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SOUTH CENTRAL COAST AREA
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Addendum to the exhibits updated 7/7/09. The view this addendum, click here.

STAFF REPORT: REGULAR CALENDAR

APPLICATION NO.: 4-08-006

APPLICANT: Santa Barbara County Parks Department

AGENTS: Dave Ward, Santa Barbara County Planning and Development Department
Chris Webb, Moffatt & Nichol
McCabe and Company
Chambers Group

PROJECT LOCATION: Goleta Beach County Park at 5986 Sandspit Road, Santa Barbara County

PROJECT DESCRIPTION: Construct an approximately 500 ft. long, 20 ft. wide, permeable pier sand retention system as an addition to the existing Goleta Beach Pier consisting of 250 – 330 timber or composite fiberglass piles (18" – 20" in diameter) and timber decking. The project also includes seasonal installation of an approximately 1,200 ft. long, 3-5 ft. high winter sand berm for a period of five years after initial development commences; removal of approximately 1,500 linear ft. of existing rock rip rap upcoast of the existing restaurant on site; repair of approximately 650 linear ft. of existing revetment at the downcoast end of the park, and offshore dredging of approximately 500,000 cu. yds. of sand and placement of dredged material on the beach immediately upcoast of the pier for the purpose of initial beach nourishment; and the implementation of an Adaptive Management and Monitoring Program that may include periodic adjustments to add or remove piles from the permeable pier sand retention system and periodic offshore dredging/beach nourishment on an as-needed basis not exceed 100,000 cu. yds. of material/year.

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SUMMARY OF STAFF RECOMMENDATION

Staff recommends **approval** of the proposed development with 18 special conditions outlined on pages 9 - 30 of this staff report. The proposed permeable pier sand retention system and beach nourishment program presents complicated coastal resource, planning, and public policy issues and is proposed by the County of Santa Barbara as a solution to an on-going, long-term coastal erosion problem at Goleta

Beach County Park that has generated tremendous public interest and controversy for many years. Following is a summary of the main issues raised by the project and how they are resolved by staff's recommendation:

The primary purpose of the proposed project is to create a widened public sandy beach at Goleta Beach County Park to reduce the potential for periodic wave-caused erosion to upland park areas and facilities and enhance public access and recreational opportunities while also maintaining existing sediment supplies to all areas downcoast of the project site to ensure that the project does not result in any increased erosion of downcoast beaches and bluffs. An approximately 1,500 linear ft. rock revetment has been constructed on the upcoast (western) portion of the park in response to the long-term shoreline erosion problem at Goleta Beach (**Exhibit 2**). Approximately 250 linear ft. of the existing 1,500 linear ft. revetment was installed in the 1980's without the required coastal permit and an approximately 1,350 linear ft. portion of the revetment was constructed between 2002 – 2005 pursuant to the Commission's approval of CDP 4-02-251 (as amended twice), which authorized that portion of the revetment on a temporary basis only until January 2008.

Although authorization for the approximately 1,350 linear ft. portion of the revetment has expired, Special Condition One of CDP 4-02-051, as amended, also specifically required the applicant to obtain a new coastal permit for either removal or permanent authorization of the revetment. This application was submitted in January 2008, in compliance with the requirements of Special Condition One of CDP 4-02-051 (which specifically allowed the applicable timelines for removal of the revetment to be extended until the Commission acts on this pending application). As part of this project, the applicant is now proposing to remove the entire approximately 1,500 linear feet of rock revetment located on the upcoast (western) portion of the park (as shown on **Exhibit 2**).

The primary issues raised by this project are: the need for the permeable pier sand retention system and the potential for the system to result in increased erosion of downcoast beaches and bluffs and changes in the frequency and duration of Goleta Slough mouth opening/closure events. With respect to the need for the system, opponents to the proposed project believe that feasible alternatives exist that would be environmentally preferable to this project, including the use of a "managed retreat" alternative.

In regards to alternatives to the proposed project, both the applicant and the Environmental Defense Center (EDC), which is opposed to the proposed project, have both evaluated a range of managed retreat alternatives including full retreat beyond the expected range of wave attack, partial retreat with a new "backstop" revetment, and a managed retreat option without use of a rock revetment that would include a strategic reconfiguration of the facilities within the park to avoid or minimize the loss of any critical park uses such as parking facilities **(Exhibit 18)**. Each of these managed retreat/reconfiguration options are relatively similar in that they would involve: (1) removal of approximately 1,500 linear ft. of as-built revetment on the upcoast end of the park, (2) retention of some or all of the existing rock revetment seaward of the existing restaurant and parking lot at the east (downcoast) end of the park and (3) provide for the removal and/or landward relocation of the seawardmost located existing facilities

and structures within the park to minimize or avoid the potential of wave caused damage.

However, each of the identified managed retreat alternatives would still result in the loss of approximately 1.3 acres of existing upland area within the park which would effectively be converted to sandy beach environment. Although this would not result in a reduction of actual park area, it would result in the conversion of upland recreational area to sandy beach recreational area. Moreover, if increased narrowing of the beach due to sea level rise occurs, then this expanded beach area would most likely be lost due to inundation in the future as well. Upland areas of the park that would be lost include portions of the grassy lawn area, picnic area, and parking lot areas. Although the managed retreat alternative is feasible and would avoid any potential adverse impacts to the marine environment and downcoast areas, this alternative would also result in the removal of approximately 1.3 acres of upland areas of the park that currently provide important public access and coastal recreational opportunities.

In regards to potential downcoast effects of the project, the permeable pier sand retention system is designed to effectively function as a "permeable groin". Similar to a regular groin, the proposed device will function by trapping sand on its upcoast side in order to create a wider beach condition. However, unlike a regular groin, the proposed "permeable pier sand retention system" is designed to be permeable allowing a percentage of the sand within the littoral system to pass through openings in the structure (the spaces between the piles), thus regulating the rate of sediment exchange, while maintaining current sand supply volumes for downcoast areas within the littoral cell. The permeable design of the structure is intended to avoid any additional erosion of downcoast beaches and bluffs.

The County has submitted a coastal engineering analysis for the proposed project by their engineering consultant, Moffatt and Nichol, analyzing the potential downcoast effects of the project utilizing computer modeling. Based on the results of the modeling, the County's engineering consultants predict that the project will not result in any significant increase in the rate of downcoast erosion of the shoreline and will not have any measurable effect on the frequency of openings or closures of the Goleta Slough mouth. However, the EDC, has also submitted an analysis by their engineering consultants, Philip Williams & Associates (PWA) disputing the results of the applicant's modeling and asserting that the project would likely result in increased erosion of downcoast areas (**Exhibit 19**).

Thus, there is clearly a disagreement between the engineering consultants retained by the County and the EDC regarding the adequacy of the modeling performed for the project and the potential effects of the project. Commission Staff Coastal Engineer, Lesley Ewing, has reviewed the results of the County's modeling and the concerns raised by PWA and concluded that the modeling performed by the applicant's engineering consultants is generally adequate from an engineering perspective although it must also be noted that all predictive models include some inherent possibility for error and can not guarantee certainty in regards to predicting the effects of any project. In addition, both the engineering consultants for the applicant and for the EDC agree that actual physical modeling should be performed prior to construction to

ensure that the appropriate percentage of permeability is achieved and to ensure that downcoast erosion is avoided. Therefore, in order to ensure that the proposed permeable pier sand retention system is constructed in a manner that ensures downcoast erosion would be avoided, **Special Condition Two (2), Section A.(2)** requires the applicant to implement physical modeling of the permeable pier sand retention system in an appropriate laboratory acceptable to the Executive Director, prior to issuance of the permit. Final detailed project design plans (identifying number of piles and spacing for initial installation) incorporating all modifications/revisions to the project necessary to avoid any increased erosion of downcoast areas resulting from the project will be required to be submitted, for the review and approval of the Executive Director, prior to the issuance of the permit as well.

Moreover, it must be recognized that the proposed permeable pier sand retention system is an experimental effort. The applicant has provided anecdotal evidence of coastal piers, such as the Huntington Beach Pier that has retained sand around the existing pier, or at Oil Piers where the beach experienced significant erosion when the piers were removed as part of the lease decommissioning; however, there are no pier projects that have been designed and built with the specific purpose of sand retention. Thus, staff is recommending that the Commission impose Special Condition Two, supported by a finding that, although the predictive modeling indicates that the project has been designed to avoid downcoast erosion, due to the possibility that the model may not accurately predict all effects of the project, it is critical that an extensive monitoring and adaptive management plan be implemented to assess the actual effects of the project over time and provide for mid-course adaptive corrections in the event that unanticipated adverse effects occur.

Therefore, **Special Condition Two (2), Section A.(3),** requires that an extensive monitoring program be established to investigate shoreline conditions, report any changes and respond promptly and pro-actively to these changes**.** The County would implement "adaptive management" actions on an as-needed basis, based on the results of the monthly, semi-annual, and annual monitoring requirements, to prevent downcoast erosion. These adaptive management actions would include adding/removing piles to adjust the permeability of the permeable pier sand retention system and additional beach nourishment. **Special Condition Two (2), Section A.(4),** also requires, in part, that that the applicant implement the identified adaptive management actions if any of the beaches or bluffs located at the established Baseline Survey Monitoring Points located downcoast of the pier experience retreat greater than the ambient trend for two consecutive spring surveys or two consecutive fall surveys.

Moreover, in the event that the downcoast beaches or bluffs experience retreat above the established ambient retreat trend, for 5 consecutive years after initial construction is completed, or if the applicant fails to submit any of the required annual monitoring reports, then **Special Condition Two (2), Section A.(4),** requires the applicant to immediately remove all portions of the permeable pier sand retention system consistent with the timing restrictions of **Special Condition Three (3)**. Further, to ensure that the Commission will have the opportunity to evaluate the actual effects of this development over time, **Special Condition One (1)** limits the term that the approved development is authorized for a period of ten (10) years from the date of Commission action, after which time an amendment to this permit, or a new coastal development, will be required to retain the permeable pier sand retention system.

Furthermore, to ensure that potential adverse effects to downcoast areas are minimized and to guarantee that the applicant will have the financial ability to remove all portions of the permeable pier sand retention system if the downcoast beaches or bluffs experience retreat above the established ambient rate over a period of 5 years, **Special Condition Two (2), Section A.(7),** requires the applicant deposit all necessary funds for the complete removal of the permeable pier sand retention system in an interest-bearing bank account, held by Santa Barbara County, which shall be reserved exclusively for this purpose. The funds shall be deposited by the applicant on an annual basis for a period of five years after the date that initial construction of the permeable pier sand retention system is completed, so that at the end of this five year period, sufficient funds are available for demolition and removal of the permeable pier sand retention system.

Although the Commission has previously certified a Local Coastal Program for Santa Barbara County, the proposed project will be located on state tidelands and is located within an area where the Commission has retained jurisdiction over the issuance of coastal development permits. Thus, the standard of review for this project is the Chapter 3 policies of the Coastal Act. The proposed project, only as conditioned, will be consistent with the applicable public access and resource protection provisions of the Coastal Act.

NOTE: 174 letters of interest regarding the proposed project have been received as of 6/25/09 including: 85 letters in support of the proposed project; 79 letters of interest which do not clearly indicate either support or opposition to the proposed project; and 10 letters in opposition to the proposed project. Due to the large volume of letters received, a representative sampling of these letters has been included as **Exhibits 23-25**. All letters received are included as part of the administrative record and are available for review in the California Coastal Commission's Ventura Office.

LOCAL APPROVALS RECEIVED: Santa Barbara County Department of Planning and Development, Approval in Concept, dated January 31, 2008.

SUBSTANTIVE FILE DOCUMENTS: Draft Environmental Impact Report for Goleta Beach County Park Long-Term Protection Plan by Chambers Group dated March 2007; Final Draft Report and Addendum Shoreline Morphology Study for Goleta Beach County Park Long-Term Plan by Moffatt & Nichol dated 7/8/08 and; Goleta Beach County Park Reconfiguration Alternative Prepared by Philip Williams & Associates dated 11/24/08; Goleta Beach Modeling Review by Philip Williams & Associates dated 4/15/09; Coastal Development Permit (CDP) 4-02-251, 4-02-251-A1, & 4-02-251-A2 (Santa Barbara County Parks Dept.); CDP 4-02-223 (Santa Barbara County Parks Dept.); CDP 4-02-128 (Santa Barbara County Parks Dept.); and CDPs 4-02-074 and 4-02-054 (Beach Erosion Authority for Clean Oceans and Nourishment, BEACON); CC-074-05, CDPs 1-06-022 and 4-07-116 (Caltrans); CDPs 4-05-139, 4-00-206, and 4-93-205 (Santa Barbara Flood Control); CDP 5-08-242 (County of Los Angeles Department of Public Works); and CDP 3-08-025 (Virg's, Harbor Hut, and The Great American Fish Company).

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I. STAFF RECOMMENDATION

The staff recommends that the Commission adopt the following resolution:

MOTION: ***I move that the Commission approve Coastal Development Permit No 4-08-006 pursuant to the staff recommendation.***

STAFF RECOMMENDATION OF APPROVAL:

Staff recommends a **YES** vote. Passage of this motion will result in approval of the permit as conditioned and adoption of the following resolution and findings. The motion passes only by affirmative vote of a majority of the Commissioners present.

RESOLUTION TO APPROVE THE PERMIT:

The Commission hereby approves a coastal development permit for the proposed development and adopts the findings set forth below on grounds that the development as conditioned will be in conformity with the policies of Chapter 3 of the Coastal Act and 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. Approval of the permit complies with the California Environmental Quality Act because either 1) feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment, or 2) there are no further feasible mitigation measures or alternatives that would substantially lessen any significant adverse impacts of the development on the environment.

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

4. 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.

5. 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. Term of Permit Approval

This coastal development permit authorizes development on a temporary basis only. The development is authorized for a period of ten (10) years from the date of Commission action, after which time the authorization for continuation and/or retention of any development approved as part of this permit (including, but not limited to, the permeable pier sand retention system, seasonal beach berm, and/or beach nourishment activities) shall cease. Prior to the date that authorization for the development expires (10 years from the date of Commission action), all portions of the permeable pier sand retention system authorized by this permit must be removed by the applicant, consistent with the requirements of Special Condition Two (2) and timing restrictions of Special Condition Three (3); unless either a new coastal development permit, or amendment to this permit, authorizing the retention of the development (including any potential continuation of adaptive management program actions and/or beach nourishment activities) is approved by the California Coastal Commission or if a complete application for a coastal development permit, or amendment to this permit, for retention of the permeable pier sand retention system is pending, and delay for the purpose of Commission consideration of the application is therefore beyond the applicant's control, then the above referenced timelines shall be extended until the Commission acts on the relevant pending application. The Executive Director may grant additional time for good cause.

2. Final Adaptive Management and Monitoring Plan

A. ***Prior to issuance of the Coastal Development Permit***, the applicant shall submit, for the review and approval of the Executive Director, a Revised Final Adaptive Management and Monitoring Plan. The final plan shall incorporate all provisions of the "Revised Draft Guideline Document Adaptive Management Plan for the Goleta Beach Park Coastal Access and Recreation Enhancement Beach Sand Stabilization Project" prepared by Moffatt & Nichol and dated March 2009, except that it shall be consistent with the following revisions:

(1) BASELINE SURVEY MONUMENTS:

Prior to issuance of the coastal development permit, the applicant shall provide revised full-size plans, prepared by a licensed surveyor or engineer, clearly delineating the nine (9) Survey Monuments (6 baseline survey monument points and 3 control survey monument points) as generally shown on **Exhibits 11 and 12**. The plans shall be of adequate scale to clearly delineate the precise location of each of the nine identified Survey Monuments and include a physical description of each of the eight survey markers to be installed. For each designated profile location, the plans shall be adequate to clearly delineate each profile line, the distance between each of the survey markers and the surveyed inland location of the sandy beach and, where bluffs are

located, the seawardmost top edge of the bluff on site for the purpose of measuring beach width, bluff edge location, and shoreline profile changes over time.

(2) PRE-CONSTRUCTION PHYSICAL MODELING AND FINAL PLANS:

The applicant shall implement physical modeling of the permeable pier sand retention system in an appropriate laboratory acceptable to the Executive Director to examine the following:

- The sensitivity of the area to pulses of sediment and variable wave climate.
- The ability of at least one configuration of 250 to 330 piles with a 500 foot by 20 foot footprint to maintain a large beach salient at Goleta Beach with no reduction in the rate of downcoast sediment transport and no increase in the rate of downcoast erosion of beaches and bluffs.

a) Prior to the issuance of the coastal development permit, the applicant shall submit, for the review and approval of the Executive Director, a written report of the model results which shall include documentation of the model scaling, wave and sediment conditions, pile configurations, salient development and downcoast sediment transport rates for all tested pile configurations. The applicant shall post the report on Santa Barbara County's public web site for a period of at least 30 days for public review. The report submitted to the Executive Director shall include the applicant's responses to any substantive comments, that have been received by the County from the public prior to the applicant's submittal of the report to the Executive Director, regarding the results of the physical modeling. The report shall identify at least one configuration design that will meet the anticipated project goals of creating a wide beach seaward of Goleta Beach County Park without resulting in any increase in the rate of downcoast erosion of beaches and bluffs.

b) Prior to issuance of the coastal development permit, the applicant shall submit, for the review and approval of the Executive Director, final detailed project design plans (identifying number of piles and spacing for initial installation) which, based on the results of the physical modeling, incorporate all modifications/revisions to the project necessary to avoid any increase in the rate of erosion of downcoast areas resulting from the project.

(3) MONITORING AND REPORTING REQUIREMENTS:

The Final Adaptive Management Plan shall be revised to require that all monitoring shall be conducted for at least one year prior to commencement of development and for a period of 10 years after initial construction, unless the permeable pier sand retention system is removed prior that time. In addition, the Plan shall also provide that the applicant shall conduct monitoring to provide an annual assessment of the shoreline, bluff edge location, and beach width consistent with the following provisions:

a. *Periodic Beach Profile Surveys*: A licensed surveyor or engineer shall survey each of the nine identified beach profile transect lines (6 Baseline Survey transects within the Project Reach Study Area and 3 Baseline Survey Control transects outside of the expected reach of the project's effects) on a semi-

annual basis each spring and fall season for one year prior to the commencement of development and for a period of 10 years after initial construction, unless the permeable pier sand retention system is removed prior that time. The landward point of each of the beach profile transects shall be a permanent location that can be identified by Baseline Survey Markers and GPS coordinates.

b. *Beach Width and Bluff Edge Measurements*: Beach width and bluff edge measurements will be performed by the applicant using a tape measure and a differentially corrected digital global positioning system (GPS) unit to record the beach width and location of the seaward top edge of the coastal bluffs on a monthly basis for at least one year prior to the commencement of development and for a period of 10 years after initial construction, unless the permeable pier sand retention system is removed prior to that time. For each of the sandy beach Baseline and Control Survey Points where no bluffs are present, measurements will occur from the Baseline Survey Marker out to the estimated mean sea level water line and shall be performed in the same location as the beach profile surveys. For each of the Blufftop Baseline Survey Points, bluff measurements will occur from the Baseline Survey Marker out to the seawardmost top edge of the bluff (and within 25 feet of either side of the profile) and beach width measurements shall occur from the toe of the bluff (with GPS toe location recorded) out to the estimated mean sea level water line and shall be performed in the same location as the beach profile surveys. The date, time and tidal conditions for all measurements shall be recorded.

c. *Slough Mouth Changes*: The applicant shall conduct visual surveys of the slough mouth on a monthly basis for the purpose of recording the frequency and duration of all slough mouth opening/closure events.

d. *Aerial Photography*: Aerial photographs of the subject reach (covering, at a minimum, the reach of beach and blufftop spanned by all 6 Baseline Survey transects and the 3 Baseline Survey Control transects) shall be taken concurrent with the fall season beach profile on an annual basis to provide a continuous assessment of the shoreline for one year prior to the commencement of development and for a period of 10 years after initial construction, unless the permeable pier sand retention system is removed prior that time.

e. *Post-Construction Reporting Requirements*: The applicant shall submit an annual monitoring report, for the review and approval of the Executive Director, for a period of 10 years after initial construction is complete (unless the permeable pier sand retention system is removed prior that time). The monitoring report shall be submitted on annual basis and shall include all survey data and a written report prepared by a qualified coastal engineer indicating the results of the shoreline profile, bluff erosion, and beach width monitoring program. The monitoring report shall include conclusions regarding the level of success of the project, a detailed analysis of any change in shoreline position, increase or decrease in beach widths and bluff erosion rates upcoast and downcoast of the permeable pier sand retention system,

details on any nourishment efforts undertaken during the year with the volume and placement location specified, and any adjustments to the permeable pier sand retention system with a plan showing specific changes. The applicant shall post each monitoring report, on an annual basis, on Santa Barbara County's publicly accessible web site for review by interested public. More specifically, the report shall include, but not be limited to, the following:

- Quantification of the volumetric change in the beach for each survey period, using the pre-project condition as the baseline.
- Analysis of the seasonal and interannual changes in width and length of dry beach, subaerial and nearshore slope, offshore extent of nourished toe for profiles within the nourishment area, and overall volume of sand in the profile; changes in downcoast bluff position; and, estimates of the rate and extent of transport of material up- and down-coast from the beach nourishment receiver site.
- Comparison of the actual changes to the shoreline in relation to the predicted changes that were anticipated based on the results of the Pre-construction numerical and physical modeling.
- Analysis of the expected time period over which the beach benefits related to the initial nourishment volume and permeable pier sand retention project can be identified as distinct from background conditions; and qualify any abnormal wave and current conditions that could account for changes to the beach outside what was anticipated.
- Provision of cumulative data detailing the annual quantity and placement of material, including interaction of the replenishment project with other beach replenishment projects or other shoreline projects that occur in the project area.
- Utilization of aerial photographs, to the extent feasible, to prepare a summary of beach width changes.
- Conclusions regarding the level of success and any adverse effects, including any observed downcoast beach/bluff erosion and any changes in the frequency that the Goleta Slough opens and closes and/or changes to the duration the slough mouth remains open/closed. The report shall also include a summary of whether excessive entangling of wrack within the piles has occurred, including frequency and effects on permeability.
- The report shall include a brief history of all previous years' monitoring results to track changes in shoreline, bluffs, and slough mouth conditions.

(4) TRIGGERS AND ACTIONS FOR ADAPTIVE MANAGEMENT ACTIONS:

Prior to the issuance of the coastal development permit, the applicant shall submit, for the review and approval of the Executive Director, a written report, prepared by a qualified civil engineer identifying the ambient rates of erosion for the beach areas at each of the nine (9) identified beach/bluff profile transect locations (6 Baseline Survey

transects within the Project Reach Study Area and 3 Baseline Survey Control transects outside of the expected reach of the project's effects) and bluff erosion for the three (3) Baseline Survey transects downcoast of the pier. The report shall provide **projected future beach width** for each transect location, as determined by the established ambient beach shoreline retreat trend and the pre-project baseline beach width. Calculation of the ambient rates of ambient beach shoreline retreat trend at each of the beach profile locations and rates of erosion at each of the bluff profile locations shall be based on analysis of the results of: (1) at least one year of new bluff position and beach profile surveys performed on a semi-annual basis each spring and fall season for one year prior to the commencement of development (2) all available historic beach/bluff profile surveys for the subject areas, (3) comparison of all available historic aerial photographs, LIDAR surveys, and all other appropriate available data concerning beach/bluff erosion/accretion rates. A detailed description and a summary of the findings for each of historic sources of data used in determining the ambient rates of erosion within the study area shall be provided. Prior to or at the same time that the applicant submits this report to the Executive Director, the applicant shall post this ambient beach and bluff change report on Santa Barbara County's publicly accessible web site for review by interested public.

Ambient erosion rates shall be established for the downcoast beaches (at each of the baseline and control survey points). Changes to downcoast beaches/bluffs, relative to control beaches/bluffs, shall be used to establish (1) triggers for implementation of identified adaptive actions including either adjustments of the permeable pier sand retention system (including reconfiguration, removal, or addition of piles) and/or implementation of additional beach nourishment; and (2) triggers for removal of the permeable pier sand retention system. All adaptive actions including either adjustments of the permeable pier sand retention system (including reconfiguration, removal, or addition of piles) and/or implementation of additional beach nourishment shall be implemented as soon as possible after the trigger condition has been reached, within the timing constraints of Special Condition Three (3); but in no case shall action be delayed more than 12 months after occurrence of a trigger condition.

In the event that supplemental beach nourishment is necessary after the initial placement of 500,000 cu. yds. of material, then the applicant shall, to the extent that such material is readily available, utilize donor beach nourishment material generated as a result of the ongoing opportunistic beach nourishment program previously approved by the Commission pursuant to CDP 4-02-054 (BEACON) and CDP 4-05-139 (Santa Barbara Flood Control) or other similar projects approved by the Commission pursuant to a separate coastal development permit. In the event that an adequate supply of donor beach nourishment material is not readily available pursuant to CDP 4-02-054 (BEACON) and CDP 4-05-139 (Santa Barbara Flood Control) or other similar projects approved by the Commission pursuant to a separate coastal development permit, then offshore dredging within the identified donor area may be used as a source of material. In no event shall supplemental offshore dredging exceed 100,000 cu. yds. of material per year. In addition, the total amount of beach nourishment material deposited at Goleta Beach pursuant to this permit, in combination with any other

sediment disposal/beach replenishment projects (including, but not limited to, all deposition activities implemented pursuant to CDPs 4-02-074 and 4-05-139) shall not exceed a cumulative total of 200,000 cu. yds. of sediment/year, with the exception of the initial placement of 500,000 cu. yds. of material pursuant to this permit. The applicant shall be responsible for coordinating with all other potential sediment disposal/beach replenishment projects at Goleta Beach.

Adaptive actions shall be taken if the annual monitoring report indicates that:

- any of the identified Baseline Survey Monitoring Points located downcoast of the pier experience bluff retreat greater than the ambient trend for two consecutive fall or two consecutive spring surveys; or
- any of the measured beach widths at the identified Baseline Survey Monitoring Points located downcoast of the pier is 15% or more narrower than the projected future beach width during two consecutive fall or two consecutive spring beach profile surveys and the calculated percentage is greater than the average of the percent narrowing of the beach widths, relative to projected future beach widths at the two downcoast Control Survey Monitoring Points.

If any of the above triggers are reached, then the applicant shall implement adaptive management actions including adjustments to the permeable pier sand retention system (add/remove piles), beach nourishment, or a combination of these actions. If any adverse downcoast conditions persist according to monitoring, the applicant shall implement any necessary additional adaptive management actions (including further adjustments to the permeable pier sand retention system and/or beach nourishment). Finally, if the annual monitoring report indicates that downcoast beaches or bluffs within the identified project monitoring area (at any of the identified Baseline Survey Monitoring Points located downcoast of the pier) experience a beach width less than the projected future beach width or bluff retreat greater than the established ambient rate of erosion **for 5 consecutive years** after initial construction is completed, or if the applicant fails to submit any of the required annual monitoring reports, then the applicant shall immediately remove all portions of the permeable pier sand retention system consistent with the timing restrictions of Special Condition Three (3).

(5) PROJECT NOTIFICATION REPORT FOR SUPPLEMENTAL ACTIONS:

In the event that future modifications/adjustments to the number/configuration of the permeable pier sand retention system, additional offshore dredging/beach nourishment activities, or construction of the seasonal sand berm are required to prevent downcoast erosion or to maintain the target beach width after initial construction is completed, then the applicant shall submit a Project Notification Report prior to the commencement of any supplemental activities, for the review and approval of the Executive Director. The Project Notification Report shall describe all supplemental actions, timing of work, staging areas, equipment to be used and method of construction and shall include all relevant monitoring reports required pursuant to this permit for the project site to ensure that the operations are in substantial conformance with the resource protection and

public access conditions of this permit. All supplemental actions and work shall be in accordance with all conditions of this coastal development permit. No change to the program beyond the supplemental actions outlined by the approved Final Adaptive Management Plan shall occur without a Commission-approved amendment to the permit, unless the Executive Director determines that no such amendment is required

(6) REMOVAL PLAN:

Prior to the issuance of the coastal development permit, the applicant shall submit detailed plans for the potential demolition and removal of the permeable pier sand retention system in the event that system is shown to result in an increase in the rate of erosion for downcoast beaches or bluffs pursuant to the above referenced monitoring and reporting requirements of this condition or if a new coastal development permit, or amendment to this permit, authorizing the retention of the development and continuation of an adaptive management program is not approved by the California Coastal Commission prior to the date that authorization for the development expires (10 years from the date of Commission action on this permit) consistent with the timing provisions of Special Condition One (1). The Executive Director may grant additional time for good cause.

(7) FUNDING ASSURANCE FOR MONITORING/IMPLEMENTATION ACTIONS

A. Prior to issuance of the coastal development permit, the applicant shall provide a detailed cost estimate for the potential demolition and removal of the permeable pier sand retention system. In addition, by acceptance of this permit, the applicant agrees to deposit all necessary funds for the complete removal of the permeable pier sand retention system in an interest-bearing bank account, held by Santa Barbara County, which shall be reserved exclusively for this purpose. The funds shall be deposited by the applicant on an annual basis for a period of five years after the date that initial construction of the permeable pier sand retention system is completed, so that at the end of this five year period, sufficient funds are available for demolition and removal of the permeable pier sand retention system. The applicant shall be responsible for adding additional funds to the account as necessary to fund the actual removal of the permeable pier sand retention system if costs exceed the original estimate. The applicant shall provide evidence to the Executive Director of each annual deposit to the account. These funds wholly, or in combination with other County funds shall ensure adequate funding remains available for removal of the permeable pier sand retention system if necessary pursuant to the provisions of Special Condition 2.A.4 of this coastal development permit or prior to the date that authorization for the development approved by the permit expires (10 years from the date of Commission action) unless a new coastal development permit, or amendment to this permit, authorizing the retention of the permeable pier sand retention system, is approved by the California Coastal Commission. **PRIOR TO EXPENDITURE OF ANY FUNDS CONTAINED IN THIS ACCOUNT**, the Executive Director shall review and approve, in writing, the proposed use of the funds as being consistent with the intent and purpose of this condition.

B. The Permittee shall undertake development and program management in accordance with the final approved plans. Any proposed changes to the approved final plans shall be reported to the Executive Director. No changes to the approved final plans shall occur without a Coastal Commission - approved amendment to the coastal development permit, unless the Executive Director determines that no amendment is legally required.

3. Timing of Operations

It shall be the applicant's responsibility to assure that the following timing restrictions and temporally-based requirements are observed, both concurrent with, and after completion of, all project operations:

(a) All project activities, with the exception of monitoring, shall occur Monday through Friday, excluding state holidays. No work shall occur on Saturday or Sunday.

(b) Construction and adjustments of the permeable pier sand retention system and beach nourishment activities shall only occur between Labor Day and February 28th.

(c) The seasonal sand berm may be constructed in accordance with project plans on an annual basis for a period of 5 years after commencement of development. Construction of the berm shall occur prior to November 1 of each calendar year.

(d) The seasonal sand berm shall be lowered prior to Memorial Day each year that it is constructed. The sand berm shall be graded to natural beach contours (in connection with its lowering) to restore the shoreline and to facilitate recreational use. If the sand berm has already eroded to an approximation of natural beach contours prior to Memorial Day, then no restorative grading will be necessary.

(e) All construction operations, including operation of equipment, material placement, placement or removal of equipment or facilities, restricting public access, and seasonal sand berm construction/removal or other activities (with the exception of habitat restoration and wrack habitat management activities) shall be prohibited as follows:

i. From the Friday prior to Memorial Day in May through Labor Day in September to avoid impacts on public recreational use of the beach and other public amenities in the project vicinity.

ii. On any part of the beach and shorefront in the project area when California grunion (including eggs) are present during any run periods and corresponding egg incubation periods, as documented by the surveys conducted pursuant to Special Condition Nine (9), to avoid impact on the spawning of the California Grunion.

iii. On any part of the beach and shorefront in the project area when western snowy plover are present, as identified by the surveys conducted pursuant to Special Condition Nine (9), to avoid adverse effects to western snowy plovers.

iv. On any part of the beach and shorefront in the project area when Beldings savannah sparrow are present, as identified by the surveys conducted pursuant to Special Condition Nine (9), to avoid adverse effects to Beldings savannah sparrow.

4. Removal of Existing Rock Rip Rap

The applicant shall remove all existing rip rap (approximately 1,500 linear feet) on site located west (upcoast) of the Goleta Beach Pier and existing restaurant structure concurrent with, or prior to, the construction of the permeable pier sand retention system and the initial placement of 500,000 cu. yds. of sand for beach nourishment.

5. Limitations on Beach Grooming and Wrack Management

Mechanized beach grooming, including raking, cleaning, and recontouring of sand shall be prohibited at Goleta County Beach with the exception of grooming associated with the placement of sand material for the purpose of beach nourishment or construction/demolition of the seasonal berm or those areas of the beach above the high high water line during summer months. No mechanized beach grooming activities shall occur, at any time, within areas that would result in disturbance or removal of existing coastal strand vegetation. During summer months, beach grooming activities above the high high water line shall be limited to once immediately before Labor Day, Fourth of July, and Memorial Day. Grooming activities shall be implemented in a manner that avoids the removal or disturbance of wrack to the maximum extent feasible. Wrack shall not be removed from this area during grooming or beach nourishment activities with the exception that debris that is entangled in the wrack, and which poses a clear threat to public safety, may be removed as needed. Trash shall be removed by hand to the maximum extent feasible and the mechanical removal of large debris that poses a clear threat to public safety shall be allowed.

6. Plans Conforming to Geotechnical Engineer's Recommendations

By acceptance of this permit, the applicant agrees to comply with the recommendations contained in all of the coastal engineering, geology, geotechnical, and/or soils reports referenced as Substantive File Documents. These recommendations shall be incorporated into all final design and construction plans, which must be reviewed and approved by the consultant prior to commencement of development.

The final plans approved by the consultant shall be in substantial conformance with the plans approved by the Commission. Any substantial changes in the proposed

development approved by the Commission that may be required by the consultant shall require amendment(s) to the permit(s) or new Coastal Development Permit(s).

7. Operations & Maintenance Responsibilities

It shall be the applicant's responsibility to assure that the following requirements are observed both concurrent with, and after completion of, all project operations:

(a) All offshore dredging operations shall be conducted using a hopper dredge. Use of a cutter/suction dredge barge shall be prohibited.

(b) At the completion of the initial beach nourishment operation and any future beach supplemental beach nourishment activities, the sand deposited on the beach shall be graded and groomed to natural beach contours to restore the shoreline habitat and to facilitate recreational use at least one month prior to Memorial Day in May. Disturbance to wrack and coastal strand habitat shall be minimized to the extent feasible.

(c) Staging areas at Goleta Beach County Park shall be used only during active construction operations and will not be used to store materials or equipment between operations.

(d) The applicant shall not store any construction materials or waste where it will be or could potentially be subject to wave erosion and dispersion. In addition, no machinery shall be placed, stored or otherwise located in the intertidal zone at any time, except for the minimum necessary to implement the project.

(e) Construction equipment shall not be cleaned on the beach or in the beach parking lots.

(f) Construction debris and sediment shall be properly contained and secured on site with BMPs to prevent the unintended transport of sediment and other debris into coastal waters by wind, rain or tracking.

(g) Construction debris and sediment shall be removed from construction areas as necessary to prevent the accumulation of sediment and other debris which may be discharged into coastal waters. Any and all debris resulting from construction activities shall be removed from the project site within 24 hours. Debris shall be disposed at a debris disposal site outside of the coastal zone or at a location within the coastal zone authorized to receive such material.

(h) During all berm construction and beach nourishment activities authorized pursuant to this permit, the applicant shall be responsible for removing all unsuitable material or debris within the area of placement should the material be found to be unsuitable for any reason, at any time, when the presence of such unsuitable material/debris can reasonably be attributed to the placement material. Debris shall be disposed at a debris disposal site outside of the coastal zone or at a location within the coastal zone authorized to receive such material.

8. Sediment Analysis and Monitoring

A. Prior to the issuance of the coastal development permit and prior to the commencement of work each subsequent year that beach nourishment is necessary, an engineer(s) or environmental professional(s), with appropriate qualifications acceptable to the Executive Director, shall: (1) prepare a Sampling and Analysis Plan and conduct testing at the source and receiver site for the review and approval of the Executive Director and (2) monitor the site during all beach nourishment activities. The Sampling and Analysis Plan shall be consistent with the following:

(1) Sampling Frequency – Samples shall be collected from both the receiver sites and the source sites. For the receiver site, samples shall be collected along transects that are approximately perpendicular to the shoreline, with one (1) transect per each 0.5 miles of receiver beach length. For the source sites, samples shall be collected throughout the source area, with one (1) sample per 0.5 acres, and a minimum of five (5) samples per source site for contaminant testing and a minimum of three (3) samples per source site for all other sediment testing. For the source site samples, the boring depth shall extend approximately one-foot (1-ft) below the anticipated excavation depth.

(2) Grain Size -- Physical analysis shall be conducted on representative samples of each source material proposed for placement at the Goleta Beach deposition site and on samples from each transect of the receiver beach. The material shall be analyzed for consistency with the U.S. Army Corps of Engineers (ACOE) / Environmental Protection Agency (EPA), State Water Resources Control Board and California Regional Water Quality Control Board (RWQCB) criteria for beach replenishment. Deposition of source material shall occur consistent with the following:

i. Source material meeting all applicable federal and state beach nourishment requirements, and for which an average of 75% or more of the material is coarse grained (retained on a Standard U.S. Sieve Size No. 200), may be deposited below the mean high tide for the purpose of beach nourishment.

ii. Source material meeting all applicable federal and state beach nourishment requirements, and for which an average of 90% or more of the material is coarse grained (retained on a Standard U.S. Sieve Size No. 200), may be deposited above the mean high tide line for the purpose of beach nourishment.

iii. Source material that does not meet the applicable physical, chemical, color, particle shape, debris, and/or compactability standards for beach replenishment shall not be used.

(3) Contaminants -- Based on U.S. EPA Tier I analyses results, Tier II bulk chemical analysis shall be conducted on representative composite samples of each source material proposed for placement at the Goleta Beach deposition site. The material shall be analyzed for consistency with EPA,

ACOE, State Water Resources Control Board and RWQCB requirements for beach replenishment. At a minimum, the chemical analysis shall be conducted consistent with the joint EPA/Corps *Inland Testing Manual*. If the ACOE / EPA, State Water Resources Board or RWQCB determine that the sediment exceeds Effects Range Medium (ER-M) contaminant threshold levels as specified by the U.S. EPA, the materials shall not be placed at the site.

(4) Color -- Color classification shall be conducted on representative samples of each upland source material proposed for placement at the Goleta Beach deposition site. The color shall reasonably match the color of the receiving beach after reworking by wave action. Color is only an issue for upland sediment, but is not as significant for marine-derived sediment sources.

(5) Particle Shape – Particle shape classification shall be conducted on representative samples of each source material proposed for placement at any of the five deposition sites. For beach replenishment, the source material shall consist of a minimum of 90% rounded particles (i.e., maximum of 10% angular particles).

(6) Debris Content – A visual inspection of the source location shall be conducted to determine the presence and types of debris such as trash, wood, or vegetation. The amount of debris within the material shall be estimated, as a percentage of the total amount of source material. Prior to placement of opportunistic sand at any beach/shoreline receiver site, all such debris material shall be separated from the sand material (by mechanical screening, manual removal or other means) and taken to a proper disposal site authorized to receive such material.

(7) Compactability – Chemical and visual inspections of the source location shall be conducted to determine the presence of elements such as iron oxides which can compact to form a hardpan surface. Source material with compactable material shall be considered for placement below the mean high tide only.

(8) Turbidity. The monitor shall observe and document the turbidity of coastal waters during all construction activities related to the permeable pier sand retention system and beach nourishment activities. The extent of turbidity plumes shall be recorded/mapped by the monitor. Monitoring of turbidity shall occur during and immediately after beach fill placement. In regards to beach nourishment activities, if the monitoring indicates that turbidity attributed to the project is not completely diminished immediately following construction (1-2 days), then the rate of placement of sand will be modified so that large, long lasting turbidity plumes are no longer created. In such cases, construction methods shall be modified to reduce levels, by such means as: use of coarser beach nourishment material, avoidance of periods of high surf/high tides, and monitoring

B. The analysis shall include confirmation by the U.S. Army Corps of Engineers and California Regional Water Quality Control Board that the material proposed for

beach replenishment meets the minimum criteria necessary for placement on the sandy beach.

9. Biological Monitoring During Construction and Pre-Construction Surveys

The applicant shall retain the services of a qualified biologist or environmental resources specialist (hereinafter, "environmental resources specialist") with appropriate qualifications acceptable to the Executive Director, to monitor the site during construction activities and conduct sensitive species pre-construction surveys. Prior to commencement of development, the applicant shall submit the contact information of all monitors with a description of their duties and their on-site schedule to the Executive Director for review and approval. The applicant shall ensure that the Environmental Specialist shall perform all of the following duties, and the applicant shall observe the following requirements:

A. The environmental resource specialists shall: (1) conduct a survey of the project site to determine presence and behavior of sensitive species one day prior to commencement of any activities related to the construction of the permeable pier sand retention system, a seasonal beach berm, and/or the commencement of any beach nourishment activities on the project site, (2) immediately report the results of the survey to the applicant and the Commission, and (3) monitor the site during all construction activities related to the permeable pier sand retention system, the seasonal beach berm, and/or the of any beach nourishment activities on the project site.

B. In the event that the environmental resources specialist reports finding that any sensitive wildlife species (including but not limited to California least tern, western snowy plover, California grunion, Beldings savannah sparrow) exhibit reproductive or nesting behavior, the applicant shall cease work and immediately notify the Executive Director and local resource agencies. Project activities shall resume only upon written approval of the Executive Director.

C. Prior to construction of the permeable pier sand retention system, the seasonal beach berm, and/or the commencement of any beach nourishment activities, the applicant shall have the environmental resource specialist conduct a survey of the project site, to determine presence of California grunion during the seasonally predicted run period and egg incubation period, as identified by the California Department of Fish and Game. If the environmental resources specialist determines that any grunion spawning activity is occurring and/or that grunion are present in or adjacent to the project site, then no construction, maintenance, grading, or grooming activities shall occur on, or adjacent to, the area of the beach where grunion have been observed to spawn until the next predicted run in which no grunion are observed. Surveys shall be conducted for all seasonally predicted run periods in which material is proposed to be placed at any of the above sites. If the applicant is in the process of placing material, the material shall be graded and groomed to contours that will enhance the habitat for grunion prior to the run period. Furthermore, placement activities shall cease in order to determine whether grunion are using the beach during the following run period. The applicant shall

have the environmental resource specialist provide inspection reports after each grunion run observed and shall provide copies of such reports to the Executive Director and to the California Department of Fish and Game.

D. Prior to initiation of daily project activities, the resource specialist shall examine the beach area to preclude impacts to sensitive species. Project activities, including construction, reconstruction, maintenance, other placement activities, or grading or grooming of the beach, shall not occur until any sensitive species (e.g., western snowy plovers, Belding's savannah sparrows, etc.) have left the project area or its vicinity. In the event that the environmental resource specialist determines that any sensitive wildlife species (including but not limited to western snowy plover, Belding's savannah sparrow, California grunion, steelhead trout) exhibit reproductive or nesting behavior, the applicant shall cease work, and shall immediately notify the Executive Director and local resource agencies. Project activities shall resume only upon written approval of the Executive Director. The applicant shall cease work should any breach in permit compliance occur or if any unforeseen sensitive habitat issues arise. The environmental resource specialist(s) shall require the applicant to cease work should any breach in permit compliance occur or if any unforeseen sensitive habitat issues arise. The environmental resource specialist(s) shall also immediately notify the Executive Director if development activities outside of the scope of Coastal Development Permit 4-08-006 occur. If significant impacts or damage occur to sensitive wildlife species, the applicant shall be required to submit a revised, or supplemental program to adequately mitigate such impacts.

E. The environmental resource specialist will conduct surveys of trees and beach areas on and adjacent to the project site (within 500 feet of any construction activities), just prior to any construction activities and once a week upon commencement of construction activities including pile driving, grading/beach nourishment, or use of other heavy equipment, and that will be carried out between **December 1st and September 30th**, inclusive. Such surveys shall identify the presence, nests, and eggs or young, of black-crowned night herons, snowy egrets, great egrets, great blue herons, raptors, western snowy plover, Belding's savannah sparrow, or other sensitive species in or near the project site. All surveys shall be submitted to the Executive Director of the Coastal Commission.

F. The environmental resource specialist shall be present at all weekly construction meetings and during all significant construction activities including pile driving or grading/beach nourishment activities to ensure that nesting birds are not disturbed by construction related noise. The environmental resources specialist shall be onsite monitoring birds and noise every day at the beginning of the project during heavy equipment use. The environmental resources specialist must review the 2006 guidance issued by the United States Fish and Wildlife Service (USFWS) for estimating the effects of auditory and visual disturbance to northern spotted owls and marbled murrelets. The USFWS document provides guidance for making determinations with regard to potential effects of construction noise on owls and murrelets. While these two species are not expected to be impacted by this project, the guidelines and procedures apply to the herons, egrets, and raptors that potentially could be impacted.

G. The environmental resource specialist shall be present during all pile driving operations and a safety radius of no less than 500 ft. shall be established on the seaward side of the Pier to serve as a protection zone for marine mammals. The size of the safety radius may be increased based on further consultation with NOAA Fisheries. If marine mammals are observed to enter this safety zone, all pile driving activities shall cease immediately until all marine mammals have vacated the safety zone. No pile driving shall occur if the visibility of the observers is less than the 500 feet radius.

H. Hydroacoustical monitoring shall be performed to ensure that underwater noise generated by pile driving activities shall not exceed an accumulated **187** dB SEL as measured 5 meters from the source and that at no time shall peak dB rise above **206** at 10 meters from the source for the protection of marine fish including salmon that utilize Goleta Slough. The applicant shall consult with the United States. Fish and Wildlife Service and NOAA Fisheries to development a monitoring program that meets this objective. The applicant shall submit a hydroacoustical monitoring plan for the review and approval of the Executive Director, prior to the commencement of pile driving activities.

I. The applicant shall submit documentation prepared by the environmental resource specialist which indicates the results of each pre-construction survey, including if any sensitive species were observed and associated behaviors or activities. Location of any nests observed shall be mapped.

10. Construction and Pile Driving Noise Level Restrictions

It shall be the applicant's responsibility to assure that the following occurs concurrent with all project operations:

A. Noise generated by construction (including, but not limited to, pile driving) shall not exceed **85 dB** at any active nesting site for black-crowned night herons, snowy egrets, great egrets, great blue herons, raptors, or other sensitive species in or near the project site. If construction noise exceeds 85 dB, then alternative methods of pile driving (including, but not limited to, vibratory pile driving, press-in pile placement, drilling, dewatered isolation casings, etc.) or other sound mitigation measures (including, but not limited to, sound shielding and noise attenuation devices) shall be used as necessary to achieve the required dB threshold levels. If these sound mitigation measures do not reduce noise levels, construction within 300 feet of the nesting trees shall cease and shall not recommence until either new sound mitigation can be employed or nesting is complete.

B. Underwater noise generated by pile driving activities shall not exceed an accumulated **187** dB SEL as measured 5 meters from the source. At no time shall peak dB rise above **206** at 10 meters from the source. If construction noise exceeds the above thresholds, then alternative methods of pile driving (including, but not limited to, vibratory pile driving, press-in pile placement, drilling, dewatered isolation casings, etc.) or other sound mitigation measures (including, but not

limited to sound shielding and other noise attenuation devices) shall be used as necessary to achieve the required dB threshold levels.

C. Underwater noise generated by pile driving activities shall not exceed 160 dB at 300 or more feet from the project. If construction noise exceeds the 160 dB threshold, then alternative methods of pile driving (including, but not limited to, vibratory pile driving, press-in pile placement, drilling, dewatered isolation casings, etc.) or other sound mitigation measures (including, but not limited to sound shielding and other noise attenuation devices) shall be used as necessary to achieve the required dB threshold level.

11. Long-Term Biological Monitoring Program

A. Prior to issuance of the coastal development permit, the applicant shall submit to the Executive Director for review and written approval, a long-term biological monitoring program for the Project Site which describes the methodology the annual monitoring reporting requirements. The program may be prepared in coordination with similar reports prepared by BEACON and Santa Barbara County to satisfy the required conditions of approval for other beach replenishment projects at the subject site. The program shall outline the procedure for the necessary surveys, report preparation and submittal, and the skills and qualifications for all personnel and shall incorporate the following:

(1) The monitoring program shall include surveys of habitat areas for California least tern, western snowy plover, raptors, California grunion, Beldings savannah sparrow, globose dune beetle, coastal strand, wrack, kelp, surfgrass, and eelgrass, as applicable at the subject site, approximately one month prior to initial and any future beach nourishment activities as well as 3 months, 6 months, and 1 year after completion of beach nourishment activities. The one-year monitoring survey may be adjusted to coincide with the following year's survey requirements, where feasible.

(2) The monitoring program shall include visual surveys of the slough mouth approximately one month prior to construction and/or beach nourishment activities as well as 3 months, 6 months, and 1 year after completion of any beach nourishment activities. The monitor shall record and report any change in the frequency and duration of all slough mouth openings/closures each year. The one-year monitoring survey may be adjusted to coincide with the following year's survey requirements, where feasible.

(3) The monitoring program shall specify the criteria that would indicate the program's effectiveness/success in avoiding adverse impacts to sensitive biological resources (including, but not limited to, California least tern, western snowy plover, raptors, California grunion, Beldings savannah sparrow, globose dune beetle, coastal strand, wrack, kelp, surfgrass, and eelgrass, etc.). The criteria shall be specific enough to provide a mechanism to determine when/how a project results in adverse impacts to biological resources and a mechanism for making adjustments to all project

activities including, but not limited to, any necessary adaptive management actions including pile driving, pile removal, and supplemental beach nourishment activities.

(4) The monitoring program shall consider potential impacts to previously unidentified or new resources in the project vicinity. If the beach replenishment operations could potentially impact such resources, the monitoring program shall be revised to assess impacts to those resources.

(5) In addition, the applicant shall monitor on a monthly basis to ensure that the permeable pier sand retention system does not result in excessive entangling of wrack within the piles, or immediately upcoast. If excessive wrack becomes entangled in the piers, or entrained immediately upcoast of the pier and results in a reduction of wrack on the downcoast beach area, then the applicant shall relocate the entangled wrack downcoast of the pier in a manner consistent with the establishment and maintenance of beach wrack habitat.

B. If the Executive Director determines that adverse impacts have occurred to any sensitive biological resources or habitat areas (including, but not limited to, habitat for California least tern, western snowy plover, raptors, California grunion, Beldings savannah sparrow, globose dune beetle, coastal strand, wrack, kelp, surfgrass, and eelgrass) then the Executive Director shall notify the applicant of such determination. The applicant shall cease work at the subject project site, and shall immediately notify local resource agencies. The applicant shall be required to submit a revised, or supplemental program, for the review and approval of the Executive Director, to adequately mitigate such impacts. Project activities shall resume only upon written approval of the Executive Director.

C. The applicant shall undertake the development in accordance with the approved monitoring program. Any proposed changes to the approved program shall be reported to the Executive Director. No change to the program shall occur without a Commission-approved amendment to the permit unless the Executive Director determines that no such amendment is required.

12. Coastal Strand Habitat Restoration and Monitoring Program

Prior to issuance of the coastal development permit, the applicant shall submit, for the review and approval of the Executive Director, a Coastal Strand Habitat Restoration and Monitoring Program. The Program shall provide for the revegetation and restoration of all areas of existing coastal strand habitat on site that will be temporarily disturbed as a result of the removal of the approximately 1,500 ft. long rock revetment at the upcoast end of the park, repair of the existing rock revetment at the downcoast end of the park, initial and supplemental beach nourishment activities, and seasonal sand berm construction/removal. The program shall be prepared by a qualified biologist(s), ecologist(s), or resource specialist(s), hereafter, referred to as the Environmental Resource Specialist(s), with experience in the field of restoration, beach ecology, and

marine biology. The permittee shall provide the resource specialist's qualifications, for the review and approval of the Executive Director, prior to plan development. The Program shall provide, at a minimum, for the following:

A. Coastal Strand Restoration Plan

1. A baseline assessment of all coastal strand vegetation and habitat on site, including detailed documentation of existing conditions on site prior to disturbance by any development authorized by this coastal permit (including photographs taken from pre-designated sites annotated to a copy of the site plans. The plan shall delineate existing vegetation types, show the distribution and abundance of any sensitive species, and shall identify the area(s) of existing coastal strand vegetation/habitat that will be temporarily disturbed as a result of approved development.

2. A description of the goals of the restoration plan, including, as appropriate, topography, hydrology, vegetation types, sensitive species, and wildlife usage. The plan shall also document the performance standards, which provide a mechanism for making adjustments to the mitigation site when it is determined, through monitoring, or other means that the restoration techniques are not working and the necessary management and maintenance requirements, and provisions for timely remediation should the need arise.

3. A description of the methodology of how any existing coastal strand plants that would be impacted as a result of the approved development will be collected, stored, and used for revegetation of the site. Prior to the commencement of the initial beach nourishment activities and/or removal of the approximately 1,500 linear ft. of rock revetment on the upcoast end of the park, the Environmental Resource Specialist(s) shall collect the native coastal strand plants that would be disturbed by these activities and maintain them for future planting. Native coastal strand plant seeds shall also be collected in anticipation of future plantings. The plan shall specify the planting palette (seed mix and collected plants), planting design, source of plant material, and plant installation. The planting palette shall be made up exclusively of native plants that are appropriate to the habitat and region or grown from seeds or vegetative materials obtained from the site or from an appropriate nearby beach location so as to protect the genetic makeup of natural populations. Horticultural varieties shall not be used. Plantings shall be maintained in good growing condition throughout the life of the project and, whenever necessary, shall be replaced with new plant materials to ensure continued compliance with the revegetation requirements.

4. Sufficient technical detail on the restoration design including, at a minimum, a planting program including a description of planned site preparation, method and location of exotic species removal, timing of planting, plant locations and elevations on the baseline map, and maintenance timing and techniques.

5. Restoration shall be implemented in a manner consistent with the continued provision of public pedestrian access between upland areas of the park and the sandy beach. If temporary fencing or informational signage is necessary

to facilitate restoration efforts, then the applicant shall submit a plan indicating the location, type, and height of any temporary fencing and a detailed description of any signage that will be used. Paths and breaks in any temporary fencing shall be provided to ensure adequate public access is maintained between existing parking and upland areas of the park and the sandy beach.

6. The Environmental Resource Specialist(s) shall collect and transplant any observed Globose dune beetles within the area to be impacted by beach nourishment/revetment removal to an appropriate nearby coastal strand/southern foredune location.

7. The applicant shall revegetate all disturbed coastal strand habitat areas on site pursuant to the approved Coastal Strand Restoration Plan within 90 days after the removal of the approximately 1,500 linear ft. of rock revetment at the upcoast end of the park, repair of the rock revetment at the downcoast end of the park, and initial beach nourishment activities are completed. The Executive Director may grant additional time for good cause.

8. In the event that disturbance to coastal strand habitat on site results from future supplemental beach nourishment and/or seasonal sand berm construction/demolition pursuant to this coastal development permit, then the applicant shall revegetate all disturbed Coastal strand habitat areas on site pursuant to the approved Coastal Strand Restoration Plan within 90 days after those activities are completed. The Executive Director may grant additional time for good cause.

9. Provisions for on-going coastal strand habitat maintenance and/or management for the term of this coastal development permit. At a minimum, semi-annual maintenance and/or management activities shall include, as necessary, debris removal, periodic weeding of invasive and non-native vegetation and revegetation consistent with the approved restoration plan.

B. Monitoring

A monitoring program shall be implemented to monitor the project for compliance with the specified guidelines and performance standards and shall provide the following:

1. Initial Monitoring Report: The permittee shall submit, upon completion of the initial revegetation, a written report prepared by a qualified resource specialist, for the review and approval of the Executive Director, documenting the completion of the initial revegetation work. This report shall also include photographs taken from pre-designated sites (annotated to a copy of the site plans) documenting the completion of the initial planting/revegetation work.

2. Interim Monitoring Reports: After initial revegetation is completed, the applicant shall submit, for the review and approval of the Executive Director, on an annual basis until the authorization for the approved development expires (10 years from the date of Commission action) a written monitoring report prepared by a

monitoring resource specialist indicating the progress and relative success or failure of the restoration on the site. This report shall also include further recommendations and requirements for additional enhancement/restoration activities in order for the project to meet the criteria and performance standards. This report shall also include photographs taken from predesignated sites (annotated to a copy of the site plans) indicating the progress of recovery at each of the sites. Each report shall be cumulative and shall summarize all previous results. Each report shall also include a "Performance Evaluation" section where information and results from the monitoring program are used to evaluate the status of the enhancement/restoration project in relation to the interim performance standards and final success criteria.

3. Final Report: Prior to the date that authorization for the approved development expires (10 years from the date of Commission action), a final detailed report on the restoration shall be submitted for the review and approval of the Executive Director. If this report indicates that the restoration project has, in part, or in whole, been unsuccessful, based on the performance standards specified in the restoration plan, the applicant(s) shall submit within 90 days a revised or supplemental restoration program to compensate for those portions of the original program which did not meet the approved success criteria. The revised or supplemental program shall be processed as an amendment to this permit.

C. The Permittee shall undertake development in accordance with the final approved plans. Any proposed changes to the approved final plans shall be reported to the Executive Director. No changes to the approved final plans shall occur without a Coastal Commission - approved amendment to the coastal development permit, unless the Executive Director determines that no amendment is legally required.

13. <u>Eelgrass Surveys</u>

A. Pre-Construction Eelgrass Survey. Prior to the commencement of any offshore dredging activities, a pre-construction eelgrass (Zostera marina) survey of the transport pipeline route shall be completed by a qualified marine biologist(s) during the period of active growth of eelgrass (typically March through October). The pre-construction survey shall be completed prior to the beginning of dredging activities and shall be valid until the next period of active growth. The survey shall be prepared in full compliance with the "Southern California Eelgrass Mitigation Policy" Revision 8 (except as modified by this special condition) adopted by the National Marine Fisheries Service and shall be prepared in consultation with the California Department of Fish and Game. The applicant shall submit the eelgrass survey for the review and approval of the Executive Director within five (5) business days of completion of each eelgrass survey and in any event no later than fifteen (15) business days prior to commencement of any development. Based on the Pre-Construction Eelgrass Survey, a pipeline route shall be selected that avoids contact with eelgrass and kelp habitat to the extent feasible. Immediately following beach fill activities, another survey of the

pipeline area shall be conducted to determine whether any kelp and eelgrass were disturbed.

B. Post Construction Eelgrass Survey. If any eelgrass is identified within any portion of the pipeline route by the survey required in subsection A of this condition above, within one month after the conclusion of dredging activities, the applicant shall survey the project site to determine if any eelgrass was adversely impacted. The survey shall be prepared in full compliance with the "Southern California Eelgrass Mitigation Policy" Revision 8 (except as modified by this special condition) adopted by the National Marine Fisheries Service and shall be prepared in consultation with the California Department of Fish and Game. The applicant shall submit the post-construction eelgrass survey for the review and approval of the Executive Director within thirty (30) days after completion of the survey. If any eelgrass has been impacted, the applicant shall replace the impacted eelgrass at a minimum 1.2:1 ratio in accordance with the Southern California Eelgrass Mitigation Policy. All impacts to eelgrass habitat shall be mitigated at a minimum ratio of 1.2:1 (mitigation:impact). The exceptions to the required 1.2:1 mitigation ratio found within SCEMP shall not apply.

14. Final Public Access Program

A. Prior to the issuance of the coastal development permit, the applicant shall submit, for the review and approval of the Executive Director, a Final Public Access Program that describes the methods (including signs, fencing, posting of security guards, etc.) by which safe public access to or around construction areas, beach deposition sites, and/or staging areas shall be maintained during all project operations. The applicant shall maintain public access pursuant to the approved version of the report. Any proposed changes to the approved program shall be reported to the Executive Director. No change to the program shall occur without a Commission-approved amendment to the permit unless the Executive Director determines that no such amendment is required.

B. Public parking areas shall not be used for staging or storage of equipment and materials, unless there is no feasible alternative. Where use of public parking spaces is unavoidable, the minimum number of public parking spaces (on and off-street) that are required at each receiver site for the staging of equipment, machinery and employee parking shall be used. At each site, the number of public parking spaces utilized shall be the minimum necessary to implement the project.

C. The applicant shall post each construction site with a notice indicating the expected dates of construction and/or beach closures.

15. Assumption of Risk, Waiver of Liability and Indemnity

By acceptance of this permit, the applicant acknowledges and agrees (i) that the site may be subject to hazards from erosion, liquefaction, waves, flooding, and sea level rise; (ii) to assume the risks to the applicant and the property that is the subject of this permit of injury and damage from such hazards in connection with this permitted development; (iii) to unconditionally waive any claim of damage or liability against the Commission, its officers, agents, and employees for injury or damage from such hazards; and (iv) to indemnify and hold harmless the Commission, its officers, agents, and employees with respect to the Commission's approval of the project against any and all liability, claims, demands, damages, costs (including costs and fees incurred in defense of such claims), expenses, and amounts paid in settlement arising from any injury or damage due to such hazards.

Prior to issuance of the Coastal Development Permit, the applicant shall submit a written agreement, in a form and content acceptable to the Executive Director, incorporating all of the above terms of this condition.

16. Required Approvals

Prior to the issuance of this permit, the applicant shall obtain all other necessary State permits that may be necessary for all aspects of the proposed project (including approvals from the California Department of Fish and Game, California State Lands Commission, and Regional Water Quality Control Board, unless evidence is submitted that such approval(s) are not required). In addition, by acceptance of this permit, the applicant agrees to obtain all necessary Federal permits that may be necessary for all aspects of the proposed project (including, but not limited to, the U.S. Army Corps of Engineers).

17. Indemnification by Applicant

Liability for Costs and Attorneys Fees: By acceptance of this permit, the Applicant/Permittee agrees to reimburse the Coastal Commission in full for all Coastal Commission costs and attorneys fees -- including (1) those charged by the Office of the Attorney General, and (2) any court costs and attorneys fees that the Coastal Commission may be required by a court to pay -- that the Coastal Commission incurs in connection with the defense of any action brought by a party other than the Applicant/Permittee against the Coastal Commission, its officers, employees, agents, successors and assigns challenging the approval or issuance of this permit. The Coastal Commission retains complete authority to conduct and direct the defense of any such action against the Coastal Commission.

18. Condition Compliance

Within 18 months of Commission action on this coastal development permit application, or within such additional time as the Executive Director may grant for good cause, the applicant shall satisfy all requirements specified in the conditions hereto that the applicant is required to satisfy prior to issuance of this permit. Failure to comply with this requirement may result in the institution of enforcement action under the provisions Chapter 9 of the Coastal Act.

IV. FINDINGS AND DECLARATIONS

The Commission hereby finds and declares:

A. PROJECT DESCRIPTION

The proposed project is for the construction of an approximately 500 ft. long, 20 ft. wide, permeable pier sand retention system as an addition to the existing Goleta Beach Pier consisting of 250 – 330 timber or composite fiberglass piles (18" – 20" in diameter) and timber decking (**Exhibits 3, 5 & 6**). The project also includes seasonal installation of an approximately 1,200 ft. long, 3-5 ft. high winter sand berm for a period of five years after initial development commences; removal of approximately 1,500 linear ft. of existing rock rip rap upcoast of the existing restaurant on site; repair of approximately 650 linear ft. of existing revetment at the downcoast end of the park, and offshore dredging of approximately 500,000 cu. yds. of sand and placement of dredged material on the beach immediately upcoast of the pier for the purpose of initial beach nourishment. The project also includes implementation of an Adaptive Management and Beach Nourishment Program that will include periodic adjustments to add or remove piles from the permeable pier sand retention system and periodic offshore dredging/beach nourishment on an as-needed basis not exceed 100,000 cu. yds. of material/year.

Project Purpose:

The proposed permeable pier sand retention system and beach nourishment program presents complicated coastal resource, planning, and public policy issues and is proposed by the County of Santa Barbara as a solution to an on-going, long-term coastal erosion problem at Goleta Beach County Park that has generated tremendous public interest and controversy for many years. Goleta Beach public park has experienced significant erosion over the past two decades, resulting in the construction of over 1,500 linear feet of rock revetment to protect upland areas of the park, including grassy lawn and picnic areas, public restrooms, utility pipelines, and public parking lots. The primary purpose of the proposed project is to create a widened public sandy beach at Goleta Beach County Park to reduce the potential for periodic wave-caused erosion to upland park areas and facilities and enhance public access and recreational opportunities while also maintaining existing sediment supplies to all areas downcoast of the project site to ensure that the project does not result in any increased erosion of downcoast beaches and bluffs. As proposed, this project specifically includes the complete removal of the existing 1,500 linear feet of rock revetment located on the upcoast (western) portion of the park (all areas upcoast of the existing restaurant on site) which have been installed in recent years by the County in response to the long-term shoreline erosion problem at Goleta Beach.

An important goal of the project is to ensure that the volume of beach quality sediment that is exchanged between areas upcoast of the proposed permeable pier sand retention system and the downcoast areas will be maintained to avoid the potential for any increased erosion of the beach and bluff areas located downcoast from Goleta Beach County Park. The permeable pier sand retention system will effectively function

as a "permeable groin". Similar to a regular groin, the proposed device will function by trapping sand on its upcoast side in order to create a wider beach condition. However, unlike a regular groin, the proposed "permeable pier sand retention system" is designed to be permeable allowing a percentage of the sand within the littoral system to pass through openings in the structure (the spaces between the piles), thus regulating the rate of sediment exchange, while maintaining current sand supply volumes for downcoast areas within the littoral cell. The permeable design of the structure is intended to avoid any additional erosion of downcoast beaches and bluffs.

Commission Jurisdiction:

Although the Commission has previously certified a Local Coastal Program for Santa Barbara County, the proposed project will be located on state tidelands and is located within an area where the Commission has retained jurisdiction over the issuance of coastal development permits. Thus, the standard of review for this project is the Chapter 3 policies of the Coastal Act.

Detailed Description of Project Components:

The proposed project includes several different components which are described in detail as follows:

1. *Permeable pier sand retention system*: Approximately 250 – 330 (18" – 20" diameter) timber or composite/fiberglass piles arranged in three rows perpendicular to the coastline to form a 20 ft. wide array that would extend 500 feet in length seaward from the shore. The piles would be installed immediately adjacent to, and downcoast, of the existing 1,500 ft. long Goleta Beach Pier. The piles would be wrapped in High Density Polyethylene (HDPE) sheathing and would be installed by pile driving equipment operating from the deck of the existing pier. During the life of the project, piles would be periodically added or removed in order to adjust the permeability of the device in order to prevent downcoast erosion while also maintaining adequate beach width of upcoast areas. The applicant proposes to construct a new timber deck over the piles which would be effectively attached to the existing deck of the Goleta Beach Pier in order to provide for additional pier area for public access, pedestrian use, and fishing, although the piles would remain exposed to allow for easier access for adjustments ("tuning") of the structure during the initial years of the project. Initial installation time of the piles would be approximately 3 months during which time it would be necessary to close public access to the pier.

2. *Initial Offshore Dredging and Pre-fill Sand and Beach Nourishment*: Approximately 500,000 cu. yds. of sandy beach material will be deposited on Goleta Beach upcoast of the proposed permeable pier sand retention system in order to pre-fill the area of beach where sand would otherwise be expected to be trapped by the permeable pier sand retention system. Prefilling with sand at the time of initial construction is necessary to ensure that the project would not result in changes to downcoast sand supply.

The pre-fill sand would be dredged from the offshore source site located approximately one mile southeast of Goleta Beach. The borrow site is approximately 40 acres in size and located approximately one mile offshore from Goleta Beach in water depths ranging from 60 to 75 ft. in depth, relative to Mean Lower Low Water (MLLW) as shown on **Exhibits 7 and 8**. No kelp, eelgrass, or other marine vegetation is located within the borrow site. The depth of excavation would range from approximately 5 to 15 feet. Sand would be dredged from the offshore borrow site and then hydraulically pumped onshore to Goleta Beach via a temporary submerged pipeline. As proposed, dredging would be performed by either a cutter/section dredge barge or use of a hopper dredge.

A "cutter/suction dredge" barge has an attached suction pipe with a rotating cutterhead that is moved across the ocean bottom within the borrow site. The cutterhead serves to excavate and loosen the bottom material. Material is then suctioned onto the floating dredge barge. Onboard equipment would then hydraulically pump the material through a temporarily installed discharge pipe to the receiving site (Goleta Beach). The discharge pipe would consist of a floating portion that trails behind the barge through the dredge area and a fixed submerged portion lying on the ocean bottom that surfaces and terminates at Goleta Beach. The pipeline would be located so that the floating section traverses the narrowest parts of the existing kelp bed.

A "hopper dredge" has an attached arm with a suction pipe that drags along the ocean bottom within the borrow site. The material is suctioned onto the floating barge and deposited onboard in the hopper (storage) bins. The hopper dredge self-propels within the borrow site until the hopper bins are full. The hopper dredge would then travel to a mooring location directly offshore of Goleta Beach. At this location, the hopper dredge would connect to a temporarily installed submerged pipe, and the onboard dredge material would be pumped onto Goleta Beach or into the Goleta Beach surf zone.

For both dredging methods, the dredge material would be discharged into swales (fill dikes) constructed on the beach. The slurry mixture from the discharge pipe would fill the swale and excess seawater would be discharged out into the surf zone. The swale would be lengthened along the beach as needed, or new swales constructed, as sections of it are filled. Bulldozers would then be used to smooth the site to create an appropriate beach gradient. Total construction time for dredging and initial beach nourishment activities would be approximately three months.

***3. Periodic Pile Adjustment and Dredging/Beach Nourishment*:** The project also includes the implementation of adaptive management actions that may include periodic adjustments to add or remove piles from the permeable pier sand retention system and periodic offshore dredging/beach nourishment on an as-needed basis. Adjustment of the piles arrangement would be completed in a similar manner to the initial construction of the permeable pier sand retention system and may be necessary in order to adjust the permeability of the structure to allow more or less sand material to pass downcoast. Piles would be driven and removed from equipment operated from the existing Goleta Pier deck. A jetting machine would be used to loosen sediment around the base of the piles for removal. The applicant expects that a maximum of 60 piles would be either added or removed over a single adjustment period of no more than one month, probably one to two years after the initial construction of the permeable pier sand retention system although additional adjustments may be required over time.

In addition, to prevent downcoast erosion, the applicant may conduct supplemental offshore dredging and beach nourishment activities. If necessary, supplemental offshore dredging and beach nourishment activities would be implemented in a similar manner to the initial construction effort. To ensure that areas where offshore dredging would occur will successfully re-establish (including re-establishment of both sand volume and epifaunal invertebrate species typical of offshore sand bottoms), the initial dredge operations (500,000 cu. yds.) will be restricted to the western half (20 acres) of the total 40-acre target borrow area. The eastern 20 acres of the target borrow area will be reserved for subsequent dredging if needed and has been divided into 5 separate borrow areas (approximately 4 acres in size each). Each of the 5 separate borrow areas could be utilized for a single dredging event of no more than 100,000 cu. yds. each in order to ensure that no portion of the borrow area would be disturbed more than once. The applicant's engineering consultants indicate that that no more than 0 - 2 supplemental beach nourishment events are expected to be necessary over a 10-year period; however, additional dredging/beach nourishment activities could potentially occur if necessary to ensure that increased erosion does not occur downcoast of the pier as a result of the project and/or to maintain the target beach width in upcoast areas.

4. Removal of Existing Rock Revetment: All portions of the existing approximately 1,500 ft. long rock revetment located upcoast of the existing restaurant on site will be removed concurrent with the initial construction of the permeable pier sand retention system and initial beach nourishment activities.

5. Repair of Existing Rock Revetment at East (Downcoast) end of Park: The approximately 650 ft. long existing rock revetment located seaward of the existing restaurant and eastern parking lot will be repaired by adding new cap rock. All rock will be placed landward of the existing toe of the rock revetment and no seaward extension of the revetment is proposed. The height of the rock revetment will be increased by no more than a maximum of 1.5 ft., and shall extend no higher than 1.5 ft. above the elevation of the parking lot.

6. Seasonal Winter Sand Berm: An annual winter sand berm program will be implemented at Goleta Beach County Park for a period of five years after commencement of construction of the permeable pier sand retention system and removal of the approximately 1,500 ft. long existing rock revetment located upcoast from the existing restaurant. The program will involve construction of a 1,400-foot long winter sand berm, extending alongshore on the western half of the park by November 1 of each year (for the first five years of the project after the commencement of construction). The proposed winter berm would be approximately 3 to 5 ft. high above the existing beach grade (15 feet above mean lower low water) with a 10-foot wide berm crest and then sloped to approximately 2:1 (horizontal to vertical) to the water, with a maximum seaward extent of approximately 35 feet from the backbeach. Annual construction of the winter sand berm would require a maximum of approximately 8,000 cubic yards which would be obtained from the sandy beach on site if other appropriate source material is not available. The berm would be constructed in late October or early November, and would be lowered prior to Memorial Day of the following year. The berm would be reconstructed to the design profile as necessary after wave damage.

B. PROJECT LOCATION AND BACKGROUND

The project site is located at Goleta Beach County Park, which occupies approximately 29 acres with 4,200 feet of beach frontage in Santa Barbara County (**Exhibits 1 and 2**). Goleta Beach County Park is bounded to the south by the Pacific Ocean, on the west by the University of California at Santa Barbara, and to the north and east by private natural gas generation and storage facilities owned by Southern California Gas Company. An easement containing various utility and sewage lines traverses the park. To the northwest, Clarence Ward Memorial Boulevard separates the Park from the greater area of Goleta Slough and the Santa Barbara Municipal Airport.

Goleta Beach County Park is situated at the mouth of the Goleta Slough, which is fed by five major drainages, Tecolotito, Carneros, San Pedro/Las Vegas, San Jose, and Atascadero Creeks. The outflow channel of Goleta Slough wraps around Goleta Beach County Park along the park's northern boundary, outletting through Goleta Beach County Park property, east (downcoast) of the developed facilities. Public access is available along the entire length of the park (approximately one mile in length) that is contiguous to the beach.

All portions of Goleta Beach County Park situated landward of the sandy beach are located on top of a clay-rich fill base placed after World War II by the federal government. Prior to placement of the fill after World War II, the subject site was a sandspit extending across the mouth of Goleta Slough subject to wave action and periodic erosion. By 1977, a timber pier, restrooms, parking lots, a snack bar, lawn, and a portion of the revetment on the east end of the beach had been constructed at the park. In the 1980's the pier was extended to 1,500 ft. in total length, a restaurant was built to replace the snack shop, the parking area was upgraded, and various other improvements occurred at the park.

Currently, development on site consists of a restaurant, two public restrooms, outdoor showers, parking lots with 594 existing parking spaces, recreation lawn area, picnic facilities, numerous utility lines, and a recreational pier. In recent years, most notably in 1999, erosion of the clay-rich fill underlying the park has occurred due to wave action from winter storms. This erosion has previously formed steep undercut slopes approximately four to five feet in height between the improved areas onsite and the sandy beach. During some winter seasons, erosion has become so severe as to wash out portions of the parking lots and threaten facilities at the park including restrooms, picnic tables, trees, lawn area, utility lines, and parking areas.

Past Commission Actions and History of Shoreline Erosion Problem at Park

The project site (Goleta Beach County Park) has been subject to several previous Commission actions attempting to address the continuing problem of wave caused erosion and protection of the park facilities. Three Coastal Development Permits (CDPs), 4-93-205, 4-00-206, 4-05-139 (Santa Barbara County), have been issued by the Commission, in 1993, 2000, and 2005, respectively, to the Santa Barbara County Flood Control District for the programmatic dredging of the slough/creeks and

placement of up to 100,000 cu. yds. of material per year in the surf zone of Goleta Beach for the purpose of beach nourishment. Each of the three permits was approved by the Commission on a time-limited basis authorizing implementation of the program for a period of 5 years. Although these permits would potentially allow for a maximum quantity of 100,000 cu. yds. of beach nourishment material to be placed on the beach each year, County staff have indicated that these previously approved dredging operations typically only generate between 10,000 to 70,000 cu. yds. (over a 2 – 3 year period) of material suitable for beach nourishment at Goleta Beach. CDP 4-05-139, which was approved in October 2005, currently authorizes slough/creek dredging and deposition of dredged sand material at Goleta Beach through October 13, 2010. Continuation of that program after October 13, 2010 will require a new coastal permit from the Commission.

Further, three separate CDPs 4-00-193, 4-01-136, and 4-02-128 (Santa Barbara County Parks) were approved by the Commission in 2000, 2001, and 2002 respectively, for construction of an annual temporary winter sand berm at Goleta Beach in an attempt to protect upland park facilities from wave caused erosion. Although CDPs 4-00-193 and 4-01-136 each only authorized construction of the berm for a single season, CDP 4-02-128 authorized the seasonal berm construction on a seasonal basis for a three-year period, which expired in spring of 2005.

In addition, on March 16, 2005, the Commission also approved CDP 4-02-074 to allow the Beach Erosion Authority for Clean Oceans and Nourishment (BEACON) to implement a five-year program to place a maximum of 791,500 cubic yards per year of suitable beach replenishment material at five separate beach fill sites within Santa Barbara and Ventura Counties (including the deposition of up to 100,000 cu. yds./year of beach replenishment material at Goleta Beach County Park). BEACON is a joint powers authority whose members consist of the different local government agencies in Santa Barbara and Ventura Counties, including Santa Barbara County itself. CDP 4-02-074 (BEACON) authorizes beach replenishment activities at Goleta Beach through March 16, 2010. In addition, CDP 4-02-054 (BEACON) was also approved in July 2003 by the Commission for a one-time beach nourishment demonstration program at Goleta Beach utilizing up to 150,000 cubic yards of sand from the West Beach area of Santa Barbara Harbor and placing it within a 2,200 foot long by 400 foot wide beach fill deposition site at Goleta Beach County Park. All work authorized by CDP 4-02-05, including the placement of 150,000 cu. yds. of sand at Goleta Beach County Park has been previously completed.

However, despite implementation of the above referenced beach nourishment projects, Goleta Beach has continued to experience wave caused erosion of the backbeach areas, including the grassy lawn, picnic areas, and parking lot facilities within the park. In response to the continued erosion of the shoreline areas on site, the County has, over the course of several successive projects, constructed approximately 1,500 linear ft. of rock revetment upcoast of the pier on Goleta Beach to protect the upland portions of the park and the facilities associated with it. Approximately 250 linear ft. of the existing 1,500 linear ft. revetment was installed in the 1980's without the required coastal permit and an approximately 1,350 linear ft. portion of the revetment was constructed between 2002 – 2005 pursuant to the Commission's approval of CDP 4-02-

251 (as amended twice), which authorized that portion of the revetment on a temporary basis only until January 2008.

Although authorization for the approximately 1,350 linear ft. portion of the revetment has expired, Special Condition One of CDP 4-02-051, as amended, also specifically required the applicant to obtain a new coastal permit for either removal or permanent authorization of the revetment. This application was submitted in January 2008, in compliance with the requirements of Special Condition One of CDP 4-02-051 (which specifically allowed the applicable timelines for removal of the revetment to be extended until the Commission acts on this pending application). As now proposed, this project includes the complete removal of the entire approximately 1,500 linear feet of rock revetment located on the upcoast (western) portion of the park (as shown on **Exhibit 2**).

In regards to the portion of the existing rock revetment at the upcoast end of the park that was temporarily authorized by the Commission between 2002 - 2005, the first 600-foot long portion of the rock revetment was installed in December 2002 under Emergency Permit 4-02-251-G to protect the western parking lot and restroom. This emergency permit authorized the revetment on a temporary basis only, requiring the applicant to either remove the revetment or obtain a regular follow-up CDP for permanent authorization. The applicant requested permanent authorization of the 600 ft. long segment of the revetment pursuant to CDP Application 4-02-251; however, on January 14, 2004, the Commission approved CDP 4-02-051 with a special condition which specified that the authorization for the revetment would be extended on a temporary basis only for a period of an additional 30 months in order to allow the County further time to evaluate other alternative methods of resolving the problem of erosion at Goleta Beach County Park.

Subsequently, in 2005, an additional 350 linear ft. segment of rock revetment was installed adjacent to the existing revetment, pursuant to Emergency Permit 4-05-005-G in response to further erosion of the upland areas of the park. The Commission approved an amendment to Coastal Development Permit 4-02-251 to temporarily authorize this additional segment of revetment for a 30-month term as well. In addition, a second amendment to CDP 4-02-251 was approved by the Commission in 2006 to authorize an extension of time to retain all of the above referenced segments of rock revetment at the upcoast end of the park for an additional term of 18 months (until January 2008) in order to further address potential alternatives methods of shoreline protection for the subject site. The authorization for this portion of the revetment expired in January 2008. Although these rock revetment has not yet been removed, the subject permit application was submitted by the County on January 31, 2008, in compliance with the terms and conditions of CDP 4-0251, as amended, for the removal of all portions of the rock revetment located at the upcoast end of the park that were either previously constructed without the required coastal development permit or authorized on a temporary basis only pursuant to CDP 4-02-251, as amended.

In addition, on the east side of the park, approximately 650 feet of existing rock revetment protects the Beachside restaurant and one of the public parking lots in the park and runs along the main tidal channel of Goleta Slough. According to the County, this revetment was constructed in 1961 prior to effective date of the Coastal Act. The

County has also indicated that previous repairs of the existing revetment have occurred in response to winter storm damage, although the required coastal permit for that work was not obtained. In this case, the approximately 650 ft. of rock revetment at the downcoast portion of the park will be retained and repaired as part of the proposed project. No seaward extension or expansion of the existing rock revetment is proposed. The repairs are relatively minor in nature and will consist of the addition of cap rock landward of the existing toe of the revetment and will not result in any increase in height greater than approximately 1.5 feet.

Moreover, in its approval of CDP 4-02-251 and its two related amendments, the Commission found that insufficient information existed at the time to fully analyze the potential impacts that the permanent retention of the revetment may have on shoreline processes and biological resources at Goleta Beach and long-term alternatives that may be available. Thus, the Commission conditionally approved the permit, as amended, but required the County conduct extensive studies of alternatives that would address erosion at Goleta Beach and to develop a long-term solution to this problem. As required by the conditions of approval for CDP 4-02-251, the County has since completed a public visioning process for Goleta Beach County Park to address long-term solutions to the erosion problem at Goleta Beach, and has prepared a Draft Environmental Impact Report addressing several alternatives.

The pending permit application for the proposed permeable pier sand retention system and removal of approximately 1,500 linear ft. of rock revetment is the County's attempt to develop a long-term solution to beach erosion at Goleta Beach County Park. Although the County initially proposed, as part of this pending application, to retain the approximately 1,500 linear ft. of existing rock revetment upcoast of the existing restaurant for an unspecified number of years until it was demonstrated that permeable pier sand retention system was effective at preventing any future erosion, the County has since revised the proposed project description at the request of Commission staff. As now proposed, the County intends to remove of all of the approximately 1,500 linear ft. of existing rock revetment upcoast of the existing restaurant concurrent with the initial construction of the permeable sand retention structure and beach nourishment project.

C. HAZARDS AND SHORELINE PROCESSES

In regards to the new construction of shoreline protective devices that may alter natural shoreline processes, 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.***

In addition, Section **30253** of the Coastal Act states, in part, that 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.***

Among other things, Coastal Act Section 30233(a) lists the type of development that is allowed to fill open coastal waters (as is proposed here). Section 30233(a) states:

> *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 the following:*
>
> *(1) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities.*
> *(2) Maintaining existing, or restoring previously dredged, depths in existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps.*
> *(3) In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities and the placement of structural pilings for public recreational piers that provide public access and recreational opportunities.*
> *(4) 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.*
> *(5) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas.*
> *(6) Restoration purposes.*
> *(7) Nature study, aquaculture, or similar resource dependent activities.*

Section 30253 of the Coastal Act mandates that new development minimize risks to life and property in areas of high geologic and flood hazard. In addition, Coastal Act Section 30235 specifically provides that shoreline protective devices must be permitted only when both of the following two criteria are met: (1) the device is required to serve coastal-dependent uses or to protect existing structures or public beaches provided that these areas/structures are in danger from erosion and (2) the device is designed to eliminate or mitigate adverse impacts on local shoreline sand supply.

Goleta Beach has experienced large changes in shoreline position over the past decades. Between 1983 and 1998 the beach narrowed, at places, by as much as 200 feet, damaging the parking area at the western end of the park and threatening other park infrastructure and buried utility lines. Analysis of the project area by the applicant's coastal engineering consultants has focused on sediment supplies and long-shore

sediment transport, noting that the erosion at the beach area corresponded to a loss of approximately 80,000 cubic yards of sand per year over the 1983 to 1998 time period. Over the intervening years, the applicant's coastal engineering consultant has examined a number of options to augment the available supply of sediment at this beach area and to retain as much sand as possible without causing erosion impacts to the downcoast beach and bluff areas.

The proposed permeable pier sand retention system is an experimental effort. The applicants have provided anecdotal evidence of coastal piers performing the function intended here, such as the Huntington Beach Pier that has retained sand around the existing pier, or at Oil Piers where the beach experienced significant erosion when the piers were removed as part of the lease decommissioning; however, no pier projects have been cited that have been designed and built with the specific purpose of sand retention.

The permeable pier sand retention system is expected to retain sufficient sand in a salient at the pier and as an upcoast fillet that together would provide a beach approximately 200 ft in width and which would extend between 750 and 1,000 ft. to either side of its midpoint, which is located at the Pier. With this salient, a wider beach would be formed all the way to the western end of Goleta Beach County Park but would not extend to the mouth of Goleta Slough to the east. Sand for the beach widening and salient would come from littoral transport and the 500,000 cubic yards of proposed nourishment to be provided from offshore dredging.

The proposed permeable pier sand retention system requires fill below the mean high tide line (i.e., fill of coastal waters) in order to install 250 -330 new 18" – 20" diameter piles adjacent to the existing Goleta Beach Pier. Thus, the installation of new pier piles constitutes fill of coastal waters. In addition, the proposed project also includes dredging of open coastal waters. Section 30233 of the Coastal Act identifies seven allowable uses for the dredging, diking, and filling of coastal waters. In regards to the proposed dredging/beach nourishment activities, the extraction/dredging of sand for restoring beaches is clearly one of the permitted uses in open coastal waters pursuant to Section 30233(a)(5); provided that the project is the least environmentally damaging alternative and any impacts have been mitigated. In regards to installation of the piles for the permeable pier sand retention system, the placement of new structural piles for public piers serving a public access and recreational purpose is clearly one of the permitted uses under Section 30233(a)(5); although installation of groins or other shoreline protective devices are not specifically listed as one of the uses. In the case of the proposed project, the permeable pier sand retention system is intended to function as both a shoreline protective device and an addition to a public pier. Thus, to the extent that the proposed permeable pier sand retention system will function as an addition to the existing Goleta Beach Pier (eventually providing more than 10,000 sq. ft. of additional deck area available for public access and recreational after the decking is installed) the project would be consistent with the provisions of Section 30223.

Regardless of whether the project can appropriately be characterized as public recreational pier project, Section 30233 does not prohibit this project, for the following reason. Although, a shoreline protective device would not necessarily be allowable in

coastal waters based on an isolated analysis of Section 30233(a), Section 30235 of the Coastal Act requires the Commission to approve a shoreline protective device, if it is necessary to protect an existing structure, public beach, or coastal-dependent uses and if it meets the other requirements of that section. In adopting Section 30235, the Legislature clearly understood that dredging, diking, and filling of coastal waters might be necessary for seawalls, groins, and breakwaters; and Section 30235 is a more specific policy than Section 30233(a) in this regard. In other words, Section 30235 of the Coastal Act requires the Commission to approve shoreline protective devices in certain circumstances, even though such activities may not comply with the allowable-use test of Section 30233(a) of the Coastal Act. Thus, regardless of whether the permeable pier sand retention system constitutes an addition to a public pier, the Commission finds that, to the extent Section 30235 requires approval of this project, the more specific and overriding direction of Section 30235 would override any potential prohibition found in Section 30233(a) in this case.

1. Shoreline Protective Device Effects:

Coastal Act Section 30235 acknowledges that seawalls, revetments, cliff retaining walls, groins and other such structural or "hard" methods designed to forestall erosion also alter natural landforms and natural shoreline processes. Accordingly, Section 30235 limits the construction of shoreline protective works to those required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion. The Coastal Act provides these limitations because shoreline structures can have a variety of adverse impacts on coastal resources, including adverse effects on sand supply, public access, coastal views, natural landforms, and overall shoreline beach dynamics on and off site, ultimately resulting in the loss of beach.

Shoreline protection devices also directly interfere with public access to tidelands by impeding the ambulatory nature of the mean high tide line (the boundary between public and private lands) during high tide and severe storm events, and potentially throughout the entire winter season. The impact of a shoreline protective device on public access is most evident on a beach where wave run-up and the mean high tide line are frequently observed in an extreme landward position during storm events and the winter season. As the shoreline retreats landward due to the natural process of erosion, the boundary between public and private land also retreats landward. Construction of rock revetments and seawalls to protect private property fixes a boundary on the beach and prevents any current or future migration of the shoreline and mean high tide line landward, thus eliminating the distance between the high water mark and low water mark. As the distance between the high water mark and low water mark becomes obsolete the seawall effectively eliminates lateral access opportunities along the beach as the entire area below the fixed high tideline is inundated. The ultimate result of a fixed tideline boundary (which would otherwise normally migrate and retreat landward, while maintaining a passable distance between the high water mark and low water mark overtime) is a reduction or elimination of the area of sandy beach available for public access and recreation.

Interference by shoreline protective devices can result in a number of adverse 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 nearshore sand 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. This affects public access again through 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 shoreline sand supply and 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. In addition, if a seasonal eroded beach condition occurs with greater frequency due to the placement of a shoreline protective device on the subject site, then the subject beach would also accrete at a slower rate. Fourth, if not sited landward in a location that ensures 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.

As a result of the potential impacts arising from shoreline protective device projects, it is critical to have an alternatives analysis based upon the technical and resource data specific to the site. The Coastal Act requires such projects to be sited and designed to protect views to and along the ocean and scenic coastal areas; to eliminate or mitigate adverse impacts on local shoreline sand supply; to avoid impediments to public access; to be compatible with the continuance of sensitive habitat and recreation areas; and to prevent impacts which would degrade sensitive habitats, parks, and recreation areas.

2. Sea Level Rise

Sea level has been rising slightly for many years. As an example, in the Santa Monica Bay area, the historic rate of sea level rise, based on tide gauge records, has been 1.8 mm/yr. or about 7 inches per century[1]. Recent satellite measurements have detected global sea level rise from 1993 to present of 3 mm/yr or a significant increase above the historic trend observed from tide gauges. Recent observations of sea level along parts of the California coast have shown some anomalous trends, however; there is a growing body of evidence that there has been a slight increase in global temperature and that an accelerated rate of sea level rise can be expected to accompany this increase in temperature. Sea level rise is expected to increase significantly throughout the 21st century and some coastal experts have indicated that sea level rise of 3 to 5 feet or more could occur by the year 2100.[2]. Mean water level affects shoreline erosion

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[1] Lyles, S.D., L.E. Hickman and H.A. Debaugh (1988) *Sea Level Variations for the United States 1855 – 1986*. Rockville, MD: National Ocean Service.

[2] Cayan, D.R., M. Tyree, M. Dettinger, H. Hidalgo, T. Das, E. Maurer, P. Bromirski, N. Graham, and R.E. Flick, 2009. *Climate Change Scenarios and Sea Level Estimates for the California 2008 Climate Change Scenarios Assessment*,

in several ways and an increase in the average sea level will exacerbate all these conditions.

On the California coast the effect of a rise in sea level will be the landward migration of the intersection of the ocean with the shore. On a relatively flat beach, with a slope of 40:1, a simple geometric model of the coast indicated that every centimeter of sea level rise will result in a 40-centimeter landward movement of the ocean/beach interface. For fixed structures on the shoreline, such as a single family residence, pilings, or seawalls, an increase in sea level will increase the inundation of the structure. More of the structure will be inundated or underwater than are inundated now and the portions of the structure that are now underwater part of the time will be underwater more frequently.

Accompanying this rise in sea level will be increased wave heights and wave energy. Along much of the California coast, the bottom depth controls the nearshore wave heights, with bigger waves occurring in deeper water. Since wave energy increases with the square of the wave height, a small increase in wave height can cause a significant increase in wave energy and wave damage. Combined with the physical increase in water elevation, a small rise in sea level can expose previously protected back shore development to both inundation and wave attack, and those areas that are already exposed to wave attack will be exposed to more frequent wave attack with higher wave forces. Structures that are adequate for current storm conditions may not provide as much protection in the future.

3. Need for Shoreline Protection at Goleta Beach and Alternatives Analysis

Coastal Act Section 30235 acknowledges that seawalls, revetments, cliff retaining walls, groins and other such structural or "hard" methods designed to forestall erosion also alter natural landforms and natural shoreline processes. Accordingly, Section 30235 limits the construction of shoreline protective works to those required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion. The Coastal Act provides these limitations because shoreline structures can have a variety of negative impacts on coastal resources including adverse affects on sand supply, public access, coastal views, natural landforms, and overall shoreline beach dynamics on and off site, ultimately resulting in the loss of beach.

Specifically, Coastal Act Section 30235 provides that shoreline protection devices shall be permitted only when all of the following four criteria are met: (1) there is an existing structure, public beach area, or coastal dependent use; (2) the existing structure, public beach area, or coastal dependent use is in danger from erosion; (3) shoreline-altering construction is required to protect the existing threatened structure or public beach area, or to serve the coastal dependent use; and (4) the required protection is designed to eliminate or mitigate its adverse impacts on shoreline sand supply. The first three

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Draft Paper, CEC-500-2009-014-D, 62 pp, http://www.energy.ca.gov/2009publications/CEC-500-2009-014/CEC-500-2009-014-D.pdf.

questions relate to whether the proposed shoreline protection device is necessary, while the fourth question applies to avoiding or mitigating any unavoidable impacts from it. In addition, even where all four criteria are satisfied, and thus, shoreline protection devices must be permitted, the other policies in Chapter 3 of the Coastal Act do not become irrelevant, so the devices must be located, designed, and maintained in a manner that is consistent with those other policies to the extent possible. Those issues are discussed in subsequent sections IV.D. through F.

a. Existing Development to be Protected:

In regards to the first question, the subject site, Goleta Beach County Park, is a public beach park consisting of both sandy beach and upland public recreational use areas (picnic facilities, recreation areas, and parking facilities including 594 existing parking spaces) as well as various structures (including a restaurant, public restrooms, and various utility pipelines including gas and water lines). Goleta Beach County Park is the most popularly used public beach in Santa Barbara County's park system and clearly supports and enhances the public's ability for coastal access and recreation within the project area. Thus, the Commission finds Goleta Beach Park includes sandy beach areas that constitute a "public beach" and that the existing coastal access and recreational facilities located within the upland areas of the park (the non-sandy beach areas) clearly constitute structures and coastal-dependent uses as referenced by Section 30235.

b. Erosion Danger:

In regards to the second question, the Santa Barbara County Parks Department has also established that the existing development on site (including the public restrooms, picnic facilities, a grassy lawn area, various utility pipelines, and parking facilities and other upland areas of the park) are in danger of serious damage or destruction due to further wave attack and associated beach erosion. The problem of ongoing erosion at this beach has been previously established by the Commission in its previous approval of several coastal development permits since 1999 which have authorized various actions including construction of rock revetments, sand berms, and beach nourishment activities at Goleta Beach in response to previous wave caused erosive events. These previously approved coastal development permits and a full description of their project descriptions are included in the previous Section IV.B "Project Location and Background".

Moreover, with global warming and sea level rise, increased relative wave heights and wave energy are expected. Along much of the California coast, the bottom depth controls the nearshore wave heights, with bigger waves occurring in deeper water. Since wave energy increases with the square of the wave height, a small increase in water depth and wave height can cause a significant increase in wave energy and wave damage. Thus, combined with the physical increase in water elevation, a small rise in sea level can expose previously safe backshore development to both inundation and wave attack, and those areas that are already exposed to wave attack will be exposed to more frequent wave attack with higher wave forces. Therefore, given the effects of expected sea level rise at the subject site, the upland areas of Goleta Beach County Park are expected to be subjected to greater wave action more frequently in the future. Thus, construction of a shoreline protective device at Goleta County Beach would serve

to protect existing structures and upland park facilities, constituting coastal-dependent uses, from erosion consistent with Section 30235 of the Coastal Act.

c. Feasible Alternatives for Protection:

The third criterion, pursuant to Section 30235, that must be met before approval of a shoreline protective device can be considered necessary is that the proposed device must be "required" to protect the existing threatened structure, coastal-dependent use, or public beach. In other words, a shoreline protection device must be permitted if approval of such a device is the only feasible means of protecting the endangered development or costal dependent use. Moreover, any particular device much be approved only if it is the only feasible means of providing protection, or, if there are multiple possible means, if it is the best alternative. Thus, when read in tandem with other applicable Coastal Act policies protecting coastal resources as cited in these findings, this 30235 evaluation is often conceptualized as a search for the least environmentally damaging feasible alternative that can serve to achieve the stated project goal of protecting the threatened structure, coastal-dependent use, or public beach. Other alternatives typically considered include: the "no project" alternative; abandonment of threatened structures or use areas; relocation of the threatened structures or use areas; sand replenishment programs; and combinations of each.

The County has prepared a Draft Environmental Impact Report (DEIR) prepared by the Chambers Group, dated March 2007, which considers a full range of alternatives including retention of the 1,500 linear ft. of as-built rock revetment, retention of the rock revetments with offshore dredging, managed retreat, and a beach nourishment program. In particular, the DEIR analyzed the "managed retreat" alternative and the "proposed project" as "co-equal" alternatives and found that the proposed project was the environmentally superior alternative. The applicant has submitted analysis of the following alternatives to the proposed project:

"No Project" (removal of 1,500 ft. of unauthorized and temporary revetments):

The County's DEIR failed to correctly analyze the "No Project" alternative which would correctly involve removal of the 1,500 ft. of unauthorized (and temporarily authorized) rock revetments on site. However, in the County's DEIR, the County incorrectly described the "No Project" alternative as retention of the approximately 1,500 ft. of unauthorized rock revetment at the upcoast end of the park with no other action.

Retention of As-Built Rock Revetments

This alternative was incorrectly identified in the County's DEIR as the "No Project" alternative. However, the approximately 250 linear ft. of unpermitted revetment and approximately 1,350 linear ft. of revetment that was previously authorized by the Commission on a temporary basis only pursuant to CDP 4-02-251 (as amended); thus, authorization for permanent retention of these structures constitutes new development that would require a new coastal development permit from the California Coastal Commission.

In the case of this alternative, staff notes that the County originally applied for permanent retention of the unauthorized and temporary revetments on the western (upcoast) end of the site in 2002 pursuant to CDP Applications 4-02-251 and 4-02-223.

However, CDP 4-02-251 was approved by the Commission with a special condition which specified that the portion of the as-built rock revetment that was the subject of that application was authorized on a temporary basis only in order to allow the County to prepare further studies of the shoreline processes at the subject site and evaluate long-term solutions, including solutions other than retention of the rock revetment. In addition, CDP Application 4-02-223 for the retention of the approximately 250 linear ft. of unpermitted rock at the western (upcoast) end of the park was never completed by the County. Thus, this portion of the rock revetment is still unauthorized at this time.

Experts generally agree that where the shoreline is eroding and armoring is installed, as would be the case here, the armoring will eventually define the boundary between the sea and the upland. On an eroding shoreline fronted by a beach, the beach will be present as long as some sand is supplied to the shoreline and the beach is not submerged by sea level rise. As erosion proceeds, the beach also retreats. This process stops, however, when the retreating shoreline comes to a revetment or a seawall. While the shoreline on either side of the armor continues to retreat, shoreline retreat in front of the armor stops. Eventually, the shoreline fronting the armor protrudes into the water, with the mean high tide line 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 armor.

Therefore, the Commission finds that although this alternative would continue to provide the same level of protection for the upland areas of the park that are currently in effect at Goleta Beach, retention of the approximately 1,500 linear ft. of as-built revetment would also result in significant adverse impacts to shoreline sand supply and process on site and downcoast, as well significant adverse impacts to public access and recreational resources, and public coastal views. Moreover, the Commission finds that this alternative would actually result in the eventual loss of public sandy beach area within the park that would otherwise be available for public coastal access and recreation due to direct occupation of the public sandy beach by the revetment itself and the inevitable loss of the sandy beach area seaward of the revetment due to both increased erosion due the effect of the revetment and because the revetment would effectively “fix” the back of the beach eliminating the ability of the back of the sandy beach to naturally migrate landward in response to sea level rise. Further, the revetment, which is currently located between much of the parking and picnic area on site, constitutes a physical obstruction to the public’s ability to access the beach from the upland park areas and parking facilities. The adverse impacts to shoreline processes and sand supply from revetments are explained in more detail in the previous section of this report *IV,C.1*, titled “Shoreline Protective Device Effects”.

Thus, although this alternative would provide some short-term benefit in protecting the upland areas on site, this alternative would, in the long-term, actually result in the significant loss of public beach areas within the park itself and substantial adverse impacts to coastal shoreline sand supply in downcoast areas as well. Therefore, this alternative is not considered feasible as a long-term solution to erosion at the park as it would result in greater adverse impacts than the proposed project.

Retention of As-Built Rock Revetments with Beach Nourishment
This alternative would also serve to protect the upland areas of the park but would still have the same adverse impacts as described above for the "Retention of As-Built Rock Revetments", including impacts to public views, public access, and shoreline sand supply. Particularly, this alternative would still result in the loss of sandy beach area within the park due to increased erosion resulting from the revetment with the exception that this loss of beach area on site would be, at least partially, offset by the implementation of an active beach nourishment program. The County estimates that approximately 60,000 cu. yds. of sand material per year would be necessary to prevent beach erosion.

However, no guaranteed source of material has been identified. The EIR indicates that material for beach nourishment might be provided by existing programs including the BEACON (Beach Erosion Authority for Clean Oceans and Nourishment) authorized by the Commission pursuant to CDP 4-02-074 or the County's own flood control creek dredging program authorized by CDP 4-05-139; however, to date, neither of these programs have consistently generated 60,000 cu. yds. of source material on a yearly basis that the County could utilize for beach nourishment operations. Thus, successful implementation of a regular beach nourishment program for this alternative would likely require a similar off-shore dredging program as proposed as part of this application. As a result, this alternative would still result in the same adverse impacts described above for the "Retention of As-Built Rock Revetments" but would likely also result in any additional impacts associated with offshore dredging operations. Thus, for these reasons, this alternative would result in greater adverse impacts than the proposed project.

Offshore Breakwater/Reef
This alternative would involve construction of an approximately 600 ft. long offshore breakwater or underwater reef, parallel to the shoreline of Goleta Beach. The breakwater would be constructed of rock boulders, similar to the existing revetments, would be constructed at a water depth of approximately -15 ft. below mean low low water level and would rise approximately 5 – 10 ft. in height above the average water level. The footprint of the resulting ocean bottom footprint for the rock structure would be 80 ft. wide by 600 ft. long.

The effect of the offshore breakwater/reef on shoreline sand supply and processes would likely be similar to the proposed project but would result in the direct occupation of a substantially larger area (48,000 sq. ft. or more than one acre) of the ocean floor and existing subtidal habitat area resulting in a significant permanent adverse impacts. In addition, similar to the proposed project, this alternative would also require offshore dredging in order to "pre-fill" the subject site with the approximately 500,000 cu. yds. of sand material for beach nourishment in order to create the design beach profile and prevent or minimize downcoast erosion due to changes in shoreline sand supply. Further, the DEIR for the project indicates that construction of an offshore breakwater/reef, would function similar to the proposed permeable pier sand retention system in regards to widening the beach at the County park; however, it would also result in greater significant adverse impacts to marine habitat areas due to filling of tidepool, rocky subtidal, and kelp bed habitat by sand or rock and an estimated increase

in the potential for artificial closures of the Goleta Slough Mouth. Thus, for these reasons, this alternative is not considered feasible as it would result in greater adverse impacts than the proposed project.

Managed Retreat/Full Retreat/Partial Retreat and Reconfiguration of Endangered Park Development/Uses:

Both the County and the Environmental Defense Center (who is opposed to the proposed project) have both evaluated a range of managed retreat alternatives including full retreat beyond the expected range of wave attack, partial retreat with a new "backstop" revetment, and a managed retreat option without use of a rock revetment that would include a strategic reconfiguration of the facilities within the park to avoid or minimize the loss of any critical park uses such as parking facilities. The Environmental Defense Center's (EDC) plan for their preferred alternative of landward relocation and strategic reconfiguration of the park's facilities is included as **Exhibit 18** of this report for reference.

Each of these managed retreat/reconfiguration options are relatively similar in that they would involve: (1) removal of approximately 1,500 linear ft. of as-built revetment on the upcoast end of the park, (2) retention of some or all of the existing rock revetment seaward of the existing restaurant and parking lot at the east (downcoast) end of the park and (3) provide for the removal and/or landward relocation of the seawardmost located existing facilities and structures within the park to minimize or avoid the potential of wave caused damage. This alternative would result in the loss of approximately 1.3 acres of existing upland area within the park which would effectively be converted to sandy beach environment. Although this would not result in a reduction of actual park area, it would result in the conversion of upland recreational area to sandy beach recreational area. Upland areas of the park that would be lost include portions of the grassy lawn area, picnic area, and parking lot areas. This option would require relocation of an existing restroom, portions of parking area, picnic facilities, underground utility lines/pipes/easements, and the removal of the existing on-site ranger/park staff housing. New ranger housing would not be reconstructed within the park.

The approximately 1.3 acres of upland area of the park that would be removed under this alternative would be expected to transition to an equivalent area of sandy beach area which would still be available for public use but would not provide for the same types of public recreational activities as the existing upland area that would be lost. In addition, if increased narrowing of the beach due to sea level rise occurs, then this expanded beach area would most likely be lost due to inundation in the future as well. Both the County and EDC assert that at least some of the different variations of this alternative for relocation/retreat could be accomplished with no loss of public parking spaces due to reconfiguration of the facilities. Specifically, the County asserts that in order to maintain the current level of parking spaces at the park it would be necessary to construct a "backstop" revetment in a further landward location than existing revetment. Alternatively, the EDC asserts that reconfiguration of the facilities, without use of any revetment, would also still maintain the same number of parking spaces on site. Specifically, the "Managed Retreat/Strategic Reconfiguration" alternative suggested by the EDC contemplates removal of some existing parking lot areas and grassy lawn/picnic areas, conversion of some existing parking lots area to provide

replacement grassy lawn/picnic area facilities, and elimination of some uses such as the "horse shoe pit" area and ranger housing in order to provide for new parking facilities.

However, the Commission also finds that although this alternative is feasible and would avoid any potential adverse impacts to the marine environment and downcoast areas, this alternative would also result in the removal of approximately 1.3 acres of upland areas of the park that currently provide important public access and coastal recreational opportunities. Moreover, due to the geographically constrained location of the park on a historic sand spit (which is fixed at its northern (inland most) boundary by Ward Memorial Boulevard and the Goleta Slough and the ocean to the south, opportunities for landward relocation or expansion of the inland boundary of the park are not possible. Thus, in this case, the managed retreat alternative would result in some areas of the park currently available to be utilized for public coastal dependent uses would be reduced in scope. The Commission finds that the developed upland areas of the park (including parking, picnic, and other recreational use areas) provides important public access/recreational amenities and support facilities that are in high demand and that are different than the public access/recreational benefits provided by the sandy beach area of the park itself.

Thus, although this alternative is feasible and would avoid any potential for adverse impacts to downcoast shoreline sand supply which may result from the construction of the proposed permeable pier sand retention system, the Commission finds that it would also result in the loss of some of existing upland park area currently available to be utilized for public coastal dependent uses. Moreover, if increased narrowing of the beach occurs as a result of sea level rise, then the 1.3 acres of upland park area that would be converted to sandy beach under this alternative would eventually be lost due to inundation in the future; whereas, the proposed project is intended to widen the existing sandy beaches on site and is expected to significantly extend the usable life of this park relative to sea level rise and natural beach retreat/erosion. Therefore, the "managed retreat/park reconfiguration" alternative would result in some unavoidable adverse effects to public coastal access and recreational opportunities.

Alternatives Conclusion

The Commission finds that the proposed project is an experimental effort to create a widened public sandy beach at Goleta Beach County Park to reduce the potential for periodic wave-caused erosion to upland park areas and facilities and enhance public access and recreational opportunities while also maintaining existing sediment supplies to all areas downcoast of the project site in order to minimize or avoid any potential increased erosion of downcoast beaches and bluffs. In comparison, it is clear that there is at least one feasible alternative (managed retreat) that could be pursued at this location that would not result in any potential adverse impacts to beach habitat and downcoast areas but it is equally clear that this alternative would not be sufficient to protect all existing endangered structures and public beach areas currently available for coastal-dependent use by the public and would result in a reduction in the limited upland areas of the park currently available for public recreational use. Therefore, given that the proposed permeable pier sand retention system, although experimental in

nature, has been designed to widen the beach, protect all existing coastal dependent uses and structures on site while also avoiding or minimizing adverse impacts to the beach, marine environment, and downcoast areas, the Commission concludes that the proposed project is the superior alternative that would serve to minimize impacts to coastal resources to the maximum extent feasible and which also satisfies the third test of Section 30235 of the Coastal Act.

d. Potential Effects to Shoreline Processes and Sand Supply

The fourth test of Section 30235 (previously cited) that must be met in order to require Commission approval is that shoreline protective structures must be designed to eliminate or mitigate adverse impacts to local shoreline sand supply.

Shoreline Processes

Goleta Beach public park has experienced severe erosion over the past several years, resulting in the construction of over 1,500 linear feet of rock revetment to protect upland areas of the park including grassy lawn and picnic areas on the western (upcoast) reach of the park. The primary purpose of the proposed project is to provide for a widened public sandy beach at Goleta Beach County Park to reduce periodic wave-caused erosion to upland park areas and enhance public access and recreational opportunities while also maintaining existing sediment supplies to all areas downcoast of the project site to ensure that the project does not result in any increased erosion or accretion of downcoast beaches.

Studies of the dynamics of sand beaches have led to the development of the general concepts of littoral cells and littoral transport. All coasts are divided into natural compartments called littoral cells. Each cell contains a complete cycle of sedimentation including sources, transport paths, and sinks. Sediment and sand material are commonly carried to the ocean by streams and rivers or deposited on the sandy beach as a result of bluff erosion. Fine suspended sand/sediment is both carried offshore in turbid plumes and deposited in deeper water and transported along the shore (either downcoast or upcoast) by waves and currents to nourish beaches. The presence of sand on any particular beach depends on the continued transport of sand within the littoral cell.

In the case of the project site, Goleta Beach is located within the Santa Barbara Littoral Cell, one of the longest littoral cells in Southern California. The Santa Barbara Littoral Cell extends from Point Conception to the Point Mugu Submarine Canyon. The wave shelter provided by the offshore Channel Islands results in an almost unidirectional movement of sand along the coast from west (upcoast) to east (downcoast) with only occasional short-term (i.e., a few hours) reversals due to pre-frontal wind-generated seas during winters storms.

Natural shoreline processes affecting the formation and retention of sandy beaches can be significantly altered by the construction of shoreline protective devices. If new shoreline protective devices, such as groins, interfere with sand transport, then downcoast beaches would be expected to erode. In addition, bluff retreat and erosion is a natural process resulting from many different factors and an important source of new

sand/sediment for the beach areas within a littoral cell. Shoreline armoring and other shoreline protective devices can impede the important natural process of bluff erosion causing a further reduction in the sand available for maintaining an adequate beach width.

Some of the effects of engineered shoreline protective devices on the beach (such as scour, end effects, increased erosion or accretion patterns, and modification to the beach profile) are temporary or are difficult to distinguish from the other naturally occurring or ambient coastal process actions that also modify the shoreline. In regards to armoring devices (such as seawalls and revetments) many of their effects on local shoreline sand supply shoreline processes can be easily quantified, such as: (1) the loss of the beach area on which the structure is located; (2) the long-term loss of beach which will result when the back beach location is fixed on an eroding shoreline (also known as “passive erosion”); and (3) the amount of material which would have been supplied to the beach if the back beach or bluff were to erode naturally.

As an alternative, the use of groins and breakwaters avoid many of the impacts typically associated with an use of armoring devices such as a seawall or rock revetment. However, these devices can still result in other significant adverse impacts to shoreline sand supply. Groins and breakwaters are engineered to maintain a wider area of beach or sediment on its upcoast side because it effectively acts as a physical barrier to block sediment transport within the littoral cell from flowing to downcoast areas. Thus, although a groin will effectively cause a build-up of beach material on its upcoast side, the secondary effect is that it is often accompanied by accelerated erosion to the downcoast (or downdrift) beach, which receives less sand. This downcoast (or downdrift) erosion can be reduced or avoided by pre-filling the groin embayment (the area upcoast of the groin where sediment accumulates) to avoid creation of a temporary “deficit” in the littoral sand supply budget to downcoast areas that would otherwise be created by the entrapment of littoral cell sand on the upcoast side of the groin. A long-term beach nourishment program may also be needed to maintain the desired beach width upcoast of such a groin and would serve to avoid or minimize downcoast erosion

In the case of the proposed permeable pier sand retention system, a primary goal of the project will be to ensure that the volume of beach quality sediment that is exchanged between the area of the coast upcoast of the proposed permeable pier sand retention system and the downcoast areas will be maintained to avoid the potential for increased erosion of the beach and bluff areas located downcoast from the Goleta Beach County Park. Specifically, the proposed permeable pier sand retention system will effectively function as a “permeable groin”. Similar to a regular groin, the proposed device will function by trapping sand on its upcoast side in order to create a wider beach condition with the exception, that unlike a regular groin, the proposed “permeable pier sand retention system” is designed to be permeable allowing the sand within the littoral system to continue to pass through openings in the structure to maintain sand supply to downcoast areas within the littoral cell to ensure continued sand supply and avoid increased erosion of downcoast beaches and bluffs.

As proposed, the project has been designed in a manner that is intended to maintain existing sediment supplies to all areas downcoast of the project site. One of the primary concerns associated with construction of groin structures, such as the proposed permeable pier sand retention system, is the potential impact to downcoast areas. Adverse downcoast impacts occur if the beach retained by the groin structure is allowed to fill with sand moving downcoast in the littoral system that would otherwise nourish downcoast beaches. The sand caught upcoast creates a beach "fillet". The sand that accumulates immediately up and downcoast around the groin is the "salient". When this sand is blocked from being able to move downcoast of the structure, it represents a loss in the downcoast sediment budget. In the case of the proposed project, the permeable nature of the proposed "permeable pier sand retention system", and the proposed pre-fill of the salient and fillet areas, are expected to avoid changes in downcoast shoreline sand supply and impacts from increased erosion.

By providing sand to the system at the salient and fillet, it allows sand that would have been trapped by the piles to pass through the site to downcoast areas. Once the salient is formed, sand moves relatively unimpeded parallel to the shoreline downcoast along the perimeter of a salient. Two methods to analyze effects of the structure are presented below (numerical and analytical modeling). They are intended to provide two different approaches to examine the outcome of the project. The analyses consistently indicate that the structure would retain sand upcoast a distance of 3,600 ft to the west. This sand formation and new beach would take approximately 10 years to form. In that time, sand would be deprived to the downcoast beach while it accumulates at the structure and upcoast area if pre-filling of the salient and fillet did not occur. Since the project proposes to pre-fill the salient and fillet formed by the permeable groin, these downcoast impacts are not expected to occur.

To fully offset erosion of downcoast beaches while the equilibrium beach is formed (sand deposition in the vicinity of the permeable pier sand retention system over 10 years), Goleta Beach will be filled with sand at the time of construction. This pre-fill is designed to prevent downcoast erosion. Pre-filling with sand artificially forms the sand deposits (the salient and fillet) at the time of construction, rather than waiting for the shoreline to gradually evolve. In this way, sand that would naturally move along the coast from west to east, will continue to move past the Park to downcoast areas, continuing natural patterns of nourishment east of the Park. The volume of sand required for this pre-fill is estimated to be 500,000 cubic yards. However, it is possible that until equilibrium, some additional sand may be trapped upcoast of the permeable pier sand retention system that exceeds the 500,000 cubic yard estimate.

The applicant has submitted a coastal engineering analysis for the proposed project by Moffatt and Nichol analyzing the potential downcoast effects of the project. In order to analyze the potential effects of the proposed permeable pier sand retention system, the applicant utilized GENESIS (Generalized Model for Simulating Shoreline Change) which was developed by the United States Army Corps or Engineers (USACE) Coastal Engineering Research Center. GENESIS is a computer program that predicts the shift in the position of the shoreline at mean sea level from a designated starting point, existing conditions in this case, in response to a proposed action. It utilizes data of

existing shoreline conditions, wave conditions, and proposed Project changes (beach fills and/or structures) to calculate sediment transport, consequent erosion and deposition, and resulting changes in shoreline position. Model predictions should be considered as trends (i.e., erosion, accretion, no change) to be evaluated at the first order for planning, rather than absolute, accurate shoreline positions for any sort of precise engineering design.

Specifically, the applicant's engineering consultants have examined the proposed permeable pier sand retention system using a simple line model, the US Army Corps of Engineers model, GENESIS, and an assumption about the permeability of the proposed pier, and determined that it will be possible to create a wide beach and beach salient at Goleta Beach, while reducing longshore transport by only 3 to 5%. During conditions with normal waves and El Niño conditions every 5 years, the reduction in longshore transport is modeled to be 4.8%, dropping from the existing condition of 183,146 cubic yards per year to 174,430 cubic yards per year with the proposed project. If the El Niño conditions occur every 5 years, on average, but with higher than average wave conditions during the intervening years, the transport was modeled to be 199,671 cubic yards without the proposed project and 192,838 cubic yards with the proposed project (for a 3.5% reduction). The model analysis is based upon several years of wave data and a steady introduction of littoral sand from the upcoast boundary.

Based on this analysis, the applicant's coastal engineering consultants have predicted that, as designed, the permeable pier sand retention system would retain sand upcoast a distance of approximately 3,600 ft to the west (upcoast). This sand formation and new beach would take approximately 10 - 20 years to fully form. In that time, sand would be deprived to the downcoast beach while it accumulates at the structure and upcoast area if pre-filling of the salient and fillet did not occur. Since the project proposes to pre-fill the salient and fillet formed by the permeable pier, these downcoast impacts are not expected to occur. Specifically, in regards to the results of the GENESIS modeling, the DEIR states:

> ***The modeling was done assuming a factor of permeability for the pier of 35 percent. This means that of the sand moving alongshore, 65 percent gets caught in the pier and 35 percent passes downcoast until the sand accumulates sufficiently for the shoreline to reach an equilibrium condition. After equilibrium is reached, sand completely bypasses the structure and heads downcoast. This pier permeability factor remains constant and does not change over time because it is only affected by the density of pier piles and not any environmental conditions.***
>
> ***For this alternative, GENESIS results show that the shoreline along Goleta Beach would become stable with the sand retention structure in place, and sand deposits (i.e., the salient and upcoast fillet) that would be pre-filled during construction. The 20-year future shoreline position along Goleta Beach protrudes seaward from the existing shoreline position by up to 190 ft under average wave conditions, adding 8.6 acres of new beach equaling approximately 555,000 cy of new sand retained, and up to 98 ft of advance under above-average wave conditions, adding 2.4 acres of new beach equaling approximately 157,000 cy of new sand retained.***
>
> ***….***
>
> ***This shoreline advance occurs from the location of the permeable pier throughout the entire length of the Park to the west, and extends farther west to a position 3,400 ft east of the tip of Campus Point adjacent to the location of the Bren School at UCSB. The***

> ***downcoast beach would also advance immediately adjacent to the retention structure for a distance of approximately 250 ft to the east and join the existing shoreline position 225 feet west of the Slough Mouth. The model predicts that it takes 10 years (by 2013) for this beach widening to occur to a point at which the shoreline position becomes completely stable (i.e., the beach retains its position without major loss of sand under extreme seasonal or episodic storm wave and tidal conditions).***
>
> ***….***

Thus, the applicant's coastal engineering consultant, Moffatt and Nichol Engineering, has concluded that the proposed project is feasible to establish a widened beach in the area upcoast of the permeable pier sand retention system. In regards to potential downcoast effects, the applicant's coastal engineering consultant, Moffatt and Nichol Engineering, indicates that that sand should continue to be provided to the beaches downcoast of the structure over the long-term and that erosion should generally not occur although the project may result in some minor increases in erosion above the existing ambient erosion rate for these downcoast areas. Specifically, the Engineering Analysis by Moffatt and Nichol dated March 11, 2009, states:

> ***Model results indicate that a minor amount of shoreline retreat may occur downcoast of the site at equilibrium, and it is limited to the area of the existing sand spit area east of the park. No other downcoast erosion should occur, so no effects to the bluffs are anticipated. The Shoreline Morphology Study cites erosion modeled for the "No Project" alternative of 45 feet over 20 years (2.25 feet per year) at a point 1,200 feet east of the slough mouth. The Beach Stabilization Project would result in erosion of 47 feet total over 20 years (2.35 feet per year) at the exact same point. The difference between future shoreline retreat under "No Project" and "Proposed Project" conditions is very minor and may be within the margin of error in predictions.***

In addition, the applicant's coastal engineering consultant, Moffatt and Nichol, also indicates that the proposed permeable pier sand retention system is not expected to have any measurable effect on the frequency of openings or closures of the Goleta slough mouth. As designed, the location of the downcoast end of the salient (widened sandy beach area) formed by the Permeable Pier Sand Retention System is expected to terminate at the end of the east parking lot of the Park and should not extend into the area of the slough mouth. Therefore, the project is not expected to result in any increase in the rate or duration of openings and/or closures of the mouth of Goleta Slough. Moreover, although the project is not expected to result in any changes to shoreline processes that would affect the slough mouth, it is relevant to note that the County's Flood Control District periodically already opens the slough mouth approximately 1-3 times/year for the purpose of flood control, pursuant to the Commission's previous approval of CDP 4-05-139. Thus, given the ongoing active management of the slough mouth at the project site, the proposed project is not expected to result in any changes to the frequency of slough mouth openings or closures.

However, although the modeling performed by the applicant's coastal engineering consultants, Moffatt & Nichol, predicts that the project would not result in any significant increase in the rate of downcoast erosion of the shoreline, the Environmental Defense Center has also submitted a memorandum by Philip Williams & Associates (PWA), dated April 15, 2009, assessing the adequacy of the modeling performed by the

applicant for the project. The full analysis by PWA has been included as **Exhibit 19** of this report. PWA asserts that the modeling of the project by the applicant is not adequate to predict the actual effects of the project. The PWA memorandum states, in part, that:

> ***The modeling is not adequate to predict the performance of the proposed groin. The effects and effectiveness of the proposed groin are unknown.***
> ***….***
> ***The Beach Stabilization Project is not likely to perform as presented in the MNE [Moffatt & Nichol Engineers] and EC reports. The Beach Stabilization Project may induce erosion downcoast; will likely require massive additional sand placement to protect "the lawn" and other park amenities, and will require extensive resources to adaptively manage the park with structural modifications of unknown effect.***

Thus, there is clearly a disagreement between the engineering consultants retained by the County and the EDC regarding the adequacy of the modeling performed for the project and the potential effects of the project. Commission Staff Coastal Engineer, Lesley Ewing, has reviewed the results of the County's GENESIS modeling and the concerns raised in the PWA memorandum dated April 15, 2009. Ms. Ewing has concluded that the GENESIS modeling performed by the applicant's engineering consultants is generally adequate from an engineering perspective although it must also be acknowledged that the PWA memorandum raises several valid concerns, particular in regards to the need to assess the actual effects of the project through implementation of monitoring and the need for additional modeling prior to construction of the project. Moreover, it should be noted that all predictive models include some inherent possibility for error and can not guarantee certainty in regards to predicting the effects of any project. In this case, in regards to the need for additional modeling prior to construction, the memorandum prepared by PWA dated April 15, 2009, and submitted by the EDC specifically indicates concern regarding the lack of physical modeling performed for the project and the difficulty and importance in assessing the actual effects of the project pursuant to a monitoring program after construction is complete. The PWA memorandum states:

> ***The use of field evidence seems to be the most pragmatic course, coupled with an adaptive management process that will allow the pile groin to be "fine tuned" following construction. However, that adaptive management process may be difficult to implement at Goleta Beach given its particular sediment transport regime.***
>
> ***The second missing step is to determine the downdrift impact of not achieving the specified permeability, resulting in actual permeabilities either above or below 35%. Qualitatively:***
> - ***If the groin is too impermeable, then sand will be deflected offshore by the structure and not return directly onshore, the result will be downdrift erosion in the lee of the structure;***
> - ***If the groin is too permeable, then sand will not be trapped and the updrift fillet will be smaller than anticipated.***

Opponents to the project object to the use of the model used by the applicant's coastal engineering consultants for characterizing the complex conditions at the subject beach and shoreline areas and question the ability of the County to adequately design and maintain the structure in a manner that would achieve the correct ratio of

permeability/impermeability necessary to ensure widening of the upcoast beach areas while concurrently avoiding adverse effects to downcoast areas. Analysis of shoreline change by PWA identifies the changes in beach width as oscillatory in nature, being driven by cyclic climate phenomena and a moving "pulse" of erosion that migrates along the coast within the littoral cell. Historic beach trends indicate that the subject shoreline position generally varies in width between 100 to 150 ft. in width, with the 1943 shoreline representing the most landward observed shoreline. The most recent observations on the beach area, from the 1980s to present, show a rapid shoreline retreat following the 1982/83 El Niño storms, with diminishing retreat over time. The Goleta Beach County Park Reconfiguration Alternative dated 11/24/08 and prepared by PWA (included as **Exhibit 18**) indicates that a sand pulse was accumulating near Coal Oil Point and this influx of sand might reach Goleta Beach in the coming decade resulting in the widening of the beach. However, it must be noted that even if such a pulse results in the creation of a wider beach condition on site, such widening would be temporary in nature as the pulse would continue to migrate downcoast.

The opponents recommend that a time-varying boundary condition should have been used to better approximate the pulses of sediment that move along this section of coast. In addition, since the wave conditions used in the GENESIS model were taken from waves measured from 2002 to 2006, they do not represent the variability of wave conditions from variability within the Pacific Decadal Oscillation and other long-term conditions that influence beach change at this location. The opponents also note that model calibration and verification are weak, and as stated in a May 11, 2009 memo from Dilip Barua, Ph.D., to Brian Trautwein of the EDC:

> ***The GENESIS modeling results appear to be inadequate for this particular application due in part to anomalous El Niño storm effects. Additionally, reviews indicate that an alternate modeling strategy involving "sensitivity analysis" would likely have yielded a more broad range of feasible results within the limitations of GENESIS. In any event, it is likely that, even based upon M&N analysis, the permeable pile-groin is likely to adversely affect the downdrift beaches.***

The opponents of the permeable pier sand retention system question the ability of the proposed project to establish the desired beach conditions at Goleta and downcoast. Consequently, the EDC has developed a plan for relocation/reconfiguration of the park facilities further landward and assert that with the natural oscillation of the beach and the pulse of sand that they believe is due to reach Goleta Beach in the coming decade, that there is no need to install shore protection of any kind at this location. However, in review of this issue, Lesley Ewing, the Commission's staff engineer, concludes that although improved modeling would provide better understanding of the likely changes to the subject beach and downcoast areas; the underlying assumptions about the performance of the proposed permeable pier sand retention system are so fundamental to any of the numerical modeling efforts, it is unlikely that any modeling study will be able to adequately anticipate all the beach changes that might occur due to the construction of such a structure. Thus, for this reason, the Commission recognizes the difficulty in assessing the effects of the proposed project from simple numerical modeling alone and that the need for physical modeling prior to construction of the project and the need to measure the actual effects of the project through

implementation of extensive monitoring after construction are critical in evaluating the effects of this experimental project.

In addition, both the engineering consultants for the applicant and for the EDC agree that actual physical modeling should be performed prior to construction to ensure that the appropriate percentage of permeability is achieved and to ensure that downcoast erosion is avoided. The DEIR for the project, prepared by the Chambers Group, states:

> ***[In regards to GENESIS] Although results should be viewed and used with caution, the model is considered reliable from myriads of previous applications and is an appropriate tool available for this analysis.***
> ***….***
> ***The only other type of analysis that can be used to predict effects of the permeable pier structure on the coast is to perform physical modeling of the site in a laboratory. This method of analysis is recommended to be applied as part of final engineering for construction, rather than in this initial planning stage. The lab physical model would be useful to refine the arrangement of the piles in the structure to optimize its performance. The existing numerical modeling is the appropriate level of analysis to determine potential environmental impacts. Due to final engineering requirements, some physical modeling may be done immediately prior to project implementation.***

Therefore, the Commission finds that in order to ensure that the proposed permeable pier sand retention system is constructed in a manner that ensures downcoast erosion would be avoided, **Special Condition Two (2)** requires the applicant to implement physical modeling of the permeable pier sand retention system in an appropriate laboratory acceptable to the Executive Director. Final detailed project design plans (identifying number of piles and spacing for initial installation) shall be submitted for the review and approval of the Executive Director, which incorporate all modifications/revisions to the project necessary to avoid any increased erosion of downcoast areas resulting from the project.

Thus, the Commission finds that although the predictive modeling indicates that the project has been designed to avoid downcoast erosion, due to the possibility that the model may not accurately predict all effects of the project, it is critical that a monitoring and adaptive management plan be implemented to assess the actual effects of the project over time and provide for mid-course adaptive corrections in the event that unanticipated adverse effects occur. Therefore, **Special Condition Two (2)** requires that an extensive monitoring program be established to investigate shoreline conditions, report any changes and respond promptly and pro-actively to these changes**. Special Condition Two (2)** requires that the monitoring provisions of the Final Adaptive Management Plan be revised to require that all monitoring shall conducted for a period of 10 years after initial construction, unless the permeable pier sand retention system is removed prior that time. In addition, the Plan shall also provide that the applicant shall conduct monitoring to provide a continuous assessment of the shoreline, bluff edge location, and beach width on a monthly basis, provide semi-annual beach profiles prepared by a licensed surveyor, a comparison of shoreline/bluff locations using aerial photographs on an annual location. The applicant shall also be required to submit, on an annual basis for a period of 10 years after initial construction is complete, unless the permeable pier sand retention system is removed prior that time, all survey data and a

written report prepared by a qualified coastal engineer indicating the results of the shoreline profile and beach width monitoring program. The annual monitoring report shall include conclusions regarding the level of success of the project, a detailed analysis of any increase or decrease in beach widths and shoreline and bluff erosion rates upcoast and downcoast of the permeable pier sand retention system, changes in the frequency and/or duration of all slough mouth opening/closure events, details on any nourishment efforts undertaken during the year with the volume and placement location specified, and any modifications to the permeable pier with a plan showing specific changes.

Further, in order to ensure that the project will not result in any adverse impacts to downcoast areas, **Special Condition Two (2)** requires that prior to the issuance of the coastal development permit, the applicant shall submit analysis, for the review and approval of the Executive Director, identifying the ambient rates of erosion for the beach and bluff areas at each of the nine (9) identified beach profile transect locations (6 Baseline Survey transects within the Project Reach Study Area and 3 Baseline Survey Control transects outside of the expected reach of the project's effects). Calculation of the ambient rates of erosion for both beaches and bluffs at the eight profile locations shall be based on analysis of the results of: (1) at least one year of new beach profile surveys performed on a semi-annual basis each spring and fall season for one year prior to the commencement of development (2) all available historic beach/bluff profile surveys for the subject areas, (3) comparison of all available historic aerial photographs, and all other available data concerning beach/bluff erosion/accretion rates. A detailed description and a summary of the findings for each of historic sources of data used in determining the ambient rates of erosion within the study area shall be provided.

Ambient erosion rates shall be established for the downcoast beaches (at each of the baseline and control survey points). Changes to downcoast beaches/bluffs, relative to control beaches/bluffs, shall be used to establish (1) triggers for implementation of identified adaptive actions including either adjustments of the permeable pier sand retention system (including reconfiguration, removal, or addition of piles) and/or implementation of additional beach nourishment; and (2) triggers for removal of the permeable pier sand retention system. All adaptive actions including either adjustments of the permeable pier sand retention system (including reconfiguration, removal, or addition of piles) and/or implementation of additional beach nourishment shall be implemented as soon as possible after the trigger condition has been reached, within the timing constraints of Special Condition Three (3); but in no case shall action be delayed more than 12 months after occurrence of a trigger condition. These adaptive actions shall be taken if the annual monitoring report indicates that:

- any of the identified Baseline Survey Monitoring Points located downcoast of the pier experience bluff retreat greater than the ambient trend for two consecutive fall or two consecutive spring surveys; or
- any of the measured beach widths at the identified Baseline Survey Monitoring Points located downcoast of the pier is 15% or more narrower than the projected future beach width during two consecutive fall or two consecutive spring beach profile surveys and the calculated percentage is greater than the average of the

percent narrowing of the beach widths, relative to projected future beach widths at the two downcoast Control Survey Monitoring Points.

Moreover, **Special Condition Two (2)** further requires that If any of the above triggers are reached, then the applicant shall implement adaptive management actions including adjustments to the permeable pier sand retention system (add/remove piles), beach nourishment, or a combination of these actions. If any adverse downcoast conditions persist according to monitoring, the applicant shall implement any necessary additional adaptive management actions (including further adjustments to the permeable pier sand retention system and/or beach nourishment). Finally, if the annual monitoring report indicates that downcoast beaches or bluffs within the identified project monitoring area (at any of the identified Baseline Survey Monitoring Points located downcoast of the pier) experience a beach width less than the projected future beach width or bluff retreat greater than the established ambient rate of erosion **for 5 consecutive years** after initial construction is completed, or if the applicant fails to submit any of the required annual monitoring reports, then the applicant shall immediately remove all portions of the permeable pier sand retention system consistent with the timing restrictions of Special Condition Three (3). Therefore, for the reasons discussed above, the Commission finds that Special Condition Two (2) must be required in order to ensure that the project will avoid, or minimize to the maximum extent feasible, any adverse impacts to downcoast shoreline sand supply and/or erosion rates.

Furthermore, to ensure that potential adverse effects to downcoast areas are minimized and to guarantee that the applicant will have the financial ability to remove all portions of the permeable pier sand retention system if the downcoast beaches or bluffs experience retreat above the established ambient rate over a period of 5 years, **Special Condition Two (2)** requires the applicant deposit all necessary funds for the complete removal of the permeable pier sand retention system in an interest-bearing bank account, held by Santa Barbara County, which shall be reserved exclusively for this purpose. The funds shall be deposited by the applicant on an annual basis for a period of five years after the date that initial construction of the permeable pier sand retention system is completed, so that at the end of this five year period, sufficient funds are available for demolition and removal of the permeable pier sand retention system.

Moreover, the Commission finds that the proposed permeable pier sand retention system is an experimental effort. The applicants have provided anecdotal evidence of coastal piers, such as the Huntington Beach Pier that has retained sand around the existing pier, or at Oil Piers where the beach experienced significant erosion when the piers were removed as part of the lease decommissioning; however, there are no pier projects that have been designed. The Commission finds that the proposed project, as conditioned, will serve to minimize adverse effects to existing shoreline processes and sand supply on site and in downcoast areas, while meeting necessary shoreline protection requirements.

However, the Commission also finds that the marine and beach environment within the project site area are dynamic systems that are subject to potential changes over time as new species migrate into the area or as potential unidentified impacts from the proposed dredging operation may be discovered over time. Therefore, due to the experimental nature of the proposed project and in order to ensure that any potential changed circumstances which may be discovered at some future point in time, such as new information regarding sensitive habitat and wildlife resources on site or new impacts from the dredging project, are considered, **Special Condition One (1)** specifically limits the duration of all development approved by this permit (including retention of the permeable pier sand retention system and implementation of adaptive management actions such as beach nourishment and pile reconfiguration) to a period of no more than ten (10) years from the date of Commission action. Specifically, **Special Condition One (1)** limits the term that the development is authorized for a period of ten (10) years from the date of Commission action, after which time the authorization for continuation and/or retention of any development approved as part of this permit (including, but not limited to, the permeable pier sand retention system, seasonal beach berm, and all beach nourishment activities) shall cease. Prior to the date that authorization for the development expires (10 years from the date of Commission action), all portions of the permeable pier sand retention system authorized by this permit must be removed by the applicant, consistent with the requirements of Special **Condition Two (2)** and timing restrictions of **Special Condition Three (3)**, unless a new coastal development permit, or amendment to this permit, authorizing the retention of the development and continuation of an adaptive management program is approved by the California Coastal Commission. Thus, to ensure that this critical information regarding potential impacts to marine resources is recorded and reported to the Executive Director for consideration of future project approvals, **Special Conditions Two** requires that extensive monitoring of the effects of the project on shoreline processes be implemented to assess the effects of the permeable pier sand retention system and beach nourishment program for the term of this permit.

In addition, Coastal Act Section 30253 requires that the proposed project assure structural stability without the need for additional armoring. As designed, the target salient would extend approximately 200 ft from the existing shoreline at the base of Goleta Pier. This would cause additional burial of some of the Pier piles in this area. These piles would experience additional depths of embedment (burial) of up to 10 ft. above existing conditions. The applicant's coastal engineering consultants, Moffatt and Nichol, assert that the additional burial will provide additional stability to the existing Goleta Pier from wave forces and, thus, is considered to be a positive impact from a structural standpoint. Also, the applicant's coastal engineering consultant asserts that this amount of sand is most probably within the range of sediment deposit that the Pier has typically experienced over the years as a result of littoral sediment transport and natural shoreline fluctuations. Thus, the applicant's coastal engineering consultants have indicated that the proposed project is adequate to ensure structural stability. Further, the applicant's consultants assert that, provided the project performs as expected and is monitored and maintained over time, additional armoring of the beach at Goleta Beach County Park can be avoided, consistent with Section 30253.

4. Dredging and Beach Nourishment Program:

The project also includes offshore dredging of 500,000 cu. yds. of material to provide donor material for beach nourishment at Goleta Beach County Park. Beach nourishment to establish a wider sandy beach at the subject site will serve to enhance public recreational and access opportunities and provide greater protection of public property and infrastructure at risk from shoreline erosion. The proposed borrow site was chosen on the basis of: (1) grain-size analysis which determined that the dredge material would be compatible with the receiver sites' existing sediments consistent with the guidelines specified by the U.S. Army Corps of Engineers (ACOE) and (2) biological surveys which indicate that the subject dredge area does not constitute environmentally sensitive habitat area (ESHA) and would avoid significant disruptions to marine biota to the maximum extent feasible.

As proposed, the general process for sand dredging, delivery, and spreading is that sand would be dredged from the borrow site with either a cutterhead suction dredge or hopper dredge. The sand would be pumped through both floating and submerged discharge lines to the beach and placed along the higher portions of the beach, using booster pumps as necessary. Existing sand would be used to build a dike between the ocean and receiver site and the dredge material would be placed behind the dike to help reduce turbidity. As the material deposits, it would be spread along the shore using bulldozers.

Section 30233 of the Coastal Act allows filling of coastal waters (or wetlands) only where feasible mitigation measures have been provided to minimize adverse environmental effects, and for only the following seven uses listed in Section 30233(a) of the Coastal Act:

> ***(1) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities.***
> ***(2) Maintaining existing, or restoring previously dredged, depths in existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps.***
> ***(3) In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities and the placement of structural pilings for public recreational piers that provide public access and recreational opportunities.***
> ***(4) 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.***
> ***(5) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas.***
> ***(6) Restoration purposes.***
> ***(7) Nature study, aquaculture, or similar resource dependent activities.***

In this case, the proposed fill would restore former public beach areas where erosion has narrowed the width of the beach. Sand deposition for beach restoration is an allowable use of fill pursuant to Section 30233(a)(5) of the Coastal Act.

In regards to beach nourishment, Section 30233(b) of the Coastal Act requires that suitable dredge materials should be transported to appropriate beaches for such

purposes. This is the activity for which the County is requesting a coastal development permit. The proposed use of dredged material for beach nourishment will partially mitigate the ongoing erosion of the County's beaches and is also necessary to ensure that the construction of the proposed permeable pile sand retention structure does not result in downcoast erosion.

In addition, Section 30233(b) of the Coastal Act states:

> ***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.***

Section 30233 of the Coastal Act allows the proposed deposition of dredge material for beach restoration only if it is planned and carried out to avoid significant disruption to marine habitats and water circulation, and where feasible mitigation measures have been provided to minimize adverse environmental effects. Coastal Act Sections 30230 and 32031 also require that the proposed development be carried out in a manner that protects water quality, biological productivity and marine resources.

In the case of the subject site, Goleta Beach public park has experienced severe erosion over the past several years, resulting in the construction of over 1,500 linear feet of rock revetment to protect upland areas of the park including grassy lawn and picnic areas on the western (upcoast) reach of the park. The primary purpose of the proposed project is to provide for a widened public sandy beach at Goleta Beach County Park to reduce periodic wave-caused erosion to upland park areas and enhance public access and recreational opportunities while also maintaining existing sediment supplies to all areas downcoast of the project site to ensure that the project does not result in any increased erosion or accretion of downcoast beaches.

If more sand is transported away from a beach than toward that beach erosion results. A sediment budget attempts to quantify the volume of sand approaching and leaving a particular beach area and to balance those volumes with the rate of erosion or accretion. The DEIR quantifies the approximate sediment budget for Goleta Beach and indicates that the beach experiences erosion (or loss) of between 30,000 to 60,000 cu. yds. of sand material per year. The DEIR states:

> ***The net littoral drift downcoast of Goleta Beach is known to be at a volume rate of approximately 310,000 cu. yds. per year (Patsch and Griggs 2005). Based on analysis of recent beach profile surveys, it is estimated that between 30,000 and 60,000 cu. yds. per year results from erosion of the beach at Goleta. The vast majority of the remainder results from rivers north of Goleta (Patsch and Griggs 2005). Less than one percent of the net littoral downcoast drift results from bluff or cliff erosion.***

Thus, based on these calculations, additional input of sand material may be needed to avoid a sand deficit at the subject site. As proposed, the project has been designed in a manner that is intended to maintain existing sediment supplies to all areas downcoast of the project site. However, one of the primary concerns associated with construction of groin structures, such as the proposed permeable pier sand retention system, is the

potential impact to downcoast areas. Adverse downcoast impacts occur if the beach retained by the permeable pier sand retention system is allowed to fill with sand moving downcoast in the littoral system that would otherwise nourish downcoast beaches. The sand caught upcoast creates a beach "fillet". The sand that accumulates immediately up and downcoast around the groin is the "salient". When this sand is blocked from being able to move downcoast of the structure, it represents a loss in the downcoast sediment budget. The permeable nature of the proposed "permeable pier sand retention system", and the proposed pre-fill of the salient and fillet areas, are expected to avoid changes in downcoast shoreline sand supply and impacts from increased erosion.

Therefore, in order to avoid any increase in the rate of erosion for downcoast areas, it is necessary to "pre-fill" the salient and fillet areas (the area upcoast or updrift of the permeable pier sand retention system). The applicant's engineering consultant, Moffatt & Nichol, have calculated that approximately 500,000 cu. yds. of sand material would be required in order to create the necessary pre-fill condition. In addition, in the event that downcoast erosion occurs of if the target beach width is not achieved at Goleta Beach (upcoast of the permeable pier sand retention system) then additional periodic dredging and beach nourishment may be required. Due to the relatively large amount of required donor material, it is not feasible to transport this material from any known inland or off-site sources. Thus, the applicant is proposing to utilize the designated donor site located approximately one mile offshore.

Although the County has previously tested the sediment in the areas proposed for dredging and determined the material to be adequate for use for beach nourishment at the subject site, sediment conditions may be altered by a number of episodic factors, including heavy rainfall events or spills. Thus, the Commission finds that is not possible to ensure that chemical and contaminant levels of sediment will not change over time as the result of a single chemical spill or contamination event. Therefore, to ensure that all future dredged material is physically and chemically compatible with the proposed deposition site and suitable for beach nourishment, the Commission finds it necessary to require **Special Condition Eight (8)** which requires the applicant to test the physical and chemical characteristics of representative samples of the dredging areas consistent with U.S. Army Corps of Engineers (Army Corps), Environmental Protection Agency (EPA), and State Water Resources Control Board and California Regional Water Quality Control Board (RWQCB) criteria for beach replenishment and dredging and disposal in intertidal areas prior to the commencement of dredging activities each year. In addition, **Special Condition Eight (8)** also ensures that dredged material meets minimum standards for particle sizes and distribution typically allowable for beach nourishment purposes.

Special Condition Two (2) further requires the applicant to notify the Commission prior to any annual dredging or discharge operations. This notification shall include information as to the sediment testing (including physical and chemical testing) conducted pursuant to the abovementioned special conditions. The sediment analysis should include confirmation by the U.S. Army Corps and RWQCB that the dredged material meets the minimum criteria necessary for placement on the sandy beach or within the intertidal zone. Further, to ensure that the project complies with all other regulatory requirements, **Special Condition Sixteen (16)** requires the applicant submit

evidence to the Executive Director that all State and Federal permits necessary for the proposed project have been obtained.

Further, the Commission notes that the applicant is requesting to place a significant volume of material on the beach and within the surfzone at Goleta Beach (500,000 cu. yds. of material initially and the periodic placement of quantities not to exceed 100,000 cu. yds. on a yearly basis). The Commission previously approved CDP 4-02-074 (BEACON) for the placement of 100,000 cu. yds./year of sediment at Goleta Beach and CDP 4-05-139 (Santa Barbara County) for the placement of a maximum of 200,000 cu. yds./year of sediment for purposes of beach replenishment (thus already allowing for a potential cumulative total of no more than 200,000 cu. yds. of material/year to be deposited at the subject beach). Since the proposed project includes potential periodic beach nourishment of up to 100,000 cu. yds. of material/year, after the initial placement of sand material, it must be noted that in combination with the other above referenced previously approved beach replenishment projects, approval of this permit, as proposed, could potentially allow for the combined discharge/placement of a combined total of 300,000 cu. yds. of material/year in the surfzone; allowing for deposition of more material on an annual basis than has been separately analyzed under any of these separate permit applications. The Commission notes that the cumulative impacts from the combined projects are not known. However, County staff have indicated that it is not the County's intention to implement all of the nourishment activities by these projects separately from each other and in a manner that would exceed more than 200,000 cu. yds./year of total deposition at Goleta Beach is currently envisioned.

Therefore, in order to ensure that the cumulative effects of the development authorized by this permit and by other previously approved coastal permits for similar beach nourishment projects at the project site, are not inadvertently greater than have been analyzed separately under any single application, **Special Condition Two (2)** limits the total amount of sediment/beach replenishment material that is deposited at Goleta Beach (after the initial placement of 500,000 cu. yds. of beach nourishment material pursuant to this permit) from all cumulative sediment disposal/beach replenishment projects (including, but not limited to, all deposition activities implemented pursuant to Coastal Development Permits 4-05-139 and 4-02-074) to no more than 200,000 cu. yds. of sediment/year. Further, **Special Condition Two (2)** further requires that in the event that supplemental beach nourishment is necessary after the initial placement of 500,000 cu. yds. of material, then material from offshore dredging shall only be utilized when adequate quantities of donor sand material is not readily available as part of other approved programs for placement of sand at Goleta Beach, including use of material generated as part of the ongoing opportunistic beach nourishment program previously approved by the Commission pursuant to CDP 4-02-054 (BEACON) and CDP 4-05-139 (Santa Barbara Flood Control) or similar projects approved by the Commission pursuant to a separate coastal development permit.

Further, in its approval of similar projects, including CDP 4-02-074 (BEACON) and CDP 4-05-139 (Santa Barbara County) the Commission found that because of the experimental nature of the these projects, long-term monitoring was critical to both assess the success of these programs, as well as to ensure that adverse impacts to coastal resources are avoided or minimized to the maximum extent feasible. In this

case, the Commission also finds that the proposed project is experimental in nature. Therefore, **Special Condition Two (2)** requires the implementation of a long-term monitoring program to analyze changes to beach profiles, sand width, and volume in relation to the volume and location of deposition activities. To avoid duplication of efforts, the program may be prepared in coordination with similar reports prepared by BEACON and by Santa Barbara County to satisfy the required conditions of approval of coastal permits for other related beach replenishment projects at the subject site (including the requirements of CDPs 4-02-074 and 4-05-139). The Shoreline Monitoring Program shall include information regarding the success of the placement activities in relation to maintaining public access, including any complaints that may have been received. The results of the monitoring shall be submitted to the Executive Director on an annual basis, with conclusions regarding the level of success of the annual sand replenishment project(s). The report shall include a brief history of the previous years' effort, if any, and shall also include photographs taken from pre-designated sites (annotated to a copy of the site plans) to track changes in shoreline conditions.

5. Seasonal Beach Berm and Removal of the As-Built Rock Revetments

The proposed project also includes the removal of all existing rip rap (approximately 1,500 linear feet) on site located west (upcoast) of the Goleta Beach Pier concurrent with, or prior to, the construction of the permeable pier sand retention system and the initial placement of 500,000 cu. yds. of sand for beach nourishment.

The applicant's engineering consultant, Moffatt & Nichol, have indicated that it may take several years for Goleta Beach to reach a state of equilibrium at its new design width of approximately 200 ft. after construction of the permeable pier sand retention system is complete. During this interim period, the County's engineering consultant has indicated that some upland portions of the park may be exposed to potential wave activity as a result of the removal of all existing rock revetments at the time of initial construction. Therefore, the applicant is also proposing the construction of an annual winter berm to provide additional protection for western parking lot and upland park areas during the first five years of the project

Construction of the annual winter sand berm will involve construction of an approximately 1,400-foot long winter sand berm, extending alongshore on the western half of the park by November 1 of each year. The proposed winter berm would be approximately 3 to 5 ft. high above the existing beach grade (+15 feet above mean lower low water with a 10-foot wide berm crest and then sloped to approximately 2:1 (horizontal to vertical) to the water, with a total seaward extent of approximately 35 feet from the backbeach. Annual construction of the winter sand berm would require a maximum of approximately 8,000 cubic yards which would be obtained from the sandy beach on site if other appropriate source material is not available. The berm would be constructed in late October or early November, and would be lowered prior to Memorial Day of the following year.

The Commission has previously approved several projects at Goleta Beach involving construction of seasonal beach berms of the same design. Three separate CDPs 4-00-193, 4-01-136, and 4-02-128 (Santa Barbara County Parks) were approved by the Commission in 2000, 2001, and 2002 respectively, for construction of an annual

temporary winter sand berm at Goleta Beach in an attempt to protect upland park facilities from wave caused erosion. Although CDPs 4-00-193 and 4-01-136 only authorized construction of the berm for a single season, CDP 4-02-128 authorized the seasonal berm construction on a seasonal basis for a three-year period, which expired in spring of 2005.

In its previous approval of the permits for other sand berms at Goleta Beach, the Commission found that construction of the berm was consistent with the protection of coastal resources provided that a monitoring program for annual sand berm project activities was implemented to identify and assess any potential changes to the beach and shoreline resulting from the project. Therefore, **Special Condition Two (2)** requires the annual shoreline monitoring program to include monthly monitoring of the subject site, preparation of semi-annual beach profiles, and an annual report be prepared containing an analysis of any changes to beach width, elevation, sand volume, erosion trends and retreat that occur. Pursuant to **Special Condition Two (2)**, the applicant shall submit an annual report which provides the results of the long-term monitoring and details the annual project activities, such as the date, length of time of construction, quantity, location, method of construction, source of material, weather conditions, estimate of material eroded from the berm that triggered reconstruction or maintenance, and any issues or complaints regarding the project received by the public.

6. Hazards and Risk:

In addition, the Commission notes, based on the information submitted by the applicant, that the proposed development is located in an area of the Coastal Zone which has been identified as subject to waves and surges, high surf conditions, erosion, and flooding. As such, the Commission notes that evidence exists that the project site is subject to potential risk. Although the proposed development is intended to reduce the potential for damage to park facilities on site from wave caused erosion, there remains some inherent risk to coastal development and the construction of any type of shoreline protective device. The Coastal Act recognizes that certain types of development, such as the proposed project, 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 erosion, liquefaction, waves, flooding, and effects from sea level rise, the applicant shall assume these risks as a condition of approval. Therefore, **Special Condition Fifteen (15)** requires the applicant to waive any claim of liability against the Commission for damage to life or property which may occur as a result of the permitted development.

Therefore, for reasons discussed in the preceding section, the Commission finds that the proposed project, as conditioned, is consistent with Coastal Act Sections 30233, 30235, and 30253.

D. PUBLIC ACCESS/RECREATION

Coastal Act Section **30210** states that:

> ***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.***

Coastal Act Section **30211** 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.***

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.

The subject site is Goleta Beach County Park, an existing public recreational area in Santa Barbara County. An improved bicycle path (which is part of a larger regional bicycle trail system) crosses the park from west to east. In addition, public access is available throughout all areas of the park, including on the existing 1,500 ft. long recreational pier and along the entire length of the sandy beach on site. The park provides both sandy beach and upland park areas for public recreational use. Currently, development on the upland areas of the site consists of a restaurant, two public restrooms, outdoor showers, parking lots with 594 existing parking spaces, recreation lawn area, and extensively used picnic facilities. The County has indicated that Goleta Beach is the most important and widely visited public beach in Santa Barbara County. During calendar years 1998 and 1999, the park received 1,766,305 and 1,580,933 visitors, respectively. The period of heaviest use is from July through September (38 percent), followed by the period from April through June (22 percent). Twenty-one percent of visitors use the park from October through December and 18 percent use the park from January through March.

The proposed project and beach nourishment program would serve to enhance public recreational activities along the coast by creating a wider sandy beach area at the subject site that would be available for public access. Specifically, the proposed beach nourishment activities will not only provide additional protection for the existing public facilities located at Goleta Beach County Park from wave caused erosion (due to creation of a wider beach which, in turn, allows for greater dissipation of wave energy to occur) but the wider resulting beach would actually increase the area of the sandy beach available for public access and recreation. In addition, the proposed project includes the removal of approximately 1,500 linear ft. of existing rock revetment. Removal of this rock will also result in significant benefits to public access and recreation as sandy beach area that was previously occupied by the rock structure will be re-opened to public use.

Further, although the new piles for the permeable pier will be clustered more densely than the piles for the existing pier, it will still be possible for pedestrians to walk between the pilings. Moreover, to ensure that the denser configuration will not impede pedestrian traffic along the shoreline, the piles have been designed to incorporate a 10 ft. wide pedestrian opening, as shown on **Exhibits 15 and 16**. Thus, as proposed, this project will serve to maximize public access and recreational opportunities to the maximum extent feasible, consistent with Sections 30210 and 30211.

However, the proposed project may also result in potential temporary adverse effects to public access resulting from the closure of portions of the beach to public use during beach nourishment and construction activities. Operation of the dredge outlet pipe in the surf zone could have safety impacts to nearby swimmers and waders. To avoid potential safety impacts to beach users, the portion of the beach and water where beach nourishment activities occur will be closed to public access for the duration of the beach nourishment activities. Advisories will be posted on site by the County advising beachgoers of the potential elevated levels of fecal coli form in ocean waters during dredging activities.

As a result of the extensive public use of each site combined with the intrusive nature of the construction and beach nourishment activities, public access will be temporarily impeded by the proposed project and will result in some adverse effects to the public's ability to access the sandy beach since beachgoers would be required to avoid the nourishment areas during placement and grading, as well as staging areas. Though deposition activities within the project site would temporarily displace beach area for public use, the remainder of the surrounding beach area would be available for public access except during any park closures necessary to ensure public safety.

In addition, construction will be limited to the fall and winter months when visitor-use of Goleta Beach County Park is lowest. The Commission also notes that closure of portions of the beach to public use during spring and summer months (during maximum visitor-use of the park) would result in significant impediment to the public's ability to fully utilize the public beach areas on site. Therefore, in order to ensure that the applicant's proposal to limit construction/beach nourishment activities that could result in potential temporary impacts to public access is adequately implemented and to ensure that adverse effects to public access and recreation are minimized to the maximum extent feasible, **Special Condition Three (3)** specifically prohibits construction and beach nourishment activities, including all construction operations, and sand berm construction/removal during summer months between Memorial Day in May through Labor Day in September to avoid impacts on public recreational use of the beach and other public amenities in the project vicinity.

Furthermore, though the winter and early spring season is the appropriate time of year to implement project activities, given the mild climate, each of these sites are still expected to attract extensive public visitorship on any given weekend. Since Goleta beach is subject to higher levels of public use during weekends, sediment disposal/placement activities during these times would result in significant adverse impacts to public access. Therefore, to ensure that maximum access is maintained for

the public in the project area consistent with Coastal Act Section 30210, **Special Condition Three (3)** also requires that all construction operations, including any restrictions on public access, be prohibited on any part of the beach and shorefront in the project area on Saturdays and Sundays, thereby removing the potential for construction-related disturbances to conflict with weekend visitor activities. In this way, scheduling operations outside of peak recreational times will serve to minimize potential impacts on public access.

Furthermore, to ensure the safety of recreational users of the project site and to ensure that the interruption to public access of the project site is minimized, the Commission requires the applicant to submit a public access plan, pursuant to **Special Condition Fourteen (14)**, to the Executive Director for review and approval. **Special Condition Fourteen (14)** further requires a description of the methods (including signs, fencing, posting or security guards, etc.) by which safe public access to and around the receiver site shall be maintained during and after beach deposition activities. Where use of public parking spaces is unavoidable, the minimum number of public parking spaces (on and off-street) that are required at each receiver site for the staging of equipment, machinery and employee parking shall be used.

Therefore, the Commission finds that the proposed project, as conditioned, is consistent with Sections 30210, 30211, and 30251 of the Coastal Act.

E. MARINE RESOURCES AND ENVIRONMENTALLY SENSITIVE HABITAT

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.***

In regards to the new construction of shoreline protective devices that may alter natural shoreline processes, 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 **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.***

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. In addition, Section 30240 of the Coastal Act states that environmentally sensitive habitat areas shall be protected and that development within or adjacent to such areas must be designed to prevent impacts which could degrade those resources.

The majority of land within Goleta Beach County Park has been previously developed and is subject to significant daily human disturbance and activities from park visitors. As a result, natural habitat for native plants and animals is limited. Nonetheless, adjacent open areas (i.e., Pacific Ocean, Goleta Slough and its associated creeks, wetlands, and some areas of the sandy beach) contain important biological resources and provide habitat for several important plant and animal species. Although none of the proposed development (including the permeable pile sand retention system, offshore dredging, beach nourishment, and construction of the seasonal berm) will occur within any environmentally sensitive habitat areas (ESHA), several sensitive species (including western snowy plover, Beldings' savannah sparrow, steelhead trout, California grunion, and globose dune beetle) may potentially be located, at times, within or near the project area and could be adversely impacted from temporary construction impacts. Moreover, the existing coastal strand vegetation and wrack on the sandy beach within the project area both constitute important habitat for several coastal floral and faunal species.

Goleta Beach County Park is located adjacent to the Goleta Slough and its associated coastal salt marsh is designated environmentally sensitive habitat. The slough is the drainage basin for five creeks that originate on the southern slopes of the nearby Santa Ynez Mountains: Atascadero Creek, San Jose Creek, San Pedro Creek, Carneros Creek, and Tecolotito Creek. Historically, Goleta Slough was a relatively deep water lagoon environment. Since the 1850's, progressive sedimentation from these five creeks have transformed the Goleta Slough from a deep water wetland habitat to a

shallow coastal salt marsh crossed by numerous tidal channels. The Goleta Slough provides perennial and seasonal habitat for several endangered and sensitive wildlife species including Belding's Savannah Sparrow, Steelhead trout, White-tailed kite, light-footed clapper rail, snowy plover, heron, egret, and at least 26 other bird species. The Belding's Savannah Sparrow is a State Endangered species. According to the Goleta Beach County Park Environmental Carrying Capacity Study and Management Plan, savannah sparrows are permanent residents in the Goleta Slough wetlands and occasionally use outlying areas. In the case of the proposed project, no development is proposed within the slough or adjacent to any wetland areas.

Coastal Strand Habitat

Coastal strand habitat has been identified along the backbeach of the subject site (in the narrow transition zone between the upland areas of the park and the sandy beach). Coastal strand is a plant community that occurs on the upper beach above the swash zone. It is comprised of plant species that are adapted to harsh sandy beach conditions and is the zone of early successional dune vegetation. Coastal strand is considered a community of special concern and a healthy, intact coastal strand community is known to support several animals such as the silvery legless lizard (*Anniella pulchra pulchra)* and the globose dune beetle (*Coelus globosus*), both California species of special concern, and a number of plants including beach saltbush (*Atriplex leucophylla),* sand verbena (*Abronia umbellata),* beach bur (*Ambrosia chamissonis),* and non-native and non-invasive sea rocket*, Cakile maritima*.

In the case of the proposed project, the applicant's biological consultants have indicated that there is less than 0.3 acres of coastal strand (located on the western end of Goleta Beach containing a mixture of native and non-native species) that will be impacted by the proposed project activities. This onsite community of strand is marginal and does not constitute ESHA due, in part, to historic and continued disturbance associated with park use. Regardless, the proposed project would result in several temporary adverse impacts to the disturbed coastal strand vegetation located on site. For instance, a sparse population of coastal strand vegetation has re-established between the rocks of the existing approximately 1,500 linear ft. of rock revetment along the upcoast end of the park. The proposed removal of the as-built rock revetment would result in the temporary removal of the coastal strand vegetation in that area of the beach; however, the removal of the rock would also serve to significantly improve the quality of this existing habitat for coastal strand in the long-term by providing additional sandy beach area for coastal stand to recolonize. Additionally, the placement of sand on the beach for the purpose of beach nourishment would also result in short-term impacts to coastal strand vegetation. However, in the long-term, the creation of a wider beach would also ultimately serve to actually improve the quality of this existing habitat for coastal strand by providing additional sandy beach for the coastal strand vegetation to recolonize.

In addition, Commission staff has confirmed pursuant to recent site visits to the site that coastal strand vegetation is also present on the sandy beach immediately seaward of the downcoast parking lot. The coastal strand vegetation at this downcoast location has also colonized between the rocks of the existing rock revetment which the applicant is proposing to repair. As proposed, all new rock would be placed landward of the existing toe of the downcoast; thus, no coastal strand vegetation located seaward of the

revetment should be significantly impacted. However, the proposed repair would impact the existing coastal strand vegetation which has colonized between the rocks of the revetment itself. Further, annual construction of the proposed seasonal sand berm for a period of five years will also result in potential disturbance to the coastal strand vegetation.

In the case of the proposed project, although the coastal strand vegetation on site does not constitute ESHA, this plant community still constitutes an area of special biological significance within the marine and beach environment. Section 30230 of the Coastal Act specifically requires that protection shall be given to areas of special biological significance, such as coastal strand. Thus, the Commission finds that although the proposed project, in the long-term, would provide increased opportunities for the expansion of coastal strand habitat on site due the creation of a widened beach on site, the project would still result in the temporary loss or disturbance to existing habitat due to construction/demolition, beach nourishment, and installation of the seasonal sand berm. Moreover, even temporary impacts to coastal strand habitat may result in delays in the re-establishment of the plant community in the future if significant areas of the project site are devegetated and/or if the seedstock is removed. Therefore, in order to ensure that any potential adverse effects to coastal strand habitat from construction activities are minimized, **Special Condition Twelve (12)** requires prior to issuance of the coastal development permit, the applicant the applicant to implement a Coastal Strand Habitat Restoration and Monitoring Program**. Special Condition Twelve (12)** requires revegetation and restoration of all areas of existing coastal strand habitat on site that will be temporarily disturbed by the project, including removal of the approximately 1,500 ft. long rock revetment at the upcoast end of the park, repair of the existing rock revetment at the downcoast end of the park, initial and supplemental beach nourishment activities, and from seasonal sand berm construction/removal. Further, **Special Condition Twelve (12)** requires the applicant's biological consultant collect coastal strand plant and seeds that would be disturbed by the project activities prior to the initial beach nourishment/revetment removal activities for use in restoration of the coastal strand community.

In addition, the Commission notes that coastal strand habitat areas located downcoast of the proposed permeable pier sand retention system could potentially be adversely impacted (due to loss of habitat area) if increased erosion of those beach areas occurs. As discussed in greater detail in the preceding sections of this report, the project has been specifically designed to maintain existing sediment supplies to all areas downcoast of the project site, in part, to ensure that no changes occur to beach and marine habitat areas downcoast of the project site. One of the primary goals of the project will be that the volume of beach quality sediment that is exchanged between the area of the coast upcoast of the existing pier and the downcoast areas will be maintained. Further, **Special Condition Two (2)** requires that an extensive monitoring and adaptive management program be established to monitor all changes in shoreline conditions on site and in downcoast areas, report any changes, and respond promptly and pro-actively to correct these changes. Thus, as conditioned, the project would serve to minimize the potential for adverse effects to coastal strand habitat located on, or downcoast of, the project site.

Noise Impacts to Wildlife

The applicant's coastal engineering consultants have indicated that, as a result of the proposed project, the sandy beach at Goleta Beach should increase to approximately 200 ft. in width over the next several years. The increased sand cover, resulting from both the initial placement of 500,000 cu. yds. of sand on the beach and in the surf zone and the long-term increase in beach width would not encroach into any sensitive offshore habitat areas including, kelp forest, eel grass, or surf grass habitat areas and is, therefore, not expected to result in any adverse effects to these sensitive habitat areas. However, the proposed project, including beach nourishment activities and installation of the permeable pier sand retention system would still have the potential to adversely impact those species from impacts during construction activities. Species present in the project area and vicinity include western snowy plover, Beldings savannah sparrow, steelhead and California grunion.

In particular, the effects of construction noise upon birds are not well known; however, significant noise levels may impact birds in a number of ways. Continuous noise above the ambient environment or single or multiple loud impulse noises may produce changes in bird foraging and reproductive behavior; mask signals birds use to communicate; mask biological signals impairing detection of sounds of predators and/or prey; decrease hearing sensitivity temporarily or permanently; and/or increase stress and alter reproductive and other hormone levels.[3] Dooling and Popper prepared a review report in 2007 for Caltrans titled, "The Effects of Highway Noise on Birds".[4] In this report they review the literature for studies that evaluate the impacts of traffic and construction noise on birds. They list three classes of potential effects of noise on birds: (1) physiological and behavioral effects; (2) damage to hearing from acoustic over-exposure; and (3) masking of important bioacoustic and communication signals all of which may also lead to dynamic behavioral and population effects.

Much of the information regarding impacts of noise on birds has been extrapolated from studies involving the influence of noise on humans and other mammals. A relatively small number of studies have focused directly on impacts of noise on birds and those studies have been performed on a limited number of bird species; to date no studies of noise impacts have been performed on wading bird species. Dooling and Popper (2007) state that, "Generally, humans have better auditory sensitivity (lower auditory thresholds) both in quiet and in noise than does the typical bird." Mammals in general have much greater auditory sensitivity than birds. Birds are more resistant to both temporary and permanent hearing loss or to hearing damage from acoustic overexposure than are humans and other mammals that have been tested.[5]

Sixty decibels (60 dB) is a widely used threshold for projects involving heavy equipment in areas supporting sensitive bird species. This threshold criterion is used by many

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[3] Longcore, T. & C. Rich. 2001. A Review of the Ecological Effects of Road Reconfiguration and Expansion on Coastal Wetland Ecosystems. The Urban Wildlands Group

[4] Dooling, R.J. & A.N. Popper. 2007. The Effects of Highway Noise on Birds. Prepared for: The California Department of Transportation, Division of Analysis. Prepared by: Environmental BioAcoustics LLC, Rockville, MD

[5] Op. Cit. Dooling & Popper 2007

agencies and consultants as the noise threshold, above which, birds may be adversely impacted. While this decibel range appears to be widely accepted and employed for projects involving potential noise impacts upon birds, its use is without well founded scientific justification.[6] Noise levels in quiet outdoor rural areas range from 40 to 45 dB(A)[7] and from 50-55 dB(A) in quiet suburban areas.[8] The 60 dB criterion stems from taking average ambient environment noise measurements and determining at what noise level, beyond that measured in the natural environment, would one expect to see adverse effects on avian vocal communication.[9] While this criterion is valuable as a starting point for it is conservative and protective, ambient environment noise levels must also be analyzed and figured into the decibel thresholds applied to projects on a case by case basis. Rural areas will have much lower exposure to significant ambient noise compared to urban areas. And while all projects have specific and unique circumstances, those with the potential to adversely impact sensitive bird species due to increased noise levels must minimize those noise impacts to the maximum extent possible.

Dooling and Popper, in their 2007 report, present a table with guidelines for potential noise effects on birds at relative distances from the source based on a synthesis of the available literature. Hearing damage can potentially result from single impulses at or above 140 dB(A) or multiple impulses at or above 125 dB(A) when birds are close to the source. At greater distances from the noise source, where noise levels fall below 110 dB(A), birds may experience a temporary loss of hearing (known as a temporary threshold shift) from continuous noise above 93 dB(A). Masking may occur at decibels above and below 93 dB(A) depending on ambient noise levels. At even greater distances from the noise source, where the noise is still above ambient levels, masking may occur. Dooling and Popper suggest that noise levels below 50 to 60 dB(A) are unlikely to cause masking.

Although 60 dB is the noise threshold widely used for projects involving heavy equipment in areas supporting sensitive bird species, this criterion is not always warranted or attainable. Threshold noise values must be considered on a case by case basis. The setting of the proposed work is a popular beachside park that experiences heavy use patterns by beachgoers, noise from vehicle traffic and parking, and associated noise from the nearby highway. In previous coastal development permit actions involving development in similar areas, including CDP 5-08-242 (County of Los Angeles Department of Public Works) and CDP 4-07-116 (Caltrans), the Commission has typically found that 85 dB is an appropriate threshold noise levels at construction sites in order to minimize impacts to adjacent to environmentally sensitive habitat areas. Further, given Dooling and Popper's 2007 review findings that, while masking may

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[6] James, R.A. 2006. California innovation with highway noise and bird issues. In: Proceedings of the 2005 International Conference on Ecology and Transportation, Eds. Irwin CL, Garrett P, McDermott KP. Center for Transportation and the Environment, North Carolina State University, Raleigh, NC: p. 569.

[7] dB(A) – a weighted decibel average

[8] Ouis, D. 2001. Annoyance from road traffic noise: a review. Journal of Environmental Psychology. Vol. 21, pgs. 101-120.

[9] Op. Cit. Dooling & Popper 2007

occur below 93 dB, it is noise above this level that presents real problems for birds. In addition, given the fact that birds, like humans, are known to compensate in a number of behavioral and physical ways to ambient noise[10]; Commission staff have determined that 85 db is an appropriate noise threshold to apply to this project given the high ambient noise levels at the project site. Therefore, **Special Condition Ten (10)** requires that noise generated by construction (including, but not limited to, pile driving) shall not exceed **85 dB** at any active nesting site for black-crowned night herons, snowy egrets, great egrets, great blue herons, raptors, or other sensitive species in or near the project site. If construction noise exceeds 85 dB sound mitigation measures such as sound shields, blankets around smaller equipment, mixing concrete batches off-site, use of muffler, and minimizing the use of back-up alarms shall be employed. If these sound mitigation measures do not reduce noise levels, construction within 300 feet of the nesting trees shall cease and shall not recommence until either new sound mitigation can be employed or nesting is complete.

Further, to ensure that adverse impacts from noise do not occur to sensitive nesting bird species, **Special Condition Nine (9)** requires the applicant's environmental resource specialist to conduct surveys of trees and beach areas on and adjacent to the project site (within 300 feet of any construction activities), just prior to any construction activities and once a week upon commencement of construction activities that include grading/beach nourishment, or use of other heavy equipment, and that will be carried out between **December 1st and September 30th**, inclusive. Such surveys shall identify the presence, nests, and eggs or young, of black-crowned night herons, snowy egrets, great egrets, great blue herons, raptors, western snowy plover, Belding's savannah sparrow, or other sensitive species in or near the project site. All surveys shall be submitted to the Executive Director of the Coastal Commission.

Moreover, pile driving to install the piles of the permeable pier sand retention system has the potential to adversely impact marine life, including fish and marine mammals. The noise and activity of construction may alter the behavior of fishes in the immediate vicinity of Goleta Pier or cause them to avoid the construction area temporarily. In addition, noise associated with pile driving may also disturb marine mammals. National Marine Fisheries Service (NOAA Fisheries) has adopted 160 dB as an acceptable level of impulsive underwater sound. Based on available scientific evidence, acoustic harassment of marine mammals would not be expected to occur below this conservative level. The DEIR prepared by Chambers Group for the project includes analysis of a similar project involving installation of 16" – 20" inch piles for a wharf and boat launch in Moss Landing Harbor (Lecky 2006). The noise levels for the Moss Landing pile installation was between 165 and 175 dB at 33 feet and 155 to 170 dB at 66 ft. These sound levels would be expected to attenuate to below 160 dB by 333 feet from the source. Thus, in the case of the proposed project, the pile driving operations may exceed the 160 dB threshold within a few hundred feet from the construction operations.

[10] Op. Cit. Dooling & Popper 2007

In addition, the DEIR for the project also indicates that acoustic monitoring was done during pile driving operations to install the new Bird Island platforms offshore Ellwood to the west of Goleta Beach County Park (Howarth 2006). Both a conventional pile driver and a vibratory pile driver were used at different times during construction. The Bird Island Project involved driving 30-inch diameter piles into bedrock and required a larger pile driver than would be expected for installation of the permeable pile pier. The conventional pile driver emitted sounds as high as 178 dB. The vibratory pile driver was generally quieter with a sound of 147 dB at a distance of 1,350 ft, although sounds as high as 179 dB were recorded. No mortality of any wildlife was noted following any pile driving operation. The DEIR further indicates that marine mammal monitors were present during caisson repair on an oil pier at Ellwood (City of Goleta 2006). A 500 ft safety zone was established for marine mammals. During the pile driving activities, monitors never observed any marine mammals within the 500 ft safety zone, nor did they observe changes in the movement or behavior of more distant individuals that would indicate any reaction to pile driving noise. However, the DEIR also found that the proposed project would still have the potential to result in adverse impacts to marine life. The DEIR states, in part, that"

> ***Although no adverse impacts to marine mammals were noted during recent pile driving operations in the Santa Barbara County nearshore area, pile driving or hammering may have the potential to exceed the 160 dB limit established as the limit to avoid acoustic harassment of marine mammals. Harassment of marine mammals by noise is a potentially significant (Class II) impact. The federal threatened southern sea otter has been observed at Goleta Bay and could be disturbed by the noise of pile driving.***

The applicant has indicated that noise associated with pile driving activities is expected to be below 160 dB at 300 or more feet from the project and that this level is expected to avoid impacts to marine mammals. However, the existing Goleta Pier also serves as an important habitat for many fish species which congregate around the pier itself. Thus, adverse impacts from loud noise will occur to these fish species if sounds levels from pile driving activities are excessive. In previous permit actions involving pile driving projects in coastal waters, including CC-074-05 (Caltrans), CDP 1-06-022 (Caltrans), and CDP 3-08-025 (Virg's, Harbor Hut, and The Great American Fish Company) the Commission has found that high pressure level impacts resulting from loud noise can, in some instances, kill fish and marine mammals and that the appropriate threshold for minimizing impacts to fish is to limit underwater noise levels to no more than 187 dB SEL accumulated and 206 peak dB. Noise levels above these thresholds may result in increased fish and marine mammal mortality rates. Thus, in order to minimize adverse impacts to fish and marine mammals, **Special Condition Ten (10)** requires that underwater noise generated by pile driving activities shall not exceed an accumulated **187** dB SEL as measured 5 meters from the source. At no time shall peak dB SEL rise above **206** at 10 meters from the source. If construction noise exceeds the above thresholds, then alternative methods of pile driving (including, but not limited to, vibratory pile driving, press-in pile placement, drilling, dewatered isolation casings, etc.) or other sound mitigation measures (including, but not limited to sound shielding and other noise attenuation devices) shall be used as necessary to achieve the required dB threshold levels. Further, Special Condition Nine (9) requires that hydro acoustical monitoring shall be performed to ensure that underwater noise generated by pile driving activities shall not exceed an accumulated **187** dB SEL as measured 5

meters from the source and that at no time shall peak dB SEL rise above **206** at 10 meters from the source. The applicant shall consult with the United States. Fish and Wildlife Service and NOAA Fisheries to development a monitoring program that meets this objective. The applicant shall submit a hydro acoustical monitoring plan for the review and approval of the Executive Director, prior to the commencement of pile driving activities.

In regards to minimizing impacts to marine mammals, the County's DEIR indicates that underwater noise levels should not exceed 160 dB. The applicant has indicated that noise associated with pile driving activities is not expected to exceed 160 dB at 300 or more feet from the project and that this level is expected to avoid impacts to marine mammals. Therefore, to ensure that adverse impacts from noise do not occur to marine mammal species due to acoustic impacts resulting from pile driving activities, **Special Condition Ten (10)** requires that the underwater noise generated by pile driving activities shall not exceed 160 dB at 300 or more feet from the project. If construction noise exceeds the 160 dB threshold, then alternative methods of pile driving (including, but not limited to, vibratory pile driving, press-in pile placement, drilling, dewatered isolation casings, etc.) or other sound mitigation measures (including, but not limited to sound shielding and other noise attenuation devices) shall be used as necessary to achieve the required dB threshold level. In addition, **Special Condition Nine (9)** requires the applicant's environmental resource specialist to be present during all pile driving or hammering operations to ensure that a safety radius of no less than 500 ft. be maintained on the seaward side of the Pier to serve as a protection zone for marine mammals. The size of the safety radius may be increased based on further consultation with NOAA Fisheries. If marine mammals are observed to enter this safety zone, all pile driving activities shall cease immediately until all marine mammals have vacated the safety zone. No pile driving shall occur if the visibility of the observers is less than the 500 feet radius.

Dredging and Beach Nourishment Operations

As discussed in detail in Section IV.C. (Hazards and Shoreline Processes) of this report, in order to establish equilibrium conditions and thus potentially avoid downcoast erosion, the proposed project includes pre-filling the beach west of Goleta Pier with approximately 500,000 cubic yards of sand. The sand for this beach nourishment is to be supplied by dredging an area with sand-sized sediments approximately one mile offshore Goleta Beach. To avoid potential impacts to kelp, the dredging area would be in water depths between 60 to 70 feet, which is beyond the 55 foot depth of historic kelp beds in Goleta Bay. Sand would be dredged with a hopper dredge to a depth of between 5 and 15 feet.

The marine habitat offshore Goleta Bay was surveyed in 1991, 2000, 2002, 2003 and 2005 and the information from those surveys was incorporated into Chambers Group's environmental impact analysis[11]. Based on those surveys, it was determined that

[11] Chambers Group. January 2008. Goleta Beach Park Coastal Access and Recreation Enhancement – Beach Sand Stabilization – Environmental Analysis and Public Response. Prepared for Santa Barbara County Parks by Chambers Group Inc. in association wit Moffat & Nicholl and Rincon Consultants, Inc.

dredging offshore Goleta Bay at depths beyond 60 feet would avoid impacts to sensitive biological resources, specifically beds of giant kelp (*Macrocystis* spp) and eelgrass (*Zostera pacifica*). To verify this conclusion Chambers Group conducted an underwater survey of the proposed borrow area on September 24, 2008[12].

The proposed dredging area is typical of offshore soft bottoms at 60 to 70 foot depths. The September 2008 survey as well as the 2002 survey indicated that kelp density is very low at depths beyond 55 feet. The September 2008 survey results support the conclusion of the environmental impact analysis[13] that dredging at the proposed borrow site will not adversely affect kelp or eelgrass beds.

The September 2008 transect survey results show that the proposed dredge area consists of sand bottom inhabited sparsely by epifaunal invertebrate species typical of offshore sand bottoms at these depths including the sea stars, *Pisaster brevispinus* and *Asterina miniata*, the sea cucumber, *Parastichopus parvimensis*, the snail, *Kelletia kelleti*, and the sea anemone, *Pachycerianthus fimbriatus*. The most abundant macroinvertebrate was the sea pen, *Virgularia californica*. The results of the September 2008 infaunal and sediment core analysis support the conclusions of the environmental impact analysis[14] that the infaunal community in the proposed dredge area is relatively diverse and typical of sand bottoms at about 60 foot water depth off mainland southern California. The samples were dominated by polychaete worms as expected and also included a number of species of bivalves, crustaceans, cnidarians, and nemerteans. No rare or unique species were observed in either the epifaunal of infaunal communities. Dr. Jonna Engel, the Commission's staff ecologist, has reviewed the applicant's biological analysis of the proposed dredging source area and concurs that the dredging poses a temporary disturbance and the epifaunal and infaunal communities are expected to attain full recovery from dredging within 6 months to two years and to begin to recovery almost immediately, with settlement of larvae and immigration of mobile species from nearby unaffected areas.

Moffat and Nichol[15] submitted a plan for sand dredging whereby dredging would be phased to reduce biological impacts. In the plan the initial 500,000 cubic yards for beach nourishment will be taken from the western half (20 acres in area) of the dredge area (40 acres in size). Thus, the eastern half of the area will be available for subsequent nourishment events, should they be necessary, which are estimated to consist of 100,000 cubic yards of sand that will be dredged section by section (phased dredge areas A-E) approximately every five years. This phased approach is an effective way of reducing biological impacts.

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[12] Davis, Noel. November 2008. Updated Survey of Proposed Borrow Area off Goleta Bay and Addendum to Environmental Analysis. Prepared for Santa Barbara County Parks by Chambers Group.
[13] Chambers Group (Jan. 2008) op cit.
[14] Chambers Group (Jan. 2008) op cit.
[15] Moffat & Nichol. March 2009. Revised Draft Guideline Document Adaptive Management Plan for the Goleta Beach Park Coastal Access and Recreation Enhancement – Beach Sand Stabilization Project, Figure 3, Phased Dredge Plan Offshore Goleta Beach.

The applicant is proposing that the dredging could be performed by either a cutter/section dredge barge or use of a hopper dredge. A cutter/suction dredge barge has an attached suction pipe with a rotating cutterhead that is moved across the ocean bottom within the borrow site. The cutterhead serves to excavate and loosen the bottom material. Material is then suctioned onto the floating dredge barge. Onboard equipment would then hydraulically pump the material through a temporarily installed discharge pipe to the receiving site (Goleta Beach). The discharge pipe would consist of a floating portion that trails behind the barge through the dredge area and a fixed submerged portion lying on the ocean bottom that surfaces and terminates at Goleta Beach. The pipeline would be located so that the floating section traverses the narrowest parts of the existing kelp bed.

Alternatively, a hopper dredge has an attached arm with a suction pipe that drags along the ocean bottom within the borrow site. The material is suctioned onto the floating barge and deposited onboard in the hopper (storage) bins. The hopper dredge self-propels within the borrow site until the hopper bins are full. The hopper dredge would then travel to a mooring location directly offshore of Goleta Beach. At this location, the hopper dredge would connect to a temporarily installed submerged pipe, and the onboard dredge material would be pumped onto Goleta Beach or into the Goleta Beach surf zone.

For both dredging methods, the dredge material would be discharged into swales (fill dikes) constructed on the beach. The slurry mixture from the discharge pipe would fill the swale and excess seawater would be discharged out into the surf zone. The swale would be lengthened along the beach as needed, or new swales constructed, as sections of it are filled. Bulldozers would then be used to smooth the site to create an appropriate beach gradient. Total construction time for dredging and initial beach nourishment activities would be approximately three months.

The biological surveys submitted by the applicant indicate that eelgrass occurs in depths between 18 and 40 ft off Goleta Beach, and giant kelp recruits throughout much of the area. The only persistent kelp bed is to the east of Goleta Pier. Placement of a pipe on the bottom between the dredge and the beach to pump sand onto the beach has the potential to disturb kelp and eelgrass habitat. Eelgrass and kelp plants could be crushed by the pipe and abraded by the side-to-side movement of the pipe as it is placed and removed from the bottom. The pipeline route would avoid the kelp bed to the east of the Pier, but eelgrass habitat and individual kelp plants may be disturbed. The DEIR prepared by Chambers Group for the project found specifically found that the amount of kelp and eelgrass habitat that would be potentially disturbed would be much greater for the cutterhead option, which would pump sand directly to the beach from the borrow site. The DEIR states:

> ***The amount of kelp and eelgrass habitat that could be disturbed would be much greater for the cutterhead option, which would pump sand directly to the beach from the borrow site. For the cutterhead option, the dredge site would be between 1 and 2 miles from shore. Assuming that placement of the pipeline could disturb a swath of as much as 10 ft along its length, the amount of potential kelp and eelgrass habitat that could be disturbed would be about 0.8 acres. For the hopper dredge option, the dredge would be positioned***

> ***closer to shore and the pipeline would be much shorter. The potential kelp and eelgrass habitat that might be impacted by pipeline placement and barge anchors for the hopper dredge option would be less than 0.2 acres.***

The DEIR also found that kelp and eelgrass habitat is patchy off Goleta Beach, so the actual amount of these resources that might be affected by temporary pipeline placement would likely be significantly less than the maximum potential habitat that could be affected. However, based on this analysis, it is clear that the use of the cutterhead option would potentially result in significantly greater adverse impacts to eelgrass than the use of the hopper dredge method, which is a feasible alternative. Therefore, in order to ensure that adverse effects to eelgrass habitat and marine resources are minimized, **Special Condition Seven (7)** requires that all offshore dredging operations be conducted using a hopper dredge only and that the use a cutter head dredge shall be prohibited. In addition, **Special Condition Thirteen (13)** requires that an underwater survey for kelp and eelgrass shall be performed by a qualified marine biologist(s) prior to the initiation of any dredging/beach nourishment activities. Based on the pre-construction survey, a pipeline route shall be selected that minimizes contact with eelgrass and kelp habitat. If any eelgrass is identified within any portion of the pipeline route by the initial survey, within one month after the conclusion of dredging activities, the applicant shall survey the project site to determine if any eelgrass was adversely impacted. The applicant shall submit the post-construction eelgrass survey for the review and approval of the Executive Director within thirty (30) days after completion of the survey. If any eelgrass has been impacted, the applicant shall replace the impacted eelgrass at a minimum 1.2:1 ratio in accordance with the Southern California Eelgrass Mitigation Policy. All impacts to eelgrass habitat shall be mitigated at a minimum ratio of 1.2:1.

In addition, to ensure that any potential adverse effects to sensitive marine areas and beach environment are minimized during actual beach nourishment activities resulting form the placement of dredged material on the beach and in the surf zone, **Special Condition Nine (9)** requires that a qualified biologist or environmental resource specialist shall conduct a survey of the project site each day prior to commencement of any beach nourishment activities to determine whether any sensitive wildlife species are present. In the event that any sensitive wildlife species are present on the project site (including but not limited to western snowy plover, Belding's savannah sparrow, California grunion, steelhead trout) exhibit reproductive or nesting behavior, the environmental specialist shall require the applicant to cease work, and shall immediately notify the Executive Director and local resource agencies. Project activities shall resume only upon written approval of the Executive Director. The monitor(s) shall require the applicant to cease work should any breach in permit compliance occur or if any unforeseen sensitive habitat issues arise. The monitor(s) shall immediately notify the Executive Director if activities outside of the scope of this coastal development permit. If significant impacts or damage occur to sensitive wildlife species, the applicant shall be required to submit a revised, or supplemental program to adequately mitigate such impacts. The revised, or supplemental, program shall be processed as an amendment to this coastal development permit.

In addition, the Commission notes that the sandy beach on the subject site has been identified as a potential grunion spawning location. Beach nourishment activities are not proposed to occur within the seasonally predicted run period and egg incubation period of the California grunion. However, the Commission notes that any potential placement of new sand material into the surf zone or on the beach may result in adverse effects to grunion due to direct disturbance by construction activity and use of heavy equipment on the sandy beach as well as indirect impacts from smothering of eggs previously deposited on the sandy beach. Therefore, in order to ensure that any potential adverse effects to grunion are avoided, **Special Conditions Three (3)** and **Special Condition Nine (9)** prohibit any beach nourishment activities from occurring on any part of the beach and shorefront in the project area when California grunion (including eggs) are present during any run periods and corresponding egg incubation periods. Further, in order to ensure that adverse impacts to the above referenced sensitive species are avoided, **Special Condition Nine (9)** also requires a qualified biological monitor to be present during all project activities. The monitor shall have the authority to cease operations should any breach in permit compliance occur or if any unforeseen sensitive habitat issues arise. If significant impacts or damage occur to sensitive wildlife species, the applicant shall be required to submit a revised, or supplemental program to adequately mitigate such impacts. The revised, or supplemental, program shall be processed as an amendment to this coastal development permit.

In addition, the applicant has submitted information that previous testing by County staff of material to be used for beach nourishment that was previously carried out and determined that those sediments meet federal and state beach nourishment and spoil discharge criteria, including physical and chemical testing. However, the Commission notes that because this project will occur over an extended period of time and that water and sediment quality in creeks may change over time due to changed conditions resulting from new upstream development or potential new non-point source pollution impacts, that continued testing of all excavated material to determine suitability for beach deposition is necessary to minimize potential adverse impacts to the marine environment. Therefore, in order to ensure the long-term protection of marine resources, **Special Condition Eight (8)** requires that all dredged material meet federal and state beach nourishment and spoil discharge criteria, including physical and chemical testing prior to beach surfzone deposition. Additionally, **Special Condition Two (2)** requires pre- and post-construction monitoring of the shoreline project areas, including beach width and sand volume changes. This information will be important to assess the project and its potential to affect plover habitat as well as evaluate the overall success of the project to meet its goals.

Further, the placement of new sand and sediment material on the beach and within the surfzone is expected to result in increased turbidity at the subject site. Temporary increases in turbidity and suspended solids decrease light penetration, causing a decline in primary productivity due to decreased photosynthesis by phytoplankton and may result in adverse impacts to marine organisms. Specifically, any appreciable turbidity increase may also cause clogging of gills and feeding apparatuses of fish and filter feeders. Turbidity impacts are anticipated to have the maximum concentrations generally restricted to the lower water column, and decreasing rapidly with distance due

to settling and dilution. However, the impacts of surfzone and beach fill placement activities (i.e., increased turbidity, sedimentation, dissolved oxygen reduction, burial of organisms) are expected to be relatively localized in nature and mobile organisms would likely relocate to an undisturbed area. Following deposition activities, organisms are expected to recolonize previously disturbed areas. Thus, impacts from sediment re-suspension caused by pile installation/removal and beach nourishment activities are anticipated to be short-term in duration. In addition, the subject site is located in an area that is considered to have naturally high levels of turbidity due to high wave energy and creek/slough outfall, particularly during the winter season when operations would take place.

In addition, the composition (i.e., grain size) of the deposition material can also affect the marine environment. For instance, material with higher fine-grained material content will contribute to higher rates of turbidity (see above discussion of turbidity impacts) and will have higher likelihood of containing contaminants. In general, the higher the amount of coarse grained sand, the lower the turbidity and associated risks to offshore resources and productivity. As a result, the grain-size of the material is an important design characteristic of the project. Therefore, in order to ensure that only appropriate material is deposited on the beach and within the surfzone and marine environment, **Special Condition Eight (8)** addresses the placement of course-grained material at the deposition sites. Using the Wentworth Classification, cobble-sized material or larger (>64 mm; approx. = 2.5 in) shall not be placed at the deposition site at anytime. Although it is recognized that there may be occasional deposits of course grained material that is gravel or pebble-sized material (2 mm – 64 mm), **Special Condition Eight (8)** requires that of the coarse grained material (retained on a Standard U.S. Sieve Size No. 200), no more than 0.5 percent shall consist of gravel or pebble-sized material. Source material meeting all applicable federal and state beach nourishment requirements, and for which an average of 75% or more of the material is coarse grained (retained on a Standard U.S. Sieve Size No. 200), may be deposited below the mean high tide for the purpose of beach nourishment. Source material meeting all applicable federal and state beach nourishment requirements, and for which an average of 90% or more of the material is coarse grained (retained on a Standard U.S. Sieve Size No. 200), may be deposited above the mean high tide line for the purpose of beach nourishment.

Further, the Commission notes that the applicant is requesting to place a significant volume of material on the beach and within the surfzone at Goleta Beach (500,000 cu. yds. of material initially and the periodic placement of quantities not to exceed 100,000 cu. yds. on a yearly basis). The Commission previously approved CDP 4-02-074 (BEACON) for the placement of 100,000 cu. yds./year of sediment at Goleta Beach and CDP 4-05-139 (Santa Barbara County) for the placement of a maximum of 200,000 cu. yds./year of sediment for purposes of beach replenishment (thus already allowing for a potential cumulative total of 200,000 cu. yds. of material/year to be deposited at the subject beach). Since the proposed project includes potential periodic beach nourishment of up to 100,000 cu. yds. of material/year, after the initial placement of sand material, it must be noted that in combination with the other above referenced previously approved beach replenishment projects, approval of this permit, as proposed, could potentially allow for the combined discharge/placement of a combined

total of 300,000 cu. yds. of material/year in the surfzone; allowing for deposition of more material on an annual basis than has been separately analyzed under any of these separate permit applications. The Commission notes that the cumulative impacts from the combined projects are not known. However, County staff have indicated that it is not the County's intention to implement all of the nourishment activities by these projects separately from each other and in a manner that would exceed more than 200,000 cu. yds./year of total deposition at Goleta Beach is currently envisioned.

Therefore, in order to ensure that the cumulative effects of the development authorized by this permit and by other previously approved coastal permits for similar beach nourishment projects at the project site, are not inadvertently greater than have been analyzed separately under any single application, **Special Condition Two (2)** limits the total amount of sediment/beach replenishment material that is deposited at Goleta Beach (after the initial placement of 500,000 cu. yds. of beach nourishment material pursuant to this permit) from all cumulative sediment disposal/beach replenishment projects (including, but not limited to, all deposition activities implemented pursuant to Coastal Development Permits 4-05-139 and 4-02-074) to no more than 200,000 cu. yds. of sediment/year. Further, **Special Condition Two (2)** further requires that in the event that supplemental beach nourishment is necessary after the initial placement of 500,000 cu. yds. of material, then material from offshore dredging shall only be utilized when adequate quantities of donor sand material is not readily available as part of other approved programs for placement of sand at Goleta Beach, including use of material generated as part of the ongoing opportunistic beach nourishment program previously approved by the Commission pursuant to CDP 4-02-054 (BEACON) and CDP 4-05-139 (Santa Barbara Flood Control) or similar projects approved by the Commission pursuant to a separate coastal development permit.

The beach and marine environment could also be adversely impacted as a result of the implementation of project activities by unintentionally introducing sediment, debris, or chemicals with hazardous properties. To ensure that construction material, debris, or other waste associated with project activities does not enter the water, the Commission finds **Special Condition Seven (7)** is necessary to define the applicant's responsibility ensure proper disposal of solid debris and material unsuitable for placement into the marine environment. As provided under **Special Condition Seven (7)**, it is the applicant's responsibility to ensure that the no construction materials, debris or other waste is placed or stored where it could be subject to wave erosion and dispersion. Furthermore, **Special Condition Seven (7)** assigns responsibility to the applicant that any and all construction debris, sediment, or trash shall be properly contained and removed from construction areas within 24 hours. Further, construction equipment shall not be cleaned on the beach or in the beach parking lots.

Moreover, the Commission finds that the proposed permeable pier sand retention system is an experimental effort. The applicants have provided anecdotal evidence of coastal piers, such as the Huntington Beach Pier that has retained sand around the existing pier, or at Oil Piers where the beach experienced significant erosion when the piers were removed as part of the lease decommissioning; however, there are no pier projects that have been designed. The Commission finds that the proposed project, as

conditioned, will serve to minimize adverse effects to existing habitat and wildlife resources on site while meeting necessary shoreline protection requirements. However, the Commission also finds that the marine and beach environment within the project site area are dynamic systems that are subject to potential changes over time as new species migrate into the area or as potential unidentified impacts from the proposed dredging operation may be discovered over time. Therefore, due to the experimental nature of the proposed project and in order to ensure that any potential changed circumstances which may be discovered at some future point in time, such as new information regarding sensitive habitat and wildlife resources on site or new impacts from the dredging project, are considered, **Special Condition One (1)** specifically limits the duration of all activities approved by this permit (retention of the permeable pier sand retention system) to a period of no more than ten (10) years from the date of Commission action. Specifically, **Special Condition One (1)** limits the term that the development is authorized for a period of ten (10) years from the date of Commission action, after which time the authorization for continuation and/or retention of any development approved as part of this permit (including, but not limited to, the permeable pier sand retention system, seasonal beach berm, and all beach nourishment activities) shall cease. Prior to the date that authorization for the development expires (10 years from the date of Commission action), all portions of the permeable pier sand retention system authorized by this permit must be removed by the applicant, consistent with the requirements of Special **Condition Two (2)** and timing restrictions of **Special Condition Three (3)**, unless a new coastal development permit, or amendment to this permit, authorizing the retention of the development and continuation of an adaptive management program is approved by the California Coastal Commission. Thus, to ensure that this critical information regarding potential impacts to marine resources is recorded and reported to the Executive Director for consideration of future project approvals, **Special Conditions Two** and **Eleven (11)** require that extensive monitoring of the effects of the project on both shoreline processes and the marine and beach environment be implemented to assess the effects of the permeable pier sand retention system and beach nourishment program for the term of this permit.

In addition, the proposed project will involve work within coastal waters and tidally influenced portions of the sandy beach and will also require approval from the United States Army Corps of Engineers, California State Lands Commission, California Department of Fish and Game, and the Regional Water Quality Control Board. Therefore, **Special Condition Sixteen (16)** requires the applicant obtain all other necessary State or Federal permits that may be necessary for all aspects of the proposed project.

Therefore, the Commission finds that the proposed project, as conditioned, is consistent with Sections 30230, 30231, 30235, and 30240 of the Coastal Act.

F. VISUAL RESOURCES

Section **30251** of the Coastal Act states that:

> ***The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinated to the character of its setting.***

Coastal Act Section 30251 requires that visual qualities of coastal areas shall be considered and protected, landform alteration shall be minimized, and where feasible, degraded areas shall be enhanced and restored.

In this case, the proposed permeable pier sand retention system, as proposed, has been designed to minimize any adverse effects to public views. The permeable pier sand retention system would be the same height, color, and design as the adjacent pier and, thus, would be visually consistent with the appearance of the existing Goleta Pier (**Exhibits 13 - 16**). In addition, the applicant proposes to construct a new timber deck over the new piles which would be effectively attached to the existing deck of the Goleta Beach Pier in order to provide for additional pier area for public access, pedestrian use, and fishing. The construction of the new decking would not occur immediately as the piles would remain exposed to allow for easier access for adjustments ("tuning") of the structure during the initial years of the project. Once the new deck is constructed on top of the new piles, the structure will look like the existing pier. Thus, in the long-term, the only visual change resulting from the project, as viewed from the deck of the pier, would be that a 500 ft. segment of the existing Goleta Pier would be widened 20 ft. For viewers in the main portion of the park and beach and the restaurant, the view will be essentially identical to their present views. The only noticeable structural change would be that the denser configuration of piles supporting the widened pier would result in a less visually permeable condition. Thus, upcoast/downcoast views for beachgoers (under the pier and through the piles themselves) would be partially obscured by the new denser array piles than would normally exist. However, as a whole, the project will be visually consistent with the existing pier and with the surrounding beach setting and will not result in any significant adverse effect to public coastal views on or along the subject site.

In addition, the project also includes the repair of the existing 650 linear ft. of rock revetment on the western (upcoast) end of the park. However, the proposed repair will not result in any seaward encroachment of the structure and will only increase the height of revetment by approximately 18" above the existing level of the parking lot. Thus, as proposed, the revetment repair will not block any public views of the ocean from any location on site or result in any new significant adverse impacts to visual resources. Moreover, the proposed removal of approximately 1,500 linear ft. of rock

revetment from the western portion of the beach would create a smoother transition from the grassy lawn to the sandy beach and will significantly improve public views.

Thus, for the reasons discussed above, the Commission finds that the project, as proposed, is consistent with 30251 of the Coastal Act.

G. UNPERMITTED DEVELOPMENT

Unpermitted development occurred on the subject site prior to submission of this permit application including, but not limited to, the installation of approximately 250 linear feet of rock revetment at the western (upcoast) end of the park and unpermitted repairs/additions to approximately 600 linear ft. of rock revetment at the downcoast end of the park. As proposed, this project includes the complete removal of the entire 1,500 linear feet of rock revetment (which includes the unpermitted 250 linear ft. segment) located on the upcoast (western) portion of the park and after-the-fact authorization for as-built and new repair of the approximately 600 linear ft. of rock revetment located at the downcoast end of the park (as shown on **Exhibit 2**).

Staff is recommending the Commission approve this application for the reasons discussed in full in the preceding sections of this report. To ensure that the unpermitted development component of this application is resolved in a timely manner, **Special Condition Eighteen (18)** requires that the applicant satisfy all conditions of this permit which are prerequisite to the issuance of this permit within 18 months of Commission action. In addition, to ensure implementation of the applicant's proposal and to prevent further adverse impacts to the beach and marine environment, **Special Condition Four (4)** requires the applicant to remove the approximately 1,500 linear feet of existing revetment on western (upcoast) side of the park, including the approximately 250 linear feet of unpermitted rock revetment, concurrent with, or prior to, the construction of the permeable pier sand retention system and the initial placement of 500,000 cu. yds. of sand for beach nourishment. The Executive Director may grant additional time for good cause.

Although development has taken place prior to submission of this permit application, consideration of this application by the Commission has been based solely upon the Chapter 3 policies of the Coastal Act. Review of this permit does not constitute a waiver of any legal action with regard to the alleged violation nor does it constitute an admission as to the legality of any development undertaken on the subject site without a coastal permit.

H. LOCAL COASTAL PROGRAM

The proposed project area lies within the unincorporated area of County of Santa Barbara, but falls within the Commission's area of retained original permit jurisdiction because it is located on state tidelands or is below the mean high-tide. The

Commission has certified the Local Coastal Program for the County of Santa Barbara (Land Use Plan and Implementation Ordinances) which contains policies for regulating development and protection of coastal resources, including the protection of environmentally sensitive habitats, recreational and visitor serving facilities, coastal hazards, and public access.

I. CALIFORNIA ENVIRONMENTAL QUALITY ACT

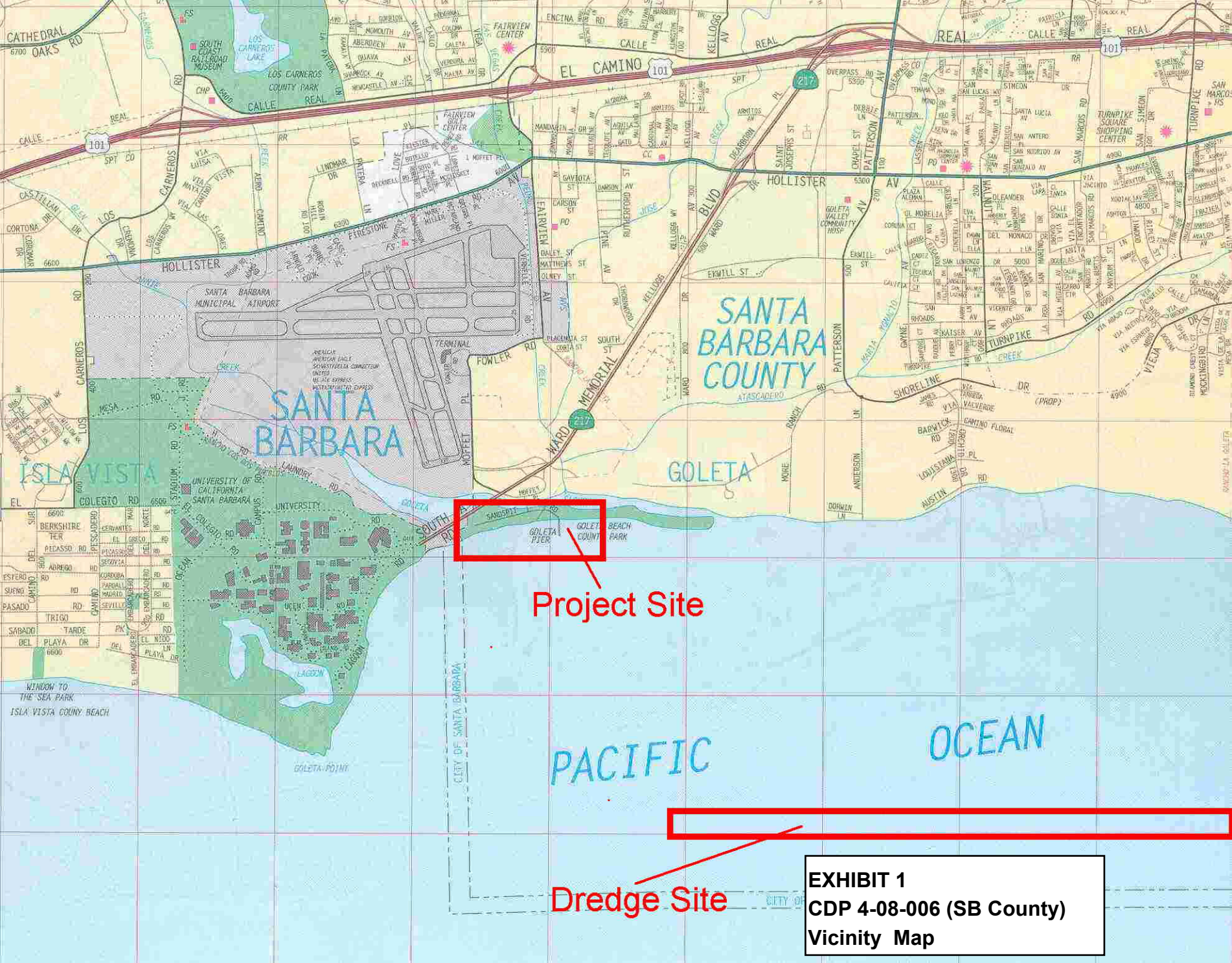
Section 13096(a) of the Commission's administrative regulations requires Commission approval of a Coastal Development Permit application to be supported by a finding showing the application, as conditioned by any conditions of approval, to be consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(A) 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 effect that the activity may have on the environment.

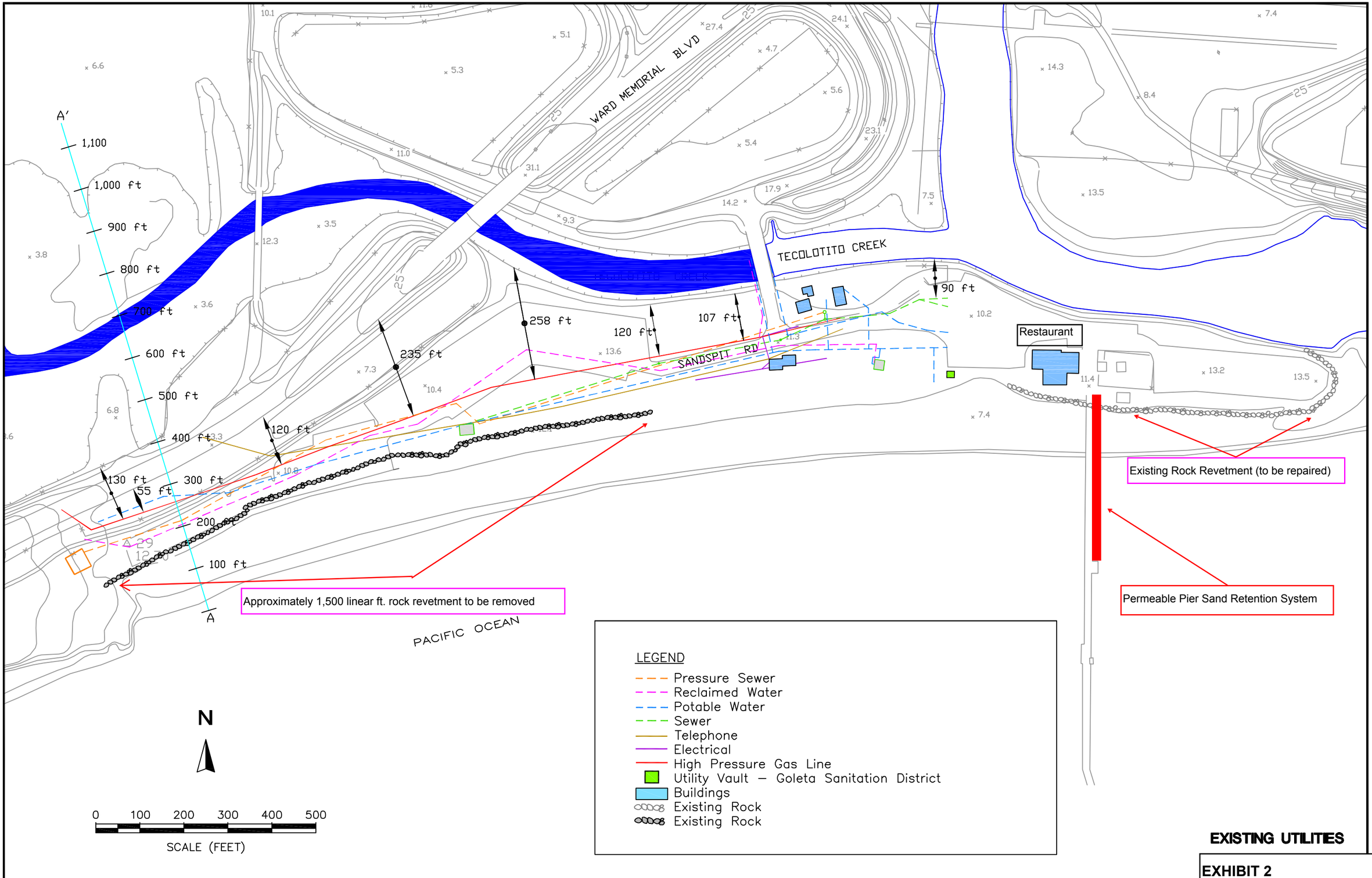
The Commission incorporates its findings on Coastal Act consistency at this point as if set forth in full. These findings address and respond to all public comments regarding potential significant adverse environmental effects of the project that were received prior to preparation of the staff report. As discussed above, the proposed development, as conditioned, is consistent with the policies of the Coastal Act. Feasible mitigation measures which will minimize all adverse environmental effects have been required as special conditions. As conditioned, there are no feasible alternatives or feasible mitigation measures available, beyond those required, which would substantially lessen any significant adverse impact that the activity may have on the environment. Therefore, the Commission finds that the proposed project, as conditioned to mitigate the identified impacts, can be found to be consistent with the requirements of the Coastal Act to conform to CEQA.

The following special conditions are required to assure the project's consistency with Section 13096 of the California Code of Regulations:

Special Conditions 1 through **18**

As conditioned, there are no feasible alternatives or feasible mitigation measures available, beyond those required, which would substantially lessen any significant adverse impact that the activity may have on the environment. Therefore, the Commission finds that the proposed project, as conditioned to mitigate the identified impacts, can be found to be consistent with the requirements of the Coastal Act to conform to CEQA.


Project Site
Dredge Site
PACIFIC
OCEAN
SANTA BARBARA
SANTA BARBARA COUNTY
GOLETA
ISLA VISTA
EXHIBIT 1
CDP 4-08-006 (SB County)
Vicinity Map



P: 6012-01 Coastal Deliverables Utilities_KL.dwg 6-24-08 09:26:41 AM klondon

EXISTING UTILITIES

EXHIBIT 2
CDP 4-08-006 (SB County)
Site Plan - Goleta Beach

THE INTENT OF THIS CONCEPT IS TO INSTALL A DENSE PILE ARRANGEMENT ALONG THE DOWNCOAST SIDE OF THE PIER TO TRAP SAND. THE PILE ARRANGEMENT IS INTENDED TO BE ADJUSTABLE OVER TIME BASED ON MONITORING TO OPTIMIZE THE PIER'S PERFORMANCE.

PARKING LOT

GOLETA BEACH

PACIFIC OCEAN

BEACH NOURISHMENT AREA

RESTROOMS

ADDITIONAL PILE MAZE ALONG EAST SIDE OF PIER CONSISTING OF APPROXIMATELY 255 PILES

A

10' O.C. TYP

NEW PILES

20'

15'

11.4

EXISTING GOLETA BEACH PIER

PUBLIC ACCESSWAY

A'

SEE SECTION SHEET 5

THE LONG PILE ROWS MAY HAVE UP TO 3 OR 4 PILES IN A LINE; SEE THE CROSS-SECTION

BEACHSIDE RESTAURANT

BEACH

BEACH NOURISHMENT AREA

PACIFIC OCEAN

APPROVED IN CONCEPT BY THE SANTA BARBARA COUNTY BOARD OF SUPERVISORS ON JANUARY 22, 2008

0ft 50ft 100ft

SCALE

CONCEPTUAL PLAN

P:\16012-01\COASTAL\DELIVERABLES\601201_03_PLAN.DWG

STATUS: CONCEPT | FINAL

DIGALERT
DIAL TOLL FREE
1-800-227-2600
AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

NO.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER TOM SPENCER No. XXXXX EXP. 12/31/09 CIVIL STATE OF CALIFORNIA

MOFFATT & NICHOL

DESIGNED BY	CHECKED BY
DRAWN BY	IN CHARGE

GOLETA BEA
COASTAL DEV
CO

SCALE | DATE

EXHIBIT 3
CDP 4-08-006 (SB County)
Site Plan - Permeable Pier

Permeable Pier Location and Estimated Dynamic Equilibrium Position

Includes landward and seaward bounds of fluctuation
of the mean shoreline along Goleta Beach

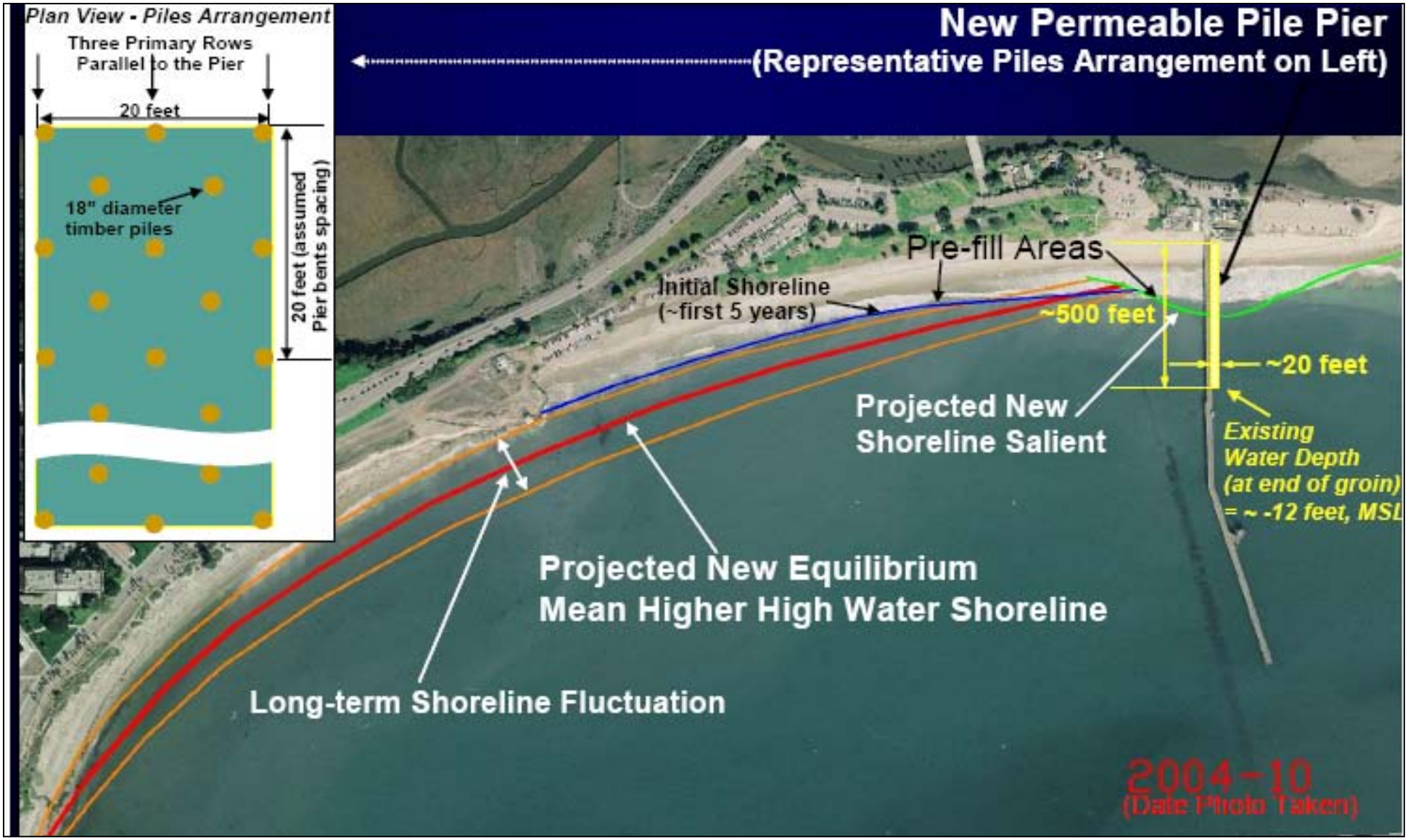
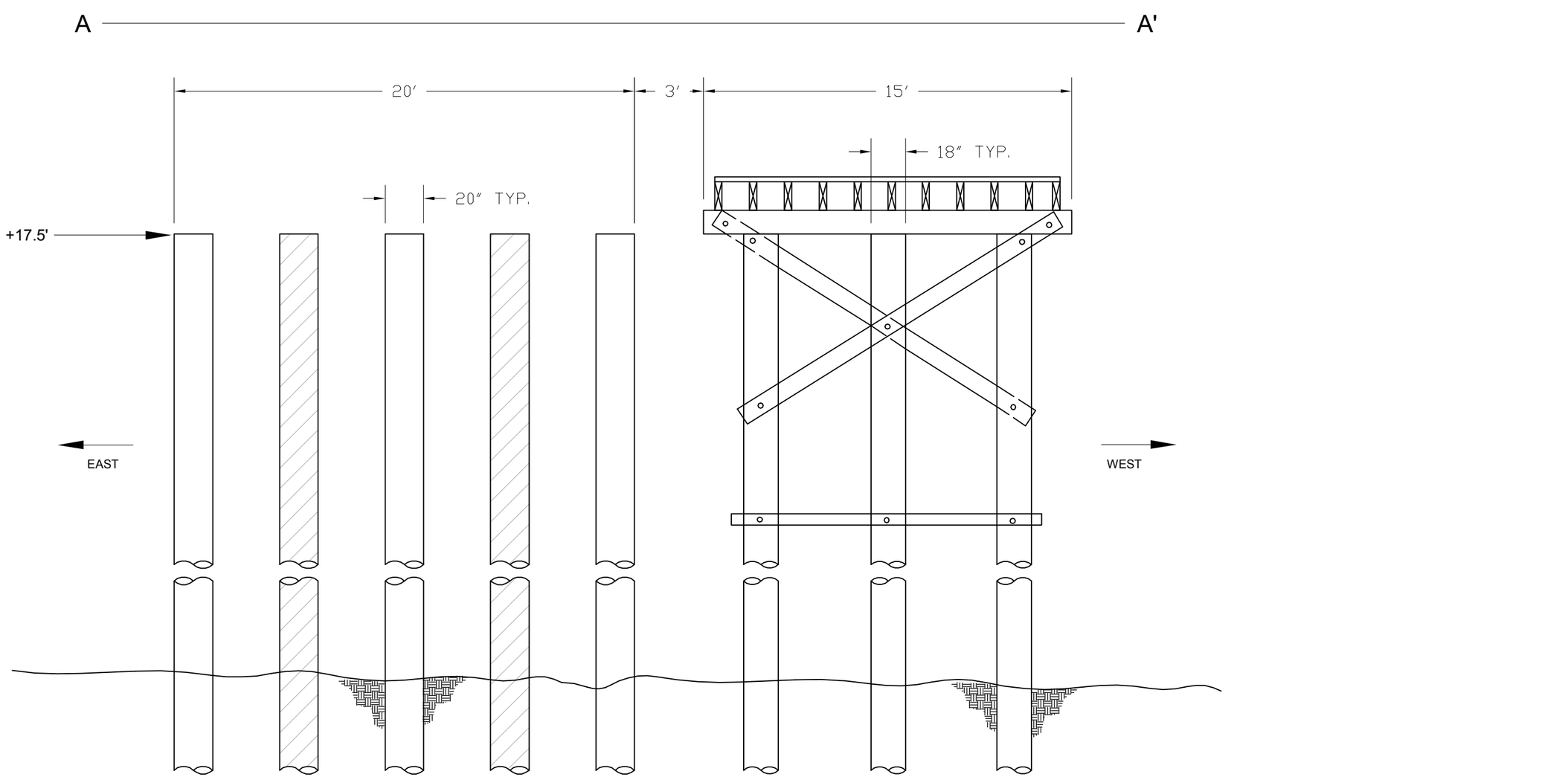


EXHIBIT 4
CDP 4-08-006 (SB County)
Design Beach Width



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FINAL | 100% | % | % | CONCEPT | STATUS

CONCEPTUAL PLAN

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NO.	REVISION	BY	DATE

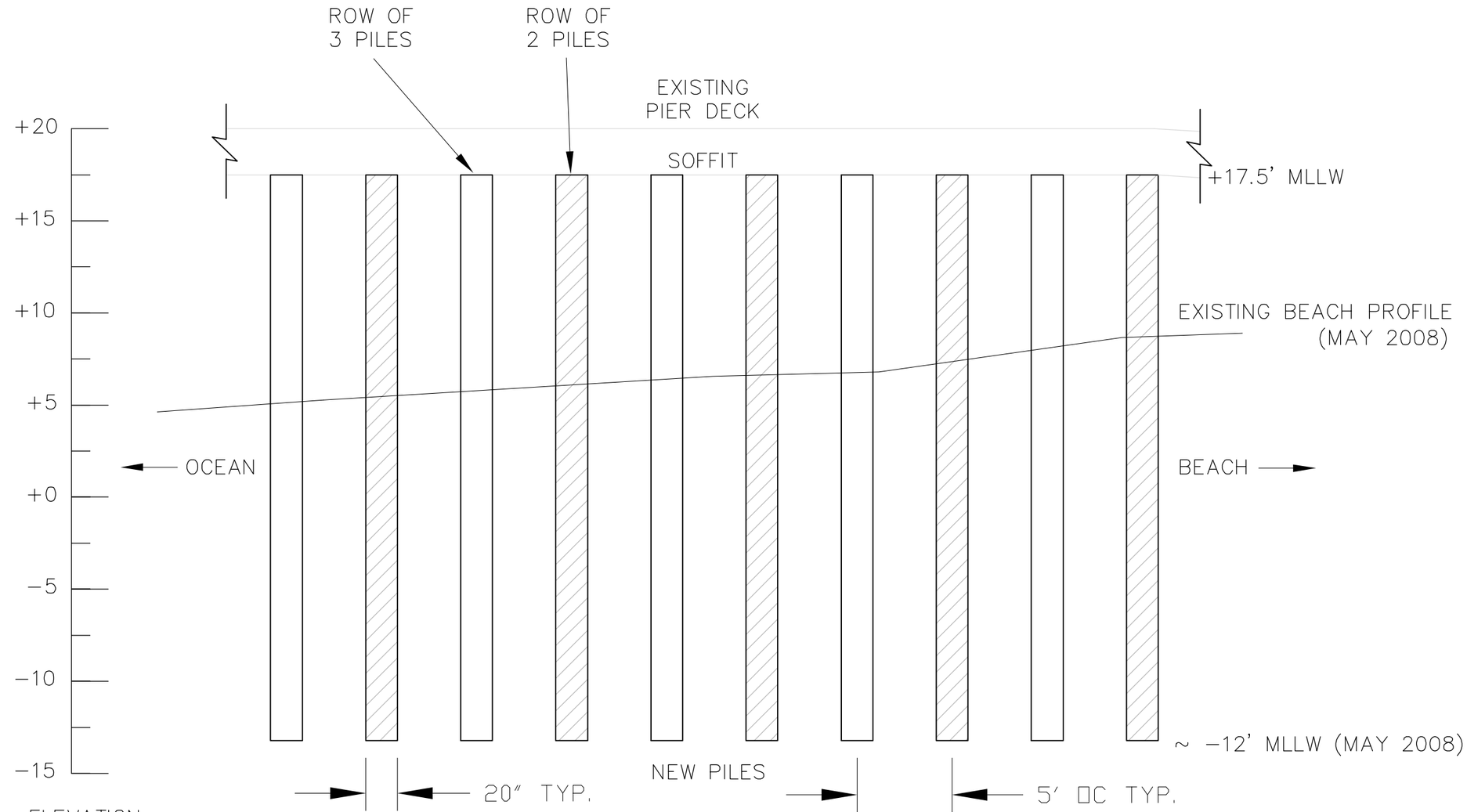
REGISTERED PROFESSIONAL ENGINEER
TOM SPENCER
No. XXXXX
EXP. 12/31/09
CIVIL
STATE OF CALIFORNIA

MOFFATT & NICHOL

DESIGNED BY	CHECKED BY
DRAWN BY	IN CHARGE

EXHIBIT 5
CDP 4-08-006 (SB County)
Permeable Pier Elevations

DATE
7/3/08
6012-01
5
7



NOTE: PILES WITH CROSS−HATCHING ARE ROWS OF TWO THAT OCCUR BETWEEN THE ROWS OF THREE PILES (SEPARATE PLANE).

CONCEPTUAL PLAN

P:\6012-01\COASTAL\DELIVERABLES\601201_04_PROFILE.DWG

STATUS	FINAL	100%	%	%	CONCEPT

DIGALERT
DIAL TOLL FREE
1-800-227-2600
AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

NO.	REVISION	BY	DATE

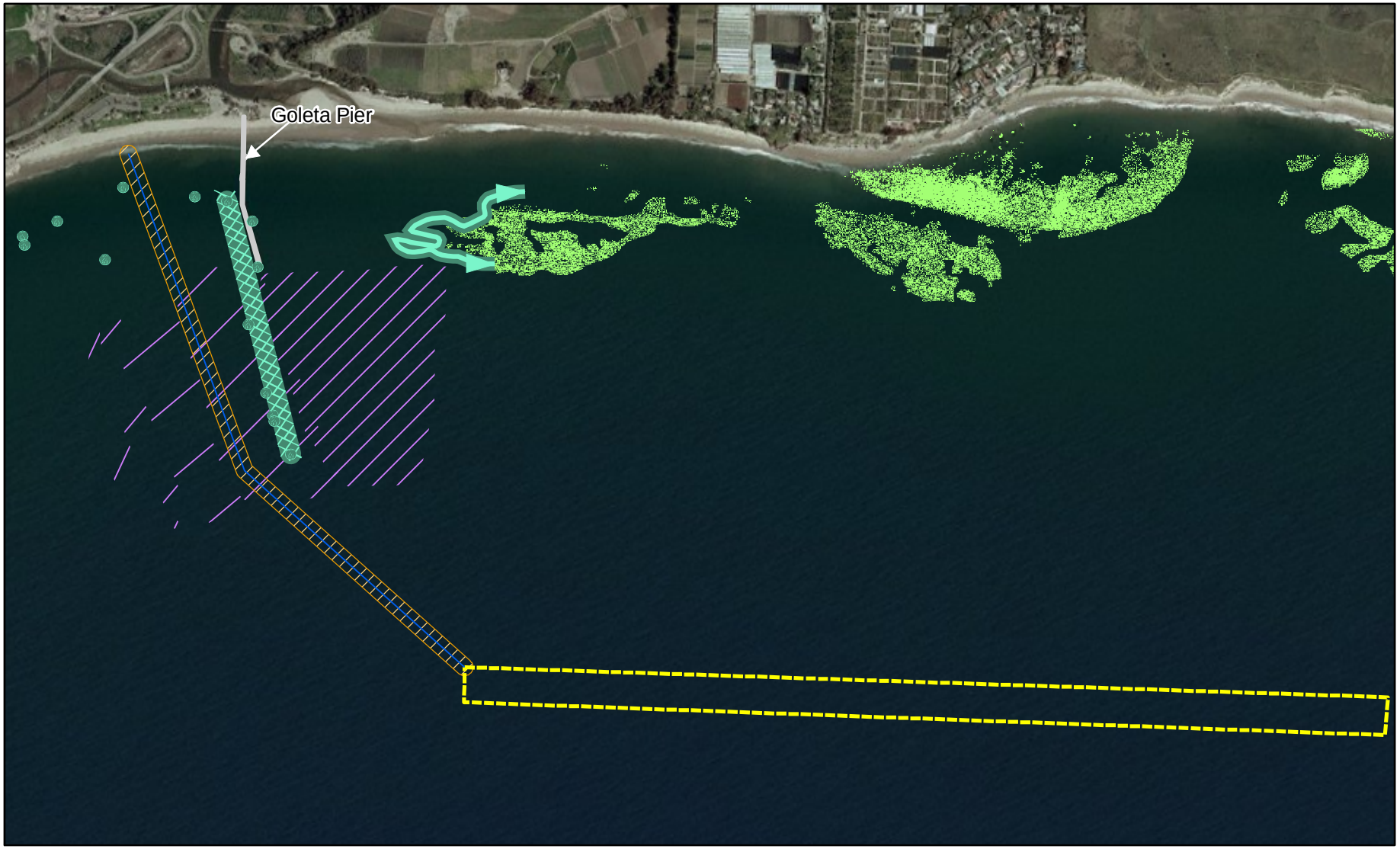
REGISTERED PROFESSIONAL ENGINEER
T. W. SPENCER
No. XXXXX
EXP. 12/31/09
CIVIL
STATE OF CALIFORNIA

MOFFATT & NICHOL

DESIGNED BY	CHECKED BY
DRAWN BY	IN CHARGE

EXHIBIT 6
CDP 4-08-006 (SB County)
Permeable Pier Elevations

SCALE	DATE
	7/3/08
JOB NO.	6012-01
SHEET	4
OF	7



Legend

- Potential Dredge Area
- Proposed Discharge Pipeline
- Eelgrass Beds (Assumed to continue East)
- June 2005 Kelp Patches
- June 2005 Pipeline Kelp Canopy
- June 2005 Kelp Canopy Boundary
- 2003 CDFG Kelp Survey
- Potential Restoration Area

N W E S

0 500 1,000 2,000 Feet

Goleta Beach 2003/2005 Kelp & Eelgrass Beds Map

EXHIBIT 7
CDP 4-08-006 (SB County)
Offshore Dredging Plan

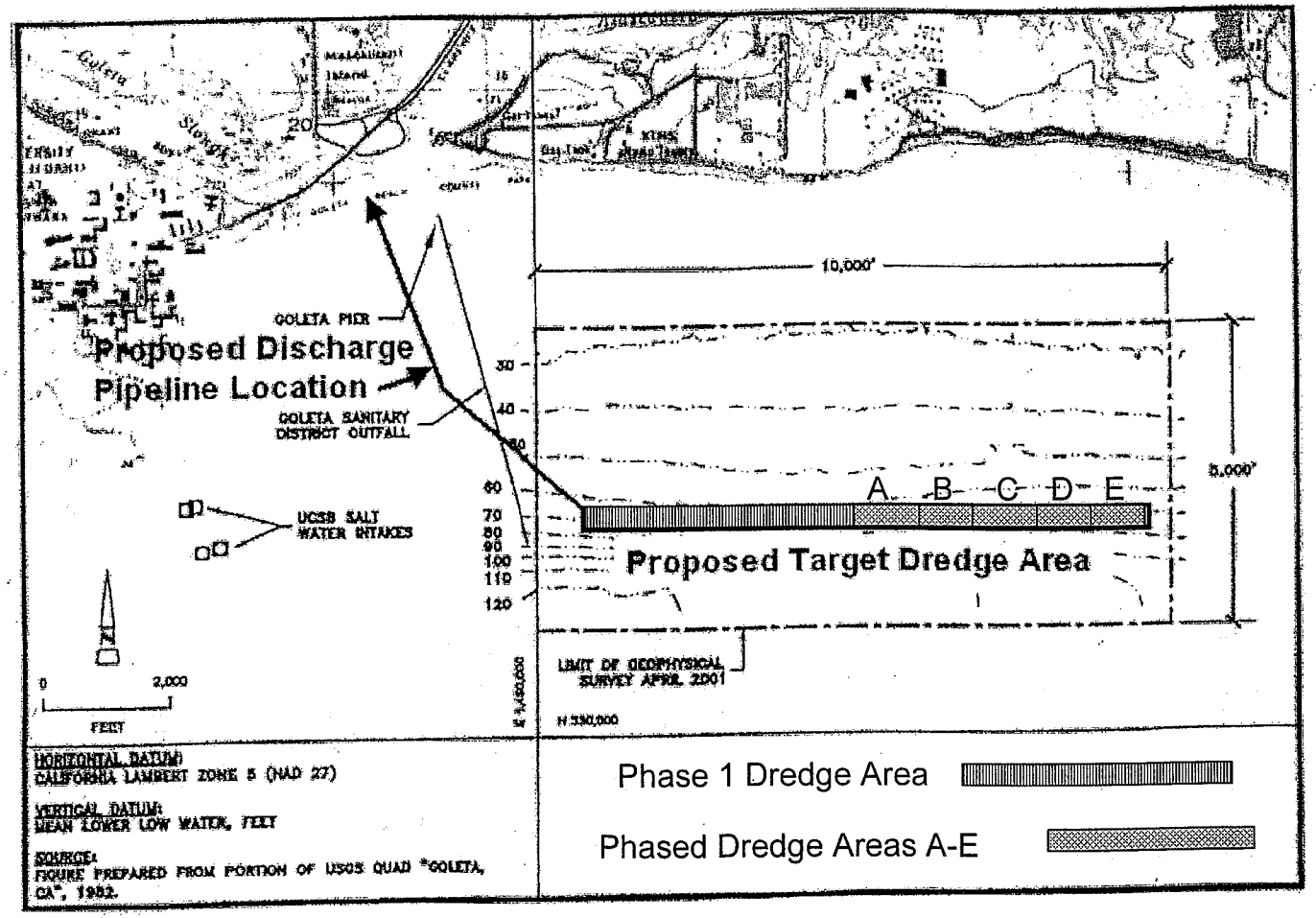
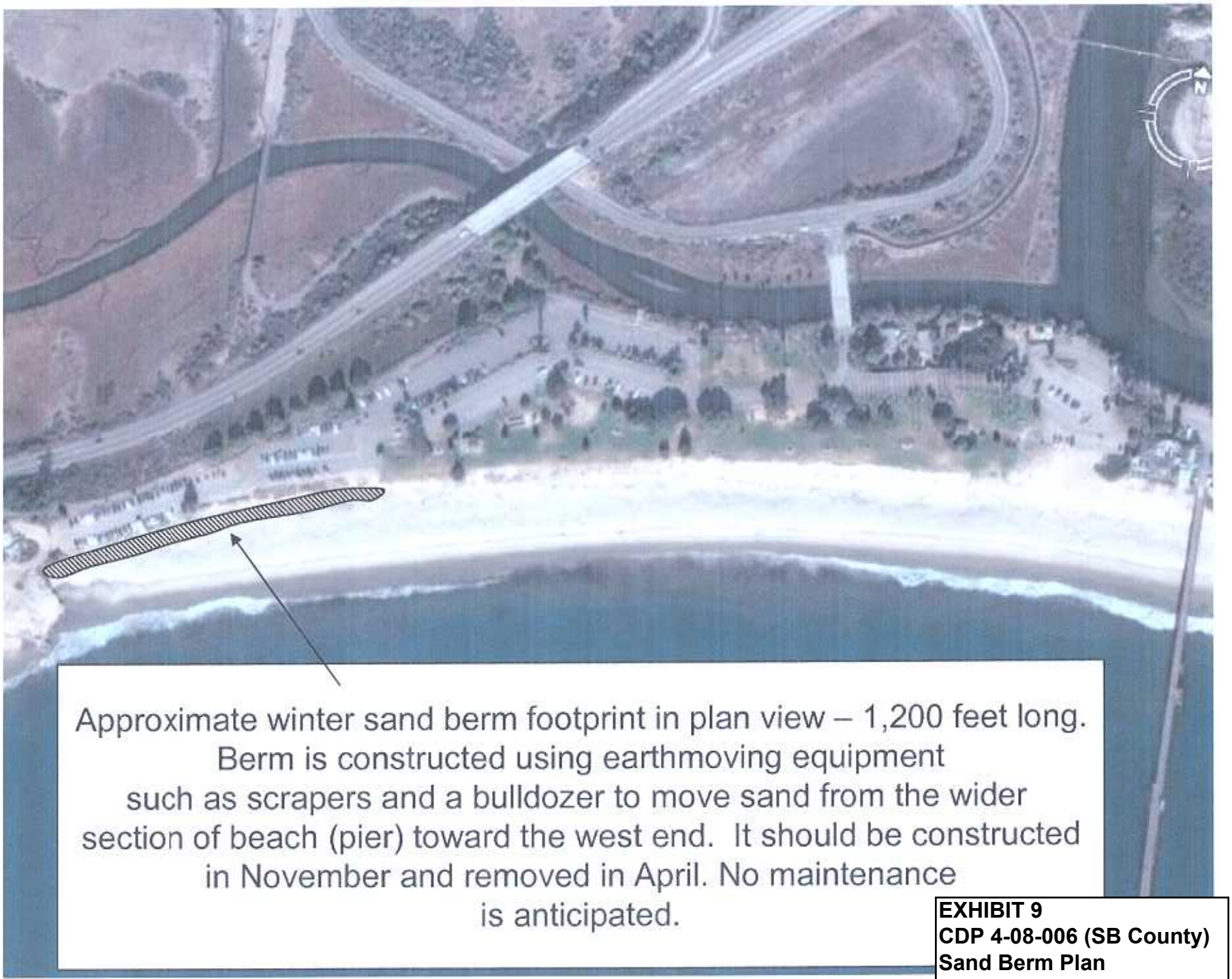


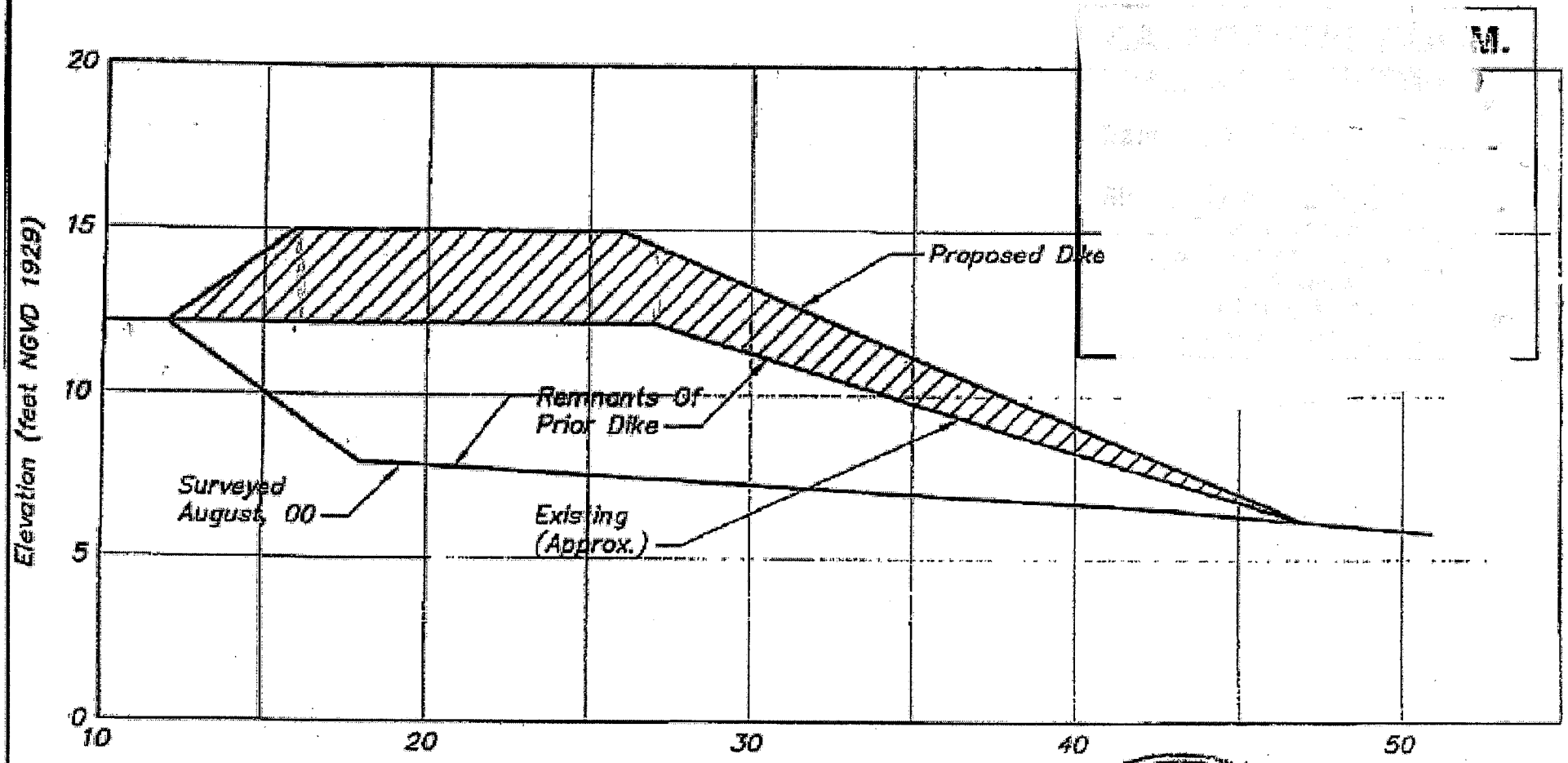
Figure 3 – Phased Dredge Plan Offshore Goleta Beach

EXHIBIT 8
CDP 4-08-006 (SB County)
Dredge Site Phasing Plan



Approximate winter sand berm footprint in plan view – 1,200 feet long. Berm is constructed using earthmoving equipment such as scrapers and a bulldozer to move sand from the wider section of beach (pier) toward the west end. It should be constructed in November and removed in April. No maintenance is anticipated.

EXHIBIT 9
CDP 4-08-006 (SB County)
Sand Berm Plan



Proposed Fill

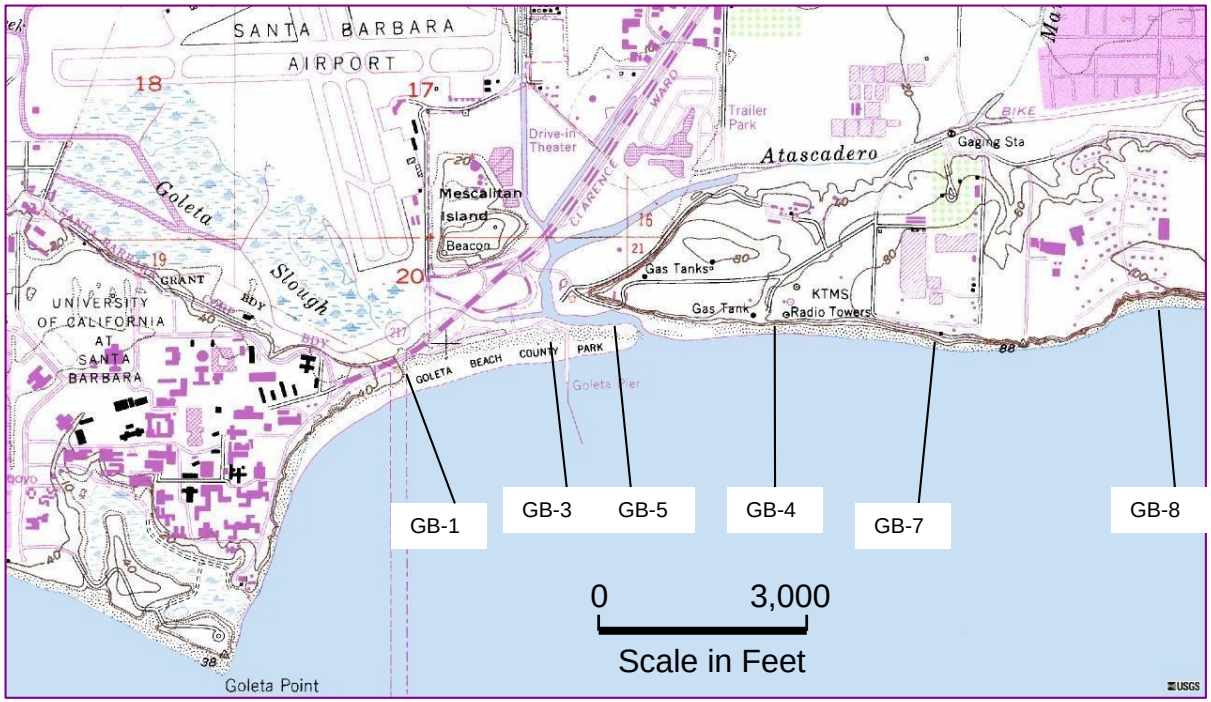
SECTION (A)

REGISTERED PROFESSIONAL ENGINEER
RUSSELL H. BOUDREAU
C041810
EXP. 3/31/04
CIVIL
STATE OF CALIFORNIA

Beach Stabilization Project

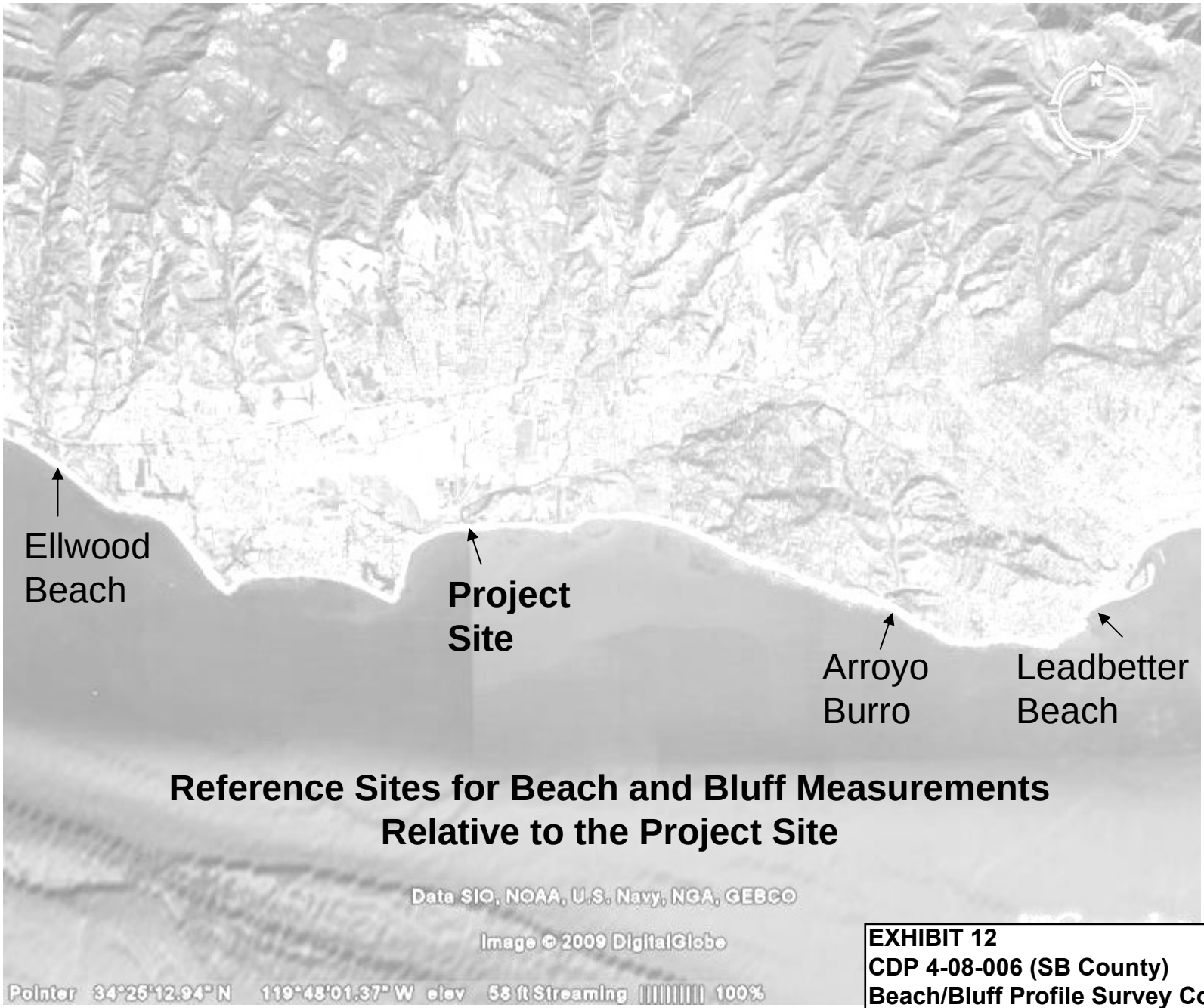
GOLETA BEACH DIKE DESIGN CROSS SECTION

EXHIBIT 10
CDP 4-08-006 (SB County)
Sand Berm Elevations



Beach Profile Locations

EXHIBIT 11
CDP 4-08-006 (SB County)
Beach/Bluff Profile Survey Points



Reference Sites for Beach and Bluff Measurements Relative to the Project Site

EXHIBIT 12
CDP 4-08-006 (SB County)
Beach/Bluff Profile Survey Control Points

Goleta Beach Park - CARE Program

Coastal Access and Recreation Enhancement Program

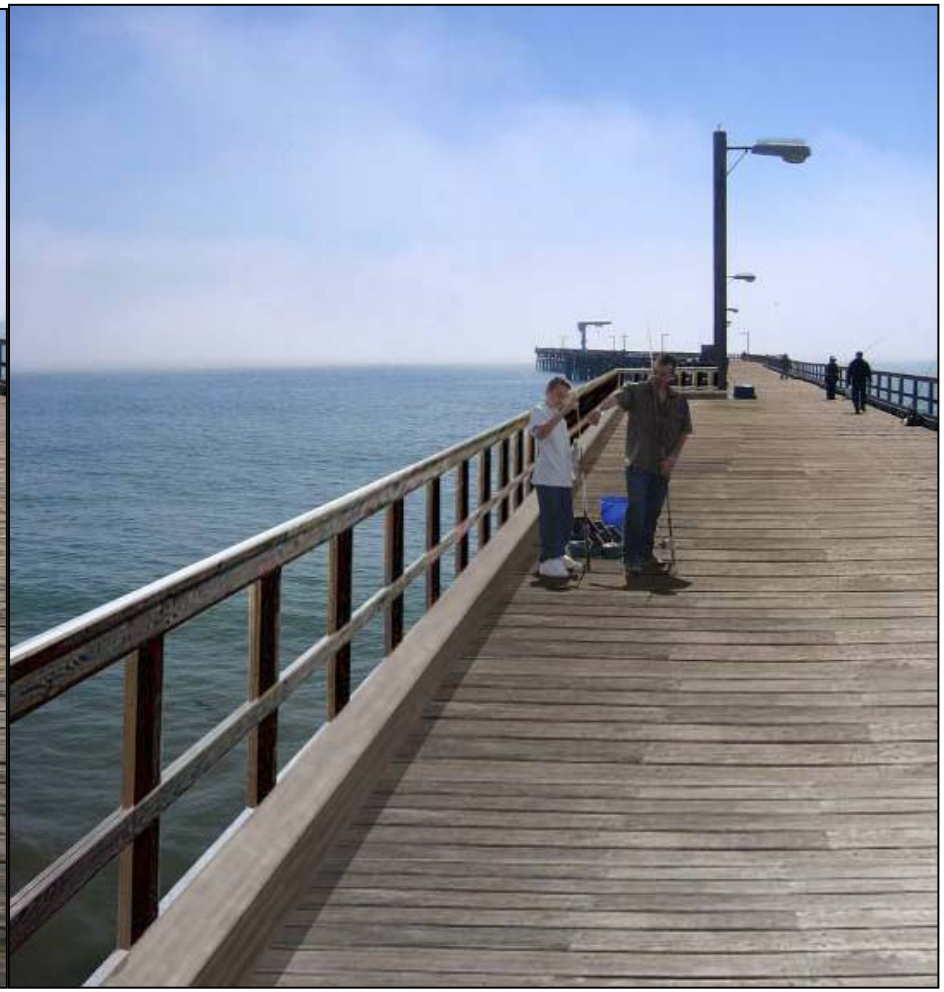
July 2008

Visual Simulations

moffatt & nichol

EXHIBIT 13
CDP 4-08-006 (SB County)
Visual Simulation

Visual Simulation of Uncovered Piles for Permeable Pier Sand Retention System

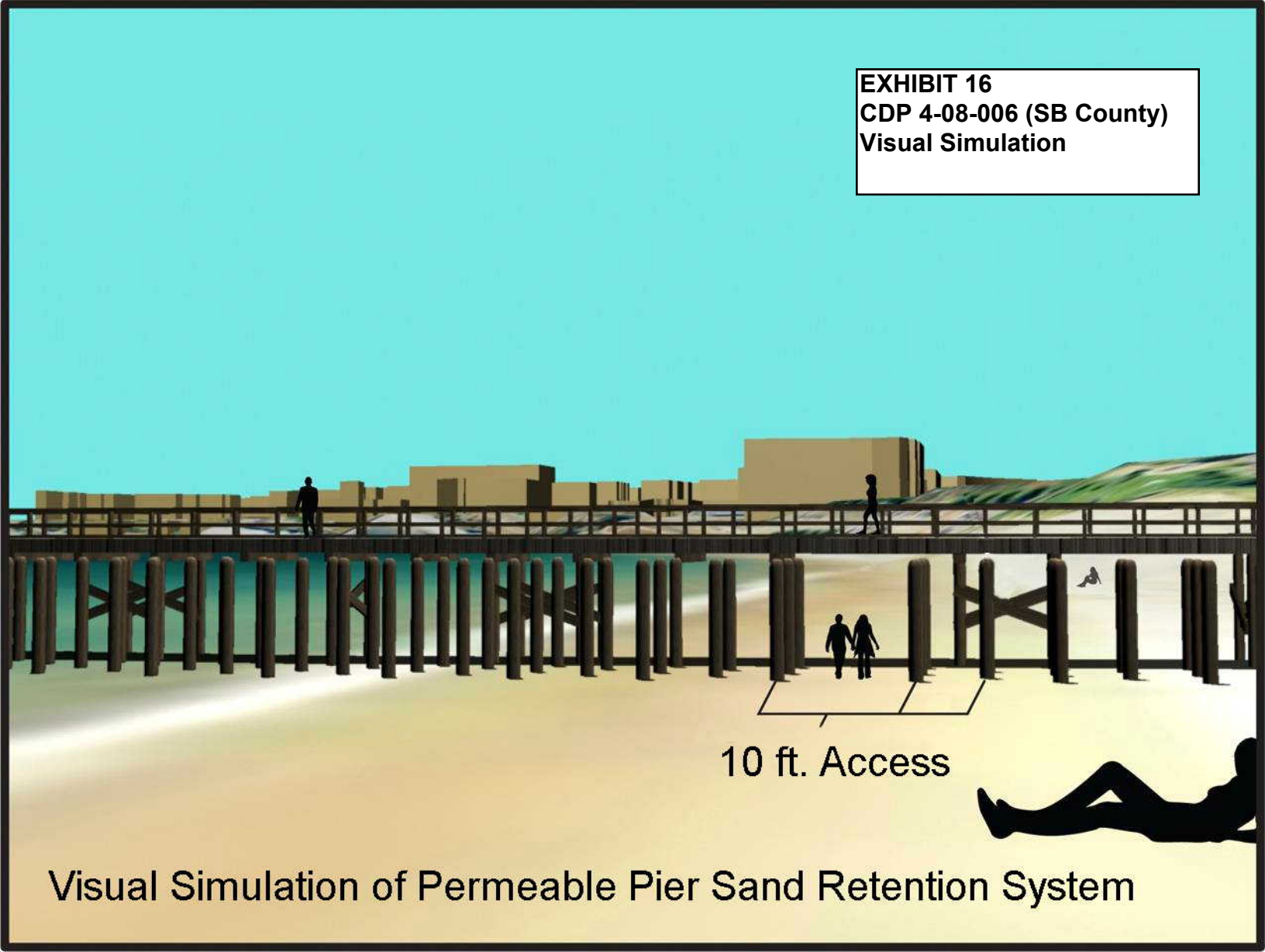


Visual Simulation of New Decking Constructed Over Piles for Permeable Pier Sand Retention System

EXHIBIT 14
CDP 4-08-006 (SB County)
Visual Simulation


EXHIBIT 15
CDP 4-08-006 (SB County)
Visual Simulation
10 ft.

EXHIBIT 16
CDP 4-08-006 (SB County)
Visual Simulation



Visual Simulation of Permeable Pier Sand Retention System

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

May 27, 2009

TO: Steve Hudson, District Manager, Ventura Office

FROM: Lesley Ewing

SUBJECT: Evaluation of Shoreline Modeling Results for Goleta Shoreline Permeable Pile Groin, Sand Retaining Structure

The Goleta Beach area is a complex coastal system. In my review of the efforts to model shoreline change at Goleta and to understand the permeable pile groin sand retaining structure, I reviewed a number of reports from the project applicant and opponents, including, but not limited to:

- PWA (2005) Master Plan Goleta Beach County Park Shoreline Management Alternative
- County of Santa Barbara (March 28, 2007) Draft Environmental Impact Report for the Proposed Goleta Beach County Park Long-Term Protection Plan
- E.A. Keller (May 10, 2007) Subject: Goleta Beach Long-term Protection Plan DEIR
- Coastal Tech (May 12, 2007) Re: Goleta Beach long-term Protection Plan draft Environmental Impact Report
- March 5, 2009 Report from County of Santa Barbara Planning and Development to Steve Hudson, Attachment 3, Revised 3-5-09
- Moffatt-Nichol (March 2009) Draft Guideline Document Adaptive Management Plan for the Goleta Beach Park Coastal Access and Recreation Enhancement Beach Stabilization Project.
- PWA (April 15, 2009) Subject: Final Memo on Goleta Beach Modeling Review
- Moffatt-Nichol (May 22, 2009) Subject: Coastal Development Permit Application Reference No. 4-08-006, Goleta Beach Sand Project, Adaptive Management Plan.

Goleta Beach has experienced large changes in shoreline position over the past decades. Between 1983 and 1998 the beach narrowed by approximately 200 feet, damaging the parking area and threatening other park infrastructure and buried utility lines. Analysis of

EXHIBIT 17
CDP 4-08-006 (SB County)
Memorandum on Modeling by Lesley Ewing, CCC, 5/27/09

the project area by the applicant's consultants have focused on sediment supplies and long-shore sediment transport, noting that the erosion at the beach area corresponded to a loss of approximately 80,000 cubic yards of sand per year over the 1983 to 1998 time period. (March 5, 2009 letter from County of Santa Barbara Planning and Development to Steve Hudson) Over the intervening years, the applicant's consultant has examined a number of options to augment the available supply of sediment at this beach area and to retain as much sand as possible without causing erosion impacts to the downcoast beach and bluff areas.

The proposed permeable pier or permeable pile groin sand retaining structure is an experimental effort. The applicants have provided anecdotal evidence of coastal piers, such as the Huntington Beach Pier that has retained sand around the existing pier, or at Oil Piers where the beach experienced significant erosion when the piers were removed as part of the lease decommissioning; however, there are no pier projects that have been designed and built with the specific purpose of sand retention. In modeling this structure, the applicant's consultant assumed that the structure could be designed to provide 35% permeability to minimize downcoast impacts.

The permeable groin is expected to retain sufficient sand in a salient at the pier and as an upcoast fillet that "desired salient would be about 200 ft seaward of the existing shoreline and would extend between 750 and 1,000 ft to either side of its midpoint, which is located at the Pier. With this salient, a wider beach would be formed all the way to the western end of Goleta Beach County Park…… The salient would extend eastward toward, but not to, the mouth of Goleta Slough." (March 5, 2009 Report from County of Santa Barbara Planning and Development to Steve Hudson, Attachment 3, Revised 3-5-09, page 7) Sand for the beach widening and salient would come from littoral transport and the 500,000 cubic yards of proposed nourishment.

The applicant's consultants have examined the proposed permeable pier using a simple line model, the US Army Corps of Engineers model, GENESIS, and an assumption about the permeability of the proposed pier, and determined that it will be possible to create a wide beach and beach salient at Goleta Beach, while maintaining longshore transport with at most only maximum 3 to 5% reduction. During conditions with normal waves and El Niño conditions every 5 years, the reduction in longshore transport is modeled to be 4.8%, dropping from the existing condition of 183,146 cubic yards per year to 174,430 cubic yards per year with the proposed project. If the El Niño conditions occur every 5 years, on average, but with higher than average wave conditions during the intervening years, the transport was modeled to be 199,671 cubic yards without the proposed project and 192,838 cubic yards with the proposed project (for a 3.5% reduction). , The model analysis is based upon wave data from 2002 to 2006 and a steady introduction of littoral sand from the upcoast boundary.

Opponents to the project object to the use of this simple model for characterizing the complex conditions at this beach, and question the development of the structure's permeability. Analysis of shoreline change by Dr. Revell identifies the beach changes as oscillatory, being driven by cyclic climate phenomena and a moving wave of erosion that

propagates along the coast. Historic beach trends indicate that the shoreline position can vary within about a 100 to 150 foot wide envelop, with the 1943 shoreline representing the most landward observed shoreline. The most recent observations on the beach area, from the 1980s to present, show a rapid shoreline retreat following the 1982/83 El Niño storms, with diminishing retreat over time. The 2005 "Master Plan Goleta Beach County Park Shoreline Management Alternative" by PWA noted that a sand pulse was accumulating near Coal Oil Point and this influx of sand might reach Goleta Beach in the coming decade.

The opponents recommend that modeling of shoreline change should include a time-varying boundary condition to better approximate the pulses of sediment that move along this section of coast. In addition, since the wave conditions used in the GENESIS model were taken from waves measured from 2002 to 2006, they do not represent the wave conditions from variability within the Pacific Decadal Oscillation and other long-term conditions that influence beach change at this location. The opponents also note that model calibration and verification are weak, and as noted in a May 11, 2009 memo from Dilip Berea, via Michael Walther to Brian Trautwein, "the GENESIS modeling results appear to be inadequate for this particular application due in part to anomalous El Niño storm effects. Additionally, reviews indicate that an alternate modeling strategy involving "sensitivity analysis" would likely have yielded a more broad range of feasible results within the limitations of GENESIS. In any event, it is likely that, even based upon M&N analysis, the permeable pile-groin is likely to adversely affect the downdrift beaches." (May 11, 2009 Memo from Dilip K. Barua, Ph.D. to Brian Trautwein, Re: Comments on the Goleta Modeling Review)

The opponents of the permeable pile-groin question the ability of the proposed project to establish the desired beach conditions at Goleta and downcoast. They have developed a plan to reconfigure the park area and are recommending that with the natural oscillation of the beach and the pulse of sand that is due to reach Goleta Beach in the coming decade, that there is no need to install shore protection of any kind at this location. The opponents' recommendations for modeling would provide better understanding of the likely changes to the beaches at Goleta County Park and downcoast. However, the underlying assumptions about the performance of the proposed permeable pier-groin are fundamental to any of the numerical modeling efforts, and it is unlikely that any modeling study will be able to adequately anticipate all the beach changes that might occur due to the construction of such a structure. Rather than undertaking additional numerical modeling to better analyze the natural variability of wave and sediment conditions at the site or to improve the calibration and verification of the GENESIS model for this location, it may be more appropriate at this point in time, to undertake some physical modeling with would examine the following:

1. The sensitivity of the area to pulses of sediment and variable wave climate
2. The ability of some configuration of 250 to 300 piles with a 500 foot by 20 foot footprint to maintain a large beach salient with only a 3.5% to 4.8% reduction in downcoast sediment transport.

EXHIBIT 17
CDP 4-08-006 (SB County)
Memorandum on Modeling by Lesley Ewing, CCC, 5/27/09

Just as the numerical modeling of this structure can only be as good as the assumptions made about the actual performance of a permeable pile groin structure, so too are there limitations to physical models of sediment transport. Scaling of the model to the prototype can introduce forces in the model, such as turbulence, that will be more dominant in the model than in the prototype. The results from the physical model cannot be assumed to mirror the performance of the proposed structure any more than the numerical model results can be used to represent all the complexity of the real situation. At best, the physical model can provide some "proof of concept" that one or more pile configurations can replicate the sediment transport characteristics that are anticipated to occur from the actual project. Modifications in a model setting can be time consuming, but such efforts are far easier to undertake in the controlled situation of a model basin, rather than in the ocean environment. Therefore the applicant should undertake model tests of the proposed permeable pile groin, document model scaling, wave and sediment conditions, pile configurations, salient development and downcoast sediment transport rates, provide this documentation to staff and make it available for at least 45 days for public review and comment, and shall identify at least one configuration design that will need to anticipated project goals of a 200 foot wide salient, at least a 200 foot wide beach seaward of Goleta County Park and maintain downcoast sediment transport to at least 95% or the pre-project conditions. Model results showing proof of concept and resolution to any issues raised by public comments on the physical model results shall be provided prior to issuance of the permit.

In addition to the confirmation or "proof in concept" from physical model testing, the applicant shall develop a detailed monitoring plan that will be adequate to identify project impacts that exceed the modifications identified by the applicant from numerical modeling, to develop response efforts that will mitigate impacts as much and as soon as possible, and triggers for removal of the proposed project if the impacts cannot be mitigated or if, with mitigation, impacts exceed those that are expected. Mitigation can include both "tuning" the permeable pile groin to modify sediment retention and transport to be more in agreement with the proposed design, and beach nourishment at the proposed project site and other sites approved through the BEACON opportunistic beach sand permit or other approved nourishment projects.

The applicant's consultant has developed several iterations of an adaptive management plan for this project, including monitoring of Goleta Beach, Goleta Slough and the beaches downcoast of the project area. The most recent management plan is, Revised Draft Guideline Document Adaptive Management Plan for the Goleta Beach Park Coastal Access and Recreation Enhancement Beach Stabilization Project, March 2009. On May 22, 2009, the applicant's consultant provided an updated Draft Adaptive Management Plan outline. This Draft Plan and Draft Plan outline provide the basic foundation for an adaptive management plan. In addition to the plans already developed by the applicant, the finalized version of the plan should be amended or augmented to include:

1. The monitoring program shall be undertaken for the life of the project (or permit).

2. Baseline conditions for downcoast beach erosion and bluff retreat should be developed from historic data, analysis of shoreline monitoring efforts that have been undertaken since 2003 in conjunction with Coastal Development Permit 4-02-251 and subsequent amendments, data from the BEACON monitor program, shoreline and bluff change developed and quantified by the USGS (such as Open File Report 2006-1219 and Open File Report 2007-1133), analysis of aerial photographs of this coastal area, shoreline or bluff monitoring by the County, US Army Corps of Engineers, academic efforts, and other shoreline studies.
3. Monitoring data and analysis shall be reported on a publicly accessible website that shall be updated regularly.
4. Monitoring should be undertaken at enough locations and sufficient frequency to identify any project impacts to downcoast beaches and bluffs and inform any project tuning to achieve the goal of no adverse impacts to downcoast beaches or bluffs.

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Memorandum on Modeling by Lesley Ewing, CCC, 5/27/09

Goleta Beach County Park
Park Reconfiguration Alternative

Prepared for
The Coastal Fund at UCSB
Surfrider Foundation – Santa Barbara Chapter
Environmental Defense Center

Prepared by

Philip Williams & Associates, Ltd.

November 24, 2008

PWA REF. #1940.00

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Services provided pursuant to this Agreement are intended solely for the use and benefit of the Surfrider Foundation and Environmental Defense Center.

No other person or entity shall be entitled to rely on the services, opinions, recommendations, plans or specifications provided pursuant to this agreement without the express written consent of Philip Williams & Associates, Ltd., 500 Kearny St, Suite 900, San Francisco, CA 94108

For planning purposes we have provided estimates of construction costs to allow cost comparison of alternatives. These cost estimates are intended to provide an approximation of total project costs appropriate for the preliminary level of design. These cost estimates are considered to be approximately -15% to +30% accurate, and include a 25% contingency to account for project uncertainties (such as final design, permitting restrictions and bidding climate). These estimates are subject to refinement and revisions as the design is developed in future stages of the project.

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1. PROJECT SUMMARY

This project provides a conceptual design of a park reconfiguration alternative at Goleta Beach County Park in Santa Barbara, California. The premise behind this project alternative is to reconfigure the infrastructure and park facilities to allow for natural shoreline processes and realignment. Recent scientific research has shown that the coastal processes operating at Goleta Beach are highly variable and have resulted in fluctuations in beach width over the last 75 years. These changes appear to be caused by cyclic climate phenomena that regulate the direction of waves and storms. Recent research findings also provide insight into an erosion wave that propagated along coast causing the recent erosion at Goleta Beach before migrating down coast affecting Arroyo Burro, Shoreline Park, and currently Ledbetter Beach. This alternative attempts to provide a new vision of Goleta Beach that functions more naturally in light of these recent scientific findings.

The proposed alternative is based upon:

1. Goleta beach has historically fluctuated and has experienced a state of dynamic equilibrium with the most landward extent of erosion being the 1943 back beach.
2. A "coastal processes zone" which is proposed to encompass the likely most landward limit of future erosion corresponding to the 1943 back beach,
3. Park infrastructure within the "coastal processes zone" is proposed to be relocated to the extent practical except for the restaurant and associated buildings which will remain protected by the existing revetment.
4. This alternative reasonably minimizes potential future erosion damage, allows natural beach fluctuations, optimizes the natural beach width, and avoids downcoast impacts associated with the pile groin currently proposed by the County.

This proposed alternative is estimated to cost approximately $4.7 million to construct as opposed to the pile groin alternative which is estimate to initially cost about $8.4 million.

The benefits of this Park Reconfiguration alternative are to reduce the hazards associated with episodic coastal processes while enhancing public recreational opportunities and beach access. This alternative is the lowest cost alternative as well as a long term investment in the park which upgrades facilities and recreational amenities while reducing long term costs. Another important benefit to this alternative is to reduce the potential for downcoast impacts. This contrasts markedly with the likely increases in disruption of longshore sediment transport associated with the County's current proposal which includes a pile groin. By removing potentially threatened infrastructure away from the ocean's edge, this alternative provides a long term vision for Goleta Beach as a unique place to recreate and enjoy a special experience along California's coastline.

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2. INTRODUCTION

PWA was commissioned by Environmental Defense Center on behalf of the Surfrider Foundation- Santa Barbara Chapter to provide a conceptual design of a park reconfiguration alternative at Goleta Beach County Park. This task included updating information on recent scientific advances on the historic evolution of the Santa Barbara shoreline and providing visual representations of the alternative. This park reconfiguration alternative provides a contrast with the proposed Santa Barbara County Beach Stabilization / Permeable Pile Groin project submitted to the California Coastal Commission (CDP-4-08-006).

A primary driver for these project alternatives has been erosion at Goleta Beach initiated during the 1997-98 El Niño. During the Goleta Beach Master Planning process, PWA was contracted by Santa Barbara County to examine managed retreat and realignment alternatives (PWA 2005). At the end of this process, another consultant for the county proposed a pile groin as the preferred alternative to undergo environmental review by the county. Although this environmental review was not completed, the pile groin project was submitted to the California Coastal Commission (CDP-4-08-006) prior to certification of the project's Environmental Impact Report.

Accommodation for the beach under this park reconfiguration alternative creates more space for the natural coastal processes to occur. This is the fundamental difference between the reconfiguration alternative proposed here and the proposed pile groin. The pile groin alternative attempts to manipulate the environmental conditions to move the shoreline zone to a new location. Unlike the pile groin proposal, the Park Reconfiguration Alternative works with natural processes to create a stable shoreline and protect down-coast beaches and natural resources.

3. FACTORS AFFECTING THE SHORELINE

The major issue to consider is where the shoreline is located in relation to the rest of the park. Some functions of the park (e.g., the restaurant, parking lots) have to be located landward of the shoreline. Other functions, such as wave dissipation and some ecological and recreational functions have to be located seaward of the line. The long-term management of the park depends on understanding the interaction of the shoreline with the various functions of the park and how these functions will change in the future. Historic changes at the park including the introduction of artificial fill and placement of rock revetments have altered the natural shoreline location and reduced naturally occurring beach widths.

We usually think of the shoreline as a line drawn on a map but this is an artificial line drawn by man. In reality, the shoreline is not static, it is continually moving, and so over time it describes not a single line but a zone. In general, the shoreline represents some time-averaged high water mark and is used to represent an area of wave activity and of the dynamic beach. If set back enough, structures and assets landward of the shoreline zone would not normally be in danger from erosion and flooding.

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The shoreline zone responds at a variety of time scales:

- In the short term (days to months), during a storm the shoreline may move landward as sand is dragged offshore to form bars. In calmer weather, sand moves onshore and builds up the beach so the shoreline moves seaward. This rhythmic movement of the shoreline can be clearly seen when comparing summer and winter profiles at Goleta Beach.

- In the medium term (seasons to years), the shoreline may be influenced by particular events. A large amount of sand arriving at that part of the coast due to erosion in the watersheds or elsewhere along the coast may deposit sand widening the beach and moving the shoreline seaward. Changes in wave energy and water levels associated with El Niño and seasonal fluctuations (e.g. winter storms) also cause the shoreline to move.

- In the long term (decades), trends in sea level and tectonic earth movements may cause the shoreline to migrate. In the case of sea level rise, the shoreline will tend to migrate landward, which has been the general history for the last ten thousand years. Tectonic earth movements can result in episodic uplift which tends to move the shoreline seaward. In addition, climatic patterns such as the Pacific Decadal Oscillation a 50-60 year climate cycle which changes phase roughly every 25-30 years affects the location of storm tracks focusing wave energy into and out of the narrow swell window of the Santa Barbara Channel. Finally, reductions in sediment supply from dam, debris basins, and shoreline armoring also influence the shoreline position.

The natural position of the shoreline is not random – it is a response to a number of environmental variables and the beach is continually adjusting itself to accommodate changes in these variables:

- Wave energy – a beach dissipates wave energy in a number of ways by providing a long rough surface over which wave energy is transformed, into breaking waves and converted into sound, heat, sediment transport, and currents. Goleta Beach is relatively sheltered from large northwest wave events by the narrow swell window between Point Conception and the Channel Islands. At a more local scale, wave refraction around Campus Point further reduces wave energy. However, during large wave events, often associated with El Niños, when swell direction is more west, the response of the beach profile is to flatten and erode inland. These profile changes increase the ability of the beach to dissipate wave energy and are part of the natural beach response to storms. The narrowing or truncating of the beach area (e.g. as due to the existing revetment) available for wave energy dissipation can lead to an increase in scour on the fronting beach, and lower the sand levels.

- Sand supply– sand to Goleta Beach comes predominantly from the creeks and rivers to the north and west. Local geologic formations forming the nearby bluffs along Isla Vista only contribute small amounts of sand (Runyan and Griggs 2004) to the beach although the contribution of cobbles is not well understood. Sand arrives along Santa Barbara beaches often during episodic storm events when stream and river discharge pulse sediment into the ocean as deltas. Over time these deltas erode as sand is transported onshore during low wave energy conditions. Proliferation of dams and debris

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basins have impounded sand and reduced the amount of sand contributed to the beaches of Santa Barbara and Ventura County by about 40% (Willis and Griggs 2003). A reduction or interruption in upland or updrift sand supply is a primary cause of shoreline erosion.

- Sand transport - Sand along the Santa Barbara coast does not just move onshore and offshore, it also moves east along the coast (alongshore). Waves approaching a beach at an angle will tend to move sand along the coast. In general, the larger the incident wave angle and the larger the waves, the greater the transport of sand. The angle the waves approach is governed by the direction of storms and ocean swell waves, the shape of the seabed for several miles offshore and the shelter provided by headlands and islands. The shoreline may be relatively stable even though a large quantity of sand is being transported provided an equal quantity of sand is arriving from further up the coast. Along Goleta Beach to the Santa Barbara Harbor, estimates of the long term average annual alongshore transport is around ~300,000 yds^3(Patsch and Griggs 2007). However given the episodic nature of sediment supply and storm events in this region, the actual transport in a particular year typical differs from the long term average, and can vary with location along the shoreline (described further below).

- Sea level rise – the position of the shoreline is defined where the beach profile and the surface of the sea intersect. With rising sea levels, associated with climate change, the point of intersection will tend to move landward, moving gradually over decades. Relative sea level rise is the difference between global sea level rise rates and vertical land motions affected by local tectonic conditions. Episodic tectonic movements cause the land levels to rise faster than sea level with the result to move the shoreline seaward. Geological dating of the West Bluff at Goleta Beach places the age at ~45,000 years BP and provides some indication that this section of coast is uplifting at about the same rate of sea level rise ~2mm/yr (Keller and Gurrola 2000).

The key is to understand the width and location of the dynamic coastal processes zone in which the shoreline will fluctuate in the future in response to large wave events, changes in sediment supply, and sea level rise, and to accommodate this dynamic coastal processes zone with the other functions of the park.

4. RECENT SCIENTIFIC STUDIES RELATED TO GOLETA BEACH

Substantial research on Goleta Beach has been completed by several authors since the publishing of the PWA report (2005). The most pertinent articles are Revell and Griggs, Revell, Dugan, and Hubbard (in press), and Hapke et al. (2006, in press, 2006). In addition, there are ongoing efforts of the USGS combining long term shoreline and beach change research by Revell with ongoing seasonal monitoring funded in cooperation with BEACON.

In Revell and Griggs (2006), the authors found that the beaches along Goleta have not exhibited a high long term erosion trend, but rather beach widths oscillate apparently in phase with the Pacific Decadal Oscillation. During positive “cool” phases (“El Niño like”), storms come from a more westerly direction (Adams, Inman, and Graham 2008), resulting in a reduced sheltering of Goleta Beach from waves.

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During the opposite phase, storms tend to be shifted northward increasing the wave sheltering and reducing wave energy resulting in wider beaches.

These authors also identified significant reductions to beach widths in front of shoreline armoring structures as a result of placement loss and passive erosion. The placement of rock revetments onto the beach reduces the overall beach area available for recreation and habitat while negatively impacting public beach access both vertically and laterally. Another significant impact to Goleta Beach has occurred at the ebb delta to Goleta Slough. The ebb delta was largest in 1938 prior to the development of the Santa Barbara Airport. The decline of this delta has been linked to the reduction in tidal prism as a result of filling of the Goleta Slough to construct the Santa Barbara airport.

The research by Revell, Dugan, and Hubbard (in press) grew directly out of a question that arose during the Goleta Beach Master Planning stakeholder process, "What is the impact of a large El Niño on Goleta Beach?" By combining topographic LIDAR data, historic shoreline change information, and measurements of ecological indicators, the authors examined the physical changes caused by the 1997-98 El Niño and the ecological response including identifying some timelines to beach and ecosystem recovery. The research found that the beaches narrowed by more than 50%, lost more than 60% of sand volumes, and also rotated in response to the El Niño storms. Beach rotation is a natural response of beaches during large storm events (often associated with El Niños) to reduce longshore sand transport and maintain sand on the beach. In this study, the authors identified the causative mechanism for the recent erosion at Goleta Beach - propagation of an erosion wave. After the El Niño, updrift Ellwood Beach remained in a rotated position for at least two years after the event. During this period, sand was naturally impounded at Ellwood, which initiated an erosion wave that migrated downdrift starving Goleta Beach. Historic profiles collected by Coastal Frontiers during monitoring of the Goleta Beach nourishment project, and subsequent seasonal surveys by the USGS, show a pulse of sand arriving at Goleta Beach in 2005. By 2005, the beach at Goleta had largely recovered its ability to buffer erosion. Currently, the erosion wave has continued to propagate downdrift affecting Arroyo Burro, Shoreline Park and is currently located at Ledbetter Beach on its way to the Santa Barbara harbor.

The last pertinent studies to Goleta Beach include examination of long term shoreline changes (1870s to recent) by the USGS and Revell. Both studies, using slightly different techniques, found that average annual long term shoreline change rates for Goleta Beach are less than -7in/yr (Hapke et al 2006, Revell and Griggs 2007). However, the average annual changes detected using a linear trend must be questioned given the oscillations observed in beach widths, and the large variability associated with the episodic nature of large storms and wave events. During this study, Revell identified that the 1943 shoreline was the most landward extent at Goleta Beach observed in the historic air photo record. In 1945, following the 1943 most eroded conditions, human changes resulted in the filling of much of the parkland artificially pushing the park seaward.

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4.1 CONCEPTUAL MODEL FOR GOLETA BEACH

The recent measurement and observation of beach oscillations, stable sandy beaches (beaches that always have some sand and hence wider minimum beach widths), the measurement of storm event beach rotations and the historic and current documentation of erosion and accretion waves provide the basis for a revised conceptual model of beach behavior along the Santa Barbara coastline (Revell and Griggs 2006, Revell, Dugan and Hubbard in press, Revell and Griggs 2007). This conceptual model also builds on the discussion of the hook shaped bay presented in PWA 2005.

Along the Santa Barbara coastline, the stable beaches such as Goleta Beach and Ellwood form different sized sand boxes or sand deposits (hereafter referred to as boxes). These boxes are connected by the movement of sand between the boxes as driven by waves. Areas without much sand, such as Isla Vista, are typically stretches of shoreline where transport is more rapid and sand does not remain for long; these are not considered boxes. The sand boxes tend to extend from the base of the cliffs to a moderate depth offshore (~2m). In dune backed boxes, (e.g Ellwood and historically Goleta) these boxes extended well inland to encompass the entire dune system.

During calm wave energy periods, these sand boxes tend to be wide such as those beaches seen during the calm PDO phase in the 1970s (Revell and Griggs 2006) when wave energy was reduced. As each box fills, it must reach a certain level before it cascades sand downdrift making it available to the next box. When this cascading transport of sand is interrupted, (e.g shoreline rotations, or human alterations such as the construction of the Santa Barbara Harbor breakwater) or reduced (e.g. the proposed permeable pile groin), then the downdrift box closest to the impoundment begins to erode. Once that first downdrift box is reduced below the bypass level, then the next box downdrift begins to erode. Conversely as sand is moved around the impoundment, the downdrift boxes fill up again in the order that sand is received. In this example, as Ellwood filled up to the bypass level, sand cascaded downdrift to fill the next box, Goleta Beach.

During a major erosion event such as an El Niño, the boxes lose most of the sand AND the beach changes shape by rotating into the dominant wave direction - generally clockwise in response to large waves from the west. In dune backed boxes, the size of the box can get temporarily larger as sand is eroded from the dunes supplying even more sand to the overall system and thus reducing some of the erosion impacts. During these erosion events, much of the sand volume (>60%) is lost revealing a layer of cobbles that, without the sand on top, changes its behavior (due to increased porosity), and gains elevation providing a dynamic cobble revetment that becomes active during large erosion events. This change of shape and size of the boxes, and coarsening of grain size reduces some of the erosion impacts. It also affects the storage capacity of each box and can increase the recovery time for each box to reach bypass level. Only after a box reaches its unique bypass level will it begin to cascade and fill downdrift boxes. At Goleta Beach, the erosion wave initiated during the 1997-98 El Niño was a result of the lack of input from upcoast sediment sources during the time required to fill the sand box at Ellwood.

Generally most of the sand cascading between boxes occurs during the winter time in higher energy conditions. Since many of the boxes are located near inlets, if there is a flood event, many of these boxes gain sand. However, the sand that is gained is generally deposited offshore in deltas and not immediately used to fill the boxes. These deltas may however reduce rates of longshore sand transport which can result in wider beaches updrift. The deterioration of the ebb delta at Goleta Beach may be enhancing storm erosion impacts. Over time (seasons to years), the sand deposited in the deltas moves landward and fills in the boxes. Disruptions or alterations to the shape or storage capacity of these boxes such as that proposed under the pile groin alternative has the potential to impact downcoast beaches.

4.2 IMPLICATIONS FOR FUTURE MANAGEMENT

1. The oscillation of Goleta Beach appears to be a balance between occasional large pulses of sediment that widen the beaches and erosion periods when the sediment is transported eastward. Wave direction is especially important with most erosion occurring during energetic southerly El Niño conditions – which produces large waves from the west, and a reduction in wave energy during the negative phase of the Pacific Decadal Oscillation – associated with waves predominantly from the north. Recent indications from NASA suggest that we may be entering a negative phase of the PDO (2008).

2. In the event of future erosion waves such as the one that impacted Goleta following the 1997-98 El Niño, nourishment in the erosion wave of appropriate volumes could be conducted to reduce the recovery time and prevent further deterioration of beach buffering capabilities. Following the 1998 El Niño, about 510,000 yds^3 were removed from the beaches from Ellwood to Goleta with Goleta losing approximately 175,000 yds^3 of sand (Revell, Dugan and Hubbard in press). This erosion especially at updrift Ellwood catalyst the erosion wave. In order to offset a similar erosion wave an estimated 175,000 yds^3 of sand would be needed. This volume is of greater quantity than any single nourishment effort following the 1998 El Niño event despite an approximate ~270,000 yds^3 of sand nourished sporadically during the 9 years (~30,000 yds^3/yr) following the event (Moffat and Nichol 2008).

3. Infilling of Goleta Slough and the consequent reduction in the ebb delta has reduced the stability and possibly increased the longshore transport along Goleta Beach.

4. The park reconfiguration alternative will provide additional room for coastal processes to occur.

5. Another pulse of sand arrived at Goleta Beach in fall of 2005, with the corresponding beach widening providing additional erosion protection.

5. PARK RECONFIGURATION ALTERNATIVE

A conceptual design for a park reconfiguration alternative has been developed that considered the goals and outcomes from the Master Planning Working Group process, input from EDC and Surfrider

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Foundation, and an understanding of historic and future shoreline evolution. The design consists of a park reconfiguration which allows for natural shoreline realignment along the west end of Goleta Beach and includes beach restoration, removal and refinement of coastal armoring, and the relocation of existing utilities and structures.

The constraints used to shape the alternative include:

- Same number of parking spots as 2008 (594)
- Same number of restrooms and facilities
- Same acreage of lawn as 2008 (4.0 acres)
- Similar acreage of beach as 2008 (3.0 acres)
- No new rock
- No backstop revetment landward of coastal process zone
- Removal of ranger housing and surrounding buildings as a planned
- Maintain restaurant
- Maintain Pier

The philosophy behind the park reconfiguration alternative is to relocate threatened infrastructure from the seaward side of the park and put it on the landward side of the park. This will enable more room along the seaward side of the park for coastal processes to occur naturally, while enhancing the recreational and park amenities on the lawn area between the parking lots and the beach. (Figures 1, 2).

To determine the potential extent of shoreline realignment, a coastal processes zone is herein defined as an area in which storm induced erosion and flooding can cause either an erosion of the shoreline or damage to infrastructure that lies within the zone. The intention is to remove facilities, infrastructure and utilities from this zone (figure 3). Moving utilities and structures landward of this coastal processes zone would provide a setback from the existing shoreline and provide an increase in the area over which natural coastal processes could operate.

The coastal processes zone was defined landward using the 1943 back beach shoreline. The 1943 shoreline is the most landward observed in the past 80 years and pre-dates significant human alterations. The area between the landward edge of the buffer zone and the maximum seaward shoreline measured in 1975 provides the seaward limit of the coastal processes zone (Figure 4).

5.1 20-YEAR VISION OF PARK RECONFIGURATION ALTERNATIVE

Within 20 years, realignment to a stable shoreline position would be allowed to the west of the restaurant as shown in Figures 1 and 2. The restaurant and the parking lot on the spit to the east would remain in place protected by the existing rock revetment[1]. The area from the west bluff to the restaurant

[1] The County may consider re-engineering this revetment given its current condition. While not included in this alternative, the potential exists to reduce the overall footprint of this structure while maintaining existing parking levels. A relocation of the pier restroom would upgrade the park facilities enhancing both public recreation and natural beach area while remaining consistent with the intent of this alternative – reconfigure the park to allow more room for natural processes to occur.

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accommodates future coastal evolution within the coastal processes zone. The park reconfiguration alternative shows the coastal process zone as a restored beach area (Figure 1).

Landward of the coastal processes zone is a beach park area that includes the existing park amenities reconfigured for the future shore conditions: space for the same acreage of lawn that currently exists, a playground, barbecue pits, horseshoe pits, picnic tables and group picnic areas, public restrooms and paths that connect the beach to the parking areas. The approximate area of the lawn in the proposed Park Reconfiguration alternative is 4.2 acres with an initial .2 acre gain compared to existing conditions as a result of Parking Lot A relocation. This increase in lawn would be located in the coastal processes zone, so overtime this increase may be reduced to existing levels. This reconfiguration also extends the desirable beach/lawn interface and potential beach access by over 850 feet to a total of 1900 linear feet.

Landward of the beach park area are Parking Areas A and B and maintenance area. The maintenance area and ranger housing would be removed as already planned by the County. In the Park Reconfiguration alternative design, Parking Areas A and B are shown connected to the restored beach area with paths to focus beach access.

Approximately 1000 feet of existing rock revetment at the west end of the park would be removed; this section of revetment is not necessary under the proposed alternative. However, at this time, it is not practical to relocate the existing restaurant, adjacent restroom, and surrounding infrastructure given the economic value and lease arrangements with the restaurant. The existing rock revetment in front of the restaurant and restroom would be extended by 150 feet to the west to protect Parking Area C and the sewer outfall vault. The rock removed from the existing west end revetment would be used to protect the sewer outfall vault. The remaining rock will be stockpiled on site at the County maintenance yard or used to bolster the existing eastern rock revetment.

As the west end and mid park revetments are removed, the underlying fill will be regraded to provide safe public access then covered with sand and vegetated (Figure 5). This area within the coastal processes zone may be subject to episodic erosion which would likely oversteepen or create a scarp in the fill material. Ongoing maintenance in the spring would be required to regard this scarp and renourish with opportunistic sediments.

Ideally, the relocation of utilities and park amenities occurs initially, but it is not required that all the proposed changes in the conceptual design occur at once. Proposed changes could be implemented in a phased manner to accommodate the evolution of the beach and budgetary constraints, and to time work to avoid highest park use periods. It is recommended that relocation of existing utilities and restrooms within the coastal processes zone be completed early in the project, but it is possible to relocate facilities within the coastal processes zone on an as needed basis. This may affect the cost at the actual time of implementation.

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5.2 PHASING OF 20-YEAR VISION

For the park reconfiguration alternative, existing utility lines, buildings, and parking lots would need to be reconfigured or removed to accommodate the design. It is anticipated that the coastal processes zone would be eroded at least once in the next 20 years given the trends in long term shoreline changes and the episodic pulses of sediment moving along the coast. While the beach would likely recover from such an erosion event, facilities in the zone may be damaged or lost. Structures and utilities within this zone, such as the restrooms, need not be relocated immediately but as erosion threats warrant and budgets allow. It is recommended a triggering threshold of 20 feet be used to identify when a utility or structure needs to be relocated. Figure 3 shows the elements in which either portions of utility lines or existing structures need to be relocated or removed as part of the park reconfiguration.

The utilities to be relocated include:

- Goleta Water District reclaimed water line
- Goleta Sanitation District pressure sewer line
- Potable water line
- Southern California Gas Line[2] (which lies outside the coastal processes zone)
- Small sewer lines to existing restrooms
- Park irrigation lines

Relocated facilities include:

- Parking Lot A
- Two restrooms
- Ranger housing (planned to be removed by County already)

The initial work includes removing the west end revetment and relocating Parking Area A landward. The next step is to regrade the scarp in the fill material at a 5:1 slope (H:V) and add lawn and sand at the landward extent of the beach (Figure 5). The vertical scarp in the fill that that forms following an erosion event could be a safety issue and also presents a negative image of the park. It is suggested if the scarp is exposed during the spring that the scarp be regraded (at 5:1 slope; H:V) and covered in sand e.g. from the sediment debris basins, and flood control projects located within the Goleta Slough watershed. This sand is already permitted for placement under BEACON's South Central Coast Beach Enhancement Program for opportunistic sediment use permit (SCCBEP). This sand would act as supplemental nourishment of the back beach.

[2] We assume that responsibility for this infrastructure lies with the Utility District since it is a private entity utilizing public lands and is not the responsibility of the County of Santa Barbara. However, we have included this relocation cost for reference only and envision a cooperative approach between the county and utility districts to obtain funding e.g. grants and/or state funds and generate support from various stakeholder groups. This is not included in any of the cost estimating associated with any of the alternatives.

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At the western end of the beach, much of the existing parking area would be reconfigured to accommodate Parking Area A. Several existing buildings would be removed or relocated as currently planned - within Parking Area B, including several maintenance sheds and onsite ranger housing. Parking Areas C and D in the proposed design currently exist, but will need to be reconfigured and restriped to compensate for the loss of spaces elsewhere. The total number of parking spaces in the park reconfiguration alternative is based on a uniform parking space dimension of 8 feet wide by 15 feet long as measured in air photos. A rigorous analysis to optimize the parking spaces, including spaces for varied sizes for compact cars and disabled parking, was not conducted as part of this analysis. There are a total of 594 parking spaces based on this estimate which is reported to be the current level of parking. The intent behind the parking analyses is to ensure that there will be equivalent number of parking spaces for the park reconfiguration alternative.

Given the likelihood that there could be another energetic El Niño in the next 20 years, the park reconfiguration alternative includes a one time erosion wave response nourishment of 175,000 yds^3 at some unknown date in the future. Annual maintenance costs for all alternatives would include seasonal monitoring as well as routine maintenance which should be similar for all alternatives. The park reconfiguration alternative would likely have slightly reduced operating costs due to the upgrading of new restroom and parking facilities and thus not require as many repairs.

5.3 ADDITIONAL OPTIONS

Several other options for the park reconfiguration alternative could also be included although these have NOT been cost estimated or incorporated into the proposed park reconfiguration alternative.

One option would be to replace the bathroom on the south side of the pier with a new restroom set inland on the opposite side of the restaurant buildings. This option would create space to enable a realignment of the armoring on the south side of the pier and increase the area available for the natural coastal processes at the most narrow point along Goleta Beach.

Another option to be considered would be the use of impervious pavement for all of the new parking lots. This would serve the purpose of improving local water quality conditions, and providing an educational showcase on one method of low impact development. These additional options could be included in any preliminary design stage if the county decides to move forward with this reconfiguration alternative.

6. COMPARATIVE COSTS

The Park Reconfiguration alternative's costs are PWA's preliminary engineers' estimates of likely construction and operation/maintenance costs. The County EIR's managed retreat and pile groin projects' costs are based upon the recent cost estimates by Moffatt and Nichol Engineers Long-Term Beach Restoration and Shoreline Erosion Management Plan (Moffatt and Nichol, 2002). For comparative purposes all of the cost alternatives are present in 2007 dollars.

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For planning purposes we have provided order of magnitude estimates to allow cost comparison of alternatives. These cost estimates are intended to provide an approximation of total project costs appropriate for the preliminary level of design. These cost estimates are considered to be approximately -15% to +30% accurate. These estimates are subject to refinement and revisions as the design is developed in future stages of the project.

6.1 PARK RECONFIGURATION

The Park Reconfiguration alternative: removes and regrades fill from the back beach, replaces fill with sand, provides for major reconfiguration of existing parking lots that currently require reconstruction, removes the western segment of revetment, extends the eastern revetment and relocates restrooms and utilities farther inland. All park improvements (except the lawn) are proposed to be moved inland of a "coastal processes zone" consistent with contemporary research. The width and location of the coastal processes zone have been established to accommodate the likely shoreline fluctuations over the next 20 years and nourishment of the beach is expected only on a contingency basis with a one time nourishment cost estimated in response to a major erosion event. However, based on historic data, erosion into this zone is not anticipated to occur before approximately 2028.

The reconfiguration presented herein is one possible layout that maintains all uses and elements (in terms of function, not existing location) previously identified by County Parks, and included in other alternatives. The precise park configuration is subject to further design and community input.

Removal of 950 feet of rock forming the western revetment is estimated at $209k ($220/ft, modified from Moffatt and Nichol, 2008). The extension of the eastern revetment, in front of parking lot C, by 150 feet is estimated at $0.33M ($2200/ft, updated from Moffat and Nichol, 2002).It is assumed that the removal of rock from the western revetment will be used directly to extend the eastern revetment with the remaining material stockpiled at the County maintenance yard or placed on the existing eastern revetment.

The fill above MHHW would be removed to the seaward edge of the buffer and replaced with sand. Removal cost of the fill would be approximately $11/yd^3 and include excavation and reuse on site during construction of the new parking lots. Sand backfill and fill will be accomplished using upland or opportunistic sand (already permitted under SCCBEP) or offshore sources. The total volume of fill to be removed is approximately 20,000 yd^3 at a cost of $0.22M and replaced with approximately 30,000 yd^3 of sand at a cost of approximately $0.44M. Initial costs would be minimized if the beach fill was left in place; the erosion scarp regraded each spring and then allowed to erode the following winter (Figure 5) This phased approach would then increase the ongoing operations and maintenance cost. Total estimated initial costs considering the total removal of the fill as part of the initial construction is $0.96M.

The beach would then be allowed to fluctuate over the next 20 years in a state of dynamic equilibrium. At measured rates of historic retreat the coastal processes zone will not be eroded until after 2028. Although these rates do not account for the pulses of sediment through the system, the coastal processes zone will

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enable these natural processes to occur without jeopardizing infrastructure and park facilities. There are also some indications that we may be entering a different phase of the Pacific Decadal Oscillation which would be more conducive to beach accretion (NASA 2008). The utilities and restrooms lie within the coastal processes zone and would not have to be moved until the back beach reached within 20 feet of these facilities zone. The relocation of these facilities should be planned in advance and timed with the availability of funds. Cost for relocating two restrooms including necessary infrastructure is approximately $0.44M (figure estimated by Santa Barbara County Parks and updated to 2007 dollars). The cost of new parking lots is approximately $0.6M using unit costs of $3.60/sf from Moffatt & Nichol Engineers. The new lawn is estimated to be $136K.

A portion of the pressure sewer line has recently been relocated landward out of the coastal processes zone; the cost for relocating the remaining portion of the sewer line inland is estimated to be $58K (figure estimated by Santa Barbara County Parks and updated to 2007 dollars). A larger undertaking is the relocation of 500 feet of the reclaimed water line that lies in the processes zone between the West Bluff and the western restroom. The cost for relocating this portion of the reclaimed water line inland is estimated to be $0.57M ($1000/ft, figure estimated by Goleta Water District and updated to 2007 dollars) Additional utility relocations include 900 ft of electrical and telephone lines at a cost of $57K, 1100 ft of potable water line at a cost of $45K (figures provided by Santa Barbara County and updated to 2007 dollars). A high pressure gas line exists at the site and is assumed to remain in its current location and thus is NOT included as part of the Park Reconfiguration Alternative.

To be thorough, the construction cost for the new high pressure gas line was estimated at $500,000 to $800,000. This estimate is from the presentation by utility companies to the Goleta Beach Park Working Group on March 4, 2004. This was summarized in a letter to Steve Hudson and Jenn Feinberg from Dave Ward, dated 2-15-2008. These costs were updated to 2007 dollars (to match all other dollars in the memo and cost estimate) to arrive at a range of $570,000 to $910,000.

A one time beach nourishment is included as a contingency element estimated to occur within the 20-years following project construction. A volume of 175,000 cy is included in the Park Configuration Alternative at a unit cost of $14.5/cy (estimate from Moffatt & Nichol Engineers, 2007). This volume of sand would widen the entire Park beach about 40 to 50 feet (following redistribution to the entire shoreface). It is anticipated that this level of beach nourishment would be desired following a severe winter such as that associated with a strong El Nino. This may or may not occur within the 20 year planning horizon. This item could also be considered a necessary addition to the other alternatives as well, which are also susceptible to storm impacts and erosion waves.

With removal of the western revetment, extension of the eastern revetment, relocation of the restrooms, new parking lots and lawn, relocation of portions of the sewer line, water line, electric and telephone lines, and the reclaimed water line, replacement of the fill, the initial project cost is estimated to be $4.7M, and with the ongoing beach nourishment as needed on a contingency basis the 20-year project cost is estimated to be $8.4M.

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6.2 SUMMARY OF ALTERNATIVES AND COSTS

The alternatives and their estimated costs described above are summarized in the Table 1 below. A detailed cost summary and comparison of the alternatives is presented in Table 2.

Table 1. Summary of Alternatives (2007 dollars)

	Existing Conditions	**Managed Retreat**	**Permeable Pier/ Pile Groin**	**Park Reconfiguration**
Lawn area	4.0	2.87	4.0	4.2 acres
Buffer area (sand or lawn)	-	1.3	-	1.3 acres
Beach area	3.0	4.0	8.6	4.5 acres
Total area for recreation	7.0	8.5	12.6	10.0 acres
Alongshore length of lawn/beach	1,035	1,900	1,300	1,900 ft.
Parking spaces	594	594	594	594
Sand Pre-fill	-	100,000 yds^3	550,000 yds^3	30,000 yds^3
Initial cost	-	$7.5M	$8.7M	$4.7M
20 year cost	-	$11.1 M	$9.6M*	$8.4M

* This cost does not include future nourishment which could increase the cost an estimated $10.5M (see text p. 17)

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Table 2. Detailed Summary and Comparison of Alternatives.

Construction Element	Managed Retreat Alternative	Beach Stabilization (Groin) Alternative	Park Reconfiguration Alternative
Estimate Prepared by:	Moffat & Nichol	Moffat & Nichol	PWA
Initial Construction Phase	**Estimated Cost[1]**	**Estimated Cost[1]**	**Estimated Cost[1]**
Mobilization & Demobilization	$200,000	$100,000	$100,000
Temporary Protective Fence	$12,600	$18,600	$9,000
Detour Traffic	$15,000	$15,000	$15,000
Utility Relocations	$275,500	$0	$728,000
Demolition	$687,500	$0	$288,000
New Restrooms	$229,250	$0	$444,000
West. & Mid. Revetments Removal	$220,000	$96,000	$209,000
New East Revetment	$89,750	$0	$90,000
East Revetment Repair	$483,800	$0	$0
West-End Backstop Revetment	$211,121	$216,108	$0
New Parking Lots	$325,500	$0	$612,000
New Lawn	$985,000	$0	$136,000
Removal of Fill Material	$0	$0	$222,000
Beach Nourishment	$1,547,128	$0	$0
Groin, Deck Construction	$0	$759,000	$0
Beach Pre-Fill	$0	$4,924,500	$435,000
Subtotal	$5,282,149	$6,129,208	$3,288,000
Contingency (25%)	$1,320,537	$1,532,302	$822,000
Eng, Design, Super, Admin (15%)	$792,322	$919,381	$493,200
Permitting (2.5%)	$132,054	$153,230	$82,200
TOTAL - Initial Phase	**$7,527,062**	**$8,734,121**	**$4,685,400**
Secondary Construction Phase[2]			
Mobilization & Demobilization	$100,000	$0	$100,000
Temporary Protective Fence	$12,600	$0	$9,000
Detour Traffic	$15,000	$0	$15,000
Beach Nourishment	$1,660,979	$0[3]	$2,500,000
New Lawn	$704,000	$0	$0
West-End Backstop Revetment	$0	$0	$0
Groin, Deck Construction	$0	$588,000	$0
Subtotal	$2,492,579	$588,000	$2,624,000
Contingency (25%)	$623,145	$147,000	$656,000
Eng, Design, Super, Admin (15%)	$373,887	$88,200	$393,600
Permitting (2.5%)	$62,314	$14,700	$65,600

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TOTAL - Secondary Phase	**$3,551,925**	**$837,900**	**$3,739,200**
TOTAL	**$11,078,987**	**$9,572,021**	**$8,424,600**
Operating and Monitoring Costs			
Annual	$130,000	$130,000	$130,000
20-year Total	$3,500,000	$3,500,000	$3,500,000

Notes:

1. All costs are presented in 2007 dollars.
2. The secondary construction is anticipated to occur in 2013, but costs are presented in 2007 dollars under the assumption that net escalation of construction costs relative to monetary inflation is small and accounted for in the contingency.
3. This cost does not include future nourishment which could increase the cost an estimated $10.5M (text p. 17)

The operating and monitoring costs are based on estimates for ongoing costs prepared by Santa Barbara County using annual costs with and escalation of 3% annually over the 20-year project period. PWA changed the annual costs for the Groin Alternative from $120k to $130k. It is also likely that the managed retreat alternative and the park reconfiguration alternatives would have reduced annual maintenance costs due to the replacement of aging facilities.

The Park Reconfiguration alternative is the lowest cost, while maintaining / replacing aging facilities (utilities, restrooms, shore protection for restaurant), in addition to enhancing and maintaining the lawn and beach areas and interface. The Park Reconfiguration Alternative does not include the potentially large, adverse effects to the downcoast beaches and tidal inlet associated with the Permeable Groin Alternative.

In contrast, the Permeable Pile Groin project costs approximately 45% more than the Park Reconfiguration Alternative, without providing new parking areas or new restrooms. The pile groin is unlikely to prevent the beach fluctuations associated with sand supply changes and episodic storm events. Given the alteration to the storage capacity of Goleta Beach, and the potential for larger volume losses following erosion events, there is a much higher risk that the permeable pile groin will have downcoast impacts. Initial pre-fill of 550,000 yds^3 may initially mitigate downcoast impacts. However, the increased storage capacity would result in greater sand impoundment following erosion events and increase the time for Goleta to fill up before cascading sand down drift. Downcoast impacts similar to those observed following the 1997-98 El Niño as the causative erosion wave passed through Goleta, could be expected to worsen as a result of the pile groin alternative. It is likely that any contingency nourishment required with the Pile Groin would include the eroded fillet volume (550,000 yds^3) and the volume necessary to infill another erosion wave (~175,000 yds^3). The cost of such a contingency is not included in cost estimating for the groin alternative and would may add an additional $10.5M in nourishment costs to the 20 year total.

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It is also important to note that PWA reviewed a hard groin alternative with a similar placement as the proposed pile groin (PWA 2005), and found that the salient created by the groin did not extend updrift (west) enough to protect the west end of the park. Given the proposed groin's permeability of 33%, the groin would be less successful than a solid structure in retaining sand. The greater the permeability designed to mitigate downcoast impacts, the less effective the sand trapping and the smaller the salient. Given the variable coastal process and sediment supply conditions the tuning of the groin would likely require ongoing maintenance increasing operations and maintenance as well as recreational opportunity costs.

PWA's initial assessment of the Permeable Groin alternative is that it is too risky to recommend. In general, the Permeable Groin Alternative is dubious in terms of effects and effectiveness, although more technical work is needed to evaluate the supporting modeling results and assumptions.

As a result of the Park Reconfiguration Alternative's lower cost, the alternative's effectiveness, avoidance of downcoast impacts, and the ability to retain and improve park facilities as well as the uncertainties associated with the proposed groins, the Park Reconfiguration alternative is the preferred alternative.

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7. LIST OF FIGURES

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8. REFERENCES

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9. LIST OF PREPARERS

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Philip Luecking, P.E.
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With technical review by:

Michael Walther, P.E.

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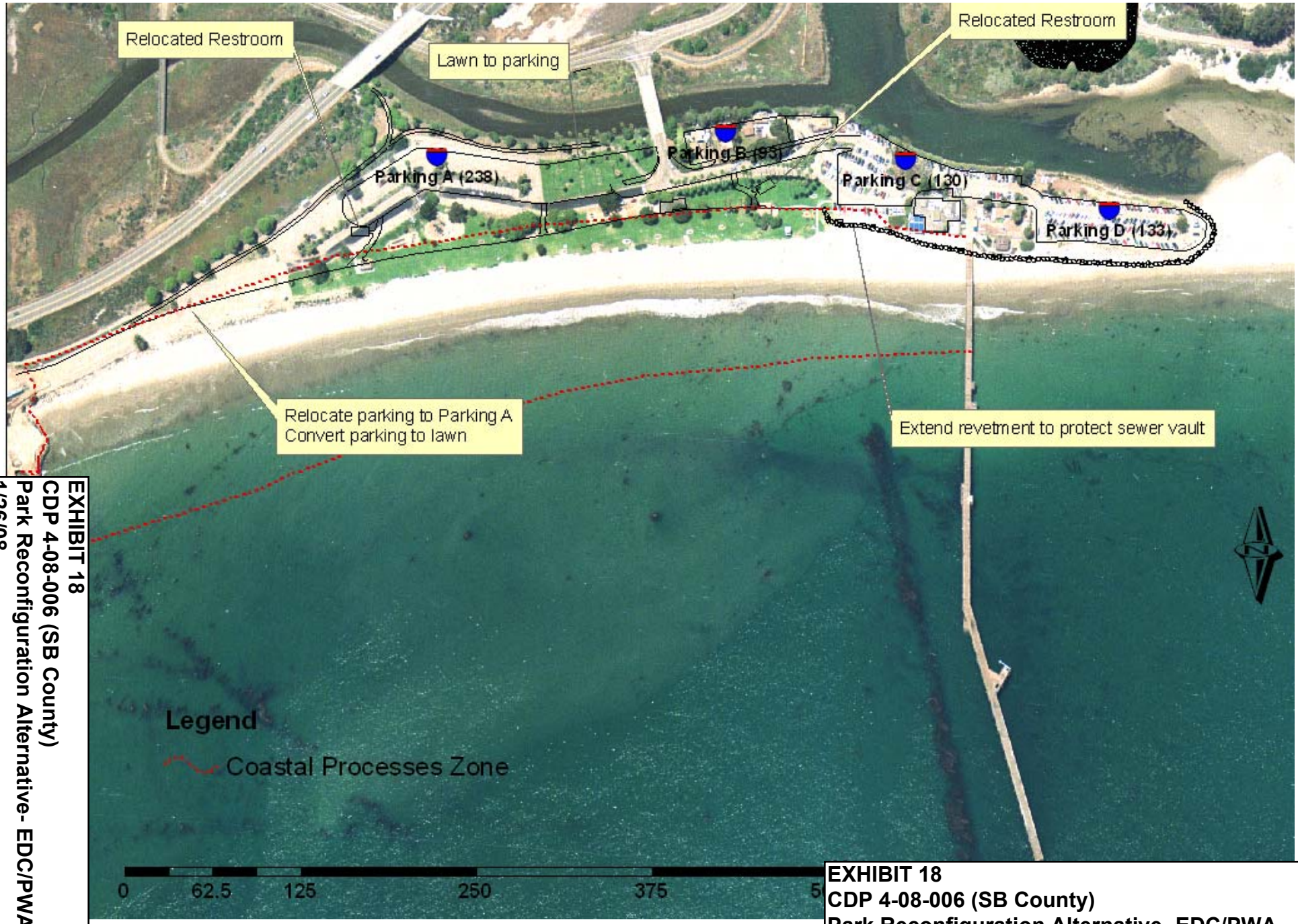

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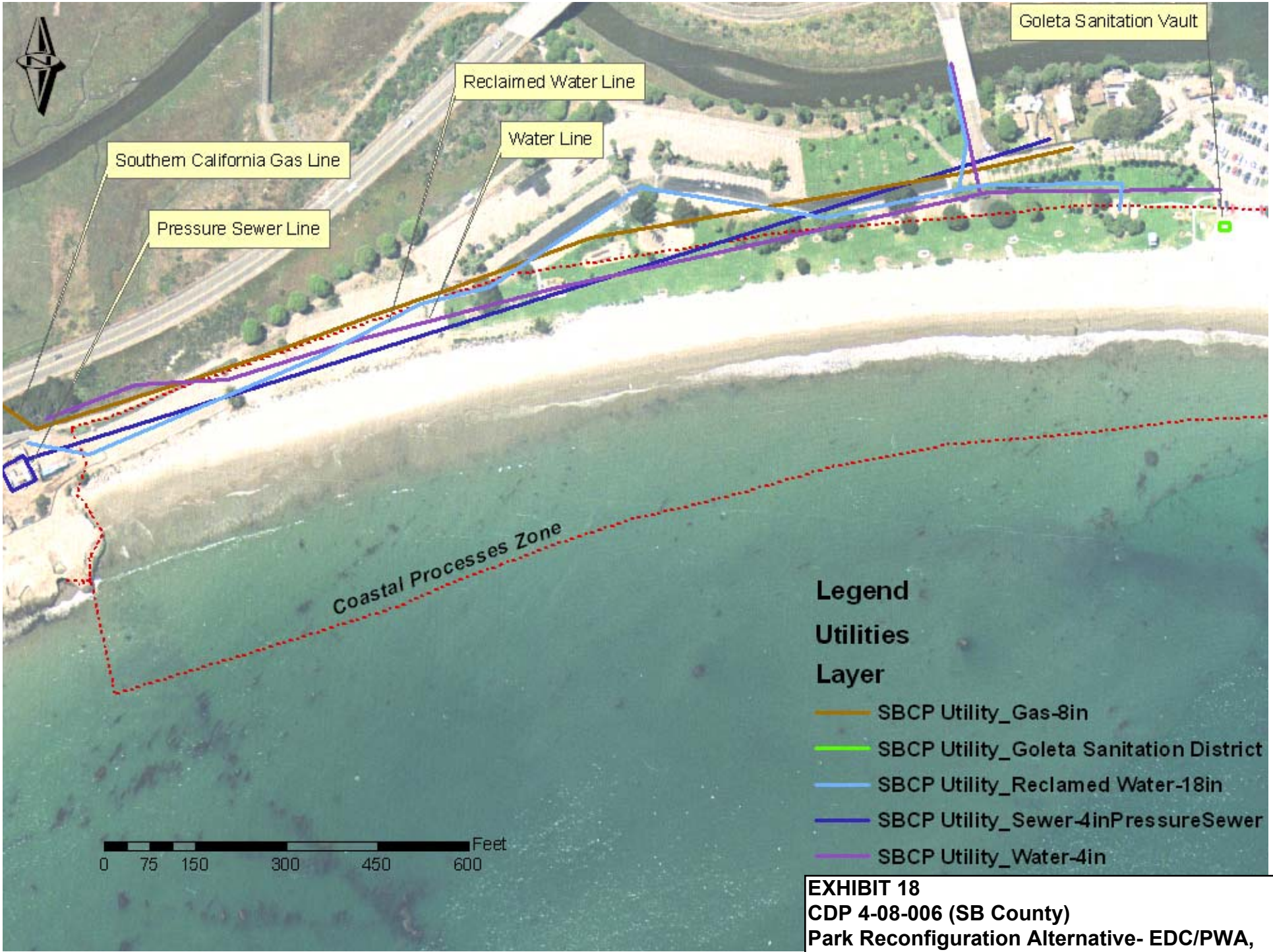

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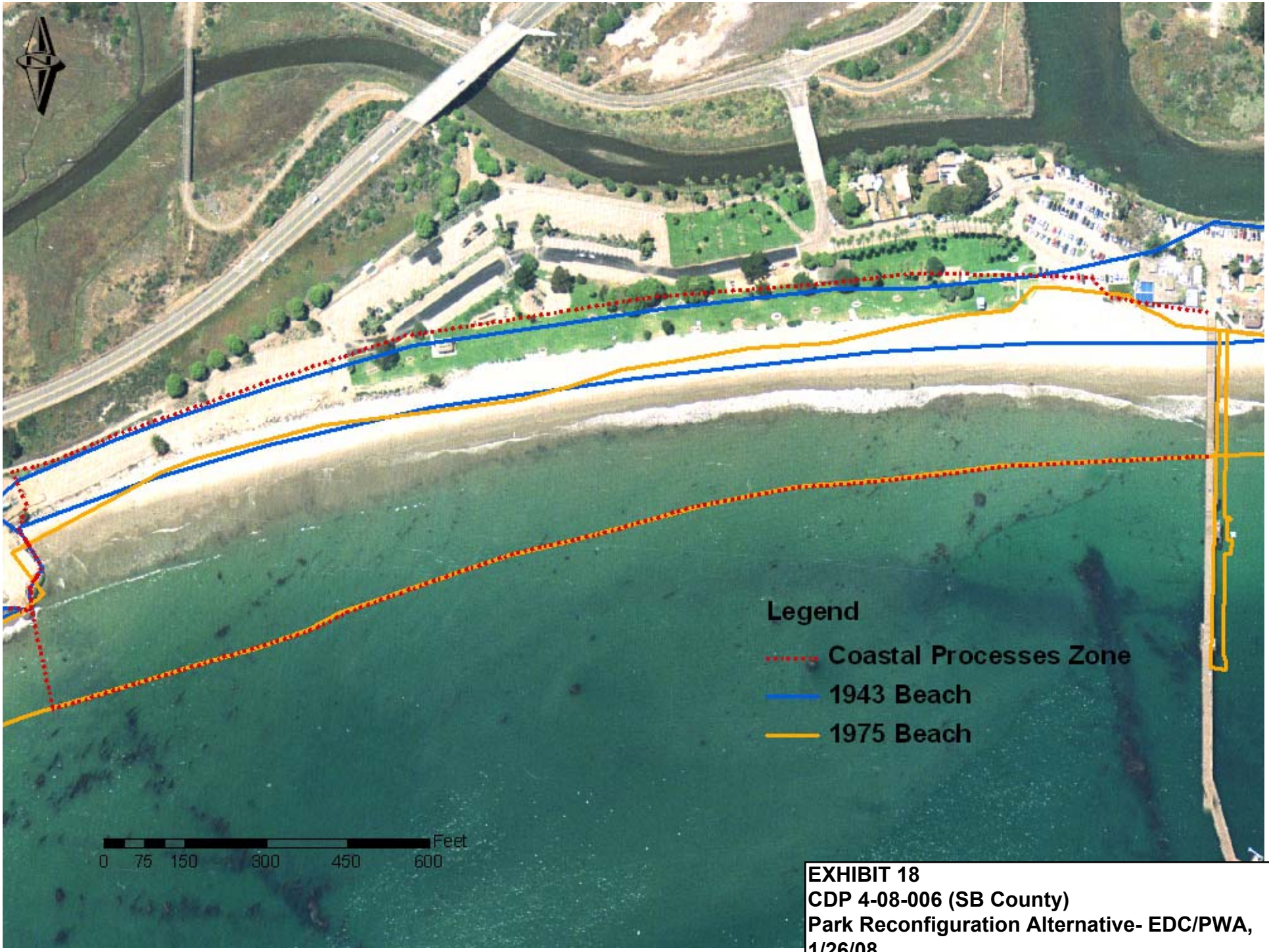

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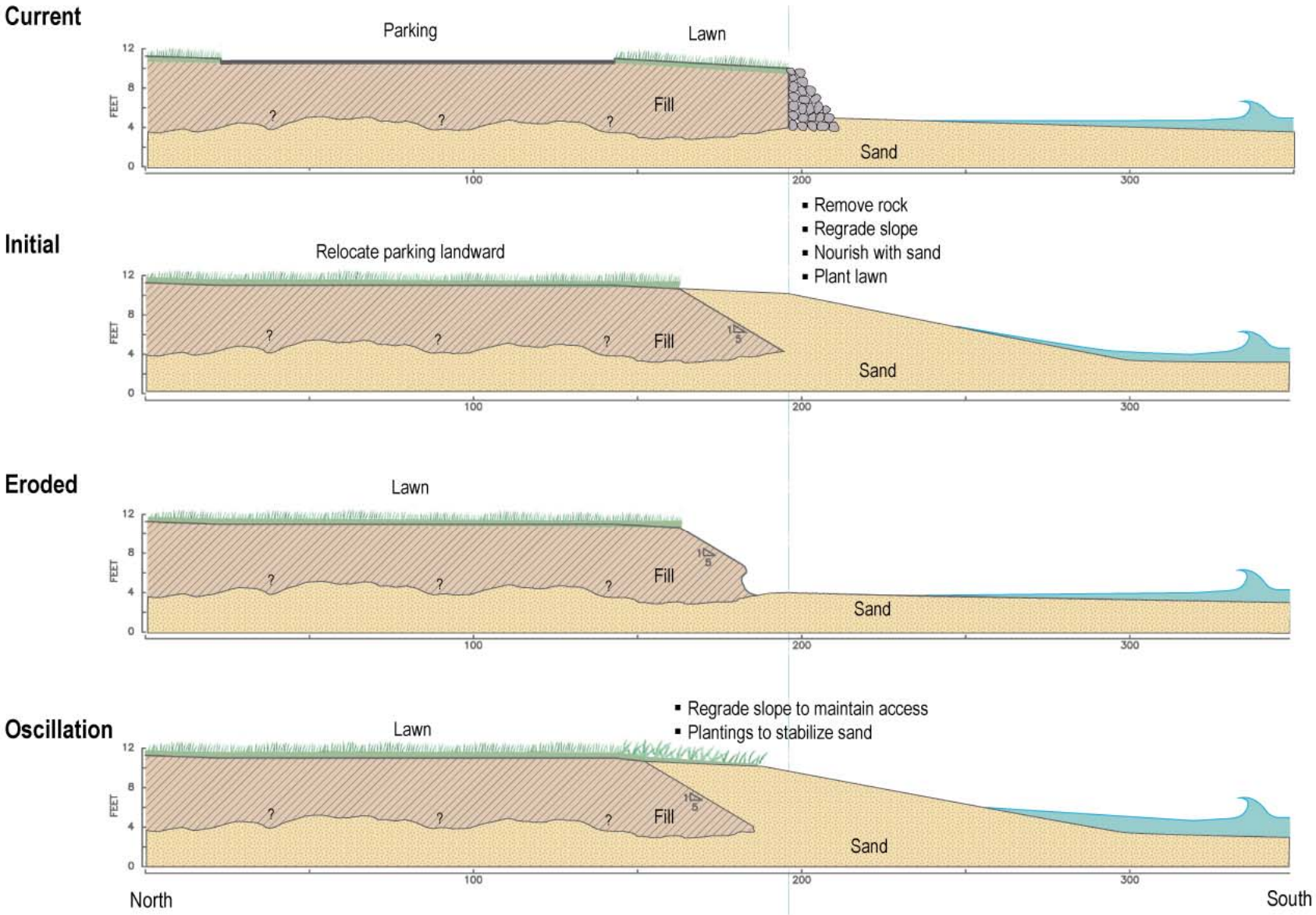

figure 1

Goletta Beach

Evolution of Park Reconfiguration Alternatives

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M E M O R A N D U M

Date:	April 15, 2009
To:	Brian Trautwein
Organization:	Environmental Defense Center
From:	Bob Battalio, PE, David Revell, PhD, Jeremy Lowe
PWA Project #:	1960.00
PWA Project Name:	Goleta Modeling Review
Subject:	Final Memo on Goleta Beach Modeling Review
Copy(ies) To:	

GOLETA BEACH MODELING REVIEW

1. PURPOSE

The County of Santa Barbara is pursuing a permeable pile groin constructed on the beach coincident with the pier at Goleta Beach County Park. In January 2008, the County applied to the California Coastal Commission (CCC) for coastal permits to build the groin project (CDP No. 4-08-006). The CCC reviewed the County's permit application and determined the permit application lacked information about a variety of issues including other alternatives, environmental impacts and modeling. The County has conducted engineering modeling of the Goleta Beach Pile Groin Project and other alternatives to ascertain their relative effectiveness at protecting the park and their likely environmental impacts such as erosion of down-coast beaches. This work is described in the County's 'Response to Incompleteness Determination' dated July 23, 2008.

Philip Williams and Associates (PWA) has been retained to review pertinent County documents and provide a technical evaluation of the proposed pile groin alternative and engineering modeling. This memo forms the deliverable for that evaluation. PWA has previously reviewed alternative approaches for the County (PWA, 2005), and further developed the Park Reconfiguration Alternative (PWA, 2008) for The Environmental Defense Center and Surfrider Foundation. The evaluation of the proposed permeable pile groin is also informed by PWA's prior work and staff's involvement in research in the area.

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The purpose of this memo is to provide a review of the modeling and a critique of the modeling assumptions and implications of those assumptions. It focuses on the likely effects and effectiveness of the proposed pile groin.

The primary document provided for the review was the County of Santa Barbara's 'Response to Incompleteness Determination' dated July 23, 2008 which included:

> Everts Coastal, 2006, *Sand Retention Concept for Goleta Beach, Santa Barbara County, California*, report prepared for The Chambers Group, August 2006. Referred to as the EC report.
>
> Moffatt & Nichol Engineers, 2007, *Final Draft Report on Shoreline Morphology Study, Appendix A- Sand Retention Concept,* draft report prepared for Chambers Group, January 2007. Referred to as the MNE report.

PWA was tasked with contacting the County and Moffatt & Nichol Engineers to obtain all relevant documents and information relating to the modeling of the Goleta Beach project. Other supporting documents reviewed are referenced at the end of this memo.

2. BACKGROUND

There has been considerable research on Goleta Beach since 2005 which forms the basis of our understanding of how the beach has evolved over the last few decades and the major factors controlling its future evolution (PWA 2005, 2008, Barnard *et al.* 2009). This body of work, including work published after the EC and MNE reports, is pertinent to our evaluation. A summary of the pertinent scientific observations, largely missing from the EC and MNE reports, is given below:

- Over the long term (1870s to recent) average annual long term shoreline change rates for Goleta Beach are less than -7 inches per year (Hapke *et al* 2006, Revell and Griggs 2007). These long term rates are approximate owing to the relatively large variability in shoreline positions, manifested in erosion and accretion periods during beach widths have oscillated (Revell and Griggs 2006).

- PWA (2005) identified the hook-shaped (crenulate) bay planform at Goleta, and the pulsating nature of sediment supply and corresponding beach widths at Goleta. Conceptually, the Goleta Beach shoreline migrates within an envelope of shoreline positions resulting from the balance of sediment supply and transport rates.

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- PWA (2008) identified that the 1943 shoreline was the most landward extent at Goleta Beach observed in the historic air photo record.

- The beaches along Goleta have not exhibited a high long term erosion trend (PWA, 2005), but rather beach widths oscillate in phase with the Pacific Decadal Oscillation (PDO) (Revell and Griggs, 2006).

- Beaches temporarily narrowed by more than 50%, lost more than 60% of sand volumes, and also rotated in response to the 1997-98 El Niño storms (Revell, Dugan, and Hubbard in press, submitted to County during Public Comments on Draft EIR). Beach rotation is a natural response of beaches adjacent to headlands, such as those along the Santa Barbara County Coast, during large storm events and often associated with El Niños. This response reduces longshore sand transport and maintains a narrowed sand beach.

- Sediment transport modeling using DElft3D show similar patterns in longshore transport velocities as observed in beach widths and rotations (Barnard *et al*, 2009; Revell, Dugan and Hubbard, in press).

- El Niño storms come from a more westerly direction resulting in a reduced sheltering of Goleta Beach from waves (Adams, Inman, and Graham 2008). During the opposite La Niña phase, storms tend to be shifted northward increasing the wave sheltering and reducing wave energy resulting in wider beaches.

- The causative mechanism for the recent erosion at Goleta Beach has been identified as the propagation of an “erosion wave” (Revell, Dugan, and Hubbard, in press, submitted to County during Public Comment on Draft EIR). After the El Niño, updrift Ellwood Beach remained in a rotated (eroded) position for at least two years after the event. During this period, sand was impounded at Ellwood Beach and the beach widened. The trapping of sand at Elwood Beach reduced longshore transport to downcoast beaches, resulting in erosion at Goleta Beach. This process has been verified by tracking the erosion wave in detailed mapping of shoreline positions over time using aerial photographs. Historic cross-shore profiles also show a pulse of sand arriving at Goleta Beach in 2005 following which the beach at Goleta had largely recovered its ability to buffer erosion (Coastal Frontiers 2006; Barnard *et al*, 2009). Currently, the erosion wave has continued to propagate downdrift affecting Arroyo Burro, Shoreline Park and is currently located at Ledbetter Beach on its way to the Santa Barbara harbor.

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In addition there are other considerations, including those related to the historic stakeholder process, which are pertinent to the evaluation:

- PWA (2005) described the concept of placing infrastructure landward of the "Coastal Erosion Hazard Zone," defined as the landward edge of the envelope of historic shoreline positions, as a more sustainable and lower cost approach. The Beach Stabilization Alternative, with several "sand retention structures" was found to require substantial ongoing nourishment and was expected to increase downcoast erosion during low-sediment-supply periods. PWA (2005, 2008) also showed that the Park Reconfiguration Alternative was less expensive, and had a lesser adverse effect on downcoast beaches than the shoreline stabilization project, and allowed maintenance of an adequate recreational beach and lawn.

- PWA (2008) also questioned the County's findings (Chambers Group, 2007) that (a) a massive beach fill and groin project would be cost-competitive with managed retreat, and (b) that a groin would not cause downcoast erosion.

- Prior studies have shown that pile supported piers affect nearshore morphology. For example, a pier in North Carolina was found to affect the nearshore within a distance of 1000 feet on each side of the pier, and out to the end of the pier which is about 1800' from shore (Miller, Birkemeier and DeWall, 1983). During uni-directional sand transport, accretion on the updrift side and erosion on the downdrift side has been found. Also, rip-current formation tends to occur near the pilings, and extend beyond the surf zone. The effect of the pier on nearshore depths and shoreline morphology was found to change markedly with changing wave conditions. These processes of localized depth changes and rip current formation were not modeled for Goleta, and the downdrift erosion was not identified. The modeling did not characterize the amount of fluctuation in the shore due to varying wave conditions.

- In addition to the above reports specific to Goleta Beach and vicinity, there are numerous other reports that address groins, piers and permeable groins. A more detailed review of the literature may provide information useful to the evaluation of the proposed structure at Goleta Beach. For example: "Permeable groin structures permit some sand to pass through the groin, but experience has shown that such structures are generally ineffective and are difficult to design, operate and maintain. (Page 4, USACE, 1981)".

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3. COASTAL GEOMORPOHOLOGY

Coastal geomorphology is an important part of any coastal engineering endeavor, and is addressed by the EC report. Overall, we find the EC report to be a very useful analysis and contribution to the body of work addressing littoral processes at Goleta Beach. However, we disagree with the analysis and findings in several key areas, as follows.

The report does not adequately address fluctuations in sediment supply and beach width identified in PWA (2005) and Revell and Griggs (2006). The report also does not address the effect of the rock outcrop at the west end of Goleta Beach, even though it affects the shoreline position and can be analyzed as a short groin or small headland, and is an important feature in assessment of the performance of the managed retreat alternative. The EC report also does not address the effect of a reduced ebb-tide delta resulting from the filling of Goleta Slough, as identified in PWA (2005) and Revell and Griggs (2006), as a potentially important factor in shore erosion at Goleta Beach. These oversights reduce the utility of the EC report.

The EC report is an important factor in the MNE approach and is used to substantiate the modeling results. This is evident by review of Figure 3 in the MNE report which is from EC and not a result of modeling. The predicted shoreline is approximate and in our opinion over-predicts the widening of the beach significantly. This can be seen by reviewing Figure 8 of the EC report, where the proposed Beach Stabilization Alternative is off the left side of the graph, based on extrapolation, and the existing Goleta Bay planform plots well above the “best fit” line. The result is that the new shoreline could be oriented more to the west (larger “alpha” on the vertical axis of Figure 8) and the Park shoreline would not widen appreciably beyond the existing shoreline. Moreover, the EC report does not address a major difficulty in applying the crenulate bay data, which is identification of the headlands defining the planform. We therefore do not agree with the estimate shoreline positions or uncertainty provided by the EC report.

We note that the EC report (Figure 9) predicts that the beach at the west end of Goleta Beach would widen at least twice as much at the groin. This finding conflicts with our judgment and is uncertain based on the empirical data, and hence is not supported by this review.

The EC report does not address the mechanism of scour around piles or scour aggregating into a channel leading offshore as a mechanism for rip-current formation, and impact to nearshore bars, wave patterns and offshore transport, including down-coast erosion (Miller *et al*, 1983).

The conditions at the Goleta Pier and other piers in the vicinity were not surveyed to assess their affects.

The assertion that it is relatively easy to add and remove piles to "tune" the permeability of the groin is not substantiated by the EC report. Also the report does not provide a way of assessing whether the adaptive management actions are needed or effective other than to generally add more piles if more sand trapping is desired, etc. The quantitative connection between geometric permeability and sand transmission is not sufficient to assess feasibility or to form a basis for shoreline evolution modeling.

We note that the EC report also states great uncertainty associated with permeable groins, and hence feasibility seems to hinge on the weak conceptual model and associated adaptive management strategy of adding or removing piles. We therefore find that the report asserts feasibility beyond a level substantiated by the findings.

We do agree that the permeable groin would make an interesting experiment that may provide useful information for coastal zone engineering and management in California.

4. MODEL BOUNDARIES AND INPUT PARAMETERS

The GENESIS model was used to simulate changes in shoreline morphology (Moffatt & Nichol, 2007). This is a one-line numerical model that calculates longshore sediment transport and shoreline change as a result of sediment inputs and outflows and differences in nearshore wave breaking over space and time. The modeling areas and input parameters used for the model are described in Section 5.2 of Moffatt & Nichol (2007).

The set up of the model in terms of input parameters should mimic the prototype system as closely as possible, in particular

- temporal variations in the sediment input should be represented;
- temporal and spatial changes in wave conditions should be represented.

From the observations that are described in Section 2 of this memo, sediment input varies over time and is controlled both by conditions at Ellwood Beach and by the phase of the PDO. The model, as set up, has a number of assumptions that reduce its ability to represent the sediment transport system at Goleta Beach:

1. The western boundary of the model is Deveraux Point (Coal Oil Point) (Moffatt & Nichol 2007, Section 5.2.1). This is down drift of Ellwood Beach. The impoundment of sand and rotation of the beach at Ellwood Beach during an El Niño, which initiates an erosion wave that migrates downdrift starving Goleta Beach (Revell, Dugan, and Hubbard, in press), cannot be reproduced in the model. Similarly the episodic release of sand from Ellwood Beach to Goleta Beach will not be

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modeled. A time-varying boundary condition could be used to better approximate the actual sediment supply over time, and hence the coastal response in the Goleta Beach area.

2. The "erosion wave" and pulses of sediment could have been represented in the model by varying the sediment input at Deveraux Point over time. However, the net longshore transport in the model is "specified to be the order of 300,000 cy per year to the east" (Moffatt & Nichol 2007, Section 5.2.6). So rather than pulses of sediment moving through the system, a steady supply is provided to Goleta Beach in the model. The known variability in the sediment supply is therefore not represented in the model.

3. The rate at which sediment is moved through the model is dependent upon the wave conditions that the model uses. The wave conditions used to drive the model are from June 2002 to June 2006. This four-year set of waves is then repeated to represent conditions over longer periods (Moffatt & Nichol 2007, p4-15). The variability in wave conditions related to changes in the PDO index are not represented (Adams *et al*, 2008); this time period did not capture a moderate or strong El Niño event. Rather the wave conditions used represent short-term average wave conditions without the El Niño events. As a consequence, the cylic movement of the "erosion wave" through the model is not modeled.

4. The modeled sand volumes and transport rates result in a continuous, net deficit to Goleta Beach. However, this presumed sediment budget is incorrect based on comparison of published sediment records that show a fluctuating net sand supply and volume, with the long term net (accretion or erosion) being small relative to the fluctuation. In other words, the modeled conditions are conceptually opposite of the actual conditions: a steady, long-term trend of erosion versus episodic pulses.

5. The model calibration and verification are weak. Some of the model runs indicate extensive erosion at Campus Beach, while others do not. The rock headland adjacent to the western parking lot is shown to erode rapidly and therefore appears to not be modeled correctly.

6. The MNE reports estimates that about 500,000 cubic yards of sand will be placed to widen the beach by up to 200 feet. The modeling starts with the sand distributed throughout the profile, out to closure depth. However, most beach nourishment results in a steeper nearshore profile with most sand placement nearshore. The subsequent cross-shore adjustment by waves distribute the sand over time. This cross-shore adjustment, adjustment timeframe and amount of sand placement to achieve the initial, theoretical shoreline are not addressed clearly, especially

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considering the strong unidirectional transport, and appear to provide an optimistic assessment by assuming all 500,000 cubic yards are perfectly distributed at the start of the model tests.

The net result of the choice of model boundaries input parameters is to average the sediment input and wave conditions and not properly represent the pulses of sediment and "erosion wave" documented by Revell, Dugan, and Hubbard (in press). The important process of beach oscillations shown in episodic erosion and accretion events at Goleta Beach, due to the down drift movement of the "erosion wave", is therefore not represented.

The consequence of this is that alternatives, such as managed retreat and the Park Reconfiguration Alternative described by PWA in 2005 and 2008, that rely on the variability of the natural processes and a dynamic shoreline (i.e. regular pulses of sediment) are not properly represented. Alternatives that rely on a more fixed shoreline due to the trapping of sand by structures will perform better in the model given the inappropriate averaging of sediment supply and wave conditions. This is shown by the modeling of the existing condition which shows continual erosion when the beach is known to build out periodically. The model may therefore be unreliable in predicting shoreline changes under future conditions.

To properly model the "erosion wave" would require an unsteady boundary condition at the western boundary, and a coincident, unsteady wave input data. Neither of these appears to have been specified. The unsteady modeling should be verified by comparison with shoreline position and sediment budget data for the range of conditions pertinent to Goleta Beach. This has not been done in this study, although USGS modeling shows a variety of sediment transport changes for the same study area (Barnard *et al* 2009). Therefore, the ability of the GENISIS model to predict shoreline response at Goleta Beach is unknown. More than likely, the model is not accurate.

5. MODELING OF THE PILE GROIN

The modeling of the pile groin relies on the correct representation of the given structure in the model. The performance of a pile groin is very difficult to anticipate and this fact is acknowledged throughout the literature (USACE, 1981). The pile groin that is represented in the GENESIS model is sketched in Everts (2006, p25-26) who provides a preliminary guess on the size of structure required to retain the desired 200ft salient (Everts 2006, p.27). The permeability of the pile groin in Everts (2006) is defined as a function of the physical dimensions of the structure:

$$\frac{\text{open area}}{\text{total wetted cross - sectional area}}$$ (Everts 2006, p24)

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which will be inversely proportional to flow resistance through the structure and is specified at 35%.

In the GENESIS model, as reported in Moffatt & Nichol (2007), the permeability of the groin is specified differently as:

$$\frac{\text{sand passing through the structure to the downcoast side}}{\text{total amount of sand}}$$ (Moffatt & Nichol 2007)

and again is specified as 35%. These two definitions of permeability lead to confusion as to the performance of the structure being modeled. Sand transport is not shown to scale linearly with percent opening in either the EC or MNE reports, and the effect on currents is not explicit in these definitions. The GENESIS model is not a test of the dimensions or layout of the structure, but rather it is its anticipated performance assuming that it performs to specification. The modeling is therefore a test of "what happens if you reduce the transport rate by 65% at a particular location along the shoreline" rather than "will this structure perform as specified".

There are two missing steps in the modeling. The first, acknowledged in the reports (Everts 2006, p27), is determining what structure will give 35% permeability in terms of sediment trapping. The Everts (2006) report recommends detailed analysis on the design of the structure but there is no evidence that this was undertaken for the Moffatt & Nichol (2007) report.

Physical modeling has been undertaken on other pile groins, which was recommended in the EC report, but never completed. This has generally been with fixed bed models (e.g. Trampenau *et al*, 2004) which model the effect of the structure on the longshore current velocity and from that infers the impact on sediment transport. Fixed bed models will therefore not provide answers on how much the sediment transport rate is reduced nor on how the beach plan shape will evolve. However, modeling pile groins in a movable bed model is much more problematic.

The scaling of material in mobile bed models is generally related to the velocity at which the material settles in water. This is not usually the same scale as that used for the dimensions of the structure. As a consequence mobile material will tend to be relatively larger in the model than in reality. Due to non-linearities associated with reduced scale hydraulic models, wave-induced sediment transport through structures cannot be accurately scaled. This is not so much of a problem with modeling open beaches or continuous structures such as impermeable groins or sea walls. It is a problem where the physical interaction of the structure and the mobile material needs to be reproduced (i.e. how much sediment will move through the pile structure versus how much will get trapped).

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The use of field evidence seems to be the most pragmatic course, coupled with an adaptive management process that will allow the pile groin to be "fine-tuned" following construction. However that adaptive management process may be difficult to implement at Goleta Beach given its particular sediment transport regime.

The second missing step is to determine the down drift impact of not achieving the specified permeability, resulting in actual permeabilites either above or below 35%. Qualitatively:

- if the groin is too impermeable, then sand will be deflected offshore by the structure and not return directly onshore, the result will be downdrift erosion in the lee of the structure;

- if the groin is too permeable, then sand will not be trapped and the updrift fillet will be smaller than anticipated.

6. ADAPTIVE MANAGEMENT OF THE PILE GROIN

Everts (2006, p27) suggests that the "pile groins, especially wide ones, are flexible in the sense they can be tweaked after construction". It is suggested that a pile alignment and pattern be developed that could later be altered by, most probably, removal of some piles. This requires some quantifiable parameter which can be used to judge the performance of the groin. Everts (2006, p.28) appears to suggest using dynamic equilibrium beach width. This would account for the natural variability in beach width in the long–term. Piles would be added or removed until an acceptable dynamic equilibrium beach width had been achieved.

At Goleta Beach, however, this natural beach variability is associated with coherent pulses of sediment or "erosion" and "accretion" waves and the PDO index affecting wave climate (Revell, Dugan, and Hubbard in press, Revell and Griggs 2007). The variability in beach width therefore occurs over periods of decades. Fine-tuning the pile groin will therefore be made very difficult as the wave energy and sand supply climates change over time. It may be that fine-tuning becomes an ongoing process of adapting to changing conditions to minimize downcoast sand supply impacts. Essentially, "chasing the tail" of fluctuating shorelines with structural modifications of unknown effect.

7. SUMMARY

1. The GENESIS model as described in Moffatt & Nichol (2007) will not reproduce the long term sediment transport regime as observed at Goleta Beach (Revell, Dugan, and Hubbard in press). The choice of model boundaries, wave conditions and sediment input does not allow the decadal variability in sand transport to be represented.

2. A pile groin has been described in Everts (2006) based upon observation of similar structures in the field. It is not clear that the pile groin described has been properly represented in the GENESIS model. It is further unclear how the detail design of the pile groin will be undertaken. At present only its performance has been specified, not its structure.

3. The modeling is not adequate to predict the performance of the proposed groin. The effects and effectiveness of the proposed groin are unknown.

4. The proposed adaptive management strategy of removing or adding piles has no quantified basis and hence is difficult to support other than in theory. We do not think the adaptive management concept mitigates the risk of poor performance and adverse environmental effects.

5. The massive beach fill of 500,000 cubic yards is the element of the proposed project that affects the shoreline evolution modeling.

8. IMPLICATIONS

1. The feasibility of attaining the desired beach response with the permeable groin is unproven and dubious.

2. The future shoreline evolution predictions are likely erroneous, and misleading.

3. The Beach Stabilization Project is not likely to perform as presented in the MNE and EC reports. The Beach Stabilization Project may induce erosion downcoast; will likely require massive additional sand placement to protect “the lawn” and other park amenities, and will require extensive resources to adaptively manage the park with structural modifications of unknown effect.

4. The County’s assertion that the project should be permitted on the basis of this technical modeling is not, in our professional opinion, valid: the Permeable Groin is experimental, and the Beach Stabilization Project description is erroneous in terms of effects and effectiveness.

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Memo

May 11, 2009

To: Brian Trautwein, Analyst - Environmental Defense Center
Via: Michael Walther - Coastal Tech
From: Dilip K. Barua, Ph.D. - Coastal Tech

Re: Comments on the Goleta Modeling Review

This Memo is:

- in response to a request to the *Surfrider Foundation* Environmental Issues Team (EIT) for "peer review of the Philip Williams and Associates critique of Santa Barbara County Parks Department's modeling of the Goleta Beach groin project";
- rendered on behalf of the Santa Barbara Chapter of the *Surfrider Foundation* and solely reflects the cited professional coastal engineering opinions based on review of documents as provided by EDC and as referenced below;
- to provide comments relative to the efficacy of the GENESIS modeling as reflected in the memo titled "Goleta Modeling Review" (dated 03/15/2009) prepared by Philip Williams Associates (PWA); and the report titled "Draft Report: Shoreline Morphology Study – Goleta Beach County Park Long-term Plan" (dated 01/05/2007) prepared by Moffatt & Nichol (M&N).

In general, relative to the fundamental issues at hand, the GENESIS modeling results appear to be inadequate for this particular application due in part to anomalous El Niño storm effects. Additionally, reviews indicate that an alternate modeling strategy involving "sensitivity analysis" would likely have yielded a more broad range of feasible results within the limitations of GENESIS. In any event, it is likely that, even based upon the M&N analysis, the permeable pile-groin is likely to adversely affect the downdrift beaches.

Please note the following:

General: GENESIS is applied by M&N as the modeling tool to study beach processes and erosion, and for assessment/optimization of remedial alternatives. Available literature shows that Goleta Beach has suffered from episodes of high erosion during El Niño events.

The PWA review as well as the M&N report have rightly pointed out that the beach morphology is affected both by regular westerly swells and by anomalous El Niño conditions. The effects of El Niño, caused apparently by water level change, and enhanced wind and wave activities are responsible for beach erosion along the eastern Pacific shorelines (see, for example, Rivas, 1993; Arciniega et al, 2003).

The applied USACE software GENESIS is a line model suitable for investigating long-term and large-scale shoreline trends. It is based on the assumptions that cross-shore profiles remain constant during the simulation period; the translation (retreat or advance) of shoreline in time, therefore, results solely from changes in longshore transport rates (see, Hanson and

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Kraus, 1989). GENESIS is not the right tool to simulate shoreline changes caused by anomalous wave activity such as during El Niño events. While M&N recognizes the importance of El Niño or Pacific Decadal Oscillation (PDO) Index (see M&N report, section 3; note the typographical mistake in Chapter numbering), it appears that software limitations or other constraints have prevented them from including it. Line models use boundary forcing of time-series wave data in frequency bands. In other words, real time series is partitioned or folded into height, period and directional bins with different frequencies of occurrence. This is suitable for ensuring run-time efficiency, and is adequate for simplified line-model formulation.

The calibration of GENESIS (Figures 23 and 24, M & N report) appears weak; calibration perhaps could have been tweaked and improved somewhat using a finer grid (model alongshore grid spacing is 100 m, page 4-10). But experience shows that line-model calibration can only be tuned to a certain limit. The M&N statement (page 4-14); "*The calibrated parameters can predict the trends of shoreline change and transport fairly well with the measured data in the verification period.*" is probably an optimistic overstatement.

PWA Memo: The following comments relate to the PWA Memo dated March 15, 2009:

Section 3: Model Boundaries and Input Parameters

1. For such a morphologically active region, the selection of Deveraux Point as a model boundary is not an ideal choice. However, the boundary is far from the area of interest. The modeler could have made some sensitivity runs to resolve the issue following a "gated or pinned-beach" boundary approach.

2. Specification of 'erosion wave' or 'pulses of sediment transport' is not straightforward because, as discussed, boundary conditions are specified in frequency bands. Again judgments and sensitivity runs could likely resolve this issue.

3. The specification of wave conditions is made in frequency bands – therefore, it is the limitation of the software that seems to have prevented the modeling effort in including time-series. GENESIS is neither ideal, nor suitable for specifying real time-series. The software is developed to analyze a portion of the physical processes (in this case only the littoral transport and the resulting shoreline change) under simplified assumptions. The M&N report should have provided the used wave and water level data either in the form of a table and/or as a graph; none of this is presented.

Section 4: Modeling the Pile Groin

There are numbers of issues in the design and assessment of structures – resolution, diffraction and permeability (ability to let sand flow through the structure). Apart from software constraints, success depends on the modelers' skill and creativity. There is a large difference between the permeability in terms of relative water area and that in terms of relative sand passing. Whether a permeability number of 35% is applicable for the pile configuration is debatable – the number should have come from laboratory tests or from

physical modeling. In such absence, sensitivity runs could have provided a more broad range of feasible responses. On permeability, the M&N report shows that the Goleta Pier permeability coefficient is 0.8, (Page 4-5, Table 6), while the sand retention structure (no configuration is presented or designed!) is modeled with a permeability coefficient of 0.35. The M & N statement in page 4-23, "*.....this structure appears to meet the objective of widening the beach and stabilizing the shoreline position of the long-term, while not inducing downcoast erosion.*" is neither substantiable by model results using only one permeability coefficient, nor intuitively justifiable. If the structure lets only 35% of sand to pass through, simple sediment budget analysis suggests that, the beach immediately downcoast of the structure would face sediment deficit and probable erosion.

If you have any further questions, or if we can assist you further, please contact us.

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Brian Trautwein

From: j_dugan@lifesci.ucsb.edu
Sent: Wednesday, May 20, 2009 3:42 PM
To: Brian Trautwein
Cc: David Hubbard; David Revell
Subject: Re: comments to CCC
Importance: High
Attachments: Airoldietal05.pdf; VaselliBulleriCecchi08.pdf; BulleriAiroldi05.pdf; WalkerSchlacherThompson08.pdf; Page et al. MEPS 2006.pdf

Hi Brian,

Sorry for my slow replies to your queries. A bit under water here already and then not one but two family crises have arisen since our return.

I think that narrower beaches will provide less intertidal habitat. Thus habitat loss is an issue to be considered for beach animals of all types (invertebrates, fish, birds) with expected impacts to biodiversity, abundance, biomass, and prey availability as well as spawning, foraging and roosting habitat. However whether the beaches downcoast of a groin or other shore-normal structure would lose upper beach zones disproportionately as predicted for beaches in front of a seawall or revetment is a good question.

What I think may be of immediate concern would be the loss of upcoast sources of colonists and propagules to replenish the narrowing beaches in the lee of a shore-normal structure. Beaches that are dependent on upcoast sources to regenerate after normal seasonal changes and beach erosion/accretion cycles will not recover very quickly, if at all, if the upcoast sources of colonists (and sand) are cut off by a groin of any type. The longshore dominated beach ecosystems of the Santa Barbara coast appear to be very dependent on a connection to upcoast sources of colonists and propagules (as well as sand) e.g. beaches where animals can survive the winter and then repopulate the rest of the coastline via littoral transport. Goleta beach has the potential to be one of these key source areas if managed to maintain the invertebrate populations and habitat quality over the winter months and its up and downcoast littoral connections.

In addition, a permeable groin will very likely act to catch large quantities of wrack and other drift material on the upcoast side (west of the pier), not only starving the downcoast beaches of wrack subsidies but creating a potentially undesirable conditions for beachusers, fishermen, and marine life in the form of a dense tangled matrix of drift algae and material that will probably decompose in place. This decomposition will lower oxygen content of the water and sediments, creating anoxic conditions that will be harmful to marine life. Our research suggests that input rates of marine macrophytes to beaches is very high in the Goleta beach and UCSB campus area. We estimated a deposition rate of >500 kg wet weight per meter of shoreline per year based on late summer estimates in 2002. This is likely quite conservative. The actual amount of drift algae that lands on the beaches is likely higher and as the kelp forest in Goleta Bay recovers, can only be expected to increase.

Lastly, Groins and other artificial structures may harbor a higher proportion of exotic marine organisms. including algae and invertebrates, than natural structures. This could include the exotic kelp, Undaria, and other species of concern. This has been studied in the Mediterranean, some reprints are attached. Santa Barbara Harbor and the offshore oil platforms, including platform holly, harbor numerous

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exotic/invasive marine species already.

I also think that human (wader and swimmer) safety in the more turbulent and potentially hazardous currents and holes created by a permeable groin need to be addressed explicitly in any analysis of this alternative.

Thanks for your efforts to inform and improve this process.

Best wishes,

Jenny

Artificial marine structures facilitate the spread of a non-indigenous green alga, *Codium fragile* ssp. *tomentosoides*, in the north Adriatic Sea

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KEYWORDS
biological invasions * *Codium fragile* ssp. *tomentosoides* * facilitation * hard coastal defence structures * recruitment * urbanization * wave exposure

Summary

* 1.
* Artificial structures have become ubiquitous features of coastal landscapes Although they provide novel habitats for the colonization of marine organisms, their role in facilitating biological invasions has been largely unexplored.
*
* 2.
* We investigated the distribution and dynamics of the introduced green alga, *Codium fragile* ssp. *tomentosoides*, at a variety of spatial scales on breakwaters in the north Adriatic Sea, and analysed experimentally the mechanisms underlying its establishment. We assessed the provision of sheltered habitats by breakwaters, the role of disturbance (e.g. from recreational harvesting and storms) acting at different times of the year, and the interactions between *Codium* and the dominant native space-occupier, the mussel *Mytilus galloprovincialis*.
*
* 3.

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* *Codium fragile* ssp. *tomentosoides* has established viable populations on artificial structures along the shores investigated. The density, cover and size (length, branching and weight) of annual erect thalli of *Codium* was enhanced in sheltered conditions, resulting in the monopolization of landward low-shore habitats of breakwaters.

*

* **4.**

* On the landward sides of breakwaters, disturbance enhanced recruitment of *Codium*. The time when bare space was provided within mussels beds was crucial. Removal of mussels in April or January did not affect the recruitment of *Codium*, whereas harvest in August, shortly before *Codium* gamete release, doubled its success. On the seaward sides of breakwaters, the effects of disturbance were more complex because mussels both inhibited recruitment of *Codium* and provided shelter from wave action to adult thalli.

*

* **5.**

* *Synthesis and applications*. Artificial structures can provide suitable habitats for non-indigenous marine species and function as corridors for their expansion. Physical (wave exposure) and biotic (resident assemblages) features of artificial habitats can be important determinants of their susceptibility to biological invasions. Alternative options in the design of artificial structures and effective management of native assemblages could minimize their role in biological invasions. In particular, increased water motion and retention of space by mussels in spring-summer would be effective in reducing the ability of *C. fragile* ssp. *tomentosoides* to persist on the breakwaters investigated in this study.

*

Received 25 March 2005; final copy received 20 July 2005 Editor: Phil Hulme

DIGITAL OBJECT IDENTIFIER (DOI)

10.1111/j.1365-2664.2005.01096.x About DOI

EXHIBIT 21
CDP 4-08-006 (SB County)
Memorandum to EDC by Dr. Jenny Dugan, 5/20/09

Exhibit 22

Ex Parte Communications
By
Commissioners

WEDNESDAY, JUNE 10, 2009 (CONT'D)

DISCLOSURE OF EX PARTE COMMUNICATIONS

Date and time of receipt of communication:
June 3, 2009 @ 11am

Location of communication:
By Phone

Type of communication:
Conference Call

Person(s) initiating communication:
Susan McCabe, Dave Ward, Anne Blemker

Person(s) receiving communication:
Bonnie Neely

Name or description of project:
Application No. 4-08-006 (Santa Barbara County, Goleta Beach) Application of Santa Barbara County to construct 500-ft. long, 20-ft. wide, permeable pile sand retention system as addition to existing Goleta Beach Pier consisting of 250–330 timber piles (18" to 20" in diameter) and timber decking, seasonal installation of approximately 1,200-ft. long, 3-5 ft. high winter sand berm; removal of approximately 1,500 linear ft. of existing rock rip rap up coast of Goleta Pier; and implementation of beach nourishment program involving initial offshore dredging of approximately 500,000 cu.yds. of sand and placement of dredged material on beach up coast of pier for beach nourishment with additional periodic offshore dredging/beach nourishment on as-needed basis not exceeding 100,000 cu.yds. of material per year, at 5986 Sandspit Road, Goleta Beach County Park, Santa Barbara County.

Detailed substantive description of the content of communication:
(Attach a copy of the complete text of any written material received.)
I received a briefing from the project representatives in which they described the permeable pier project and informed me that they are still working with staff to resolve some outstanding issues related to monitoring and funding conditions. They described the extensive erosion occurring at Goleta Beach Park and the need to find an innovative solution to protect the existing recreational facilities. They described the mechanics of the proposed permeable pier system and how the beach would build up over time. The representatives described their efforts to work with staff and to respond to concerns raised in their multiple incomplete letters. In response to staff comments, the County modified their proposal to remove the rip rap on the up coast end of the park and instead construct a temporary winter berm. Remaining concerns relate to costly additions to the monitoring program and a requirement to set aside funding for the removal of the permeable pier at the outset of the project. The representatives were hopeful to work out as many issues as possible with staff prior to the July 2009 hearing.

Date: June 3, 2009

Signature of Commissioner: Bonnie Neely

RECEIVED
JUN 04 2009
CALIFORNIA
COASTAL COMMISSION
SOUTH CENTRAL COAST DISTRICT

FORM FOR DISCLOSURE OF EX PARTE COMMUNICATION

Date and time of communication: Monday, June 1, 2009, 11:00 am

Location of communication: Monterey Office

Person(s) initiating communication: Margie Kay & Sarah Corbin (ORCA)

Person(s) receiving communication: Dave Potter

Name or description of project: Santa Barbara County/Goleta Beach (postponed)

Description of content of communication:

Explained they continued will brief later when item returns to Commission.

6/2/09
Date

Dave Potter
Signature of Commissioner

If the communication was provided at the same time to staff as it was provided to a Commissioner, the communication is not ex parte and this form does not need to be filled out.

If communication occurred seven (7) or more days in advance of the Commission hearing on the item that was the subject of the communication, complete this form and transmit it to the Executive Director **within** seven (7) days of the communication. If it is reasonable to believe that the completed form will not arrive by U.S. mail at the Commission's main office prior to the commencement of the meeting, other means of delivery should be used, such as facsimile, overnight mail, or personal delivery by the Commissioner to the Executive Director at the meeting prior to the time that the hearing on the matter commences.

If communication occurred within seven (7) days of the hearing, complete this form, provide the information orally on the record of the proceeding and provide the Executive Director with a copy of any written material that was part of the communication.

From: Jennifer Minnehan [mailto:jminnehan@mccabeandcompany.net]
Sent: Thursday, May 21, 2009 11:59 AM
To: Pat Kruer
Subject: Site visit request

Pat:

Good afternoon. Please see the request below. If you are unable to do a site visit then we would like to set a call.

We also need to set a call re: Goteta Beach.

Please advise if you are planning to attend everyday of the June 2009 California Coastal Commission meeting. If so, we would like to request and schedule an ex parte to discuss the Santa Monica Mountains Conservancy (Conservancy) and Mountains Recreation and Conservation Authority (MRCA) project and offer a site tour via road trip or helicopter.

The Conservancy and MRCA have submitted an amendment (MAL-MAJ-1-08) to the City of Malibu Local Coastal Program (LCPA) pursuant to the LCP "Override" procedures in Coastal Act Section 30515, following rejection of the LCPA by the City of Malibu.

As submitted by the Conservancy and MRCA, the LCPA:

- Enhances PUBLIC ACCESS to coastal parks in Malibu
- Connects 5 coastal parks through 6 miles of new Coastal Slope Trail
- Connects existing OTDs and the California Coastal Trail on the beach to Backbone Trail via 3.5 miles of new public trail
- Creates ADA-accessible Parking
- Creates ADA-accessible Restrooms
- Creates 29 "cold" campfire campsites including ADA-accessible

A briefing packet with additional information will be sent separately.

Please advise your availability and interest in the site tour.

- Jennifer

Jennifer Minnehan
McCabe & Company
1121 L Street, Suite 100
Sacramento, CA 95814
(916) 553-4088
(916) 397-8523 Cell
(916) 553-4089 Fax
jminnehan@mccabeandcompany.net

FORM FOR DISCLOSURE OF EX-PARTE COMMUNICATIONS

Name or description of the project: **Goleta Beach Pile**

Time/Date of communication: 3/27/09, 3pm

Location of communication: 22350 Carbon Mesa Rd, Malibu

Person(s) initiating communication: Mark Massara

Person(s) receiving communication: Sara Wan

Type of communication: meeting: Phone call

Mark said he was very troubled by how staff was handling this. There would be significant impacts on the downcoast sand and to the ESHA in the lagoon which would be buried. That staff was ignoring this and he didn't understand why. That the County had not done adequate analysis of alternatives, and as usual the ones doing the analysis, Moffet and Nichols, were the ones who would get the job and benefit from this. The analysis needed to be done by an independent entity and it should not ignore the negative impacts of this.

Sara J Wan

Date: 5/28/09

Sara Wan

Exhibit 23

Letters in Support of Project

NOTE: 86 letters in support of the proposed project have been submitted as of 6/25/09. Five of the received letters have been included here for reference.

All letters received are included as part of the administrative record and are available for review in the California Coastal Commission's Ventura Office. Five of the received letters have been included here for reference.

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

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

SANTA BARBARA • SANTA CRUZ

DEPARTMENT OF EARTH SCIENCE

SANTA BARBARA, CALIFORNIA 93106-963
FAX (805) 893-2314

e-dress: sylvester@geol.ucsb.edu

27 May 2009

Mr. John Ainsworth, Deputy Director
California Coastal Commission
South Central Coast District Office
89 South California Street, Suite 200
Ventura, CA 93001-2801

Dear Mr. Ainsworth,

Then Santa Barbara County Supervisor Susan Rose convened a Working Group in 2003 that met numerous times over two years to consider solutions to the erosion problem at Goleta Beach Park. I was the Science Liaison to that 18-member group and as such attended all but one of its meetings. Thus from almost all of the expert testimony and committee discussions, I concluded that:

a) The concept of a permeable pier is the best option to widen the park's beach over time, because will it enhance the beach thereby, and the accumulated sand will protect the park from further erosion during high storm events;

b) A permeable pier will work as has been demonstrated by other such piers, including that at Huntington Beach, and it will allow sand to pass so that beaches are not starved downstream; it can be adjusted or removed after a reasonable trial period if necessary;

c) The concept of managed retreat means permissive shoreline retreat; it focuses on natural beach processes that allow erosion of the Goleta Beach Park, an event that will significantly damage a public amenity;

d) Nowhere has the concept of managed retreat been demonstrated; the beach at Goleta Beach Park is not the place to experiment with such a concept, for if it fails, then a significant value to the community will be irrevocably lost.

I support Santa Barbara County's application No. 4-08-006 before the Commission's 10 June 2009 meeting and urge the Commission to approve it as the best, and viable solution to a serious on-going problem to a unique community asset.

Sincerely,

Arthur G. Sylvester, Professor Emeritus
Geological Sciences

Steve Hudson

From: Tom Blabey [Tom@goletavalley.com]
Sent: Monday, February 25, 2008 12:12 PM
To: Steve Hudson
Subject: Goleta Beach Park: Beach Stabilization/Permeable Pier project application update

Steve,

To follow up my voicemail left Thursday afternoon, the Goleta Valley Chamber of Commerce is very interested to hear how the application process is proceeding for the Goleta Beach Park beach stabilization project.

When do you expect the Coastal Commission will issue a response to Santa Barbara County? Is there a timetable in place yet for a hearing?

Goleta Beach Park plays a major role in the quality of life of Goleta Valley residents of all socio-economic levels. It is a valuable community resource enjoyed by 1.4 million visitors annually.

At the January 22nd Board of Supervisor's hearing in Santa Barbara, we spoke in favor of the permeable pier solution along with a large group including private citizens, community groups, and respected scientists from UCSB. Only two or three speakers, representing the EDC and the Surfriders, spoke against the proposal.

The permeable pier is a compromise solution that is environmentally sensitive and economically practical.

We urge the Coastal Commission staff to recognize the years and millions of dollars already spent to study and review numerous proposals for protecting the park from devastating erosion and hope that the review process continues to move forward without serious delay.

Thank you for your time and effort on this important project. The entire local community is eagerly awaiting news on the future of our park.

Best Regards,
Tom Blabey

Tom Blabey
Director of Public Policy
Goleta Valley Chamber of Commerce
271 N. Fairview, Suite 104

P.O. Box 781
Goleta, CA 93116
P: (805) 967-2500 x103
F: (805) 967-4615
www.goletavalleychamber.com

Dear Coastal Commission

Please [redacted] add my name to those supporting the concept of saving Goleta Beach thru the "permeable pier pile system".

Carol Anderson
1550 N. Fairview Ave.
Goleta, Ca 93117

DOUG & TRACY HART
2045 MONTECITO
SANTA BARBARA CA. 93101

Brenda Cox
939 Walnut Lane
Santa Barbara, Ca 93111

RECEIVED
JUN 03 2009
CALIFORNIA
COASTAL COMMISSION
SOUTH CENTRAL COAST DISTRICT

June 21, 2009

Dear Mr. Ainsworth,

We live in Carpinteria and just today, Fathers' Day, discovered Goleta Beach. We took a hike from the Goleta park to Coal Oil Point and return. What a real treasure!

We support the proposal to replenish the eroding beach west of the pier. Please add our voices to those who desire a return to beach conditions of several years ago.

Very truly yours,

Jim McIntosh

Jean W. Blois
5354 Calle Real 2-C
Goleta, CA. 93111

June 5, 2009

Mr. Jack Ainsworth, Deputy Director
CA Coastal Commission
89 South California Street
Ventura, CA. 93001

Re: Application NO. 4-08-006 (Santa Barbara Coumty, Goleta Beach)

Dear Mr.Ainsworth,

My family and I have used and enjoyed the Goleta Beach for nearly 60 years. My two oldest grandchildren who live in Camarillo declared that Goleta Beach is the best.

I am imploring you to endorse the Santa Barbara County's proposal to replenish the eroding beach and construct additional pilings and deck adjacent to the Goleta Pier – called a "permeable pier piling system".

From 1991 to 2001 I was a director of the Goleta Water Board and am very cognizant of the problems involved with re-locating the various underground piping systems (water, gas & sewer).

The County's proposal is the one proved most environmentally correct without total destruction of this great public park. Goleta Beach is one of the most used in the County.

Please endorse the County's proposal. Thank you!

Sincerely,
Jean W. Blois

Exhibit 24

Letters of Interest: Unspecified Recommendation

NOTE: 78 letters of interest have been submitted which do not clearly indicate either support or opposition to the proposed project have been submitted as of 6/25/09. Five of the received letters have been included here for reference.

All letters received are included as part of the administrative record and are available for review in the California Coastal Commission's Ventura Office.

RECEIVED
JUN 10 2009
CALIFORNIA
COASTAL COMMISSION
SOUTH CENTRAL COAST DISTRICT

DEAR Deputy DIRECTOR Ainsworth

I AM WRITING this in hopes that you will support SAVING GOLETA BEACH County PARK. When I say I am ONE -just one- of over A million who use this BEACH EVERY YEAR - you know it NEEDS SAVING - there is NO PRICE you CAN put ON this PARK

Its priceless!

Joan Erling
Rancho LB Mobile Home Park
LB 93110

Mead

6/2/09

To: Jack Ainsworth

Please, Please, please, save Goleta Beach. It is a wonderful place to build community and we have a responsibility to take care of our community.

The Beach Side Cafe is the only restaurant in S.B. that has delicious food with a gorgeous view of the Ocean.

It would be a huge mistake to allow this important piece of our shoreline disapear!

Dell Barde

RECEIVED
JUN 10 2009
CALIFORNIA
COASTAL COMMISSION
SOUTH CENTRAL COAST DISTRICT

Please Save Goleta Beach

Bob Craig
7189 Emily Ln.
Goleta CA 93117

craigbob@cox.net

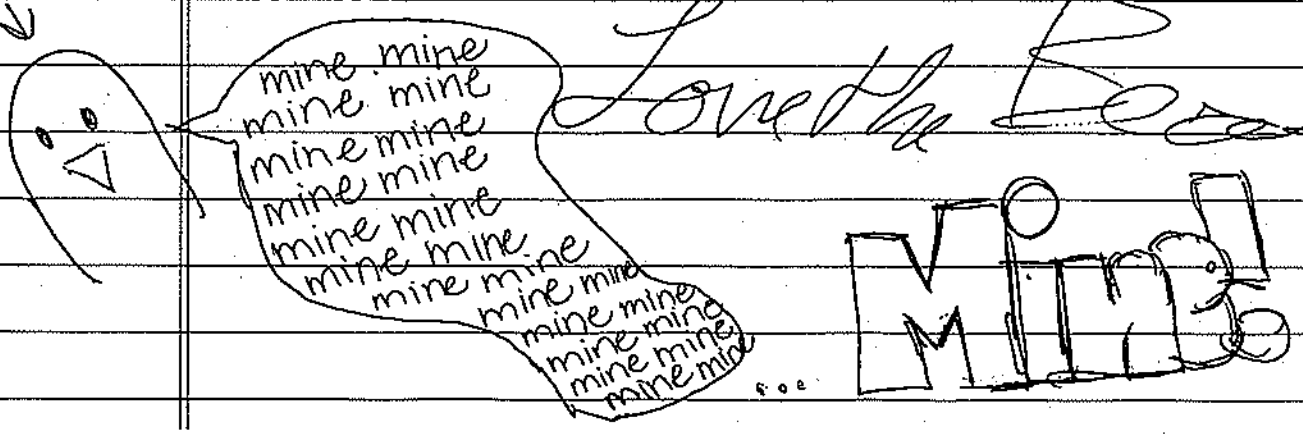
I love seagulls & turtles
so save the freakin beach!

Please save the beach, because I love to make sand castles, and body surf!

Save the [redacted] beach! The ocean is my natural bathroom.....

I love the beach and its animals

Love the Seagull



5/27/09

Dear Jack,

I have lived in Santa Barbara almost forty years and have enjoyed Goleta Beach all that time. Goleta Beach is one of the beautiful, public and free parks accessible for exercise, celebrations or just watching the sunset.

Plese help save Goleta Beach. It is a treasure for the community.

Sincerely,
Jan Anderson
1454 Twinridge Rd.
Santa Barbara, CA 93111

6/3/09

To Whom It May Concern:

We very much would like to continue enjoying the beach here in Goleta.

Hopefully more sand will appear.

Thankfully,

Bonnie Smith
and Dorothy Windholtz

Exhibit 25

Letters in Objection to Project

NOTE: 10 letters in opposition to the proposed project have been submitted as of 6/25/09. Five of the received letters have been included here for reference.

All letters received are included as part of the administrative record and are available for review in the California Coastal Commission's Ventura Office.

More Mesa Preservation Coalition
P.O. Box 22557
Santa Barbara, CA 93121

May 27, 2009

Steve Hudson
California Coastal Commission
89 South California Street Suite 200
Ventura, CA 93001-2801

Reference: Groin Approach to Goleta Beach Erosion

Dear Mr. Hudson,

I am writing on behalf of the More Mesa Preservation Coalition (MMPC), an organization of more than 900 supporters who are committed to the preservation of all of More Mesa in perpetuity. Because of our interest in the totality of More Mesa, including the shoreline below the mesa itself, we are extremely concerned about the proposed permeable groin structure to the issue of beach erosion at Goleta Beach.

I must preface my remarks by noting that I was a member of the Goleta Beach Working Group for the entire time of its operation, about a year and a half. Moreover, I was an active participant in the crafting of the recommendations that were sent to Santa Barbara County at the conclusion of our work. At that time, we proposed two alternatives be studied. However, the "Permeable Groin", a new approach, appears to be the current option of choice, an option that bears no resemblance whatsoever to either alternative the Working Group had recommended. Therefore any statements asserting that this option is the result of a public process are erroneous.

Having read many documents concerning the permeable groin and attended presentations of the consultants proposing this structural approach, I have several grave concerns about this project. These include:

- The GENESIS modeling is very flawed, as it will not reproduce the long term sediment transport regime as observed at Goleta Beach, it does not describe the pile groin accurately, and it does not accurately predict the groin's performance.

- The permeable groin approach has not been implemented anywhere in the world, and therefore has no track record, successful or otherwise. From the material that exists, it appears to be an experimental, expensive and extremely controversial approach.

- Finally, and most importantly for More Mesa, it is clear that down coast erosion has been identified by at least three professional coastal processes engineers and geologists (Dr. Ed Keller of UCSB, Philip Williams and Associates, and Coastal Tech, Inc.) as a very likely result of this type of beach stabilization project.

In summary, the More Mesa Preservation Coalition strongly opposes this project because it will result in significant adverse environmental impacts to both Goleta Beach and, most especially, to the down coast beach below More Mesa. We also believe that there is potential for erosion of the coastal bluffs as well. Therefore, MMPC is advocating for the Park Reconfiguration Alternative prepared by the Surfrider Foundation and Environmental Defense Center. The Park Reconfiguration project is most appealing to us because it both protects Goleta Beach Park and allows for natural coastal processes to occur, resulting in a more stable shoreline, and lessens or avoids many adverse impacts on the environment that would be caused by the permeable pile groin.

Thank you for your kind consideration.

Yours truly,

Valerie F. Olson

Valerie F. Olson
President, Board of Directors
More Mesa Preservation Coalition
964-4815
vfo@mindspring.com

Mr. Ainsworth,

Goleta Beach is a valuable resource to the cities of Santa Barbara and Goleta however the intrinsic value of the central California Coast cannot be ignored. Efforts at saving Goleta Beach must emphasize the importance of natural resources in addition to economic interests. While it is a step in the right direction the "permissable pier piling system" is still ineffect, a seawall. Steps towards preserving the beach through new, ~~forms~~ ~~of~~ more environmentally sound, means is crucial. I urge the coastal comission to explore options such as a submerged breakwater rather than a terristrial form of antierosion construction.

Thank you for your time and service!

Sincerely,

Sarah Barkley

Student and Santa Barbara local

Steve Hudson

From: asmith12@berklee.net
Sent: Tuesday, June 23, 2009 4:57 PM
To: Steve Hudson
Subject: Please Deny Destructive Groin Project at Goleta

Coastal Commissioners

Dear Coastal Commissioners,

I am writing to urge you to deny the Goleta Beach Permeable Pile Groin Project. The Project would trap sand and keep it from reaching down-coast beaches. This would set a negative precedent for coastlines throughout California.

Coastal Experts agree that the groin will cause down-coast beaches to erode and will threaten to erode the Coastal Bluffs. The groin will also damage "Environmentally Sensitive Habitats" in violation of the state Coastal Act.

The less expensive Park Reconfiguration Alternative fully protects Goleta Beach Park without causing down-coast impacts. This alternative should be approved instead of the groin.

Ironically, while the groin project purports to protect access and recreation, the County's files describe plans to charge "parking fees" at Goleta Beach to pay for construction and upkeep.

Please uphold Coastal Policies by denying the Permeable Pile Groin Project and approving the Park Reconfiguration Alternative.

Sincerely,
Alex Smith
409 Regents Park Lane
Noblesville, IN 46062

Steve Hudson

From: LULUDDL@aol.com
Sent: Tuesday, May 26, 2009 10:26 PM
To: Steve Hudson
Subject: THE GOLETA BEACH PILE GROIN SHOULD BE DENIED

1. **The Goleta Beach Pile Groin should be denied.**
2. Coastal Experts agree that the groin will cause down-coast beaches to erode and will threaten to erode the Coastal Bluffs. (Philip Williams and Associates 2008, Coastal Tech (2007; 2009).)
3. The groin will damage "Environmentally Sensitive Habitats" in violation of the state Coastal Act.
4. The less expensive Park Reconfiguration Alternative fully protects Goleta Beach Park without causing down-coast impacts. This alternative should be approved instead of the groin.
5. Ironically, while the groin project purports to protect access and recreation, the County's files describe plans to charge "parking fees" at Goleta Beach to pay for construction and upkeep.

ALLOWING THE GOLETA BEACH GROIN TO ALTER OTHER BEACHES WOULD BE A VERY UNFAVORABLE SITUATION

Thank you,
Lucinda Brisbane
LULUDDL@aol.com
Stinson Beach, Ca 94970

Steve Hudson

From: jeffe7@sbcglobal.net
Sent: Tuesday, June 23, 2009 6:28 PM
To: Steve Hudson
Subject: Please Deny Destructive Groin Project at Goleta

Coastal Commissioners

Dear Coastal Commissioners,

I am writing to urge you to deny the Goleta Beach Permeable Pile Groin Project. The Project would trap sand and keep it from reaching down-coast beaches. This would set a negative precedent for coastlines throughout California.

Coastal Experts agree that the groin will cause down-coast beaches to erode and will threaten to erode the Coastal Bluffs. The groin will also damage "Environmentally Sensitive Habitats" in violation of the state Coastal Act.

The less expensive Park Reconfiguration Alternative fully protects Goleta Beach Park without causing down-coast impacts. This alternative should be approved instead of the groin.

Ironically, while the groin project purports to protect access and recreation, the County's files describe plans to charge "parking fees" at Goleta Beach to pay for construction and upkeep.

Please uphold Coastal Policies by denying the Permeable Pile Groin Project and approving the Park Reconfiguration Alternative.

Sincerely,
Jeffrey Andrews
7075 Heron Circle
Carlsbad, CA 92011