide standards adopted pursuant to CWC sections 13290-13291.7 based upon the information submitted by the City of Malibu as indicated in Appendix A.

2. The Regional Board shall provide adequate assistance to the City of Malibu upon request from the City of Malibu. This assistance may be in the form of technical guidance, training opportunities, and/or review of onsite wastewater treatment systems.

3. The Regional Board shall provide notice to the City of Malibu at the earliest point in the development of regulations, of any proposed or Basin Plan amendments, Regional Board Orders or policies that regulate onsite wastewater treatment systems.

4. The Regional Board shall invite input from the City of Malibu and other stakeholders during the review of any statewide standards adopted pursuant to CWC, sections 13290-13291.7, or during the Basin Plan amendment process or the development of Regional Board Orders or policies that regulate onsite wastewater treatment systems.

5. On projects requiring WDRs, the Regional Board shall ensure that the operator has obtained any additional required permits from the City of Malibu.

6. The Regional Board shall provide the City of Malibu copies of waste discharge requirements, notices of violation, and any other permitting and enforcement actions related to onsite wastewater treatment systems within the City of Malibu.

VI. INTERIM MEASURES

1. Point of Sale Ordinance:
The City of Malibu proposes to adopt a Point of Sale ordinance within one (1) year. Owners of commercial and residential properties, including single family, multiple family, duplexes, apartments, and condominium occupancies, shall be required to obtain a Certificate of Inspection from a City registered Onsite Wastewater Treatment System Inspector prior to entering into an agreement to sell or convey an interest in such property. The inspection report shall be submitted to the City on a standard form developed by the City. Upon determination

of compliance of the OWTS, a renewable Operating Permit shall be granted for the system. The permit shall be valid for a period of five (5) years for conventional systems, and three (3) years for advanced treatment systems when issued for a single-family residence. The permit shall be valid for a period of two (2) years for commercial and multifamily occupancies. Inspections shall be required prior to permit renewal. "Compliance of the OWTS" shall indicate that the OWTS has been inspected by a registered City of Malibu inspector and has conditionally passed all requirements established within the Official Inspection Form for Onsite Wastewater Treatment Systems. Single-family residences, condominium occupancies and duplexes that cannot demonstrate compliance through inspection shall provide adequate vertical separation to demonstrate compliance. If such facilities cannot provide adequate vertical separation, they shall require secondary treatment with disinfection. All commercial and multifamily occupancies shall require secondary treatment with disinfection. In addition, denitrification shall be required as indicated by applicable total maximum daily loads (TMDLs).

2. IWIMS:
The City of Malibu shall implement all facets of the Integrated Wastewater Information Management System. All data from the LA County Assessors records will be imported into the database. The inventory of all OWTS will be uploaded into the system. The system will be used to facilitate the day-to-day OWTS management and track the effectiveness of the Wastewater Management Plan. The City shall require all commercial and multifamily systems required to obtain a WDR from the Regional Board to submit all Groundwater Monitoring results required by the WDR to the City for inclusion into the IWIMS database. The database shall be utilized to further evaluate the need for additional code amendments to address any specific impacts indicated.

3. Malibu Lagoon and Beaches Bacterial Contributory Areas:
Ordinances shall be drafted by staff, and recommend for adoption by City Council, within two (2) years requiring all OWTS within the six - month time-of-travel zone, as identified in the Risk Assessment Report, to provide advanced treatment and disinfection. The six-month time-of-travel zone shall include all areas contributing to Malibu Creek and Lagoon, and beaches between Sweetwater Canyon outfall and Winter Canyon outfall. OWTS located outside of the six-moth time-of-travel zone that cannot demonstrate compliance through inspection or that are identified as impacting groundwater by any other means shall provide adequate vertical separation and/or advanced treatment with disinfection. "Compliance" shall indicate that the OWTS has been inspected by a registered City of Malibu inspector and has conditionally passed all requirements established within the Official Inspection Form for Onsite Wastewater Treatment System.

4. Malibu Lagoon Nitrogen Contributory Areas:
Ordinances shall be drafted by staff, and recommend for adoption by City Council, requiring property owners within the contributory area to obtain an Operating Permit within one (1) year. An ordinance shall be drafted within three (3) years requiring all commercial and multifamily occupancies within the lagoon contributory area to provide secondary treatment with disinfection and denitrification. Within two (2) years, the City shall establish denitrification standards for residential OWTS to be implemented at the time of major repair, renovation or

replacement of OWTS within the contributory area and at point of sale. OWTS located outside of the contributory area that cannot demonstrate compliance through inspection or that have been identified as impacting groundwater by any other means shall provide adequate vertical separation and/or advanced treatment with denitrification. "Compliance" shall indicate that the OWTS has been inspected by a registered City of Malibu inspector and has conditionally passed all requirements established within the Official Inspection Form for Onsite Wastewater Treatment System.

5. Water Resource Management:
Develop programs to advance the sustainability of the City's and LARWQCB water quality management programs based on the findings of the Risk Assessment Report as an ongoing project. The City will continue to fulfill a leadership role in the development and implementation of the Santa Monica Bay bacterial TMDL. The City will continue the regional groundwater-quality sampling program in the Civic Center area utilizing the existing monitoring wells, contingent upon funding source allocation. The sampling shall be expanded to include nitrogen constituents and Microbial Source Tracking for bacteria, contingent upon funding source allocation. Data loggers within existing wells shall be maintained and data collected. All hydrogeology data associated with OWTS applications shall be submitted to the City as a condition of the Operating Permit, with such data entered into the IWIMS for cataloging and retention purposes.

6. Registration Programs:
Ordinances shall be drafted by staff, and recommended to City Council for adoption, establishing registration criteria and programs for all associated disciplines of OWTS installation and management within four (4) years. Registration shall be established for all OWTS designers, installers, pumper-haulers, and maintenance contractors. Programs shall be established for the training and testing of each discipline.

7. Onsite Wastewater Treatment System Information Manuals:
The City will develop and produce a comprehensive OWTS information manual applicable to all OWTS systems within the City. The manual shall provide guidelines for the acceptable design, siting, installation and maintenance of all OWTS's.

VII. ALTERNATIVE SYSTEMS:

The City of Malibu agrees to evaluate and amend its Code, if appropriate, to allow enhanced onsite wastewater treatment technologies in order to reduce threats to water quality.

VIII. EVALUATION:

This MOU shall be reviewed by June 10, 2009 and every five years thereafter, and re-negotiated if either party desires modification to the terms and conditions contained herein. If neither party requests re-negotiation of the MOU at the five-year review period, the MOU will remain in effect for another five years.

Evaluation of the City of Malibu's onsite wastewater treatment system program is a cooperative process between the City of Malibu and the Regional Board. The intent of the evaluation is to identify those aspects of the program that provide desired results, and those that need improvement.

The City of Malibu shall submit information to the Regional Board as indicated in Appendix A, attached hereto and incorporated herein by reference. The Regional Board may provide comment and recommendations based upon the information submitted by the City of Malibu. The Regional Board shall use this information to perform an evaluation of the City of Malibu's onsite wastewater treatment system regulatory program once every five years and provide constructive input. The Regional Board shall provide at least twenty-one days written notice to the City of Malibu prior to performance of the evaluation. The evaluation process shall be in conformance with Appendix A.

The Regional Board shall provide the City of Malibu for consideration a written summary of findings and recommended program modifications within thirty days of completion of the evaluation. Within thirty days of receipt of the report the City of Malibu shall provide a written response detailing action taken or proposed regarding the findings and recommendations contained in the reports.

IX. ENFORCEMENT OF THE MOU:

The Regional Board and the City of Malibu shall be responsible for assuring that the terms of the MOU are enforced. If evaluation reveals that the Regional Board, or the City of Malibu is not performing its duties as required by this MOU, and the Regional Board or the City of Malibu does not amend its process per agreement, the Regional Board or the City of Malibu may terminate this MOU. This MOU may be renegotiated by request by the Regional Board or the City of Malibu. Either party may terminate this MOU without cause upon thirty day prior written notice to the other party. Termination of the MOU by the Regional Board or the City of Malibu may require that the Regional Board issue Order No. 01-031 or other Regional Board Order to each new or existing onsite wastewater treatment system within the boundaries of the City of Malibu. The Regional Board shall make any determination to terminate the MOU at a publicly noticed hearing.

In addition to the foregoing, in the event that statewide standards under CWC sections 13290-13291.7 are not adopted by July 1, 2005, the Regional Board staff shall provide information, at a public hearing, to the Regional Board as to the status of adoption of the statewide standards, whereupon the Regional Board shall, at its discretion, have the right to terminate the MOU, or direct staff to renegotiate the MOU, or to take other actions as the Regional Board shall deem appropriate.

X. ACCEPTANCE:

This Memorandum of Understanding is hereby approved by the parties on, and its effective date is,

9-17-04

[*Insert the last date of the signature dates below*]

REGIONAL BOARD:

I, Jonathan Bishop, Interim Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of a Memorandum of Understanding approved by the California Regional Water Quality Control Board, Los Angeles Region on August 5, 2004.

Jonathan Bishop, Interim Executive Officer,
Los Angeles Regional Water Quality Control Board

8/12/04
Date

CITY OF MALIBU:

9.17.04
Date

KATIE LICHTIG, City Manager

ATTEST:

LISA POPE, City Clerk
(seal)

APPROVED AS TO FORM:

CHRISTI HOGIN, City Attorney

DRAFT MEMORANDUM OF UNDERSTANDING
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION
AND
THE CITY OF MALIBU

APPENDIX A

INFORMATION REQUIRED FOR EVALUATION OF THE ONSITE WASTEWATER TREATMENT SYSTEM PROGRAM OF THE CITY OF MALIBU

1. The City of Malibu shall submit the following information to the Regional Board once every five years upon request:

   - The number of permits issued for new construction, repairs, additions, and destruction of standard onsite wastewater treatment systems.
   - The number of permits issued for alternative, and experimental onsite wastewater treatment systems including the type of enhanced treatment device permitted.
   - The results of any monitoring program for onsite wastewater treatment systems including the number of changes of ownership, the number of monitoring inspections, the type of system monitored, flows in gallons per day for each system, the number of properly functioning systems, and those in failure or needing repair.
   - The number and type of complaints pertaining to onsite wastewater treatment systems in the City of Malibu's jurisdiction.
   - The number of corrective actions taken in the City of Malibu's jurisdiction for failing onsite wastewater treatment systems.
   - The number of enforcement actions taken in the City of Malibu's jurisdiction and the status of compliance with those enforcement actions.

2. Once every five years the Regional Board shall evaluate the City of Malibu's implementation of the onsite wastewater treatment system program. This five-year evaluation by the Regional Board may include:

   - Office review of the Code, local ordinances, laws, standards, and policies relating to the regulation of onsite wastewater treatment systems.
   - Field review of staff activity pertaining to the siting, permitting, and monitoring of onsite wastewater treatment systems.
   - Field review of various types of onsite wastewater treatment systems installed within the city.
   - Office review of files, inspection records, monitoring results and reports, plans or other information pertaining to onsite wastewater treatment systems.
   - Review of onsite wastewater treatment system owner outreach, education, and compliance assistance programs.
   - Review of groundwater monitoring program implemented by the City of Malibu.
   - Review of the results of any pertinent water quality monitoring data.