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STAFF REPORT: REGULAR CALENDAR

APPLICATION NO.: 4-97-156

APPLICANT: University of California, Santa Barbara

PROJECT LOCATION: University of California, Santa Barbara, Main Campus - Adjacent to Eastern Lagoon Barrier

PROJECT DESCRIPTION: Expansion of the existing seawater renewal system pumphouse, placement of two 2,500 ft. long seawater intake lines and the construction of a 460 ft. long, 10 ft. high, 15-45 ft. wide, rock revetment, stairway, access ramp.

SUBSTANTIVE FILE DOCUMENTS: Shown on ***Appendix A***

SUMMARY OF STAFF RECOMMENDATION

Staff recommends approval of the proposed project with two (2) special conditions regarding revised plans and assumption of risk. The applicant is proposing the expansion of the existing seawater renewal system beach pumphouse, placement of two 2,500 ft. long seawater intake lines and the construction of a 460 ft. long, 10 ft. high, 15-45 ft. wide, rock revetment, stairway, access ramp (Exhibit 3).

The project site is located on the southeast perimeter of the Main Campus at UCSB on the sandy beach bordered by the Marine Biotechnology Laboratory to the north and the "lagoon island" to the south. The Campus Lagoon is located directly west from the project site and is separated from the Santa Barbara Channel to the east by the existing lagoon barrier. The shoreline immediately up and downcoast from the project site is characterized by high coastal bluffs. The low-lying project site serves as a primary public access point to the sandy beach between Goleta Point and Goleta Beach. In addition, the State Lands Commission has determined that the proposed revetment will be located on sandy beach seaward of the mean high tide and will therefore be subject

Commission. Although the University has a certified Long Range Development Plan, the proposed project is located within the original jurisdiction of the Coastal Commission (which includes all tidal lands) and is, therefore, subject to a coastal development permit.

The existing seawater renewal system provides seawater to Campus laboratories. The expansion will serve to increase the capacity of the system from its current maximum of 800 gallons per minute (gpm) to 1,200 gpm in order to meet increased educational and scientific needs and to increase the reliability of the system. The University proposes to construct a 460 ft., 15-45 ft. wide, long rock revetment which would occupy 25 to 50 percent of the available sandy beach to protect the existing/expanded pumphouse, intake lines and to prevent the lagoon barrier from breaching. However, the Commission notes that coastline development is routinely subject to potential damage as a result of storm and flood occurrences. As such, the Commission finds that due to the unforeseen possibility of wave attack, erosion, and flooding, the applicant shall assume these risks as a condition of approval. Because this risk of harm cannot be completely eliminated regardless of the construction of a shoreline protective device, special condition two (2) requires the applicant to waive any claim of liability on the part of the Commission for damage to life or property which may occur as a result of the permitted development.

Although the expansion of the seawater renewal system component of this application is consistent with the applicable policies of the Coastal Act, the shoreline protection component of this application, as proposed for the construction of a rock revetment, raises issue with the Coastal Act in regards to adverse impacts to shoreline sand supply, public access, and environmentally sensitive habitat area. The Coastal Act allows for the use of shoreline protective devices, such as revetments, when those structures are necessary to serve coastal-dependent uses or to protect existing structures in danger from erosion and when they are designed to eliminate or mitigate adverse impacts on local shoreline sand supply. The University has documented damage over the past 21 years which has occurred to the seawater renewal system due to erosion of the lagoon barrier by wave action. However, the Commission notes that coastline development is routinely subject to potential damage as a result of storm and flood occurrences and that the lagoon barrier has been maintained with periodic maintenance in its present condition for more than 50 years and that the existing pumphouse has been maintained with periodic maintenance in its present condition since the 1970's. Staff observation of the site after recent severe storms has confirmed that both the pumphouse and barrier remained relatively intact. As such, the applicant has not demonstrated that the proposed rock revetment is consistent with Section 30235 of the Coastal Act.

In addition, under section 30235, the proposed rock revetment, can not be considered "necessary" if a feasible alternative which would result in fewer adverse impacts to coastal resources exists. In the case of this project, alternative forms of shoreline protection which could achieve the basic project objectives with fewer adverse impacts are available which have not been adequately addressed in the University's submittal.

Commission staff, in correspondence with the University, has raised the issue of alternatives to the proposed revetment. However, the University has not responded other than the minimal information provided in the final EIR and the University's response letter dated 4/23/97, which do not provide adequate analysis of alternative methods of shoreline protection. Therefore, the applicant has not demonstrated that the proposed project is consistent with Section 30235 of the Coastal Act or CEQA requirements.

Although, the proposed rock revetment would protect the existing educational and scientific opportunities provided by the Campus Lagoon, it would also result in adverse impacts to the ESHA, habitat, recreational and public access values of the beach area. Further, alternative forms of shoreline protection such as dune nourishment and beach replenishment, may not only be feasible but could also serve to enhance the habitat, educational, and scientific value of the project site which is located within an area designated as ESHA by the UCSB Long Range Development Plan (LRDP). For the purpose of clarification, the Commission notes that although designated as ESHA by the LRDP, pursuant to the recent determination by the State Lands Commission, the project area is located within the Coastal Commission's original jurisdiction. Therefore, special condition one (1) requires the applicant to submit revised plans for the seawater renewal system expansion without the placement of a rock revetment.

STAFF RECOMMENDATION:

The staff recommends that the Commission adopt the following resolution:

I. Approval with Conditions.

The Commission hereby grants, subject to the conditions below, a permit for the proposed development on the grounds that the development, as conditioned, will be in conformity with the provisions of Chapter 3 of the California Coastal Act of 1976, will not prejudice the ability of the local government having jurisdiction over the area to prepare a Local Coastal Program conforming to the provisions of Chapter 3 of the Coastal Act, is located between the sea and the first public road nearest the shoreline and is conformance with the public access and public recreation policies of Chapter 3 of the Coastal Act, and will not have any significant adverse impacts on the environment within the meaning of the California Environmental Quality Act.

II. Standard Conditions.

1. Notice of Receipt and Acknowledgment. The permit is not valid and development shall not commence until a copy of the permit, signed by the permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.

2. Expiration. If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.

3. Compliance. All development must occur in strict compliance with the proposal as set forth below. Any deviation from the approved plans must be reviewed and approved by the staff and may require Commission approval.

4. Interpretation. Any questions of intent or interpretation of any condition will be resolved by the Executive Director or the Commission.

5. Inspections. The Commission staff shall be allowed to inspect the site and the development during construction, subject to 24-hour advance notice.

6. Assignment. The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.

7. Terms and Conditions Run with the Land. These terms and conditions shall be perpetual, and it is the intention of the Commission and the permittee to bind all future owners and possessors of the subject property to the terms and conditions.

III. Special Conditions.

1. Revised Plans

Prior to the issuance of the coastal development permit, the applicant shall submit to the Executive Director for review and approval, revised plans prepared by a qualified civil engineer which eliminate the proposed rock revetment.

2. Applicant's Assumption of Risk

Prior to the issuance of the coastal development permit, the applicant shall submit a signed document in a form and content acceptable to the Executive Director, which shall provide: (a) that the applicant understands the site may be subject to extraordinary hazard from storm waves, erosion or flooding and the applicant assumes the liability from such hazards; and (b) the applicant assumes the liability from such hazards and unconditionally waives any claim of liability on the part of the Commission or its successors in interest for damage from such hazards and agrees to indemnify

and hold harmless the Commission, its offices, agents, and employees against any and all claims, demands, damages, costs, expenses or liability arising out of the Commission's approval of the project.

3. Timing of Construction

Construction activity involving the placement of the seawater renewal system intake pipelines or the operation of tractor-tread machinery on the sandy beach shall not occur within the seasonally predicted run period and egg incubation period for the California grunion as identified by the California Department of Fish and Game.

4. Construction Responsibilities and Debris Removal

It shall be the applicant's responsibility to assure that the following occurs during project construction: a) that no stockpiling of dirt shall occur on the beach; b) that all grading shall be properly covered, sand-bagged, and ditched to prevent runoff and siltation; and, c) that measures to control erosion must be implemented at the end of each day's work. In addition, no machinery will be allowed in the intertidal zone at any time. The permittee shall remove from the beach and seawall area any and all debris that result from the construction period.

IV. Findings and Declarations.

The Commission hereby finds and declares:

A. Project Description and Background

The applicant is proposing the expansion of the existing seawater renewal system pumphouse, placement of two 2,500 ft. long seawater intake lines and the construction of a 460 ft. long, 10 ft. high, 15-45 ft. wide, rock revetment, stairway, and access ramp. The new seawater intake lines will be fastened to the sea floor and extend 2,500 ft. seaward from the existing pumphouse. The existing pumphouse will be expanded from 250 sq. ft. to 1,465 sq. ft and will include the addition of a second pump and wet well. A public viewing deck will be located on the roof of the structure and will provide access for the physically challenged through the use of an access ramp. The 460 ft. long rock revetment would be located seaward of the existing seawater renewal system pumphouse and the eastern lagoon barrier. A stairway and access ramp have been incorporated into the design of the revetment to allow for access to the remaining amount of sandy beach that would not be occupied by the revetment.

The project site is located on the southeast perimeter of the Main Campus and is bordered by the Marine Biotechnology Laboratory to the north and the "lagoon island" to the south. The Campus Lagoon is located directly west from the project site and is separated from the Santa Barbara Channel to the east by the existing lagoon barrier. The eastern lagoon barrier was originally constructed using sand and cobblestone in

1942 when the subject site was used as a Marine Air Corp station in order to extend a dirt road to Goleta Point. In 1952, after the project site had been awarded to the Regents of the University of California, the barrier was raised and widened through the placement of available construction debris including soil, broken concrete, brick and pieces of asphalt paving to form a more substantial barrier between the Campus Lagoon and the ocean. At this time, an overflow weir to control the maximum water level of the lagoon was also installed. The Lagoon Barrier serves to retain the water of the Campus Lagoon which has a surface elevation of approximately 6 ft. above Mean Sea Level (MSL).[1]

Although not part of this coastal development permit application, the University has concurrently submitted a notice of impending development for improvements to the lagoon barrier (which is not in Coastal Commission original jurisdiction and is subject to the LRDP) which involve the placement of approximately 700 cu. yds. fill to raise the height of the barrier from approximately 8 ft. mean sea level (MSL) to approximately 11 ft. MSL, pavement of the existing access road across the barrier. However, the Commission notes that the placement of fill along the barrier is integrally related to the revetment which is proposed as part of this coastal development permit application as this grading is only necessary in conjunction with the proposed rock revetment. Sand elevation is approximately 5 ft. MSL at the lagoon barrier. As the lagoon barrier now exists, beachgoers may easily access the sandy beach from any point along the approximately 400 ft. long barrier road with only an approximate change in elevation between the road and the beach of 3 ft. The placement of fill to increase the height of the barrier raises issue in regard to adverse impacts to public access.

Historically, the lagoon operated as an evaporative salt flat wetlands which was open to occasional tidal action. As it now exists, the lagoon functions artificially receiving its source water from the Campus stormwater drainage system and from seawater discharge of the marine laboratory which has a maximum capacity of 800 gpm. Outflow from the lagoon is from an overflow weir located at the western terminus of the lagoon and from two overflow pipes located in the lagoon barrier. As discharge from the existing seawater renewal system is the main source or input of water for the lagoon, the expansion of the seawater renewal system will serve to increase water circulation and quality within the lagoon. Since the bottom of the lagoon is primarily above mean sea level, if the barrier were breached, the lagoon would partially drain and become re-exposed to periodic tidal inundation creating an evaporative salt flat wetlands. The University asserts that reversion of the lagoon to a salt flat wetlands would adversely affect the educational, research and aesthetic value of the lagoon.

As certified in the UCSB Long Range Development Plan (LRDP), the Campus Lagoon and all beaches (including the project site) are designated as environmentally sensitive habitat areas (ESHAs). The LRDP also describes the Campus Lagoon as a coastal dependent use for instructional and research purposes. Although not specifically mentioned in the LRDP, the existing seawater renewal system, including the pumphouse and wet well located in front of the lagoon barrier is also a coastal

[1] UCSB Draft Lagoon Management Plan

dependent use essential to the operation of the Marine Biotechnology Laboratory which provides unique academic and research opportunities. In past years, the lagoon barrier has been subject to erosion from winter storm events. In the past, the University has implemented temporary measures including the placement of fill, sandbags, and concrete debris to protect the existing pumphouse and prevent the lagoon barrier from breaching. The construction of the proposed revetment would also serve to protect the pumphouse and revetment.

B. Shoreline Protective Devices

As stated previously, the University proposes to construct a 460 ft. long, 10 ft. high, 15-45 ft. wide, rock revetment to protect the pumphouse and lagoon barrier. The proposed revetment would be located seaward of the existing pumphouse and lagoon barrier and would connect to the existing rock revetments which extend approximately 400 ft. both up and downcoast from the project site and which serve to protect the high coastal bluffs.

Section 30235 of the Coastal Act allows for the construction of a shoreline protection device when necessary to protect existing development and coastal dependent uses only when designed to eliminate or mitigate adverse impacts to the shoreline sand supply. In addition, Section 30253 of the Coastal Act requires that all new development must assure structural integrity and not contribute to significant erosion or destruction of the site.

Section **30235** of the Coastal Act states:

> ***Revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls, and other such construction that alters natural shoreline processes shall be permitted when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply. Existing marine structures causing water stagnation contributing to pollution problems and fish kills should be phased out or upgraded where feasible.***

Section **30253** of the Coastal Act states:

> ***New development shall:***
>
> ***(1) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.***
>
> ***(2) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.***

Therefore, it is necessary to review the proposed project for its consistency with sections 30235 and 30253 of the Coastal Act and with past Commission action. In

addition, under section 30235, the proposed rock revetment, can not be considered "necessary" if a feasible alternative which would result in fewer adverse impacts to coastal resources exists. The following sections will analyze the physical characteristics and dynamics of the subject site shoreline to determine whether the use of a shoreline protective device is required to protect the existing and proposed structures, as well as the existing lagoon, and whether the proposed shoreline protective device is designed to eliminate or mitigate the adverse impacts of such development or if there are feasible project alternatives which would accomplish equitable shoreline protection which would result in fewer adverse impacts.

1. Site Shoreline Characteristics

The subject site is located within the Santa Barbara Littoral Cell which extends from Point Conception to the Mugu Submarine Canyon. Beach material is derived from stream sources and the erosion of bluff material. Beaches along the coast within the surrounding region tend to be narrow and backed by high cliffs.[2] Broader pockets of sandy beach are often associated with stream outlets. The Campus Lagoon is believed to be part of an old stream channel that may represent the historic mouth of the Goleta Slough system.[3]

Further, the project site is located at one of the three historic natural outlets of the lagoon. The beach within the project site is backed only by the low artificial lagoon barrier rather than the high bluffs characteristic of the surrounding coastline and, thus, constitutes a natural access point for beachgoers. The project site is characterized as a "pocket" type beach which is wider in nature than those sections of the beach immediately up or down coast which are narrow and backed by high bluffs.

2. Beach Erosion Pattern

Determination of the overall beach erosion pattern is an important factor in determining the impact of the seawall on the shoreline. In general, beaches fit into one of three categories: 1) eroding; 2) equilibrium; or 3) accreting. The persistent analytical problem in dealing with shore processes in California is distinguishing long-term trends in shoreline change from the normal seasonal variation.

The University has submitted evidence of damage to the seawater renewal system pumphouse components and intake system resulting from erosion of the backshore and lagoon barrier by wave action over the past 22 years (Exhibit 10). In addition, photographic evidence and inspections of the project site by Commission staff have confirmed that some erosion of the backshore and lagoon barrier has occurred over the years. In addition, the final Seawater Renewal System Environmental Impact Report (EIR) in discussion of the "No Shoreline Protection Alternative" states that "Over time, sand sediments comprising the Lagoon Barrier would naturally erode and transport

[2] BEACON, Draft Environmental Impact Report for BEACON Beach Nourishment Demonstration Project, 1992.
[3] UCSB Draft Lagoon Management Plan

offshore through wave action and littoral processes." This could allow the lagoon to partially breach. However, no time estimate was provided for the rate of erosion of the lagoon barrier or for the possibility of a partial breach and no additional information was submitted by the applicant regarding the immediacy of concern.

The applicant's marine and earth sciences consultant has indicated in his Scour and Overtopping Report dated April 20, 1997, that scour of the beach and foreshore of the subject site does occur during a storm event. The report states:

> ***surficial sand is moved offshore and a steep (1 vertical on about 5 horizontal) coarse beach face is formed. Removal of the surficial beach sand results in a temporary retreat of the strand an estimated 20 to 30 ft.***

Although the report does include a discussion of estimated wave runup probabilities which indicates that the proposed revetment will have a 27% chance of being overtopped by wave action per year, no analysis of the resultant erosion of the existing lagoon barrier or the backshore without the benefit of the proposed revetment is included. In regards to long-term erosional trends of the subject site shoreline, the report states that:

> ***virtually no change in the position of the shoreline has taken place at the site during the interval from 1871 to the present...Shoreline retreat does not appear to be occurring at the subject site at present.***

The above analysis of long-term shoreline erosional trends of the subject site submitted by the applicant's marine and earth sciences consultant is based on the comparison of a U.S. Coast Survey Map of Goleta Point from 1871 and topographic maps of Goleta made by the Santa Barbara Flood Control District in 1965 and 1991. Although not stated in the report, the above description of the subject site as having a relatively stable shoreline configuration over time with temporary erosion of the sandy beach area and some permanent erosion resulting to the lagoon barrier would seem to infer that the subject site is a typical example of an "equilibrium beach."

However, the University has also submitted a Draft Lagoon Management Plan (LMP) as part of LRDP amendment 2-97 which is related to this project and which indicates that the subject site is an eroding beach stating that:

> ***Winter-summer sand movements have contributed to significant beach erosion between Goleta Point and the marine laboratory since the mid-1970s. Historic photographic evidence indicates that the Campus Lagoon margin was approximately 1,000 feet from the active shoreline and the shoreline faced southeast. Since 1972, the shoreline has been eroded into a concave form facing northeast and has retreated westward approximately 25 feet toward the Campus Lagoon.***

Based on the contradictory information submitted by the applicant, the Commission finds that there is conflicting evidence to whether the project site is an eroding beach or in a state of equilibrium. Independent research by Commission staff has not identified any long-term studies of the shoreline erosional tendencies of the project area. University staff have since stated that the information contained in the proposed LMP is incorrect but have submitted no further evidence to that effect. The Commission can not conclude that the subject beach is either eroding or in equilibrium based on this evidence. However, even assuming the accuracy of the applicant's Scour and Overtopping Report dated April 20, 1997, the Commission notes that many studies performed on both equilibrium and eroding beaches have concluded that loss of beach occurs on both types of beaches where a shoreline protective device exists.[4]

3. Location of the Proposed Shoreline Protective Device in Relation to Wave Action

In order to determine the impacts of the proposed revetment on the shoreline, the location of the proposed protective device in relationship to the expected wave runup must be analyzed. The 460 ft. long, 10 ft. high, rock revetment would be variable in width and extend approximately 15-45 ft. seaward of the existing lagoon barrier resulting in the loss of 25-50 percent of the sandy beach depending on tidal conditions. The proposed revetment would connect with the existing rock revetments which extend approximately 500 ft. up and down coast from the project site in both directions. The existing rock revetments are located at the base of high coastal bluffs typical of the area, whereas the proposed revetment will be located at a break between the high bluffs at a natural low point along the coast which provides convenient access for beachgoers.

The California State Lands Commission has determined that the proposed rock revetment will periodically be located seaward of the ambulatory mean high tide line (Exhibit 9). In addition, although the University has not submitted an analysis of the rate of erosion of the lagoon barrier, the University has prepared a summary list of damages which have occurred since March of 1977, to the existing seawater renewal system and pumphouse due to erosion of the backshore area and the lagoon barrier. Based on the University's records of lagoon barrier erosion and staff observation of the site during varying tidal conditions, the Commission finds that inundation of the beach fronting the proposed revetment does occur during extreme high tide conditions and/or storm events. In addition, the Scour and Overtopping Report dated April 20, 1997, submitted by the University predicts that wave runup would have a 27 percent chance each year of overtopping a 10 ft. rock revetment on the project site. Therefore, based on the determination by the California State Lands Commission and information provided by the applicant, the Commission finds that the proposed rock revetment

[4] Coastal Development Permit 4-97-071 (Schaefer)

would be located seaward of the ambulatory mean high tide line at least some of the time and would be subject to wave action at least during extreme high tide and/or storm events.

It is important to accurately calculate the potential of wave runup and wave energy to which the seawall will be subject. Dr. Douglas Inman, renowned authority on Southern California beaches concludes that, "the likely detrimental effect of the seawall on the beach can usually be determined in advance by competent analysis." Dr. Inman further explains the importance of the seawall's design and location as it relates to predicting the degree of erosion that will be caused by the shoreline protection device. He states:

> ***While natural sand beaches respond to wave forces by changing their configuration into a form that dissipates the energy of the waves forming them, seawalls are rigid and fixed, and at best can only be designed for a single wave condition. Thus, seawalls introduce a disequilibrium that usually results in the reflection of wave energy and increased erosion seaward of the wall. The degree of erosion caused by the seawall is mostly a function of its reflectivity, which depends upon its design and location.***[5]

Rock revetments operate on the principle that wave energy is dissipated within the voids of the wall, thereby producing less wave reflected energy than a smooth vertical wall. However, similar to a vertical wall, a rock revetment is a rigid structure fixed in place and will reflect wave energy and produce the same type of erosional impacts cited by Dr. Inman above. The Commission finds that there are two basic premises of siting coastal protective structures on sandy beaches:

> *1) The most important factor affecting the potential impact of a seawall on the beach is whether there is long-term shoreline retreat. Such retreat is a function of sediment supply and/or relative sea level change. Where long-term retreat is taking place...and this process cannot be mitigated, then the beaches in front of seawalls in these locations will eventually disappear.*

> *2) One of the most critical factors controlling the impact of a seawall on the beach is its position on the beach profile relative to the surf zone. All other things being equal, the further seaward the wall is, the more often and more vigorously waves interact with it. The best place for a seawall, if one is necessary, is at the back of the beach where it provides protection against the largest of storms. By contrast, a seawall built out to or close to the mean high water line may constantly create problems related to frontal and end scour, as well as upcoast sand impoundment.*[6]

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5 Letter dated 25 February 1991 to Coastal Commission staff member and engineer Lesley Ewing from Dr. Douglas Inman.

[6] Tait, J.F. and G.B. Griggs, "Beach Response to the Presence of a Seawall: A Comparison of Field Observations," Shore and Beach, 1990, Vol. 58, No. 2, pp 11-28.

Based on the above discussion, the Commission finds that the rock revetment, at its proposed location, will periodically be seaward of the Mean High Tide Line and will encroach into an area of the beach that is currently subject to wave action during severe storm and high tide events. Therefore, the following discussion is intended to evaluate the impacts of the proposed seawall on the beach based on the above information which identified the specific structural design, the location of the structure and the shoreline geomorphology.

4. Effects of the Shoreline Protective Device on the Beach

The proposed 460 ft. long rock revetment will periodically be seaward of the Mean High Tide Line and will be subject to wave action. The revetment, as a result of wave interaction, will potentially result in significant adverse impacts to the configuration of the shoreline and the beach profile. Even though the precise impact of a structure on the beach is a persistent subject of debate within the discipline of coastal engineering, and particularly between coastal engineers and marine geologists, it is generally agreed that a shoreline protective device will affect the configuration of the shoreline and beach profile whether it is a vertical bulkhead or a rock revetment. The main differences between a vertical bulkhead and rock revetment seawall are their energy dissipation and is their physical encroachment onto the beach. However, it has been well documented by coastal engineers and coastal geologists that shoreline protective devices or shoreline structures in the form of either a rock revetment or vertical bulkhead will adversely impact the shoreline as a result of beach scour, end scour (the beach areas at the end of the seawall), the fixing of the back beach and the interruption of alongshore processes. In order to evaluate these potential impacts relative to the proposed structure and its location on the sandy beach, each of the identified effects will be evaluated below.

a. Beach Scour

Scour is the removal of beach material from the base of a cliff, seawall or revetment due to wave action. The scouring of beaches caused by seawalls is a frequently-observed occurrence. When waves impact on a hard surface such as a coastal bluff, rock revetment or vertical bulkhead, some of the energy from the wave will be absorbed, but much of it will be reflected back seaward. This reflected wave energy in combination with the incoming wave energy, will disturb the material at the base of the seawall and cause erosion to occur in front and down coast of the hard structure. This phenomenon has been recognized for many years and the literature acknowledges that seawalls do affect the supply of beach sand.

Although, the Scour and Overtopping Report submitted by the applicant's Marine and Earth sciences consultant analyzes the effects of scour on the proposed rock

revetment, no analysis of how the proposed revetment will affect scouring of the sandy beach is included. In addition, as discussed in a previous section, the subject site is described as having a relatively stable shoreline configuration over time with temporary erosion of the sandy beach area which is characteristic of an equilibrium beach. However, the report does not analyze the effects of the proposed rock revetment in relationship to the seasonal transport of sand on and offshore and how this would affect the rate of seasonal beach recovery over time. As such, it is not possible to determine what long-term impacts the proposed revetment may have on shoreline sand supply.

However, the Commission finds that, as discussed in the previous section, the project site is subject to wave action during high tides and/or storm events. The following quotation summarizes a generally accepted opinion within the discipline of coastal geology that, "Seawalls usually cause accelerated erosion of the beaches fronting them and an increase in the transport rate of sand along them."[7] Ninety-four experts in the field of coastal geology, who view beach processes from the perspective of geologic time, signed the following succinct statement of the adverse effects of shoreline protective devices:

> ***These structures are fixed in space and represent considerable effort and expense to construct and maintain. They are designed for as long a life as possible and hence are not easily moved or replaced. They become permanent fixtures in our coastal scenery but their performance is poor in protecting community and municipalities from beach retreat and destruction. Even more damaging is the fact that these shoreline defense structures frequently enhance erosion by reducing beach width, steepening offshore gradients, and increasing wave heights. As a result, they seriously degrade the environment and eventually help to destroy the areas they were designed to protect.***[8]

The above 1981 statement signed by 94 respected coastal geologists indicates that sandy beach areas available for public use can be harmed through the introduction of seawalls. Thus, in evaluating an individual project, the Commission assumes that the principles reflected in that statement are applicable. To do otherwise would be inconsistent with the Commission's responsibilities under the Coastal Act to protect the public's interest in shoreline resources and to protect the public's access along the ocean and to the water, as discussed in more detail in the subsequent Section IV.D. Public Access.

The impact of seawalls as they are related to sand removal on the sandy beaches is further documented by the State Department of Boating and Waterways:

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7 Saving the American Beach: A Position Paper by Concerned Coastal Geologists (March 1981, Skidaway Institute of Oceanography), pg. 4.

8 Saving the American Beach: A Position Paper by Concerned Coastal Geologists (March 1981, Skidaway Institute of Oceanography), pg. 4.

> ***While seawalls may protect the upland, they do not hold or protect the beach which is the greatest asset of shorefront property. In some cases, the seawall may be detrimental to the beach in that the downward forces of water, created by the waves striking the wall rapidly remove sand from the beach.***[9]

Finally this observation was underscored more recently in 1987 by Robert G. Dean in "Coastal Sediment Processes: Toward Engineering Solutions":

> ***Armoring can cause localized additional storm scour, both in front of and at the ends of the armoring...Under normal wave and tide conditions, armoring can contribute to the downdrift deficit of sediment through decreasing the supply on an eroding coast and interruption of supply if the armoring projects into the active littoral zone.***[10]

It is generally agreed that where a beach is eroding, the erection of a seawall will eventually define the boundary between the sea and the upland. This result can be explained as follows: on an eroding shoreline fronted by a beach, a beach will be present as long as some sand is supplied to the shoreline. As erosion proceeds, the entire profile of the beach also retreats. This process stops, however, when the retreating shoreline comes to a seawall. Eventually, the shoreline fronting the seawall protrudes into the water, with the winter MHTL fixed at the base of the structure. In the case of an eroding shoreline, this represents the loss of a beach as a direct result of the seawall.

Dr. Craig Everts found that on narrow beaches where the shoreline is not armored, the most important element of sustaining the beach width over a long period of time is the retreat of the back beach and the beach itself. He concludes that:

> ***Seawalls inhibit erosion that naturally occurs and sustains the beach. The two most important aspects of beach behavior are changes in width and changes in the position of the beach. On narrow, natural beaches, the retreat of the back beach, and hence the beach itself, is the most important element in sustaining the width of the beach over a long time period. Narrow beaches, typical of most of the California coast, do not provide enough sacrificial sand during storms to provide protection against scour caused by breaking waves at the back beach line. This is the reason the back boundary of our beaches retreats during storms.***[11]

Dr. Everts further concludes that armoring in the form of a seawall or revetment interrupts the natural process of beach retreat during a storm event and that, "a beach with a fixed landward boundary is not maintained on a recessional coast because the beach can no longer retreat."

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9 State Department of Boating and Waterways (formerly called Navigation and Ocean Development), Shore Protection in California (1976), page 30.

10 Coastal Sediments '87.

11 Letter Report dated March 14, 1994 to Coastal Commission staff member and engineer Lesley Ewing from Dr. Craig Everts, Moffatt and Nichol Engineers.

The Commission has observed this phenomenon up and down California's coast where a seawall has successfully halted the retreat of the shoreline, but only at the cost of usurping the beach. For example, at La Conchita Beach in Ventura County, placement of a rock revetment to protect an existing roadway has caused narrowing of the existing beach. Likewise, at City of Encinitas beaches in San Diego County, construction of vertical seawalls along the base of the bluffs to protect existing residential development above, has resulted in preventing the bluffs' contribution of sand to the beaches, resulting in narrowing. Although this may occur slowly, the Commission concludes that it is the inevitable effect of constructing a seawall on an eroding or equilibrium shoreline.

The impact of potential beach scour is also important relative to public access to and along the beach. The east facing shoreline of the Campus is characterized by high coastal bluffs. As such, the low-lying project site serves as one of only two vertical public access points to the sandy beach between Goleta Point and Goleta Beach. The other public access point, an existing stairway from the blufftop located approximately 1,100 ft. to the north of the project site, has been closed by the Campus for safety reasons. If the beach scours at the base of the revetment, even minimal scouring in front of the 460 ft. long proposed revetment will translate into a loss of beach sand available (i. e. erosion) at an accelerated rate than would otherwise occur under a normal winter season if the beach were unaltered.

The applicant's consultant has indicated that the revetment will be acted upon by waves during storm conditions. Even assuming that the project site functions as an equilibrium beach, the Commission notes that if an eroded beach condition occurs with greater frequency due to the placement of a revetment, this site would also accrete at a slower rate. In such areas, even as erosion proceeds, a beach would be present in the absence of a seawall. Regardless of whether the subject site is an eroding or an equilibrium beach, the proposed revetment will potentially result in significant adverse impacts to the sand supply as the protective device becomes a dominant component of the shoreline system.

b. <u>End Effects</u>

End scour effects involve the changes to the beach profile adjacent to the shoreline protection device at either end. One of the more common end effects comes from the reflection of waves off of the shoreline protection device in such a way that they add to the wave energy which is impacting the unprotected coastal areas on either end. Coastal engineers have compared the end effects impacts between revetments and bulkheads. In the case of a revetment, the many angles and small surfaces of the revetment material reflect wave energy in a number of directions, effectively absorbing much of the incoming wave rather than reflecting it. Because of the way revetments

modify incoming wave energy, there is often less problem with end effects or overtopping than that which occurs with a vertical bulkhead. In the case of a vertical bulkhead, return walls are typically constructed in concert with seawall, and, thus, wave energy is also directed to the return walls causing end erosion effects.

In addition, the Commission notes that the literature on coastal engineering repeatedly warns that unprotected beach adjacent to any shoreline protective device may experience increased erosion. Field observations have verified this concern. Although it is difficult to quantify the exact loss of material due to end effects, in a paper written by Gerald G. Kuhn of the Scripps Institution of Oceanography, it is concluded that erosion on properties adjacent to a rock seawall is intensified when wave runup is high.[12]

An extensive literature search on the interaction of seawalls and beaches was performed by Nicholas Kraus in which he found that, while seawalls will have little if any effect on a beach with a large supply of sand, there will be effects to narrow beaches or beaches eroded by storm activity. His research indicated that the form of the erosional response to storms that occurs on beaches without seawalls that are adjacent to beaches with seawalls is manifested as more localized toe scour and end effects of flanking and impoundment at the seawall.[13] Dr. Kraus' key conclusions were that seawalls could be accountable for retention of sediment, increased local erosion and increased end erosion. Kraus states:

> ***At the present time, three mechanisms can be firmly identified by which seawalls may contribute to erosion at the coast. The most obvious is retention of sediment behind the wall which would otherwise be released to the littoral system. The second mechanism, which could increase local erosion on downdrift beaches, is for the updrift side of the wall to act as a groin and impound sand. This effect appears to be primarily theoretical rather than actualized in the field, as a wall would probably fail if isolated in the surf zone. The third mechanism is flanking i.e. increased local erosion at the ends of walls.***

In addition, preliminary results of researchers investigating the length of shoreline affected by heightened erosion adjacent to seawalls concluded that:

> ***Results to date indicate that erosion at the ends of seawalls increases as the structure length increases. It was observed in both the experimental results and the field data of Walton and Sensabaugh (1978) that the depth of excess erosion is approximately 10% of the seawall length. The laboratory data also revealed that the along-coast length of excess erosion at each end of the structure is approximately 70% of the structure length.***[14]

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12 Paper by Gerald G. Kuhn of the Scripps Institution of Oceanography entitled "Coastal Erosion along Oceanside Littoral Cell, San Diego County, California" (1981).

13 "Effects of Seawalls on the Beach", published in the Journal of Coastal Research, Special Issue #4, 1988.

14 "Laboratory and Field Investigations of the Impact of Shoreline Stabilization Structures on Adjacent Properties" by W.G. McDougal, M.A. Sturtevant, and P.D. Komar in Coastal Sediments '87.

A more comprehensive study was performed over several years by Dr. Griggs which concluded that beach profiles at the end of a seawall are further landward than natural profiles.[15] This effect appears to extend for a distance of about 6/10 the length of the seawall and represents both a spatial and temporal loss of beach width directly attributable to seawall construction. In the case of this project the scour effects could be as great as 33 ft. to 39 ft. (6/10 of 460 ft. = 276 ft. or 70% of 460 ft. = 322 ft.). These end effects would be expected only when the seawall was exposed to wave attack and, under equilibrium or accreting beach conditions, this scour would disappear eventually during post-storm recovery. However, such cases of natural renourishment of end areas are rare for erosional beaches.

In the case of this project, the proposed rock revetment would connect to the existing rock revetments located both up and downcoast from the project site. The alignment and connection of the proposed revetment with the existing revetments will serve to minimize end effect erosion between the two structures. As such, the proposed revetment is designed to minimize erosional end effects along both the up and downcoast ends of the wall.

5. Alternatives Analysis

The Commission finds that the proposed 460 ft. long rock revetment will have adverse impacts on the shoreline. In addition, there is substantial evidence that the seawall as proposed will adversely impact sand supply and public access as a result of beach scour and the direct occupation of the public beach. However, Coastal Act section 30235, which is previously cited, states that shoreline protective devices, such as revetments and other construction that would alter natural shoreline processes, shall be permitted when those structures are necessary to serve coastal-dependent uses or to protect existing structures or to protect public beaches in danger from erosion and when they are designed to eliminate or mitigate adverse impacts on local shoreline sand supply. In the case of this project, the University has stated that the proposed revetment is necessary to protect the existing pumphouse, intake lines, and lagoon barrier. However, the Commission notes that coastline development is routinely subject to potential damage as a result of storm and flood occurrences and that the lagoon barrier has been maintained with periodic maintenance in its present condition for more than 50 years and that the existing pumphouse has been maintained with periodic maintenance in its present condition since the 1970's. Staff observation of the site after recent severe storms has confirmed that both the pumphouse and barrier remained relatively intact. As such, the applicant has not demonstrated that the proposed rock revetment is consistent with Section 30235 of the Coastal Act. In addition, under section 30235, the proposed rock revetment, can not be considered

15 "The Interaction of Seawalls and Beaches: Seven Years of Field Monitoring, Monterey Bay, California" by G. Griggs, J. Tait, and W. Corona, in Shore and Beach, Vol. 62, No. 3, July 1994.

"necessary" if a feasible alternative which would result in fewer adverse impacts to coastal resources exists. As required by the California Environmental Quality Act (CEQA), an analysis of alternatives to the proposed revetment which might better eliminate or mitigate adverse impacts, is included in the Seawater Renewal System Final Environmental Impact Report (EIR) dated May 1997.

However, the Commission notes that alternative forms of shoreline protection which could achieve the basic project objectives with fewer adverse impacts have not been adequately addressed in the Environmental Impact Report or any other information submitted by the University. The UCSB Long Range Development Plan (LRDP). states that the Campus Lagoon must be prevented from naturally breaching in order to maintain its ESHA, instructional and research value. Although, the proposed rock revetment would serve to prevent the Campus Lagoon from breaching, it would also result in adverse impacts to the shoreline sand supply, ESHA, recreational and public access values of the beach area. Further, as discussed below, alternative forms of shoreline protection such as dune nourishment and beach replenishment, may not only be feasible but could also serve to enhance the habitat, educational, and scientific value of the project site which is located within an area designated as ESHA by the LRDP.

a. No Shoreline Protection Alternative

The EIR does identify a "No Shoreline Protection Alternative" stating that "Over time, sand sediments comprising the Lagoon Barrier would naturally erode and transport offshore through wave action and littoral processes." This could allow the lagoon to partially breach. Commission staff, in correspondence, requested that this alternative be explored. However, the EIR provides only minimal analysis of this alternative which would allow for the periodic maintenance of the existing barrier. The University has documented damage over the past 21 years which has occurred to the seawater renewal system due to erosion of the lagoon barrier by wave action (Exhibit 10). However, the applicant has not included any analysis of whether the appurtenant pipes and intake lines for the seawater system could be designed to avoid the necessity for shoreline protection. Further, the Commission notes that coastline development is routinely subject to potential damage as a result of storm and flood occurrences and that the lagoon barrier has been maintained with periodic maintenance in its present condition for more than 50 years and that the existing pumphouse has been maintained with periodic maintenance in its present condition since the 1970's. Staff observation of the site after recent severe storms has confirmed that both the pumphouse and barrier remained relatively intact. Further, since the lagoon is now being maintained as an unnatural closed system, it may be feasible to rebuild the lagoon closure after a partial breach, rather than to provide a solid, long-term closure. Periodic partial breaching may also provide some natural scour of the lagoon which could offset the sedimentation which could occur from upland runoff.

In addition, there is no analysis of the rate of erosion for the lagoon barrier and the possibility of a partial breach. In the Scour and Overtopping Report prepared by Dr. Anikouchine, it was found that "long-term erosion of the beach at the subject site is improbable." It is likely that the no protection alternative was in consideration of the short-term shoreline change which can occur during extreme storm events. Permanent shoreline armoring would provide a greater level of protection against breaching than the *No Protection Alternative*; however, there is no information on the immediacy of concern.

Although, this alternative would not serve to protect the existing seawater renewal system, staff notes that the expanded pumphouse structure will be constructed on 16 grade beam driven piles and that the wetwell structure also serves as an independent support for the structure. Further, the summary list of damages to the seawater renewal system from high tides and storms indicates that the damage which has occurred has primarily affected the appurtenant intake, delivery, and electrical lines and not in structural damage to the pumphouse itself. No analysis of whether the appurtenant intake, delivery, and electrical lines can be designed or relocated to minimize damage occurring from storm or high tides has been submitted. Alternatives to protect the seawater system only might include minimal rock at the base of the pumphouse and/or stronger reinforced intake, delivery, and electrical lines.

b. Beach Replenishment Alternative

The EIR found that this alternative would protect the lagoon barrier and seawater system while resulting in beneficial effects on coastal access and beach recreation. However, this alternative was determined not to be feasible "because beach replenishment would need to be implemented on a periodic basis along the entire 56 mile coastline between Isla Vista and Point Mugu to achieve the basic project objectives of protecting seawater system improvement." It is also noted in the EIR that:

> ***beach replenishment would not provide a permanent structure and would require long-term maintenance activities to permanently stabilize the coastline...Costs associated with beach nourishment make it infeasible."***

However, Commission staff notes that, in many respects, the project site would be a prime area for beach nourishment. (1) The project site is in the upshore portion of the Santa Barbara Littoral Cell and, as such, could serve well as a feeder beach for the regional beach system. The Campus Lagoon Beach would receive primary benefits from the nourishment, but it might easily be developed as a long-term regional program. In addition, this alternative would serve to create new opportunities for educational and scientific studies. (2) There is approximately 24 million cubic yards of

sand in an offshore deposit site immediately offshore from Goleta Point.[16] This sand has not been tested extensively for suitability for beach nourishment; however, it does hold promise as a source for the 20 to 40 thousand cubic yards of sand needed for beach replenishment.

Beach nourishment was found in the EIR to be infeasible because of costs and the need to replenish 56 miles of shoreline. However, the EIR does not indicate what the costs for beach nourishment are, so it is impossible to determine whether beach replenishment would, in fact, be too costly. (Critical to the determination of project costs would be the estimated replenishment rate for long-term stability.) Further, it is not clear why the beach replenishment program must reportedly address the entire Santa Barbara Cell to be effective at the Campus Lagoon Beach. The area between Goleta and the Santa Barbara Harbor is an identified subcell and this provides a better bound for the coastal processes affecting the Campus Lagoon Beach. Since the project site is at the upcoast portion of the cell and subcell, its nourishment could benefit much of the downcoast shoreline, but complete nourishment of the entire cell would not be necessary for nourishment to be successful at the Campus Lagoon Beach. As such, the Commission can not conclude that beach nourishment is not feasible as it has not been satisfactorily demonstrated or supported with evidence.

In addition, for the purpose of an adequate comparison, the analysis of the proposed rip-rap revetment does not address the long-term maintenance of this structure. While the revetment will be an engineered structure, using geotextile material and core rock, it will be founded on sand and old landfill material. From study of revetment structures in the central coast, Griggs and Fulton-Bennet found that:

> ***Most engineered and non-engineered rip rap that we observed required additional stone after almost every moderate (say 5 to 10 year recurrence interval) storm season...In addition, rip rap settlement appears to be reactivated each time a major storm arrives. At many locations, rip rap has moved 5 to 10 feet vertically downward and 10 to 30 feet horizontally seaward during single storms.*** [17]

Further, the option of beach replenishment was found in the EIR to be infeasible due to the need for long-term maintenance; however, the long-term maintenance for a revetment in this location was never considered and could equal or exceed the maintenance required for beach replenishment. Fulton-Bennet and Griggs found that "after a storm of roughly ten-year recurrence interval, engineered structures along the Central California coast required repairs totaling between 20 to 40 percent of their construction cost (2 to 4% per year) and that non-engineered structures required

[16] The Final EIR for the BEACON Beach Nourishment Demonstration Project, September 1992.
[17] Fulton-Bennet, Kim and Griggs, Gary (No Date) Coastal Protection Structures And Their Effectiveness. Joint Publication of the State Department of Boating and Waterways and marine Science Institute of the University of California at Santa Cruz.

repairs totaling between 50 to 150 percent of construction cost (5 to 15% per year)."[18] Since the proposed rip rap revetment would be located on a significant proportion of the available dry beach, it would be very important for the University to maintain the rip rap revetment and replace all dislodged rock promptly. Dislodged rock does not provide effective protection of the backshore area and further reduces the area of beach available for public access and recreation.

c. Dune Nourishment Alternative

Another method for maximizing the retention of beach nourishment material not discussed in the EIR is to include a stable back beach dune into the beach nourishment project. This can often be very effective where there is limited space or nourishment material. The beach area seaward of the dunes can provide access and recreational opportunities and the dunes can provide habitat, new educational and scientific opportunities, reduce wind blown losses of sand, and provide a stable barrier to wave erosion and lagoon breaching. If appropriate, the dune system could be underlain by a rock or geotube core and covered by appropriate dune vegetation. Periodic additions of sand are often needed to sustain the dune system over the long term, but the amount of sand is usually less than that required for a standard beach nourishment program. This alternative was not analyzed in the EIR and should be considered. The Commission notes that the educational and research value of a dune nourishment program would complement the use of the lagoon ESHA as an educational and scientific resource. Further, given the academic setting provided by the University, alternative forms of shoreline protection, such as dune nourishment and beach replenishment, may not only be feasible but could be studied providing valuable information to assist in dune restoration efforts elsewhere along the coast while also serving to enhance the habitat, educational, and scientific value of the project site which is located within an area designated as ESHA by the University LRDP.

6. Conclusion

Section 30235 of the Coastal Act allows for the construction of a shoreline protection device when necessary to protect existing development and coastal dependent uses only when designed to eliminate or mitigate adverse impacts to the shoreline sand supply. However, under section 30235, the proposed rock revetment, can not be considered "necessary" if a feasible alternative which would result in fewer adverse impacts to coastal resources exists. In the case of this project, alternative forms of shoreline protection which could achieve the basic project objectives with fewer adverse impacts are available which have not been adequately addressed in the University's submittal. In addition, it may also be feasible to construct the seawater renewal system without the use of a rock revetment as the existing pumphouse has

[18] Ibid.

been maintained in its present state since the 1970s. Commission staff, in correspondence with the University, has raised the issue of alternatives to the proposed revetment. However, the University has not responded other than the minimal information provided in the final EIR and the University's response letter dated 4/23/97, which do not provide adequate analysis of alternative methods of shoreline protection. Therefore, the applicant has not demonstrated that the proposed project is consistent with Section 30235 of the Coastal Act or CEQA requirements.

As such, the Commission finds that there may be feasible shoreline protective alternatives which could result in less adverse impacts to the shoreline sand supply and public access than the proposed rock revetment and that these possible alternatives have not been adequately addressed by the University. Therefore, it is not possible to determine whether the proposed rock revetment is consistent with Section 30235 of the Coastal Act. In order to ensure that the proposed expansion of the seawater renewal system is consistent with Section 30235 of the Coastal Act, special condition one (1) requires the applicant to submit revised plans for the seawater renewal system expansion without the placement of a rock revetment. Therefore, the Commission finds that, only as conditioned will the proposed project be consistent with section 30235 of the Coastal Act.

C. Hazards and Geologic Stability

Section 30253 of the Coastal Act mandates that new development provide for geologic stability and integrity and minimize risks to life and property in areas of high geologic, flood, and fire hazard. Coastal Act Section **30253** states:

> New development shall:
>
> ***(1) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.***
>
> ***(2) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.***

Coastline development is routinely subject to potential damage as a result of storm and flood occurrences. Therefore, it is necessary to review the proposed project and project site against the area's known hazards.

The "El Nino" storms in 1982-83 caused additional damage to coastal areas, when high tides of over 7 feet were combined with surf between 6 and 15 feet. These storms caused over $12.8 million in damage to structures in Los Angeles county alone. Due to the severity of the 1982-83 storm events, they have often been cited as an illustrative example of an extreme storm event and used as design criteria for shoreline protective structures. Damage to coastline development was documented in an article in California Geology. This article states that:

> ***Once quiet, wide, sandy beaches were stripped of their sand and high surf pounded residential developments .... The severe scour, between 8 to 12 feet, was greater than past scour as reported by "old timers" in the area. Sewage disposal systems which rely on the sand cover for effluent filtration were damaged or destroyed creating a health hazard along the coast. Flotsam, including pilings and timbers from damaged piers and homes, battered coastal improvements increasing the destruction. Bulkhead failures occurred when sand backfill was lost due to scour exceeding the depth of the bulkhead sheeting, or scour extending beyond the return walls (side walls of the bulkhead which are extended toward the shore from the front wall of the bulkhead).***[19]

Storms in 1987-88 and 1991-92 did not cause the far-reaching devastation of the 1982-83 storms, however, they too were very damaging in localized areas and could have been significantly worse except that the peak storm surge coincided with a low tide rather than a high tide. Further, after the recent 1998 "El Nino," Santa Barbara and Ventura Counties have been declared by the state as disaster areas. These storms have resulted in widespread damage along the shoreline due to high wave and tide caused erosion.

The applicant proposes the placement of two 2,500 ft. long intake lines, the expansion of the existing seawater renewal system pumphouse, and a 460 ft. long rock revetment. The expanded pumphouse structure will be constructed on 16 grade beam driven piles which will extend below sand scour depths. In addition, the wetwell structure itself will also serve as an independent support for the structure. As such, the proposed pumphouse will be structurally sound. The University has submitted a summary of damages which have occurred to the existing seawater renewal system since 1977, primarily consisting of damage to appurtenant exterior pipes. However, future damage to these components may be minimized through the use of alternatives to protect the seawater system which might include minimal rock at the base of the pumphouse and/or stronger reinforced intake, delivery, and electrical lines

Further, the Commission notes that the proposed development will extend into an area exposed to wave attack, flooding, and erosion hazards that in the past have caused significant damage to development along the California coast. The Coastal Act recognizes that new development, such as the expansion of the pumphouse and placement of the intake lines, may involve the taking of some risk. Coastal Act policies require the Commission to establish the appropriate degree of risk acceptable for the proposed development and to determine who should assume the risk. When development in areas of identified hazards is proposed, the Commission considers the hazard associated with the project site and the potential cost to the public, as well as the individual's right to use his property.

As such, the Commission finds that due to the unforeseen possibility of wave attack, erosion, and flooding, the applicant shall assume these risks as a condition of approval. Further, the potential placement of any form of shoreline protection or continued maintenance of the existing lagoon barrier will not serve to completely

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[19] "Assessment of 1982-83 Winter Storms Damage Malibu Coastline", by Frank Denison and Hugh Robertson, in California Geology, September 1985.

eliminate the risk inherently associated with development along the shoreline. Because this risk of harm cannot be completely eliminated, special condition two (2) requires the applicant to waive any claim of liability on the part of the Commission for damage to life or property which may occur as a result of the permitted development. The applicant's assumption of risk, will show that the applicant is aware of and appreciated the nature of the hazards which exist on the site, and which may adversely affect the stability or safety of the proposed development.

The Commission finds that, as conditioned above, the proposed project is consistent with Section 30253 of the Coastal Act.

D. Public Access.

One of the basic mandates of the Coastal Act is to maximize public access and recreational opportunities along the coast. The Coastal Act has several policies which address the issues of public access and recreation along the coast.

Section **30210** of the Coastal Act states:

> ***In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.***

Section **30211** of the Coastal Act states:

> ***Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.***

Section **30212** of the Coastal Act states (in part):

> ***(a) Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects...***

Section **30220** of the Coastal Act states:

> ***Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.***

Coastal Act sections 30210 and 30211 mandate that maximum public access and recreational opportunities be provided and that development not interfere with the public's right to access the coast. Likewise, section 30212 of the Coastal Act requires that adequate public access to the sea be provided to allow use of dry sand and rocky coastal beaches. Section 30220 of the Coastal Act requires coastal areas suited for

coastal recreational activities, that cannot be provided at inland water areas, be protected.

The major access issue in this permit is the occupation of sand area by a structure and narrowing of the public beach in front of the structure, in contradiction of Coastal Act policies 30211 and 30221. Section 30211 requires that development shall not interfere with access. The State Lands Commission has determined that the proposed rock revetment and seawater renewal system intake lines would be located within State Tidal Lands. As such, the proposed development will be located on sandy beach which is currently available for public use.

As proposed, the revetment would extend out onto a public sandy beach area approximately 15-45 ft. beyond the existing lagoon barrier. As stated in the preceding section, the east facing shoreline of the Campus is characterized by its high coastal bluffs, the low-lying project site serves as one of only two vertical public access points to the sandy beach between Goleta Point and Goleta Beach. The other public access point, an existing stairway from the blufftop located approximately 1,100 ft. to the north of the project site, has been closed by the Campus for safety reasons.

As noted above, interference by the proposed revetment has a number of effects on the dynamic shoreline system and the public's beach ownership interests. First, changes in the shoreline profile, particularly changes in the slope of the profile which results from a reduced beach berm width, alter the usable area under public ownership. A beach that rests either temporarily or permanently at a steeper angle than under natural conditions will have less horizontal distance between the mean low water and mean high water lines. This reduces the actual area in which the public can pass on their own property. The second effect on access is through a progressive loss of sand as shore material is not available to nourish the bar. The lack of an effective bar can allow such high wave energy on the shoreline that materials may be lost far offshore where it is no longer available to nourish the beach. The effect of this on the public are again a loss of area between the mean high water line and the actual water. Third, shoreline protective devices such as revetments and bulkheads cumulatively affect public access by causing accelerated and increased erosion on adjacent public beaches. This effect may not become clear until such devices are constructed individually along a shoreline and they reach a public beach. Fourth, if not sited landward in a location that insures that the seawall is only acted upon during severe storm events, beach scour during the winter season will be accelerated because there is less beach area to dissipate the wave's energy. Finally, revetments and bulkheads interfere directly with public access by their occupation of beach area that will not only be unavailable during high tide and severe storm events but also potentially throughout the winter season.

Due to the aforementioned adverse impacts of shoreline protective structures on public access, the proposed shoreline protection device must be judged against the public access and recreation policies of the State Constitution, Sections 30210, 30220, and 30211 of the Coastal Act. Along the California coast, the line between land and ocean is complex and constantly moving.

The State Owns Tidelands, Which Are Those Lands Below the Mean High Tide Line as it Exists From Time to Time. By virtue of its admission into the Union, California became the owner of all tidelands and all lands lying beneath inland navigable waters. These lands are held in the State's sovereign capacity and are subject to the common law public trust. The public trust doctrine restricts uses of sovereign lands to public trust purposes, such as navigation, fisheries, commerce, public access, water-oriented recreation, open space and environmental protection. The public trust doctrine also severely limits the ability of the State to alienate these sovereign lands into private ownership and use free of the public trust. Consequently, the Commission must avoid decisions that improperly compromise public ownership and use of sovereign tidelands.

Where development is proposed that may impair public use and ownership of tidelands, the Commission must consider where the development will be located in relation to tidelands. The legal boundary between public tidelands and private uplands is known as the ordinary high water mark. (Civil Code, § 830.) In California, where the shoreline has not been affected by fill or artificial accretion, the ordinary high water mark of tidelands is determined by locating the existing "mean high tide line." The mean high tide line is the intersection of the elevation of mean high tide with the shore profile.[20] Where the shore is composed of a sandy beach whose profile changes as a result of wave action, the location at which the elevation of mean high tide line intersects the shore is subject to change. The result is that the mean high tide line (and therefore the boundary) is an "ambulatory" or moving line that moves seaward through the process known as accretion and landward through the process known as erosion.

Consequently, the position of the mean high tide line fluctuates seasonally as high wave energy (usually but not necessarily) in the winter months causes the mean high tide line to move landward through erosion, and as milder wave conditions (generally associated with the summer) cause the mean high tide line to move seaward through accretion. In addition to ordinary seasonal changes, the location of the mean high tide line is affected by long term changes such as sea level rise and diminution of sand supply.[21]

The Commission Must Consider a Project's Direct and Indirect Impact on Public Tidelands. In order to protect public tidelands when beachfront development is proposed, the Commission must consider (1) whether the development or some portion of it will encroach on public tidelands (i.e., will the development be located seaward the mean high tide line as it may exist at some point throughout the year) and (2) if not located on tidelands, whether the development will indirectly affect tidelands by causing physical impacts to tidelands.

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[20] In this location, the mean high tide line elevation is 1.6 MSL.

[21] The legal location of the tidelands boundary is the subject of litigation involving the Coastal Commission, the State Lands Commission and an owner of private uplands. (See *Lechuza Villas West* v. *California Coastal Commission*, __Cal. App. 4th __, 97 Daily Journal D.A.R. 15277 (Dec. 19, 1997)

In order to avoid approving development that will encroach on public tidelands during any time of the year, the Commission, usually relying on information supplied by the State Lands Commission, will look to whether the project is located landward of the most landward known location of the mean high tide line. In this case, the State Lands Commission has determined that the proposed rock revetment and seawater renewal system intake lines would be located within State Tidal Lands (Exhibit 9).[22] The State Lands Commission has informed the Commission that the University is currently in the process of acquiring a lease from the State Lands Commission for the use of public tidelands for the construction of a rock revetment and placement of the intake lines.

As the proposed rock revetment will be located seaward the mean high tide line, it is understood that the development will have an impact on shoreline processes as wave energy reflected by those structures contributes to erosion and steepening of the shore profile, and ultimately to the extent and availability of tidelands. The Commission must consider whether a project will have indirect impacts on public ownership and public use of shorelands. In this case, the proposed development will result in direct impacts on tidelands including the occupation of sand area by a structure and narrowing of the public beach in front of the structure from potential scour effects since the revetment is located in an area that is subject to wave attack and wave energy.

The Commission Also Must Consider Whether a Project Affects Any Public Right to Use Shorelands That Exists Independently of the Public's Ownership of Tidelands. In addition to a development proposal's impact on tidelands and on public rights protected by the common law public trust doctrine, the Commission must consider whether the project will affect a public right to use beachfront property, independent of who owns the underlying land on which the public use takes place. Generally, there are three additional types of public uses identified as: (1) the public's recreational rights in navigable waters guaranteed to the public under the California Constitution and state common law;[23] (2) any rights that the public might have acquired under the doctrine of implied dedication based on continuous public use over a five-year period; and (3) any additional rights that the public might have acquired through public purchase, offers to dedicate and the like.

In this case, the entire sandy beach is presently available for public use and the proposed revetment would directly impact public access within State Tidal Lands. In addition, there is evidence, as discussed above, that the project would generate adverse individual and cumulative impacts on sand supply, beach profile, and ultimately, public access as a result of localized beach scour, retention of beach material and interruption of the alongshore and onshore sand transport process, as well as the direct occupation by a structure of the public beach. The analysis further indicates that regardless of whether the shoreline is eroding or at a state of relative equilibrium, the revetment will be subject to wave uprush. This too would limit the

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[22] Letter dated December 15, 1997 to Catriona Gay, UCSB Budget and Planning, from Barbara Dugal, State Lands Commission staff member.

[23] The existence and extent of this right is also being litigated in the *Lechuza Villas West* case.

availability of sandy beach area available for public access and recreation due to changes in the slope of the beach profile due to wave caused scour of the beach in front of the revetment. A beach that rests either temporarily or permanently at a steeper angle than under natural conditions will have less horizontal distance between the mean low water and mean high water lines. This reduces the actual area in which the public can pass on their own property.

These use rights are implicated as the public walks the wet or dry sandy beach below the mean high tide plane. This area of use, in turn moves across the face of the beach as the beach changes in depth on a daily basis. The free movement of sand on the beach is an integral part of this process, and it is here that the effects of structures are of concern.

The University beaches are used not only by students, but also by visitors of both local and regional origin and most planning studies indicated that attendance of recreational sites will continue to significantly increase over the coming years. The public has a right to use the shoreline under the public trust doctrine, the California Constitution and California common law. The Commission must protect those public rights by assuring that any proposed shoreline development does not interfere with or will only minimally interfere with those rights. Here, there is a high probability that the proposed revetment will generate a permanent loss of sandy beach over time as a result of both the direct placement of the seawall on the beach and the change in the beach profile or steepening which is likely to result over time. Presently, this shoreline remains open and can be used by the public for access and general recreational activities.

Further, as stated previously, the project site is an existing public access point. Goleta Beach, which is maintained by the County of Santa Barbara as a public beach, is located approximately 3,200 ft. downcoast from the project site. The Commission notes that Goleta Beach, which is located adjacent to the University, is one of the most heavily used beaches in the Goleta area. In addition, beachgoers who access the beach from either Goleta Beach, or from the public access points on Campus, often walk along the shore to Goleta Point (upcoast from the project site) or beyond and back again passing directly in front of where the proposed revetment is located. Based on both historic and recent observations of beach use in this area, it is clear that measures to ensure the protection of the public's ability to both laterally and vertically access the area must be asserted.

In addition, the Commission finds that there may be feasible shoreline protective alternatives which could result in less adverse impacts to the shoreline sand supply and public access than the proposed rock revetment and that these possible alternatives have not been adequately addressed in the EIR submitted for the proposed project. Further, the Commission notes that although the use of shoreline protection devices such as a rock revetment may serve to protect upland areas, it does not protect the sandy beach seaward of the device. However, alternatives such as dune nourishment and/or beach replenishment not only provide protection for upland areas but also serve to enhance public access through the stabilization of the existing sandy beach which is currently available for public use. Therefore, it is not possible to

determine whether the proposed rock revetment is consistent with the applicable sections of the Coastal Act. In order to ensure that public access to and along the beach, as well as the public's continued use of State Tidal Lands, is not adversely impacted, special condition one (1) requires the applicant to submit revised plans for the seawater renewal system expansion which eliminate the placement of a rock revetment.

Therefore, the Commission finds that the proposed project, only as conditioned, is consistent with Sections 30210, 30211, 30212 and 30220 of the Coastal Act.

F. Environmentally Sensitive Habitat Areas and Marine Resources

Section **30230** of the Coastal Act states:

> ***Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.***

Section **30231** of the Coastal Act states that:

> ***The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.***

Section **30240** of the Coastal Acts states:

> ***(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.***
>
> ***(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.***

As previously mentioned, the applicant is proposing the expansion of the existing seawater renewal system pumphouse, placement of two 2,500 ft. long seawater intake lines and the construction of a 460 ft. long, 10 ft. high, 15-45 ft. wide, rock revetment, stairway, access ramp. The new seawater intake lines will be fastened to the sea floor and extend 2,500 ft. seaward from the existing pumphouse. The existing pumphouse will be

expanded from 250 sq. ft. to 1,465 sq. ft and will include the addition of a second pump and wet well.

Section 30231 requires that the biological productivity and quality of coastal waters be maintained. Section 30230 requires that uses of the marine environment be carried out in a manner that will sustain the biological productivity of coastal waters for long-term commercial, recreational, scientific, and educational purposes. The existing seawater renewal system allows the Marine Science Program at the University to provide unique educational and scientific opportunities. The expansion of the existing system (larger pumphouse and new seawater intake lines) will serve to meet the growing needs of the program. In addition, Section 30240 permits development in areas that have been designated as environmentally sensitive habitat areas (ESHAs) only when the location of the proposed development is dependent upon those habitat resources and when such development is protected against significant reduction in value. The project site, including the sandy beach and lagoon barrier, is located within an ESHA area as designated by the LRDP. In the case of the proposed project, the location of the pumphouse expansion and new intake lines are dependent upon the resources within those areas. The pumphouse expansion is located in its proposed location in order to connect to the existing pumphouse and to facilitate the construction of the wet well which requires the presence of sand deposits to a sufficient depth as provided at the proposed site. Although the entire project site is located within ESHA, the primary sensitive habitat resources are the sandy beach and the lagoon. Commission Staff notes that the existing lagoon barrier constitutes an extremely disturbed area within the ESHA.

However, the placement of the 2,500 ft. seawater intake lines will result in some localized short-term impacts to the marine environment (Exhibit 4). The Seawater Renewal System Final EIR dated May, 1997, and the Marine Biology/Water Quality Report by MEC Analytical Systems, Inc., dated 11/22/96 extensively analyze the adverse impacts to the marine environment which will result from the construction and operational phase of the seawater renewal system intake lines. Impacts from the placement of the intake lines during the construction phase will include indirect smothering of benthic organisms from increased turbidity of the water, direct smothering of benthic organisms from placement of the pipe, and possible interference with grunion spawning events. Impacts to kelp beds are not expected as the giant kelp is distributed sparsely at depths of 15-35 ft. along the proposed pipeline corridor and should not be significantly affected. In order to avoid any adverse impacts to grunion spawning events, the University intends to conduct all construction activity outside of the seasonally predicted run period and egg incubation period of the California Grunion. In order to ensure that construction activity does not adversely affect grunion spawning events, special condition three (3) has been required. In addition, special condition four (4) regarding construction responsibility and debris removal is required in order to ensure that impacts from construction activities do not adversely impact the intertidal zone. In addition, any impacts relating to the smothering of benthic organisms through placement of the intake line would be localized and short-term. Adverse impacts to water quality resulting from increased turbidity during the construction phase

of the project will also be localized and short-term. The Marine Biology/Water Quality Report by MEC Analytical Systems dated 11/22/96 states:

> ***Mobile organisms, such as fish and marine mammals (including sensitive species), would have the ability to leave or avoid the area of impact and not be affected. Organisms that are attached or buried, however, would be affected...While some smothering of benthic infauna may occur, effects are expected to be localized and short-term. These organisms are routinely impacted by winter storms and recover rapidly***

Impacts from the operation of the intake lines include increased surface area of hard substrate on the sea floor and impacts to biological resources from the intake of seawater. The increase in hard substrate surface on the sea floor will be localized in nature and result in a change of habitat in the affected area. The pipeline and anchor structures may result in the beneficial impact of the development of a hard-bottom community through the colonization of benthic invertebrates and algae. As such, the adverse impacts to the marine environment resulting from the physical presence of the new intake lines, and corresponding increase in hard substrate habitat will not be significant.

The proposed new intake lines would draw waters at the 60 ft. depth contour and increase the flow form the current capacity of the existing intake lines of 800 gallons per minute (gpm) to 1,200 gpm. The increase of 400 gpm will result in some reduction of larvae and other plankton from the nearshore environment. However, studies on effects of entrainment on plankton at the Ormond Beach Generating System in Oxnard (238,000 gpm at time of study) indicated that while there was no significant reduction in phytoplankton between intake and discharge sampling locations, there was a 10 percent loss of zooplankton due to mechanical damage.[24] The Marine Biology/Water Quality Report by MEC Analytical Systems dated 11/22/96 states:

> ***Although increased mortality of zooplankton is expected, the proposed level of increase (400 gpm) will not substantially diminish the local populations of marine biota; thus, impacts are considered non-significant.***

Based on the analysis of the Marine Biology/Water Quality Report by MEC Analytical Systems and the applicant's Final EIR, the Commission finds that the seawater renewal system component of the proposed project, including the placement of two new 2,500 ft. intake lines and expansion of the existing pumphouse will not result in any significant impacts on marine resources or water quality and is consistent with section 30230, 30231 and 30240 of the Coastal Act.

The University also proposes to construct a 460 ft. long rock revetment, 15-45 ft. wide, 10 ft. high rock revetment on the sandy beach in front of the existing lagoon barrier in order to protect the intake lines, pumphouse and lagoon barrier. However, as discussed in a previous section (IV.B.) the Commission finds that there may be alternative forms of feasible shoreline protection which have not been adequately addressed in the applicant's EIR.

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[24]Marine Biology/Water Quality Report by MEC Analytical Systems, Inc., dated 11/22/96.

As discussed in a previous section, one method for maximizing the retention of beach nourishment material not discussed in the EIR is to include a stable back beach dune into the beach nourishment project. This can often be very effective where there is limited space or nourishment material. The beach area seaward of the dunes can provide access and recreational opportunities and the dunes can provide habitat, new educational and scientific opportunities, reduce wind blown losses of sand, and provide a stable barrier to wave erosion and lagoon breaching. If appropriate, the dune system could be underlain by a rock or geotube core and covered by appropriate dune vegetation. Periodic additions of sand are often needed to sustain the dune system over the long term, but the amount of sand is usually less than that required for a standard beach nourishment program.

Staff notes that a sand replenishment project could result in short-term adverse impact to the benthic environment from sedimentation and increased turbidity. However, impacts to the marine environment from increased sedimentation and turbidity are temporary and are comparable to seasonal increases in the sediment load. As discussed above in regards to increased sedimentation resulting from the placement of the intake lines for the seawater renewal system, benthic organisms are routinely and seasonally subject to increased sedimentation conditions. Further, impacts to the benthic organisms may be minimized by conducting sand replenishment operations during those times of the year when the water is already subject to conditions of naturally occurring turbidity.

Further, the proposed rock revetment will cover most of the upper beach area of the Campus Lagoon Beach. This area has special habitat values and is studied by an upper division marine biology class each year. This area of the beach, which is subject to periodic tidal action, includes potential habitat for grunion spawning activities. The EIR noted that the rock revetment would cover this area, but did not provide a thorough analysis of the impacts from this loss; nor was there any mitigation proposed for this loss.

The UCSB Long Range Development Plan (LRDP) states that the Campus Lagoon must be prevented from naturally breaching in order to maintain its ESHA, instructional and research value. Although, the proposed rock revetment would protect the existing educational and scientific opportunities provided by the Campus Lagoon, it would also result in significant adverse impacts to the habitat, recreational and public access values of the beach area from the direct occupation of the sandy beach by a structure, as well as the potential scouring of the beach in front of the revetment, as discussed in a previous section. In addition, the Commission notes that alternative forms of shoreline protection such as dune nourishment and/or beach replenishment would not only serve to maintain but actually increase the currently available sandy beach habitat. Further, given the academic setting provided by the University, alternative forms of shoreline protection, such as dune nourishment and beach replenishment, may not only be feasible but could be studied providing valuable information to assist in

dune restoration efforts elsewhere along the coast while also serving to enhance the habitat, educational, and scientific value of the project site which is located within an area designated as ESHA by the University LRDP.

The Commission finds that there may be feasible shoreline protective alternatives which could result in less adverse impacts to the ESHA value of the project site than the proposed rock revetment and that these possible alternatives have not been adequately addressed in the EIR submitted for the proposed project. Therefore, it is not possible to conclude that the proposed rock revetment is consistent with Sections 30230, 30231 and 30240 of the Coastal Act. Special condition one (1) requires the applicant to submit revised plans for the seawater renewal system expansion which eliminates the placement of a rock revetment. Therefore, the Commission finds that, only as conditioned will the proposed project be consistent with the applicable sections of the Coastal Act.

G. CEQA

Section 13096(a) of the Commission's administrative regulations requires Commission approval of Coastal Development Permit application to be supported by a finding showing the application, as conditioned by any conditions of approval, to be consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(i) of CEQA prohibits a proposed development from being approved if there are feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse impact which the activity may have on the environment.

The Commission finds that there may be feasible shoreline protective alternatives which could result in less adverse impacts to the shoreline sand supply, public access and the habitat value of the project site than the proposed rock revetment and that these possible alternatives have not been adequately addressed in the EIR submitted for the proposed project. Special condition one (1) requires the applicant to submit revised plans for the seawater renewal system expansion without the placement of a rock revetment. The Commission finds that, the proposed project, only as conditioned, will not have significant adverse effects on the environment, within the meaning of the California Environmental Quality Act of 1970. Therefore, the proposed project, as conditioned, has been adequately mitigated and is determined to be consistent with CEQA and the policies of the Coastal Act.

APPENDIX

SUBSTANTIVE FILE DOCUMENTS

Scour and Overtopping Report by William Anikouchine, PH.D, dated 4/20/97.

Marine Biology/Marine Water Quality Report by MEC Analytical Systems, Inc., dated 11/22/96.

Certified Long Range Development Plan 1990-2005, University of California at Santa Barbara dated 12/11/86.

Final Environmental Impact Report for Seawater System Renewal Project, University of California at Santa Barbara, dated May 1997.

Draft Management Plan for the Campus Lagoon, University of California at Santa Barbara, dated August 1996.

Draft Environmental Impact Report/Environmental Assessment for the BEACON Beach Nourishment Demonstration Project by Chambers Group, Inc. dated February 1992.

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LETTERS and MEMOS

Letter to Catriona Gay, UCSB Budget and Planning, from Barbara Dugal, State Lands Commission staff member dated December 15, 1997.

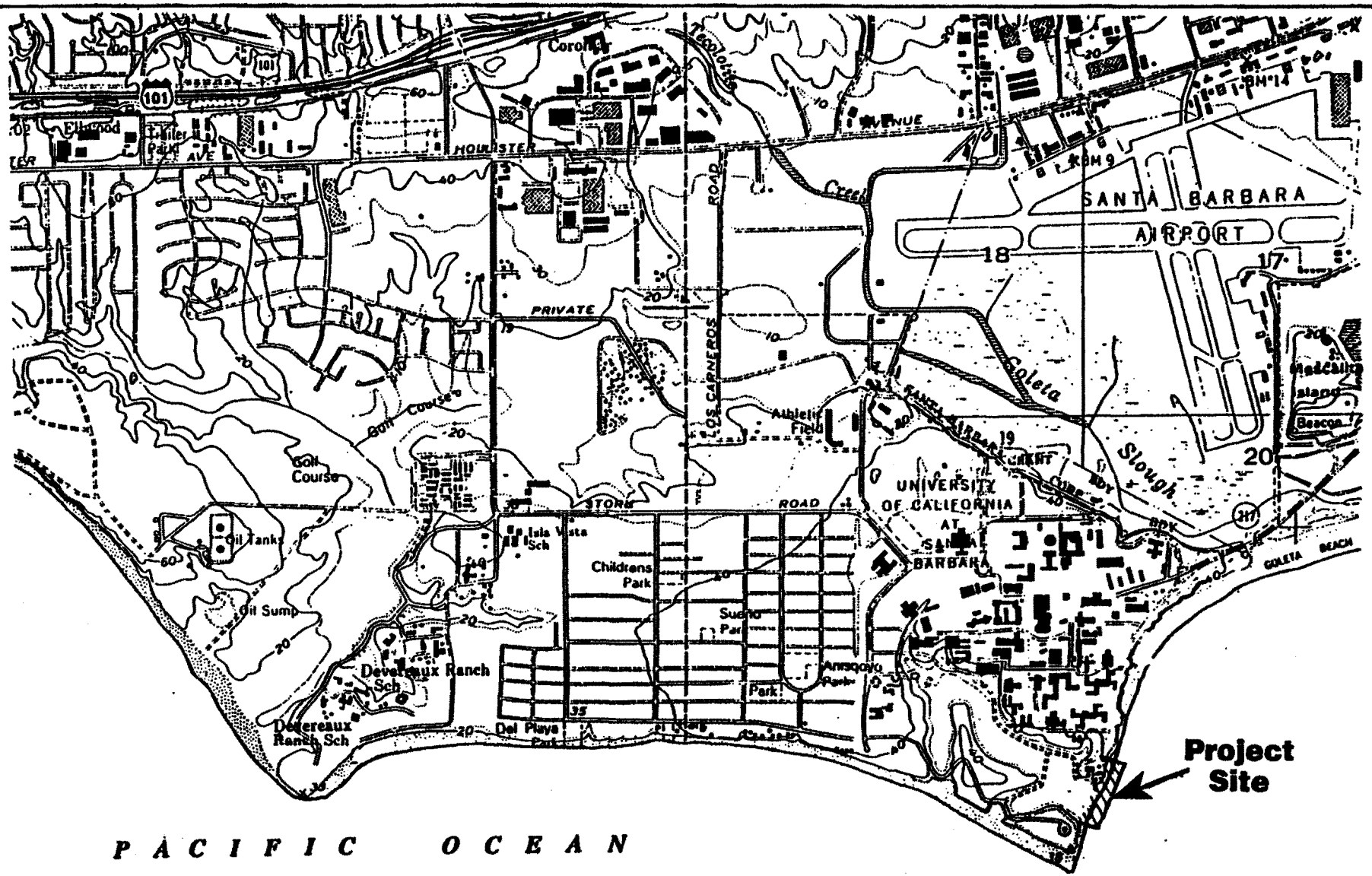
Letter to Frank Castanha, UCSB Facilities Management from Charles Watson, Penfield & Smith Engineers and Surveyors dated February 6, 1998.

Letter to Lesley Ewing from Douglas Inman, Ph.D., February 25, 1991.

Letter to Lesley Ewing from Dr. Craig Everts of Moffatt and Nichol Engineers, March 14, 1994.

COASTAL PERMIT APPLICATIONS

Staff Report Lechuza Villas West 2/4/97 (Lechuza Villas West); 4-94-200 (Dussman); 4-97-071 (Schaeffer); and 4-94-012,013,014,107 and 111 (Hill, Green, Irving, Gale & Moorman).



Source: USGS 7.5' topo, Dos Pueblos Canyon and Goleta Quadrangles.

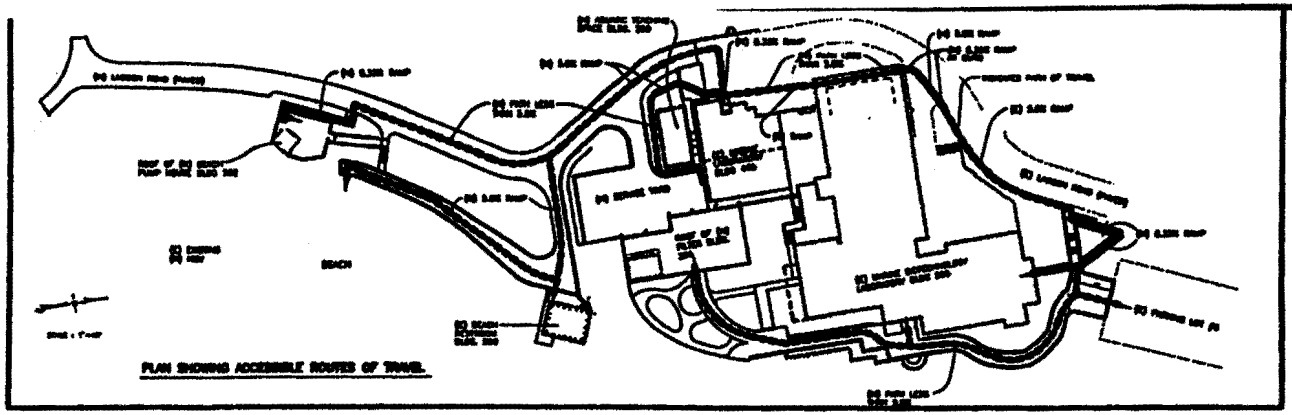
0 1/2 mile

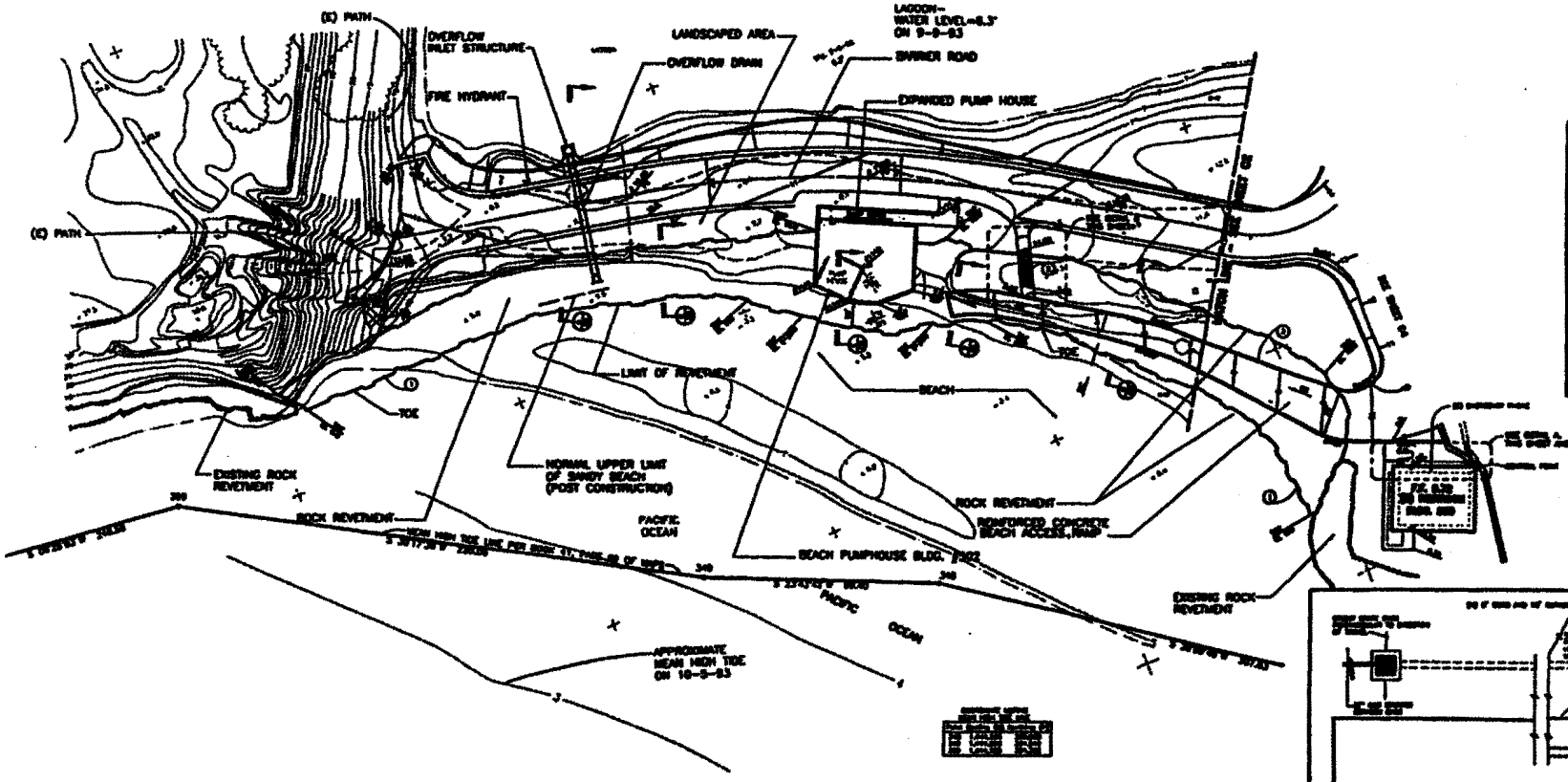
Figure 1 Regional Location Map

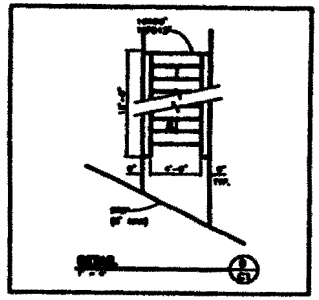
EXHIBIT 1
Permit 4-97-156
Regional Location

Figure 2 Project Location Map

EXHIBIT 2
Permit 4-97-156
Project Location







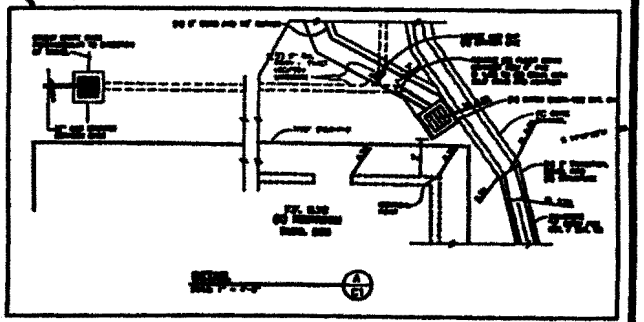
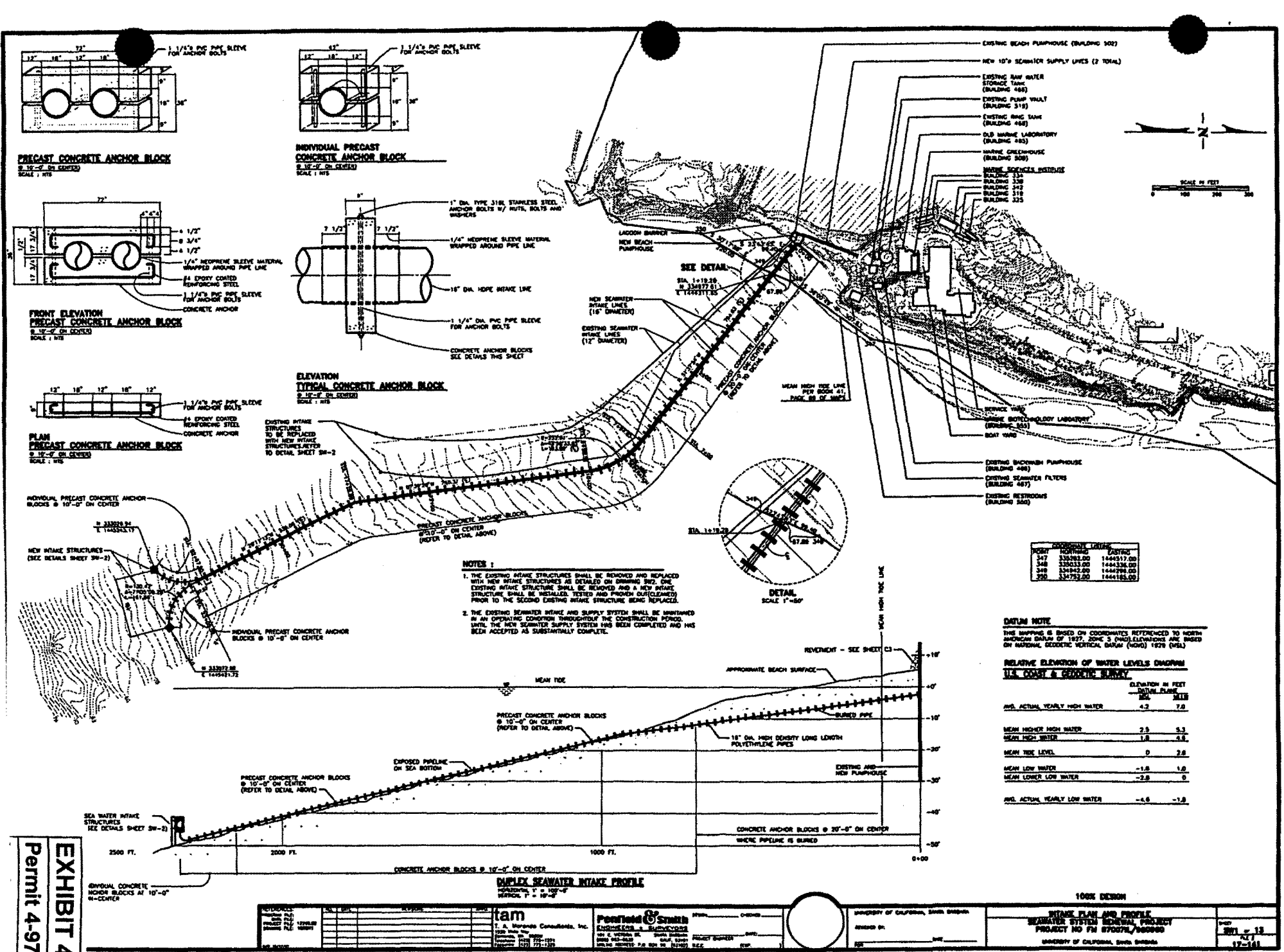


EXHIBIT 3
Permit 4-97-156



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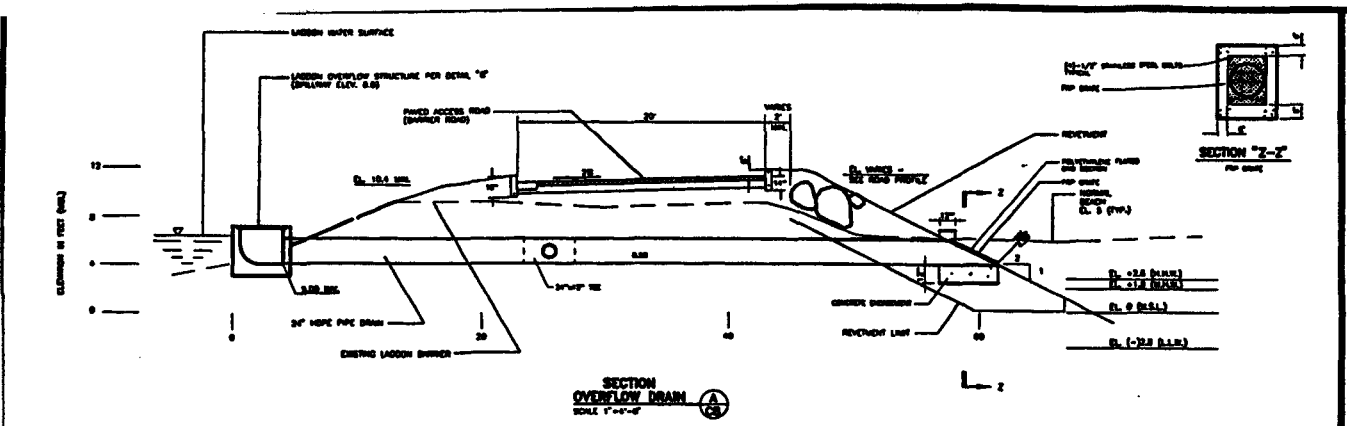

SECTION
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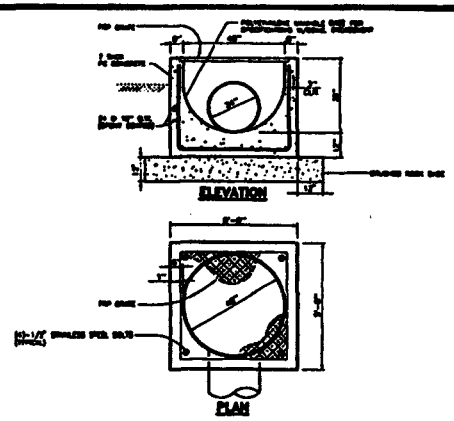
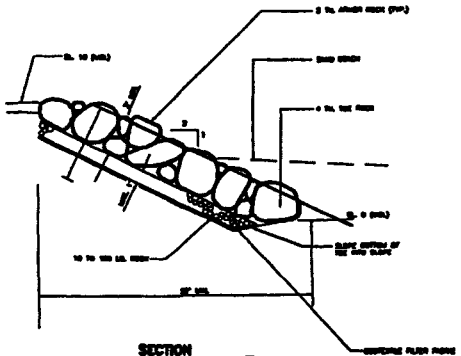


OVERFLOW STRUCTURE (B/C8)



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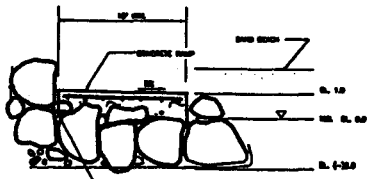

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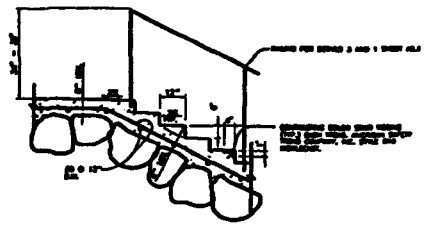
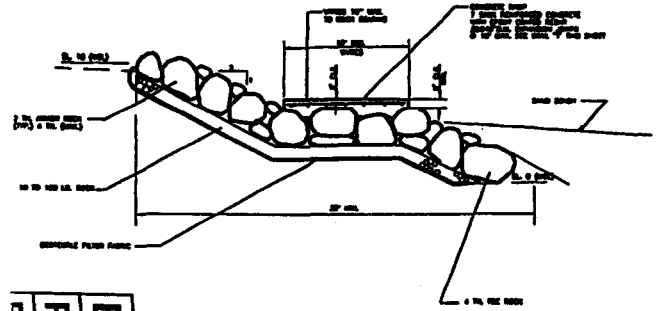


STAIR DETAIL (H/C8)



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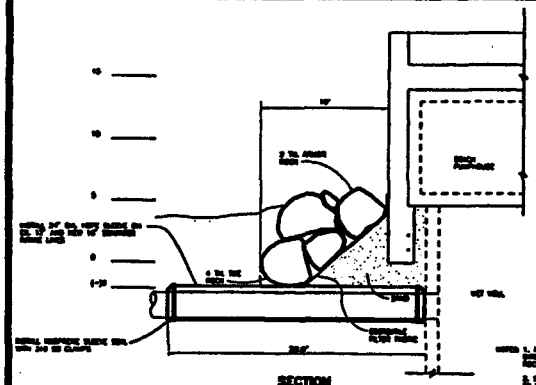

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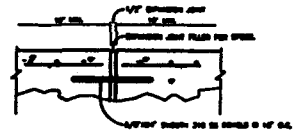


EXPANSION JOINT DETAIL (I/C8)

100% DESIGN

EXHIBIT 5
Permit 4-97-156

tam
T. A. Moseley Consultants, Inc.

Penfield & Smith
Engineers - Surveyors

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

LAGOON BARRIER REVETMENT DETAILS
SEAWATER SYSTEM REMEDIAL PROJECT
PROJECT NO. FM 97007IL/980000
UNIVERSITY OF CALIFORNIA, SANTA BARBARA

C8 of 14
17-141

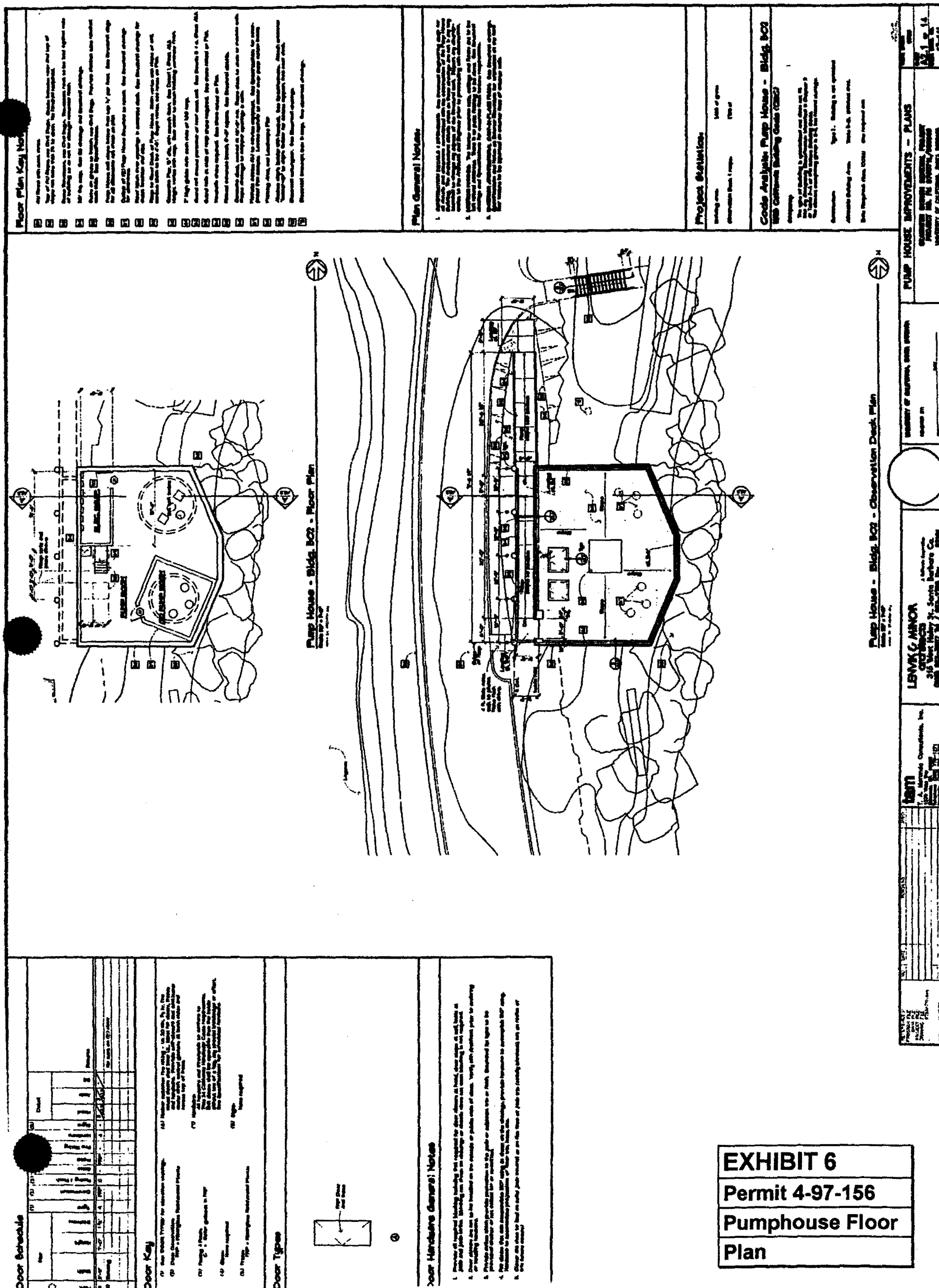
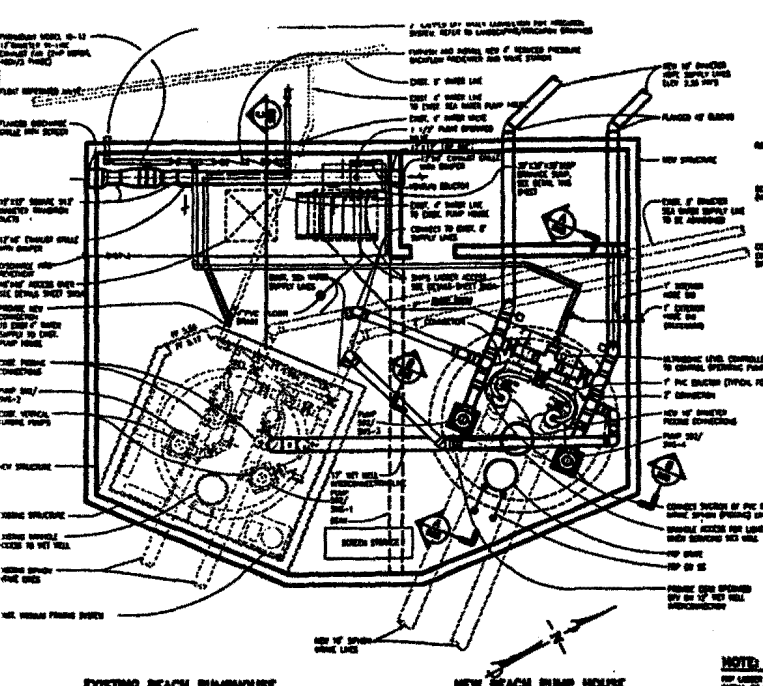
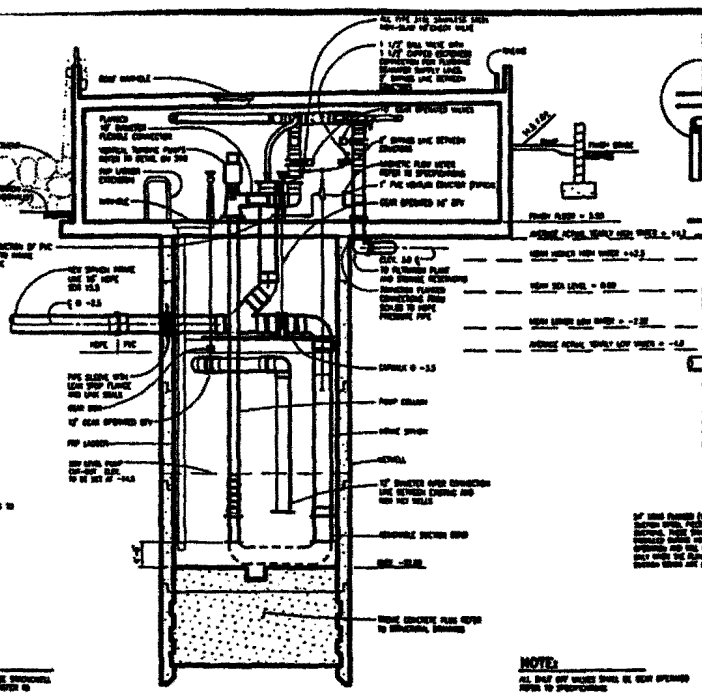


EXHIBIT 6
Permit 4-97-156
Pumphouse Floor Plan

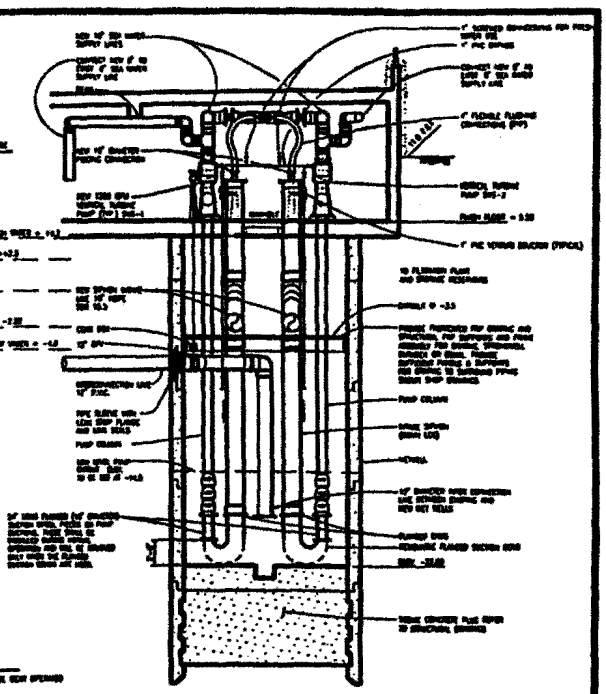


EXISTING BEACH PUMPHOUSE PLAN

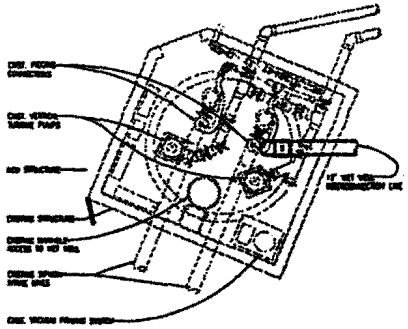
NEW BEACH PUMP HOUSE



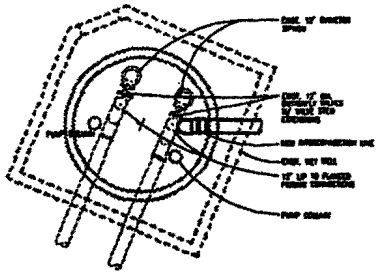
BEACH PUMP HOUSE SECTION "A-A"



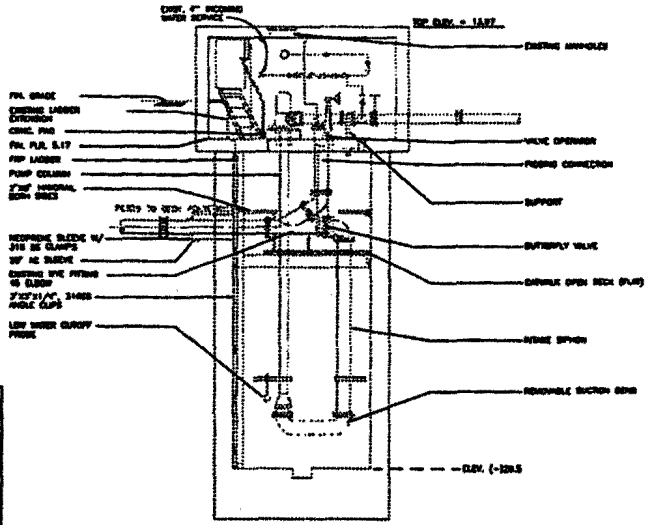
BEACH PUMP HOUSE SECTION "B-B"



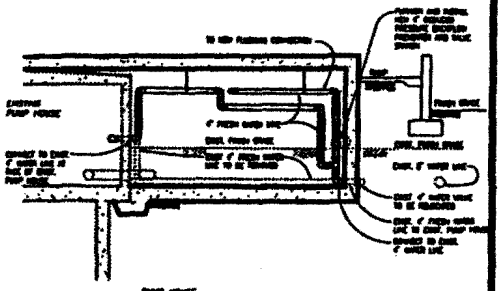
PLAN OF EXISTING PUMP HOUSE



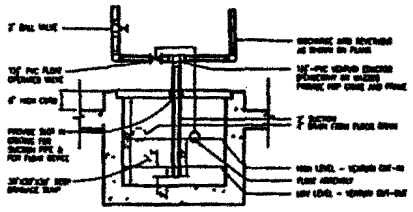
PLAN OF EXISTING WET WELL



EXISTING PUMP HOUSE SECTION

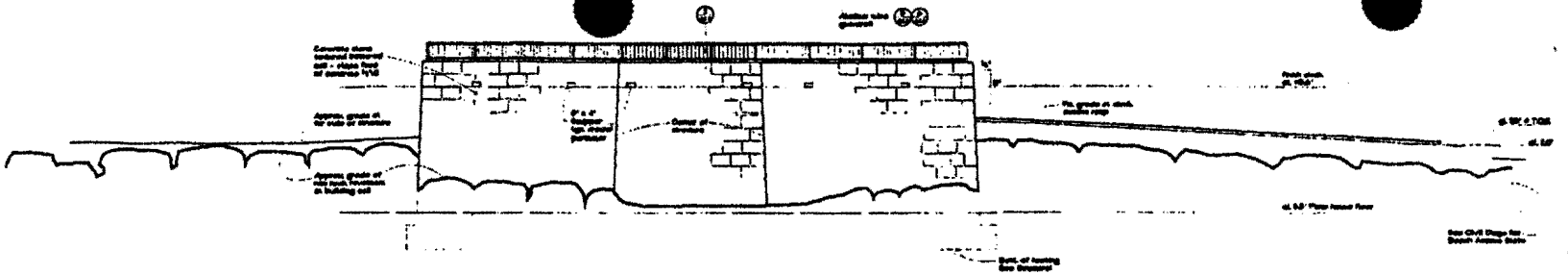


BEACH PUMP HOUSE SECTION "C-C"

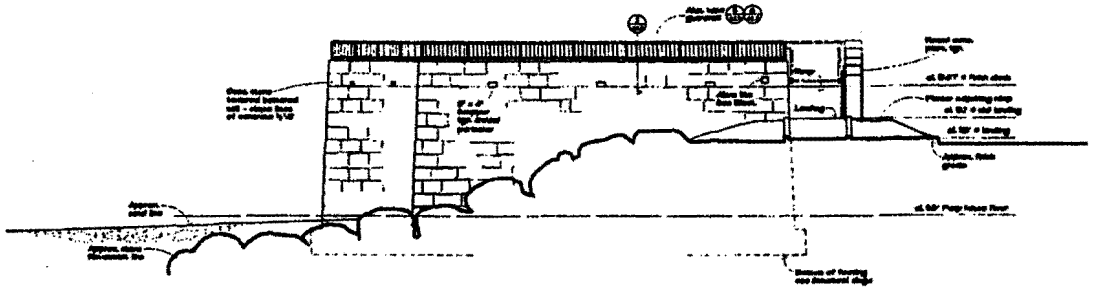


DRAINAGE SUMP DETAIL

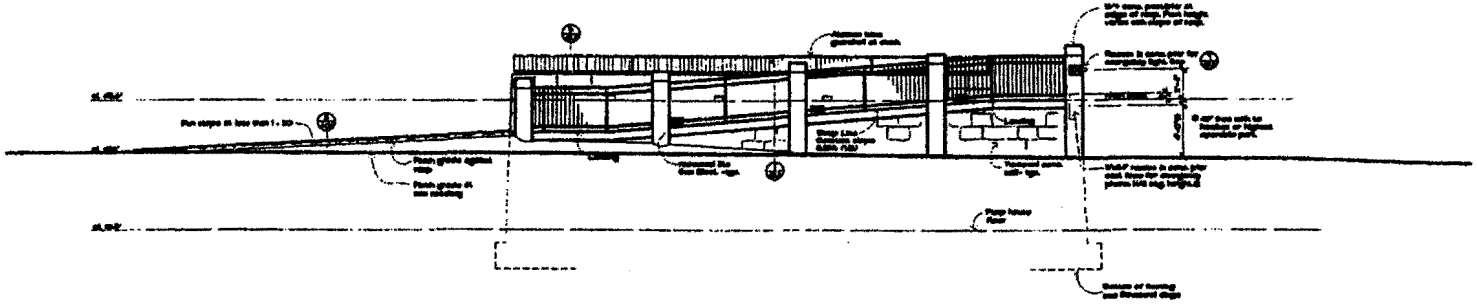
EXHIBIT 7
Permit 4-97-156
Pumphouse Cross Section



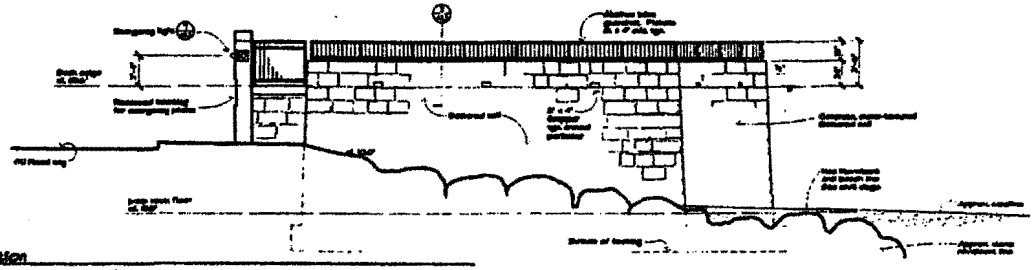
West Elevation



North Elevation



East Elevation



South Elevation

EXHIBIT 8
Permit 4-97-156
Pumphouse
Elevation

tam
T. A. Moruzzi Consultants, Inc.

LENVIK & MINOR
ARCHITECTS
315 West Haley St. Santa Barbara Ca.

PUMP HOUSE IMPROVEMENTS – ELEVATIONS

A2.2 of 14

STATE OF CALIFORNIA — PETE WILSON, *Governor*

CALIFORNIA STATE LANDS COMMISSION
100 Howe Avenue, Suite 100 South
Sacramento, CA 95825-8202

ROBERT C. HIGHT, *Executive Officer*
(916) 574-1800 FAX (916) 574-181
California Relay Service From TDD Phone 1-800-735-2
from Voice Phone 1-800-735-2929

Contact Phone: (916) 574-1833
Contact FAX: (916) 574-1925

December 15, 1997

File Ref: W 25374

Catriona Gay
University of California, Santa Barbara
Office of the Assistant Chancellor
Budget and Planning
Santa Barbara, California 93106-2030

Dear Ms. Gay:

Subject: Expansion of Seawater Renewal Project, Santa Barbara County

This letter confirms our recent discussions regarding the University of California, Santa Barbara's (UCSB) proposed seawater renewal project and serves to clarify the status of UCSB's application.

When staff reviewed UCSB's initial application, we determined that the existing and proposed intake pipelines would involve State lands under the jurisdiction of the Commission and a lease would be required. At that time, we had not made a final determination regarding the rock revetment and whether it involved lands under the jurisdiction of the Commission. Commission staff recently completed a formal review of the additional information provided regarding the rock revetment portion of the proposed seawater renewal project. Based on this review, we have determined that the revetment will involve lands under the jurisdiction of the Commission and will, therefore, require a lease. It is our intent to process a lease to the University for both the intake pipelines and for both the existing and proposed rock revetment.

I am currently drafting the proposed lease terms and am having a land description prepared. Normally, this portion of the application process can take between one and two months to complete. Once these two items have been completed, I will forward the proposed lease document to the University for review and consideration. After I receive the signed lease documents from the University, I will schedule this item to be heard by the Commission at a regularly scheduled Commission meeting.

I hope this clarifies the status of the University's application with the Commission. I do appreciate your patience and cooperation regarding the lease application. Please do not hesitate to contact me at (916) 574-1833 should you have any questions regarding the application process.

Sincerely,

Barbara Dugal
Public Land Management Specialist

EXHIBIT 9
Permit 4-97-156
State Lands Letter

cc: Rebecca Richardson
California Coastal Commission
89 South California Street, #200
San Buenaventura, CA 93001

Gary Timm
California Coastal Commission
89 South California Street, #200
San Buenaventura, CA 93001

Dr. Theresa Stephens
U. S. Army Corps of Engineers
2151 Alessandro Drive, #255
Ventura, CA 93001

February 5, 1998

To: Catriona Gay
Budget and Planning

Fr: Larry Nicklin, Manager
Biological Sciences

Re: History of Seawater System Problems at the Deep Well Pump House

On February 2, Shane Anderson, Supervisor of Marine Operations, and I participated in a conference call with other University staff to the California Coastal Commission Staff. The CCC staff were Jack Ainsworth, Steve Hudson, and Gary Timm. During the conference call reference was made by Shane Anderson to past seawater problems at the deep well that were caused by storms and other environmental conditions. The CCC staff appeared to be uninformed that the University has had these problems in the past.

Shane Anderson made the point that the pump house and the deep well require protection from the damage that can be and has been caused by high tides and storms. A revetment that encloses the distance between the existing revetment on the South and on the North side of the deep well will serve to protect the pump house structure. The revetment will also reduce or eliminate further damage to the existing and the proposed upgraded seawater system.

My staff and I have reviewed our history logs and have compiled on the attachment a brief statement of the damage sustained at the deep well since 1977. No effort was made to describe the corrective action in each case. However, the most extensive damage was in March 1983 and required a complete replacement of the seawater intake line at a cost of $250,000. Today, that cost would easily be twice that amount. In each case, the repairs have been documented by the Facilities Management department.

I also attach some copies of photos taken of some of the repairs that have been made at the deep well pump house.

Our history logs indicate that we have not sustained any damage at the deep well pump house during the period from June 1990 to August 1997. It is possible that some damage may have occurred, but no record was maintained by our staff. Also, I want to point out that the seawater system has periodic problems, but this listing includes only those situations that have occurred at the deep well pump house.

EXHIBIT 10
Permit 4-97-156
Damage Summary

As I mentioned on Monday to the CCC staff, it is extremely vital to the mission of the Biological Sciences Departments and to the Marine Science Institute that the seawater system remains operational at ALL times. The seawater is a vital component to these organization's research and teaching.

Attachments

UNIVERSITY OF CALIFORNIA
SANTA BARBARA

HISTORY OF DAMAGE TO SEAWATER SYSTEM AT DEEP WELL PUMP HOUSE
(BUILDING 502)

1977 March	East intake line undercut at deep well causing sagging of pipeline.
1978 June	Rupture of intake pipeline penetration resulting in groundwater contamination.
1978 August	Both seawater delivery lines to deep well and the freshwater main ruptured.
1979 November	East line ruptured at deep well pump house.
1980 January	Ground water penetration through intake pipe penetrations. Electrical conduits damaged.
1982 April	Circumfrential crack at bottom of deep well allowing ground water penetration.
1982 June	Intake lines broken and electrical conduit lines to deep well severed.
1983 March	East intake line destroyed by storm, West line damaged and deep well sanded in.
1988 January	East and West intake lines broken.
1988 December	West intake line sustained damage at deep well.
1989 January	Delivery lines from deep well ruptured.
1990 June	Broken intake line at deep well.
1997 August	East intake line at deep well cracked.
1997 August	Flooded electrical conduit and electrical panel in deep well.
1997 July	Sea water delivery line undermined and ruptured.
1997 December	Sea water delivery line undermined and ruptured.
1998 January	Fresh water main undermined and ruptured.
1998 January	Sea water and sand seepage through door from storm and wave action.

February 5, 1998