Th 10b

STATE OF CALIFORNIA—THE RESOURCES AGENCY PETE WILSON, Governor

CALIFORNIA COASTAL COMMISSION
SOUTH CENTRAL COAST AREA
SOUTH CALIFORNIA ST., SUITE 200
VENTURA, CA 93001
(805) 641-0142

RECORD PACKET COPY

Filed:	2/25/98
49th Day:	4/15/98
180th Day:	8/24/98
Staff:	S. Hudson
Staff Report:	3/24/98
Hearing Date:	April 9, 1998
Commission Action:	

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, 15-37 ft. wide, rock revetment, stairway, access ramp.

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

STAFF NOTE

This application was previously presented to the Commission at the hearing of March 12, 1998. No action was taken at that time; however, concerns were raised by staff and the Commission that the University had not included an adequate analysis of all feasible alternatives to the proposed rock revetment in its submittal as required by Section 30235 of the Coastal Act and by the California Environmental Quality Act (CEQA). At the Commission's request, this item has been rescheduled to be heard at the April Commission hearing in order to allow the University an opportunity to provide the additional information necessary for such analysis. On March 13, 1998, Commission staff informed the University (by letter sent by fax) what information is necessary to provide an adequate analysis of the alternative forms of shoreline protection (Exhibit 11). University staff indicated at the March Commission hearing that a comprehensive alternatives analysis had been previously carried out and that such information either had been submitted, or could be submitted, to Commission staff by the following week (March 16-20). The University was informed in the letter dated March 13, 1998, that any additional information to be included in the analysis for the staff report for the April hearing should be submitted to Commission staff by March 19,

1998. The University responded by letter dated March 18 and received by this office on March 20, 1998, stating that the University would submit information as soon as possible (Exhibit 12). However, as of March 24, 1998, no additional information concerning the proposed revetment and alternatives has been submitted by the University. As no new information has been submitted by the University, all information previously submitted before or at the March Commission hearing has been included for Commission review as Exhibits 13 (a-g).

In addition, several questions were raised at the March 12 Commission hearing by the Commissioners. The University (and the University's engineer in a letter dated 3/9/98) asserted at the March 12 hearing that the proposed revetment will cover only 12 percent of the beach. However, the amendment and coastal development permit applications submitted by the University state that the proposed "revetment would replace an estimated 25 to 50 percent of the sandy beach with large rock rip-rap which would reduce the area used for recreational activities on the beach..." As such, the University has submitted inconsistent information regarding the area of beach to be adversely impacted by the proposed rock revetment. Further, no information has been submitted by the University on how either of these figures were reached. Further, the mean high tide line is ambulatory by nature and; therefore, the percentage of available beach occupied by the proposed revetment is not a static number but would change depending on tidal conditions and seasonal fluctuations.

In addition, the question was also raised at the March Commission hearing as to the actual width of the proposed rock revetment. Based on the project plans submitted by the University for the proposed revetment, Commission staff and the University's engineering consultant have agreed that the proposed variable width rock revetment is most accurately described as being between 15 and 37 ft. in width. One difficulty in quantifying the percentage of beach that will be covered by the revetment arises from the seasonal and interannual changes in total beach area. While the area of available beach will fluctuate, the revetment will continue to occupy approximately 10,000 sq. ft. (almost 1/4 acre) of beach. As such, a significant portion of the available sandy beach will be occupied by the proposed rock revetment.

The University also asserted at the March Commission hearing that the public may not easily access the sandy beach from the existing lagoon barrier. However, Commission staff has observed public use of this access point on a daily basis. In addition, the height of the existing lagoon barrier was also questioned in regards to the proposed placement of 700 cu. yds. of fill to raise the height of the barrier. The University's engineering consultant has stated in two letters dated 3/9/98 and 2/6/98 that 90 linear ft. of the existing barrier would require 3 ft. of fill to raise the barrier to elevation 11 ft. Mean Sea Level (MSL), 200 linear ft. of the barrier would receive 2 ft. of fill and 75 ft. of the barrier would only require 1 ft. of fill (Exhibit 13c). In addition, the University has submitted project plans which calculate that the average elevation of beach sand is at 5 ft. MSL. Although, beach sand elevation is variable, as the lagoon barrier now exists, beachgoers may access the sandy beach from most of the approximately 400 ft. long barrier road with only an approximate change in elevation between the road and the

beach of approximately 3-5 ft. The placement of fill to raise the height of the road will create a condition where, under even the most favorable circumstances, there will be a change in elevation of 6 ft. between the barrier road and beach and an even greater difference in elevations during periods of lower sand elevations.

The University's engineering consultant has stated in the letter dated March 9, 1998, and submitted at the March 12, 1998, Commission hearing that the "mean high tide line does not under any of the storm scenarios prepared by Dr. Anikouchine reach the toe of the proposed revetment. Therefore, the revetment does not at any time become subject to State Lands jurisdiction" (Exhibit 13d, pg. 6). However, the Commission notes that this analysis of the proposed revetment in relation to the mean high tide line is in contradiction to that of the California State Lands Commission which has completed a formal review of the proposed project and has determined that the revetment would be located seaward of the mean high tide line at least some of the time (Exhibit 9). In addition, the University is required to obtain a lease from the State Lands Commission for the proposed revetment. As such, the Commission must conclude that the portions of the proposed project are located seaward of the mean high tide line and that the University has acknowledged this fact by its application for a lease from State Lands for the revetment.

Further, the University's oceanography consultant has stated in his letter dated March 8, 1998, and submitted at the March 12, 1998, Commission hearing that alternatives such as beach replenishment and dune nourishment (the construction of artificial dunes using a hard substrate) are not possible due to the fact that: (1) there is no source of sand without undue environmental impacts, (2) the cost is prohibitive, (3) the concept is not proven at or near site, (4) it is not possible to perform tests on source sand when it is needed during an emergency, and (5) it is not possible to place sand by barge or truck during a storm event and sand would need to be placed on either side of Goleta Point (Exhibit 13b, pg. 3).

Commission staff and the Commission requested but did not receive analysis of these alternatives, including detailed information on the constraints to beach and dune nourishment. Commission staff has not undertaken a detailed design for nourishment at this site. However, after inspection of the region and constraints raised by the University, Commission staff continues to believe that nourishment could be an acceptable alternative. Relative to this alternative, it is noted that the University's Final Environmental Impact Report identifies beach nourishment as the "environmentally superior alternative" which "would avoid most of the significant impacts of the project related to the shoreline protection while attaining the basic project objectives of protecting the seawater system" (Exhibit 13f, pg 22). Although beach replenishment could result in some impacts to marine resources which would require mitigation, this alternative was found to be infeasible due to costs.

Concerning the above constraints raised by the University's oceanography consultant, the Commission notes that several sources of potential nourishment material do exist near the subject site. The BEACON Beach Nourishment Demonstration Project Final

Environmental Impact Report dated 1992, identified 24 million cu. yds. of potential sand material located directly offshore of Goleta Point. In addition, the Goleta Slough, which is periodically dredged, may provide a possible source of replenishment material. The Santa Barbara County Flood Control District routinely cleans out their detention basins and has expressed interest in using beach quality material for nourishment projects. No analysis of these or other potential sources of beach sand was submitted by the University.

Second, the University's oceanography consultant has stated that costs for nourishment are prohibitive. However, the Commission notes that no analysis of the cost of any alternative forms of shoreline protection have been submitted by the University. Therefore, the Commission can not conclude that costs are prohibitive for this alternative.

Third, while the potential for nourishment has not been proven for this specific site, the Campus lagoon area provides many of the desired characteristics for successful nourishment. As noted by the University's engineering consultant, this is a sheltered location. The University's oceanography consultant has stated that "little wave energy reaches this beach compared to other places on the South Coast" and seasonal erosion of the beach is estimated to be only 20 to 30 ft. (Exhibit 13a, pgs. 2 & 6). These conditions indicate beach nourishment may be effective protection for the subject site. The lack of examples of proven nourishment projects in this area should not lead to an unsubstantiated conclusion to reject an otherwise acceptable alternative by the University.

Fourth, it is not clear why it would be necessary to either conduct sand replenishment activities or testing during a storm event as claimed by the University. Commission staff notes that these activities are typically carried out before the storm season or after a storm event. The purpose of beach and dune nourishment is to provide a sufficiently wide buffer in front of the area to be protected so that the beach or dune can erode without damage to the area landward of the buffer zone.

Finally, the University has submitted only minimal analysis of the beach replenishment alternative and no analysis regarding dune nourishment or a combination of the two methods. In addition, the University has submitted only minimal analysis of the environmental impacts related to the use of beach replenishment techniques and no analysis regarding dune nourishment. No analysis of alternative methods of delivery besides truck or hopper dredge has been submitted, such as the use of a pipeline, nor has any analysis regarding mixed alternatives, such as the use of a smaller revetment (possibly covered with sand) used in conjunction with a beach replenishment project, etc., been provided by the University. Since the University has submitted no new information or analysis of alternatives, and for the reasons discussed above, staff recommendation remains the same as presented to the Commission at the March 12 hearing.

SUMMARY OF STAFF RECOMMENDATION

Staff recommends approval of the proposed project with four (4) special conditions regarding revised plans and assumption of risk, timing of construction, and construction responsibilities/debris removal. 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, 15-37 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 to a lease agreement between the University and the State Lands 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., 15-37 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 from the project and relating to such hazards.

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, 15-37 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

[1] UCSB Draft Lagoon Management Plan

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 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, 15-37 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

---

[2] BEACON, Draft Environmental Impact Report for BEACON Beach Nourishment Demonstration Project, 1992.

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 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

[3] UCSB Draft Lagoon Management Plan

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]

---

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

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 15-37 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 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]

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.

---

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.

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:

> ***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":

---

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.

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

> ***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."

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

---

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.

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. <u>The third mechanism is flanking i.e. increased local erosion at the ends of walls.</u>***

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]***

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

---

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.

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.

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 "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.

---

[16] The Final EIR for the BEACON Beach Nourishment Demonstration Project, September 1992.

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 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

---

[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.

[18] Ibid.

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 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 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

---

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

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 15-37 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.

<u>The State Owns Tidelands, Which Are Those Lands Below the Mean High Tide Line as it Exists From Time to Time.</u> 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]

<u>The Commission Must Consider a Project's Direct and Indirect Impact on Public Tidelands.</u> 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.

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

---

[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)

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 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

---

[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.

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, 15-37 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, 15-37 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.

---

[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.

STUDIES AND PUBLICATIONS

Chrisiansen, Herman. "Economic Profiling of Beach Fills" in Coastal Sediments '77. 1977.

Dean, Robert G., "Coastal Sediment Processes: Toward Engineering Solutions". Coastal Sediments '87.1987.

Denison, Frank and Hugh Robertson. "Assessment of 1982-83 Winter Storms Damage to Malibu Coastline". California Geology. September 1985.

Graber & Thompson. The Issues and Problems of Defining Property Boundaries on Tidal Waters in California. California's Battered Coast (California Coastal Commission, 1985).

Griggs, G., K. Fulton-Bennet. Coastal Protections and Their Effectiveness. Joint Publication of the State of California Department of Boating and Waterways and the Marine Science Institute of the University of California at Santa Cruz.

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

Hale. "Modeling the Ocean Shoreline". Shore and Beach (Vol. 43, No. 2). October 1975).

Johnson. "The Significance of Seasonal Beach Changes in Tidal Boundaries". Shore and Beach. (Vol. 39, No. 1). April 1971.

Kraus, Nicholas. "Effects of Seawalls on the Beach". Journal of Coastal Research. Special Issue # 4, 1988.

Kuhn, Gerald G. Coastal Erosion along Oceanside Littoral Cell, San Diego, California. 1981

Maloney & Ausness. "The Use and Legal Significance of the Mean High Water Line Coastal Boundary Mapping". 53 No. Carolina L. Rev. 185 (1974).

McDougal, W.G., M.A. Sturtevant, and P.D. Komar. "Laboratory and Field Investigations of the Impact of Shoreline Stabilization Structures on Adjacent Properties". Coastal Sediments '87. 1987.

National Academy of Sciences. Responding to Changes in Sea Level, Engineering Implications. National Academy Press, Washington D.C. 1987.

Shepard, Beach Cycles in Southern California, Beach Erosion Board Technical Memorandum No. 20 (U.S. Army Corps of Engineers, 1950).

State of California. State Department of Boating and Waterways (formerly Navigation and Ocean Development). Shore Protection in California. 1976.

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

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.

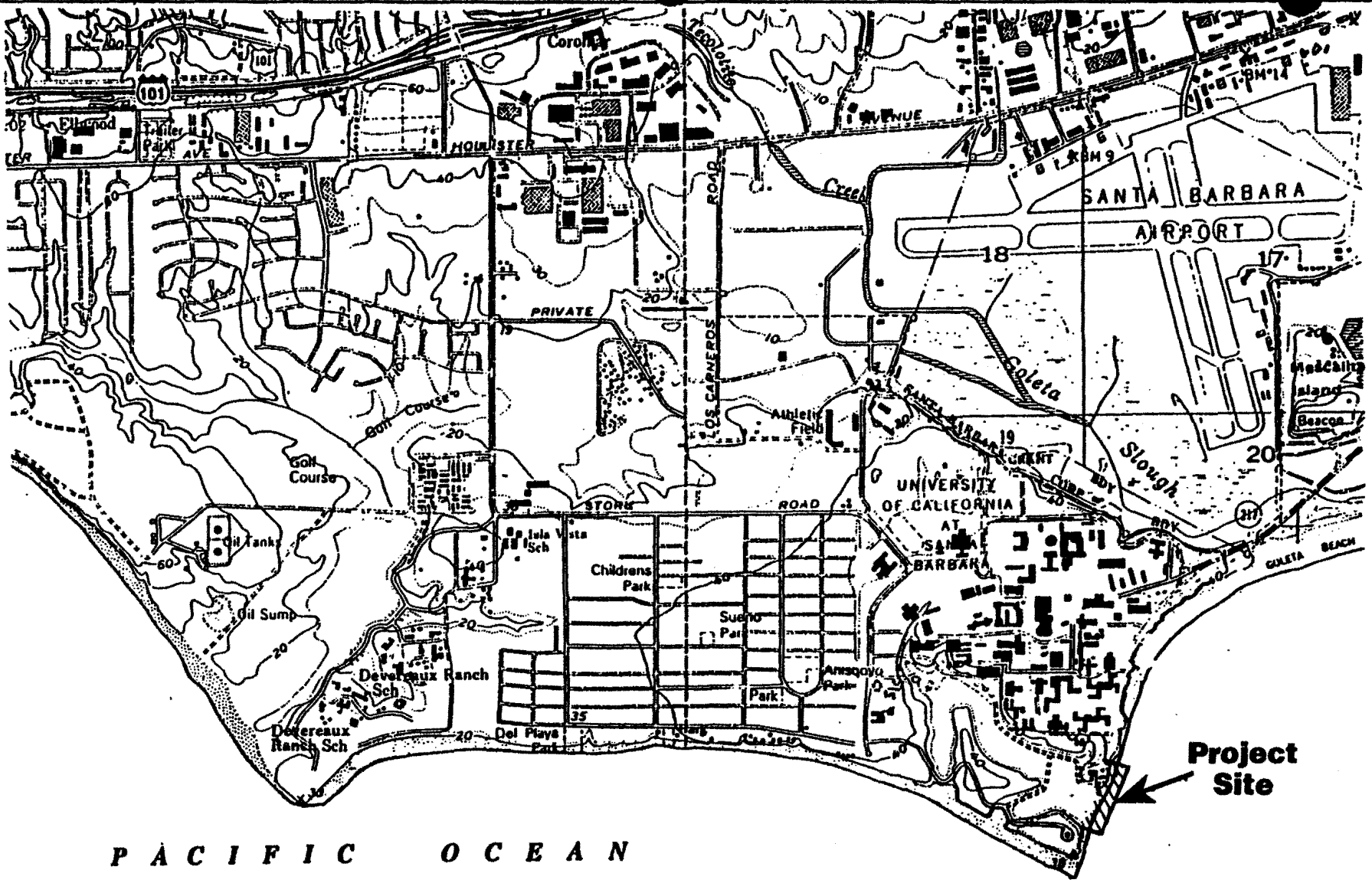
Letter to Lesley Ewing from Dr. Craig Everts of Moffatt and Nichol Engineers, March 14, 1994.

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).

EXHIBITS TO THE STAFF REPORT ARE ATTACHED SEPARATELY AS LISTED BELOW

Regional Location Map	(Exhibit 1)
Project Location Map	(Exhibit 2)
Site Plan	(Exhibit 3)
Intake Plans	(Exhibit 4)
Revetment Details	(Exhibit 5)
Pumphouse Floor Plan	(Exhibit 6)
Pumphouse Cross Section	(Exhibit 7)
Pumphouse Elevations	(Exhibit 8)
State Lands Determination Letter	(Exhibit 9)
Summary of Storm Damage	(Exhibit 10)
Request for Additional Information	(Exhibit 11)
UCSB Response Letter	(Exhibit 12)
Scour and Overtopping Report	(Exhibit 13a)
UCSB LRDPA 2-97	(Exhibit 13b)
Revetment Design Letter	(Exhibit 13c)
March Hearing Submittal	(Exhibit 13d)
UCSB March Hearing Submittal	(Exhibit 13e)
EIR Alternatives Section	(Exhibit 13f)
UCSB Letter	(Exhibit 13g)
Letters from Public Against Revetment	(Exhibit 14a)
3 of 17 Letters from UCSB Staff	(Exhibit 14b)



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

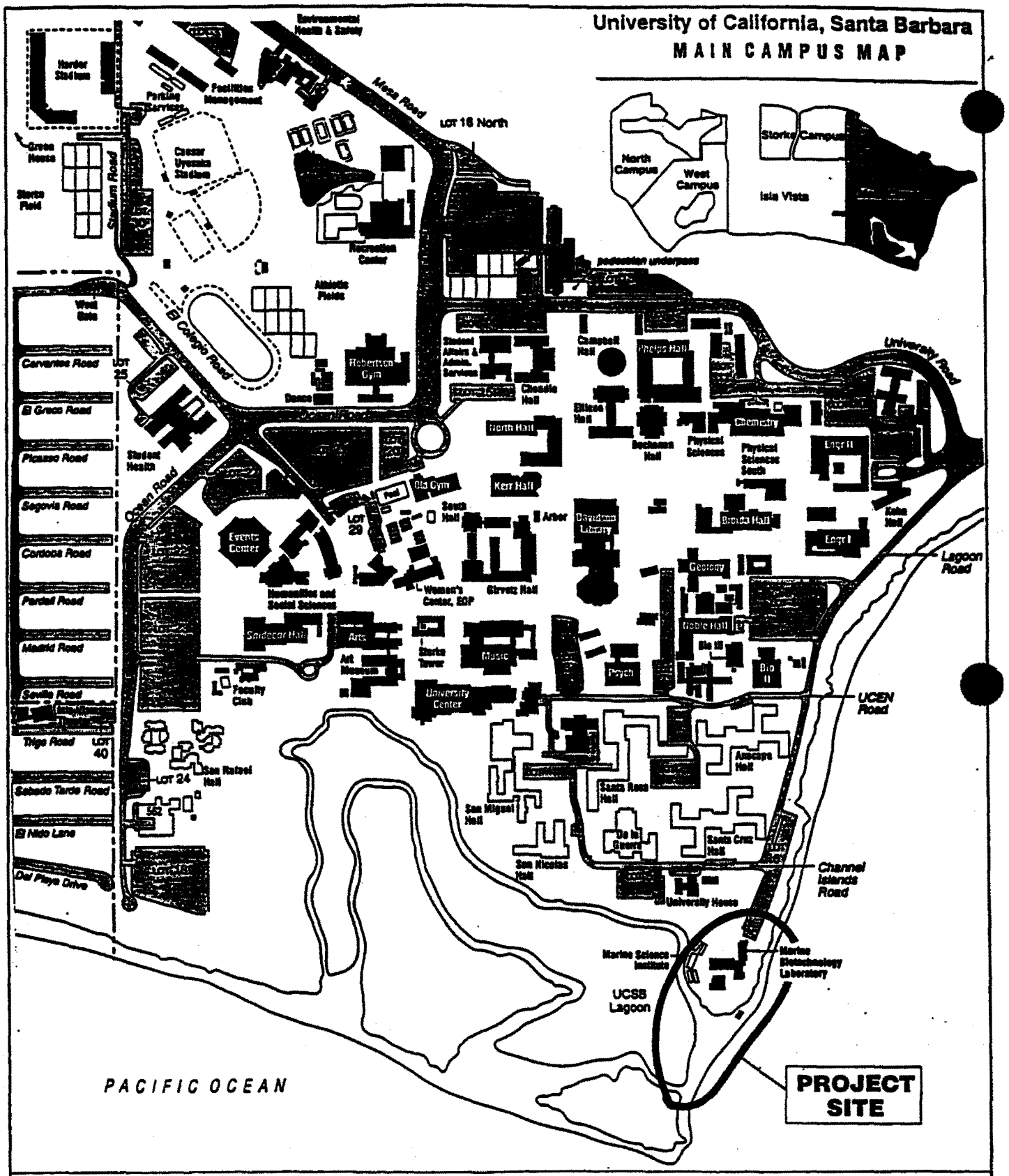
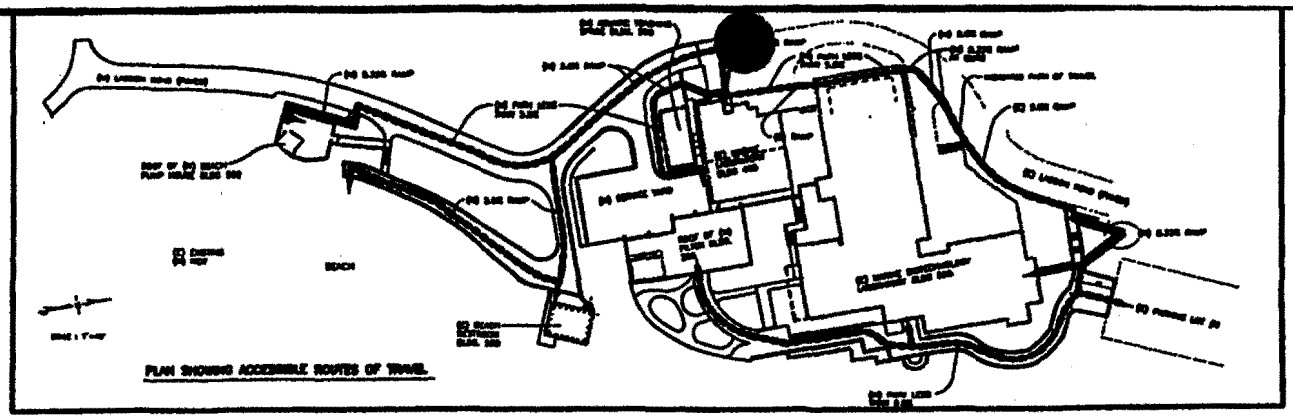
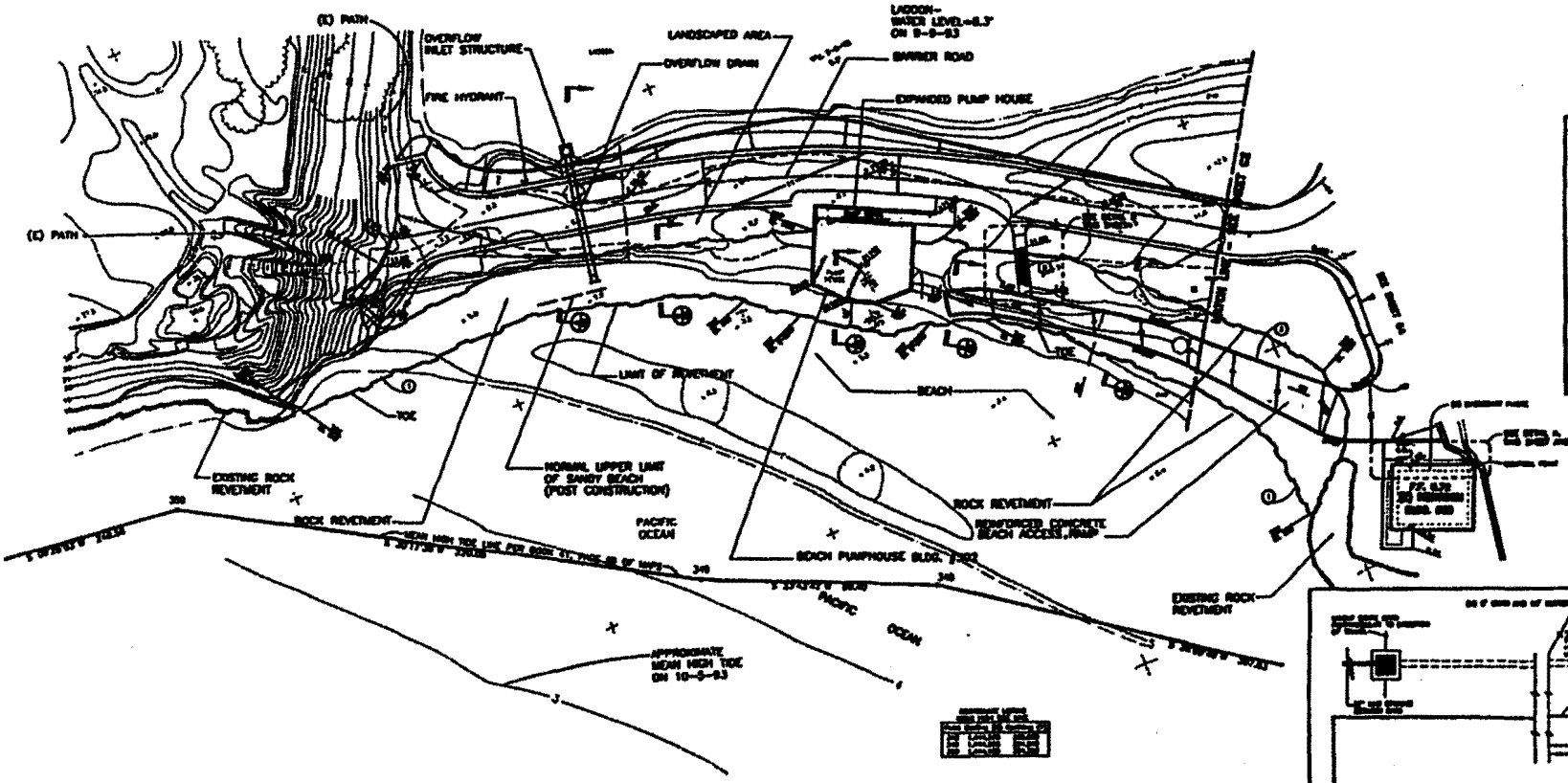
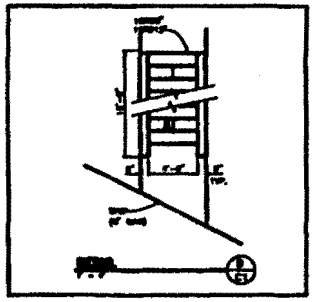


Figure 2 Project Location Map

EXHIBIT 2
Permit 4-97-156
Project Location







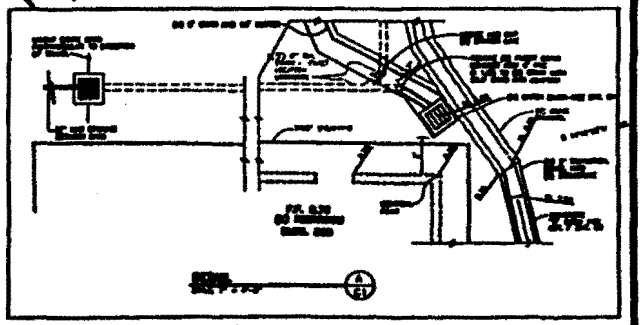


EXHIBIT 3
Permit 4-97-156
Site Plan

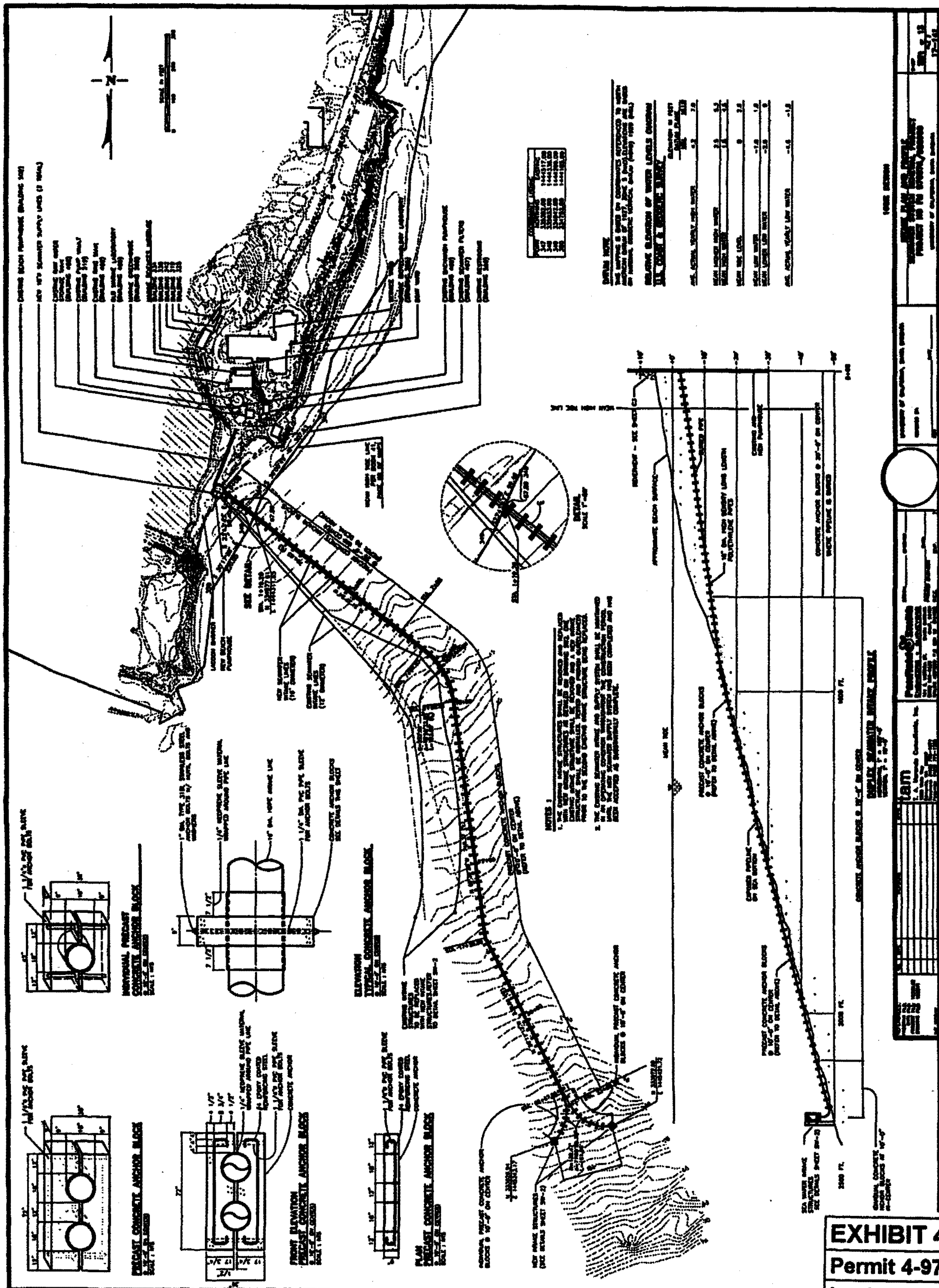


EXHIBIT 4

Permit 4-97-156

Intake Plans

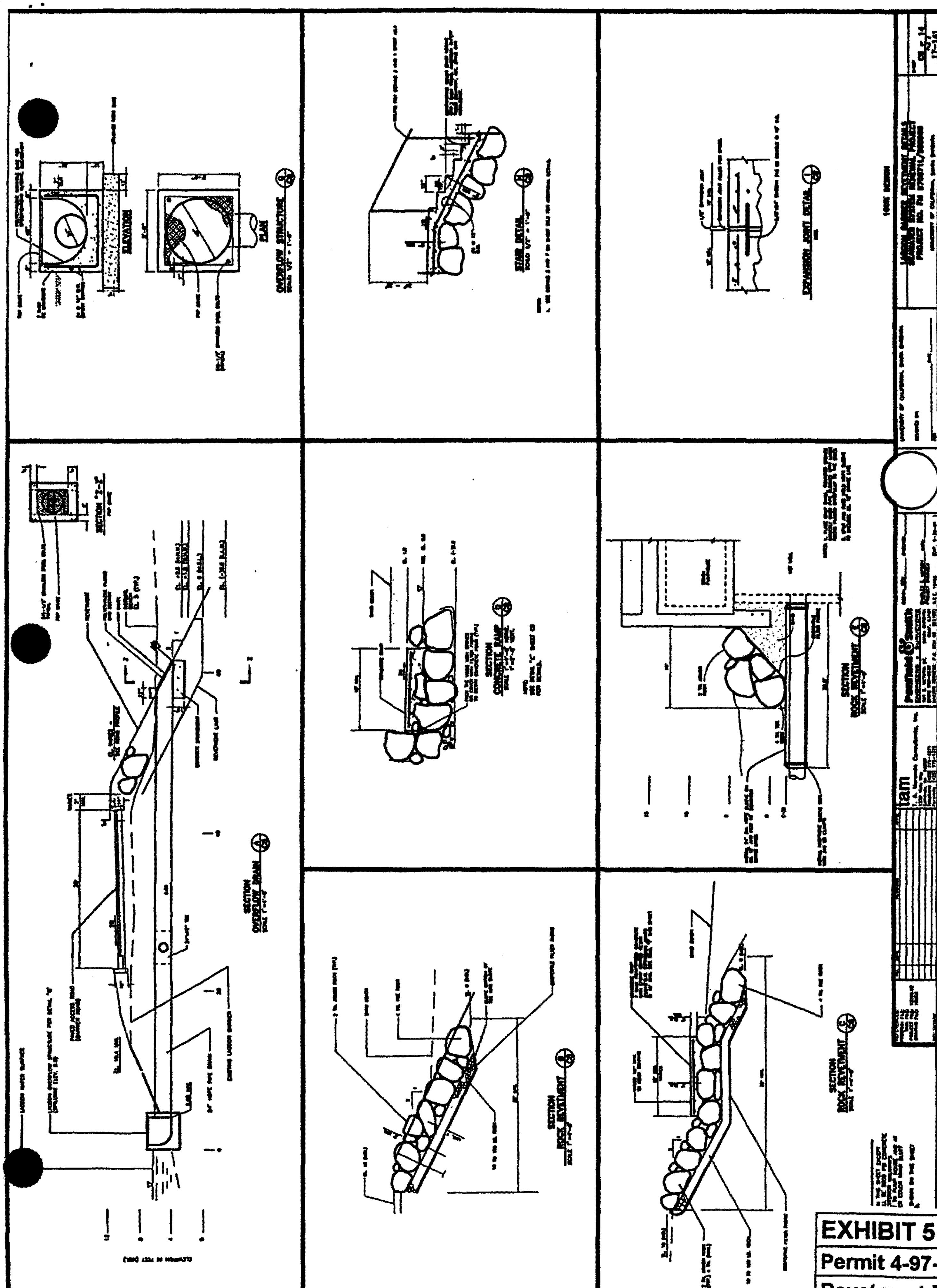


EXHIBIT 5

Permit 4-97-156

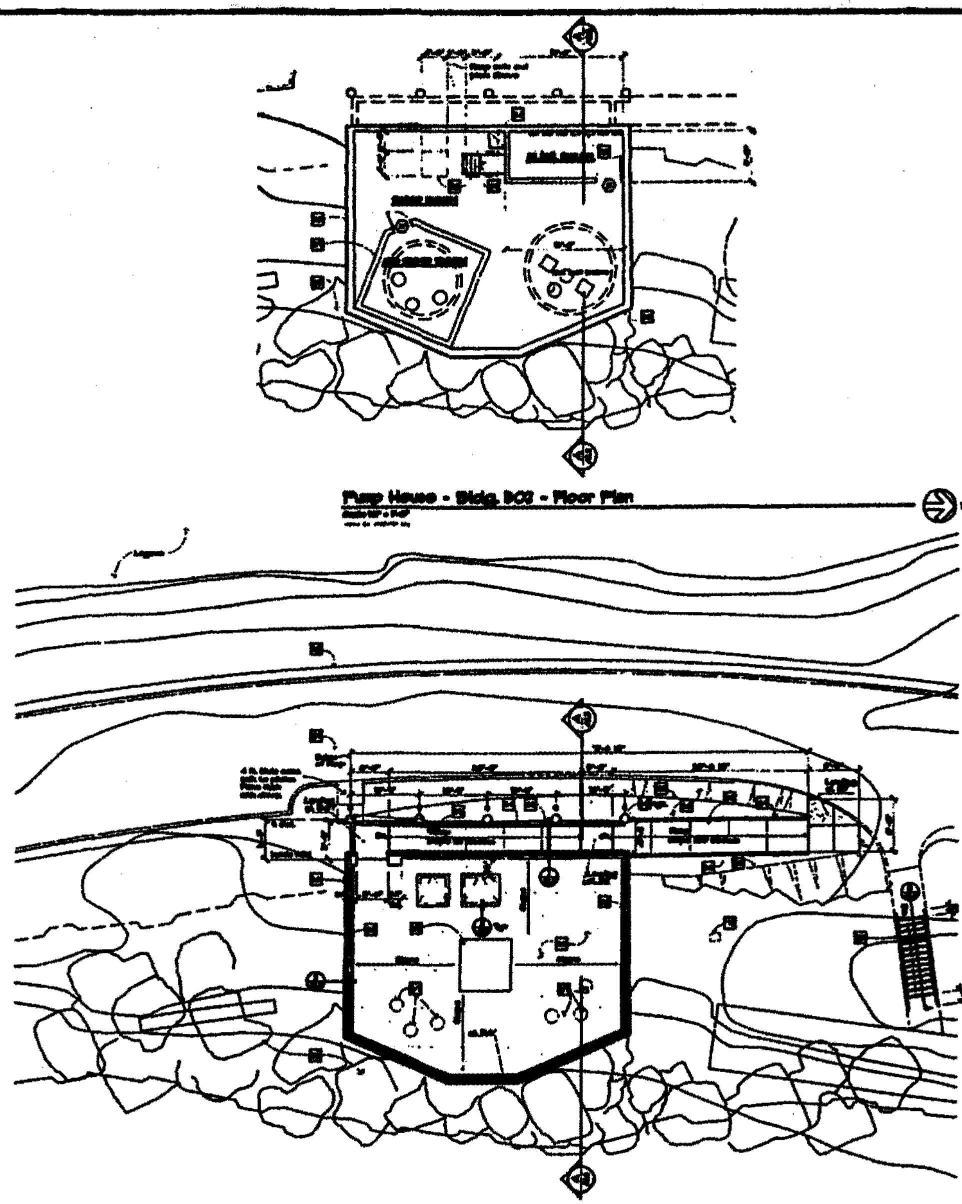
Revetment Details

Door Schedule

Door Key

Door Types

Door Hardware General Notes



Pump House - Bldg. 502 - Floor Plan

Pump House - Bldg. 502 - Observation Deck Plan

Floor Plan Key Notes

Plan General Notes

Project Statistics

Code Analysis: Pump House - Bldg. 502

1998 California Building Code (CBC)

LENVIK & MINOR ARCHITECTS

315 West Haley St. Santa Barbara Ca.

PUMP HOUSE IMPROVEMENTS - PLANS

EXHIBIT 6

Permit 4-97-156

Pumphouse Floor Plan

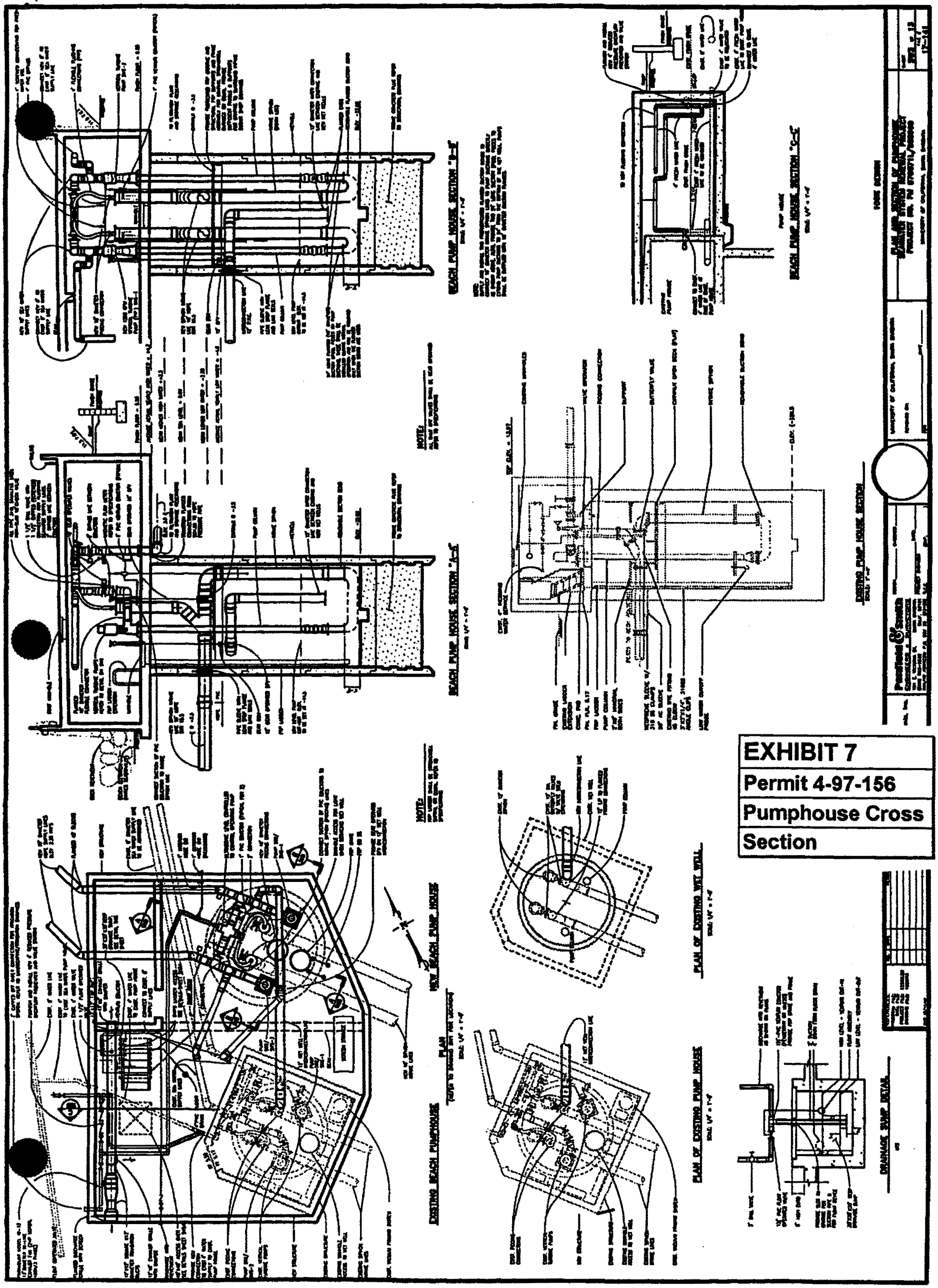
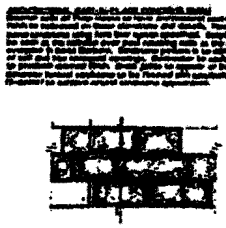
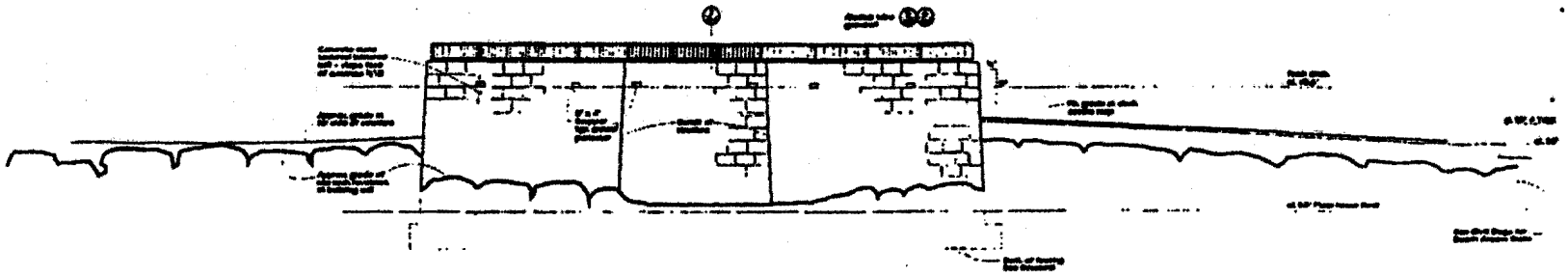


EXHIBIT 7

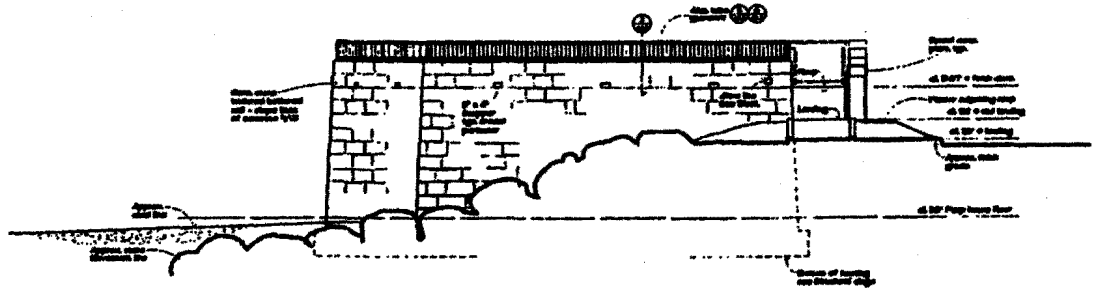
Permit 4-97-156

Pumphouse Cross Section

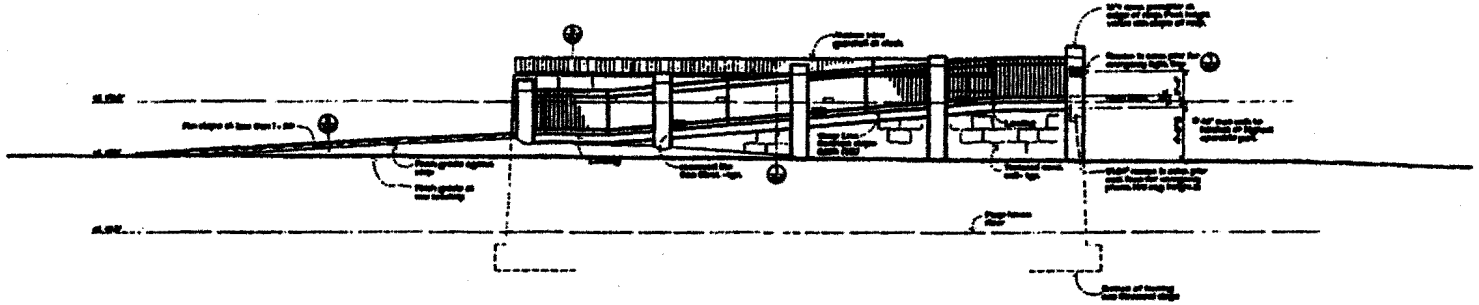




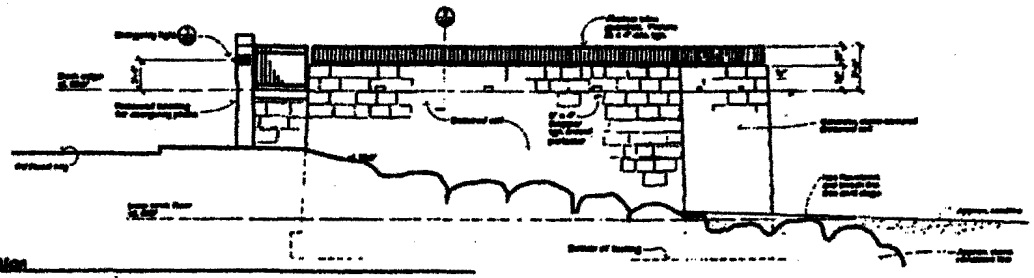
East Elevation



North Elevation



West Elevation



South Elevation

EXHIBIT 8
Permit 4-97-156
Pumphouse
Elevation

LENVIK & MINOR
ARCHITECTS

PUMP HOUSE IMPROVEMENTS – ELEVATIONS

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) 574-1810
California Relay Service From TDD Phone **1-800-735-2922**
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

CALIFORNIA COASTAL COMMISSION
SOUTH CENTRAL COAST AREA
89 SOUTH CALIFORNIA ST., SUITE 200
VENTURA, CA 93001
(805) 641-0142

March 13, 1998

EXHIBIT 11
Permit 4-97-156
Request for Additional Information

Catriona Gay
Senior Planner
Physical and Environmental Planning
Office of the Assistant Chancellor - Budget and Planning
University of California Santa Barbara
Santa Barbara, CA 93106-2030

Re: Long Range Development Plan Amendment 2-97 and Coastal Development Permit 4-97-156

Dear Ms. Gay:

In response to the issues raised by the Commission and public at the March 12 hearing, additional information is necessary to provide an adequate analysis of the alternative forms of shoreline protection. Please provide the following:

1. Conceptual design and detailed feasibility analysis for beach nourishment and dune nourishment programs.

2. An environmental impact analysis of dune nourishment and beach replenishment compared to the proposed rock revetment.

3. An analysis of the potential for the use of sand from the off-shore sand deposit (identified in the Final Environmental Impact Report for the BEACON Beach Nourishment Project dated September 1992), as well as any other feasible sources, as a borrow site. Include an analysis of suitability of sand from this borrow site for dune and beach nourishment. Discuss transport methods (pipeline, hopper dredge, etc.).

4. A detailed analysis of interim protection, such as the emergency deployment of sandbags or other measures.

5. An alternatives analysis for constructing a revetment to only protect pump house (include mixed alternatives analysis including pump house revetment with sand and/or dune nourishment program).

6. An alternatives analysis for the construction of a smaller rock revetment. Discuss the feasibility of a smaller revetment which could be covered by sand.

7. A detailed analysis of options of mixed shoreline protection alternatives (such as the use of a dune nourishment program and a smaller revetment, revetment to protect the pump house and intakes with dunes to protect the lagoon area, etc.).

8. An analysis of the long-term (for the life of the pipeline and pump house facility) maintenance needs for all alternatives.

9. Stability analysis of the pump house without a revetment in relation to wave action as it is constructed upon 16 grade beam driven piles, as well as, the wet well structure itself which also acts as a stabilizing foundation. Include alternatives analysis for reinforcing appurtenant intake and electrical lines.

10. Quantification of beach area covered by revetment (both cobble and sand). If possible, an aerial photograph of the project site beach with an overlay showing the proposed revetment would assist in this analysis.

11. A detailed analysis of potential wave refraction/diffraction and scour impacts on the beach from all possible alternatives including the revetment (discuss impacts to sand supply, public access and surfing) and mitigation measures if adverse impacts result.

If you have any questions regarding this project or the above requested information, please do not hesitate to contact Steve Hudson of our office. As per Commission direction, this item will be scheduled for the April Commission hearing in Long Beach. University staff indicated at the March Commission hearing that a comprehensive alternatives analysis has been previously carried out by the University and that such information could be submitted to Commission staff by next week (March 16-20). In order to facilitate this matter, please submit the requested information as soon as possible. However, please note that for new information to be included in the analysis for the staff report for the April hearing, it must be submitted to this office by no later than March 19, 1998.

Sincerely,

For Gary Timm
District Manager

cc: Steve Scholl
Chuck Damm
Leslie Ewing

Item 4

UNIVERSITY OF CALIFORNIA, SANTA BARBARA UCSB

BERKELEY · DAVIS · IRVINE · LOS ANGELES · RIVERSIDE · SAN DIEGO · SAN FRANCISCO SANTA BARBARA · SANTA CRUZ

Office of the Assistant Chancellor –
Budget and Planning
Santa Barbara, CA 93106-2030
Tel: (805) 893-3971
Fax: (805) 893-8388

March 18, 1998

Mr. Gary Timm, District Manager
California Coastal Commission
89 South California Street, Suite 200
Ventura, California 93001

Dear Mr. Timm:

Catriona Gay is on vacation this week and I am responding on behalf of the University to your letter faxed to us on March 13, 1998. We will do our best to respond to as many of your requests for additional information as is feasible.

The focus of our approach will be to provide the specific information the Commissioners requested on alternatives to the proposed project. We do not anticipate any new information, but rather a more concise explanation and elaboration of information already provided, in response to the questions of the Commissioners.

I realize that, as Mr. Douglas indicated at the hearing, it may not be possible for Commission staff to perform additional analysis for the April hearing. I assure you that, as we have in the past, the University will provide you with all the information we have available, as soon as possible, in order for the Commissioners to arrive at the best possible decision.

Sincerely,

Martha J. Levy, Director
Capital and Physical Planning

cc: Coastal Commissioners
Steve Scholl
Chuck Damm
Leslie Ewing
Tye Simpson
Catriona Gay

EXHIBIT 12
Permit 4-97-156
UCSB Response Letter

WILLIAM ANIKOUCHINE, PH.D
CONSULTANT IN MARINE AND EARTH SCIENCES

April 20, 1997

Mr. Charles E. Watson P.E.
President
Penfield and Smith Engineers
111 E. Victoria Street
Santa Barbara CA 93102

RE: Scour & Overtopping - Revetment at UCSB Seawater Intake
Project No. 12268.02

Dear Sir:

Herein is a report of my findings regarding oceanographic analysis of factors pertaining to the design of a rip rap revetment to protect the proximal end of a seawater intake at Goleta Point. The subject structure is to be located on a sand bar separating the UCSB campus lagoon from Goleta Bay. The revetment is to be placed such that it will armor the crest of the bar. Its seaward face will have a slope of 2 ft per ft. The toe of the revetment is to be placed at an elevation of 0 ft MSL.

The purpose of this report is to assess the effects of wave scour and overtopping upon the proposed revetment. The information required for this study was developed from data in the writer's files and from data and maps provided by Penfield and Smith Engineers.

TOPOGRAPHY AND BATHYMETRY

The crest of the sand bar separating the UCSB campus lagoon from Goleta Bay has a crest elevation of 10 ft MSL (12.8 ft MLLW). The bar is about 70 ft wide and

1636 HILLCREST RD. SANTA BARBARA, CA. 93103 805-962

EXHIBIT 13a
Permit 4-97-156
Scour and Overtopping Report

about 400 ft long. It extends between claystone outcrops at Goleta Point and at the bluff supporting the Marine Biotechnology laboratory building (Building 555).

The sand bar forms a barrier to free exchange of seawater with the water within the lagoon. The elevation of the water in the lagoon is typically about 6 ft MSL. This means that half of the time a head of between 6 ft and 10 ft is acting across the barrier. The rest of the time the head is from 0 ft to 6 ft.

The lagoon was formed when a barrier bar became built across an embayment formed by faulting associated with the More Ranch fault system. The barrier bar formed as a spit extended to the NE from Goleta Point until it reached completely across the embayment.

The beach on the ocean side of the bar is about 370 ft wide at mean tide. It faces Goleta Bay to the SE. Due S of the bar is the Santa Barbara Channel. The subaerial slope of the beach (the beach face) is rather flat, about 1 ft per 62 ft. The offshore slope is 1 ft per 41 ft to a depth of -60 ft MSL. Such flat slopes indicate that little wave energy reaches this beach compared to other places on the South Coast. The configuration of the beach profile is shown on Figure 1.

SOIL BORINGS

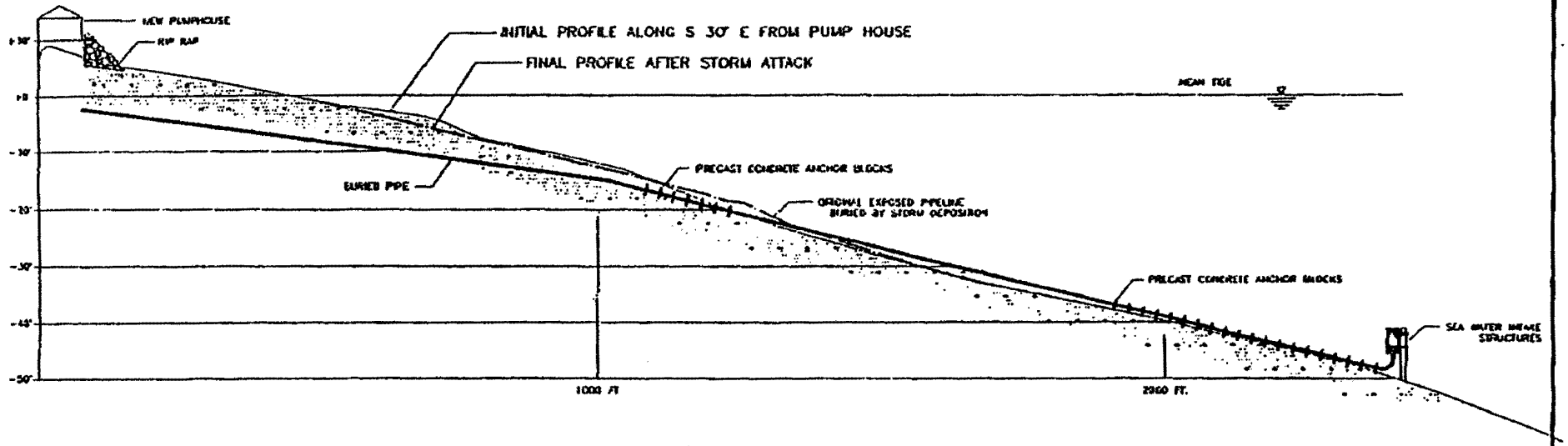
The sand forming the lagoon barrier bar was sampled by borings performed during the design of a seawater supply at the site. Borings were made in 1965 and 1974. The borings revealed that the substrate at the proposed revetment site is beach sand to a depth of at least 30 ft (-24 ft MSL). This means that the revetment will have to be founded in beach sand rather than a hard substrate such as claystone.

The analyses of sand samples from the vicinity of the proposed revetment indicated that the material is a fine sand having a median (D50) grain diameter of about 0.30 mm (No. 50 Standard Screen). The sand contains silt at depth.

SEVERE STORM WAVE ATTACK

The mainland and the Santa Barbara Channel Islands protect the subject site from attack by the WNW to N storms that reach the W entrance of the Santa Barbara Channel. Waves from the W to the WSW can reach the subject site; waves can reach

LITTORAL PROFILE AT SEAWATER INTAKE SHOWING EXTENT OF EROSION AND DEPOSITION CAUSED BY EXTREME STORM WAVE ATTACK



WILLIAM ANDRUSCHKEVICH P.E.
ENGINEERING CONSULTANT

BASE DRAWING COURTESY OF PENFIELD & SMITH ENGINEERS

FIGURE 1

the site from the SE as well. Locally generated waves from southerly directions are not as important due to their limited fetch in the channel.

Waves approaching the measurement site from both the WSW and the SE were included in the historical data set studied for this investigation.

The waves approaching the subject site from bearings between 245° and 270° and from between 145° and 170° are refracted as they approach to the site. The effect of such refraction is shown by the results of a refraction analysis of the subject site:

DIRECTION OF APPROACH	PERIOD Sec.	REFRACTION COEFFICIENT
135°	10	.87
255	10	<.44
255	12	<.44
255	14	<.44
255	16	.48 to .67
270	8	<.44
270	10	<.44
270	12	<.44
270	14	.44
270	16	<.44
270	18	.58

The results show that southeasterly waves are refracted the least. Waves passing from the W entrance of the Santa Barbara Channel to the subject site are refracted strongly by the channel bathymetry. Even so, waves from the W are usually higher and longer so the net effect is that westerly waves might cause higher runup at the subject site.

The evaluation of how the proposed revetment will behave under attack from severe storm waves was examined by using historical storm wave data that included waves from both the W and the SE. Storms during the interval from 1899 to 1996 comprise the data base used for this investigation.

The statistical analysis of the historical storms in the data set yielded the distribution of expected extreme W and WSW storm waves is given in the following table.

RETURN INTERVAL, yrs	STORM SIGNIFICANT WAVE HEIGHT, ft
2	11.0
5	17.1
10	20.6
25	24.5
50	27.1
100	29.4

The same distribution would apply to maximum wave heights as well as significant wave heights. The largest SE waves are often associated with WSW and W storms so the extreme event distribution would describe waves from either direction. Waves from this distribution were used to determine how severe storm waves will run up the beach and the revetment to be constructed at the subject site.

PREDICTION OF RUNUP ON THE BEACH AT GOLETA POINT

The characteristics of the distribution of extreme storms, the nature of the tides at the subject site and the pattern of wave refraction at the site were used to determine the nature of runup on the revetment to be constructed on the site.

The most severe wave runup occurs when a storm coincides with an extreme high tide. The tides used in the analysis of runup have the following characteristic levels.

ASTRONOMICAL TIDAL ELEVATIONS AND DATUM PLANES

Level	Elevation, Feet
Average Actual Yearly High Water	7.0*
Mean Higher High Water	5.30
Mean High Water	4.60
Mean Tide Level	2.80
N.G.V.D. of 1929	2.84
Mean Low Water	1.00
Mean Lower Low Water	0.00
Average Actual Yearly Low Water	-1.8*

* Includes wind effects. Measured at Los Angeles, California

The analysis of the runup expected at the subject site was performed using the initial profile shown in Figure 1. The beach profile extends along an azimuth of 150°. The details of the grades of the beach at the site were taken from plans provided by Penfield & Smith Engineers.

The runup expected on the beach and revetment during future severe storms was estimated for both SE wave attack and W to WSW wave attack. The results showed that the waves from the W to WSW caused slightly higher runup than those from the SE. The results from the W to WSW storms are given in the following table.

The table indicates the expected amount and frequency of overtopping of the revetment to be built at the site. Note that the runup and overtopping elevations are referred to the NVGD datum. This is virtually the same as MSL, the datum for elevations shown on the site plans.

RUNUP ENCOUNTER PROBABILITIES

RUNUP above NVGD ft	OVERTOPPING Ave. Vol cf/ft	Peak Vol. cf/ft	Peak Rate cfs/ft	Project Life, years 1	10	20	30	50
1	108	814	106	34.86	98.62	99.98	100.00	100.00
2	80	597	75	34.84	98.62	99.98	100.00	100.00
3	59	493	61	34.83	98.62	99.98	100.00	100.00
4	43	405	54	34.83	98.62	99.98	100.00	100.00
5	31	331	47	34.81	98.61	99.98	100.00	100.00
6	21	269	42	34.73	98.60	99.98	100.00	100.00
7	14	216	37	34.28	98.50	99.98	100.00	100.00
8	9	172	32	33.10	97.20	99.97	100.00	100.00
9	6	135	28	30.69	95.44	99.93	100.00	100.00
10	3	104	24	26.57	92.44	99.48	99.99	100.00

11 FT 21.77

Overtopping of the proposed revetment has a 27% chance of occurring every year. This is not surprising considering that the barrier bar was built and maintained by this mechanism. The bar has to be rebuilt each year to repair the erosion caused by strong winds. The probability of runup above any level increases with the interval of time considered. This is because the probability of encountering an extreme storm increases with time. Within 30 to 50 years the inundation is a virtual certainty below elevations of 10 ft NGVD.

The table must be used with the understanding that occasional overtopping is to be endured. The crest elevation of the revetment is expected to have a 27% chance of

being overtopped every year, but the average volume of water would be small, about 3 cu ft (about 22 gal) per linear ft of fronting structure.

The peak total flux of seawater over the crest of the revetment can be calculated by multiplying the length of the proposed revetment (370 ft) by the Peak Rate of Overtopping at 10 ft (24 cfs/ft). This yields an estimate of the maximum rate at which overtopping seawater must by removed.

BEACH EROSION

The scour of the beach and foreshore at the subject site occurs rapidly during the first few hours of a severe storm. Storm waves breaking on the beach cause a short, energetic shoreward impulse alternating with a long, accelerating seaward flow. Sand and coarser materials are thrust landward and then only finer sand is carried seaward.

As a result of the repeated reversing motion, 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.

Beach erosion at the site of the proposed revetment was investigated using the historical storms from the SE and W to WSW. SE waves were characterized by historical hindcast data. Beach erosion caused by waves from the WSW and W was investigated using wave data recorded during an actual storm in Feb-Mar 1983. This storm represents an extreme event having a return interval of about 100 yrs. Both wave directions were investigated to determine which was the most important in causing erosion of the beach at the subject site.

The erosion of the beach expected at the subject site was investigated using an explicit finite difference beach erosion and sediment transport simulation model. The model accepts data for the height and period of storm waves, variation in the local sea level related to winds and tides, granulometric properties of beach sediment, sea water temperature and the profile of the littoral offshore, the beach and structures on the beach. It can accommodate the presence of a seawall. The model requires the assumption of a sand beach.

To assure that the worst case was examined, the 5-day sequence of the storm of Feb-Mar 1983 was made to coincide with the signature of the highest spring tides of any

year. A rigid, impermeable wall was modeled at the location of toe of the proposed revetment. The model would indicate failure of the wall if the runup of the modeled storm waves scoured below the base of the wall.

The intent of the modeling was to disprove the hypothesis that the wall would fail by being undercut by wave erosion and scour. Such an event would represent the exposure of the toe of the proposed revetment to attack by storm waves.

The model simulations indicated that the waves from the W and WSW caused more erosion and deposition on the littoral profile than did waves from the SE. The W to WSW waves were higher and longer than the waves from the SE so that even strongly refracted W to WSW waves were more energetic than barely-refracted waves from the SE.

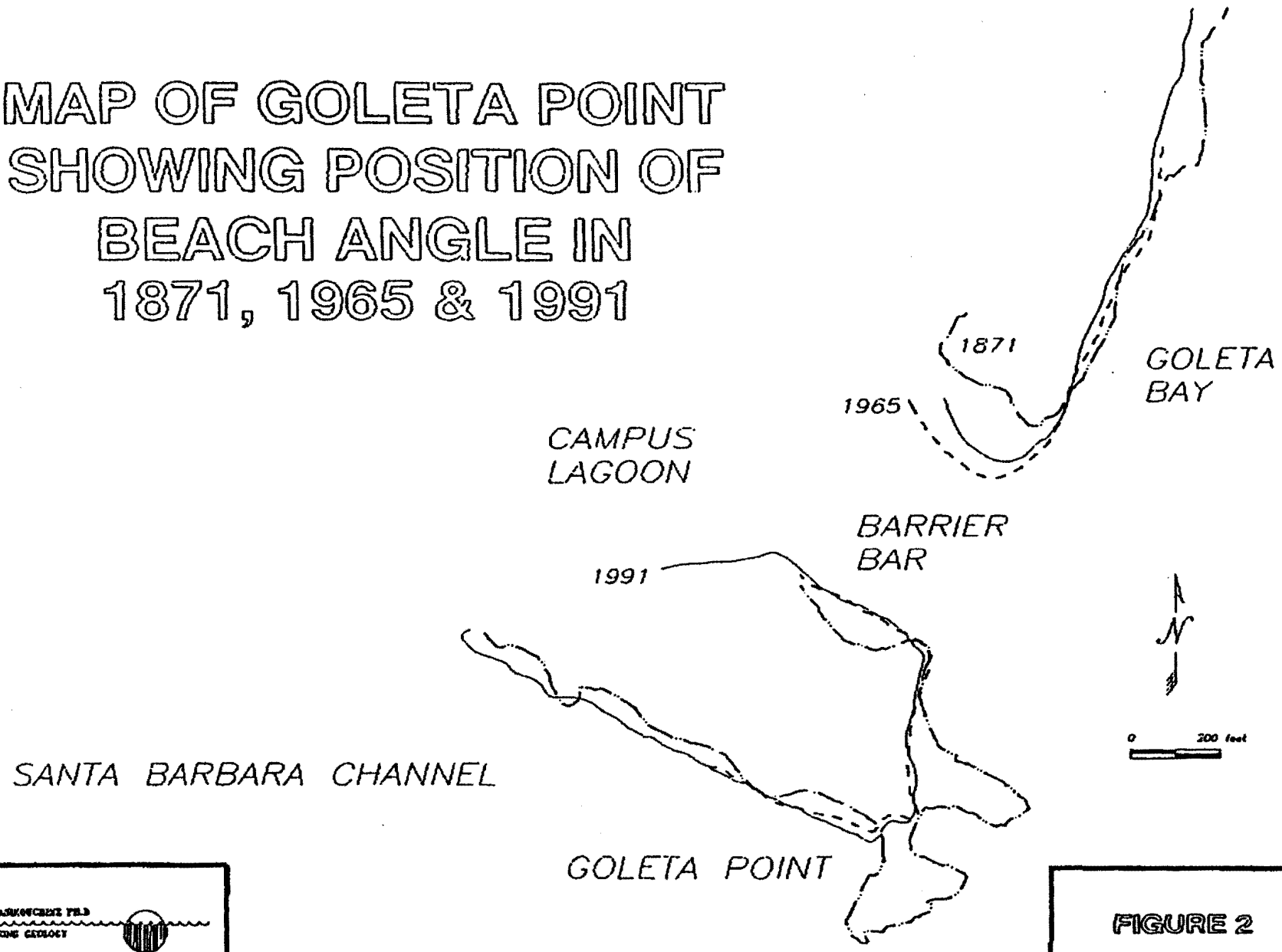
The result of the model simulation of the attack by W to WSW waves is presented as the final profile on Figure 1. It is clear that the most vigorous attack that can be postulated reasonably left the modeled wall intact. No scour was evident at the position of the wall. Only about 3 ft of erosion of sand occurred at the position of the plunge point of breaking waves (about -3 to - 4 ft MSL). The sand eroded from the plunge point was distributed in a sheet extending to a depth of about -30 ft MSL. A slight bar formed at a depth of -20 ft MSL. Below a depth of - 30 ft MSL, no change in the profile occurred.

CHANGES IN THE BEACH PLANIFORM

The amount of shoreline movement during the past 120 yrs was evaluated by comparing its position on a historical map with the position and configuration of the coastline on maps made in modern times. The maps considered here are the U.S. Coast Survey map of Goleta point made in 1871 and the topographic maps of Goleta made by the Santa Barbara County Flood Control District in 1965 and in 1991.

The shore angle (intersection of seacliff and beach) lines abstracted from each map are shown on Figure 2. These maps of the shore indicate that virtually no change in the position of the shoreline has taken place at the site during the interval from 1871 to the present. This can be attributed to the protected location of the site and to the presence of claystone in the seacliffs at Goleta Point and along Goleta Bay.

MAP OF GOLETA POINT SHOWING POSITION OF BEACH ANGLE IN 1871, 1965 & 1991



WILLIAM ASHCROFT FIELD
ENGINEERING GEOLOGY

FIGURE 2

A model study of changes in the the planiform of Goleta Bay under conditions of sediment influx from the mouth of the Goleta Slough indicated that, under the influence of the typical regime of waves in the Santa Barbara Channel, most of the introduced sediment was transported to the lee of Goleta Point. This would imply that long-term erosion of the beach at the subject site is improbable.

During the severe storms of 1978 and 1983 the beach at the site might have been modified somewhat, but the position of the barrier bar at the site probably did not change. There is no reason to expect that its position should change in the immediate future (on the order of 30 to 50 years).

Shoreline retreat does not appear to be occurring at the subject site at present. There is no reason to expect that constructing a revetment on the site should accelerate shoreline retreat there.

SCOUR AT THE TOP OF THE REVETMENT

Scour can be expected to occur wherever water flows rapidly over unconsolidated materials such as beach sand. Local scour of surficial materials could occur during a severe storm due to overtopping. It could also be caused by overflow of rain water impounded in the lagoon during such a storm.

Peak shear velocities associated with such flows would be on the order of about 24 ft per sec. Armoring the sand with rocks weighing 2 tons each should provide adequate protection from such local scour. Note that this is a rule-of-thumb estimate; actual conditions will depend upon the density of the riprap rock, the amount of interlocking of the rock and the roughness of the finished surface. As is true for the revetment, the armoring should be installed with a minimum of three points of contact between adjoining rocks.

OTHER FACTORS

Tsunami runup could cause overtopping that would persist longer than that caused by a severe wave (on the order of 15 min versus 10 sec). Despite this, the infrequent occurrence of a tsunami and the relatively small runup values recorded in the Santa Barbara Channel in the past (some reports appear to have been exaggerated) suggests that flooding by a tsunami event is too rare an event to consider here.

FINDINGS

The observations made in preparing this report indicate that the proposed revetment should not be endangered by wave scour at its toe. It is to be constructed at an elevation above sea level sufficient to provide considerable protection from all but the most severe storm waves. Minor redistribution of sand by the wind will occur, but this should not affect the proposed revetment in any material way.

The beach erosion simulation model indicated that no scour should be expected at the top of the revetment as proposed. The wave runup and overtopping analyses indicate that overtopping of the revetment will occur, but will involve minimal amounts of seawater. Nonetheless, provision should be made to drain overtopping seawater over to the lagoon rather than back toward the revetment so as to not cause piping and undermining of the riprap.

I hope these findings are suitable for your purposes. If you have questions regarding the material contained herein please contact me. It has been a pleasure to be of service to you in this important and interesting matter.

Sincerely yours,

William Anikouchine

William Anikouchine PhD
California Certified Engineering Geologist EG1584

WILLIAM ANIKOUCHINE, PH.D
CONSULTANT IN MARINE AND EARTH SCIENCES

March 8, 1998

Rusty Areias, Chairman
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2291

RE: COMMENTS - CCC STAFF REPORT ON PROPOSED UCSB SEAWATER INTAKE PUMPHOUSE REVETMENT

Dear Commissioner Areias,

I have been asked by UCSB staff to respond to the cited CCC staff report. I present here oceanographic facts that might aid the commission to recognize that the proposed revetment meets CCC criteria for acceptance as suitable and necessary shore protection device at the pumphouse site.

The proposed revetment is to be placed upon the seaward face of the barrier between Goleta Bay and the Campus lagoon. The lagoon has existed as such as early as 1871 where it is shown on a USCGS map to be nearly as large as its present size.

The barrier consists of several feet of artificial fill placed upon the sand bar that was formed across the lagoon embayment by littoral processes.

Episodic storm wave attack is eroding the barrier with the effect of removing the artificial fill and replacing it with a wedge of beach sand. The net result would be a reversion to a low sand bar which will be overtopped, breached and rebuilt in concert with the incidence of future severe wave attack. Maintaining the road on the barrier and the pumphouse would be difficult to impossible during a severe storm. The results would be catastrophic. Barrier protection is required.

1636 HILLCREST RD. SANTA BARBARA, CA. 93103 805

Measurements of long-term movement of the strand have been limited to within the error band inherent in the analysis of historical maps and unrectified aerial photographs. Sea state, seasonal shifts of the strand and variation of tidal stage at time of photography assure that the error band is wide. The slope of the beach at the site is such that one foot of vertical error produces about 50 ft of lateral error on photographs.

It is not evident that appreciable net long-term erosion has occurred at the site. This is explained by the fact that erosion at the west side of Goleta Bay is controlled by the erosion of the claystone bluffs on the lee shore there and not by erosion of the barrier sand bar. Bluff erosion at the project site is minimal because of the riprap revetments already emplaced there.

The sand budget at the site:

Regional littoral drift brings sand eastward to Goleta Point where it is impeded by the sea stacks there. Waves from the W to SW move sand around the point and then northward to and past the site. This is caused by refraction of the waves augmented by diffraction from the point.

Waves from the SE would tend to remove the sand to the N rapidly because no sand would be brought around Goleta Point under such conditions. However sand would be moved westward along Goleta State Beach and toward the site. Transport west and south from Goleta beach would be accentuated during ESE to E wave attack. Under any of these conditions littoral transport would not be impeded by the proposed revetment.

Excursions of the strand occur on a seasonal basis (summer to winter) and on an episodal basis (calm seas to storms) as sand is removed offshore and then replaced onshore.

It is necessary to stabilize such excursions by preventing erosion to the seaward face and crest of the lagoon barrier and concomitant destruction of the pumphouse and infrastructure.

A riprap revetment was chosen for stabilizing the strand and preventing undermining of the pump house/observation deck. This structure will not contribute to erosion of the coast because:

1) No source of beach sediment exists shoreward of it.
2) The ends of the structure will be connected to existing riprap structures.
3) The revetment cannot be flanked by swash or act as a groin.

The revetment will not interfere with littoral transport around Goleta Point or from the mouth of Goleta Slough. The revetment design has no adverse impacts that require extensive mitigation. Such impacts are minimized by the design of the revetment.

Riprap structures have successfully protected East beach, Leadbetter beach, Arroyo Burro beach in the Santa Barbara area from some of the severest storms of the century. They do not demonstrate adverse effects of beach erosion. The revetments at Goleta Point to which the proposed revetment will attach have not caused recognizable changes in the beaches at the project site.

Other designs for stabilization considered and rejected:

The No Project alternative would have the catastrophic consequences described above. Reversion of the lagoon to an ephemeral salt flat would have aesthetic impacts far outstripping any possible benefits of ecological realignment.

Both a concrete Galveston wall, plank and post bulkhead both would cause objectionable reflection of wave energy. Increased turbulence in the surf zone would narrow the beach by reducing the amount of littoral drift that is deposited at the site. The beach would steepen and become coarser, but worse, wave energy would be allowed to travel closer to the wall and pumphouse where it could attack with greater vigor. Further, such structures require a solid substrate for adequate footing and the prevention of undermining.

Sand nourishment and dune construction has not been demonstrated to be effective anywhere in the region. Several factors indicate strongly that this alternative is unfeasible:

1) No source of sand that could be extracted without concomitant destruction of environment exists.
2) Costs in perpetuity are unrealistic.
3) The concept is not proven at or near the proposed site.
4) It would not be possible to perform the required granulometric, chemical and bacteriological testing of candidate nourishment sediments when sand is needed most urgently to protect the barrier infrastructure.
5) It is probably impossible to place sand for shore protection during a severe storm when it is needed most. The sand would have to be introduced to the surf zone immediately on either side of Goleta Point. The hazard of bringing a unmaneuverable barge full of sand into the surf zone during a storm is unreasonable. Trucking in the sand to Goleta Point over the very barrier that is in jeopardy of destruction because sand has left the beach poses unacceptable risk.

Dunes for backshore stabilization are not feasible because:

1) The barrier is not wide enough to accommodate the ambulatory nature of dunes.
2) The only source of excess beach sand for nourishing the dunes naturally is separated from the site by the bluffs of Goleta Point.
3) The prevailing winds that would blow sand toward the site occur only 14% of the time. The rest of the time the winds would tend to destroy the dunes and blow their sand into the bay of the lagoon. It is doubtful that vegetation would manage to get established in such an environment especially when being trampled by the public using the dune area for access to Goleta Point. Wave attack of dunes is rapid and dramatic; tens of feet can be lost overnight. Wind attack is not as severe but is unrelenting.

Gunnite, wave "trippers", artificial reefs, buoy fields are unproven and unlikely to survive the Pacific wave climate, their impact to the offshore environment is unknown, but is probably extreme.

Some conclusions based upon a study of the project by a professional coastal oceanographer and certified engineering geologist who has practiced in the area since 1967 (the writer) include:

...No net change in the position of the lagoon barrier and beach has been noted since 1871. The revetment will not change this.

...Littoral drift past the barrier bar will not be impaired. No source of sand exists behind or within the barrier bar.

...Littoral supply will be unaffected. Upcoast (to the west) will continue. The source of sand from the mouth of Goleta Slough will not be affected.

...Littoral drift toward the west during southeast wave conditions will be unimpaired.

...The width of the beach will not be changed materially except for the footprint of the revetment. Modal waves strip away the sand to the Sisquoc claystone wave cut terrace on either side of the revetment site at lowest tides. Subsequent waves at higher tides rebuild the beach to its former state. The revetment will not interfere with this natural process.

...The revetment is the superior alternative for protecting the barrier and its infrastructure and minimizing adverse impacts to the coastal zone.

I will be at the Commission hearing in Monterey on March 12, 1998. I plan to make myself available to answer any questions that you might have regarding this letter or our presentation.

Respectfully submitted,

William Anikouchine

William Anikouchine PhD

Penfield & Smith
ENGINEERS • SURVEYORS

101 EAST VICTORIA STREET
P.O. BOX 98
SANTA BARBARA, CALIFORNIA 93102
805-963-9532 • FAX 805-966-9801

2051 NORTH SOLAR DRIVE
SUITE 225
OXNARD, CALIFORNIA 93030
805-983-7499 • FAX 805-983-1826

W.O. 12268.02

February 6, 1998

Mr. Frank Castanha
University of California at
Santa Barbara
Facilities Management
Santa Barbara, CA 93106

Subject: **Basis for Design - Lagoon Barrier for Seawater Renewal System**
Project No. FM 970071L/980960

Dear Mr. Castanha:

This will summarize the design considerations which resulted in the recommendations to set the lagoon barrier and rock revetment at a minimum elevation of 10 feet (MSL). The configuration and location of the rock revetment barrier and road profile will also be discussed.

1. ROCK REVETMENT HEIGHT BASED ON OCEAN WAVE ATTACK.

Rock revetment exists both north and south of the barrier. These revetments are built to approximately Elevation (El.) 10.

In addition, this firm has experience in the design and performance of several seawalls and rock revetments in the local area. Based on this experience, El. 10 is considered marginally adequate in breaking wave conditions. Therefore, El. 10 was selected for preliminary design.

The height of breaking waves on the revetment is determined by the depth of scour at the toe of the revetment. Wave run-up analysis is based on several factors including the height of breaking waves.

At the preliminary stage of design, certain assumptions were made regarding beach scour at the toe of a protective rock revetment on the seaward side of the lagoon barrier in order to estimate a breaking wave height from which to calculate the wave forces acting on the barrier.

EXHIBIT 13c
Permit 4-97-156
Revetment Design Letter

Run-up was then calculated based on these assumptions. The results suggested that over-topping Elevation 10 might be infrequent.

Subsequently, a computer modeling analysis was performed which indicated that the selected revetment height could expect over-topping to occur with a 27% probability in any given year. It predicated a peak over-topping volume of 104 cubic feet per foot. For a top El. 9.0, the over-topping volume was 30% greater (135 CF/FT).

Peak flow velocity approaching the revetment was determined to be about 24 fps. resulting in a water depth of about 1 foot over the 10 elevation with a horizontal inertial force of 1150 pounds per square foot. Greater depths are associated with increasing force and possibility of damage to the road and erosion of the barrier.

2. ROCK REVETMENT HEIGHT BASED ON LAGOON WATER LEVEL.

Normal operation level of the lagoon is in the range of El. 5.0 to 7.5 and is based on habitat requirements of the native plant species the University is attempting to re-establish on the lagoon margin. El. 10 provides a 2 ½' freeboard at maximum operating level. However, storm run-off entering the lagoon exceeds a reasonable capacity for the lagoon outlet structure. This means that during peak storm flows, the lagoon water level will rise temporarily to store flow capacity in excess of the outflow capacity. A worst case 100-year storm condition with no lagoon outflow would result in a rise of 2.8' in the lagoon. Outflow through the proposed 24-inch outlet yields a 2.4' rise in water level during the 100-year event. A barrier El. 10 provides adequate protection against overflow.

3. LOCATION AND FOOT PRINT OF REVETMENT.

The lagoon barrier needs to be wide enough to accommodate fill slopes, a fire access and maintenance road with minimal encroachment into the lagoon margin. Fill slope widths at 2:1 are determined by fill height. Road width was determined by a fire access width of 12 feet plus a parking width of 8 feet for maintenance vehicles. The 10' high rock revetment at a stable design slope of 2:1 plus top width, results in a 22' foot print. Two feet are added to each side of the road for road shoulders. This results in the revetment location delineated on the project plans.

The revetment is placed against the existing lagoon barrier and its ends are curved to join the existing revetments to the north and south.

Rock was placed in front of the pumphouse structure in order to minimize upward splash and vertical scour of the beach in front.

4. LAGOON BARRIER FILL REQUIREMENTS.

The road profile on the lagoon barrier was set for a low point of El 10.0 at the gutter inlet to the storm drain. The lowest elevation of the existing barrier is the 9.0 contour as shown on the 1994 topographic base map, delineated just west of the road centerline on Sheets C1 and C4 of the project drawings. A gradient of 1% from the low point was selected to provide good drainage from the north. The gradient to the south was selected to conform to the existing grade at the end of the fire truck turnaround in order to avoid the need for a retaining wall.

The profile results in raising the height of the lagoon barrier as follows:

FILL HEIGHT LESS THAN	LENGTH OF FILL
1 FT.	75 FT.
2 FT.	200 FT.
3 FT.	90 FT.

VOLUME OF FILL = 700 C.Y.

It is my opinion, based on the foregoing, that this design provides reasonable protection and serviceability consistent with the project's goals. A minimum lagoon barrier and revetment no lower than El. 10 (MSL) is recommended.

Please call me with any questions.

Very truly yours,

PENFIELD & SMITH

Charles E. Watson
RCE 18548

CEW/mmk

P&S

Penfield & Smith
ENGINEERS • SURVEYORS

101 EAST VICTORIA STREET
P.O. BOX 98
SANTA BARBARA, CALIFORNIA 93102
805-963-9532 • FAX 805-966-9801

2051 NORTH SOLAR DRIVE
SUITE 225
OXNARD, CALIFORNIA 93030
805-983-7499 • FAX 805-983-1826

W.O. 12268.03

March 9, 1998

Mr. Rusty Areias, Chairman
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2291

Subject: Agenda Item Th6A
LRDP Amendment 2-97. UCSB Seawater System Renewal Project and Lagoon Management Plan.
Agenda Item Th11a
UCSB Seawater System Renewal Project - Coastal Development Permit (CDP) 4-97-156

Dear Commissioner Areias:

The following comments are submitted in response to the California Coastal Commission staff report dated February 27, 1998. The staff's recommendation is that the proposed revetment is inconsistent with the Coastal Act and should be denied.

Contrary to staff's opinion, the rock revetment is essential and necessary to the Seawater System Renewal Project because it protects vulnerable elements of a life support system for the University's marine science research laboratories. The rock revetment was selected over other candidate protection systems because of its proven reliability in absorbing and dissipating the forces of storm wave attack.

I believe that the revetment is consistent with the Coastal Act and should be approved for the following reasons:

California Coastal Commission staff report LRDP, page 12, Section C. Marine Environment

Coastal Act: §30235 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.

EXHIBIT 13d
Permit 4-97-156
March Hearing Submittal

Comment: The revetment is consistent with §30235 because revetment is permitted when required to serve coastal dependent uses and the proposed revetment would protect components of the existing and expanded coastal dependent Seawater System from damage by wave action.

The proposed revetment is consistent with §30235 because revetment is permitted when required to protect existing structure. The 1990 LRDP identified the need for revetment to protect the lagoon barrier. The final design of the rock revetment evolved from the initial LRDP concept in order to achieve the goal of reliable protection of the existing pumphouse and the lagoon barrier.

Under §30235 revetment is permitted when required to protect public beaches in danger from erosion. Without any shoreline protection the lagoon barrier would eventually erode and the beach at the lagoon mouth would become an open channel with seasonal sand buildup. (EIR, pg. 5-6). Although the cobblestone revetment described in the LRDP may also prevent a breach of the lagoon barrier, the rock revetment design will have better reliability and require less frequent maintenance. (EIR as discussed in Section 5.0, Project Alternatives.)

The proposed revetment is consistent with §30235 because revetment is permitted when designed to eliminate or mitigate adverse impacts on local shoreline sand supply. During project design it was determined that the rock revetment would have no impact on local shoreline sand supply. As discussed in the certified EIR, Section 4.2, Geology/Soils, the local shoreline sand supply would not be impacted by the revetment. To minimize structural damage, the proposed revetment will be designed in accordance with the USACOE Shoreline Protection Manual and other applicable requirements. The design criteria include anticipated maximum wave height and scour depth during the life of the structure, which is the basis for estimating required rock size and frequency of overtopping. The toe of the revetment will be buried below the anticipated scour elevation, and the top of the revetment will extend to an adequate height to minimize overtopping.

California Coastal Commission staff report LRDP, page 13, Section C. Marine Environment.

Coastal Act: §30253 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 land forms along bluffs and cliffs.

3. Be consistent with requirements imposed by an air pollution control district or the State Air Resources Control Board as to each particular development.

4. Minimize energy consumption and vehicle miles traveled.

5. Where appropriate, protect special communities and neighborhoods which, because of their unique characteristics, are popular visitor destination points for recreational purposes.

Comment: The proposed revetment is consistent with §30253 because it will minimize the risk of coastal erosion damage to the wet well and beach pumphouse and ensure the stability and structural integrity of the renewed Seawater System components by protecting them from wave attack during winter storms (EIR Section 4.2). The revetment will not have significant impacts on beach erosion because it will be located within the wave and wind shadow of Goleta Point which blocks the site from typical northwestern wave patterns that cause erosion and it will be above the area of long shore sand transport. Aerial photographs of the project site and surrounding area illustrate the sheltered location of the project site. The revetment would connect with the two adjacent revetments at the base of nearby bluffs and protect the remaining unprotected lagoon island bluffs south of the lagoon barrier from wave attack. The revetment will protect the unique characteristics of the lagoon area which is a popular visitor destination point for recreation. Construction of the revetment will be done in accordance with Santa Barbara APCD air quality measures, and LRDP EIR mitigation measures that were adopted as part of the project through the EIR process.

California Coastal Commission staff report LRDP, page 13, para. 3 and 4; and CDP B. Shoreline Protective Devises, page 2 para 4 and page 7:

Comment: The basis for review is described as consistency with Sections §30235 and §30253 and with past Commission action. However, the California Coastal Commission's own Procedural Guidance Document for Reviewing Permit Applications for Shoreline Protective Devices (January 1997) also states that:

> The analyst should recommend approval of a shoreline altering device under Section §30235 if:

1. *there is an existing structure to be protected;*

2. *the existing structure is in danger from erosion;*

3. *shoreline altering construction is required to protect the existing threatened structure; and*

4. *the required protection is designed to eliminate or mitigate the adverse impacts on shoreline sand supply.*

1. EXISTING STRUCTURE. There are existing structures to be protected.

The existing structures are the lagoon barrier and paved road that were built in (approx.) 1950 and the seawater system and pumphouse that were built in 1974. The project consists of replacement and expansion of the existing Seawater System including intake pipelines and improvements to tanks, pumps, filters to increase capacity and reliability of system. The intake pipelines, utilities serving the pumphouse, and waterline to the fire hydrant are located beneath the road. The revetment is necessary to protect all these components of the project.

2. DANGER FROM EROSION. The existing structure is in danger from erosion.

The existing structures have been subject to wave attack during storms and high tides resulting in damage to the seawater system. Waves attack the structure because of modal excursions of the strand on a seasonal basis (summer to winter) and on an episodal basis (calm seas to storms). The threat of wave damage has required emergency shore protection repeatedly in the past. The pumphouse cannot be relocated because geological conditions which support the wet well cannot be replicated without greater damage to the environment.

3. REQUIRED TO PROTECT/LEAST DAMAGING ALTERNATIVE. Shoreline altering construction is required to protect the existing threatened structure.

The lagoon barrier cannot simply be continually maintained as it has in the past with continual addition of fill material to replace erosion, because the time when it is most needed (winter storms at high tide) are also the times when it is the most difficult to access the site with personnel and equipment often needed elsewhere. It is necessary to stabilize such excursions by preventing erosion to the backshore, face and crest.

Other alternatives were considered, and it was determined that there were no feasible alternatives that would protect the pumphouse, intake lines, underground utilities, lagoon barrier, ADA and public access improvements to the standard required by the

project goals. Other designs for stabilization that were considered and rejected include:

- Concrete Galveston Wall, Plank and Post Bulkhead: both would cause objectionable reflection of wave energy;

- Sand Nourishment: no feeder beach is feasible, no source of sand that could be extracted without concomitant destruction of environment exists, costs in perpetuity are unrealistic, concept not proven locally, probably unfeasible because sand cannot be placed reliably during a severe storm when it is needed most;

- Gunnite, Wave "Trippers", Artificial Reefs, Buoy Fields are unproven and unlikely to survive the Pacific wave climate, their impact to the offshore environment is unknown, but is likely significant.

The width of the beach will not be changed materially except for the footprint of the revetment. Modal waves strip away the sand to the Sisquoc claystone terrace on either side of the revetment site at lowest tides. Subsequent waves at higher tides rebuild the beach to its former state. Special care has been taken during design to ensure that the revetment will not interfere with this natural process. The revetment will occupy and thus result in a loss of a few feet of beach. Littoral drift past the barrier bar will not be impaired. No source of sand exists behind or within the barrier bar. Littoral sand supply will be unaffected. The source of sand from the mouth of Goleta Slough will not be affected.

Other factors that were considered in designing the revetment were the need to provide proper protection from the risk of damage to the pumphouse, infrastructure, ADA access, emergency response vehicles and public access to the beaches between Campus Point and Goleta Point.

4. SAND SUPPLY IMPACTS. The required protection is designed to eliminate or mitigate the adverse impacts on shoreline sand supply.

A riprap revetment was chosen for stabilizing the strand and preventing undermining of the pumphouse/observation deck. It was designed and engineered by this firm. It is a proven design that absorbs wave energy within the structure by lifting water and generating turbulence within the riprap. The footprint of the revetment would be 22 to 32 feet wide (at toe elevation) and about 470 feet long. Much of its exposed surface would be covered with sand most of the time. It is to be faired into existing rock revetments on the north (Campus Point) and south (Marine Science Building) with smooth transitions to prevent local concentration of wave energy and to prevent flanking.

The matrix below compares the various alternatives.

REVETMENT ALTERNATIVES - IMPACTS MATRIX

ISSUE	ROCK REVETMENT	NO PROJECT	SAND & COBBLES	VERTICAL SEAWALL	BEACH NOURISH-MENT
Proven Reliability	*			*	
Sand Supply/ Transport	*	*	*	*	*
Energy Dissipation	*				
Local Scour/ Barrier Erosion	*				
Beach Encroachment		*		*	*
Maintenance Requirements	*			*	

* = Favorable Comparison Alternative

INCONSISTENCIES IN STAFF REPORT

There are 3 errors of fact in the Staff Report which may have contributed to reaching flawed conclusions.

1. Mean high tide line does not under any of the storm scenarios prepared by Dr. Anikouchine reach the toe of the proposed revetment. Therefore, the revetment does not at any time become subject to state lands jurisdiction.

2. The lagoon barrier is more correctly characterized as existing at El. 9, than El. 8. The lowest spot elevation on the centerline of the barrier is near 8. The lowest continuous contour elevation is a continuous ridge along the lagoon side of the barrier where the lowest elevation is 9. Thus the magnitude of raising the barrier has been overstated in the Staff Report.

3. The area of the rock revetment footprint on the upper edge of the beach is less than 12% of the total beach measured from mean high tide shown on the topographic map and project site plan, not 25% to 50% as stated in the Staff Report.

BASIS FOR DESIGN FOR PROTECTION OF LAGOON BARRIER, BEACH PUMP HOUSE, VITAL UTILITY LINES, RECREATION, ADA AND EMERGENCY RESPONSE VEHICLE ACCESS.

This will summarize the design considerations which resulted in the recommendations to set the lagoon barrier and rock revetment at a minimum elevation of 10 feet (MSL). The configuration and location of the rock revetment barrier and road profile will also be discussed.

BASIC DESIGN CRITERIA

The primary design requirement of the Seawater System Renewal Project is reliability. This project is the life support system for the University's marine science research and experimental activities. As such, all elements of the system are designed to be as fail-safe as is feasibly possible. The system elements located at the land/sea interface are the most vulnerable to storm weather conditions and sea wave attack. With this in mind, it is important to select means of protecting the pumphouse, utilities and the lagoon barrier which supports the pumphouse, wet well and lifeline utilities.

The May 1994 Detailed Project Program (DPP) for the Seawater System Replacement Project was made available to Coastal Commission Staff during the course of the project review. The program requirements, design criteria and alternative analysis thoroughly developed and covered under Section 3.2 Lagoon Protection, pp. 3 - 16 to 3-22 of the document.

The following discussion supplements and amplifies the material covered in the DPP.

1. ROCK REVETMENT HEIGHT BASED ON OCEAN WAVE ATTACK.

Rock revetment exists both north and south of the barrier. These revetments are built to approximately Elevation (El.) 10.

In addition, this firm has experience in the design and performance of several seawalls and rock revetments in the local area. Based on this experience, El. 10 is considered marginally adequate in breaking wave conditions. Therefore, El. 10 was selected for preliminary design.

The height of breaking waves on the revetment is determined by the depth of scour at the toe of the revetment. Wave run-up analysis is based on several factors including the height of breaking waves.

At the preliminary stage of design, certain estimates were made regarding beach scour at the toe of a protective rock revetment on the seaward side of the lagoon barrier in order to estimate a breaking wave height from which to calculate the wave forces acting on the barrier.

Run-up was then calculated based on these assumptions. The results suggested that over-topping Elevation 10 might be infrequent.

Subsequently, a computer modeling analysis was performed which indicated that the selected revetment height could expect over-topping to occur with a 27% probability in any given year. It predicated a peak over-topping volume of 104 cubic feet per foot. For a top El. 9.0, the over-topping volume was 30% greater (135 CF/FT).

Peak flow velocity approaching the revetment was determined to be about 24 fps resulting in a water depth of about 1 foot over the 10 elevation with a horizontal inertial force of 1150 pounds per square foot. Greater depths are associated with increasing force and possibility of damage to the road and erosion of the barrier.

2. ROCK REVETMENT HEIGHT BASED ON LAGOON WATER LEVEL.

Normal operation level of the lagoon is in the range of El. 5.0 to 7.5 and is based on habitat requirements of the native plant species the University is attempting to re-establish on the lagoon margin. El. 10 provides a 2 ½ Ft. freeboard at maximum operating level. However, storm run-off entering the lagoon exceeds a reasonable capacity for the lagoon outlet structure. This means that during peak storm flows, the lagoon water level will rise temporarily to store flow capacity in excess of the outflow capacity. A worst case 100-year storm condition with no lagoon outflow would result in a rise of 2.8 Ft. in the lagoon. Outflow through the proposed 24-inch outlet yields a 2.4 Ft. rise in water level during the 100-year event. A barrier El.10 provides adequate protection against overflow.

3. LOCATION AND FOOTPRINT OF REVETMENT.

The lagoon barrier needs to be wide enough to accommodate fill slopes, a fire access and maintenance road with minimal encroachment into the lagoon margin. Fill slope widths at 2:1 are determined by fill height. Road width was determined by a fire access width of 12 feet plus a parking width of 8 feet for maintenance vehicles. The 10 Ft. high rock revetment at a stable design slope of 2:1 plus top width, results in a

22 Ft. footprint. Two feet are added to each side of the road for road shoulders. This results in the revetment location delineated on the project plans.

The revetment is placed against the existing lagoon barrier and its ends are curved to join the existing revetments to the north and south.

Rock was placed in front of the pumphouse structure in order to minimize upward splash and downward vertical scour of the beach in front.

4. LAGOON BARRIER FILL REQUIREMENTS.

The road profile on the lagoon barrier was set for a low point of El. 10.0 at the gutter inlet to the storm drain. The lowest elevation of the existing barrier ridge is the 9.0 contour as shown on the 1994 topographic base map, delineated just west of the road centerline on Sheets C1 and C4 of the project drawings. A gradient of 1% from the low point was selected to conform to the existing grade at the end of the fire truck turnaround in order to avoid the need for a retaining wall.

The profile results in raising the height of the lagoon barrier as follows:

FILL HEIGHT LESS THAN	LENGTH OF FILL
1 FT.	75 FT.
2 FT.	200 FT.
3 FT.	90 FT.

CONCLUSION

It is my opinion, based on the foregoing, that this design provides reasonable and reliable protection and serviceability consistent with the project's goals. A minimum lagoon barrier and rock revetment no lower than El. 10 (MSL) is recommended.

The revetment is necessary to protect vital elements of the project.

Its location is set at the back of the wide beach, well above the zone of littoral processes and consequently will not affect the sand supply.

It sloping rock surface will dissipate wave energy and mitigate any possible local scour.

The revetment footing utilizes less than 12% of the sandy beach and much of the rock will be covered with sand most of the time.

The revetment is necessary. It will effectively perform its function and it will have minimal impacts.

Based on the foregoing, it is my opinion and recommendation that the project be approved as proposed by the University.

Very truly yours,

PENFIELD & SMITH

Charles E. Watson, P.E.
RCE 18548

CEW/mmk

REGISTERED PROFESSIONAL ENGINEER
CHARLES E. WATSON
No. 18548
Exp. 6-30-01
CIVIL
STATE OF CALIFORNIA

P&S

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

UCSB

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO

SANTA BARBARA • SANTA CRUZ

Office of the Assistant Chancellor —
Budget and Planning
Santa Barbara, CA 93106-2030
Tel: (805) 893-3971
Fax: (805) 893-8388

March 10, 1998

From: _____

Rusty Areias, Chairman
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, Ca 94105-2219

Dear Commissioner Areias:

Re: Seawater System Renewal Project and Lagoon Management Plan
LRDP Amendment 2-97.
Coastal Development Permit 4-97-156
Notice of Impending Development

I respectfully request that the California Coastal Commission approve the proposed LRDP text amendment as submitted (included as Exhibit 5 in the Commission staff report), and the concurrent application for a coastal development permit. The Commission staff is recommending approval of all aspects of the Seawater System project except the revetment. A detailed response from the University to issues raised in the Commission staff report dated February 27, 1998 is attached. In addition there are letters from the consulting coastal geologist, Dr. William Anikouchine, and civil engineer, Charles Watson, P.E. that support the finding that the revetment is consistent with the Coastal Act.

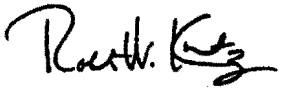
The concept of a revetment at this location was approved by the Commission in the 1990 LRDP. The revetment is located in an area that was previously covered by the lagoon barrier and that has been eroded by wave damage over the last 50 years. The University's options are very limited as this project, unlike a house or commercial building, is dependent on a coastal location and the only alternative location for the pumphouse and wet well would be on the beach. Unfortunately the very location that can accommodate the wet well is a location that is subject to damage from wave attack. The seawater system continues to age making it critical to improve the existing system, and the barrier continues to erode so that each year the University has to go to even greater lengths to protect it from high tides and storms.

The Seawater System Renewal Project is consistent with the Coastal Act; it will protect the Lagoon and the seawater system, maintain and enhance public access, and is designed to avoid impacts to environmentally sensitive habitat areas and coastal processes. The project has many public benefits, it provide a critical utility for research and education, provides access for disabled persons, includes a new aquarium and visitor center, and is accompanied by a comprehensive, funded, management plan for the entire lagoon area.

The Seawater System Renewal Project was approved by the Chancellor of the University of California, Santa Barbara under authority delegated to him by the Board of Regents of the University of California on May 28, 1997. The Director of Capital and Physical Planning is authorized by the Chancellor of the University of California, Santa Barbara to modify the proposed LRDP Amendment, if required, in response to comments received from the Coastal Commission. The Director of Capital and Physical Planning is authorized to accept and agree to the terms and modifications of the Commission's certification of LRDP Amendment 2-97 at the Coastal Commission Hearing. The LRDP amendment will not require formal adoption by the Regents of the University of California after Commission approval. If the Director of Capital and Physical Planning accepts and agrees to the Commission's terms and modifications the LRDP Amendment will take effect automatically upon the Commission's approval.

I urge you to approve the LRDP Amendment, Coastal Development Permit, and Notice of Impending Development for the Seawater System Renewal Project as proposed and without delay. Thank you for your time and consideration.

Sincerely,



Robert W. Kuntz
Assistant Chancellor

cc.
California Coastal Commission members
Peter M. Douglas
Gary Timm

Office of Budget and Planning responses to California Coastal Commission staff report and recommendations.

Responses to Commission staff report for LRDP Amendment 2-97, dated February 27, 1998.

1. *California Coastal Commission staff report, page 1, para. 1.*
   The amendment consists of four components: (1) expansion of the existing seawater renewal system;

The report states that an LRDP Amendment is required in order to renew and expand the existing seawater system. However, an LRDP Amendment should not be required because the project is included within the scope of the 1990 LRDP. Consistent with the Coastal Act provisions (§30254) addressing public works facilities, the LRDP outlines the University's commitment to maintaining the campus infrastructure. The Seawater System is a coastal-dependent utility serving the existing academic needs on campus and the future academic growth provided for in the approved 1990 LRDP. The 1990 LRDP (page 146) notes that the Campus owns utilities distribution infrastructure on campus and continuously maintains and upgrades them to serve (only) campus needs. The LRDP states that the campus will design and construct on-campus public works facilities to meet needs when they arise.

2. *California Coastal Commission staff report, page 1, para. 1.*
   The amendment consists of four components:....(4)..... pavement of an existing access road...
   and page 2, para. 3... an access road across the barrier will be paved...

The report does not acknowledge that the existing lagoon barrier road is paved.

3. *California Coastal Commission staff report, page 1, para. 3.*
   The Lagoon Management Plan identifies specific policies....etc.....

The report does not acknowledge that the Campus has approved funding of $387,000 for capital improvements, and permanent staff funding, to implement the policies to protect, enhance and restore the lagoon area.

4. *California Coastal Commission staff report, page 2, para. 2.*
   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 to a lease agreement between the University and the State Lands Commission.

State Lands Commission review became a significant issue in processing the University's application. The University's application was not accepted as complete by Coastal staff until State Lands Commission had reviewed the proposed revetment and pumphouse The LRDP Amendment was submitted to the California Coastal Commission in July 1997 and this issue caused a lengthy delay in the review process. The State Lands Commission approved the decision to enter into a lease agreement with the University on February 27, 1998. The lease includes the rock revetment. State Lands Commission decisions are based

upon such factors as, consistency with the public trust, natural resource protection and other environmental values, and preservation or enhancement of the public's access to State lands. The University's lease with the State Lands Commission is based on the fundamental purpose of the project for the "public use and benefit".

5. *California Coastal Commission staff report, page 2, para. 3.*
As the lagoon barrier road 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. As such the placement of fill to increase the height of the barrier and reconfiguration of the existing access road will raise issue with the Coastal Act policies regarding impacts to public access.

Beachgoers do not always have easy access to the beach from the existing lagoon barrier road. During winter conditions wave damage to the barrier road results in a sheer drop that is not easily accessible. Beachgoers climbing down from the damaged barrier can cause further erosion. Currently, the beach is not accessible to people with physical disabilities at any time. The project includes features that will provide safe and universal access to the beach at all times of the year - including the beach ramp, stairs, and regraded slopes.

6. *California Coastal Commission staff report, page 2, para. 4.*
In this case, 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 these possible alternatives have not been adequately addressed in the EIR or other information submitted for the proposed amendment.

The FEIR provided responses to the Commission staff's comments asking for additional information in the alternatives analysis. Coastal Commission staff have not challenged the adequacy of the EIR alternatives analysis. Since fall 1996, from the outset of the design and environmental review process, the University has made every effort to inform Coastal staff, and to bring newly assigned staff up to speed. Most recently, UCSB initiated meetings between UCSB staff and consultants, and Coastal Commission staff on October 15, 1997, February 3, 1998 (teleconference), and February 10, 1998 (including a site visit). The purpose of the meetings was to provide the Coastal staff an opportunity to discuss design alternatives with the licensed civil engineer, seawater system designer, and coastal geologist. These consultants were available to answer Coastal staff's questions and following the meetings, the coastal analyst discussed project alternatives with UCSB consultants by telephone.

7. *California Coastal Commission staff report, page 3, para. 4.*
The University held a public hearing and received written comments regarding the project from public agencies, organizations and individuals.

The Seawater System Renewal project has been non-controversial throughout the public and agency review process. No one attended the noticed public hearing and no comments were received from individuals or organizations. Four agencies commented on the Initial Study and three of these agencies also commented on the DEIR. UCSB also held an EIR Scoping meeting for regulatory agencies that was attended by only Coastal Commission staff and an intern from the County of Santa Barbara.

8. *California Coastal Commission staff report, page 6, Modification 1.*

The proposed Modification would require design changes that are inconsistent with the recommendations of the Seawater System designer and civil engineer. The revetment design is constrained by a number of factors including; protection of the pumphouse, underground utilities, and lagoon barrier, compliance with ADA, and protection and enhancement of public access. Design constraints, alternative shoreline protective devices, and impacts to coastal processes are discussed in the attached letter from Charles Watson, P.E.

9. *California Coastal Commission staff report, page 12, Section C. Marine Environment*

The report does not discuss the project's relationship to, and consistency with, Coastal Act provisions (§30230) addressing Marine Resources.

> *§30230 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 marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

The revetment is consistent with this policy because its purpose is to protect components of the Seawater System and to maintain the Campus Lagoon as an open body of water. The revetment will protect the Seawater System from storm damage and prevent disruption or destruction of ongoing marine science research projects and educational programs. In addition, the Seawater System intake pipelines which extend into the Pacific Ocean would be anchored to the sea floor. This would provide a rocky habitat for marine resources characteristic of hard-bottom marine communities.

The revetment would provide protection to the Campus Lagoon and a reliable system for maintaining the water level. In the event that the revetment is not constructed, then the lagoon barrier could be breached and the lagoon would drain or partially drain. The proposed revetment will protect the existing wetlands restoration and enhancement project at the north end of the Lagoon and sustain the existing ecological functions of the lagoon for continued research and instructional purposes.

Mitigation measures to protect marine resources during construction were identified in the project EIR, and incorporated into the project design.

10. *California Coastal Commission staff report, page 12, Section C. Marine Environment*

The report discusses the project's relationship to §30231 but it does not acknowledge the environmental benefits of the revetment and its consistency with §30231.

> *§30231: 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 wastewater discharges and entrainment, controlling runoff, preventing depletion of ground water supplies, substantial interference with surface water flow, encouraging wastewater reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

The revetment is consistent with §30231 because it will minimize ongoing maintenance, and avoid the resulting ground disturbance and potential impacts from runoff. Furthermore, the revetment will protect the seawater system and ensure a continued supply of clean seawater for the lagoon.

11. *California Coastal Commission staff report, page 12, Section C. Marine Environment*

The report discusses the project's relationship to §30235 but it does not acknowledge the project's consistency with §30235. The attached letters from Dr. William Anikouchine and Charles Watson, P.E. discuss alternative shoreline protective devices, impacts to coastal resources, and the project's consistency with §30235.

12. *California Coastal Commission staff report, page 13, Section C. Marine Environment*

The report discussed the project's relationship with §30253 but it does not acknowledge the project's consistency with Coastal Act §30253. The attached letters from Dr. William Anikouchine and Charles Watson, P.E. discuss alternative shoreline protective devices, design constraints, impacts to coastal resources, and the project's consistency with Coastal Act §30253.

13. *California Coastal Commission staff report, page 13, para. 3 and 4.*

The basis for review is described as consistency with sections 30235 and 30253 and with past Commission action. However, the California Coastal Commission's own *Procedural Guidance Document for Reviewing Permit Applications for Shoreline Protective Devices (January 1997)* also states that:

> *The analyst should recommend approval of a shoreline altering device under Section 30235 if:*
> *1) there is an existing structure to be protected;*
> *2) the existing structure is in danger from erosion;*
> *3) shoreline altering construction is required to protect the existing threatened structure; and*
> *4) the required protection is designed to eliminate or mitigate the adverse impacts on shoreline sand supply.*

The attached letters from Dr. William Anikouchine and Charles Watson, P.E. outline how the project meets this criteria and why, therefore, it should be approved.

14. *California Coastal Commission staff report, page 13, para. 4 .*
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.

The report does not include an analysis of conditions at the project site. The report discusses the impacts of seawalls located at La Conchita Beach in Ventura, and at City of Encinitas beaches in San Diego County(page 15). The project site has unique characteristics that were described in the EIR but were not considered in the Commission staff report. For example, the location of the lagoon barrier is characterized by a distinctive break in topography between the adjacent coastal bluffs and marine terraces to the north and south, by it's location between the existing revetments currently protecting these bluffs, and by being within the wave and wind shadow of Goleta Point. The coastal bluffs range in elevation from 20 to 30 feet, whereas the lagoon barrier has an elevation of approximately 9 feet above MSL.

For purposes of evaluating cumulative impacts, the Seawater EIR outlined differences between the University's project and another proposal for shoreline protection (EIR Section 4.2). The University's proposed revetment is different from the Isla Vista seawall because of the favorable orientation and unique physical characteristics of the UCSB site and the choice of protective device . The Del Playa Seawall project is proposed approximately 1.2 miles west of the Seawater System Renewal project. Property owners are proposing to construct approximately 1,540 feet of timber seawalls at the base of the Isla Vista bluffs. The seawalls are proposed to arrest erosion which is causing bluff instability and failure along the coastline of Isla Vista. The timber seawalls proposed at Isla Vista are highly reflective unlike the rock revetment proposed by UCSB. In considering the potential impacts of the Del Playa Seawall and the Seawater System revetment on local sand supply, two major factors must be addressed: the orientation of the coastline with respect to dominant wind and wave direction and the predominant source of sand in the area. The Isla Vista coastline faces south, while the coastline adjacent to the site is oriented in a southeast direction. Orientation of the coastline affects how waves approach the shoreline and deposit or erode beach material. Summer swells typically arrive from the south and can direct wave energy toward south and southeast facing beaches in the Isla Vista and UCSB area. However, summer wave energy and tides are less intense than the winter season and usually contribute to seasonal sand accretion along the coast. In the winter, storms swells and wave energy in the Santa Barbara Channel originate from the northwest-west. Because of the orientation of the coast, south-facing Isla Vista can receive storm swells more directly, while the southeast-facing project site is shadowed from the predominant storm track by Goleta Point. Waves bend around the point and approach the project site obliquely, rather than directly. Although storm damage occurs along the entire coast, Isla Vista is an unprotected headland and Goleta Point often protects the site from wave damage. The EIR also discussed impacts to sand supply (EIR, Section 4.2) Bluffs and streams west of campus are the primary sources of sand for local beaches (Noble Consultants, 1989). The proposed revetment would be constructed along a small portion of bluff and a larger beach, which are not major sand sources for the region. As indicated in the project analysis, the seawater system revetment would not reduce sand supply and lateral access along area beaches.

The only other discussion in the Commission staff report related to the physical characteristics and dynamics of the subject site shoreline is contained within the discussion of the Beach Replenishment Alternative (page 17, para. 5, and page 18, para. 1).

The report identifies where the site is within the Santa Barbara Littoral Cell, its potential to serve as a feeder beach, and the location of (untested) offshore deposits of sand. This information does not address whether the use of a shoreline protective device is required for protection at this location. Further, it does not establish that there are feasible project alternatives which would accomplish equitable shoreline protection and result in fewer adverse impacts. The report states that beach nourishment at this location might easily be developed as a long-term regional program. However, the report does not acknowledge

that since the BEACON feasibility study was completed, the participating agencies have been considering, but have not yet been able to begin to implement what would be a multi-million dollar project. Currently there is no regional organization in the area which administers a beach replenishment or in-lieu fee program. Although the BEACON feasibility study identified off-shore sand as the most economical source, the sand would be loaded on barges and taken in to the surf zone, which would be a difficult undertaking during winter high tide and storm conditions. In conclusion, the report suggests that the revetment should be replaced with a sand replenishment program that is untested, un-permitted, unfunded, and unproved. It may be a good idea, but clearly at this point the program's effect is speculative.

15. *California Coastal Commission staff report, page 14, para 2.*
A revetment at this location, as a result of wave interaction, will potentially result in adverse impact at the configuration of the shoreline and the beach profile.

There report concludes that there would be wave interaction and therefore adverse impact, because the revetment would periodically be seaward of the mean high tide line and subject to wave action during severe storm and high tide events. The fact that this location is subject to wave action is precisely why a revetment is needed. The conclusion that this revetment will result in adverse impact at this specific location, is based on a general statement about the adverse effects of shoreline protective devices. Although the principles may be sound, the report does not acknowledge the information provided by the University about conditions at this specific location.

16. *California Coastal Commission staff report, page 14, para. 6, and page 15.*

This section of the report discusses the impact of seawalls but it does not acknowledge the beach scouring impacts of expanding the pumphouse, improving the barrier road to safely accommodate the underground utilities, and building the beach ramp without a revetment. Any one of these surfaces would act as a sheer seawall, whereas the rock revetment was designed to absorb wave energy within the structure by lifting water and generating turbulence within the riprap.

17. *California Coastal Commission staff report, page 15, para. 5.*
There is substantial evidence that a rock revetment, as proposed in this amendment will adversely impact shoreline sand supply and public access as a result of beach scour, and retention of potential beach material.

The report does not include substantial evidence that the proposed revetment will adversely impact shoreline sand supply and public access. It provides general statements about the adverse impacts of shoreline protective devices. The University has provided site specific information that demonstrates that the revetment will not adversely impact sand supply or public access. The impacts to coastal resources are discussed in the attached letter from D. William Anikouchine.

Every reasonable effort has been taken to protect the new and old system from damage while ensuring that public access to the area will be maintained and enhanced. The design improves the quality and degree of access to the beach by providing pedestrian paths, ramp access for the handicapped, outdoor aquarium, visitor center, and viewing platform. The revetment will not block an existing public access way to the shoreline because it includes stairs, a ramp, and improvements to the existing paved service road. Coastal access for

visitors will not be consequently inhibited, and it will be improved for the handicapped and for emergency access.

18. *California Coastal Commission staff report, page 16, para. 1.*
Staff observation of the site after recent severe storms has confirmed that both the pumphouse and the barrier remained relatively intact.

The report concludes the revetment is not necessary because the University has been able to maintain the barrier for the last 50 years which ignores damage to the system since the 1970s. A partial list of damage to the pumphouse since the 1970's is attached to the Commission staff report as Exhibit 7. More recently the severe storms and high tides have caused extensive damage to the lagoon barrier. The report does not acknowledge that when staff visited the site on February 10, 1998, the intact barrier was the result of the University maintaining it on an almost daily basis since the winter storms began in December 1997. In January 1998 one of the sea water supply lines was undermined and the damage resulted in the loss of sea water. In February 1998 the 6" fresh water main that supplies water to the pump house and the fire hydrant was undermined and over 20 feet of the pipe was lost to the sea. The water line is still unconnected to the fire hydrant.

The report correctly notes that coastline development is routinely subject to potential storm and flood damage. Unfortunately, the choice of this location, one that is subject to such regular and expensive damage, is dictated by the fact that the seawater system is coastal related and coastal dependent.

19. *California Coastal Commission staff report, page 16, para. 2.*
However, the Commission notes that alternative forms of shoreline protection which could achieve basic protection of the lagoon barrier and seawater renewal system with fewer adverse impacts have not been adequately addressed in the Environmental Impact Report or other information submitted by the University.

The certified EIR was non-controversial and the adequacy of the alternatives analysis has not been challenged. The report ignores the information provided by the University to Coastal staff at meetings and site visits.

The report is critical of the EIR analysis of the No Shoreline Protection Alternative because it does not explore the alternative of periodically maintaining the barrier. This was not considered as an alternative because it is the existing situation. The report questions the need to protect the expanded structure and implies that the proposed improvements would serve to protect (the same improvements) the structure from wave damage. No portion of the project is proposed to protect the system other than the revetment. The report is critical of the analysis for not considering redesign or relocation of the intake lines and utilities currently located beneath the road and under the sandy beach. The only other alternative would be to place the utilities and pipelines above ground where they would be subject to more damage from waves, wind, vandalism, fire, and in the case of electrical lines could pose a safety hazard. It would also restrict public access and create visual impacts not presented by the proposed project.

The report does not provide sufficient information to demonstrate that the Beach Replenishment Alternative is a feasible alternative - either to protect the seawater system, or to have any beneficial impact on sand supply. It ignores the fact that there is no regional organization in the area which administers a beach replenishment or in-lieu fee program. It minimizes the difficulties involved in setting up a program such as the BEACON project.

The report does not discuss the downside of using off-shore sand for beach replenishment, including the danger and disturbance involved in having a barge working in the surf zone, and the environmental impacts of dumping sand in this area. If beach replenishment were considered solely for this project, provisions would be required to install some sand retention structures, such as groins to preclude the rapid loss of this sand. The long term recommendations in the BEACON report endorsing beach nourishment would only work when a coastline implementation program is instituted. Installation of a groin would cause additional impacts to the marine and terrestrial environment.

The University would not consider the Dune Nourishment Alternative a feasible alternative for reasons similar to those for rejecting construction of an annual sand berm. If the sand were taken from another beach there would be a concomitant destruction of that beach environment. If the sand came from a location other than from a beach it could introduce pollutants or organisms incompatible with the beach environment. The periodic additions of sand suggested in the report would need to be transported to the site via truck resulting in traffic, noise, and energy impacts. There are two sand dunes areas on the western end of the lagoon and restoration of these sand dunes is included in the Lagoon Management Plan. The proposed sand dunes restoration project will provide the desired educational and research benefits for dune restoration efforts elsewhere along the coast. The absence of existing sand dunes at the project location is most likely because they would be subject to the same wave attack as the lagoon barrier, and also because this area is so heavily used as a beach access point.

Long term maintenance and monitoring.

The report indicates that information on the long term maintenance of the rip-rap revetment is needed to make an adequate comparison of the impacts of rip-rap versus other protective devices. Over the long term, the new section of rock revetment will be monitored and maintained as the existing rip-rap has been for the last 20 years. The existing rip rap has been in place for 20 years and has not required major replacement of dislodged rock. The sandy beach in front of the two present structures have remained virtually unchanged from the time they were installed. The monitoring program will consist of the following semi-annual visual inspections:

- for exposed underlining geotextile material;
- to determine if the rocks have either shifted position or are moving seaward;
- to determine if the revetment elevation has dropped;
- to determine if the revetment has been buried by sand; and
- to determine if the revetment has rotated seaward.

If the revetment has moved, a licensed civil engineer will be brought in to evaluate what action is necessary for repair or modification.

In addition to the Physical Facilities Department semi-annual inspections, the Marine Biotechnology Seawater System Operators will assist in monitoring the revetment during their daily routine operations. Any revetment movement will be reported to Physical Facilities for evaluation.

20. *California Coastal Commission staff report, page 26, para. 3. Conclusion*
"In this case, alternative forms of shoreline protection which could achieve the basic protection objectives with fewer adverse impacts are available which may have not been adequately addressed in the University's submittal. In addition it may be feasible to

construct the seawater renewal system without the use of a rock revetment as the existing pumphouse has 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 4/23/9, which do not provide adequate analysis of alternative methods of shoreline protection.

The report does not identify an alternative form of shoreline protection that could achieve the basic protection objectives. The assertion that rock revetment is not needed because the pumphouse has been maintained since the 1970's ignores the damage to the system that has occurred sine the 1970s. The report also fails to mention or use any of the information provided to staff during meetings with UCSB staff and consultants. Some of the other alternatives considered by the University. included the Cobblestone Revetment Alternative, the No-Project Alternative, and the Seawall Alternative.

21. *California Coastal Commission staff report, page 22, para. 3.*
Public Access
...a rock revetment... would convert an estimated 25 to 50 percent of the adjacent sandy beach, depending on tides, to large rock rip rap resulting in a reduction of the physical area available for coastal access.

The proposed rock revetment design will minimize impacts to the public's right of access to the sea in comparison to no shoreline protection or alternative shoreline protective devices. As indicated in the attached letter from Charles Watson, P.E. the revetment footing will utilize less than 12% of the sandy beach. The rock revetment design includes site improvements which enhance coastal access with a paved road, beach access ramp, and viewing deck on the pumphouse. After construction of the rock revetment the adjacent beach would resemble the sandy beach areas adjacent to the existing rock revetment located north and south of the project site. The loss of sandy beach would occur during winter high tide conditions.

If there were no shoreline protection, it would be difficult to protect the access improvements such as the paved road and ramps proposed with the rock revetment. The lack of shoreline protection would alter the recreation and coastal access uses of the site (EIR pg. 5-6). The eventual erosion of the lagoon barrier would eliminate the connecting pathway from the UCSB campus to Goleta Point beach from the east end of the Lagoon Island (Figure 3). The pathway is used extensively for recreation and coastal access by students, staff, and faculty on campus and by the general public. Without revetment, it would be difficult to build or protect the beach access ramp. Loss of the ramp would not enhance coastal access for boats or kayaks used for academic research or recreation and would reduce lateral coastal access to Goleta Point. Elimination of the lagoon barrier would also affect the beach at the mouth of the Lagoon. Erosion of the lagoon barrier would alter the lagoon from an open body of water to a mudflat or salt marsh ecosystem subject to seasonal changes in the level of the water. The sand at the Lagoon mouth would erode away over time and become an open channel with seasonal sand buildup.

For purposes of comparison, the cobblestone revetment described in the LRDP would have greater impacts on the public's right of access to the sea as 10 to 12 additional feet of beach width would be consumed (EIR pg. 5-13). Neither passive nor active beach recreation, such as sunbathing and jogging, would be compatible with the cobblestone substrate. Beach access would be restricted to pedestrian traffic (excluding ramp assisted and

emergency vehicle access). Although recreational benefits provided by the lagoon barrier connection would be preserved there would be an increased loss of beach sand area.

22. *California Coastal Commission staff report, page 22, para. 2.*
the use of shoreline protective devices, while effective at protecting upland areas, is likely to contribute to erosion of the sandy beach area located seaward of the device further reducing the sandy beach area

See previous response (number 4). The width of the beach will not be changed materially except for the footprint of the revetment.

23. *California Coastal Commission staff report, page 22, para. 3.*
As the lagoon barrier now exists, beachgoers may easily access the sandy beach from any point along the approximately 400 ft. long barrier road. The placement of an 11 t. high revetment along the existing lagoon barrier will adversely impact or restrict vertical public access.

See previous comment (number 5) Currently, it is not always easy to access the sandy beach after winter storm damage to the lagoon barrier, and the sandy beach is inaccessible at all times to the physically disabled. The rock revetment will improve public access from the nearest public roadway to the shoreline and along the coast. The revetment will provide long-term protection of pathways to the Campus Lagoon and Goleta Point by stabilizing the lagoon barrier. Furthermore, the project is included in a broader, comprehensive planning context in the form of the (funded) Lagoon Management Plan, which is also before the Coastal Commission for approval. The public access improvements include:

- repairing damaged bluffs and slopes;
- installing informational signs;
- continuing to enforce restrictions on bicycles to reduce erosion and damage to pedestrian trails;
- maintaining access across existing lagoon barriers to Lagoon Island;
- installing new stairways;
- maintaining the existing natural surface of well-established paths;
- continuing to maintain parking areas and coastal access routes;
- maintaining all currently available vehicle access routes for emergency services, maintenance and public safety; and
- maintaining traditional access routes to the beaches.

24. *California Coastal Commission staff report, page 22, para. 4.*
Further, ramp access to the sandy beach for the physically challenged is possible regardless of whether a revetment is constructed in the proposed location.

The report provides no indication of how a ramp could be constructed without protection from the same winter storms, high tides, and wave attack that currently damage the pumphouse. Furthermore, it the ramp were constructed it would present a sheer face to incoming waves, that would act as a seawall.

25. *California Coastal Commission staff report, page 22, para. 5.*
The addition of other related improvements to the lagoon barrier including the placement of approximately 700 cu. yds. of fill to raise the height of the existing barrier from approximately 8 ft. MSL to approximately 11 ft. MSL, paving an access road across the barrier, and constructing a hammerhead style turnaround at the Lagoon Island terminus would also require an amendment to the LRDP.

The report provides no basis for requiring an LRDP amendment for improvements to the existing lagoon barrier access road. With or without the revetment, the lagoon barrier road is an existing paved road for emergency and service vehicles, and with utilities located under the road bed. Like other campus infrastructure the campus maintain the road consistent with State and Federal requirements such as those imposed by the State Fire Marshal and the ADA. The height of the revetment is designed to maintain the water levels of the lagoon and protect the existing salt marsh restoration project at the north end of the lagoon.

26. *California Coastal Commission staff report, page 23, para. 2.*
The Commission finds that the amendment as proposed, will result in significant adverse impacts to public access both to and along the beach.

The revetment will contribute to the maintenance and enhancement of coastal access. Lagoon Island and the beach area at Goleta Point are used by many visitors and students. Goleta Point is popular with surfers and the trails through Lagoon Island are heavily used for walking and jogging. The project will include a paved access road which can be used by pedestrians to get to Lagoon Island. The road and pumphouse will be protected by the proposed rock revetment. A ramp will lead to an observation deck on top of the beach pumphouse deck which will provide new access to views of the lagoon and ocean. The beach access ramp will provide wheeled access for marine science boats, service vehicles and kayaks. An expanded sidewalk will be installed from Parking Lot 6 and the existing beach restrooms will be made accessible for disabled persons.

Furthermore, this project is included in a broader, comprehensive planning context in the form of the (funded) Lagoon Management Plan, which is also before the Coastal Commission for approval. The Lagoon Management Plan outlines management actions to maintain and enhance public access to the coast including :

- repairing damaged bluffs and slopes;
- installing bluff fencing;
- installing stairs;
- diverting paths around highly eroded slopes and installing barriers;
- rehabilitating paths;
- continuing to enforce restrictions on bicycles to reduce erosion and damage to pedestrian trails;
- constructing bicycle barriers;
- maintaining access across existing lagoon barriers to Lagoon Island;
- maintaining the existing natural surface of well-established paths;
- continuing to maintain parking areas and coastal access routes;
- maintaining all currently available vehicle access routes for emergency services, maintenance and public safety; and
- installing informational signs;

- educating people about ways to reduce erosion;
- continuing to use present facilities (e.g. metal fire rings) and managing beach areas without alteration or increase.

The project also includes construction of a new teaching aquarium to house the marine laboratory touch tanks. The touch tanks provide "hands on" instruction for local K-12 grade students, community college students, and the general public.

27. *California Coastal Commission staff report, page 2, California Environmental Quality Act.*

There was no public controversy about the project. The University held an optional scoping meeting for regulatory agencies that was attended by only Coastal Commission staff and a Santa Barbara County planning intern. Only four agencies commented on the initial study, and three of those agencies commented on the Draft EIR. No one appeared at the noticed public hearing and no letters were received from individuals or organizations.

28. *California Coastal Commission staff report, page 27, para. 2.*
For the reasons discussed in this report, the LRDP amendment, as submitted is inconsistent with the Chapter 3 policies of the Coastal Act, there are feasible alternatives or mitigation measures available which would lessen any significant adverse impact which the approval would have on the environment.

For the reasons discussed below, the project is consistent with the Coastal Act, and more specifically with the sections of the Coastal Act addressing diking, filling and dredging, and construction of revetments and breakwaters.

N/A *§30233: Diking, Filling & Dredging*
(a) The diking, filling or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to [among other uses] the following:. (5) incidental public service purposes, including but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines. (7) restoration purposes, [and] (8) nature study, aquaculture, or similar resource-dependent activities.
(b) Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation. Dredge spoils suitable for beach replenishment should be transported for such purposes to appropriate beaches or into suitable long shore current systems.
(c) In addition to the other provision of this section, diking, filling, or dredging in existing estuaries and wetlands shall maintain or enhance the functional capacity of the wetland or estuary. Any alteration of coastal wetlands identified by the Department of Fish and Game shall be limited to very minor incidental public facilities, restorative measures, and nature study.

The revetment is consistent with §30233 because the location of the revetment and the associated trenching and filling of wetlands is constrained by the location of the existing Seawater System, and there is no feasible less environmentally damaging alternative for renewing and protecting the existing Seawater System. The rock revetment is less environmentally damaging than the cobblestone revetment described in the LRDP because

it will reduce impacts on marine and terrestrial biological resources. (EIR pg. 5-14) Another alternative that was considered but eliminated from further consideration would involve moving the revetment landward (or west) of its proposed location to: 1) increase the width of beach area east of the structure; and 2) place the revetment further away from wave action and erosion forces. Under this alternative, rock revetment would be placed across the lagoon barrier between the southerly existing revetment and Marine Sciences complex, leaving the wet well and pumps unprotected from wave action and storm surges. Storm-induced failure of the Seawater System is likely to occur without proper protection of the critical structures under this alternative. In addition, installation of the emergency vehicle lane and turnaround parallel to the alternative revetment location could increase impacts to sensitive biological habitats along the edge of the Campus Lagoon. Moving the revetment structure landward is not a reasonable alternative because the beach pumphouse expansion must occur in its present location.

The revetment is consistent with §30233 because feasible mitigation measures have been provided to minimize adverse environmental effects (EIR , Summary, Section 2.0). The only permanent, significant, unavoidable impact caused by the revetment is not to environmental resources, but on recreational activities conducted on the sandy beach area. (EIR , pg. 4.1-22).

The revetment is consistent with §30233 because the Seawater System is an existing utility serving a public University, and the proposed revetment is necessary for the ongoing maintenance of the pumphouse and existing intake and outfall lines. Among the permitted uses that may require diking, filling or dredging of open coastal waters and wetlands are incidental public service purposes, including burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.

The revetment is consistent with §30233 because diking, filling or dredging of open coastal waters and wetlands for nature study, aquaculture, or similar resource-dependent activities is permitted, and the purpose of the rock revetment and lagoon barrier is to protect the Seawater System and the existing lagoon for research and instructional purposes. The marine science research and instruction served by the Seawater System are resource-dependent activities.

The revetment is consistent with §30233 because the project has been designed and incorporates measures to ensure that trenching and filling avoid significant disruption to marine and wildlife habitats and the proposed revetment will maintain the existing water circulation in the project vicinity by maintaining the lagoon as an open body of water. Construction of the rock revetment, expanded beach pumphouse, and intake pipelines would have direct but insignificant impacts to marine resources on the lagoon barrier beach and intertidal zone because there are no sensitive or protected species identified on the lagoon barrier (Figure 18). Although some sparsely distributed invertebrates would be temporarily disturbed or buried in the high intertidal zone, the quantity of their habitats would not be substantially diminished. (EIR , Section 4.4-8) Construction of the lagoon revetment and beach pumphouse would result in the loss of 0.23 acre of coastal strand habitat and an equivalent amount of foraging habitat for shore birds (EIR pg. 4.5-22). This represents less than 2.0 percent of the linear beach associated with the campus. Extensive coastal strand habitat occurs on beaches in the region. If temporarily displaced by construction activities, shorebirds are expected to find foraging opportunities on other local and regional beaches. They are also expected to resume foraging on the campus beach during periods of low activity and after the construction phase is completed. The temporary or permanent loss of coastal strand foraging habitat associated with the proposed project is not expected to cause shorebird populations to drop below self-sustaining levels and is not considered a significant impact. The project incorporates extensive mitigation measures

during grading to prevent erosion and sedimentation from covering wetland vegetation and the resulting reduction in productivity and the loss of habitat. (EIR , pp. 4.5-17 through 4.5-21). The project will not result in dredge spoils suitable for beach replenishment.

The revetment is consistent with §30233 because the project incorporates mitigation to ensure the functional capacity of the lagoon edge is maintained and enhanced.

Despite temporary construction impacts, the revetment, is consistent with §30233 because it protects the existing ecological functions of the Campus Lagoon ESHA (Figure 5). The Campus Lagoon is an open body of water that provides foraging habitat for the brown pelican and California least tern (EIR pp. 4.5-8 to 4.5-11). These waters and their adjacent wetlands also provide foraging sites for six bird species of concern to the USFWS, the CDFG, or which are listed as Species of Special Interest by the scientific staff of the Museum of Systematics and Ecology. Also included within the Campus Lagoon ESHA are salt marsh vegetation and lagoon open waters representing foraging habitat for sensitive wildlife species.

The project incorporates extensive mitigation measures during grading to prevent erosion and sedimentation from covering wetland vegetation and the resulting reduction in productivity and the loss of habitat. Grading activities would remove vegetative cover and loosen the soil profile on cuts. Filled areas are characterized by unconsolidated soils that are susceptible to erosion. Without mitigation, eroded soils from road banks along the lagoon edge of the lagoon barrier could be deposited into wetlands (EIR pg. 4.5-25).

The revetment is consistent with §30233 because the purpose of the proposed revetment is to protect a utility serving a public University, and supporting marine science research. §30233 states that any alteration of coastal wetlands identified by the Department of Fish and Game should be limited to very minor incidental public facilities, restorative measures, and nature study. The construction impacts on coastal wetlands are offset by the long term benefits of maintaining the Campus Lagoon ESHA, including the wetlands restoration and enhancement project at the north end of the Lagoon.

29. Revetments and breakwaters are addressed in the Coastal Act Policy requiring that:

> *§30235 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.*

As outlined in the letters from Charles Watson, P.E. and Dr. William Anikouchine, the proposed revetment would serve a coastal dependent use, protect existing structures, protect a public beach in danger from erosion, and would not impact the local shoreline sand supply.

Responses to Commission staff report for Coastal Development Permit 4-97-156, dated February 27, 1998.

1. *California Coastal Commission staff report, Summary of Staff Recommendation, page 2, para. 3*
   The applicant has not demonstrated that the proposed rock revetment is consistent with Section 30235 of the Coastal Act.

The critical need for the revetment to protect the seawater system was addressed in the University's response to the recommendation to not include the proposed revetment in the LRDP amendment.

2. *California Coastal Commission staff report, Summary of Staff Recommendation, page 2, para. 4*
   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.

The University considered other alternatives and determined that were no feasible alternatives that would protect the pumphouse, intake lines, underground utilities, lagoon barrier and ADA and public access improvements and have less adverse impacts.

3. *California Coastal Commission staff report, Summary of Staff Recommendation, page 3, para. 1*
   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.

The University has made every effort to involve and inform the Commission staff from the beginning of this project, first throughout the EIR process, and later during Coastal staff's review of the submittal The project was submitted to the Coastal Commission in July 1997. Coastal staff requested additional information in August 1997. Additional information, as requested, was submitted to the Coastal Commission on September 19,1997. The University scheduled a briefing for Coastal staff with the project consultants on October 15, 1997. This meeting was not in response to Coastal staff concerns but to give staff direct access to the project designers and consultants in case there were follow up questions. At that time Coastal staff, in response to specific questions from the University, did not indicate that they needed any further information to process the application. The University then waited to be informed of the hearing date and place. During February the University initiated two further meetings to provide information to Coastal staff. The meetings were held on February 3, 1998 (teleconference), and February 10, 1998 (including a site visit). The purpose of the meetings was to provide the Coastal Staff an opportunity to discuss design alternatives with the licensed civil engineer, seawater system designer, and coastal geologist. The UCSB consultants were available to answer further questions, and the coastal analyst continued to discuss project alternatives with them by telephone.

4. *California Coastal Commission staff report, Special Conditions, page 4, Special Condition 1.*
..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.

The proposed condition would require design changes that are inconsistent with the recommendations of the Seawater System designer and civil engineer. The proposed condition requires design revisions that would neither achieve the project objective of protecting the structure and lagoon barrier, or minimize the impacts of wave action. Design constraints, alternative shoreline protective devices, and impacts to coastal processes are discussed in the attached letter from Charles Watson, P.E. and Dr. William Anikouchine.

5. *California Coastal Commission staff report, Special Conditions, page 4, Special Condition 2.*
...the applicant ....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 hod 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.

This condition is unacceptable as written and has been the subject of discussion between General Counsel for the University and General Counsel for the California Coastal Commission.

6. *California Coastal Commission staff report, Special Conditions, page 5, Special Condition 3, Timing of Construction*

The University does not agree that beach construction activities should be prohibited entirely between March 1, and September 1 to avoid impacts to spawning grunion. The University has agreed to limit construction activities as required by the Department of of Fish and Game through the Streambed Alteration Agreement process. The Agreement specifies that construction on the beach should cease during grunion spawning events as identified by Department of Fish and Game. This condition originated with the Department of Fish and Game Region 5, Environmental Specialist who conducted a site visit and is familiar with local conditions. UCSB has agreed to cease construction during grunion spawning events.

7. *California Coastal Commission staff report, B. Shoreline Protective Devices, page 7.*

The University's response to this section of the report is addressed in the attached letters from Charles Watson, P.E. and Dr. William Anikouchine, that discuss design constraints, alternative shoreline protective devices, and impacts to coastal processes.

8. *California Coastal Commission staff report, B. Shoreline Protective Devices, page 7, para. 6.*
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.

The basis for review is described as consistency with sections 30235 and 30253 and with past Commission action. However, the California Coastal Commission's own Procedural Guidance Document for Reviewing Permit Applications for Shoreline Protective Devices (January 1997) also states that:

The analyst should recommend approval of a shoreline altering device under Section 30235 if:
1) there is an existing structure to be protected;
2) the existing structure is in danger from erosion;
3) shoreline altering construction is required to protect the existing threatened structure; and
4) the required protection is designed to eliminate or mitigate the adverse impacts on shoreline sand supply.

The project meets these criteria. There are existing structures to be protected. The existing structures are in danger from erosion. Shoreline altering construction is required to protect the existing threatened structure. The revetment is designed to eliminate or mitigate the adverse impacts on shoreline sand supply. The University considered other alternatives and determined that were no feasible alternatives that would protect the pumphouse, intake lines, underground utilities, lagoon barrier and ADA and public access improvements.

9. *Past Commission Action.*

The report also states that the project will be reviewed for its consistency with past Commission Action. In this regard, there is a history of Commission actions that support the concept of a revetment at this location and continued maintenance of the lagoon as a body of water.

- The Campus Lagoon has been in existence for some fifty years, protected from breaching by varying forms of revetment structures. As an existing condition, with habitat and recreational values, it is discussed in the 1980 and 1990 LRDP which has been found by the Commission to be consistent with the Coastal Act. The effects of allowing the eventual breaching of the lagoon due to natural processes is inconsistent with the adopted 1990 LRDP. Breaching the lagoon was not analyzed in the 1990 LRDP FEIR nor was it raised as an issue by Commission staff at that time.

- The 1990 LRDP describes The Campus Lagoon area on the Main Campus as an environmentally sensitive habitat because it is a rich habitat for plants and a valuable foraging area for a variety of birds. The Lagoon was originally a salt flat, at a higher elevation than the ocean and cut off from tidal flows by sand bars. These sand bars are occasionally breached by winter stormwaters, which threaten the lagoon habitat. The LRDP notes that the Campus had proposed a revetment to reduce the risks to the lagoon

posed by winter storm and that the revetment is more fully discussed in Part 2, Chapter VI, Section D.

- The Lagoon is referenced throughout the 1990 LRDP as a body of water that is critical to meeting other LRDP and coastal policies. The Lagoon is a resource for plants and animals; the most significant visual and landscape element of the campus; and has great value as a passive recreational area used by the campus community and the public. It is clear from the whole of the Plan that it was intended to retain and protect the Lagoon. The Commission certified that objective as consistent with the California Coastal Act.

- The 1990 LRDP notes that the water quality of the Campus Lagoon will be further improved and protected under a policy of Part 2, Chapter VI, Section D (pg. 218) of the Plan by allowing for construction of a revetment along the sandbar separating the lagoon from the ocean to prevent seawater inundation during sever winter storms to inhibit the Lagoon from draining into the ocean with consequent loss to much of its existing habitat value.

- The 1990 LRDP notes that no specific projects to construct seawalls, revetments or other shoreline devices were proposed in the prior 1980 LRDP, but then goes on to discuss what the 1990 LRDP proposed.

- The 1980 LRDP proposed no changes to the Campus Lagoon, such as allowing it to drain or converting it to a brackish, mud-flat, environment, so past policies were incorporated in the 1990 LRDP to protect the lagoon in its existing state by such things as prohibiting motor vehicles unleashed dogs and swimming, minimizing siltation and prohibiting chemical wastes, sewage effluent or waste water from entering the Lagoon.

- UCSB has recently completed an extensive, and expensive, landscaping and wetlands creation project on the north margin of the lagoon, in the area adjacent to the UCEN. Not only would draining the lagoon be a radical departure from the adopted 1990 LRDP, but it would also threaten the viability of the north lagoon margin landscaping project.

10. *California Coastal Commission staff report, B. Shoreline Protective Devices, page 10, para 1.*

The University's submittal did include contradictory information. The reason for this is that the management plan included information from an undergraduate thesis that was wrong (i.e. used out of context), and that in any case, was irrelevant to management of the lagoon environment. The focus of the undergraduate thesis was environmental not geological. The Lagoon Management Plan paragraph referred to, was used as background data only, and was based on a reference to other (older) geological reports. Furthermore, the report omits the last sentence of this paragraph which states that *"Wave action has caused damage to the lagoon revetment that was installed in 1942."* information that is relevant to the University's proposal to protect the lagoon barrier. When notified of the discrepancy by Coastal staff, the University agreed that the information was contradictory and should be revised to reflect data from recent engineering studies, instead of data from an undergraduate student senior thesis.

11. *California Coastal Commission staff report, page 22, C. Hazards and Geologic Stability*

The report describes the conditions that have led to the University proposing a revetment at this location i.e. wave attack, flooding and erosion. The report notes that:

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.

This is a State -funded project in excess of $9 million. The revetment is proposed to protect a public investment, not private property. The proposed revetment is designed to protect specialized coastal dependent marine facilities of a major State educational institution. The proposed revetment will protect a project that is critical for the University to fulfill its instructional, research, and public service functions. There will be enormous costs to the State of the California if the Seawater System Renewal project is built without protection and subsequently fails due to storm damage.

12. For the reasons discussed below, the project is consistent with the Coastal Act, and specifically with the sections that address the issues of safety, stability, pollution, and energy conservation:

§30253 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 land forms along bluffs and cliffs.*
3. *Be consistent with requirements imposed by an air pollution control district or the State Air Resources Control Board as to each particular development.*
4. *Minimize energy consumption and vehicle miles traveled.*
5. *Where appropriate, protect special communities and neighborhoods which, because of their unique characteristics, are popular visitor destination points for recreational uses*

The proposed revetment is consistent with §30253 because it will minimize the risk of coastal erosion damage to the wet well and beach pumphouse and ensure the stability and structural integrity of the renewed Seawater System components by protecting them from wave attack during winter storms (EIR Section 4.2). The revetment will not have significant impacts on beach erosion because it will be located within the wave and wind shadow of Goleta Point which blocks the site from typical northwestern wave patterns that cause erosion. The revetment would connect with the two adjacent revetments at the base of nearby bluffs and protect the remaining unprotected Lagoon Island bluffs south of the lagoon barrier from wave attack. The revetment will protect the unique characteristics of the Lagoon area which is a popular visitor destination point for recreation. Construction of the revetment will be done in accordance with Santa Barbara APCD air quality measures, and LRDP EIR mitigation measures that were adopted as part of the project through the EIR process.

This revetment project is included in a broader, comprehensive planning context in the form of the (funded) Lagoon Management Plan, which is also before the Coastal Commission for approval. The Plan recognizes and identifies management actions to address: public

safety; air quality; recreation; and the effects of new development, erosion processes, public use, and pollutants on important habitats and areas around the lagoon. The Lagoon Management Plan management actions are described in Chapter 3 of the Lagoon Management Plan and include, but are not limited to the following:

- To assure safety, stability, protection of the area, and avoid alteration of natural landforms along bluffs and cliffs:
- control public access to eroded areas;
- construct stairs to protect steep slopes;
- install a gate and signs to protect fragile coastal resources from bicycle use;
- revegetate eroded areas;
- install low fences and barriers along the coastal bluffs;
- maintain and improve emergency service vehicle access routes in the lagoon area;
- improve the east lagoon barrier as part of the Seawater System Renewal project, in accordance with LRDP development standards; and

  monitor and stabilize the two lagoon barriers on either side of Lagoon Island through revegetation and control of public access.
- introduce additional Best Management Practices to improve watershed management; and
- reduce dust through erosion control measures such as revegetation.
- Protect the special characteristics of the lagoon area that make it a popular visitor destination point for recreational uses:
- maintain the Lagoon as an open body of water;
- provide an access ramp as part of the Seawater System Renewal project that can be used for boats, kayaks, surfers, and disabled people; and
- control public access to reduce environmental impacts.

13. *California Coastal Commission staff report, D. Public Access, page 24*

Public Tidelands and Public Trust Issues
The report contends that the project will interfere with public access and the public right to use the shoreline under the public trust doctrine. This discussion does not recognize that UCSB is a public university. The State Lands Commission approved the decision to enter into a lease agreement with the University on February 27, 1998. The lease includes the rock revetment. State Lands Commission decisions are based upon consideration of such factors as, consistency with the public trust, protection of natural resources and other environmental values, and preservation or enhancement of the public's access to State lands. The lease with the State Lands Commission is based on the fundamental purpose of the project for the "public use and benefit".

14. For the reasons discussed below, the project is consistent with the Coastal Act, and specifically with the sections that address public access.

Other than public safety restrictions, public access to the beach, and the adjacent natural and open space areas on the state-owned UCSB campus is generally unrestricted and uncontrolled. Furthermore, UCSB adheres to California Coastal Act requirements to manage the campus for public access. To accomplish this, UCSB has designated several

parking lots and beach access routes that the public can use to reach coastal resources. The ocean is easily visible from most parking areas designated for visitor use. Signs are posted at the parking areas to provide information and identify beach access routes. Information regarding visitor facilities, parking, and access is available at the east entrance gate to the campus.

The project site is part of an important area of open space for the university, that provides numerous opportunities for public use that are oriented primarily toward passive recreation and enjoyment of the outdoor setting. The area is easily accessible to and is used extensively by the UCSB community, particularly students. The beach is conveniently close to several residence halls, the community of Isla Vista, and well-used parts of the campus. This area is also an important regional recreation and open space resource that is used by the general public. The area's diverse landforms and natural features, aesthetic quality, and accessibility are several reasons why people are attracted to and use the area. Most access to and through the project area is on foot.

Paved vehicle access to the project area terminates near the maintenance and storage yard. Emergency, maintenance, and other authorized vehicles drive over the unpaved lagoon barrier when necessary.

The project was designed to maintain and enhance public access. The revetment will maintain and improve public access from the Main Campus to the beach and Goleta Point, in addition to protecting the structural integrity of the barrier and lagoon. Access improvements include regrading the existing access road down the slope to the barrier, providing a ramp for full access to the beach and restrooms, a viewing deck on top of the pumphouse, and providing stairs to the beach at the pumphouse. The beach access ramp will provide wheeled access for marine science boats, service vehicles, and kayaks. Other access improvements proposed at the east lagoon barrier, are primarily for public safety, and include placing a removable bollard across the road to provide emergency access near the marine laboratory, paving the road on top of the barrier, and providing a hammerhead turnaround at the base of the north-facing bluff.

15. Public Benefit

The revetment is one element of a project that has considerable public benefit. The role of the seawater system is to aid in the advancement of bio-marine knowledge through instruction and research. The benefits are statewide, both in terms of providing first class instructional facilities at a public university, and in the application of research to fields such as medicine and environmental resource protection. The seawater system supports the research and instruction needs of the faculty in the Departments of Biological Sciences, Geology, Chemistry, and the Marine Sciences Institute. Once the marine facility exists, use of marine material in classes is considerable less expensive than using terrestrial vertebrates. Employment related to the marine biology laboratory provides a regional benefit. The seawater labs and aquarium also provide "hands-on" instruction for local K-12 grade students, community college students, and the general public.

As of December 1996 funding for marine science research projects supported by the seawater system was in excess of ten million dollars.

Directed Marine Science Research on Behalf of State Agencies
Current Projects (as of December 1996)

Agency	Number of Current Projects	State Funding Level	Federal Funding Level
State/Local Agencies			
California Coastal Commission	6	$ 799,747	
California Department of Fish and Game	5	$ 120,389	
Santa Barbara County	3	$ 178,033	
Los Angeles County	2	$ 126,936	
California Air Resources Board	2	$ 406,956	
California Dept. Transportation	1	$ 147,818	
California Trade & Commerce	1	$ 1,000,000	
Mono County	1	$ 16,587	
Subtotal	21	$ 2,796,466	
Joint State & Federal Programs			
Minerals Management Service- State of California Cooperative Research programs (State Clients: SLC, CCC, CDF&G, Tri-Counties)	2	$ 2,500,000	5,000,000
		State	Federal
Total	23	$ 5,296,466	5,000,000
Combined Total		$10,296,466	

The value of seawater systems to teaching in the life sciences has long been recognized. Major universities urge students to attend a marine course during the summer at facilities such as Woods Hole, Friday Harbor etc. The existence of a marine laboratory on a general campus is unique. It enables the University of California to integrate instruction and research of marine organisms throughout the curriculum. The alternative, whereby students take a short course at a marine station is not only less comprehensive but it also too expensive for the average student. The subjects served by the marine laboratory include elementary life science courses, invertebrate zoology, parasitology, physiology, pharmacology, developmental biology, and introduction to research. There are no other facilities within the Santa Barbara County region that provide the benefits associated with the seawater system. The nearest similar facilities are located at Moss Landing, Santa Catalina Island, and San Diego.

16. *California Coastal Commission staff report, page 29, F. Environmentally Sensitive Habitat Areas and Marine Resources*

For the reasons discussed below, the project is consistent with the Coastal Act, and specifically with the sections that address Environmentally Sensitive Habitat Areas and Marine Resources.

Development adjacent to Environmentally Sensitive Habitat areas is addressed in the Coastal Act provision that:

> *§30240 (a): Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values and only uses dependent on such resources shall be allowed within such area.*
>
> *§30240 (b): Development in areas adjacent to environmentally sensitive habitat areas shall be sited and designed to prevent impacts which would significantly degrade such areas and shall be compatible with the continuance of such habitat areas.*

The revetment is consistent with §30240 because it is necessary to protect a resource-dependent use and it has been designed to protect adjacent environmentally sensitive habitat areas The proposed rock revetment would have less impacts on the lagoon habitat and lateral coastal access than the cobblestone revetment conceptually described in the LRDP. The rock revetment will be constructed in the Beaches Environmentally Sensitive Habitat Areas (ESHA) and adjacent to the Lagoon ESHA. The EIR determined (Section 4.3) that impacts to the Beaches ESHA would not significantly disrupt habitat values on the beach. The revetment would protect the Seawater System and lagoon barrier, which would maintain the Campus Lagoon as an open body of water and protect the existing ecological functions of the lagoon. The EIR also determined (Section 4.3 and 4.5) the rock revetment would not impact or significantly degrade the water quality or biological resources of the Campus Lagoon ESHA. Short-term impacts to existing vegetation (Figure 18) along the margins of the ESHA caused by construction of the revetment would be mitigated through revegetation.

The proposed revetment would have less impacts than the current situation , the cobblestone revetment conceptually described in the LRDP, or other shoreline protective devices. Continued repair and maintenance of the lagoon barrier involves ongoing disturbance to the beach and wildlife dependent on the Campus Lagoon, as materials are trucked in. The cobblestone revetment conceptually described in the LRDP would result in the loss of more coastal sand habitat and would require more frequent maintenance than the proposed revetment. Loss of coastal strand habitat should be avoided, to the extent possible, to maintain foraging habitat for shore birds. Protection of the lagoon barrier through installation of a revetment would benefit local species that are dependent on the lagoon open water habitat.

This revetment project is included in a broader, comprehensive planning context in the form of the (funded) Lagoon Management Plan, which is also before the Coastal Commission for approval. The Plan recognizes and identifies management actions to protect environmentally sensitive habitat areas. The Lagoon Management Plan management actions are described in Chapter 3 of the Lagoon Management Plan, and include, but are not limited to the following.

- protecting, monitoring, and mapping special status plants;
- removing invasive plants;
- revegetating the dunes;

- installing interpretive exhibits;
- protecting saltmarsh habitat; and
- collecting, growing, and planting native plants.

17. *California Coastal Commission staff report, page 33, G. CEQA.*

The project has been non-controversial. No one attended the public hearing and no comments were received from individuals or organizations. Four agencies commented on the Initial Study and three of these agencies also commented on the DEIR. UCSB held a Scoping meeting (optional per CEQA) for regulatory agencies that was attended by only Coastal Commission staff and an intern from the County of Santa Barbara.

18. The project has been approved as proposed by the State Department of Fish and Game, U.S. Army Corps. of Engineers, and the State Lands Commission.

5.0 PROJECT ALTERNATIVES

5.1 INTRODUCTION

The California Environmental Quality Act (CEQA) Guidelines §15126(d) require that an Environmental Impact Report (EIR) describe a range of reasonable alternatives to the proposed project, or to the location of the project, that could feasibly attain most of the basic project objectives but would avoid or substantially lessen any of the significant environmental effects of the project. Section 15126 (d) of the CEQA Guidelines further states "the EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project." The "rule of reason" governing the range of alternatives specifies that an EIR should only discuss those alternatives necessary to allow a reasoned choice by the decision-makers. Such alternatives should be limited to those that would avoid or substantially lessen the significant effects of the proposed project. Generally, significant effects of an alternative must be discussed, but in less detail than the proposed project and should provide decision-makers perspective as well as reasoned choice. The alternatives analysis of an EIR must, however, include the No Project Alternative.

This alternatives analysis was developed employing the above described CEQA Guidelines. The basic project objectives of the Seawater System Renewal Project were considered in selecting alternatives for evaluation and comparison in this section. The Draft EIR (DEIR) analysis of the project identified significant environmental impacts for the following issues:

- Land Use /Coastal Access (loss of beach area)
- Hydrology/Surface Water Quality (sedimentation)
- Terrestrial Biology (wetland habitats)
- Marine Biology (surf grass, grunion spawning sites, turbidity)
- Noise (construction noise)

The above significant impacts are primarily attributable to construction and operation of the proposed revetment structure. Therefore, the range of alternatives to the Seawater System Renewal Project were selected for their ability to lessen or substantially reduce the revetment impacts and still accomplish the project objectives. Most impacts associated with construction and operation of the seawater system, itself, would be reduced to below a level of significance. All of the mitigation measures identified in Section 4.0, Environmental Setting, Impacts, Mitigation Measures, and Cumulative Impacts, for those other components will be necessary if an alternative is adopted. As identified in Section 3.0, Project Description, the project objectives are as follows. To build a seawater system and associated structures that will:

- Supply a continuous and uninterrupted flow of filtered and unfiltered seawater to research and instruction facilities;
- Increase the reliability of the seawater system by constructing flow and back-up capacity to meet the research and instruction demands on campus;
- Protect project improvements from erosion damage by coastal processes (wave action);
- Protect the existing ecological functions of the Campus Lagoon;
- Maintain and improve fire safety and service vehicle access to beach pumphouse;
- Improve disabled persons' access to beach and restrooms;
- Maintain pedestrian and recreational access to the eastern beach and Lagoon Island;

- Decrease maintenance costs through new and improved materials and construction techniques; and

- Adhere to all relevant goals, objectives, and policies in the 1990 LRDP.

Project Alternatives Considered, But Eliminated

Among the project alternatives considered initially were an alternative location. This alternative was eliminated from further discussion because it would worsen project impacts and/or not attain the basic project objectives. A brief summary of the alternative considered, but eliminated from further discussion, and the reasons for its rejection is provided below for the reader's reference.

Alternative Shoreline Protection Location

This alternative would involve moving the revetment landward (or west) of its proposed location to: 1) increase the width of beach area east of the structure; and 2) place the revetment further away from wave action and erosion forces. Under this alternative, rock revetment would be placed across the Lagoon Barrier between the southerly existing revetment and Marine Sciences complex, leaving the wet well and pumps unprotected from wave action and storm surges. Storm-induced failure of the seawater system is likely to occur without proper protection of the critical structures under this alternative. In addition, installation of the emergency vehicle lane and turnaround parallel to the alternative revetment location could increase impacts to sensitive biological habitats along the edge of the Campus Lagoon. Moving the revetment structure landward is not a reasonable alternative because the beach pumphouse expansion must occur in its present location as discussed in Section 3.0, Project Description. This alternative would not achieve most of the project objectives, and has been eliminated from further consideration.

Project Alternatives Evaluated in Detail

The following five project alternatives are described and evaluated herein:

- No Project Alternative
- No Shoreline Protection Alternative
- Cobblestone Revetment Alternative
- Beach Replenishment Alternative
- Seawall Alternative

In addition, the Environmentally Superior Alternative is identified in this section based on its ability to minimize project-specific impacts, to the maximum extent possible, and attain most of the basic project objectives.

5.2 NO PROJECT ALTERNATIVE

As required by CEQA, the No Project Alternative must be discussed in the EIR. Under the No Project Alternative, the proposed Seawater System Renewal Project and associated improvements would not be constructed and coastal erosion impacts would continue on the Lagoon Barrier as discussed in the 1990 Long Range Development Plan (LRDP). The revetment and coastal pathway projects identified in the 1990 LRDP would not be implemented. The project site would remain in its current condition. Emergency actions, including sand bags, would be frequently used during the winter to control erosion damage during storm surges and high tides. The seawater used for research would continue to be supplied by the existing system and future system failures would be repaired on an "as needed" basis. These system failures could result in a die-off of marine organisms in the laboratories and aquaria. No upgrades in the system reliability or permanent shoreline protection would be implemented under the No Project Alternative. This alternative would not be consistent with the 1990 LRDP which identifies a need for shoreline protection of the Lagoon Barrier. In addition, the No Project Alternative would not attain any of the basic project objectives such as ensuring a continuous uninterrupted supply of seawater to campus.

Conclusions

The No Project Alternative would result in significant erosion impacts to, and possible destruction of, the Lagoon Barrier and seawater system improvements due to continued storm damage associated with a retreating coastal environment. Project impacts to land use, terrestrial biology, marine biology, visual quality, and noise would be avoided by not constructing the proposed project. Potential breach of the Lagoon Barrier would adversely impact species that are currently dependant on the open water habitat of the lagoon. Potential impacts on visual character would be expected if the Campus Lagoon water drains and eliminates the highly scenic water feature. Although many of the significant project impacts would be reduced or eliminated, the No Project Alternative does not meet any of the basic project objectives and could jeopardize valuable research projects should the seawater system fail. For these reasons, the No Project Alternative is rejected as infeasible.

5.3 NO SHORELINE PROTECTION ALTERNATIVE

The No Shoreline Protection Alternative has been provided at the request of the California Coastal Commission in response to the Notice of Preparation (NOP) (Appendices A and B). Under this alternative, all of the proposed seawater system improvements described in Section 3.0, Project Description, would be constructed with the exception of the rock revetment. Seawater discharges to Campus Lagoon would continue under this alternative. Without the revetment to stabilize the beach slope, the beach access ramp would not be implemented. In contrast to the No Project Alternative, there would be no emergency erosion control measures, such as sand bagging, taken during winter storm events. In addition, no maintenance or artificial protection of the Lagoon Barrier would occur. Over time, sand sediments comprising the Lagoon Barrier would naturally erode and transport offshore through wave action and littoral processes. Due to elevation differences between water levels in the Campus Lagoon (average elevation of 4 feet above mean sea level [MSL]) and the Pacific Ocean (sea level), an eventual breach in the unprotected Lagoon Barrier would allow the lagoon to partially drain. Open water may be seasonally maintained in the western deeper portion of the Campus Lagoon. The seawater system would continue to discharge to the lagoon, contributing a consistent source of water. This alternative would subject the lagoon to natural tidal influences via an eroded channel connection to the Pacific Ocean. Changes in the water

regime of the lagoon could establish a mudflat/coastal saltmarsh ecosystem along the edges of the nonsubmerged area. Ultimately, the No Shoreline Protection Alternative would allow erosion processes to remove protective sediment to a point where seawater system improvements on the beach would be exposed. The magnitude of potential damage to structures would be much greater than the No Project Alternative, which provides some shoreline protection.

Land Use/Coastal Access

The elimination of shoreline protection would not directly eliminate the LRDP designated use of the project site as Open Space because seawater system development would not eliminate open space. However, the lack of shoreline protection would alter the recreation and coastal access uses of the site. The eventual erosion of the Lagoon Barrier would eliminate the connecting pathway from the UCSB campus to Goleta Point beach from the east end of the Lagoon Island. The pathway is used extensively for recreation and coastal access by students, staff, and faculty on campus and by the general public. Without revetment, the beach access ramp would also not be implemented. This alternative would not enhance coastal access for boats or kayaks used for academic research or recreation uses and would reduce lateral coastal access to Goleta Point. Elimination of the Lagoon Barrier would also affect the Campus Lagoon and Beaches ESHAs. Erosion of the Lagoon Barrier would alter the lagoon from an open body of water to a mudflat or salt marsh ecosystem subject to seasonal changes in the level of the water. The Beaches ESHA would erode away over time and become an open channel with seasonal sand buildup. This alternative would also be inconsistent with the Draft Lagoon Management Plan (LMP) which proposes to manage the lagoon as an open water body and acknowledges the revetment as a means to protect and maintain the Lagoon Barrier.

As a result of physical changes in the site, this alternative may not be consistent with LRDP policies related to the preservation of coastal access and recreation activities and the protection of environmentally sensitive habitat areas. In contrast to the proposed project, which would be generally consistent with the LRDP policies (Table 4.1-1), the No Shoreline Protection Alternative may not be consistent with the following LRDP policies:

LRDP - Campus Plan, Part 1; II. Campus Development Plan; Section B Development Guidelines; Section A. Main Campus; Service and Emergency Vehicle Access. This alternative would not provide service and emergency vehicle access to the coastal bluffs on Lagoon Island and Goleta Point.

LRDP - Coastal Act Element, Part 2; Chapter II. New Development; Section F. Maintenance and Enhancement of Public Access. This alternative would not maintain or enhance public access to the coast and would not improve coastal access via pedestrian paths to the southern coastal bluffs.

LRDP - Coastal Act Element, Part 2; Chapter IV. Recreation; Section B. Oceanfront Land; Protection for Recreational Use and Development. This alternative would result in the gradual erosion of the sandy beach area, which would not preserve active recreation uses on suitable oceanfront land.

LRDP - Coastal Act Element, Part 2; Chapter V. Land Resources; Section A. Environmentally Sensitive Habitat Area; Adjacent Development. The alternative would not preserve resources in the Campus Lagoon and Beaches ESHA as described in this policy. However, a different type of sensitive biological resources would be established under this alternative. Therefore, the No Shoreline Protection Alternative would not be consistent with this policy, but would preserve the intent of protecting environmentally sensitive habitat areas on campus.

LRDP - Coastal Act Element, Part 2; Chapter VI. Marine Resources; Section A. Marine Resources, Maintenance. This alternative would not preserve the continual maintenance of the Campus Lagoon as a 32-acre brackish pond and as a natural laboratory in UCSB. This alternative would not protect the expanded pumphouse and connecting seawater intake pipelines, which may be damaged and inoperable due to beach erosion. This would prevent the seawater system from operating and supporting instruction and research functions of the Marine Sciences complex.

LRDP - Coastal Act Element, Part 2; Chapter VI. Marine Resources; Section D. Revetments, Breakwaters. This alternative would not implement the revetment protection of the Lagoon Barrier required in this policy. This alternative would not be consistent with the proposal to remove the existing sandbags and add fill consisting of cobblestone, gravel and soil. The alternative would allow the barrier to erode and degrade the visual quality of the area, or become a safety hazard. None of the policy goals would be achieved under this alternative.

Geology/Soils

Under the No Shoreline Protection Alternative, wave action on the coastline would erode the Lagoon Barrier, causing the lagoon to breach. The discharge of water from storm drains and the seawater system would likely incise a channel in the lagoon bottom, which would allow water to flow out to the Pacific Ocean. Littoral sediment transport would seasonally result in the formation of a sandbar immediately offshore of where the barrier currently exists, temporarily cutting off the mouth of the lagoon to tidal influences. During storm events and extreme tidal fluctuations in the winter, the sandbar would breach. As indicated in Section 4.2, Geology and Soils, the project site is not a significant source of sand for local beaches. Erosion of the barrier would initially contribute a very minor amount of sand. Therefore, this alternative would not adversely affect or appreciably benefit sand supply on beaches.

With the lack of shoreline protection, the existing bluff on the northern shore of the newly opened lagoon mouth, below the Marine Sciences Complex, would be subjected to increased erosion. Erosion of this portion of the bluff could potentially compromise the structures located above the bluff in this area, including the seawater system storage tanks, filters, and pumps. In addition, the expanded beach pumphouse, electrical connections, and supply pipelines buried in the Lagoon Barrier would be exposed to erosion forces, which would result in damage. Significant impacts on the project improvements and bluff stability would occur under this alternative.

Hydrology/Surface Water Quality

The seawater system and construction area in the vicinity of the lagoon would be similar to that identified in the proposed project. Project impacts associated with sedimentation would still be expected. Operationally, this alternative could significantly change the hydrology and water quality of the lagoon. Under existing conditions, the maximum surface elevation of the lagoon is approximately 7 feet above MSL and the minimum is approximately 4 feet above MSL during the summer (UCSB, 1996). The current hydrologic control point is the overflow weir at the west end of the lagoon. If the lagoon Barrier were allowed to breach, the elevation of Campus Beach would become the new hydrologic control point and the elevation of the lagoon surface would be approximately that of the beach. The average elevation of the beach has ranged between 5 and 6 feet above MSL (Penfield and Smith, 1993; Penfield and Smith, 1994).

It is expected that seasonal variation in the elevation of the beach could have minor effects on the elevation of the lagoon surface. During the summer, sand would build up on the Lagoon Barrier beach, which could cause a seasonal increase in the minimum water level in the lagoon. If high tide exceeds the beach elevation, water could overtop the beach and enter the lagoon. During low tides, water would be expected to flow out of the lagoon to approximately the beach elevation. If the Lagon Barrier is breached, it is anticipated that the maximum surface elevation would be reduced by approximately 2 feet. Existing water depth data (UCSB, 1996) suggests that a 2-foot drop in lagoon elevation would have minor effects on the areal surface of the Campus Lagoon. With a breached barrier, the surface elevation would probably have less seasonal variation and increased fluctuations with the tidal cycle.

Water from the seawater system, stormdrain system, and other existing sources would continue to flow into the lagoon and out of the lagoon at the beach. At high tides or during winter storms, seawater would flow into the lagoon, increasing internal circulation. Salinity and dissolved oxygen of the lagoon water would remain more constant throughout the year because tidal flushing would bring fresh saltwater into the lagoon twice daily. The effects of this alternative on water quality would, therefore, be beneficial.

Marine Biology

Breach of the Lagoon Barrier would result in loss of beach habitat on campus. Intertidal invertebrates currently residing on site would be washed away over time through erosion by wave action. Spawning habitat for California grunion would be shifted to a new location. The beach area would likely be seasonally replaced with subtidal benthic habitat. Some fish and marine mammals may enter the lagoon during higher tidal fluctuations. Impacts to intertidal invertebrates are not considered significant because their habitats would not be substantially diminished.

Terrestrial Biology

Direct impacts to terrestrial biology of the No Shoreline Protection Alternative are similar to the proposed project for all habitats except coastal strand. Since rock revetment would not be built, impacts to coastal strand habitat would be reduced by 0.23 acres. Impacts to coastal strand habitat from expanding the beach pumphouse would still occur. Indirect impacts from erosion, noise and human activity during construction would also be similar to the proposed project because the seawater system improvements would be constructed. The No Shoreline Protection Alternative would cause an additional indirect impact on terrestrial biology by allowing existing erosional processes to damage the Lagoon Barrier and cause a breach of Campus Lagoon. UCSB would not repair any future breaches and the eastern end of the Campus Lagoon would be open to tidal influences.

Changes in the hydrology of the lagoon would likely change the lagoon's biotic composition and could modify the areal extent of salt marsh vegetation. Tidal influences within the Campus Lagoon would be expected to favor, and potentially increase the amount of, salt marsh vegetation. This could occur because salt marsh vegetation is more adapted to daily (versus seasonal) fluctuations in water levels. The lowered average water elevation would likely convert areas within the University Center (UCEN) Lagoon Wetlands Restoration Area intended for pickleweed to areas more suitable for saltgrass and other high marsh species. Lower areas of the restoration project would continue to support brackish marsh species due to the continued presence of low saline water. Other possible changes could include an increase in aquatic habitat diversity (intertidal habitat mixed with subtidal

resulting in increased species diversity of both invertebrates and vertebrates. In addition, fewer algal blooms and die-offs would be expected due to increased flushing of nutrients. This in turn would be expected to reduce the possibility of fish kills associated with algal die-offs.

Under the No Shoreline Protection Alternative, the existing subtidal habitat would likely be converted to a mix of intertidal and subtidal habitats. Populations of organisms dependent upon subtidal habitat would likely be reduced because the extent of their habitat would be reduced. Existing populations of intertidal species would likely be increased and additional intertidal species could become established.

Visual Quality

Without the rock revetment and the paved access road raising the barrier elevation, the 35-foot-wide expanded beach pumphouse would be more visible from viewpoints located on and surrounding the Campus Lagoon. However, this alternative would not block or eliminate views to ocean and scenic coastal areas because the expanded beach pumphouse would not break the line-of-sight. Although this alternative would minimize the project's alteration of natural landforms at the project site, substantial changes in the topography of the Lagoon Barrier may occur as waves erode the beach and form a channel. The erosion of the Lagoon Barrier may be a gradual process over time and would not be an immediately perceptible change in landform.

The erosion of the Lagoon Barrier would also alter the visual character of the Campus Lagoon from an open body of water to a mudflat/salt marsh ecosystem subject to seasonal changes in the level of the water. Seawater discharges and tidal flows may encourage open water in the deeper, western edge of the lagoon near Commencement Green. However, the eastern arm of the lagoon may be drier in appearance. The character of the project site; itself, would change from a cobblestone berm and sandy beach to eroding pathways and beach areas subject to intertidal flows of the Pacific Ocean. Depending upon the severity of future winter storms, the cobblestone berm may completely erode and decrease in elevation, forming an inundated mouth to the Campus Lagoon. This would result in the gradual alteration of the character of the project site from a sandy beach area utilized

for active/passive recreation to a natural salt marsh or estuary. Nonetheless, the scenic character of the coastline would not be degraded significantly.

Noise

Revetment construction is projected to take approximately 3 months to complete. Elimination of the revetment could reduce project-related noise impacts by shortening the overall construction schedule. However, the daily magnitude of construction noise would not reduce significantly because high noise equipment, such as pile drivers, would be necessary for other components of the project. Therefore, significant noise impacts on classroom space and residence halls would still be expected due to short-term noise levels which exceed acceptable limits during construction.

Conclusions

The No Shoreline Protection Alternative would temporarily increase the reliability of the seawater system on campus by constructing new and upgraded facilities. However, without shoreline protection incorporated into the project design, the Lagoon Barrier would not be stabilized and all seaward improvements would eventually be exposed to erosion caused by wave action and storm surges. Damage to the beach pumphouse, wet well and underground utilities could jeopardize the seawater system and research projects that depend on fresh seawater. In the event of system failure caused by erosion damage, none of the marine research and instruction involving seawater could be accomplished. Access to the east beach and Lagoon Island would be eliminated, significantly impacting passive/active recreation opportunities in the area. This alternative would also be inconsistent with LRDP policies pertaining to coastal access and recreation. The alternative would conflict with the LMP, which identifies the need to protect the Lagoon Barrier from breaching and maintain open water in the lagoon. Effects on biological resources (terrestrial and marine) and water quality would not be considered significant. However, the species composition of the UCEN Restoration Area could change. This alternative is rejected as infeasible because it would not attain the basic project objectives, including protection of the seawater system and existing ecological functions, recreational uses, and aesthetic values of the Campus Lagoon.

5.4 COBBLESTONE REVETMENT ALTERNATIVE

This alternative would involve construction of the revetment structure conceptually proposed in the 1990 LRDP. As indicated in the LRDP, the proposed revetment would include removal of existing sandbags and the addition of cobbles, gravel, and soil. Cobblestone fill would be placed on the seaward side of the Lagoon Barrier. The alternative revetment would cover 400 lineal feet of beach at an approximate width of 50 feet, expanding the width of the Lagoon Barrier from the existing 35 to 45 feet to a maximum 100 feet. The cobblestone/fill revetment would be designed "to protect the Lagoon Barrier and beach pumphouse, avoid alteration of natural shoreline processes, and maintain coastal access along dry sand area." To allow for pedestrian access to the beach, the LRDP proposed to slope the fill gently downward toward the beach with all the materials compacted according to "good engineering practice." No beach ramp would be constructed for this alternative and emergency vehicle beach access would be impeded. Installation of cobblestone/fill shoreline protection would be a temporary solution which would require periodic reconstruction and ongoing replenishment to maintain (Penfield and Smith, 1993). The amount of maintenance required for this alternative is similar to the emergency sand bagging method implemented under the No Project Alternative.

Land Use/Coastal Access

The Cobblestone Revetment Alternative design would be in substantial conformance with the 1990 LRDP and would not require an LRDP Amendment. However, greater impacts to land use would occur as 10 to 12 additional feet of beach width would be consumed by a cobblestone revetment structure. Neither passive nor active beach recreation, such as sunbathing and jogging, would be compatible with the cobblestone substrate. Beach access would be restricted to pedestrian traffic (excluding ramp assisted and emergency vehicle access). Although recreational benefits provided by the Lagoon Barrier connection would be preserved, land use/coastal access impacts would be significant and slightly greater than the proposed project due to the increased loss of beach sand area.

Geology/Soils

The Cobblestone Revetment Alternative would be capable of protecting the Lagoon Barrier and seawater system provided long-term maintenance is conducted. Similar effects as the proposed project on the beach profile and sand budget would occur. The foundation of the cobblestone structure would encompass more beach area and permanently change the beach sand character to cobbles. The abrasive effects of cobbles could be more damaging to structures in the tidal zone, particularly if the seawater intake lines become exposed during storm surges. Impacts would not be significant.

Hydrology/Surface Water Quality

The seawater system and construction area in the vicinity of the lagoon would be similar to that identified in the proposed project. Therefore, impacts to hydrology and water quality associated with construction-related sedimentation would be significant, but mitigable through the implementation of LRDP mitigation measures, and similar to the proposed project.

Marine Biology

This alternative would expand the width of the Lagoon Barrier and reduce intertidal habitat onsite. Fauna living in the upper beach are sparse; thus, this impact is not significant. Significant impacts due to construction and burial of the seawater pipelines would be similar to those identified by the proposed project.

Terrestrial Biology

The Cobblestone Revetment Alternative would result in the loss of more coastal sand habitat and would require more frequent maintenance than the proposed project. Loss of coastal strand habitat should be avoided, to the extent possible, to maintain foraging habitat for shore birds. Likewise, disturbance associated with maintenance activities would represent an adverse effect on wildlife dependent on the Campus Lagoon. For these reasons, this alternative would have greater impacts

than the proposed project. Protection of the Lagoon Barrier through installation of a cobblestone revetment would, however, benefit local species that are dependent on the lagoon open water habitat.

Visual Quality

The smoother and smaller materials used to construct a cobblestone/fill revetment would have a more natural appearance than the proposed rock revetment and would result in a more shallow structure. Because the revetment width would increase, less sand would be visible during winter time and the beach texture would appear to change under this alternative. The cobblestone revetment would result in the conversion of the sandy beach to cobblestone. This would result in a change in the visual character of the beach area. This alternative would protect the scenic resources attributable to the Campus Lagoon by preventing a breach of the Lagoon Barrier. Impacts to visual quality from the Cobblestone Revetment Alternative would be less than significant and similar to the proposed project.

Noise

Construction noise associated with installing the Cobblestone Revetment Alternative would be similar to that expected for the proposed project. Maintenance activities required to replenish or reform the cobblestone material after major storm events would produce temporary increases in noise levels onsite intermittently throughout the life of the project. Minimal construction equipment would be needed to accomplish the maintenance tasks and noise levels would not exceed acceptable levels. Construction of the seawater system improvements would be similar to those identified by the proposed project.

Conclusions

The Cobblestone Revetment Alternative would generally have similar impacts as the proposed project. However, the larger footprint and unconsolidated nature of the structure would increase the magnitude of the impacts to land use/coastal access, geology/soils, and terrestrial biology. The

Cobblestone Revetment Alternative is rejected as infeasible, because of the temporary nature of the solution and the initial and long-term maintenance costs (Penfield and Smith, 1993).

5.5 BEACH REPLENISHMENT ALTERNATIVE

Under this alternative, beach replenishment, instead of rock revetment, would be the proposed shoreline protection mechanism protecting the seawater system facilities and Lagoon Barrier. Beach replenishment would involve hauling sand from off site sources and placing it on the beach directly or in the surf zone to be deposited by wave action. Under this alternative, approximately 20,000 to 40,000 cubic yards of sand would be placed updrift of the project site at Goleta Point. This amount would restore beach conditions to pre-coastal development conditions. The sand would be transported along the coast and past the site by a wave-driven process called littoral drift. Typical sand sources could include dredge material from harbors, sand mining facilities in Santa Barbara County, or offshore sand deposits identified by Beach Erosion Authority for Control Operations and Nourishment (BEACON) (Noble Consultants, 1989). Sand grain size and condition would have to be suitable for use on public beaches. Nourishment activities would be scheduled to seasonally replace sand lost in storm events. This alternative would be consistent with sand replenishment recommendations by BEACON (Noble Consultants, 1989). Wheel-assisted beach and emergency vehicle access would not be accomplished under the Beach Replenishment Alternative.

Land Use /Coastal Access

The Beach Replenishment Alternative would result in beneficial effects on coastal access and beach recreation by providing a permanent source of sand to replenish eroded beach area, thus avoiding significant project impacts to designated land use and coastal access. Recreation linkages around the Campus Lagoon and onto Lagoon Island would be preserved by this alternative through protection of the site from erosion forces.

Geology/Soils

Beach replenishment would protect the Lagoon Barrier, seawater system, and coastal bluffs from wave damage. Beach replenishment would widen the shoreline with suitable sand sources, mitigate shoreline erosion and storm damage, and alleviate the concern of coastal fortification. The segment of coastline between Goleta Point and Goleta Beach, including the project site, was identified as a candidate site for beach replenishment (Noble Consultants, 1989). However, for beach replenishment to be successful, sand must be regularly placed throughout the entire littoral cell from Isla Vista to Point Mugu. Significant project impacts would be avoided and beneficial impacts on coastal processes would be realized under this alternative.

Hydrology/Surface Water Quality

The seawater system and construction area in the vicinity of the lagoon would be similar to that identified for the proposed project. Therefore, project impacts to hydrology and water quality associated with construction-related sedimentation would be significant, but mitigable through the implementation of LRDP mitigation measures, and similar to the proposed project.

Marine Biology

Placement of sand at Goleta Point would smother and destroy sensitive intertidal habitats, including the rocky intertidal areas containing tide pools and surf grass. Impacts to these habitats would be considered significant and greater than expected with the proposed project. Impacts to marine resources and water quality due to construction and burial of the seawater pipeline would be similar to the proposed project. Beach replenishment, however, would increase nearshore ocean water turbidity on a temporary basis. These impacts would not be considered significant because the effect would be temporary and no sensitive species would be impacted.

Terrestrial Biology

The Beach Replenishment Alternative would result in the creation of coastal strand habitat in the project vicinity. This alternative would also reduce construction-related disturbances to wildlife

dependent on the Campus Lagoon by eliminating the need to construct the rock revetment. Although periodic maintenance would produce short-term noise and human activity, it would occur near Goleta Point, sufficiently removed from the lagoon to avoid an impact. For these reasons, this alternative would have less significant impacts than the proposed project. Beneficial effects on coastal resources would be realized because the Lagoon Barrier would be stabilized and existing open water habitat would be maintained.

Visual Quality

The Beach Replenishment Alternative would result in the maintenance of the beach area with sand which would retain the existing visual character of the sandy beach. This alternative would avoid the adverse effect of a rock or cobblestone revetment which would reduce the area of sandy beach. This alternative would protect the natural appearance of the Lagoon Barrier and the unique scenic resources of the open water lagoon.

Noise

Construction noise sources associated with beach replenishment includes equipment use during maintenance activities which are required to replenish sand material over the lifetime of the project. Replenishment would occur closer to Goleta Point than the proposed project and would produce temporary, seasonal increases in noise levels. Additional vehicle traffic and noise would occur on campus if beach sand is hauled to the site. Offshore sand sources would produce barge activity. The replenishment activities would occur further away from noise sensitive receptors than the proposed revetment. Construction of the seawater system improvements would be a much larger one-time source of noise on site. Therefore, noise impacts would be similar in magnitude to those produced by the proposed project.

Conclusions

In general, adopting the Beach Replenishment Alternative would minimize or eliminate most proj impacts associated with constructing and operating a rock revetment. Beach replenishment wo

not provide a permanent structure and would require long-term maintenance activities to permanently stabilize the coastline. Replenishment would occur south of the site at Goleta Point and sand would be moved by wave action and currents northward to the site. Sensitive marine habitat near Goleta Point would be significantly impacted by turbidity created by these replenishment activities. This alternative would not be considered 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 improvements.

5.6 SEAWALL ALTERNATIVE

This alternative would install a 400-linear foot seawall, instead of rock revetment, to control shoreline erosion and stabilize the project site. A concrete, vertical seawall would be placed against the sand escarpment on both sides of the beach pumphouse. The seawall would extend and connect to the existing revetments. The seawall would incorporate access ramps/staircases and provide aesthetic wall treatments to blend with the project environs, to the extent feasible. A wave deflecting cap could be provided to minimize seawater over-splashing during storms. A seawall would reduce the width of the construction zone and permanent shoreline protection structure.

Land Use/Coastal Access

Adoption of the Seawall Alternative would require approval of an LRDP Amendment describing the design of a seawall instead of the cobblestone concept originally proposed in the 1990 LRDP. The Seawall Alternative would reduce the amount of sandy beach excavated for the foundation of the shoreline protection structure. This alternative would avoid the adverse effect of permanent loss of sandy beach which is used for active and passive recreation. The Seawall Alternative may contribute to a loss of lateral beach access due to reflective wave action and resulting erosion. However, this alternative would not result in a permanent conversion of beach area from "beach" to revetment and would avoid the project's significant impact to land use. The coastal access features, including stairways, beach access ramp, and emergency vehicle access, would have beneficial coastal access effects that are similar to the proposed project. Stabilization of the Lagoon Barrier would also preserve the recreation linkages around the Campus Lagoon and to Lagoon Island.

Geology/Soils

Under this alternative, the landward migration or retreat of the coastline, and particularly the Lagoo Barrier, would stop. Because the project site is not a significant source of sand, no net changes i the amount of sand being generated for the littoral cell are expected. However, the increased wav reflectivity associated with seawalls could accelerate erosion forces (i.e., scour) offshore. Beac profile changes would be greater under this alternative and could contribute to increased erosion sand covering the seawater intake pipelines. Impacts would be considered potentially significan

Hydrology/Surface Water Quality

The seawater system and construction area in the vicinity of the lagoon would be similar to th identified for the proposed project. Therefore, project impacts to hydrology and water quali associated with construction-related sedimentation would be significant, but mitigable through t implementation of LRDP mitigation measures, similar to the proposed project.

Marine Biology

Increase scour resulting from the increased wave reflectivity may result in changes in the offsho benthic environment. Greater erosion of the seafloor bottom may reduce the marine biota. Impa to marine biology and water quality due to construction and burial of the seawater pipelines wou be similar to the proposed project.

Terrestrial Biology

The Seawall Alternative would initially impact less coastal strand habitat, but may ultimat increase beach erosion and permanent loss of coastal strand habitat. The resulting loss is likely be greater than impacts associated with the proposed revetment. The noise and human activ effects due to construction would be similar to the proposed project. For these reasons, the Seav Alternative is likely to have greater adverse effects to biological resources than the proposed proj Protection of the Lagoon Barrier through installation of a seawall would benefit local wild species that are dependent on lagoon open water habitat.

Visual Quality

The Seawall Alternative would have the visual characteristics of a large concrete form and mass which would not blend with the naturalized existing rock revetment. The vertical seawall would reduce the amount of sandy beach area excavated for the foundation of the shoreline protection structure leaving more beach exposed. This alternative would avoid the adverse visual quality effects of a rock or cobblestone revetment in that it would substantially decrease the width of sandy beach covered by the shoreline protection feature. Because of the vertical height of the structure (approximately 10 feet above sea level during low tides) and the contrast with scenic and natural character of the site, impacts to visual quality and character would be considered significant and slightly greater than the proposed project. The use of colors and textures that blend the seawall with the surrounding bluffs would partially mitigate visual quality.

Noise

Construction noise produced by installing the Seawall Alternative would be similar order of magnitude as the proposed project. Similar construction equipment would be used, with the exception of the need for concrete trucks. No maintenance activities would be required and, therefore, long-term construction noise would not be produced.

Conclusions

Although the Seawall Alternative would minimize impacts associated with the revetment footprint and generally attain the basic project objectives, increased coastal erosion would conflict with the LRDP policies to minimize coastal processes impacts. Although this alternative would attain most of the basic project objectives, coastal erosion and construction costs would be much greater than the proposed rock revetment. Therefore, this alternative is rejected because it would cause greater beach erosion than the proposed project.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Beach Replenishment Alternative would avoid most of the significant impacts of the project ıted to the shoreline protection while attaining the basic project objectives of protecting the ıwater system. Increased traffic, construction noise, and marine biology impacts to intertidal ıbitat would occur on a periodic, but long-term, basis during seasonal replenishment activities required during the life of the project. Only impacts to marine resources would be significant and require additional mitigation. However, costs associated with beach replenishment make it infeasible.

REFERENCES

County of Santa Barbara, 1996. Proposed Final Supplemental Environmental Impact Report for the Del Playa Seawall Project, 95-CP-019, Planning and Development Department, May.

Noble Consultants, 1989. Comprehensive Sand Management Plan, Santa Barbara and Ventura County Coastline, Main Report, unpublished report prepared for BEACON, July.

Penfield and Smith, 1993. Beach Bluff and Lagoon Barrier Stabilization Project at the University of California at Santa Barbara, April.

University of California Santa Barbara (UCSB), 1990a. Long Range Development Plan, Sedway Cooke and Associates.

UCSB, 1990b. Long Range Development Plan Final EIR, EIP Associates.

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

UCSB

BERKELEY · DAVIS · IRVINE · LOS ANGELES · RIVERSIDE · SAN DIEGO · SAN FRANCISCO · SANTA BARBARA · SANTA CRUZ

Office of the Assistant Chancellor—
Budget and Planning
Santa Barbara, CA 93106-2030
Tel: (805) 893-3971
Fax: (805) 893-8388

April 23, 1997

Ms. Rebecca Richardson
California Coastal Commission
89 South California Street Suite 200
Ventura CA 93001

Dear Rebecca:

Thank you for your March 31, 1997 letter, commenting on the Draft EIR prepared for the UCSB Seawater System Renewal Project. This letter responds to your comments and request for additional information.

1. UCSB proposes to process an LRDP amendment to include a more precise description of the proposed rock revetment, including beach ramp and emergency vehicle access road, as discussed on pgs., 3-18 through 3-25 of the DEIR. The DEIR presents the proposed language modifications to the adopted LRDP in a ~~strike-out~~/underline format. Project consistency with the entire LRDP, including the Coastal Act policies, is presented in Table 4.1-1. The analysis concludes the seawater system renewal project, including the revetment structure, would be consistent with the intent of all applicable LRDP and coastal policies. Within the University of California, the Chancellor has delegated authority to make minor changes in wording to the adopted LRDP document and process the amendment to the local campus staff. Despite having an adopted Coastal Plan (as part of LRDP), the University acknowledges that a Coastal Development Permit is a necessary discretionary action for the offshore improvements (refer to pg., 1-2 of the DEIR).

2. Preliminary wave data assumed for design purposes was based on maximum design still-water level (SWL) of 6.3 ft., mean seal level datum (MSL), which includes both the highest high yearly tide, combined with a statistical 100-year storm surge, 1 1/2 feet of wave setup, and 1/2-foot of additional height to account for long term sea level rise. Also the DEIR analysis assumed the site contains a sediment-starved beach that, long term, would scour down to -1 ft., mean lower low water datum (MLLW), or -3.8 ft., (MSL). These parameters were selected to represent worst-case scour during severe southerly storms. This results in a depth at the structure toe resulting in a maximum design breaker height of 10 ft., (U.S. Army Corps of Engineers Shore Protection Manual - 1984 Edition, Chapter 7). Wave runup depends on structure, shape and roughness, water depth at structure toe, bottom slope in front of the structure, and incident wave characteristics.

EXHIBIT 13g
Permit 4-97-156
UCSB Letter

3. The revetment would protect the existing and expanded pumphouse by forming a continuous barrier between pumphouse structure and the existing revetment on either side. This expanded barrier would prevent erosion of the sediments (i.e., Lagoon Barrier) surrounding the pumphouse which protects the structure from direct wave attack. A reduced revetment length would not afford the same amount of protection and would leave the ends of the lagoon barrier exposed to wave attach. The subsequent erosion of protective sediments would ultimately undercut the revetment resulting in failure and damage to the pumphouse and pipelines. As discussed on pg. 2-8 of the DEIR, the pumphouse must be located next to the existing wet well for a number of design-related reasons, including the needs to place the structure below ocean water levels to create a passive siphon. This location was specifically proposed to minimize impacts to the beach. It is not feasible to relocate the station westerly of the barrier road because of the environmental sensitivity of the lagoon resources. An alternative location to the south or north of its current location would require extensive excavation into hard rock to a depth of 30 ft., below sea level. The environmental and budgetary costs of an alternative design would make the project infeasible.

4. The primary function of the access road is not intended to serve as emergency access to the pump house. The beach area and Lagoon Island are used by many students and visitors to the campus. In the event of an emergency (drowning or other emergency health and safety incident) access for ambulances, fire trucks, and rescue equipment is necessary. The access road will be used by the University to provide routine maintenance to seawater system equipment in the pumphouse.

5. It should be recognized that UCSB has the ability to maintain lagoon water at desired levels. There will not be an increased discharge into the lagoon from this project as indicated on pg., 3-17 of the DEIR. The western weir would continue to function as it currently is designed. In the event that the campus requires additional seawater supply, any discharged water will be directed to the ocean via the existing 12-inch seawater discharge pipe that currently empties on to the beach. The seawater system has incorporated a second outflow structure to be buried beneath the Lagoon Barrier which would allow the water captured in the lagoon during high precipitation events to be released into the ocean. The overflow structure would release the water onto the revetment prior to its running into the ocean. Any water discharged to the ocean would not pond, but would sheet flow due to the natural gradient of the beach to the ocean.

6. A qualitative analysis was conducted to compare the environmental impacts for the construction of a seawall versus a rock revetment. Based upon well-established reflectivity patterns associated with revetments and seawalls, it was determined that the reflectivity of a seawall and associated beach erosion would exacerbate erosion rates when compared to the lower reflectivity of the revetment (State of California Department of Boating and Waterways and Marine Sciences Institute of UC Santa Cruz, Coastal Protection Structures and Their Effectiveness, undated; U.S. Army Corps of Engineers, Shoreline Protection Manual, Volume 1, 1994). The assumption that a vertical seawall would case beach erosion and nearshore turbidity is based on long-term beach sediment deficit and a scoured beach fronting the wall. This situation would allow incoming wave to break directly on the wall. Assuming these worst-case conditions, a vertical seawall with high reflectivity would result in localized increased scour at the base of the wall from the vertical downward component of a breaking wave impacting the wall. This reflectivity will tend to increase turbidity. The Seawall Alternative assumed the seawall would be situation in the same location as the revetment to afford the same protection to the pumphouse structure as the revetment.

7. As indicated in the DEIR, the Beach Replenishment Alternative is consistent with the recommendations by BEACON (Noble Consultants, 1989). However, specific to this site, the 40,000 cubic yards of sand recommended in the DEIR mainly restores beach conditions to pre-coastal development conditions. However, this relatively high energy cost would quickly erode this localized sand source, redistributing it downdrift of the site. However, if beach replenishment were considered solely for this project, provisions would be required to install some sand retention structures, such as groins, to preclude the rapid loss of this sand. The long-term recommendations in the BEACON report endorsing beach nourishment would only work when a coastline implementation program is instituted. Installation of a groin would cause additional impacts to the marine and terrestrial environment that would not occur under the proposed project.

8. Construction of a sand berm was reviewed by UCSB as part of the original engineering feasibility study by Penfield & Smith (1986). There are several constraints to this alternative. Obtaining and placing the sand has environmental and economic impacts. UCSB would need to purchase sand from a supplier which will result in a continuous economic impact to the campus. Once the sand is purchased, it would need to be transported to the site via truck, resulting in traffic, noise and energy impacts each and every year (or more frequently if storm surges occur). The discharge of sand on the beach annually would cause impacts to the sensitive marine environment annually. The marine species in the intertidal zone would be buried and turbidity impacts would occur each time the beach nourishment is completed. Due to increased overall cost implications and the impacts to the environment as compared to the proposed project, UCSB rejected this alternative as not feasible.

9. The stairs are incorporated into the expanded pumphouse design itself and have no dependence on the rock revetment for foundation. On the other hand, without the revetment the beach ramp would be subject to wave action and erosion forces which, over time, would lead to permanent damage of this access improvement.

10. Two alternative methods to secure the pipeline were evaluated in the preliminary stages of the project design effort. The first alternative design consisted of laying the pipelines across the beach and placing large rock over the pipelines for stabilization. Operational concerns related to this alternative include the fact that the pipelines would be more vulnerable to scour and erosion. The environmental disturbance associated with the placement of rock material on the beach and in the intertidal zone would be much greater than the proposed project. The second pipeline design alternative consisted of pile driving hold fasts 60 ft., deep and anchoring them into the hard rock substrate below the site. The pipelines would then be secured by hooks and covered by sand. This would require a barge to drive the piles and would be considered more disruptive to marine and terrestrial biology than the proposed project. These alternatives were rejected for environmental and budgetary reasons.

11. The marine and terrestrial biology sections of the DEIR identified the placement of the revetment as adverse; however, it was not identified as significant because no sensitive, threatened or endangered species were observed or are expected to occur on site. The footprint of the impact is limited to the area above the intertidal zone. Elimination of beach sand in the winter is a natural occurrence and will happen without a revetment structure. Because the revetment would not significantly increase the amount of sand seasonally removed from the beach nor disrupt the habitat values on the beach, the DEIR concluded that impacts to the ESHA would not be significant (refer to Table 4.1-1 in the DEIR).

Short-term impacts to existing vegetation along the margins of the ESHA caused by regrading of the Lagoon Barrier and construction of the emergency access road would be mitigated through revegetation.

If you have any further questions about this project, please call me at 805-893-8430.

Cordially, Catriona Gay

Catriona Gay, Senior Planner
Physical and Environmental Planning

SIERRA CLUB
CALIFORNIA / NEVADA / HAWAII FIELD OFFICE

VIA FAX
March 20, 1998

Steve Hudson
Leslie Ewing
California Coastal Commission
45 Fremont Street
San Francisco, California

Re: Campus Point Seawall
UCSB

Dear Staff:

Thank you again for your well prepared staff report and presentation at the Monterey meeting of the Coastal Commission. We continue to be shocked and disappointed in the UCSB Marine Sciences Department for their outrageous proposal to build a gigantic rip-rap rock seawall at Campus Point.

You will be pleased to learn that many organizations and individuals in the Santa Barbara region have only just learned of this proposal and are requesting an opportunity to participate in these proceedings. This weekend the Santa Barbara County Chapter of Surfrider Foundation is sponsoring a forum on the matter which is to coincide with a surf contest where over 200 people are expected.

In speaking with other surfers who grew up in the area, learned to surf at Campus Point and who recreated on the beach long before the Marine Sciences Department constructed their ill-advised research facility on an eroding bluff above the beach, we are all perplexed at the rise of the water level in the lagoon.

Twenty-five years ago there was no such disparity between the ocean level and the lagoon. They were roughly at the same level. No one recalls the dramatic inequality that exists today. We suspect that the lagoon may have subsequently filled up with sediments, and risen as a result. If this is the case, then the obvious alternative to the rip-rock wall is dredging of the lagoon with beach nourishment of Campus Point the result. Such dredging would of course also be more appropriate for "restoration" of the lagoon. We believe you are correct that such nourishment would benefit the entire southern Santa Barbara County.

EXHIBIT 14a
Permit 4-97-156
Letters from Public

We assume that an analysis of the lagoon must necessarily include a detailed history of it, including its size and depth prior to the University being constructed. Interestingly, the bluff area adjacent to the point itself does not appear to have eroded significantly at all. This will also need examination. Construction of University buildings along the interior of the lagoon may also have impacted it.

Moreover, the Marine Sciences building itself may be the cause of some of the erosion currently underway in the southern reach of the beach. Moving that inappropriately sited building might be the most advantageous long term strategy to prevent further erosion in the area.

We are also extremely concerned that the University may destroy a precious (and famous) surfing environment at the beach. This surfing resource is priceless and entitled to protection by law pursuant to the Coastal Act. The University should be required to conduct surfing studies and monitoring PRIOR to any construction in order to create baseline data. Future monitoring will also need to be conducted and mitigation obtained should the University's Marine Scientists destroy the surfing resource.

Lastly, there is simply no way that this project should be considered without a cumulative effects analysis with recently approved mile long seawall proposed for Isle Vista Beach. Together these two gigantic seawall structures (perhaps the most extensive seawall structures in the history of California?) would wall off nearly the entire town of Isle Vista, and may have dramatic adverse impacts to surfing, beach quality, marine life, and the quality of life for thousands of residents, students and visitors to the region.

We again thank you for allowing the public the opportunity to scrutinize this important project. We look forward also to reviewing with you the documentation the University produces. Since we do not have a contact at the University, please forward this letter to them and request that they provide us with notice and information regarding their analysis at the earliest possible opportunity.

Sincerely,

Mark A. Massara

Isla Vista Chapter

Surfrider Foundation

March 11, 1998

To whom it may concern,

After review of the Seawater System Renewal Project EIR, the Isla Vista and Santa Barbara Surfrider Foundation Chapters feel that there are serious and necessary concerns specifically with the revetment associated with the project. There are areas that need to be addressed which include further exploration of alternatives, , public safety, potential degradation to surf and long range impacts, lack of publicity, and cumulative impacts.

Alternatives

The EIR does not address alternatives to beach protection. While the University believes the revetment will protect the lagoon and pumphouse providing educational purposes, the revetment will potentially cause erosion of the beach prohibiting educational opportunities along the sandy beach. Surfrider is in support of staff recommendations to pursue alternatives to the revetment that could potentially be beneficial such as beach nourishment. This alternative, for example, would not only protect the educational uses along the Campus point beach, but also enhance research and educational programs interested in habitat restoration.

Public Safety and beach access

The proposed revetment will reduce the number of notes where people could safely exit the surf during higher tides and high surf conditions. Adjacent areas are high bluffs some which is lined with existing revetment with no access areas. The Anacapa stairs are closed and no lifeguards are present. The lagoon barrier is an important part of the beach for access, much different from the existing revetment up and down the coast. The existing revetment provides protection to the vertical faces of bluffs of where access is already infeasible. The lagoon barrier is the only low lying access to the eastern beach for nearly one mile from the Isla Vista depressions west to Goleta Beach east of the project site. The project will not be enhancing access, only limiting the area where the public can access the beach. In addition, the revetment will increase the current barrier height by three feet, making it even more difficult to scramble across the rocks. Leaving the barrier in the current state it has been for the past fifty years would allow for the greatest public access and safety.

Long range impacts

The barrier revetment would initially cover areas of the existing beach upon installment. The EIR states that the revetment would remove a portion of the dry sand area presently used for coastal access and recreation creating a permanent change from sandy beach to rock. This is a significant impact to existing land use. Transport of sand in longshore currents and the seasonal berm accumulations may potentially be greatly altered further reducing the available sandy beach area, recreational quality and value, habitat quality, and diversity to the UCSB campus coast permanently.

Although significant beach loss has been acknowledged as a significant impact in the EIR, nothing has been said about the potential degredation of surfing conditions at the site. Campus Point is a right point break, providing wide and positive recreational opportunities producing a range of conditions suitable for young beginners to experts. It is well protected from prevailing winds and is often one of the only surfable locations for miles. Its' proximity to a large surfing population with extensive popularity and wide use implies that its' degradation would impose significant loss to an entire community which relies on this area specifically for their recreational needs. It is impossible to accurately predict the project's impact on this resource, but subjective criteria are available to determine if beach dynamics change. If this does occur, we ask the Commission to install a trigger in the approval process which would require mitigation should the resource deteriorate. Such mitigation could be a re-engineering of the structure, beach nourishment or the construction of artificial surfing reefs nearby. This also implies to the

6730 Pasado Rd Isla Vista California 93117 805.685.8447 dav@acidel.ece.ucsb.edu

Isla Vista Chapter
Surfrider Foundation

potential permanent loss of the Campus Point Beach as well. If under certain criteria, lateral access is depleted substantially, the removal of the revetments would be required in the approval of the entire seawater system project.

Lack of Publicity

Campus Point provides a considerable wide use by Goleta and Isla Vista community members. With such popularity and extensive use and little public comment, we feel this project has had minimal publicity. If the public were aware of potential changes to their beach, this would be a substantial controversial issue. The revetment component of the project specifically impacts resources which are important to the community. This is a proposed development of property which is public, not University owned, a branch of the Public Lands Trust. Due to the fact that there has been little public scrutiny, we feel that there needs to be more time for public review where alternatives can be thoroughly evaluated. We support and would greatly appreciate continuance of this project if the coastal commission is not ready to make a decision on alternatives until proper analysis can be made.

This project violates the following sections of the Coastal Act: 30210 and 30211 which provide for access; 30220 which protects recreation at the beach; 30251 which protects the scenic values; and it contradicts 30235 which regulates revetments - since there are alternatives.

Given the need to address the numerous concerns we have raised with regard to the proposed revetment associated with the UCSB Seawater System Renewal Project and the present lack of public input and awareness of the project, we respectfully request that you continue the hearing on this project.

Sincerely,

Keith Zandona

Keith Zandona
Surfrider Foundation

6730 Pasado Rd Isla Vista California 93117 805.685.8447 dan@geidel.ece.ucsb.edu

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO • SANTA BARBARA • SANTA CRUZ

DEPARTMENT OF ECOLOGY, EVOLUTION & MARINE BIOLOGY
PHONE: (805) 893-3511
FAX: (805) 893-4724

SANTA BARBARA, CALIFORNIA 93106-9610

February 27, 1998

Rusty Areias, Chairman
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, Ca 94105

Dear Mr. Areias:

I am a Professor of Marine Biology at the University of California, Santa Barbara. I am deeply concerned that the Coastal Commission does not fully understand the enormous costs to the State of California should the Seawater Renewal Project not go forward as planned. Without the revetment to protect the pumphouse, utilities, road and lagoon our seawater system, the backbone of the extensive marine research and teaching infrastructure at the campus, will be severely jeopardized from periods of high storm activity. The project is before the Coastal Commission because we cannot protect the system in its present form against the kinds of storm activity California is now experiencing regularly. Without this protection, we will not be able to maintain our seawater system and the organisms that rely on it. Given the low impacts of the project (minor loss of only a few feet of beach, no impact on coastal access (access will actually be improved), minimal impact of beach appearance), the enormous costs of not approving this project become especially appalling. What are those costs?

Costs to the State of California if the project is not Approved.

1. **Quality of Undergraduate Education and qualifications for jobs**: UCSB presently has 300 Aquatic Biology undergraduate majors, most in the marine area, each taking several laboratory courses dependent upon organisms maintained in the seawater system. Without a reliable seawater system we cannot offer these courses. The educational experience of these students will be severely downgraded. These students will no longer be as qualified for jobs in the state or for graduate and professional training. Many of these students come to UCSB because of the availability of live marine organisms for them to study.

UCSB also has over 2400 undergraduate majors in Biology. The year long Introductory Biology course use marine animals maintained in the seawater system for many of its required laboratories. Without a reliable system these students will not experience the diversity of marine organisms or the various investigations of biological principles which use live marine organisms. They might as well have gone to college in Kansas! UCSB is one of the few Universities in the nation directly on the coast. Our location and the unique educational experience we can provide through our facilities is a tremendous draw for students, especially biology students.

2. **Impact on new Programs**: UCSB just started a new Graduate Program in Marine Science with the blessings of the UC system and the State. Without a reliable seawater system to support graduate student research and training the value of this program and its ability to recruit students will be impacted at considerable loss to the program and to industrial, government, and educational institutions in California that might have hired them.

3. **Costs to Research**: The UCSB research marine enterprise is enormous. Extramural funding to the Marine Science Institute was over $17 million dollars last year. Much of this research depends heavily on the seawater system. Without a reliable system, we cannot obtain grants. The loss in overhead to the State of California will total millions each year. The costs of the loss of research that might have benefited the people of California cannot even be evaluated!

5. **Loss of quality faculty**: No major Marine institution in the country can survive without a reliable seawater system. Faculty do not take jobs or stay in jobs where they cannot do their work. I myself could not stay here without access to a reliable sea water system. If the Coastal Commission denies this project, many faculty will be forced to go elsewhere. Such a decision would essentially dismantle 30 years of State investment in building the marine program at UCSB. This would not only be a terrible loss of tax payer dollars, it would be totally irresponsible to the State of California.

6. **Loss to public Education**: UCSB has a very sought-after program where thousands of elementary school students from all over the Tri-counties are brought in each year to view our live animals and enjoy our touch tanks. This experience invigorates many young students to go into science. This program would fold without the facilities to maintain marine organisms. Such a loss would be a great disappointment to many K-12educators in our area as it enriches their programs and their students educational experience.

The Seawater Renewal Project is intrinsically unique. The project proposes to protect the specialized marine facilities of a major State educational institution. This is not a seawall. This is not a proposal to protect private property. It is a proposal to protect public property that benefits the people of the State of California in many, many ways. The proposal will improve beach access and have minimal impact on beach size or appearance.

We cannot continue to maintain revetment as we have done in the past because or pump house is most threatened during times of high waves, when access is the most restricted. Present measures are not working. Other options to protect this system are not viable. We cannot relocate the pump house because the geological conditions which support the wet well cannot be replicated without much greater damage to the environment.

I urge the Coastal Commission to consider all of the costs a denial of this project would incur so that you can make a fully informed decision. There is much more at stake here than may appear. I urge you to approve this project.

Sincerely,

Alice Alldredge
Professor of Marine Biology and Chair of the Interdepartmental Graduate Program in Marine Science

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO

SANTA BARBARA • SANTA CRUZ

BIOLOGICAL SCIENCES ADMINISTRATIVE SERVICES
PHONE: (805) 893-3511
FAX: (805) 893-4724

SANTA BARBARA, CALIFORNIA 93106-9610

March 2, 1998

Mr. Rusty Areias, Chairman
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105

Dear Mr. Areias:

I am writing to express my enthusiastic support for the Seawater Renewal Project as proposed by the University of California at Santa Barbara. It is my understanding that the Coastal Commission staff will be recommending approval of the Seawater Project, but not the revetment which is a vital component of the entire renewal project. It is imperative that the project be approved by the Commission as proposed by the University. The revetment was designed as part of the project to protect the seawater system pump house and the lagoon.

I have been the manager of resources in the Biological Sciences Department at UCSB for the past 20 years. Part of my responsibilities has involved the maintenance of the existing seawater system. During that time the seawater system intake pipes have been damaged several times by storms and wave action. In each case, the seawater system has become disabled and inoperative for both short and long time periods. In each case, the research and instruction mission of the University has been compromised.

I strongly believe that the revetment will provide adequate protection of the seawater system. The University cannot permit the untimely interruption of the seawater system if it is to maintain its research and teaching responsibilities.

- With regard to teaching. The Biological Sciences has approximately 2300 undergraduate majors. Each major must take specific core courses at the lower division level before progressing to upper division level courses. One of the core courses relies heavily on the seawater system to maintain marine organisms for the laboratory course. Enrollment for this laboratory course averages 800.

- In upper division courses, related to the Aquatic Biology major, about 300 undergraduates enroll in laboratory and field courses that rely on the

seawater system for maintaining and studying marine organisms and the marine environment.

- The University serves as an important educational experience for elementary school children. The Marine Laboratory and its aquariums are opened to local elementary schools for field trips. Marine aquariums are set-up to introduce young students to the marine environment. The seawater system sustains the marine organisms for these activities. Approximately 5000 elementary students visit the Marine Laboratory annually for this hands-on experience.

- Marine research is an important major activity on the UCSB campus, being located on a coastline where it can take advantage of marine resources. In conducting these Federal and State funded research programs, the seawater system is a vital element. In some cases, these research programs are directly funded by the Coastal Commission. Each of the research programs relies on a reliable and functional seawater system. Any disruption of the seawater system can cause loss of vital marine research organisms, loss of important data, and loss of valuable research time and effort.

The seawater system is a critical element in fulfilling the University's instruction, research and public service functions. Furthermore, protecting the seawater system and maintaining its operation 24 hours a day every day of the year is essential. The seawater system is a utility, similar to electricity or natural gas. It is not a utility that can be turned off periodically for any duration. Consequently, every effort must be made to ensure that it is protected from damage, erosion or other catastrophic interruptions. Installation of the rock revetment will provide that needed protection.

I strongly urge the Commission to approve this project as proposed by the University.

Sincerely,

Lawrence Nicklin

Lawrence Nicklin
Manager

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO

SANTA BARBARA • SANTA CRUZ

MARINE BIOTECHNOLOGY CENTER
MARINE SCIENCE INSTITUTE
TEL: 805-893-8982
FAX: 805-893-7998; or 805-893-8062

SANTA BARBARA, CALIFORNIA 93106-6150

February 28, 1998

Mr. Rusty Areias, Chairman
California Coastal Commission
45 Fremont Steet, Suite 2000
San Francisco, CA 94105-2219

Dear Mr. Areias:

I left my previous faculty position at Harvard Medical School to join the faculty at UCSB because of UCSB's unique seawater system, and its unique capabilities for seawater-dependent research and teaching. My use of this seawater system has produced economic benefits to the State, provided training to California industries and regulatory agencies, and trained more than 1,000 students in seawater-dependent research and industrial and regulatory methodolgy over the past two decades. Without UCSB's seawater system (unique in its physical capabilities among those at every marine research institution I have seen in the country) none of this would have been possible.

My students, research colleagues and I discovered the natural "signals" that regulate abalone spawning and larval development, and converted these discoveries to simple, reliable methods that increase the economic efficiency and yield of abalone production. **These methods are now used world-wide in the commercial production of abalone and many other valuable shellfish. We used our seawater labs at UCSB to train members of California's emerging aquaculture industry in the new methods we developed, and we also trained members of California's municipal, county and State regulatory agencies (including researchers at CF&G) in the use of these methods both for production purposes, and for use in a simplified and highly sensitive test we developed for the detection and quantitation of the effects of pollutants in coastal waters.** These new methods of production are now standard operating procedure in the most successful abalone producing aquaculture companies in California, and the pollution assay we developed is widely used by the State's regulatory agencies as one of the most sensitive monitors of coastal pollution.

My colleagues and I now bring more than $2-million/year to the State in grants from the U.S. Department of Commerce, the National Institutes of Health, the National Science Foundation, the Office of Naval Research, the Army Research Office and major chemical, manufacturing and biotechnology industries, **for our research investigating the molecular mechanisms controlling biomineralization in marine organisms**. Recognized internationally as pioneering research, these studies are shedding new light on the mechanisms controlling normal human bone development and abnormal mineralization in human disease, and are providing new paths for the environmentally benign synthesis of high-performance composite materials for use in the next generation of computers, communication devices, smart medical implants and biosensors. **Students trained in our laboratories in this program - in research based on marine organisms cultivated in the University's seawater system - are finding excellent employment in the State's most advanced silicon, biotechnology and manufacturing companies, where they are leading in the development of new technologies and industries that will maintain California's leadership in technology for the future. Remarkably, their training - and its**

strong economic support - is based on research probing the genes and proteins of abalones and other simple marine animals!

Several years ago, I worked with members of the California Coastal Commission and our local community to help draft Santa Barbara's original Coastal Development Plan, and was pleased that mariculture, marine research and marine resource teaching were identified as "coastally dependent" activities. The State's investment of $8-million for the construction of UCSB's Marine Biotechnology Laboratory (with laboratories equipped with thermostatically regulated, fresh flowing seawater as well as the latest in scientific instrumentation), and the State's cumulative investment over the years of more than $15-million for the construction and renovation of UCSB's Seawater System, affirm the State's recognition of the value of the unique seawater-dependent research and training activities of the kind described above, and affirm the State's commitment to continue these activities. It is necessary that the State now protect these investments and the research and training activities they were intended to support by physically protecting the Seawater System upon which they are based, with the proposed revetment.

The environmental impact of the proposed protection will be minimal, since the vulnerable sand berm in question already is flanked on both sides by rip-rap that has become "sanded-in" and of relatively low visibility. There is an environmental benefit from the proposed protection as well, since this will maintain the integrity of the lagoon that is both a scenic and recreational resource enjoyed by the wider Santa Barbara community, and a temporary and permanent home to thousands of migratory and resident waterfowl.

My students, colleagues and I ask that you please approve the proposed Seawater System project in its entirely, including the revetment that is essential for protecting the system.

On behalf of the generations of students who already have benefited from the unique training that UCSB's Seawater System has provided, the generations of future students now scheduled to receive such training, UCSB's research community, and California's many beneficiaries of the research and employment training made possible by this Seawater System, I thank you for your consideration of the campus's request for permission to protect this unique resource.

Sincerely,

Daniel E. Morse
Professor of Molecular Genetics
and Biochemistry,

Chairman
Marine Biotechnology Center